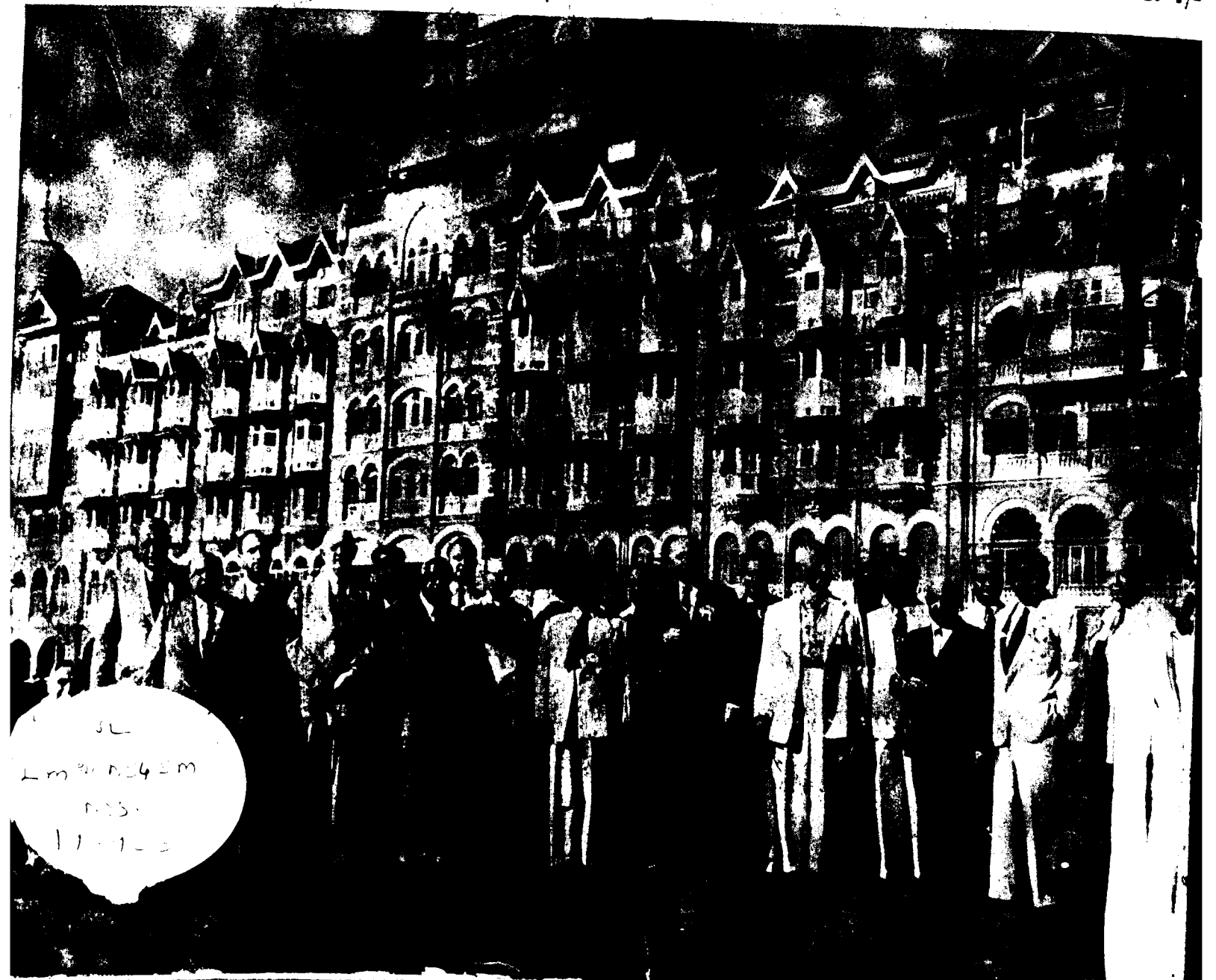


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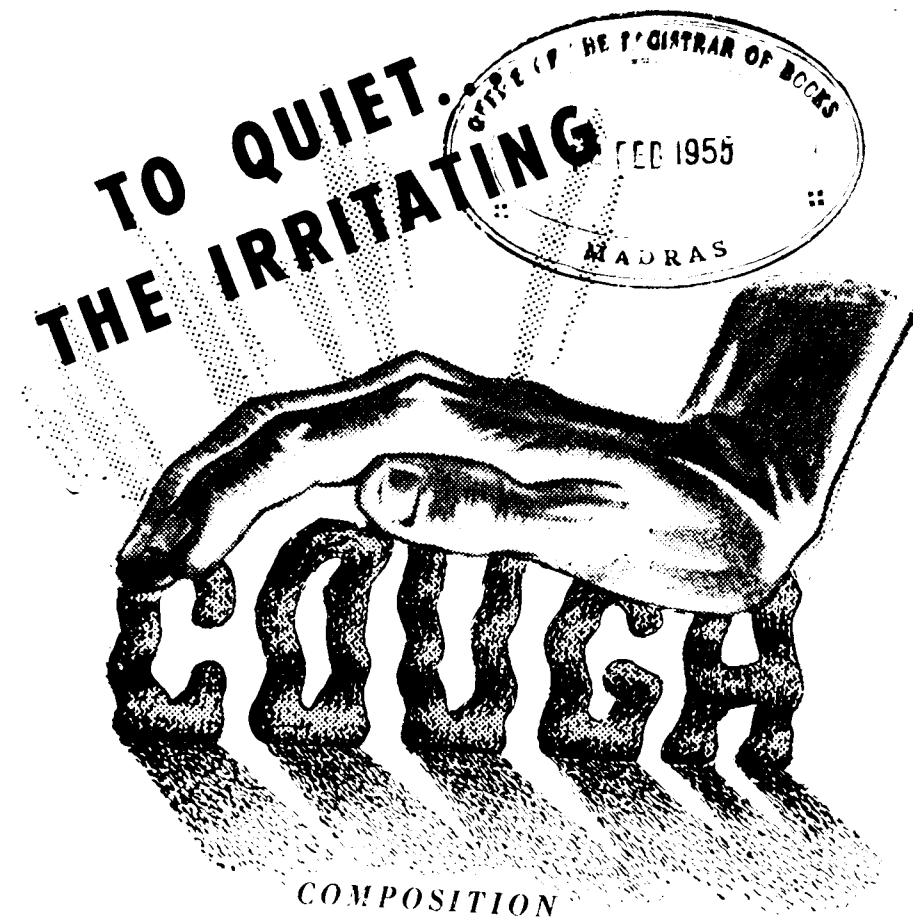
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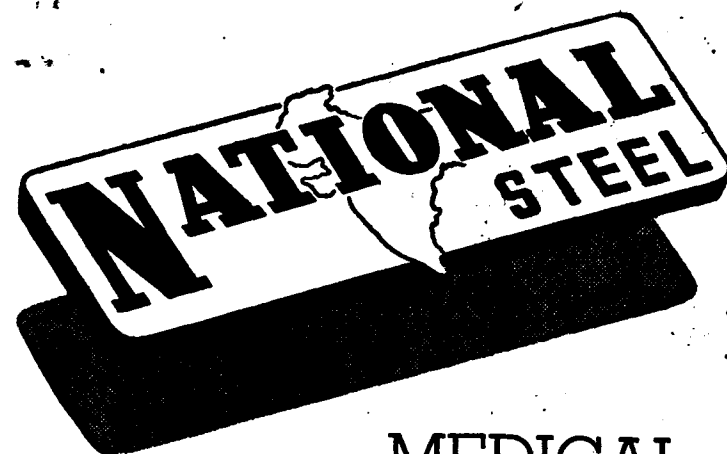
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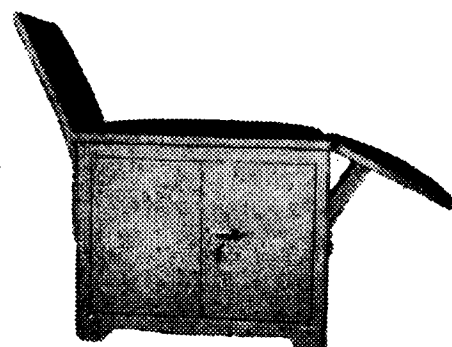
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OUR COVER PAGE

A group photograph taken in front of the Taj Mahal Hotel in Bombay, of the 18 American doctors who attended the conference of the Indian section of the International college of Surgeons at the Taj Mahal Hotel on November 10 and 11, 1954. With the doctors are also some of their Indian hosts.

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Medical Examination of the Industrial Worker

WHEN the first "Factory" was started the worker was no doubt a contrivance to run the more important "machinery". His health and life were of secondary or no importance compared to production and income. With the employment of more men and the formation of a sort of union amongst them the human element entered the picture and it had to be dealt with satisfactorily. The employer was not prepared to recognise the importance, because labour was very easily and cheaply available. One life could easily be substituted by the other, at worst by spending some money. This led to irritating frictions, resulting in a third party, the Government taking up the problem for solution.

As far back as in April, 1810, it is said, that a Committee was set up by the French Government to go into the question of the control of the workers' health and hygiene in factories and to investigate the causes of accidents. The Great Revolution of England and the entry of the Labour Party into the Cabinet, brought the problem to the lime light and floors of the Parliament. As far as we are concerned here in India, the question was tackled stage by stage till today all the factories are governed by the Factories Act of 1948. In addition to the Health problems, the act concerns itself with the problem of Inspecting Staff including Certifying Surgeons, Safety, Welfare, Working Hours, Employment of Young persons, Leave etc. It lays down specific rules and regulations for building and running a factory, it prohibits child employment and determines the compensation for loss of life or limb, it lays down the hygienic standards inside the factory and has set up the necessary machinery to enforce them all. Unfortunately it does not insist on the medical examination of persons before they are employed. With the exception of a few enterprising ones, industry has generally been rather slow to realise the importance of this examination.

An effective medical programme in industry is of course beneficial to the employee, the employer and the community in general. To the employee, poor health means loss of wages, a reduced period of useful and productive capacity and the need for making arrangements to provide for himself and his family when income fails. Ill, injured or improperly placed employees means loss of service, decreased efficiency, low morale and increased manufacturing cost to the employer. To the community all of these factors mean decreased prosperity, increased welfare costs and perhaps labour strife.

The medical examination should be in three stages:

1. The Physical Examination of the applicant to determine the advisability of admitting him to a factory in general (pre-employment examination);
2. The Physical and Mental Examination to determine the fitness of a Worker to do a particular job. (Preplacement examination); and
3. Periodical Examination to ensure prompt remedial measures to restore his health and working ability, which might have gone down in the course of work.

The importance of the Pre-employment Examination need hardly be emphasised. It helps in the elimination of the diseased and repulsive cases and also in the selection of

fine specimens. In a country like ours where man power is so abundant and cheap there is no reason why only those who come up to the required standards be employed. It would create an army of workers in whom the incidence of sickness would be less and the health in general of a uniformly high level. This would naturally lead to increased production and enhanced national wealth.

The Preplacement Examination is more important, in the sense that it determines whether the particular person can fit into the particular job expected of him. Experience has demonstrated that healthy persons, properly placed are more productive, safer and more contented employees. Confused, or misplaced persons have a poorer judgment and are more prone to accident. They have a delayed reaction time and may frequently miscalculate distances and speed, resulting in a decrease of efficiency. The physical and mental requirement for each type of job is different and various factors like weight, vital capacity, agility, vision etc., have to be taken into consideration. No rigid uniform standards could be laid down because the requirements vary from industry to industry and job to job. These are best left to the Industrial Physician of the particular unit to determine. The Industrial Physician again on his part must have an understanding of the production problems of his particular industry, the principles of management, and the essentials of personnel work. His clinical knowledge must include a great deal which the average Physician in private practice does not ordinarily need to know, such as the recognition of hazards in industrial environment, toxicology of the raw materials etc. The Industrial Physician can never make a proper Preplacement examination unless he is familiar with the job, its physical demands and its inherent hazards, as well as the physical capacities and limitations of the employee. Here knowledge of labour psychology would go a long way in placing the proper person for the proper job. With more and more automatic machines coming into use, and more and more machines coming into use, and more and more stress being laid on mass production, resulting in a certain amount of monotony, physical energy required to operate a job is gradually being replaced by the mental.

Besides these two types of examinations, the periodical examination must also form a regular feature and suitable legislation must be taken in hand by the Government to enforce this practice. Spending more than a third of the day in the factory, the seat of harmful effects and hazards, the worker is more liable for a breakdown in general health than any other person. An early recognition and treatment of the damage is an absolute necessity, and the periodical examination is the only solution for this. No doubt it involves a lot of expenditure but it does pay in the long run. After all it is the worker, healthy in body and mind who can produce more and raise the total output.

Now that the Employees State Insurance Scheme has been introduced in several of our Industrial Cities, it should be possible for the Corporation to widen the scope of the Act to include the various medical examinations. While this may present some difficulties for the units which may require only temporary hands or workers for seasonal operations, it should not be difficult to enforce in the case of permanent recruits and particularly at the time of confirmation. After all our aim should be to first build a strong and healthy Labour Class and then to maintain them in the interest of industrial production and consequent prosperity to the nation.

Tubercular Meningitis—Clinical Aspects

By

K. N. RAMAN, M.B., B.S., AND P. R. SITARAMAN, L.M.P.

“SO rapid has been the advance of chemotherapy in the past decade that we have come to accept, almost too readily, the remarkable fact that recovery from tuberculous meningitis is now possible”. (Ref. No. 1.)

JAYA, a girl 11 years of age came under our care on 15th July 1953, for the following complaints:

1. Fever of two weeks' duration; commenced with chill and shivering; for three days, there was fever in the evenings only, the child remaining well during the rest of the day. Subsequently, the fever has been continuous, the temperature ranging from 101 to 103.
2. Gradually increasing restlessness and occasional spells of crying for the past five days.
3. Three days ago, the child had an attack of “fits” and lost consciousness for about half-an-hour.
4. Headache and pain in the neck for the past three days.
5. Drowsiness and bed-wetting from the day before.

PAST HISTORY

Health has been usually good. There was an attack of “fits” one year ago, the child losing consciousness for about an hour.

CLINICAL EXAMINATION

Some degree of wasting present.

Drowsy, can be roused partially, and with difficulty; irritable, and cries when so roused. Eyes half closed, slight squint noticeable.

Tongue clean; temperature 101, pulse 130, low tension.

Neck extended, tender to pressure; .

Pupils; unequal, sluggish reaction to light.

Heart
Lungs
Abdomen } No abnormality found.

Knee and Ankle jerks: present. Kernig's sign positive.

INVESTIGATIONS

Antimalarial drugs had been administered in the early stages of the illness, and subsequently, some penicillin and 12 doses of chloramphenicol liquid. When we saw the child on 15th July, the differential diagnosis appeared to be between ‘meningism’ (occurring during the course of malaria, typhoid or other fevers), and actual meningitis of some type. Taking into consideration the gradual onset, and failure of antimalaria therapy, the field seemed to narrow itself to (i) meningism of typhoid (ii) typhoid meningitis, (iii) influenzal meningitis (iv) tubercular meningitis. Lumbar puncture was done, and the cerebrospinal fluid collected in two tubes. Fluid was clear and not under increased pressure. A blood film and a specimen of urine were collected for examination. Venous blood was also collected for Widal test.

Blood film showed—no malarial parasites, some degree of polynuclear leucocytosis.

Urine examination revealed no abnormal findings.

The laboratory is 40 miles from the patient's home, and apart from the question of distance, it is possible that the time elapsing before the specimen of C. S. F. is examined may vitiate the glucose estimation and cell count, both of which are important for diagnosis. One tube of C. S. F. was therefore sent to the laboratory, and the other used by us for the following tests:

1. Cell count: 230 per c. mm., mostly lymphocytes.

2. Glucose: Normal C. S. F. contains sufficient glucose to reduce an equal volume of Benedict's qualitative solution. $\frac{1}{2}$ cc. of the patient's C. S. F. was added to $\frac{1}{2}$ cc. of Benedict's in a small tube and boiled: there was no colour change. Though this test is not accurate, failure to reduce when fresh C. S. F. is used, indicates definite *diminution of glucose content*.

A positive test for glucose was obtained with the C. S. F. of this patient after treatment for 40 days.

3. Globulin: (Nonne-Apelt reaction) A freshly prepared clear saturated solution of Ammonium sulphate in distilled water is used. ½ cc. is added to ½ cc. of C. S. F. in a narrow tube, the mixture shaken and set aside for 3 minutes. Normal amounts of globulin are not precipitated, and the mixture remains clear. Increase of globulin is indicated by a precipitate which varies from slight opalescence to marked turbidity, according to the concentration of globulin present. This test may also be performed as a ring test, the C. S. F. being superimposed on the ammonium sulphate solution. In our case, there was a moderate degree of opalescence indicating "increased globulin".

4. Organisms: Examination of centrifuged deposit showed no acid fast bacilli or other organisms.

So we had the following salient points: fever for two weeks, neurological symptoms and signs present, malaria excluded, and C. S. F. showed increase of cells, (230, mostly lymphos) decrease of glucose, and increase of globulin. A diagnosis of tubercular meningitis was made, and treatment commenced accordingly. The reports received from the laboratory on 17th ruled out enteric and confirmed the diagnosis.

A. Blood for Widal—Negative for enteric group of organisms 1 in 50.

B. C. S. F.—C. S. F. findings are tabulated for comparison with the normal, and for differential diagnosis from allied conditions.

TABLE 'A'

C. S. F. of	Naked Eye appearance	Cytology		Chemistry				
		Cells per c. mm.	Type of cell.	Chlorides	Glucose	Total Protein	Globulin	Bacteriology
PATIENT	Fibrin webs formed on refrigeration	224	lymphos 96%	480	NIL detected	120	Increased	No organisms seen
NORMAL	Clear colourless	0 to 5	lymphos	760 to 700	45 to 100	10 to 35	Normal	No organisms
TUBERCULAR MENINGITIS	Fibrin webs form clear or opalescent	up to 300 Maybe 1000	lymphos and polys.	diminished 700 to 500	15 to 45	30 to 400	usually Increased	Causative organisms
TYPHOID MENINGITIS	May be yellow Clear or opalescent	Mild cases 100 Severe cases 1000	lymphos poly.	diminished 750 to 600	0 to 45	100 to 200 or more	Increased	are
IMFLUENZAL MENINGITIS	Opalescent or purulent	1000 or more	Mostly Poly.	diminished 750 to 650	10 to 60	30 to 100 or more	Increased	usually seen

X-ray of chest and spine, taken much later, when the patient was able to move about, revealed no evidence of a focus in those regions. The pictures are usually taken before treatment is begun, to exclude miliary tuberculosis.

DIAGNOSIS

"There appears to be a belief prevalent among many medical practitioners that streptomycin treatment does no more than prolong life or produce 'recovery' as a physical and mental wreck. This is not true. Of

patients treated early in the disease, some 40% made a complete recovery, except in some instances, for minor disabilities, which did not interfere with their leading a normal life." (Ministry of Health, U. K. Ref. No. 2.)

This underlines the importance of recognising the case early. The first requisite for diagnosis, as in all other conditions, is an awareness on the part of the physician, of this disease as a possible diagnosis. The onset is insidious, and early symptoms, vague and non-specific—fever, headache, drowsiness and irritability

(a paradoxical combination!), pain in the neck, vomiting, eye changes,—the presence of some or all of these is suggestive. A history of contact with patients suffering from tuberculous disease in usually forthcoming; this was lacking in the case presented here. Rigidity of neck and definite neurological signs are now recognised as late symptoms.

Fever and headache are the constant and early symptoms, and the causes of these in our country are legion. How is the general practitioner to play a correct role in the early diagnosis? We feel that, when the physician has excluded malaria, by blood film examinations, and typhoid by blood culture (first week), or Widal (after first week), he need not hesitate to do a lumbar puncture when some of the suggestive symptoms and history are present.

SOME HINTS ABOUT THE C. S. F.

C. S. F. may not be under obviously increased pressure. It may also be clear—if the cell count is less than 200 per c. mm. Usually it is opalescent or turbid and under increased pressure. If the fluid is left undisturbed, a clot may form, which has been aptly likened to a 'spider web'. The fluid has to be watched from time to time during the first hour; otherwise, if the web retracts, and settles at the bottom, it may be missed.

The chemistry and cytology have been tabulated above,. In early cases, a fall in glucose and an increase in cells (mostly lymphocytes) are seen.* Diminution of chloride comes a littee later, and a fall below 600 is practically diagnostic of tubercular meningitis.

Bacteriology :—Acid fast bacilli are demonstrable in the spider web clot and in centrifuged deposits. (Often a number of negative findings precede a positive result.) If negative, the C. S. F. may be sent for culture and animal inoculation. Positive results are more likely here. The bacilli remain viable for long periods, and the C. S. F. collected under aseptic conditions, may be sent by post for these tests.

Encephalitis lethargica and Benign lymphocytic meningitis are also to be considered in the differential diagnosis. The course of the disease and C. S. F. changes help in the differentiation.

* Occasionally, the cells are predominantly polynuclear in the early stages, but the absence of a corresponding increase in the peripheral blood helps to exclude acute purulent meningitis. (M. V. Chari, Ref. No. 3)

TREATMENT

Treatment is considered to be outside the scope of the general practitioner, and admission to an institution is much to be preferred. But in our country, there is a general reluctance to get patients admitted to hospitals, and the available bed strength is far from adequate, and for these and other causes, domiciliary treatment has often to be undertaken.

The chief difficulty in treating the patient at home lies in the intrathecal administration of streptomycin. The Ministry of Health, U. K. (1950) has concluded that intramuscular therapy alone is insufficient, and intrathecal injections on more than 50% of the "intramuscular days" give better results. Lumbar puncture is not a procedure to be lightly undertaken, but with normal aseptic precautions and good technique, it does not carry any unusual risk.

More recently, the need for intrathecal therapy has been questioned, and it is claimed by some that intramuscular therapy alone produces equally good results. Specific therapy of tubercular meningitis has been in the field only for a short period now, and opinions and trends are still changing. The crucial question appears to be, "What is the concentration of streptomycin in the C. S. F. in a particular patient after intramuscular injection?" It is known that this concentration varies in different patients, and also in the same patient at different stages of the disease. However, if intramuscular therapy alone is found to be adequate, the field for domiciliary treatment becomes greatly widened.

There is considerable variation in the schedules of treatment and the dosage of drugs used, and only a brief reference to treatment is made here.

A. Specific treatment: Streptomycin is given by I. M. injections in doses of 2 gms. per day for adults, and 20 mgm. per pound of body-weight for children. This is continued for at least 6 months. A mixture of equal parts of streptomycin and dihydrostreptomycin (like 'Ambistryn') is less likely to cause toxic effects during prolonged use. Now it is the usual practice to give streptomycin in combination with other tuberculostatic drugs—P. A. S. 3 to 20 grams a day according to age; I. N. H. up to 200 mgms. or even more.

Intrathecal streptomycin up to 100 mgms. is given daily for the first 6 weeks, and at longer intervals subsequently.

The case presented here had streptomycin $\frac{1}{2}$ gm. I. M. twice a day for the first month, and $\frac{1}{2}$ gm. once a day for the next 3 months. 100 mgms. out of this was given intrathecally every third day for a total of 15 injections. Lumbar puncture was done, and C. S. F. allowed to drain, till the flow was reduced to about 30 drops a minute. Streptomycin 100 mgms. in about 2 cc. of distilled water was diluted by withdrawing C. S. F. into the syringe and then injected slowly. "Ambistryn" was used for I. M. injections, and streptomycin for intrathecal injections. Equipment was sterilised at the bedside by boiling in normal saline just before use.

I. N. H. was given in doses of 50 mgms. thrice daily. From the 5th month onwards, the injections have been discontinued, and the patient is on P. A. S. and I. N. H.

This "schedule", if it is worth that name, is far less than what we would have liked, but with the limitations of general practice, this was the best we could do.

B. Adjuvant treatment: A potent cause of failure of treatment is the formation of a thick basal exudate which blocks the C. S. F. pathways, and prevents access of streptomycin to the lesions. (Ref. No. 4). Attempts have been made to prevent this complication or minimise its effects:—

- (i) Surgery — Frontal burr-holes are made for draining C. S. F. and administering streptomycin into the ventricles.
- (ii) Use of intrathecal streptokinase, a lytic enzyme, along with streptomycin.
- (iii) Use of tuberculin intrathecally: Smith and Vollum (1950) reported recovery of two "hopeless" cases treated in this way.

Date	Naked eye	Cells	Chloride	Glucose	Proteins	Globulin
17 Jul	Fibrin webs present	224	480	nil	120	increased
19 Oct	No webs	6	720	60.5	40	not increased

Among the patients followed up in the survey organised by the Ministry of Health U. K., (Ref. No. 2) none of the patients *who were clinically well, and had normal C. S. F. findings*, (like our patient) relapsed. The period of observation varied from two to three years approximately.

(Continued on page 9)

(Ref. No. 5) It is essential to administer streptomycin concurrently to prevent dissemination of the disease.

These procedures are only possible in hospital practice, and their value is yet to be finally assessed.

C. General nursing as for unconscious patients. Paresis or paralysis has to be watched for, and deformities like wrist drop and foot drop prevented.

D. Adequate provision of proteins and vitamins in the diet.

PROGRESS & PROGNOSIS

Although the treatment is strenuous, patients generally stand up to it well. Our patient continued to be comatose for about a month after commencing treatment. She had a transient right-sided hemi-paresis during this period. Then she regained consciousness. She took her feeds and medicines throughout without much difficulty, and nasal feeding was not required at any time. The pain in the neck disappeared in another 10 days, and at the end of the second month, she was able to sit up and converse intelligently. At this stage, we noticed that she was unable to recognise objects and faces of persons by looking at them. She had a blank look and dilated pupils (optic atrophy). However, she made out friends and relatives by their voice, and distinguished objects by feeling them. The general health and body-weight improved gradually. After 4 months, she was able to move about on her own.

Residual symptoms are—defective macular vision (optic atrophy) and a slight right ankle clonus. She is not able to read books, but can read bold type letters, and recognise small objects.

C. S. F. examination on 19th. October, at the end of 3 months gave normal findings.

An over-all recovery rate of less than 50% would not be considered today. But it is difficult to assess the prognosis in the individual case. Some apparently 'mild' cases have died in spite of treatment. Favourable factors are early diagnosis, normal state of consciousness and absence of focal neurological signs.

THE STUDENT HEALTH SERVICE

BY NICOLAS MALLESON

UNIVERSITY PHYSICIAN'S IMPORTANT ROLE

IS the student a particularly unhealthy fellow? Surely not. Has he a greater social value than his less intellectual brothers? Judgment of worth can easily become pernicious. Is he more exposed to occupational hazards? If more prone to rugged injuries and "examinitis", he is less likely to get pneumoconiosis or industrial dermatitis.

A student health service fulfils many functions, most of which, in Britain at any rate, could be done severally by other bodies. But by bringing them all together, we have not only achieved greater efficiency, but have founded an institution that is taking an integral place in the university of today.

With the notable exceptions of Oxford and all but three of the colleges of London University, almost every university institution in the country now has some form of Student Health Service. About half of these confine themselves to preventive and advisory work, the remainder also undertake clinical work partly within the compass of the National Health Service. My own experience has been in a comprehensive centre, and it seems to me that the comprehensive principle is the more satisfactory.

(Continued from page 8)

But even among the deeply stuporose and delirious patients, some patients have recovered with treatment, and we wish to end on that optimistic note.

SUMMARY

A case of tubercular meningitis has been described.

Clinical features as seen at the bed-side, and some of the problems in diagnosis and treatment have been referred to.

Some hints have been given regarding the examination of cerebrospinal fluid, which is the most important test.

Treatment is strenuous, but the patient usually stands up to it well. Prognosis in the individual case is difficult to assess. An over-all recovery rate of 50%

It is convenient to consider the functions of a student health service under a number of headings, though the separation is more descriptive than real.

CLINICAL FUNCTIONS

A comprehensive service fills a number of clinical functions.

It acts as a casualty station for a large institution. (In practice, the great majority of accidents and other emergencies are minor and are usually dealt with by a nursing sister.)

The university physician acts as an industrial medical officer for these people who are living at home and still within the care of their regular family doctor, it being often more convenient for a student or member of staff to visit the university physician than attend a surgery in his home district. The university physician then writes to the family doctor, and investigates or treats the case in conjunction with him—though this formal procedure is not always observed for trivial disorders.

For those who live in lodgings and are, therefore, outside the care of their family doctor, the university physician holds a list ("panel") under the National

may be expected with early diagnosis and adequate treatment.

Acknowledgement: We wish to thank Dr. P. K. Kalyanaraman. M. B. B. S., Honorary Physician, Coimbatore, for his unfailing interest in the subject and valuable suggestions for getting these notes compiled.

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"A man asked Mark Twain one night if there was anything in the world worse than having both an earache and a toothache at the same time.

"Yes", answered Twain, "Rheumatism and St. Vitus's dance together".

Health Service Act. He then accepts full responsibility as their general practitioner, does all their medical consultations, and visits them when sick in lodgings. Very few students stick to lodgings in the same locality for more than a term or two. In the past, this involved a great many changes of local doctor. By registering with the university physician, who can visit him wherever he moves within the university city, continuity of service is obtained.

As well as clinical medical services, some centres are able to offer a dental service under the N. H. S. Act. This is not only convenient for the student, but it carries with it the assurance of high quality workmanship.

As a rule, the clinical services of a student health centre are very closely associated with the university hospital. The university physician is usually regarded as an honorary member of the hospital staff, and radiological, pathological and cardiographic facilities are directly available to him; in some cases he even has some beds. These facilities, and the close social



Medical inspection in one of the County schools in England by the school doctor who visits the school weekly.

relationship which is involved, do permit a very high standard of clinical work.

WIDE RANGE

The university physician expects to meet the full range of conditions encountered in any general practice.



Medical inspection in one of the County schools in England by the school doctor who visits the school weekly.

The range from the trivial cuts, colds, and boils, to serious conditions like tuberculosis and the unusual tropical infections sometimes encountered in students from overseas. Naturally conditions like cancer, which are normally met in the middle years of life, are seldom seen, although most university physicians do attend the staff as well.

Tuberculosis is the most common serious disease in the age group 18 to 24 throughout the country. Students get their fair share, and out of every thousand, one or two every year have to interrupt their studies. Nowadays with modern drugs like streptomycin, and with the recent advances in chest surgery, recovery does not take so long, but careful and prolonged convalescent is still necessary.

The British Student Tuberculosis Foundation exists to bring university teaching to the bedside of the convalescent student. At Pinewood Hospital in Berkshire, it runs a 16-bed convalescent unit for men students, where they get regular visits from university teachers and all modern instructional aids, such as films and strip projectors. A similar though smaller unit for women is due to open at Highwood Hospital in Essex, and before very long it is hoped that they will be brought together into a single permanent unit somewhere in the suburbs of London.

EFFECT ON CAREERS

In general, students are not more liable to physical illnesses than are other people of their age.



Schoolchildren of Croydon are undergoing radiography tests at Croydon Town Hall. A report is sent to their parents, following the doctor's report. The doctor does this by viewing a small 35 mm. film. Should it show any defect the child is asked to come again for a full size plate to be taken. Schoolchildren lined up for the radiography test.

Nowadays financial grants from local education authorities are general, and the effect of under-nutrition, often seen in indigent students before the war, is no longer a problem. Nevertheless, the student has always to work hard and continuously if he is to achieve success in his examinations all along the course. A minor physical illness or disability, which in another walk of life might have only nuisance value, may, in a student, make the difference between success and failure, and mean that he loses his place in College. If he cannot always get efficient and prompt treatment, not only his present health but his whole future may suffer.

The most specialised aspect of a university physician's work concerns mental health; the occupational hazards of the student are principally psychiatric. In Oxford from 1947 to 1949, Dr. R. W. Parnell was able to trace nine suicides as against one death from tuberculosis, and 76 major absences from mental disease as opposed to 33 from tuberculosis. There can be no doubt that being a student is a very great nervous strain, even on the strongest dispositions. The university physician inevitably meets and treats a great many such cases.

PREVENTION

There are two major procedures in general use for prevention. First, mass miniature radiography is done annually at nearly every university; at many it is compulsory. There is no evidence that tuberculosis is

any more common in students than for other occupations, but their age group is the one heavily affected throughout the population. On average, a university of 3,000 students will have four or five active cases of tuberculosis every year, and perhaps a dozen minor X-ray shadows to keep under careful observation. These routine X-ray examinations ensure that most cases are detected in the early and treatable stages, and that the chances of infection are diminished.

Secondly, routine medical examination is available at nearly all student health services. In some cases it is compulsory. The examination varies from place to place according to the views of the physician, but in general it amounts to a systematic examination of the kind usual in a medical outpatient department; and with a careful medical family and personal history, the whole takes about three quarters of an hour. It would be fair to say that most university physicians nowadays do not hold that this examination is a very reliable way of detecting previously unknown constitutional disease—for indeed it seldom does so. Its real value is as a means of introduction, so that the students know the physician, and feel ready to come back if in trouble later. It is also an excellent medium for giving advice on matters of general and personal health.

There can be no doubt that a great deal of ill health, if not actual illness, can be prevented by intelligent advice on healthy living. Many students have played games and taken a great deal of physical exercise whilst at school. But on coming to university, particularly to universities in big cities like London, where sports fields are a long way off, they tend to drop out. Not only is this a disadvantage for physical health, but it is a disadvantage to their mental wellbeing.

Some variety of activity, in particular some outdoor activity and relaxation, is a great stabilising factor. It is a leavening of the otherwise heavy burden of study, a leavening as valuable to the mind as to the body. Many students are reluctant to give the time necessary to play games, unless one can explain to them that it will indirectly benefit their studies rather than detract from them.

ADVICE ON OVERWORK

Advice on how to study can also do much to prevent strain and ill health. Most university courses today are rather too heavy, indeed the volume of work to be got through is sometimes enormous. Many students feel that the longer they can spend at their studies, the

better they will do; and in consequence they overwork to the point where they are always tired.

The university physician, when seeing a student either at routine medical examination or on account of some minor physical illness, will often suspect that he has been overdoing it. He must then discuss study methods. He must explain that if a factory increases the length of a shift over a certain point, usually about eight or eight-and-a-half hours, not only does the output per hour fall off, but the gross output falls. The operatives steadily became a little too tired to work at peak efficiency. So it is with intellectual work, with study.

A student may drive himself to do another couple of hours at midnight; although his eyes follow the printed text, his mind is not fresh enough to grasp, digest, understand, and learn the full meaning. After a few days of this, he is waking tired, and all through his studies his intellectual perception is dimmed. Although his hours of study may be enormous, the amount he actually learns—his “gross output”—has fallen gravely. By reducing his studying so that his total working day is more like that of a factory operative and his week-ends are free for relaxation, he will not only be happier and fitter, but he will learn more.

One might expect that university physicians would give some systematic instruction in health and sex education, for there is still much unhappiness from ignorance and misunderstanding. Yet in practice, I do not think this is done anywhere in the United Kingdom. It has obvious difficulties. There is great variety in social background, religion, and moral standards in the university today, and such lectures would be likely to cause offence, not to say great distress to some, unless they were so trite as to be worthless. Nevertheless, the possibility remains interesting; it comes up regularly for discussion at annual professional conferences.

ADMINISTRATION AND RESEARCH

In any large institution, the medical officer can be of considerable help to the authorities and to welfare in general. Sanitary inspections and advice, particularly inspections of kitchens, and food handling and serving facilities, are often very valuable. The university physician is always interested in the sort of diet his students are getting, and tries to ensure, as far as possible, that the College canteen serves a well-balanced and appetising meal at a price the student can afford.

(Continued on page 13)

Medical examination for permanent staff appointments or superannuation schemes are often and administrative help and an economy to the university. First aid and accident prevention is also of the greatest importance; this is particularly the case where there are specialised risks, like radiation in physics departments, or noxious gases, or the danger of chemical burns. It is important to see that all the requisite first aid equipment and special antidotes are at hand, and that the technicians and staff are trained in their use.

A unit dealing with a limited population, having an adequate staff and adequate facilities at its disposal, should be able to produce a certain amount of valuable original work, particularly in the field of what is usually called social medicine. Most university physicians have a research interest, and a fair amount of work, often of more than local importance is published. Oxford university and the Student Health Service at Leeds have done work on physical measurements. Birmingham Student Health Service has produced work on glandular fever, a disease which in its minor manifestations appears to be very much more common than was previously suspected. Cambridge Student Health Service, amongst other things, has produced work on the changes of stature among young people in the last 60 years. Edinburgh Student Health Service has worked on tuberculosis prophylaxis.

It may be that it is in mental health that the more unique contributions will be made; and this field does not give objective data either very easily or very rapidly. Nevertheless, a body of experience is being steadily built up and university physicians from all over the country meet regularly to pool their knowledge. Our understanding of mental difficulties in students is increasing and so is our ability to help.

MENTAL HEALTH

Dealing with mental distress among students is such an important and specialised part of the work that I think it merits this heading separate from the general clinical work. There is, as I see it, a continuous spectrum of these problems as they come to us. They range from normal healthy people who, perhaps, seek a little advice on study methods, through varying degrees of disturbance right to the frank schizophrenic.

On the one hand, our work here crosses into the province of the academic tutor, on the other to that of the hospital psychiatrist. To some extent it calls for the skills of both.

A CASE OF KWASHIORKOR SYNDROME

from

CHILDREN MEDICAL WARD, GOVERNMENT ERSKINE HOSPITAL, MADURAI

By DR. T. V. VENKATESAN, M.B., B.S., F.D.S. (Lon), F.C.C.P. (U.S.A.)

Honorary Physician, Erskine Hospital, Madurai

A child by name Boominathan, aged 3 years was admitted on 24-8-54 with a history of swelling of feet, duration 9 months.

CONDITION ON EXAMINATION

The child has got a pale skin with brown scanty soft hair. There is swelling of the feet and dorsum of the hands. The skin over the scrotum and perineum is pink and shows peeling; similar changes are noticed on the front of the legs and back of trunk. The front of legs and back of forearms show a glossy redness. There is no enlargement of lymph glands. The child shows none of the interest and liveliness of a well nourished child. When disturbed he becomes resentful and peevish and shows no vigour in his resentment. Extremities are cold to the touch.

FAMILY HISTORY

Mother has two more children, who are older than this child and they are both healthy.

HISTORY OF PRESENT ILLNESS

Since the birth of the child he was not receiving breast feeding because the mother had no sufficient quantity of milk and therefore he was getting artificial feeds.

Since 8 months, the child has got swelling of the feet and hands and he has no oliguria. The child is also having 3 to 4 loose motions per day. The child goes through the meal, vomits everything and goes to bed, curled up and exhausted.

(Continued from page 12)

Just as the work of a university teacher amounts to more than getting his students through their examinations, the work of a university physician is far wider than detecting or treating constitutional diseases. He is, I believe, coming to take a very real place in the life of a university. The modern system of grants and the need for continued examination success has in many ways altered the old relationship between a student and his teachers. He often feels them to be his mentors rather than his friends and helpers. When he meets trouble, personal or academic, he is often reluctant to go to his tutor or the staff of his department. He dimly feels it may “count against him”.

Nowadays, more perhaps than ever before, there is a need for someone else whose experience and judgment the student can respect, who has an intimate knowledge both of the university and of problems of young people, and yet who is not too closely identified with the academic machine. In the past, this role of “intermediary” has often been filled with great success by a Clerical Dean, particularly in the classical universities. But times change, and more and more the duty is being taken up by the university physician. To regard him simply as a practitioner of disease, physical or mental, is, in my view, quite to overlook his place in that whole humane structure which distinguishes a university from an intensive correspondence course—*Health Horizon*

“In Greenville Hospital, Dr. Herman Jaffe was called to examine some children from a nearby orphanage. Dr. Jaffe looked the first boy over carefully, then said, “Stick out your tongue, Red”.

Red looked at him in youthful confusion. “What for? I’m not mad at you”.



3 Years—Kwashiorkor.

RESPIRATORY SYSTEM

Inspection: Movements equal on both sides.

Palpation: Movements equal. V. R. cannot be tested since the Child could not co-operate.

Percussion: No loss of resonance.

Auscultation: Vesicular breath sounds: Occasional moist sounds both sides. V. F. Cannot be tested as the child could not co-operate.

C. V. S.

Apex beat in the fifth interspace inside the left midclavicular line.

PALPATION

No thrills are felt.

Percussion: Heart boundaries normal.

Auscultation: Heart sounds in all areas normal.
Pulse: Volume and tension poor. Rate 92.
Temperature: 96.8 F.

C. N. S.

Cranial Nerves: Normal
Pupils react to light.
Motor system: Normal
Reflexes: Normal
Sensory system: Normal.

INVESTIGATIONS DONE

Urine — Albumin nil: Sugar nil.

Blood — Smear. Normocytic.

Hl. B.— 70%

(Talquist)

Total Proteins: 2.2 grams.

Albumin — 1 grm. Globulin 1-2 grm.

Motion — Semisolid, frothy with little slime. No ova or cyst.

X-RAY CHEST

Lungs clear. Heart configuration — normal.

SUMMARY OF FINDINGS

The child had (1) Retarded growth.
(2) Dyspigmentation of hair and skin.
(3) Oedema of hands and feet.
(4) Hypoalbuminaemia.
(5) Nutritional dermatoses.
(6) Gastro-intestinal disorders, Stomatitis, glossitis, cheilosis, vomiting and diarrhoea and
(7) Peevishness and mental apathy.

The baby suddenly expired on 27-8-54; autopsy could not be done as the mother did not consent.

These symptoms-complex are described under the syndrome called KWASHIORKOR.

KWASHIORKOR is a disease largely, but not entirely restricted to the first few years of life characterised by failure of growth, pigmentation of skin and hair, dermatoses, hypoproteinaemia, Oedema, Complex gastrointestinal defect, mental irritability and a high mortality.

In 1933 Cicely Williams described with great clarity the clinical picture of Kwashiorkor. The word Kwashiorkor was derived from Gold Coast where Kwashi is the name of the boy born on Sunday and Orkor means red.

DIFFERENCE BETWEEN PELLAGRA & KWASHIORKOR.

Kwashiorkor.	Pellagra.
1. Common in children	1. Rare in children
2. Well developed dermatitis indicates severe degree of the case	2. Severe dermatitis may occur with constitutional symptoms
3. Rashes have no relation to exposed areas	3. Rashes in exposed areas will disappear if the skin is protected
4. Early stages the skin is bleached	4. Early stages the skin is red and swollen
5. Large mortality — Sudden unexpected death	5. Rarely fatal

TREATMENT: There are only two rules in the treatment. Firstly to search for any focus of infection and treat it vigorously even if trivial. Secondly to give large amount of milk protein.

Difficulty is encountered if diarrhoea is uncontrollable or there is profound anorexia or much vomiting. In these cases blood transfusion and human serum-albumin are helpful.

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In fine, I have pleasure to thank the Superintendent of the Erskine Hospital, Madurai, for his kind permission to publish the above article.

"Dr. Frank Boyle reports seeing a boy of seven on a train nearing New York who was constantly sniffing, to the annoyance of the other passengers. Finally, a spinster sitting across the aisle from the doctor entered the picture. "Little man", she said reproachfully, "do you have a handkerchief?"

"Yes, ma'am," he said "but I never lend it to strangers".

The Struggle Against Man's Natural Enemies

BY SIR LIONEL WHITBY

Regius Professor of Physic, University of Cambridge

SIR Winston Churchill once said, when addressing the Royal College of Physicians of London, that 'the more one looks back the further one can look forward', and so if one is thinking of what medicine will be like in the next quarter of a century it is not unprofitable also to look back at least 25 years for a brief survey not so much of the facts of medical advances as of their implication.

The tremendous progress during this period has been a dividend from the basic work on bacteria and parasites. And this work had to wait until the microscope was sufficiently developed to observe these minute organisms. The great names in these fields are Pasteur, Koch, Lister, and Ross. There has been exploitation also of the principle of the deficiency diseases first forecast by Joseph Lind's experiments on scurvy in the British Navy as long ago as 1753, but not accurately recognised until the work of Theobald Smith at the beginning of this century.

And from the research which the development of these principles made possible we have been able to develop all the modern methods of preventive medicine: for example, the practice of successful immunisation against diphtheria, yellow fever, typhus, and many other infections; the control of diseases caused by bacteria, such as pneumonia and septicaemia, for which we use the sulphonamides, penicillin, and other antibiotics; the mastery of parasitic infections such as malaria; the maintenance of good health in deficiency diseases like diabetes and pernicious anaemia, not to mention the avoidance of the more obvious vitamin-deficient states like the classical scurvy.

PROTECTION AGAINST VIRUS DISEASES

But it is quite salutary to take a broad look at this magnificent tale of success and to realise that the most spectacular advances have been in the diseases arising from agents outside the human body. We have not yet done nearly so well in the fight against the pathological conditions which are inherent in man himself. The bacteria and the parasites which are extraneous agents have been studied and methods have been found for their eradication, control, and the prevention or cure of the diseases which they cause. Then there are still smaller agents from outside the body, the viruses.

These in principle are entirely parasitic and cannot multiply unless they are located within a living cell. And here the successes have been strictly limited.

As long ago as the eighteenth century Jenner achieved a triumph with the first rational experiment in preventive medicine by vaccination against smallpox, a virus disease. This triumph has not yet been repeated with the common cold or influenza, nor with the



Dr. J. Ehrlich holding a culture plate of the mould *Streptomyces Venezuelae* from which he succeeded, in collaboration with Dr. Q. R. Bartz, in first isolating chloromycetin.

dreaded nervous-system infections such as poliomyelitis. But research workers have now got something of the measure of the problem, and it would be reasonable to forecast that in 25 years' time protection against a good many more of the virus diseases will be reasonably efficient; though it may not be 100 per cent effective on account of the large number of different strains of virus which exist.

EVOLUTION OF NEW STRAINS

Here again one should pause for a moment and reflect whether in 25 years' time the position will be greatly different from what it is today. It is a curious fact that the elimination of one disease seems somehow to uncover or lead to the evolution of another. Bacteria themselves can quickly change their nature—or, as we say, undergo mutation because they multiply so rapidly.



Testing the potency of penicillin which has been added to animal feeding stuffs. This picture was taken in the laboratory of the research division of Glaxo Laboratories, Ltd. at Greenford, Middlesex, England. Experiments have proved the value of antibiotics in the fattening of young stock.

In one hour an organism can become a grandfather three times. It is a well-established fact that different organisms have already developed strains which are resistant to the sulphonamide drugs, or the penicillin, or to streptomycin. And so in 25 years' time the wheel may have turned again so that the research workers may well be looking for new chemotherapeutic agents and antibiotics which will be effective against strains of organisms no longer sensitive to the agents which we employ today.

For some considerable time now the most actively growing points in medical knowledge have been in the subject of biochemistry. It is likely that many of the discoveries in this highly scientific and factual aspect of life—physiological and pathological—will find their way into everyday medical practice in the fields of both prevention and cure during the next 25 years. If we are to solve the problem of prevention and cure of the degenerative diseases which are inherent in man himself we must understand much more fully than we do now the chemistry of the body.

DEGENERATIVE CHANGES

By the diseases inherent in man himself I mean, for example, the degenerative changes which occur in the blood vessels, such as a hardening of the arteries, or diseases of the joints or other systems of the body as the result of ageing, or of climate or mode of living, and not least the stress and strain of everyday life. Cancerous conditions likewise fall into this class, since cancer itself is fundamentally a disorder of metabolism—that is to say it comes from changes in the chemistry of a cell which give to the cell malignant properties. If we could understand the basic chemistry of the disordered change we could see the way to cause and prevention. But the chemistry of the living cell is so complex that even in 25 years it is unlikely that anything more than the fringe of its marvels will have been explored. It is always salutary for mere man to appreciate that the intricate enzyme systems—the chemical factory—of the simplest living cell can accomplish in a fraction of a second what all the laboratories and the whole resources of the biochemical world achieve at enormous expense of time, energy, and effort—and in some cases cannot achieve at all.

Take, for example, the substance which was at one time called Compound F. It was regarded as a specific curative agent for the treatment of rheumatoid arthritis and a number of allergic diseases. This material, originally obtained at great labour and cost, is produced by the living cell as part of its normal, easy everyday function. And, even more, there is little doubt that comparable substances are just one stage in a whole, long chain of which the living cell can forge all the links in fractions of a second, whereas man does not yet know the nature of the links themselves, much less how to forge them. We can see that studies like these may provide the solution to the problem of prevention rather than cure in cancer and comparable diseases which arise from faults in the living cell itself. Such diseases, and more especially cancer, will only come to be properly understood by sheer hard work, the intelligent application of ever-increasing but hard-won knowledge, and, let us hope, one or more of those inspirations which come occasionally to the mind of a man who, by his training and instinct, is able to grasp their significance.

STARVATION INSTEAD OF MALARIA

So far I have discussed man's triumphs over his natural enemies. But one ought also to pause and ponder seriously whether man's life and death, his happiness or misery, and his property or poverty, may

An Industrial Hygiene Project in India

By HARRY HEIMANN, M.D.

(Specially contributed)

INDIA, the eighth largest industrial country of the world is in the process of rapidly expanding its economy. In this economic expansion, industrial operations play an important part. The Government of India, recognising the importance of the welfare and health of the workers in maintaining a high level of production has taken many forward-looking steps to preserve these valuable assets. One of these steps has been the promulgation of laws relative to the prevention of occupational diseases. In fact, India has a workmen's compensation law, in effect since 1923, which recognises 12 occupational diseases as compensable, and another law, enacted in 1948, which makes notification of the occurrence of 17 occupational diseases compulsory. Claims for compensation for occupational diseases have rarely been made, however, and the reporting of such diseases to appropriate authorities has been even rarer.

The Indian officials concerned have for some years recognised that conditions of work in industry in their country must be a cause of much more illness than the official records indicate, and they have recognized the failure to receive reports of occupational diseases as a defect in their programme. They knew that only when they would have information about where and under what conditions these diseases occurred would they be able to take the necessary steps to eliminate them.

Consequently, the Government of India requested that a team of industrial hygiene experts from the United States be sent to India to advise and assist in evaluating its occupational disease problems, with the ultimate purpose of improving the country's industrial production through the conservation of the health of the labour force. More specifically, the request was for a

(Continued from page 17)

not within some measurable time be dependent not upon plague and pestilence caused by the enemies of man or upon the diseases to which a finite biological entity must be heir, but upon man himself and the vicious circle which his own ingenuity has produced.

For example, if it be that the parasitic diseases, such as malaria, can be controlled and eliminated, what may be the population in 25 years' time of certain countries where the birth-rate is astronomical but where the survival rate has always hitherto been influenced by an indigenous disease which has exerted a natural control over the number of mouths that need to be filled? Modern medicine, by removing the misery and mortality of malaria, may have raised the spectre of starvation in vast areas. In such places the fertility of the soil and the industry of the people may eventually be more important than medical discoveries.

Man's ingenuity, too, has enabled him to hurtle through the air at speeds for which the human body was never constructed. Who can doubt that in 25 years' time, when even space travel may be if not practicable at least contemplated, the problem of protecting the vulnerable human body will call for much ingenuity? And man's ingenuity in the field of nuclear fission and atomic energy, though it will provide him with boundless power, has also given him the ability to obliterate or sterilise whole tracts of country, and to make huge areas uninhabitable because of the deleterious effects of irradiation on the living cell. So it may be that in 25 years' time medicine will be more concerned with trying to neutralise the results of man's folly, the misuse of the fruits of his ingenuity, than with a struggle against his natural enemies or his natural decay. In such an event the problems will indeed be formidable.

"Bob Hope tells of the English doctor looking over the charts in a London hospital, who was interested in the system of abbreviations: S. F. for Scarlet Fever; T. B. for Tuberculosis.

All the charts seemed to indicate a favourable progress except one that was labelled G. O. K.

The doctor called one of the Staff Physicians "Just what is G. O. K.?"

"Oh that? It means we can't diagnose it. GOD ONLY KNOWS".

team consisting of an industrial hygiene engineer, an industrial hygiene chemist, and an industrial hygiene physician to demonstrate by precept and by example how occupational disease problems might be evaluated in India.

TEAM PERSONNEL AND EQUIPMENT

In November 1951, a United States Technical Co-operation Administration team consisting of an engineer, a chemist, and a physician arrived in India to stay for 6 months. At the end of 6 months, only the physician remained, but at the request of the Government of India, the project was extended for another 12-month period. A chemical engineer joined the physician in October 1952 for the last months of the project.

The Government of India, in its original prospectus for the work to be done by the team, emphasised the fact that the specialised instruments which they would need were not then available in India. Therefore, engineering instruments for collecting air samples and for making field tests of conditions in factories were ordered before the team left the United States. Equipment for medical examinations was not ordered until much later, and it did not arrive until shortly before the project terminated.

INDIAN TECHNICAL STAFF

The United States team was assigned to the Office of the Chief Adviser of Factories, of the Ministry of Labour in New Delhi. In addition to giving advice on occupational disease control, through some 18 State factory inspectorates, the Office of the Chief Adviser of Factories has among its activities the following:— industrial safety, industrial building construction, certain industrial welfare programmes, and dock safety. The first three functions are carried out, primarily, by advisory work to the States, most of which have their own factory inspection units for the day-to-day work. Dock safety work is done directly by this office through its technicians in the important ports of Bombay, Calcutta, and Madras. Thus, the personnel of the Office of the Chief Adviser of Factories are occupied with many official duties.

In addition to the director, who was well qualified in industrial safety, a physician, three engineers, and a chemist, all of whom had an adequate grounding in the fundamentals of occupational disease control, were the technical staff of this office. This was the primary group with whom the industrial hygiene team was to work and with whom it was to leave in India a further

knowledge of the specialty. As contact was made with technical persons on the State government staffs, industrial engineers, and medical personnel, it was expected that to them as well would be transmitted a better understanding of local occupational disease problems and how they might be solved.

PRELIMINARY SURVEY

Immediately upon arrival in India, the United States team began its preliminary observations, the purpose of which was essentially two fold: (a) to obtain information on the nature of Indian industries and working conditions in them to determine to what degree, if any, they differ from those in other countries; and (b) to evaluate the degree of understanding of the occupational disease problems among appropriate Indian nationals. After preliminary conferences and discussions with the personnel of the Office of the Chief Adviser of Factories and other officials of the Ministry of Labour, the team visited Bombay, Ahmedabad, Calcutta, and Jamshedpur, in which all types of industry are highly concentrated. Later in the project, the team also visited industrial establishments in Delhi, Mysore, Bangalore, Kolar Gold Fields, Giridih, and Kodarma.

In each of these communities the team and representatives of the Office of the Chief Adviser of Factories held conferences with the State chief inspectors of factories and their staffs and made inspections of factories representative of local industry. In all some 80 to 100 industrial operations were visited, including chemical plants, automobile assembly plants, foundries (ferrous and nonferrous) ceramics factories, glass factories, paint factories, steel plants, airplane repair plants, storage battery factories, dry-cell battery factories, rubber tyre factories, manganese mines, iron ore mines, metal machining operations, clothing factories, leather tanning factories, cloth weaving sheds and jute factories. In each, pertinent recommendations were made to factory management, is necessary for the evaluation and control of occupational disease hazards. As items regarding occupational diseases were observed, they were pointed out to the Indian Government officials and others who accompanied the team on these tours.

BROAD STUDY PROGRAMME

Following the preliminary observation period, a programme of actual field surveys was prepared. These surveys were to be undertaken to determine the size of the occupational disease problem in India and how it might be combated. It appeared to the team that, in the present stage of industrial development of the

country, the largest single group of occupational disease hazards was the industrially created dusts which tend to produce adverse health effects on the lungs alone. Therefore, the programme stressed the need for surveying the industries that have been known to produce such diseases elsewhere, such as the cotton textile industry, the jute industry, mining, and the asbestos industry.

PLANNED STUDIES

Most of the planned studies were done in three field surveys of occupational disease. These included studies of the health hazards in refractory brick making and chromite mining and processing and a study of the silica dust hazard in mica mining and processing.

The United States team planned the study of the health hazards in refractory brick making, made the initial survey, prepared the prospectus for the investigation, indicated where and how the environmental dust studies should be made, and finally, read all the chest X-ray films. The data will be analyzed and a written report prepared by the Ministry of Labour technicians, on the basis of the pattern the team established and the report will be published by the Government of India.

For the chromite mining and mica mining studies, the team prepared the prospectuses, participated in the preliminary surveys, participated in and supervised the collection of the engineering and medical data, and prepared the final reports. The report of the survey made in the mica mines of Bihar State shows the chemical nature of the airborne dust and the degree of dustiness, the nature and degree of pulmonary disease caused by that dust, the incidence of chronic pulmonary disease among the exposed workers, and the relative degree of effectiveness of dust control measures used in some of the mines, and it makes recommendations for further improvement of the existing controls. This comprehensive survey and report probably were the first of this type to have been made in India.

COLLATERAL WORK

As time permitted, the United States team participated in other activities to help the Indian technicians increase their understanding of occupational disease. Upon their arrival in India the team found that the Office of the Chief Adviser of Factories had made two studies of occupational disease, one in the chromate manufacturing industry and the other in the lead storage battery industry, and had collected data which needed to be analyzed for possible significance. A minor objective of

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the studies was the demonstration of the degree to which the Indian technicians might need guidance. The team reviewed the material and after lengthy conferences and discussions with appropriate technicians, helped to analyse the data and prepare suitable reports. These reports will be published by the Government of India.

A second activity in which the team participated was the preparation of the brochure to stimulate reporting of occupational diseases, and to assist all concerned—medical personnel in particular, but also factory inspectors, labour welfare officers, personnel managers, safety officers, and others—in recognizing these diseases and to instruct them in the methods of prevention. This 80-page booklet was printed by the Government of India for very wide distribution.

A third team activity was the demonstration of certain laboratory methods and the proper use of industrial hygiene field and laboratory testing equipment. Methods for performing dust counts and for collecting air samples were demonstrated to industrial hygienists. Chest X-ray reading for pulmonary dust effects was demonstrated not to the Government technicians but also to all medical personnel who manifested an interest in this subject.

In addition, some 40 lectures were given on various phases of the occupational disease problem to physicians, engineers, State factory inspectors, and others concerned with the health and welfare of the labour force. It is estimated that about 1,000 technical persons were in attendance at these lectures. Lectures were given to students in the courses in industrial hygiene at the All India Institute of Hygiene and Public Health in Calcutta, and to a large group of State junior factory inspectors. Lectures also were given at the Southeast Asian Regional Seminar on Labour Inspection, held under the auspices of the International Labour Office in Calcutta. Attending this seminar were representatives of all the Southeast Asian countries, as well as representatives of India.

EVALUATION OF THE PROJECT

It is believed that the objective of the mission to India was accomplished, that is, the demonstration of the method of performing field surveys of occupational disease under conditions that exist in India; but is recognized that more work needs to be done in the country for the control of those diseases. A beginning was made in making people realize that there are occupational diseases in India and that they can be

Diseases associated with Varnish making

BY DR. BIRENDRA CHANDRA DUTTA, M.B., B.S.

Medical Officer, M/s. Jenson & Nicholson (India) Ltd., Naihati, 24—Parganas, West Bengal.

THOUGH it is not merely an assumption but a fact, that our country is far behind the march of time, it is none the less true that she is recouping rapidly the lost reputation. There can be no controversy that bigger achievements on the scientific lines can only be gained by organised and systemic team works. So the role of the medical adviser is no less important in the manufacturing lines, where he has not only to cure diseases, but also to prevent them and maintain good health of all those concerned, and thereby keep up a good morale to stand against the hazards of manufacture. It may be most emphatically said, that, the factories of the day are very careful to protect the precious human lives associated with the manufacturing processes, but further cautiousness is still necessary, so that dangers can be brought down to a minimum. Apart from the common injuries and burns that may occur during the manufacture, some of the ailments, associated with the different chemicals used should always be kept in mind so that, they can be diagnosed whenever such cases arise. Let us take the common chemicals that may be used in the varnish making one by one.

A. SOLVENT AND DILUENTS

1. *Light and heavy solvent Naphtha* — are both obtained by fractional distillation of coal tar. Fatal

cases of poisoning are not known. Acute poisoning may produce giddiness, intoxication, irregular breathing and unconsciousness. Chronic poisoning may be lead to Dyspepsia.

PETROLEUM AND ITS DERIVATIVES

2. The crude oil from the oil fields is carried along iron pipes, refined and fractionally distilled. Some of the fractions are used in varnish preparations. Inhalation of the petrol vapour in less severe cases, causes symptoms similar to alcoholic intoxication, but in cases where it is inhaled for a long period, lassitude, vomiting, head noises, contraction of pupil appear and may even lead to unconsciousness. Prolonged contact may give rise to anaemia and general debility. Ingestion of petrol, causes intoxication and narcosis. Pneumonia is known to have accompanied many cases of petrol and kerosine poisoning.

White Spirit, is obtained from the distillation of Petroleum. These are least toxic and cases of poisoning are very rarely seen. Dermatitis is commonly seen amongst susceptible persons, who are in contact with the liquid for a long time. Generally the arms and hands are involved. Eyes may be inflamed by the constant irritation of the vapour. Though not commonly seen,

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controlled and prevented. It is felt, however, that more work also should be done in alerting the people to occupational disease problems.

Partly as a result of the work of the industrial hygiene team, further training in industrial disease control is

being planned by the Government of India for selected government technicians. One chemist and one engineer have each spent 6 months in the United States gaining experience in industrial hygiene. It is expected that a qualified physician will soon be sent to the United States for training in industrial pulmonary dust disease.

An English doctor had been out in India with the empire builders, and when he returned to his old club in London he was quite hungry for companionship. There was only one member in the club, and he was a frowzy, grumpish old fellow who refused the offer of a drink. "No thanks", said the grump, "tried drinking once, didn't like it, y' know".

The chap from India tried the old man on a cigar. Again came refusal. "Y'know, tried smoking once. Didn't like it. Sorry, and all that".

It was the same with the suggestion of a game of billiards. The old fellow had tried the game once and didn't like it.

"But", he said to the empire builder, "my son will be here shortly. He will play you a game".

The chap from India smiled meaningfully. "Your son, eh? The only one, I suppose".

giddiness and vomiting may arise and in extreme cases may result in unconsciousness. Mild poisoning cases recoup very rapidly.

Other petroleum distillates — Cause dermatitis and hyperaesthesia of the skin. So skin wetting by petroleum distillates for long periods is not advisable.

3. *Trichlor Ethylene* — used as a solvent is a halogen derivative of the paraffin and is dangerous. Susceptible persons get nausea and giddiness. It produces a burning sensation on the skin when in contact and the vapour produces congestion of the eyes. Continued exposure to a large dose may lead to fatal result. Chronic exposure has been held responsible for paralysis of the sensory fibres of the fifth nerve and retrobulbar neuritis followed by optic atrophy. It is said that the vapour that is evolved acts as corneal anaesthetic. So if a foreign body lodges in the cornea and produces ulceration the worker may be insensitive about it. Treatment advised are, rest, light diet rich in carbohydrate, glucose, alkali and liver therapy.

4. *Carbon Tetrachlor* — is another halogen derivative, colourless liquid, have a sweet smell like that of chloroform and is used as a solvent. Externally it irritates the skin and the smell produces nausea, vomiting and giddiness. Poisoning favours necrosis of liver and damage to kidney. Headache, nausea, vomiting, diarrhoea are followed by tenderness over the hepatic region and jaundice. In kidney damage oliguria and suppression of urine appear. Blood urea may rise. Disturbance of vision and polyneuritis have been recorded.

TREATMENT

(i) No acute case of carbon Tetrachlor poisoning should be treated on the same floor, as the gas is heavier than air. (ii) Glucose drink (iii) Calcium Lactate by mouth in heavy doses (iv) Calcium Gluconate or Calcium chloride — I. V. (v) for sub-acute and chronic cases, fresh air, alkalis as sod carbonate and Calcium Carbonate. (vi) Vit-B, is said to be a good remedy.

5. *Benzene or Benzole* — obtained as a bye-product during distillation of coal-tar is one of the most dangerous chemicals amongst the industrial solvents (is different from Benzine which is derived from the distillation of petroleum and is non-toxic). It produces damage to the C. N. S. in poisoning and dermatitis when in contact with skin.

Acute Benzene poisoning—may occur with those who prepare it and clean tanks, but it is unseen with varnish making.

Chronic Benzene poisoning, is also rare, but was once recognised as an important industrial poison because of its more evaporation rate. Effects are primary—stimulation and secondary—toxic. Early poisoning cases are expected with symptoms as giddiness, nausea, anorexia, tightness of the chest, weakness and nervousness, and followed by progressive anaemia and haemorrhagic symptoms with increased bleeding time. There may be susceptibility of a single individual. When the bone marrow is involved leukaemic changes of blood or leukopenia may result. In very chronic cases splenomegaly may appear.

Treatment — for acute cases, rest, warmth, artificial respiration, oxygen and symptomatic. For chronic cases repeated blood transfusions has been advised. Saline injections Liver therapy, Iron and Vit C and improvement of general health.

6. *Xylol and Toluol* — Both are said to damage the C. N. S. Toluene though is considered to be more poisonous in high concentrations than Benzene, but in industry fatalities are not heard as it is less volatile. Xylol is thought of as less dangerous than Benzene. High concentrations may cause giddiness and intoxication leading ultimately to unconsciousness, but fatal cases are not known.

7. *Turpentine* — is an unsaturated hydrocarbon, grouped under essential oils, is used as a solvent in varnish making for mixing with pigments. Externally, it is an irritant and in large quantities it may form vesicles on the skin. As it is absorbed through the skin it should not be allowed to be handled to persons who suffered from Bright's Disease. The concentration of vapour which is generally met with in varnish making is harmless. But in higher concentration it causes giddiness and nausea. But they pass over very rapidly.

8. *Butyl alcohol or Butanol* — obtained from starch or fusel oil is used in the preparation of lacquers. The vapour produces nausea and giddiness and congestion of the conjunctiva. Prolonged exposure is said to produce anaemia.

We have seen in the previous lines that the solvent in general affect the skin producing dermatitis. General

idea is that from the superficial horny layer, fat is removed and a raw surface is left behind, which becomes easy for infection and so leads to acute and chronic skin diseases. Many of the solvents are absorbed through the skin producing toxicity. Often allergic reactions are seen causing general dermatitis.

B — GUMS — are poly saccharides and are exuded from plant. Congo — gum is generally used. When run into the pot the fumes produce congestion of the throat and irritates the eyes.

C — RESINS

1. *100% Phenolic Resins*, when reacted with oil give rise to fumes which produce irritation to the throat and eyes.

2. *Phthalic Anhydride* — is an important and common chemical for manufacturing synthetic resins and dye — stuffs, is obtained from Naphthalene which again comes from middle oil distillate of coal — tar. When it sublimes, the fume produced is injurious to the eyes, throat and gastric mucosa.

3. *Melamine Resins* — these are prepared resins containing strong solvent, which produce tightness of the chest and nausea.

4. *Cashew — nut — shell — oil* and *Valawan nut oil* — are vegetable oils. Cashew — nut — shell — oil is primarily phenolic in character and is vesicant in action. Dermatitis and skin eruptions have followed its contact with skin. But the commercial oil is less likely to do any harm as it is neutralised and used after heat treatment. Both of these oils when heated, fumes produced, irritate the eyes throat and lungs.

D — PRESERVATIVES

1. *Formalin* — it irritates the eyes and the skin.

2. *Pentachlor Phenol* — is a very light substance (white flakes), when worked with, float in the air passes into the trachea and lungs and covers the exposed part of the skin. This irritates wherever it comes in contact.

E — LEAD OXIDE — used as drier needs a title mentioning. Constant handling may lead to chronic lead poisoning. But the regular medical examination and extreme carefulness regarding this chemical has brought down poisoning to almost nil.

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GENERAL PRECAUTIONS

1. Use of more toxic solvents should be avoided as to the minimum.
2. Instillation of adequate ventilation system. Strong smell is an indication of presence of harmful vapour. Exception is mustard gas which dulls the power of smell.
3. Avoiding low boiling, highly volatile substances or when dealing with these chemicals, respirator should be used.
4. To save the skin as much as possible by use of protective clothing.
5. Gloves should be worn and eye — glasses worn where necessary.
6. Any injury, small or big, should be dressed when within the department, as dermatitis frequently originates round an untreated sore.

TREATMENT FOR INDUSTRIAL DERMATITIS

1. Removal from the contact of offending material.
2. Regular cleansing of the skin, which come in contact with the irritating material.
3. Lanoline is a good protective against mineral oil and tar dermatitis.
4. Pure liquid paraffin is of benefit in ordinary cases of itches and dermatitis.
5. In cases where dermatitis is established 1% hydrarg ammon with Zinc paste may be applied after removing the crust with starch Boric Poultice Calamine Lotion is of service in many cases. If there is no exudation 1% Ichthyol paste spread on linens may be applied with satisfaction.

In infective exudative cases—gentian violet lotion, Starch Boric Poultices or $\frac{1}{4}$ per cent silver Nitrate Solution in water may be used. Crude Tar is said to have given good results in some cases. Penicillin ointment in selected cases often produces marvellous results.

6. Improvement of the general condition is no less important.

THE MENACE OF QUACKERY

BY DR. SHAMANNA, B.A., M.B., B.S.

EVERY day fierce competition is reigning galore amongst those engaged in the art of healing the sickmen and women. Sickness itself is ubiquitous and it is no wonder that persons professing to cure it should be wide and vast. The criterion of curing an ailment is an ability to cure it and the patient who craves for relief does not bestow any thought on who gives such relief and in what manner it is given. The patient is not bothered whether his fever is due to malaria or influenza provided he gets rid of it by the pill given him by his doctor. Amongst all the diseases the disease of Quackery is the worst because though it is universal and its signs and symptoms are so well known, its radical cure is still unknown, more so, in our country than in others.

I have in the following paragraphs set down a few random thoughts on Quackery. None of them are new to readers of this article nor are they all exhaustive or even arranged in any definite order. Even though such ideas are jumbled and oft-repeated they are worth such repetition on account of their importance.

Those who are actually trained in any recognised system of medicine be it Allopathy, Ayurveda, Unani, Homeopathy etc., are feeling the competition at the hands of those not so trained. When differences of opinion between Allopaths and other groups practicing indigenous medicine are not yet composed, all these

groups as a whole — the orthodox group have to compete with a larger group — the Quacks — who are carrying on the healing art openly or surreptitiously. This latter group consists of a heterogeneous miscellany of people — dismissed or retired compounders, and midwives, postal diploma holders, proprietors of medical shops, "Dais", priests, fortune tellers, nurses and servants of hospitals etc., etc.

Some of them — the compounders and male nurses have certain features in common. They have no systematic training in any recognised institution and have no recognised hall mark to practice medicine. But they want to be known as doctors, prefix the title "Doctor" to their names prominently, dress fashionably, carry a stethoscope and a leather bag and to all external appearances look like doctors. In fact they suffer from an inferiority complex and their external embellishment is a cloak to mask such inferiority. They do anything and everything to earn a livelihood under the guise of doctors. They pretend to examine a patient, put the chestpiece of the stethoscope here, there and everywhere, administer pills and injections and even give prescriptions for proprietary medicines, though not bothered with the correct spelling of such medicines. They invade the villages, examine and prescribe and collect a fee in cash or kind. If in the initial stages they succeed, in curing a few cases they get bold, set up a

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During those bitter days of the Murmansk run, a sailor on leave from such death-defying experiences, dropped into a USO center in St. Louis. One of the charming hostesses asked him how he felt. It was conversational routine. But he had an answer.

"I'd feel fine if it weren't for a sore throat".

"Sore throat? Why, that responds readily to a gargle. Have you tried salt water?"

"Lady, are you kidding? I have been torpedoed three times".

consultation room in the neighbourhood of a dispensary employ touts and by hook or crook attract the village patients to their apartments.

There are besides general practitioner Quacks, Quack specialists. Some couched the cataractous lens, others cure all ear ailments, a few are pyorrhoea specialists and others are piles specialists not to speak of those engaged in eye testing and selling of spectacles.

The "Dais" is commonplace personality in every village. The trained lady doctor has to compete with her. Even abnormal presentations are attempted by Quack gynaecologists, and when unsuccessful their patients are rushed into hospitals in a moribund state.

Those who advertise specifics for asthma and other incurable diseases those who cry hoarse to cure sexual disability and menstrual disorders, nervous breakdowns, hysteria, and diabetes, mental diseases etc., are a legion. Many of them sojourn in important cities giving previous publicity of their programme for the benefit of their patients.

Some men and women are reputed as good physicians and carry on a practice in their own homes. They hold secret recipes for certain diseases and collect a fee saying that the fee just covers the cost of the medicine given.

In many a village even today, the first doctor to be consulted is the priest who prescribes talisman or amulet to be worn by patients. The villagers seek the assistance of persons who are supposed to be endowed with the voice of God, whether such and such a doctor could be consulted. The attendance of patients in a few rural dispensaries has fallen down considerably on account of such practices of the part of the villagers.

The proprietors of Medical shops take an active interest in prescribing this pill or that to their patients, interested as they are in the sale of their wares. The use of some proprietary medicines is so well known, that they are prescribed ubiquitously for symptomatic relief by one and all. If patients themselves can cry out their diseases, the medicine vendor can do bumper business.

Even in the field of surgery the nurses and dressing Boys are carrying on Quack practice. They steal the surgical instruments and dressings from the hospitals and do minor operations in patient's homes, with local or vocal anaesthesia. Hundreds of circumcisions are done by surgery coolies apart from ritual circumcisions the

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patients being apprehended that if they go to surgeons they might emasculate them by removing the penis.

Instances are rare and yet true that a few technicians have stolen radium from hospitals and applied to patients in their own houses.

Persons engaging themselves in setting right fractures and dislocations are so well known that no elaborate description of them is necessary. Their end results are the real headaches and despair of the orthopaedic surgeons.

It is tritely true, that in our country there are more Quacks practising Dental Surgery than other specialisations of surgery.

Quacks do not need any big capital to start their trade. "Quackery" is not so apparent in other professions. It is only the orthodox or scientifically trained doctors that are worried about the causation, diagnosis and prognosis of a disease. They feel that they have a definite responsibility towards their patients and endeavour to do correct approved manouvers and manipulations. The Quacks are a law unto themselves, have no codal rules or regulations to guide them, have no qualms of conscience and so carry on their practice galore.

Quackery is in some ways akin to bribery. In both two sets of individuals are concerned—the donor and the recipient, whether the patient that seeks advice of a Quack or whether it is the Quack who inflicts treatment on a patient that is at fault, is difficult to decide.

Quackery itself is a speciality. Quacks thrive because some diseases are self curing, some self-remitting and relapsing, and some chronic and incurables. The treatment of Quacks is simple, cheap and available at the doors of patients. There is absolute privacy of what they do. The wandering Quacks prescribe a remedy and leave the locality even before its effects are apparent. Quacks need not know even the 3 'R's.

It is a grim tragedy that the trained medico has to carry on a competition with Quacks. They are so low in social and intellectual status and yet the Quacks and the orthodox doctors are called in to fight in a common arena. Many a Medico's blood is boiling on account of these thriving Quacks and it is the poor Medico that has to go to the wall. A time has come when the profession cannot ignore Quackery.

Three U. S. Scientists Win 1954 Nobel Award for Polio Research

(Specially contributed)

WASHINGTON D. C.

THREE American fighters against Infantile Paralysis (Poliomyelitis) will share this year's Nobel Prize for Medicine & Physiology.

The winners are Dr. John Franklin Enders of the Harvard University Medical School and his collaborators, Dr. Thomas Weller of the Harvard School of Public Health and Dr. Frederick Robbins of the Western Reserve Medical School at Cleveland, Ohio.

The three scientists were honoured for their accomplishments in finding new ways of growing virus for Polio Vaccine.

The citation of the Royal Caroline Institute College of Stockholm, whose members award this prize, says that the award was given to them "for their discovery of the ability of the Poliomyelitis Virus to grow in cultures of different tissues".

This means, in effect, that the three doctors have given scientists tools that may eventually conquer Infantile Paralysis. Their discovery made possible the development by Dr. Jonas Salk of the so-called Salk Vaccine with which some 6,000,000 children in the United States were inoculated during the summer of 1954.

Dr. Enders, Dr. Weller and Dr. Robbins devised a means of mass-producing Polio Vaccine, which was the result of many years of effort. Before the three scientists succeeded, it was practically impossible to produce Polio Vaccine in the required quantities because of the scarcity of the necessary isolated virus.



Dr. Frederick C. Robbins, professor of podiatrics at Western Reserve University, Cleveland, Ohio, is shown in his laboratory at Cleveland City Hospital after he received the news that he and two colleagues, Dr. John F. Enders and Dr. Thomas Weller, will share the 1954 Nobel Prize for medicine and physiology. The three American scientists won the award for their work to combat poliomyelitis or infantile paralysis, specifically "their discovery of the ability of poliomyelitis virus to grow in cultures of different tissues". Their discoveries made possible the development of the Salk anti-polio vaccine, now being given a nation-wide test in the United States.

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That some orthodox medicos are emulating the Quacks, that Quackery is universal, that so long as there are persons who fall ill and those who come forward to cure them Quackery exists, that Legislative measures cannot abolish Quackery and with spread of education, Quackery gets mitigated are all statements often alluded to by the learned. The problem is a difficult one of immediate solution. It takes a long time in our country to abolish Quackery. While there is a dearth of orthodox Medicos in our country there is an

excess of those engaged in the art of healing. With the spread of education amongst the masses and suitable legislative measures, the taking of scientific medical relief to the doors of the villagers, the reduction in the cost of our treatment as to be within the reach of the poor, are some of the measures that might mitigate the ravages of Quackery. More than all, the ethical standard of our people should be raised before Quackery can be abolished.



Dr. Thomas Weller, left, and Dr. John F. Enders, right, are shown at the Children's Hospital in Boston, Massachusetts, after they received news that they and Dr. Frederick Robbins had been awarded the 1954 Nobel Prize for medicine and physiology. Dr. Enders is associate professor of bacteriology and immunology at Harvard Medical School. Dr. Weller is professor of tropical public health at Harvard School of Public Health. The award was given for research work which developed a method of growing virus for polio vaccine.

Poliomyelitis is caused by a virus which may be one of three types. Early efforts to cultivate the virus in test tubes, as ordinary microbes are cultivated, failed because the conditions were wrong. Dr. Enders and his two colleagues discovered the conditions under which success could be achieved. They found that the culture medium had to be free from nerve-cells; it had to be rotated so as to assure even distribution; it had to be fed properly; it had to be supplied with air; it had to be kept at the right temperature and humidity. When a preparation thus cultivated in glass was inoculated with a Poliomyelitis virus, Dr. Enders and his assistants were able to see how human tissue was destroyed. The achievement made history.

"I arrived at my method by refusing to acknowledge defeat, by working hard and by trying many methods of approach", Dr. Enders is quoted by friends as saying.

Dr. Enders is Associate Professor of Bacteriology and Immunology at the Harvard Medical School and Director of the Research Division of Infectious Diseases at the Children's Medical Centre at Boston, Massachusetts. He was born at West Hartford, Connecticut, in 1897, received his A. B. degree from Yale University in 1920, and his Ph. D. degree from Harvard in 1930. He has been engaged in active medical research since the early 1920's, when he was concerned with studies of the Tubercle Bacillus and various types of pneumococcus. Since the 1940's he has been interested in studying mumps and measles with the hope of developing preventive vaccines for both.

In October, 1954, Dr. Enders received the Lasker Foundation Award, which cited him for "distinguished achievements in the cultivation of viruses".

Dr. Weller was born at Ann Arbor, Michigan, in 1915, received his B. S. degree from the University of

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The Conference of International College of Surgeons in India

THE two-day-session of the Conference of International College of Surgeons in India began in Bombay at the "Taj Mahal Hotel" on 10th November, 1954 and was addressed by Dr. Max Thorek, M. D., F. C. P. S. (Hon), F. I. C. S., F. R. S. M. (Eng), Founder and Secretary-General, International College of Surgeons and several other visiting U. S. Surgeons.

Among the scientific papers read before the conference were :

1. Abdominoperineal Excision for Low-lying Cancer of Rectum by Dr. Harry E. Bacon, of Temple University, U. S. A.
2. Dupuytren's Contracture or Volkmann's Ischemic Paralysis of the Hands and Feet by Dr. Henry W. Meyerding, Emeritus Professor of Orthopaedic Surgery, University of Minnesota, U. S. A.
3. Complications of Cataract Surgery by Dr. William H. Ryder, attached to Hospital of St. Raphael, New Haven, Connecticut.

4. The evolution of Gall Bladder Surgery by Dr. Moses Behrend, of Philadelphia.
5. Modern Concepts of the Tonsil Problem by Dr. Herbert L. Cahn, of the New York Medical College.



Dr. Max Thorek of Chicago, founder and secretary general of the International College of Surgeons, addressing a group of doctors who attended the meeting of the Indian section of the college, held at the Taj Mahal Hotel in Bombay recently.

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Michigan in 1937 and his M. D. degree from Harvard in 1940. He served as a Major in the Army Medical Corps during World War II, and was stationed at San Juan, Puerto Rico. He is now Professor of Tropical Public Health at the Harvard School of Public Health, and is an assistant to Dr. Enders at the Research Division of the Children's Medical Centre, where the virus culture findings were made.

In addition to his work on the Polio Virus, Dr. Weller has isolated and propagated the causative agent of Chickenpox and of shingles, and has made special studies of various tropical diseases.

Dr. Robbins, a classmate of Dr. Weller at the Harvard Medical School, is now Professor of Pediatrics at the Western Reserve Medical School at Cleveland, Ohio. He was born in Auburn, Alabama, in 1916, received his B. A. degree from the University of Missouri in 1936 and his M. D. degree from Harvard in 1940.

While serving as an Officer in the Army Medical Corps during World War II, he was responsible for isolating the Rickettsia (an organism resembling a bacterium or a virus) of "Q fever" in the Mediterranean areas.

In commenting on the award of the Nobel Prize to himself and his two collaborators, Dr. Enders said:

"It is perhaps symbolic of this kind of investigation work that no one man but men working together, building on the foundations laid by their predecessors, accomplish their results".

The research work done by the Enders Group was financed by the National Foundation for Infantile Paralysis, an organisation whose founding was stimulated by the late President Franklin D. Roosevelt, himself a sufferer from Infantile Paralysis.



Dr. Max Thorek of Chicago, Secretary of the International College of Surgeons, chatting with Dr. Vasant P. Mehta, Honorary Secretary of the Indian section of the college.

6. Management of Severe Gastric Hemorrhage by Dr. Thurman M. Rogers, of St. Benedict Hospital, Sterling, Colorado.
7. Physical Law of Repair and the Healing of Wounds by Dr. W. C. Speidel of Seattle Surgical Society (Former President).
8. Prevention of Recurrent Renal Calculi by Dr. Henry W. Livtak, of New York University Medical School.
9. The Use of Femoral Prosthesis in Hip Surgery by Dr. Nick J. Accardo of Tulane University, New Orleans.
10. Spontaneous Rupture of Ileum by Dr. Lorne W. Mason of St. Francis Hospital, Evanston, Illinois.

Besides 16 other important papers on various aspects of Medicine & Surgery were also read at the second and final day of the Conference which was rounded off with a Dinner at which Hon'ble Shri Morarji R. Desai, Chief Minister of Bombay, was the Chief Guest.

The President, Dr. Max Thorek and the visiting American Surgeons visited several hospitals, Medical Colleges and several other sight seeing centres during their sojourn in Bombay and later left on a tour of the remaining centres in India.

Hon'ble Rajkumari Amrit Kaur, Union Health Minister, who could not be present at the Conference in Bombay owing to her long deferred visit to the United States sent a message to Dr. Thorek welcoming him and the visiting U. S. Surgeons and expressing her hope that the Surgeons in India would greatly benefit by their visit.

Dr. Max Thorek, Graduate of the Rush Medical College and the University of Chicago has had a chequered career in the history of the Medical Profession. His assignments have been too numerous to mention in this writeup. Author of about 300 important papers on *General Surgery* his contributions to the medical literature are voluminous.

GENEROUS DONATION



His Excellency Mr. George V. Allen, United States Ambassador presenting a token gift parcel of life-saving drugs viz., Penicillin, Streptomycin, etc., to Hon'ble Rajkumari Amrit Kaur, Union Health Minister, at the Secretariat recently. This is part of the large-scale supplies of medical aid planned for India by the U. S. Government.

A Few Conceptions of Pathogenesis of Hypertension

BY DR. ABDULLA, L.C.P.S., L.M.S., F.C.P.S.,

The Nursing Home, Vaniyambadi.

HYPERTENSION is not a disease, but a syndrome; a mosaic, in which several mechanisms are involved and many factors operate. Its pathology is still as unintelligible as it is obscure.

Man has inherited it from his fore-father Adam, who left the heavenly kingdom (to talk in biblical terms) under stress and strain. Little wonder, therefore, that man—the true son of Adam—exhibits the traits of his progenitor.

When Eve came on the scene, the confusion not only became worse but also more complicated, for according to Ayman⁽¹⁴⁾ and Platt,⁽¹¹⁾ the off-springs of TWO Hypertensive parents have higher blood pressure. About 47% of them develop Essential Hypertension in later life; whereas only 3% of the children of more sober normotensive parents develop hypertension. In families in which only one parent is hypertensive, the incidence is about 28%.

The problem of hypertension was taken up for serious study only about a century ago, when the tension of the radial pulse became the object of attraction, the tension being the indicator of the arterial pressure. The interest became all the more great when Bright, as early as 1827, pointed out the frequency of Hypertrophy of the heart in nephritis. With the advent of the more exact clinical instruments like sphygmomanometer (by Van Basch), it became possible to assess accurately the blood pressure in the arterial system and to evaluate critically the effects of the continued high pressure.

In the understanding of the real pathology, we have had many obstacles. We have got over few of them. There is no longer the question WHY does hypertrophy of the heart occur in the kidney diseases? But the present problem is HOW does the hypertension occur in general?

There are two important factors to be considered :—
(1) Is the hypertension due to increased volume of blood while the peripheral resistance is constant?

(2) Or is it due to the increase of peripheral resistance while the blood volume is constant?

It has been proved that the volume of the blood does not alter or increase at any time and the hypertension is mostly due to peripheral resistance.

How is this peripheral resistance caused? What are the factors that regulate it?

There is a division of opinion on this. The French writers are inclined to believe that the cause is due to hyperadrenalinemia, while the German and other Continental writers, including Americans, consider it due to the Central or Reflex stimulation of the vasomotor centre, which regulates the blood pressure through the immense bed of blood vessels which are controlled by the Splanchnic nerves. Stimulation of splanchnic nerves, activates the adrenals which steps up the production of its hormone "Renin". Renin is a powerful vasoconstrictor that raises blood pressure.

For pedagogic purposes we can classify the various systems involved in hypertension as follows :—

(1) OBESITY

(2) HEREDITY

(3) CARDIOVASCULAR PARTICIPATION

- | | |
|-------------------------|----------------------------------|
| (a) Atherosclerosis | (g) Coarctation of Aorta |
| (b) Heart failure | (h) Arteriovenous fistula |
| (c) Arteriosclerosis | (i) Heart Block |
| (d) Polycythemia | (j) Arteritis |
| (e) Panarteritis Nodosa | (k) Visceral Lupus Erythematosus |
| (f) Scleroderma | |

(1) Vascular anomalies and obstructions, like embolism, venous or arterial thrombosis, aneurysm and tumours.

(4) AFFECTIONS OF PARENCHYMA

- | | |
|-------------------------------|---------------------------|
| (a) Acute & Chronic Nephritic | (h) Pyelonephritis |
| (b) Hydronephrosis | (i) Polycystic Disease |
| (c) Amyloidosis | (j) Infarcts |
| (d) Tumours | (k) Hypernephroma |
| (e) Ectopia | (l) Toxaemia of Pregnancy |
| (f) X-Ray Lesions | (m) Renal Stones |
| (g) Hypogenesis | (n) Dystopia |

(5) AFFECTIONS OF PERINEPHRIC STRUCTURES

- | | |
|---|--|
| (a) Perinephritis | (d) Hematoma |
| (b) Retroperitoneal masses causing pressure on parenchyma | (e) Wilm's Tumour |
| (c) Tumours | (f) Obstruction near/of, pelvis of the kidney ureter, prostate, urethra & Pyelitis |

(6) CEREBRAL

- | | |
|--|--|
| (a) Increased intracranial pressure due to trauma, tumour and inflammation | (d) Acute Porphyria |
| (b) Diencephalic Stimulation | (e) Lesions of brain stem like ascending paralysis & Poliomyelitis |
| (c) Anxiety States | |

(7) ENDOCRINE FACTORS

- | | |
|------------------------|---------------------------------------|
| (a) Pheochromocytoma | (d) Adrenal Carcinoma and Hyperplasia |
| (b) Chrionepithelioma | (e) Adrenal-like Ovarian Tumours |
| (c) Cushing's Syndrome | |

Let us confine our discussion to the following principal concepts :—

(1) OBESITY (2) RENAL FACTOR (3) NERVOUS FACTOR and (4) ATHEROSCLEROSIS

OBESITY

OBESITY is the external sign of internal satiety or gluttony; the culminating effect of frequent and unlimited ingestion of dainty cakes and pastries; in medical language, the result of imperfect and insufficient burning of fat in the heat of physical energy.

Glands or Gluttony (?) or Both (?), in children the corpulence is mostly due to the free supply of buns, pastries, sweets and other carbohydrate foods. In adolescence the problem becomes serious, more specially when a married woman of short stature who has had a number of pregnancies or none at all, "runs to fat".

In a young man, as easy life, rich food, frequent club lunches and parties, overflowing with hot drinks are quite often the most common causes. Sometimes mental worry seems to be the casual factor. The more the mental worry—be it due to loss in business, love or jealousy, loss of position or affluence—the freer the flow of drinks and puffs of smoke.

The average age, when persons become corpulent is about 40. The woman seems to outgrow the man in size much earlier. She develops localised fat—vast buttocks, fat thighs and legs, protruded, loose and hanging abdomen and a pair of mighty sized shoulders and arms to support a round or a square face with a conspicuous double chin. The meno-pausal changes seem to quicken obesity. It may be otherwise also.

The man, who, normally at the age of 40 is already a father of some children, finds his trousers belt becoming tighter and tighter till he is obliged to give it up for good and take to a more comfortable device: braces, to keep his trousers up. His belly measurement increases month by month till it outgrows the chest measurement. This uncontrollable and unwanted "bulge" becomes so large till he can no more see the pair of feet on which he stands, or till he can no more bend to tie his shoe laces while sitting on a chair.

These bulges and fat lumps are the "Red Signals" pointing to the increased danger of post-operative embolism, diabetes, osteoarthritis, myocardial weakness/failure, hypertension and coronary diseases.

The strain on the aging heart is increased by the extra pounds of fat the person carries on him. The heart which at this age, instead of being given some rest, is compelled to work faster and harder against the increased vascular pressure and pounds of accumulated fat.

Statistically, it has been shown that obese persons of Cushing's syndrome and the corpulent people, usually have over-average blood pressures; (⁸, ³⁸, ⁶⁷, ⁷⁵, ⁷⁸, ¹¹¹, ¹²¹, ¹³⁷) among the American writers are Grimson, (⁶⁵) Heymann (⁷⁴) and etc. (³², ⁵⁸, ⁷⁷, ⁹², ¹¹²)

Over-average blood pressure, in children of over-average weight, is also reported. (¹³⁷, ¹⁴⁰)

Manifest Essential Hypertension is also commonly present in the obese. (⁸, ¹⁸, ³⁸, ⁵², ⁷⁸, ⁹⁷, ¹¹¹, ¹²¹, ¹²⁵, ¹³⁷, ¹⁴¹, ¹⁴³)

Like-twins, exhibit very similar body weights and blood pressure. (⁷¹, ⁸², ¹²⁸, ¹⁵¹)

Alterations in the body weight and blood pressure were observed in the obese and normotensives, (², ²², ²³, ¹⁰⁷) and in hypertensives also. (⁸, ⁹⁷, ¹⁰⁶, ¹⁰⁷, ¹²⁰, ¹²⁶, ¹⁴³) The hypertension is modified with the reduction of weight.

Obesity, as a hereditary factor rarely occurs before the age of 35. It is commonly found between the ages of 45 to 75. Both sexes are affected equally; between 60-75 it is common in women. Weitz (¹⁵⁸) and others are of opinion that heredity and age play an important part in hypertension.

Not only the Gods Bacchus, Mars and Cupid play an important role in the life of hypertensives but also the devil "Nicotine" who came later on.

Grace, M. Roth carried out careful investigations and demonstrated :- (1) The vaso-constrictive effects of tobacco, which could not be counteracted by the use of alcohol. (2) After smoking two cigarettes, the average blood pressure increase was 19 mm HG. Systolic and 14 mm. HG. Diastolic. (3) The pulse rate increased to an average of 36 beats per minute. (4) The electrocardiograph changes consisted of an increase in the heart rate, and a lowering of the amplitude of the "T" waves; in one person the "T" waves became inverted.

It is interesting to note that abandonment of tobacco smoking as a therapeutic measure or for caprice, increases corpulence. It is suggested that such persons develop good appetite and eat more. During the period of the smoking craze they chew nuts, eat sweets or chocolates to forget the craze for the time being. This further adds more calories to the food intake.

The conclusion that could be drawn from the foregoing studies is that there is a definite relationship

between obesity and high blood pressure; heredity and age also have some bearing in the pathogenesis.

RENAL FACTOR

This is the one of the most interesting and complicating factors having a few enthusiastic supporters, despite several convincing facts and experimental proofs against it.

As early as 1827, Bright drew attention to the left sided hypertrophy of the heart in nephritis. Arterial hypertension, both systolic and diastolic, is a constant feature, both in acute and chronic glomerulonephritis. In acute nephritis the onset of the hypertension is abrupt and severe, and the glomerular filtration in kidneys is definitely decreased. This decrease is attributed to the oedema and exudation. There are also vasospasm and constriction of arterioles, which subsequently produce ischaemia of a marked nature.

There is a dichotomy of thought in the cause/causes of the arteriolar constriction and renal ischaemia. One school champions the hypothesis that renal ischaemia is the cause and the vasoconstriction is the effect; whereas the other school produces evidence to show that neurogenic factors are the initial causes and the ischaemia is the after effect. They produce instances of Hypertension and Oliguria that have been relieved by high Cadual Anaesthesia, suggesting that vasomotor spasm of Neurogenic Origin may be the factor in the renal functional pattern.

Cases of hypertension with normal kidneys found at necropsy have been noted. (¹⁹, ⁴⁰, ¹⁰⁹, ¹¹⁴)

McGeorge (¹⁰⁵) demonstrated a decrement in the renal function with increasing age. The decrease in the renal function sets in more rapidly in cases of Essential Hypertension. Cox & Dock (³⁴) perfused the kidneys of patients suffering from hypertension and found that the flow decreased with age and was most marked in kidneys of essential hypertension. It would therefore not be wrong to suggest that in young patients with "Prehypertensive State", the blood pressure quite often manifests itself before pathological changes are manifested in the kidneys.

Goldblatt (⁶⁷) suggested, after conducting many and careful experiments, that the essential hypertension might be due to renal ischaemia, produced by the renal arteriolar changes.

The arterial changes in the renal vascular system have been proved by Fahr (⁴¹) and many others. (⁴⁰, ¹⁰⁹, ¹²²) The ischaemia in all advanced cases of hypertension has been established. This liberates an enzymatic substance "Renin". Renin enters the blood vessels through the renal veins and interacts with "hypertensinogen" (Renin — Activator) — an alpha globulin produced in the liver and found in blood plasma. A combination of renin and hypertensinogen "Hypertension" (Angiotonin) is formed, which acts as a powerful pressor and vaso constrictor of smooth muscles. Renin is supposed to be produced in the Juxtaglomerular apparatus and the cortical tubules. The exact site of its production has not yet been established.

The ischaemia of renal tissue in hypertension has been established for certainty. The more the ischaemia the more the hypertension. Fortunately the action of renin is limited. It is destroyed by various enzymes. There is a hypothesis that the normal kidney liberates anti-pressor substance which counteracts the effects of the pressor substance. The normal functioning of the renal tissue is reduced as a consequence of the renal arteriolar changes. The failure of the antipressor activity, freely allows the hypothetical pressor substance to act as a powerful peripheral vasoconstrictor and produce vascular spasms. This hypothesis lacks evidence.

Renal ischaemia is not always accompanied by a rise in blood pressure. (³³, ⁸⁸) Whether this is due to the failure of the kidneys to release the pressor substances or an increase in the production of anti-pressor agents, it is not definitely known. (⁴², ¹²⁴)

The kidneys are the seat of the origin of hypertension perhaps, because (1) In only the renal disease the hypertension is present. (2) In anuria due to any cause, be it enlarged prostate, tumour pressing a ureter, a stone in urethra, ureter or kidney or even in bladder, and phimosis due to any cause, obstructing the free flow of urine, the rise of blood pressure is usually noticed. When the obstruction is removed the fall of blood pressure occurs. (3) In polycystic kidney or in multiple hydronephrosis of individual nephron, the hypertension is a rule. (4) In animal experimentation, hypertension occurs after the destruction of renal tissues; after ligation of the main renal artery or its branches and after ligation of the ureter also.

It therefore appears that any retardation, check or disturbance in the free flow of blood in the kidney or any primary obstruction producing changes in the haemodynamics of the kidneys, gives rise to hypertension.

Therefore the kidney seems to be responsible for the production of the "unknown pressor substance" in the blood stream. This hypothesis is supported by Tigersted, (¹⁴⁴) who found pressor substances in the extract of normal kidneys.

The 2nd Angioplastic group of cases are those in whom primary endarteritis of renal arteries and granular kidneys due to Amyloid, occurs. The endarteritis of the renal arteries is mostly due to syphilis and rarely due to tuberculosis.

The 3rd Angioplastic group is that in which hypertension is not due to renal origin, as in toxæmia of pregnancy and lead poisoning. The theory of eclampsia will have to be rewritten, if it could be proved that the renal pressor substance in the blood is the cause of eclampsia.

In Bright's disease, diffuse glomerulonephritis or secondary contracted kidney, two factors are noticeable, viz. (a) A general vasoconstriction and (b) presence of "pressor substance" in the blood.

Is the renal vasoconstriction, a part of general ischaemia or the peripheral vasoconstriction secondary to renal process? The present concept is that the peripheral vasoconstriction is renal in origin. Some consider that the essential hypertension is caused neither by general vasoconstriction nor by purely chemical nervous factors, but by profound changes in the walls of the arteries and arterioles. Hypertrophy of Elastica of Pre-arterioles and hyalinization of the arterioles are present. The increase of the thickness in the layers of the elastic part in periarterioles is considered as a senile phenomenon. It may be the fore-runner of Arteriosclerosis and may be termed as "presclerosis". When lipid deposits, hyalinization and degenerative changes are found, it is termed as "Arteriosclerosis".

In 1872, Gull and Sulton (⁸⁶) emphasised the importance of the changes in the arterioles and suggested that fibrosis in the arterio-capillary vessels was responsible for the maintenance of hypertension.

Goldblatt (1927) (⁶⁴) attempted to induce a disturbance in intra-renal haemodynamics and produced constriction of the main renal artery of one kidney. An elevation of the blood pressure was noticed. By varying the degrees of the constriction of the main artery he produced hypertension very much resembling benign and malignant phases of Essential Hypertension. Goldblatt, based on his experiments, postulated a hypothesis that reduction of blood supply to the kidneys is responsible for the production of certain changes in the intra-renal haemodynamics.

Following the theory of Goldblatt, many surgeons removed the diseased kidney. The results were varied. For instance, Wilson⁽¹⁵⁶⁾ and others,^(56, 116) found that the removal of the ischaemic kidney in rats did not reduce the hypertension. They suggested that certain pathological changes would already have taken place in the other kidney which prevented the reduction of hypertension. It has been shown that removal of the ischaemic kidney in dog, reduces blood pressure, provided that the removal is carried out within a few weeks.^(25, 57, 123) There are other experiments to show that blood pressure persisted even after the removal of ischaemic kidney for a period of about 3 or 4 months.^(1, 2) This is much similar to those cases of women in whom pregnancy is accompanied by hypertension of short duration and termination of pregnancy rapidly reduces the hypertension to normal. But in cases where the elevation of the pressure has been of longer duration, the blood pressure may persist and permanent hypertension may result.

Pyelonephritis is the most common renal disease in which athero and arteriosclerosis are found. Raachon (1948) showed that it accounted for 58% of deaths by uremia. No contributory cause of the infection could be found in 1/3rd of the cases. The problem is therefore not entirely urologic. Of course, in very many cases the association of pyelonephritis with severe hypertension, exists. They are both common ailments. To label the one as effect and the other a cause, is illogical and inadmissible.

The unilateral pathological renal lesion — pyelonephritis — constitutes a large portion of the lesions. High blood pressure is usually present in this disease. The logical treatment would be nothing short of nephrectomy, but Smith (1948), pointed out that about 20% of the cases were cured of hypertension spontaneously. The conclusion is, that unless the elusive factors which initiate and perpetuate renal hypertension are known, the problem of hypertension will continue to be empiric and a mystery.

Nephrectomy in diseased kidney of a dog, usually reduces hypertension but in rats it is not so. Man resembles more his enemy the rat than his friend the dog. Wilson⁽¹⁵⁷⁾ found in uni-nephrectomised rats suffering from hypertension, that the hypertension is not reduced as supposed by others. Their observation led them to a concept of a "Vicious Circle" in renal hypertension i. e., that the abnormal kidney causes hypertension. Hypertension when prolonged, results in arterial and arteriolar disease. Renal arterial disease

causes pressor endocrine activity which increases arterial pressure further and in case of nephrectomy, it causes hypertension to persist.

In patients with essential hypertension the reduction of blood flow comes only late in the disease and not during its initial stage.⁽¹⁴⁸⁾

Quite recently there has been an increased interest in the circulatory action of neurochromes, adrenaline and noradrenaline—both of which are sympathomimetic animus circulating in blood.

Adequate studies and research have revealed that major changes in the haemodynamics are caused by either of the hormones. Adrenaline in small doses is a dilator substance. The dilatation lasts 45 to 60 seconds.⁽⁹⁾ Then the blood flow returns to about its resting level. Larger doses of adrenaline cause vasoconstriction. If given intravenously the transient dilatation is immediately followed by a phase of sustained increase in the blood flow. Some observed a 50% increase in cardiac output, while Goldenberg⁽⁶⁶⁾ et al (1948) found the cardiac output approximately doubled. The change in the cardiac output is mostly due to the changes in the increased heart rate and alterations in stroke volume. Adrenaline increases the systolic pressure and its action on diastolic pressure is variable.

Noradrenaline is now regarded as the principal transmitter substance of sympathetic nerves. Obviously there is very likelihood of its being a positive factor in hypertension. Goldenberg et al (1948) suggested that Essential Hypertension might be due to a failure of methylation of noradrenaline of adrenaline.

Foreign substances: Plasma from sick patients or shocked animals and those who have received injections of Crude Extract of Kidney, contains a pressor substance and this when injected into non-nephrectomized cats, produce a sustained rise of blood pressure.⁽⁶⁸⁾

Ogden⁽¹¹³⁾ (1947), produced evidence to show that during the first few weeks of experimental renal hypertension the humoral mechanism is responsible for the rise and that it is displaced later on by the vasoconstriction action of the Nervous system.

Renin by itself is not a vaso-active substance but it is only one component of a complex system yielding vaso-pressor substance. After the operation on kidney, renin appears in blood and is detected only for about a week and after this period, it slowly disappears from the blood stream, when the nervous control takes its place.

NERVOUS FACTOR

An equal number of observers have held that the nervous factor is primary and the renal changes are only secondary. They contend that physiological elevation of blood, due to any cause/causes, if constant and prolonged, predispose to essential hypertension. The constant elevation of Basal Blood Pressure also leads to pathological elevation of blood pressure later on.

Volhard⁽¹⁴⁹⁾ (1931), had the following hypothesis: emotion, worry and similar strain, raise the cardiac output. This rise of the cardiac output does not normally raise the blood pressure because the arteries dilate automatically from reflexes arising from the aorta and carotid sinuses. He thought that as a result of the continued stimulation, these reflexes become exhausted, reflex vasodilation fails resulting in the rise of blood pressure. In later stages anatomical thickening of the arteries takes place causing persistent resistance to the arterial blood flow. This is what is found in permanent hypertension.

For convenience the various terms used in recording blood pressure are defined, though they are not needed: (1) The blood pressure taken under ordinary circumstances and conditions is termed CASUAL BLOOD PRESSURE, (2) and that taken under defined basal conditions as BASAL BLOOD PRESSURE (3) and the difference between the two 'the Casual and the Basal' pressures is SUPPLEMENTAL BLOOD PRESSURE.⁽⁴⁾ (4) The rise of blood pressure in emotion, alertness, anger, fear and psychic effects, above the limits of the normal basal pressure is called TRANSIENT BLOOD PRESSURE.

A rise of 10 to 20 mm. HG of Transient Blood Pressure is common and sometimes it may go up to 30 to 50 mm. It is generally found in persons who appear for examination for Military service, life assurance or clinical examinations for some purpose or other. These rises are temporary and subside within about a few minutes when the person is put to rest.^(5, 6, 18, 103, 131, 132, 165)

In nervous persons the rise of transient blood pressure could easily be produced by sudden provocation of the neurogenic centre by making a serious remark or suggesting an impending catastrophe or by staging the sudden arrival of a nurse or ward orderly with a number of syringes or surgical instruments in a tray.^(7, 84)

There is no understandable pathological cause for the variations in the transient blood pressure. It has been noticed that not all nervous patients show these changes,

but those who do and whose blood pressures are invariably due to sudden temperamental changes exhibit these variations more often than normal individuals. Changes in the mental attitude of melancholic persons, psychotics and psychoneurotics, are almost always liable to such blood pressure changes.⁽¹⁰¹⁾ Psychiatry now claims that much of the hypertension is due to psychic emanations of a disturbed nervous system. Many are of opinion that essential hypertension is found in a group of people, who, in temperament are irritable, over-active and over-tense and who flare up at the least provocation.^(12, 20, 107, 108)

Those with a philosophical bent of mind and those who take life easy and are "come-what-may" type; and those who live in rural areas, free from the hustle and bustle of the cities and industrial towns, are free from hypertension.^(69, 70, 133)

The mental change, however, transitory it may be, is noticed even in children of high school or in those who are under strict discipline and in students who are nearing annual examinations.^(127, 144) Such changes have also been noticed in the troops occupied in the front lines.^{(39, 69, 83).}

Those who are easily prone to the changes of Transient Blood Pressure, develop continued hypertension later on in life^(71, 116, 121, 160). Even the younger people who are subject to such variations in the transient blood pressure, are subject to continued hypertension, later on in life.^(37, 88, 89, 95, 104, 116, 128)

The rise of basal blood pressure is physiological constant for an individual and the supplemental blood pressure which is registered above the casual blood pressure is due to the person's emotional changes, — physical, metabolic and cerebral upsets. In normal conditions of rest and undisturbed sleep, the basal blood pressure is at the lowest level and the Supplemental Blood Pressure does not rise at all. A high basal pressure does not affect the usual expectation of life, as in this condition the cardio-vascular pressure is unaffected. It is the high casual pressure due to high basal pressure, that is of a more serious nature than the variables of Transient Blood Pressure.

Rise of blood pressure due to emotions (Transient Blood Pressure) is of a longer duration in many cases.^(5, 6, 17, 26, 39, 60, 72, 83, 103, 134, 135, 150, 155)

People who are liable to a rise of higher basal pressure and a higher supplemental pressure are prone to develop continued Hypertension later on.⁽¹³¹⁾

ie blood pressure level as taken in the wards or during the first visit of the patient, is not of a diagnostic value because it is not the average blood pressure during all the 24 hours. (^{15, 27, 30, 46, 64, 95, 101, 102})

Rats subjected to a long period of intense intermittent audeogenic stimuli, developed elevation of blood pressure. The experiments were conducted by Medoff (⁹⁶) and Farris (⁴⁷) (1945). Later on Smirk (¹³²) confirmed those findings and were quite in agreement with them. The rise of pressure was not abolished by light or other anesthesia.

Smirk (¹³²) noted that after the removal of audeogenic stimulation, the blood pressure persisted for long and there was no histological change in any one of the kidneys; and the blood pressure continued for more than 36 hours, even after performing bilateral nephrectomy. The conclusion that Smirk derived was, that there was a possibility of the nervous system by supersonic waves.

Smirk again exposed rats to a buzzer noise, eliminating the possibility of supersonic waves and passing mild electric waves causing a mild-to-moderate faradic stimulation of the rats' feet. This led to a rise of blood pressure after a few weeks. It was again not abolished by anesthesia. He concluded that elevation of blood pressure in this case was due to nervous stimulation which was maintained by some process other than that which initiated it.

It was considered that pathological changes in the arteries and the arterioles, proceeding hypertrophy of the intima, media or both, may cause continued hypertension in the peripheral arteries. This was discussed by Volhard (¹⁴⁹) (1931). He pointed out the futility of such a hypothesis. The very fact that Nitroglycerine, Nitrates, Sympathectomy and Thiocyanates, reduce the blood pressure, points out that there could be no passive changes in the vascular bed.

Selye and Heinbecker, ascribed the hypertension to the activity of Adrenal Cortex and Pituitary-Hypothalamus centres. It is suggested that hypothalamus stimulate pituitary, and pituitary stimulate adrenals which release Corticosteroids. The latter in turn affect the renal haemodynamics and produce hypertension.

As early as 1891 Johnson pointed out that the rise of blood pressure could be due to (1) Nervous causes and (2) to adrenaline activity in the blood. Anrep concluded that any stimulation of the nervous system activated the

Supra-Renals, the hormone of which affected the arterioles along with the nervous stimuli, both working simultaneously.

Anrep pointed out the effect of the stimulation of the vasomotor and the cardio-inhibitory centres. They act synergetically. Inhibition of the vasomotor centre causes vaso-dilation and the stimulation of the cardio-inhibitory centre causes slowing of the pulse, the latter occurring when the Vagi are in tact. (2) A mechanical rise of blood pressure in brain inhibits the vasomotor and stimulates the cardio-inhibitory centre and when it is reduced, immediate vasodilatation of the arterioles in the body takes place. The effect is almost immediate and observed within a fraction of a second. The changes are found irrespective of the fact whether Vagi are cut or not, showing that the mechanism is of a Central and Vasomotor in origin.

In regard to cardiac rate (Anrep and Starling; Anrep, Segall and Nash), it increases when the blood pressure in the brain is reduced and when it is sufficiently raised the heart rate slows down. These responses disappear when the Vagi are severed. Any rise of pressure in Aorta has similar action as that of a rise of blood pressure in the centres themselves, producing an inhibition in the vasomotor and stimulation in the cardio-inhibitory centre.

Hering's Carotid Sinus Reflex is a second regulator of blood pressure, identical with the depressor mechanism described above.

Section of the Carotid sinus and Aortic depressor nerves causes continued hypertension and cerebral ischaemia. But neither produces the hypertension simulating Essential Hypertension in man. (¹⁷) Subsequent experiments by Bing (²¹) and others (^{65, 74, 77, 147}) showed that the hypertension was widely fluctuating and depended on the changes in the cardiac rate — the disproportion being due to the increased cardiac output far exceeding the capacity of the arterial bed.

Ligation of the Cerebral Arteries in dogs produced hypertension but it did not occur at all times. (^{45, 112, 148})

In human beings the hypertension is often found in cases of Bulbar Poliomyelitis, Tabes Dorsalis, Sclerosis of Carotid Sinus and Chronic Porphyria. It is most marked in the hypertensive diencephalic syndrome. Increased intracranial pressure raises the arterial pressure. But this does not last long.

RACE AND ENVIRONMENT

In European and American population, specially in North Americans, the incidence of hypertension is greater — greater than Indians, Chinese, Philipines, American Indians, Africans, Malayees, Indochinese, Egyptians and Indonesians. The difference in the pressure may be as much as 10 to 20 mm. Systolic and 8 to 15 mm. Diastolic in comparable ages. (^{48, 78, 79, 136})

Geographical environments also appear to have some influence on blood pressure. China favours an environment to lower blood pressure and less hypertension while North America favours high blood pressure and more hypertension.

Essential Hypertension in Chinese is uncommon. (^{31, 35, 49, 60, 80}) Even the well-fed people have little of hypertension. (⁷²)

It is interesting to note that the Chinese develop hypertension after a long residence in the United States and when they return to their native land, China, the blood pressure falls. (^{49, 145}) The blood pressure of

Chinese in China is much lower than a Canadian of United States. (^{31, 49, 80, 145, 167})

Africans have low blood pressure as long as they are in Africa (¹³³) but they develop hypertension while in United States. (¹¹⁹)

American Negroes have more high blood pressure than the American Whites. (^{3, 7, 9, 48, 59, 73, 82, 102, 110, 119, 164})

Egyptians, have as a rule, less blood pressure. (⁷⁴) British residents in Egypt have lower pressure than their friends in Britain. (Smirk, unpublished observation)

The blood pressure of Philipines and Proto Ricans is less than other people in United States. (^{12, 29, 36, 91, 146})

In India, more specially in poorer classes, the blood pressure is much lower (⁹⁴) and lower than Anglo-Saxons. (¹²⁹) The South Indian of Yucatan (¹³⁶) and the Cuna Indians have as an average blood pressure of 105/69. (⁷⁹) The Zuni Indians too have very low pressure. (^{43, 44, 81}) The Australian aboriginals have

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at an average a systolic pressure of 110 and those between 60 to 65 years have 130, whereas the Whites of Australia have a higher incidence of blood pressure.

From the above statistics it will be observed that certain environments are responsible for higher "Normal" pressure and some for lower "Normal" blood pressure. People with higher blood pressure have higher incidence of *Essential Pressure* and those with lower blood pressure have lower incidence.

OTHER CAUSES

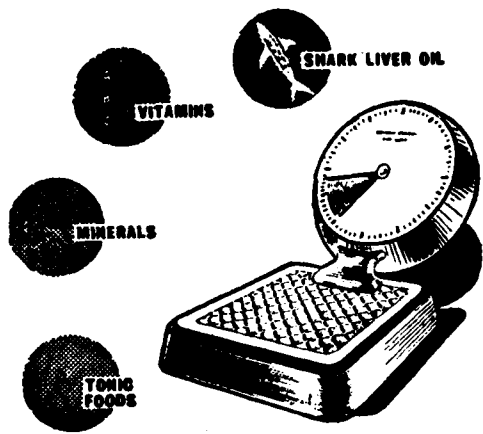
Amongst the other causes we may mention that prolonged arterial hypertension, due to any cause, leads to hypertrophy of the media of the smaller arteries, arterioles. This process is understandable. Increase work of any muscular organ, voluntary or involuntary, beyond physiological point, causes hypertrophy of the muscles. In hypertension due to constant load beyond the physiological range, the distensile capacity or the elasticity of the walls of the arteries is lost. (28, 41, 153) With the failure of the distensibility, partially or wholly, the systolic hypertension results. This failure of elasticity is not the whole explanation of the hypertension but it is a factor which participates in the syndrome.

Restall (unpublished observations) found that in hypertension, the responses to various stimuli of the medial wall of the arteries and the arterioles, is often exaggerated and this may be one of the causes to set the vicious circle going. There is a likelihood that it renders the stimuli more active specially in the renal vessels.

People with higher sensibility to Cold Presser Test and the blood pressure raising reflexes from muscle are supposed to develop hypertension later on, especially in the aged. (10, 130)

ATHEROSCLEROSIS

The term Atherosclerosis is unsatisfactory. To some it is synonymous with Arteriosclerosis; some use this term to mean the degenerative changes of the vascular tree. It is not a degenerative disease, nor inevitable concomitant of ageing, but it is a pathological process, definitely secondary to some other factor/factors. It is usually found in cases of Hypercholesterolaemia. (34) It is even associated with nephrotic syndrome. (23) It has also been found in persons dying of advanced age. (7) It advances with age, slowly but steadily, in the hypercholesterolaemic obese and hypertensive persons. (26, 121)



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Hypercholesterolaemia, is suggested to be the cause of Atherosclerosis. It affects mainly the large and small Arteries. The disease is characterised by patchy or irregular deposition of lipids in the arterial intima. This takes place by intimal proliferation, and later on, by calcification and degeneration, which conjointly lead to the production of Arteriosclerosis. Diet containing high cholesterol, like eggs and dairy products—the two favourites of the obese—is one of the causes.

In the early stages of Atherosclerosis, the internal layer of the arteries is affected and later on the medial layer is involved in the degenerative process. There is considerable evidence to show that some sort of relationship exists between Arteriosclerosis of the arteries, more specially of the coronary arteries, and cholesterol metabolism. What has not been definitely established is, whether the lipid content of the diet has anything to do with the deposition of the cholesterol in the intima. (11, 29, 33) Moreton (33) making a provocative statement that while ageing is relentless, Atherosclerosis is not necessarily a concomitant factor nor is associated with it, advanced a hypothesis and presented evidence that the high fat intake induces hyperlipemia; (2) that the size of the lipid particles is comparable to that of particles known to produce arteriosclerosis experimentally; (3) that the intima may take up the particles and form "Form Cells"; (4) and that the Triglycerides and fatty acids are more readily resorbed and removed than chloesterol which remain as the "difficult-to-remove residue" and when the residue of the inert and "difficult-to-resorb" cholesterol is thus trapped between the high pressure blood stream on the one side and the internal elastic membrane on the other; It is withheld and prevented from being despatched to the liver (and possibly other sites), where theoretically it could be easily degraded and eliminated by cells that are specialised in such metabolic functions. Thus the accumulation of lipids, in the arterial intima seems to be a local and mechanical problem, unrelated to general balance or overall metabolism of these substances.

Sir Clifford Albutt, in his famous treatise on "Diseases of Arteries", (1915), London, pointed out that the arterial degeneration of atherosclerotic type is prone to produce arteriosclerosis later on. This degeneration much depends on the defective fat metabolism. This has been proved by Malmros (110) and Strom and Jensen. (138) They also showed that those races who live on diet, low in cholesterol, show a remarkably low incidence of atherosclerosis. In Scandinavia, where the incidence of death due to circulatory

diseases was high, it diminished remarkably after the 2nd World War when the dietary fat was reduced to a minimum owing to the exigencies of the war.

Recent studies indicate that an excess intake of dietary fat and persistent alimentary hyperlipemia appear to be the casual factor of Atherosclerosis. (62, 93)

Goffman (62) has demonstrated by an ingenious optical ultracentrifuge technique that Coronary Atherosclerosis is associated in most cases with "giant" Lipoprotein particles of low physical density circulating in the blood stream and these are the causes of Atherosclerosis.

Other investigators found that Lipocrons (any fat particle) and Chylomicrons (large fat particle) circulating in the blood stream after the ingestion of fat, are contributory factors.

It is now well known that diseases associated with Hyperlipemia during life time have predominantly an increased incidence of atherosclerosis: Diabetes Mellitus, Nephrosis, Myxedema and Xanthomatosis. (98, 99, 100)

The study of the diet of the various national groups was studied very carefully and after careful investigations it has been found that people on low fat intake have a decrease or no atherosclerosis. (119, 138, 172)

In addition to the above genetic causes, constitutional factors also operate in the production of atherosclerosis. (Aldersberg (11) and others) (152)

It is believed that in most cases the liver is in metabolic error. (98, 99)

Atherosclerosis with its "internal swellings" in the intimal layer of the arteries, tends to increase the internal pressure of the vascular tree and any continued and irritating factor within it subsequently tends to produce continued Hypertension.

COMMENT AND CONCLUSION

The elevation of Blood Pressure in Essential Hypertension does not seem to be originating from one factor alone. There are several factors which operate and any one of them may be predominantly present in a

particular case. But this does not prove that the particular factor should be necessarily present in all the other cases. The essential hypertension seems to be but an exaggerated form of Benign Hypertension with some additional factor.

In some cases the simple over-activity of the physiological processes and in some the pathological and functional changes tend to produce and maintain hypertension. And any tendency to raise the blood pressure frequently and for sufficiently long period may tend to elevate hypertension, later on in life.

Heredity, obesity, race, geographical environments, emotional liability to over-alertness, worry and tenseness, circumstances and occupations requiring severe strain and mental alertness and over-average liability of vasoconstriction due to the above mentioned physical and psychical factors and metabolic stimuli, over-average body weight and sthenic habitus are the common factors that play a part in the production and maintenance of Hypertension.

Hypertension, as in Arteriosclerosis is considered to be produced by certain exogenous factors, like alcohol, syphilis, over-eating, nicotine and psychic disturbances. No definite proofs have been produced in support of them.

It would appear that there are two types of hypertension. One is the *renal* and the other *nervous*. In one variety all the vessels seem to be contracted and in the other it is not so. In the first the patient is pale and in the second, red or ruddy. The kidneys in the 1st group, at autopsy, are pale whereas in the 2nd they are red. In the pale variety the patient is very ill, weak and tired; and in the red variety he is vigorous, healthy and may enjoy life to its full. In the pale group the peripheral arteries seem to be narrowed whereas in the other it is not so. In the 1st group the retinal arteries are contracted, ischaemic with retinitis albuminuria and angiopastica, whereas in the 2nd group they are not so.

The group termed "*RED*" hypertension is what we once called the 'Idiopathic Hypertrophy of the Heart' and to-day we recognise it as a permanent or Genuine or Essential Hypertension.

The group termed "*PALE*" hypertension is considered to be due to chemical or humoral mechanism. The question that has been a great puzzle to the medical world, is whether the general constriction of the

arterioles is due to the output of the supra-renal hormone in the circulating blood or whether there is any other factor in the blood that sensitises the tissues to Adrenaline.

The answer to question No. 1 is in the negative. No one has yet proved the presence of any extra quantity of supra-renal hormone in the blood. The answer to question No. 2 is "probable". Increase of secretion of supra-renal glands may precipitate the syndroms of hypertension.

The active phase of chemical regulation elevates the blood pressure; the lowering of it—reduces it. The chemical factor is a powerful one. The nervous system, likewise powerfully and effectively controls the elevation of blood pressure. There are separate nerve-paths endowed with a power of reflex mechanism to reduce the blood pressure, with pressure sensitive areas in the heart, aorta and in the large arteries of the brain. There are separate nerve-paths to check the extracerebral pressure as well.

The other factors are those that singly or in combination produce pathological changes in the vascular vessels:—

- (1) The inelasticity of the large arteries;
- (2) The presence of "*presser*" substances in the blood;
- (3) The toxins of ischaemic kidney;
- (4) The exaggerated contraction of hypertrophical arterioles;
- (5) The hypermotility due to hypersensitivity of the arterioles; and
- (6) The disturbance due to hormonal glands.

These are all hypothetical factors and have not been proved by any scientific means as conclusive evidence.

There is evidence on the other hand to suggest that the Malignant Tension has a different bearing or origin and is quite distinct and separate from Benign or Essential Hypertension. —Bright's prealbuminuric phenomenon, Von Basch's latent Arteriosclerosis, Allbutt's Hyperpiesia, Suchard's Presclerosis, Janeway's Hypertensive Cardio-Vascular Disease, Volhard's and Fahr's Benign and Malignant Sclerosis—are known in the United State as *Essential Hypertension*.

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SANITEX have introduced a new Anti-Anemic Drug for Iron deficiency Anemias. It combines Ferrous Gluconate with a new trace element COBALT GLUCONATE which directly stimulates bone marrow causing multiplication of cells and release of erythrocytes into the blood stream thus haemoglobin formation is facilitated and available iron utilized promptly. Cobalt - Iron Therapy is indicated in all cases in which regeneration failure of the bone marrow creates a need for stronger hemopoietic stimulus than that presented by a therapeutic increase of Iron supply, particularly in acquired and congenital Hemolytic Anemias, essential Hypochromic Anemias, Anemias due to Tumor, Toxic Anemias and other Iron Refractory States. Toxically damaged bone marrow due to infectious anemias requires a hemopoietic stimulus which extends beyond that of the supply of Iron so that the blood formation may be set in motion. In such cases, Cobalt is said to be an almost absolute indication. The dosage is 2 to 3 tablets of Fer-G-Nate with Cobalt three times a day is recommended.

CORTISONE FOR SKIN DISORDERS

Cortisone, used effectively in the treatment of rheumatoid arthritis, can help patients with severe and distressing chronic skin diseases. This use of cortisone is not experimental; in many cases it has already prolonged the lives of patients with skin disorders ordinarily considered fatal. It has brought relief and rehabilitation to others suffering from chronic diseases that ordinarily would incapacitate them. Four years' experience, shows that those being treated did not acquire resistance to the drug and there was no need of continued increase of dosage. Neither was there any addiction to the drug. In most cases, the amount given could be progressively decreased and the diseases was kept under control while the patient gradually learned to do without the hormone.

The disorders treated were first those not ordinarily fatal but in their severe forms often ruinous to life - such as severe atopic dermatitis; and second the ordinarily fatal but often chronic skin diseases, such as various forms of pemphigus.

CANCER INCREASE IN MALAYA - INDIANS MOST AFFECTED

Malaya's Radio Therapist Dr. G. Lynch has recently revealed that Cancer in Malaya is on the increase and

statistics show that Indians are the worst affected. It would seem that Cancer is highest among the Indians, slightly less among the Chinese and least among the Malays.

"Indians had the highest incidence of Cancer in the mouth and this could be attributed to the chewing of betel" Dr. Lynch opines. What causes the disease is not known but it is possible that betel chewing only supplements bad oral hygiene and that dietary factors may be more important. He suggested that lime and tobacco which was often used could be responsible for the disease and that the reluctance of Malays to visit hospitals might be responsible for the low Cancer figures for Malaya. There were few cases of lung cancer in Malaya but a high incidence of cheek cancer and of cancer developing in the naso-pharynx. It was not quite clear why Chinese should suffer the most from this nose cancer. It was high among those Chinese born in Singapore, Hong Kong or even America.

CHLORPROMAZINE STOPS HICCUPS

Serious hiccups can often be stopped by one of the new so-called wonder drugs called Chlorpromazine, according to Dr. B. Lyman Stewart and Dr. A. G. Redeker of California. In five of seven patients treated the hiccups were stopped and they were partially controlled in the other two cases. In one case a patient hiccuped day and night for six days following a gall-bladder operation. The hiccups were partially controlled when he was put into a deep sleep with morphine and barbiturate sleeping medicines, but the hiccups always came back. A single injection of Chlorpromazine stopped his hiccuping and he was well enough to leave the hospital four days later.

HAIR TEST AIDS IDENTIFICATION

Scientific detectives have a new tool to use for identifying people. Examination of human hair with a polarising microscope and an instrument called a refractometer can indicate roughly the age and sex of the person from whom the hair came. This has been determined by twenty-year-old Dr. Oliver H. Duggins of Washington University at St. Louis, Missouri. The study shows that the refractiveness of men's and women's hair differs and changes as the individual grows older.

CAMOFORM SHOWS PROMISE OF CURING AMOEBIC DYSENTERY AND NON-AMOEBIC FORM OF THE DISEASE

Comoform shows promise of curing both amoebic dysentery and the non-amoebic. This drug was first synthesised during world war II by a popular American Pharmaceutical Firm while engaged in research for new anti-malaria drugs. About four years later Dr. Paul E. Thompson and Dr. Alexander M. Moor discovered its anti-amoebic activity. Two doctors from Peru now report that they have met with considerable success in curing the disease with Comoform.

Dr. Barrios of Peru, one of the Physicians, reports that in his controlled and followed-up study of 20 amoebic dysentery patients treated with Comoform "all were cleared of infection". Acute symptoms, such as abdominal pain, fever and diarrhoea, were "rapidly controlled, most of them days after treatment began".

The Physician pointed out that one patient had been sick and suffered relapses for two years before under-

going Comoform therapy. Twenty-two days of treatment cleared up the amoeba, and the patient continued negative at the five-month follow-up.

Dr. Bustamante said 82 out of 85 Comoform-treated patients with acute amoebic colitis were negative between the sixth and 15th days after therapy had begun.

He also said that even in three remaining cases a clinical cure was obtained and only the laboratory showed the presence of amoebas. Dr. Bustamante also reported that Comoform was effective in the treatment of chronic carriers of amoeba.

Comoform is an organic compound and does not contain arsenic or other toxic heavy metals. It is given by mouth. Because it tends to remain in the tissues for long periods, it may have preventive action against amoebic infections.

DR. P. ROBINSON, OF WORLD HEALTH ORGANISATION IN INDIA

Dr. Robinson, Maternity and Child Welfare Adviser to World Health Organisation for South-East Asia stated

recently in Saurashtra that his organisation would aid the state government in the expansion of Health Service Schemes for primary and secondary school children. A doctor and two nurses have been sent to Saurashtra to train midwives and nurses for the purpose. They will conduct classes for two years throughout the State in nursing and midwifery. Dr. Robinson also said that the WHO would help in setting up two Children's hospitals in Saurashtra for the promotion of Child health in the State. At present there is not even a single Children's Hospital. Dr. Robinson complimented the State Administration in the running of health services and particularly in the maintenance of rural health projects efficiently. He also said that a Maternity and Child-welfare Project would be launched in Punjab (India) with the aid of WHO & UNICEF.

GERMAN FIRM'S GIFT OF MEDICINES FOR FLOOD-STRICKEN ASSAM

A gift of medicines worth about Rs. 10,000 was made by Mr. H. L. Nebeling, Representative of Messrs. Farbwerke Hoechst, A. G., Germany, to Mr. S. K. Patil, Chief of the Bombay Provincial Congress recently for the benefit of flood-stricken Assam and other parts of the country. At a formal ceremony held at the premises of the Indo-German Cultural Society, Bombay, Mr. Nebeling said that "our modest gift may be looked upon as an expression of the warm feeling of sympathy for the Indian nation".

Accepting the gift on behalf of the Indian Red Cross Society, Mr. Patil expressed his gratitude to the firm for their generosity in coming to the aid of the Indian people. The medicines were handed over to Captain N. J. Vazifdar of the Indian Red Cross Society for proper distribution.

WORLD EXPERTS ON TUBERCULOSIS TO MEET IN LONDON NEXT JUNE

Some of the foremost authorities on Tuberculosis, from countries all over the world, will be among the speakers at the fourth Commonwealth Health and Tuberculosis Conference in London next year. The conference, arranged by the National Association for the Prevention of Tuberculosis, will be held at the Royal Festival Hall from June 21 to 25.

Subjects for discussion at the main session will be: "The Preventive Outlook Today", "Child Hygiene and

Infection", "Tuberculosis—a Problem of Different Races", "Do Death-rates Matter?", "X-Ray and Tuberculosis Surveys—Their meaning and interpretation", "Choice of Drugs in Medical and Surgical Treatment of Tuberculosis", and "The Psychology of the Patient and Relatives as a Factor in Successful Treatment".

Although the conference is especially concerned with Tuberculosis as affecting the Commonwealth, the campaign against the disease is, of course, a world problem, and the conference offers to members from all countries a valuable opportunity of exchanging views and experiences. Discussion and clinical meetings will be held and time given for practical demonstrations, visits to sanatoria, hospitals and clinics.

U. K. FLOOD-RELIEF SUPPLIES TO INDIA

The last consignment of goods provided out of the British Government's gift of £.100,000 for the relief of distress caused by the recent floods in India, Pakistan and Nepal is now being loaded at Liverpool docks. It consists of 120 tons of Chloride of lime to be carried by the Steamer Clan McIntosh, which is due to reach Calcutta by the first week of January this year.

The Government of India asked that its share of the gift be devoted to the provision of medical supplies, most of them (in the form of drugs) purchased in India. Supplies not available locally were bought in the United Kingdom. Three thousand Hypodermic Syringes and 750 blood-transfusion sets have already been flown to India, and the consignment of chloride of lime now on its way to India will complete the list of requests from our Government.

MENTAL HEALTH PROGRAMME OF WORLD HEALTH ORGANISATION

The past few years work of the Mental Health Section of the World Health Organisation have been remarkably a good beginning. Short-term appointments offered to Consultants have produced valuable reports on such subjects as juvenile delinquency and the relation of maternal care to mental health in early and later life.

Expert Committees have reviewed outstanding aspects of mental health, including such subjects as

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alcoholism, drug addiction, the mental health side of adoption, and the care of the mentally subnormal child. Visits of consultants to many parts of the world have been found valuable, and fellowships have been awarded for attendance at seminars, for travel to the U. S. A., and Europe, or for the detailed study of special subjects.

The five-year-programme since 1949 appears to have put its emphasis in two main ways. First, there has been a concerted effort—by reports, visits and study groups—to seek understanding on many aspects of mental health in childhood, since it is now widely accepted, some would say a little belatedly, that the child is father of the man. The second is the stress laid on the preventive side of mental health, and in this connexion the public health services of communities all over the world are being encouraged to take on the promotion of the mental health as well as the physical health of the population.

From the beginning of its work, and largely owing to the stimulus of its first Director-General and a small band of enthusiasts, WHO has put mental health firmly in its programme. The results may not be measurable for a generation or so, but already there seems a strong case for the expansion of the mental health section from its modest beginnings.

DEVICE RECORDS HEART VIBRATIONS

Dr. Denis Jackson, Professor Emeritus of Pharmacology at the University of Cincinnati Medical School, has demonstrated a new instrument which records heart vibrations. The device picks up vibrations of heart beats through an anaesthetic mask placed over the nose and mouth. The vibrations are converted into electric current and by the new instrument recorded on graph paper. The device is believed to be useful in diagnosing leaky valves, holes in the heart chamber walls or other abnormalities.

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Utilization of Foam Rubber in Industrial Medicine

BY THOMAS F. V. LAPORTE, M.D.,
Medical Director, General Motors Corporation, Connecticut
(Specially contributed)

THREE years ago we decided to study the value of foam or sponge rubber in industrial medicine and now after evaluating over 500 cases in which it has been utilized, I have deemed it worth-while to call this method of treatment to the attention of men doing traumatic or industrial surgery. It may have been used before in some type of cases, but I believe it has a wider range of applicability than has been realised.

The objective of our study was to submit this material to practical application in a variety of conditions normally expected in a manufacturing plant of our size (4000+employees). We have found the use of foam rubber to be effective, materially reducing the period of disability and deformity, together with increase in employee comfort and well being. It is an accepted dogma in traumatology that any trauma adequately treated within the "golden period" of the first six to eight hours is likely to have a good end result, with less likelihood of disabling sequelae, so that initial care is of paramount import as to the end result, both as to disability and deformity. Sterling Bunnell has advocated that the early elimination of edema by pressure removes a major cause of stiffness and that edema plus immobility results in contractures. We feel that pressure dressings with foam rubber supply pressure exactly where desired, and that they adapt themselves to whatever the contour of the area may be.

- Generally speaking, we found eight major categories into which our cases fell.
1. Hemostasis of bleeding areas where suturing is not feasible.
 2. Promotion of the healing of wounds, both sutured and unsutured by primary intention.
 3. Preventing or minimizing in degree, swelling, pain and disturbed function, resulting from the exudation of blood or serum or both into traumatized tissues.
 4. Obliteration of dead spaces in wounds and areas, so as to decrease the possibility of sequelae

- such as secondary infections due to unabsorbed hematomata etc.
5. Padding for various forms of immobilization and in conjunction with elastic bandages, decreasing the present disadvantages of the application of the latter.
 6. Non-surgical treatment and resolution of collections of fluids around joint spaces and in joints such as in various forms of bursitis and synovitis.
 7. Protective dressings to absorb impacts to sensitive traumatized areas encountered by injured while working, which otherwise would increase their disability and discomfort.
 8. Restoration of normal muscle elasticity and tone and motion range of joints by exercising with sponge rubber in adjunct with other physio-therapeutic procedures.

To date we have had over 500 cases in which foam rubber has been utilized and found of value. Among the various conditions in our series in which it has been found to be satisfactory are the following :-

- Various types of lacerations, such as in eyebrows, eyelids, face and other areas where suturing was not always feasible.
- Protective dressings of lacerations in various parts of the body coapted with sutures, michel clips or sterile adhesive.
- Protective dressings in cases of avulsion of finger and toe nails and superficial tissues of distal phalanges.
- Protective dressings in various types of strains.
- Protective dressings over amputated stumps, old osteomyelitic areas, and painful recently traumatized areas.

As an adjunct in the treatment of fractures of digital bones, metacarpals, and metatarsals.

As a padding within casts and other forms of immobilization for fractures and severed tendons and for extension traction in certain types of fractures.

Hemostasis in lacerations and severe contusions.

As a compressive dressing in bursal and synovial distentions of various types such as synovitis of the knee, olecranon, prepatellar, and post calcaneal bursitis, either aspirated or not.

As a compressive type of wet dressing where an inflammatory element is present.

As a compressive dressing in the conservative treatment of ganglia by pressure alone or in conjunction with hydrocortisone injection into the cavity of the cyst.

As a compressive dressing in burn cases.

As a compressive dressing following operative removal of various types of cysts and other surgical procedures where it may be desirable to obliterate dead space.

As a compressive dressing in cases of aseptic tenosynovitis and also in sprains of the ankle and wrist with or without the concomitant injection of procaine.

As a compressive dressing in the conservative treatment of derangement of the medial semilunar cartilage of the knee.

Cases of painful heel following trauma which may or may not have co-existent bony spurs were relieved by a dressing with a contour fitting piece of foam rubber.

Cases of acute foot strain and unstable arches were benefited by including a piece of foam rubber in the strapping of the foot.

Varicose ulcers were found to respond more readily to accepted treatments when there was added the judicious use of foam rubber dressings.

Intranasal packing with foam rubber for nasal hemorrhage gave excellent results.

Exercising with foam rubber in conjunction with physiotherapy has been of assistance in the restoration of joint mobility and muscle tone.

It has reduced irritation due to cotton or tensor bandaging at joint creases, chest binders and back supports.

Chronic low back derangements of undetermined origin had some relief with the application of a piece of foam rubber over the localized point of pain being incorporated in the immobilization normally used.

We have not experienced in our series any cases of contact type of dermatitis resulting from the use of foam rubber.

Almost every major rubber company produces some type of compressive sponge or foam rubber. It is available in various degrees of thicknesses, lengths, densities, and compressibilities. It is extremely porous, permitting air circulation, resilient and flexible with no matting down or sagging and it is odorless. We found it to launder well, either by hand or in automatic washing machines, and it may be sterilized either by boiling or autoclave, with no deleterious effects. However, in most of our cases it has been sufficient that the rubber be surgically clean, and it is only in isolated cases that complete sterility of the rubber is indicated. It can be shaped and cut to conform to the contour of any area of the body.

The rubber we have been using is scrap foam rubber discarded by rubber fabricators producing pillows, mattresses and upholstery padding of different types. It has been discarded because of some minimal structural defect, which however does not impair its value to us. In fact we prefer this type of foam rubber with its large concave honeycomb construction which lends itself to our uses more satisfactorily in the majority of cases than do the comparatively expensive sheets processed by surgical supply Companies.

The satisfactory results we have obtained from this simple adjunctive type of treatment have prompted us to call it to the attention of others so that they may utilize and further evaluate it and develop other indicated uses not apparent to us at this time. It might be significant to note that of 223 major occupational injuries which occurred in 1953, where 112, or over 50% of the total were fractures, amputations, lacerations, contusions and burns, only two of the total 223 cases resulted in actual lost time (as distinguished from charged). Viewed from a different light, of 6,628,948 manhours worked only 16 hours of actual lost time were experienced.

Sanitation of Waters Around Towns and Cities

BY S. C. PILLAI, PH.D., A.I.I.S.C., A.R.I.C., M.R.SAN.I., M.INST.S.P.,

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AND

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SANITATION of the waters around towns and cities is of vital importance from several points of view, e. g. the health of the community, development of fisheries and facilities for irrigation and recreation. The subject of sanitation of waters came up for scientific study some eighty years ago quite naturally when the problem of pollution of natural waters, such as rivers and harbours, arose from the discharge of increasing quantities of sewage and industrial wastes into the waters. Dying of fish and putrefactive changes in the polluted liquids were correlated with the depletion of dissolved oxygen from the waters. The situation was sometimes further complicated by the circumstance that, as in some cities and towns in India, the available water was liable to be polluted by sewage

and other waste effluents which did not always receive sanitary treatment. Occasional outbreaks of cholera as also typhoid and dysentery attacks have generally been ascribed to polluted water supplies. The vital statistics prepared at various centres have shown that introduction of protected and pure water supplies and of efficient methods of sewage purification has markedly reduced the incidence of water-borne diseases and consequent death rate.

So long as the quantity of sewage discharged was proportionately much less than the available water for dilution, the method was considered practicable; but in the absence of adequate volume of clean water containing the necessary amount of oxygen for the

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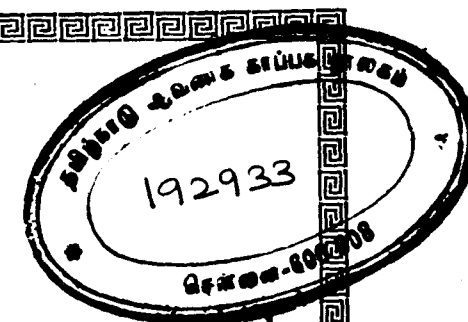
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oxidation of the organic matter, serious polluting effects on the waterways were noticed. The waste water of Paris¹ flowed into the river Siene at the rate of 3 cu. m. per second, and a report in 1874 stated that river Siene was contaminated very largely with animal and vegetable waste and was covered with a fatty layer becoming putrid and evolving immense bubbles of gas having sometimes a diameter of 1 to 1.5 m. Purification trials with aluminium sulphate were made, but gave unsatisfactory results. Many other investigations have since been made by numerous authorities, whose publications constitute a very considerable volume of literature. Among these the Reports of the Metropolitan Sewerage Commission of New York, 1910-14 are worthy of special mention for their very complete and extensive character. Referring to the pollution of New York Harbour, Fowler (1934)² observed: "Year by year at many points in New York Harbour, the dissolved oxygen approaches more nearly to a dangerously low limit. Along certain water front it is virtually absent, and the black stinking water, and its floating grease and debris, affords no cause for civic pride to the city whose great bridges and railway terminals are the admiration of the traveller". The

waterways around some of the Indian towns are seriously polluted with sewage and other organic wastes and the oxygen contents of the waters are very low. In certain inland towns the sewage or sullage is allowed to flow down without any treatment in open channels on gradient land and left to natural agencies to operate on the polluting liquid.

The practical significance of the oxygen content of polluting material in relation to stream sanitation was indicated by the Royal Commission on Sewage Disposal in their Eighth Report³ "that the nuisance-producing power of a normal sewage or effluent is broadly proportional to its power of de-oxygenating the water of a stream, and that tests which are based upon the rate and degree of absorption of oxygen are the most trustworthy tests for determining whether nuisance is or is not likely to be caused in a stream by the discharge of sewage liquids". Close study and continued research on this and related aspects of oxygen transactions in the waters have since been proceeding in different parts of the world with increasing interest.

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OXYGEN CONTENTS OF FRESH AND SEA WATERS UNDER NORMAL CONDITIONS

Oxygen is very sparingly soluble in fresh water under atmospheric conditions and still less so in sea water. Thus, according to Adeney (1928)³, it requires but 1.0 g. of oxygen to saturate 100,000 c. c. (22 gallons) of fresh water at 65° F., while only 0.8 g. of oxygen is required to saturate a similar volume of sea water at the same temperature under atmospheric pressure.

Adeney and his associates have shown that aeration of a body of water is greatly increased by the "streaming" of thin films from the surface, owing to the increased density of the surface film produced by evaporation and cooling. This effect is naturally greater in the case of sea water owing to its higher saline content. Experiments arranged to eliminate this streaming effect indicated that the rates of absorption of oxygen by fresh and sea waters were practically identical when these values are expressed in percentages of saturation.

Adeney (*loc. cit.*) called attention to five conditions upon which the mechanism of the aeration of fresh and sea waters, under open-air conditions, primarily depends. They are: (1) area of water exposed to air; (2) temperature; (3) humidity of the air; (4) salinity (in the case of tidal waters); and (5) wind, causing both an increase in area exposed and an acceleration of evaporation per unit area. The sparing solubility of oxygen in water, even when these conditions are all favourable, limits the rate of oxidation of organic wastes and other polluting materials introduced into waters.

EARLY IDEAS AND OBSERVATIONS ON THE OXIDATIVE CHANGES IN POLLUTED WATERS

When putrescible organic matter, such as that in town sewage, is discharged into a stream or river, depending upon the quantity of organic matter, the oxygen content of the watercourse is decreased or even depleted with serious effects on the fish life and other living forms in the water. The Rivers Pollution Commission, appointed in 1868, recorded in their *First Report* (1870, Adeney, *loc. cit.*) the belief then existed in certain quarters that: "if sewage be mixed with 20 times its volume of river water, the organic matter, which it contains, will be oxidised and completely disappear, whilst the river is flowing a dozen miles or so". The Commissioners made a series of observations on the rivers Mersey Irwell and

Darven, each of which provided the condition of a flow of sewage-polluted waters for 12 or 13 miles without further material pollution. But they failed to obtain any evidence of appreciable "self-purification" from sewage pollution of the waters of these rivers by oxidation.

LATER OBSERVATIONS ON THE "SELF-PURIFYING" POWERS OF OPEN WATERS

Later investigations carried out by the Royal Commission on Sewage Disposal (1898) and particularly by the Metropolitan Sewerage Commission of New York (1910-14) and by Adeney (*loc. cit.*) showed that open waters possess powers of self-purification to a degree depending upon the quantity of oxygen present in solution in them, and that the amount of dissolved oxygen present in a sewage-polluted tidal water is the most serviceable single test that can be made to determine the intensity of pollution; and that further when this test is applied over a sufficient period of time, and through a sufficient range of conditions, it well indicates the load of pollution by showing how rapidly the demand for oxygen is made.

Further studies showed that surface waters differ in their ability to deal with polluting matter. Fair (1939)⁴ gave a range of values of self-purification ratio for different bodies of water. More recently Bhaskaran (1950) discussed the modern trends in the study of stream sanitation.

OXYGENATION OF SEWAGE AND THE PROCESS OF PURIFICATION

When the various constituents of domestic sewage matter, *viz.*, faecal matter, urine, wash water from kitchens and soil washings, are disseminated in clean water, one of the quickest and most serious changes observed is de-oxygenation of the water. The water then becomes grossly polluted and it develops, among other things, the dangerous condition or capacity to deplete the oxygen contained in a relatively large volume of clean water, many times the volume of the polluting liquid. In this connection reference may be made to the investigations of Letts and Adeney on the pollution of estuaries and tidal waters, which led the Royal Commission on Sewage disposal (1908) to conclude that with a dilution of over 500 volume, crude sewage might be discharged subject to certain safeguards. For dilutions below 500 various kinds of preliminary treatment become necessary,

differing in completeness in accordance with the amount and nature of diluting water available.

If raw sewage is exposed in a shallow vessel for a sufficiently long period of time, replenishment of oxygen takes place gradually and purification proceeds simultaneously. Indeed the modern methods of sewage purification represent the various devices employed for increasing the rapidity of the recovery of the depleted oxygen in the medium. The rate of oxygenation under natural conditions closely follows the process of purification. Oxygenation is thus essentially purification. The oxygenated, purified material regains the life-sustaining power.

AVAILABLE EVIDENCE ON THE DE-OXYGENATION AND RE-OXYGENATION PROCESSES IN POLLUTED WATERS

How does the depletion of oxygen from waters actually take place? The available evidence on the question would suggest that excessive amounts of putrescible

organic matter under the influence of biological action take up the dissolved oxygen. A number of workers have considered the possible adverse effect of bacterial activity on the oxygen contents of waters. At the same time, others have pointed out that bacteria are mainly responsible for the purification of the polluted liquids, e. g. raw sewage which is a typical polluted water and which has been engaging the attention of the health authorities everywhere. How can bacterial activity which causes quick depletion of dissolved oxygen can at the same time bring about rapid purification which is in effect oxygenation of the medium? Clearly, further work is needed on the nature and extent of bacterial activity in sewage and other polluted waters.

From the early days of the study of the problems of water pollution, it has been known that the quality of a water or a sewage effluent may be assessed in terms of its oxygen content. Recognition of this factor has promoted a considerable amount of work, e. g. treatment of sewage with oxygen and oxygenated compounds such as ozone and hydrogen peroxide, and also the aerobic biological methods of sewage treatment, includ-

ing the forced aeration methods. In regard to the physical factors influencing re-aeration of sewage and sewage-polluted waters, considerable information is available, but in regard to biological and biochemical conditions favouring the re-oxygenation of the media, the available information is meagre. Some work has been done on the activity of plankton, algae and other organisms, but the results of these studies do not seem to explain the biochemical nature of the process of re-oxygenation of polluted waters and of sewage during artificial aeration.

It is generally known that sewage purification is a biological process. The natural or self-purification of sewage-polluted rivers and the purification process in the activated sludge tank are essentially due to the activity of micro-organisms. Sewage-polluted rivers contain a variety of micro-organisms and higher forms of life, while activated sludge, which can oxygenate and purify undiluted domestic sewage most rapidly in a few hours, contains a relatively few types of micro-organisms and does not contain e. g. any active form of algae which have been reported to influence re-aeration

of waters. It is indeed of great interest to note that during the activated sludge process oxygenation and purification of sewage proceed almost simultaneously. But little is known about the biological activity in activated sludge. Here again it is believed that the bacteria are of primary importance. Examination of this belief in the light of the following facts would indicate the possibility of other influencing factors. It is well known that one c. c. of raw sewage contains several millions of bacteria; that over 99% of these bacteria are removed during treatment with activated sludge; and that activated sludge is but a deposit developed exclusively from the sewage itself by aerating successive portions of it.

Apart from bacterial forms, certain other forms of unicellular life are invariably present in activated sludge and in other systems of purification. The functional activity and relative importance of these micro-organisms have been subjects of investigation at different centres, and the evidence accumulating on these may be considered in a later communication.

ZIMAX

For ECZEMA and ATHLETE'S FOOT

Ref: '*Indian Practitioner*', January 1954

1. **Dr. T. K. MEHTA**, M.B., B.S., F.C.P.S., D.V.D., **B. Y. L. Nair Hospital**, 'ZIMAX' is an Ayurvedic Patent. I have found it very useful for acute and sub-acute stages of ECZEMA.
2. **D. J. A. FERNANDIZ**, M. R. C. P. (Ed.), M. R. C. S., L. R. C. P. (Lon.), **Bombay**, 'ZIMAX' gave satisfactory results in four cases out of six. Two cases have not reported back yet.
3. **MEDICAL OFFICER, New India Assoc. Co. Ltd.**
Fourteen cases in the staff were treated by 'ZIMAX.' Out of which twelve were cases of ECZEMA and two of ATHLETE'S foot. The Eczema cases were both dry and scaly type. Out of these ten cases were relieved of itching in a day or two and Eczema entirely disappeared in ten or fifteen days. The relief obtained by ZIMAX in Athlete's foot was very remarkable and a complete cure was effected in five or six applications.

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