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The Antiseptic

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For the use of Registered Medical Practitioners, Hospitals and Laboratories only

Founded by the late Dr. U. RAMA RAU in 1904

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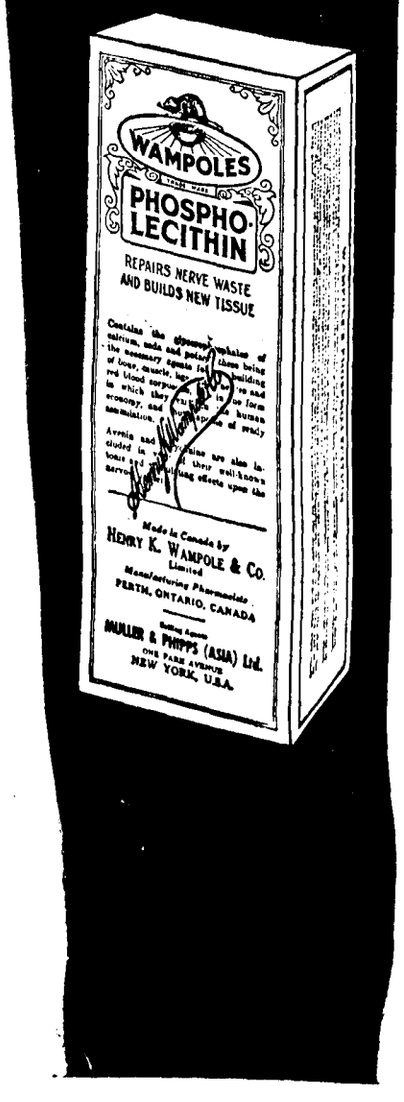

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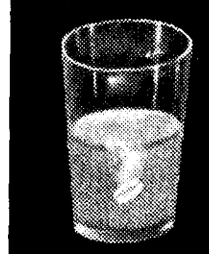

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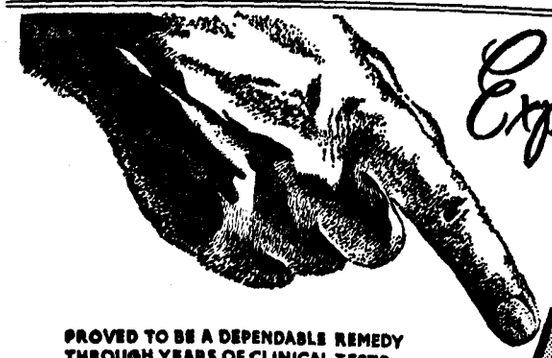

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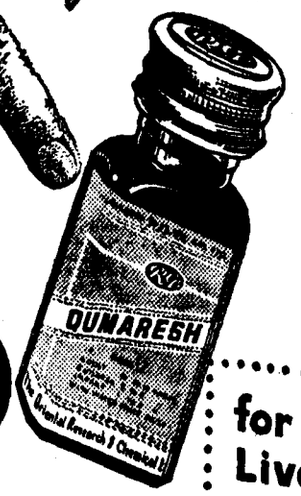

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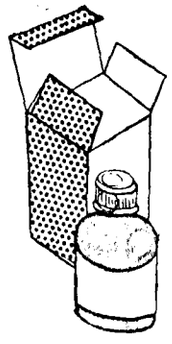

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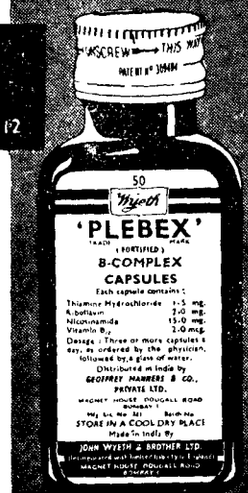

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Dalda—*its role in nutrition*

McCarrison in one of his addresses remarked: "The general dietetic error lies not in quantity, but in quality." Faulty nutrition is no doubt common in this country, but it is not so much lack of food as lack of the right kind of food, particularly vitamins and fats.

In a statistical survey of Vitamin A deficiency —judging by poor dark adaptation—more than half the children from working class homes in England were found to be deficient by Harris and Abbasy in 1939. Both in Africa and India, skin changes due to lack of Vitamin A were present in 80% of some groups of children (Nicholls, L-Indian Medical Gazette : 1933). This is also emphasised in Health Bulletin No. 23 (1956), issued by the Nutrition Research Laboratories, Coonoor. Vitamin A deficiency is the single factor responsible for a large number of nutritional deficiency diseases. The daily allowances for an adult are in the neighbourhood of 3,000 to 4,000 International Units of Vitamin A.

Vitamin A is found in only a very few foods, of which the most common are eggs, milk and butter, and for that reason it is important to realise that their Vitamin A content is not constant, but depends on the diet of the hens and cows. Besides, these animal foods are expensive and beyond the reach of many. Therefore, Fitzgerald Moore, in a practical discussion of the whole problem, concludes that the only hope of a solution is to reinforce local vegetable oils and fats with Vitamin A concentrates. As is well known, the Food Fortification Sub-Committee of the Indian Council of Medical Research thought on the same lines, and recommended that 700 International Units of Vitamin A should be added to every ounce of Vanaspati. This recommendation was accepted by the Government and to Dalda we add 700 International Units of Vitamin A in addition to 56 International Units of Vitamin D.

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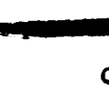

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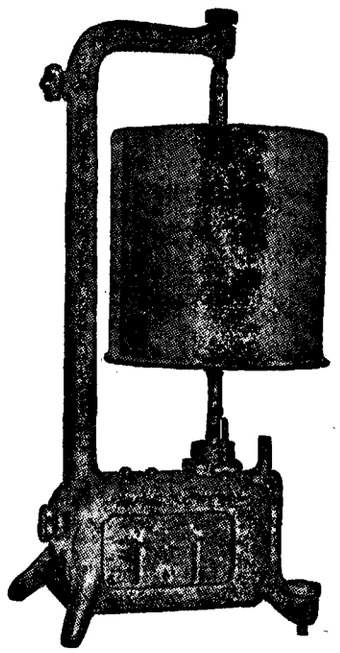

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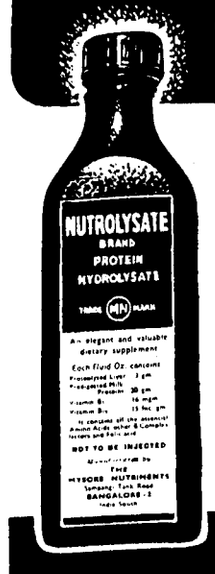

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Original Articles

PITFALLS IN THE DIAGNOSIS OF HEART DISEASES*

S. SEN, B.Sc., M.B.B.S. (Cal.), M.R.C.P. (Lond.), F.R.F.P. & S. (Glas.), D.T.M. & H. (Lond.),
Chief Physician, Tata Main Hospital, Jamshedpur;
Late Prof. of Clinical Medicine, Calcutta National Medical College

PITFALLS in the diagnosis of cardiac diseases are many, particularly for the general practitioners. None of the modern diagnostic aids such as fluoroscopy, skiagram, electrocardiogram may be available to them. Symptoms and signs and their true clinical interpretations are the back-bone for the diagnosis in most of these cases. Then again no physical sign may exist in such a common and fatal disease as coronary thrombosis. All depends on what the patient complains.

It has been said that in the investigation of a case of cardiac disease the various methods have roughly the following relative values:—history 50%, physical examination 25%, electrocardiogram 10%, radiograph 10%, and pathological and other special methods of diagnosis 5%. It is quite clear that an accurate evaluation of the symptoms is all important in the diagnosis of a cardiac patient.

Recognition of slight heart disease in an apparently healthy person requires a recognition of some physical signs which become the basis of diagnosis. These signs may be obvious or more often slight or dubious and difficult to interpret. Diagnosis of heart disease on flimsy and doubtful physical signs is fraught with difficulties. But a substantial sign supported by others though less convincing may lend support to the diagnosis. Such signs which are important in the early diagnosis of cardiac abnormalities need proper interpretation. Even with proper

*Specially contributed to the ANTISEPTIC

care and reasonable skill, diagnosis may still remain at best a probability.

History is very important. A history of past rheumatic fever, chorea and syphilis should require a thorough search for physical signs of heart disease.

The appearance of a patient in the absence of clubbed fingers, cyanosis or dropsy may not be of much help.

Examination of the pulse forms an integral part of the investigation in heart diseases. Exercise tolerance test can have little value in the recognition of myocardial or valvular disease or even in the assessment of the myocardial efficiency. It is however valuable, as at best it gives one an idea about the nervous control of the heart-rate. At the beginning of an examination the pulse-rate may be high due to nervous excitement, which comes down to normal as the examination proceeds and as the patient gains more confidence and when he lies down. If it does not and the pulse rate continues to remain high over 100 per minute, it may be due to slight fever, congestion of the throat or incipient tuberculosis. Such persistent high rate of the pulse without any obvious cause needs further examination preferably on another day. A high grade of persistent tachycardia can be a manifestation of a neurosis provided no other cause is apparent. But thyrotoxicosis, masked or overt, has to be excluded. There may be fine tremors of the outstretched fingers and very slight enlargement of the thyroid gland which can only be detected by making the patient sit on a low chair, leaning forward and moderately elevating the chin. If he is then asked to swallow, the gland will rise and reveal its size and form to the observer standing in front of him. The patient may exhibit a lively temperament, fine tremors and some wasting which will lend support to the diagnosis.

The rhythm of the pulse may vary with inspiration and expiration if the pulse-rate is slow. Such waxing and waning with respiration is normal sinus arrhythmia but may be mistaken for auricular fibrillation with a slow ventricular rate. This can be decided by asking the patient to hold the breath for a while and noting the pulse. If there is a missed beat, exercise will rectify such pulse-deficit by raising the rate in the case of extra-systole. Missed beat due to heart block can be detected by listening to the heart simultaneously, when, in the case of extra-systole, an extra beat, however small, can be heard preceding the long pause, but not so in heart block. Then again in a very obese person this may not be heard at all. Frequent extra beats may be confused with auricular fibrillation if they are irregular; but fibrillation not only persists but becomes worse on exertion. Final proof lies with E.C.G. Auricular and even ventricular extra-systoles are more often innocuous and

consistent with a healthy heart whereas auricular fibrillation is usually not so. As Mackenzie (1918) pointed out, extra-systoles are in themselves of no clinical significance, and seldom, if ever, are they harbingers of auricular fibrillation or any other grave cardiac condition. After middle age they may be considered almost a normal phenomenon. When present in a case of organic disease of the heart, as they often are, they may be safely ignored in assessing the seriousness of the condition and in considering the prognosis. A good deal of misconception still exists amongst many practitioners who regard extra-systoles as an indication of organic disease of the heart and a chance remark may produce cardiac neurosis in an otherwise healthy person. Considerable circumspection is therefore, necessary in making such a pronouncement.

Apart from irregularities the collapsing type of pulse in aortic incompetence (there are other causes too) and pulsus tardus in aortic stenosis one should note the rate which may vary widely in a normal person. The resting pulse rate in an adult varies from 60 to 100, but rates as low as 35 and as high as 120 can occur normally; and on exertion, the rate may speed up to even 200 or more. Wide fluctuations in the rate occur throughout the day, and during sleep the rate may slow down markedly.

The pulse is usually equal on both sides. Variations may occur due to anatomical differences, in the depth and location of the radial arteries and normal variation in bilateral blood-pressure. If there is marked inequality of the radial pulses, the brachial arteries should be palpated.

The neck vessel pulsations may give valuable clues. The presence of the systolic collapse of the jugular veins is very important especially in the differential diagnosis of cardiac arrhythmias, because it indicates that sinus rhythm or one of its variants is present. Carotid and jugular pulsations may be confused. Apart from other well-known characteristics venous pulsations are diffuse, the arterial being localized.

The interpretation of the tone of cardiac sounds requires a good deal of experience. A heart is often unjustly condemned because in the opinion of the examiner the sounds are "weak," "toneless," "of poor quality," or the like. The character of heart sounds, whether first or second, is on occasions of great help in the diagnosis of cardiac conditions, but the idea that one can gauge the functional efficiency of a heart by the loudness of the sounds is altogether fallacious. A flabby tone of the first sound as a sign of diseased myocardium is of value, only if there are other unmistakable signs of cardiac failure. Dulling of heart sounds is far more often due to obesity or emphysema, or to both, than to a feeble myocardium. In addition chests possess very

different acoustic properties, and listeners differ greatly, not only in the acuity of their hearing but also in their standards of normality.

A sharply loud first sound at the apex may suggest early mitral stenosis. This is of value only when the rate is normal or moderate, as tachycardia from any cause will itself cause a sharp first sound. In any case a sudden or snapping first sound alone can never be the basis of a diagnosis of mitral stenosis unless it is accompanied by a pre-systolic or mid-diastolic murmur which may possibly be elicited in such a case. It may not be heard easily. In that case, when suspicion is aroused with the snapping first sound, make the patient swing his arms or perform some brisk exercise—make him lie down and turn to the left and listen immediately at the apex. An obscure pre-systolic murmur may be made clear during the first half minute after such exercise. It may be a short rumbling murmur pre-systolic in time—so characteristic of mitral stenosis. But such a murmur must undoubtedly be heard before one can accept a diagnosis of mitral stenosis. Occasionally reduplication of the first sound may be heard at the apex in a normal heart, but the sound is not accentuated in such a case. Even the palpation may suggest double first sound and the feel may simulate feebly the purr of a thrill which is a common mistake. This need not necessarily mean a pathological state. A loud pulmonary second sound, on the other hand, may be suggestive of mitral stenosis.

Mitral regurgitation, unaccompanied by mitral stenosis, seldom if ever, occurs as a result of rheumatic endocarditis. But contrary to current teaching, a systolic murmur at the mitral area is the commonest murmur suggestive of mitral stenosis, not a pre-systolic. This fact is claimed to have been firmly established in recent years by radiological and electrocardiographic and phonocardiographic examinations, although Graham Steel drew attention to it so long ago as 1906. It is the long, blowing, apical systolic murmur in a patient who gives a history of previous acute rheumatism which is particularly suspect. On the other hand "Functional" apical systolic murmurs are typically short and non-blowing in character. In no branch of cardiology is fluoroscopy more useful than in determining the significance of systolic murmurs. A pre-systolic murmur is apt to be missed. If the apex beat is visible it is the tendency to listen to that particular area for any murmur. This need not be so. A little inside the visible apex beat, one may by chance pick up a sharply localized pre-systolic murmur identified by its crescendo characteristic. One may just miss it if he is too particular to listen to the apex only. Here a harsh systolic murmur, if present, comes to one's aid.

Systolic murmur at the apex, however, needs careful clarification and evaluation before it is accepted as a sign of valvular

disease. Many authorities dismiss it as being a sign of no pathological significance; and on this basis they ignore such a diagnosis as mitral regurgitation. True, such a murmur is evident in a wide variety of physiological and pathological conditions not referable to the heart, so that its significance has lost all value in the diagnosis of cardiac valvular disease. After exertion, during febrile conditions, in the period of excitement and nervousness it is not uncommon to hear a systolic bruit or murmur at the apex. It may even persist. But if it is harsh, prolonged and well-conducted it may mean some mitral leakage and is almost always associated with certain degree of stenosis.

Be that as it may, other authorities do not dismiss such murmurs as of no significance. One has to evaluate its meaning by its character and the antecedent history of the patient. Pitfalls are many and indiscriminate diagnosis of mitral reguritation on the mere presence of a systolic murmur at the apex, even if conducted towards the axilla, is to be condemned.

The significance of systolic murmur at the apex has been assessed variously by different authorities. According to Parkinson "if such a murmur is at all difficult to hear being soft and short; if louder at the end of inspiration; if varying much with posture, it is probably functional and can be neglected." Such a murmur produced by exertion is also negligible. If, however, it is heard constantly during standing and recumbency, still more if it is harsh and long, it demands close investigation. Here a history of rheumatism and chorea is all important. 'Does he get breathless?' is also an important clue. "Is the first sound replaced by the murmur?" is yet another point to be cleared. Or, best of all, can the pre-systolic murmur or mitral stenosis be elicited on listening quickly at the apex when the subject briskly exercises, promptly lies down and turns over towards his left side? Even if not, the man with a forcible apex beat slightly or even doubtfully displaced, and with a noticeable and invariable systolic murmur should be under suspicion for rheumatic mitral valve disease. According to the same authority "if the murmur is palpable *i.e.* if there is a systolic thrill the term "mitral incompetence is permissible, though mitral stenosis will almost certainly coexist. On the other hand a systolic murmur of any significance at the apex is an easy clinical indication of aortic incompetence." The valve may be relatively incompetent to close the stretched auriculo-ventricular ring of an enlarged left ventricle. So we come to think that a systolic murmur at the apex, if considered significant is most likely to be accompanied by either a mitral pre-systolic murmur in case of mitral stenosis or an aortic diastolic murmur in aortic incompetence. Pure systolic murmur is practically of no value. Anæmia is an important cause of systolic murmur, basal and apical. One cannot, however,

be very dogmatic about a particular type of systolic murmur at the apex unassociated with any other sign of significance.

Levine, on the other hand, does not disregard the systolic murmur altogether—nor does he think that it always means heart disease. Systolic murmur is quite significant in a case of subacute bacterial endocarditis in which condition organic insufficiency may exist without stenosis. A moderate mitral systolic murmur may exist in an older person and this may indicate structural mitral insufficiency that is very difficult to diagnose and which may result from calcification of the annulus fibrosus. This can be seen on fluoroscopic examination, but produces no characteristic physical sign.

As mentioned above some authorities maintain that a short and rough systolic murmur at the apex is associated with slight mitral stenosis, insufficient to produce a pre-systolic murmur. Terence East suggests that "a short rough systolic murmur at the apex is probably from a small leak due to sclerosis of the mitral valve. The lesion is rarely of importance, if unaccompanied by any other abnormality. Patients carry them all their lives, arising from rheumatism in youth." It appears one may regard as of no importance any apical systolic murmur when it is the sole detectable abnormality.

Clark Kennedy says that soft systolic murmurs are of little significance in the absence of other more convincing signs. "But the louder and harsher a systolic murmur, and the more clearly it is conducted outwards into the axilla or through the back to the angle of the scapula, the more likely is a systolic murmur to be due to some structural change in the heart. If associated with a systolic thrill the organic origin of the murmur is almost certain." A fibrosed valve is invariably narrowed as well as incompetent, although the atypical murmur of stenosis is not always heard. Loud systolic murmur at the apex is common in elderly person with high blood pressure and atheromatous changes in the vessels. Clark Kennedy remarks, "It is hard to believe that the mitral valve can be incompetent in these cases." Thus he concludes: "In practice the interpretation of soft systolic murmurs at the apex is so difficult, and their pathological significance so uncertain, that it is seldom worth while wasting too much time attempting to interpret murmurs of this kind."

But to evaluate the true significance of an apical systolic murmur is of utmost importance to a general practitioner as it is very common, and as by his indiscretion he may condemn an otherwise normal person to a life-long tragedy of cardiac neurosis. It is conceded that systolic murmur is not usually heard at the apex of a normal person. But the appearance of such a murmur need not necessarily be abnormal. For a general practitioner it can be stated as follows:—any systolic murmur at the

apex of any degree of harshness, loud and prolonged—more than a faint and soft one, may be pathological in the event of a history of antecedent rheumatism or chorea and accompanied by some other signs of cardiac involvement. A systolic thrill at the apex is certainly a confirmation of its pathological nature. Apart from this, such a murmur in one area only has not much significance.

A systolic murmur at the base may generally be ignored if it is soft and heard only on the patient lying down. If, however, it is loud and long and present constantly it may have a different significance. If heard on the left side in the pulmonary area it may mean a congenital lesion; and if on the right *i.e.*, aortic area, it means aortic stenosis. In such case, a thrill is likely to be felt if palpated lightly with the patient leaning forward after an expiration. The absence of an aortic second sound means non-functioning of the valves, as may happen with fixed and rigid curtain; and so there must be incompetence. To put it otherwise "the aortic second sound may be absent for the same reason that a diastolic murmur may be present,—because of the fixed stenotic valve."

It requires close concentration and undivided attention to listen to an aortic diastolic murmur. It is soft, blowing and receding in character. It may not be audible in recumbent posture, may be audible in a sitting or standing posture or may not be audible at all. If possible direct auscultation, as taught by Mackenzie, may be a better method of auscultation in the detection of such a murmur. The ear needs training to detect this. A collapsing pulse, a high pulse-pressure with high systolic and low diastolic reading and an enlarged heart are good clues and suggestive findings. Aortic valvular disease is the most common cause of enlargement of the heart. Hypertension is less so unless of long standing. Adhesive mediastino-pericarditis which causes huge enlargement of the heart has other characteristic signs.

A loud aortic second sound in an young man should arouse suspicion as to the possibility of the existence of a faint aortic diastolic murmur which may be missed easily by contrast. It is very important to detect this murmur and for this not only the aortic area, but also the left border of the sternum should be auscultated in a quiet place with concentrated attention. To listen to the soft aortic diastolic murmur the patient should preferably sit up and lean forward as the chest is auscultated and he should further be instructed to pause at the end of expiration. Once it is undoubtedly heard the diagnosis of aortic incompetence is assuredly made even in an early case when the collapsing character of the pulse and capillary pulsation may not be evident.

In auscultation of the heart generally it is better, according to Parkinson, not to listen too long, but to pause and try again.

The position of the apex beat gives an idea of the size of the heart. But this may not always be felt; but this in itself is a proof against enlargement, as an enlarged heart usually beats more strongly. A diffuse pulsation, on the other hand, does not necessarily mean an enlarged heart. In heart disease the apex beat may be displaced and may become forcible. But in one's mind the position and the force of the heart beat should be considered separately, because either may give the clue and either may strengthen the other in its diagnostic significance.

If the apex beat is displaced outwards it may mean enlargement of the heart. But again it *may* not be so. Although the apex beat is rarely displaced from its normal position unless the heart is affected, there are certain fallacies which must be guarded against. In a big built and heavy man the apex beat, if felt at all, may be lifted up and out by the high diaphragm. Again in tachycardia the apex beat may be jerky and appear forcible or displaced or both. This can be corrected by resting the patient and examining him again after the rapid rate has subsided, if it is due to nervousness and excitement. Scoliosis likewise may show an apparent displacement of the apex beat which can be clarified by examining the spine which may have a curvature with the convexity to the right. In such a case, the heart may lie a little to the left but not enlarged. The heart may be pulled by the fibrotic lung or displaced to the left in collapse of the lung. If all these considerations could be settled satisfactorily, then the displaced apex beat should be taken as an indication of an enlargement of the heart. If the apex beat is very forcible and the rate is normal or moderate it will probably lie outside the mid-clavicular line and the assumption should be that it is enlarged and therefore, not normal.

To diagnose a case of myocardial failure without any obvious cause such as chronic valvular disease or hypertension, essential, arteriosclerotic or nephritic, is a very ticklish matter. There may not be any positive finding, the cardiac rhythm may be normal and yet there may be myocardial failure. The tone of the cardiac first sound does not help very much. Relative loudness of the first and the second sounds may be of some help. But in the end many cases of congestive failure of the heart due to myocardial failure without any obvious cause, is a matter of inference—a conjecture based on negative findings, there being nothing to account for the oedema. It is only by a process of exclusion and evaluation of the signs and symptoms that one may come to a tentative conclusion. But oedema which is not accompanied by enlargement of the heart is practically never cardiac in origin. Such enlargement may not be obvious clinically. Radiological examination may be needed.

In any case of cardiac disease the blood pressure should be estimated—particularly if the apex beat is displaced or forcible without any other cause or if the aortic second sound is accentuated. The systolic reading may be high in the presence of tachycardia. A second reading should be taken when the patient has rested and confidence gained. If the pressure taken under satisfactory conditions of rest, freedom from nervousness and in the absence of tachycardia, shows a high reading verified by repeated examination, it should be considered to be of significance. A systolic pressure persistently above 150 and diastolic above 95 mean high blood-pressure. The diastolic one is more significant. The urine should invariably be examined in such cases. Rarely coarctation of the aorta may be the cause in a child or yonth.

A high systolic with a low diastolic pressure calls for examination for aortic diastolic murmur. Occasionally in normal persons, the diastolic pressure may be 0 mm. This is a transient phenomenon, and is associated with excitement and a normal or even elevated diastolic pressure in the femoral artery in contrast to aortic insufficiency in which a low diastolic pressure in the brachial artery is associated with a low femoral artery diastolic pressure.

Pressure in the right arm may normally be ten millimetres higher than that in the left; occasionally it is lower.

A high pulse-pressure with high systolic and not too low diastolic pressure if accompanied by tachycardia should draw attention to the condition of the thyroid.

Eating, smoking, and exercise may raise the pressure, which may go even so high as 200 110, particularly after strenuous exercise. During sleep the systolic pressure may fall even 15 to 30 mm. and with prolonged rest in bed, even more. On standing, the systolic pressure usually falls slightly, and the diastolic pressure rises slightly. On inspiration, the blood-pressure may also fall a few millimetres.

Blood pressure in the femoral or popliteal artery is normally higher than in the brachial artery and may equal or exceed 150 90 in the lying position in a normal person, becoming still higher on standing because of the added hydrostatic pressure of the blood column. The high pressure in the femoral artery is due to the large calibre of the vessel and to the fact that the great circumference of the mid-thigh and the deep location of the artery here, makes it necessary to apply more pressure than exists in the artery to compress it.

Certain symptoms such as dizziness, faintness and syncope may occasionally occur but they are not cardinal symptoms of heart disease. Unconsciousness may occur in some, though by no means all cases of high grade heart-block and more rarely,

at the onset of an attack of auricular fibrillation, auricular flutter or coronary thrombosis; but much more often they are symptomatic of vasomotor disturbance of psychoneurotic origin. Neither exhaustion nor the feeling of tiredness is a cardinal symptom of heart disease as popularly believed.

The cardinal symptoms of heart disease are two and only two *viz.*, shortness of breath on exertion, and pain, usually retrosternal.

The pain of angina pectoris is typically retro-sternal, not precordial, as is commonly believed. It tends to radiate across the front of the chest, often to the left shoulder and axilla, in many cases down the left arm as far as elbow or even the fingers, sometimes down both arms or down the right arm only, and upwards to the neck on one or both sides. It may involve the jaw, it may spread to the back, it may have other situations and distributions, yet hardly ever is it situated below the left breast. Wherever it is or wherever its spread, the pain of angina pectoris is almost invariably brought on by exercise and relieved by rest.

Left submammary pain is very rarely due to heart disease, even though it may sometimes extend to the left scapula and, by way of the left supra-mammary region and left shoulder, to the left arm. Such pain, unlike angina, is persistent, aching in character, and not induced, though it may be increased, by exercise. It is usually associated with a group of symptoms indicative of physical and nervous exhaustion which have no organic basis. Such symptoms do, of course, occur also in patients with cardiovascular disease, *e.g.*, in mitral stenosis and aortic incompetence, for it is only natural that such patients should tend to develop anxiety states.

Regarding coronary thrombosis the pain is all characteristic, and no other physical sign need be present. Though coronary thrombosis can give rise to any of the known arrhythmias, in the majority of cases the rhythm remains regular, no bruits are produced, and no increase in the size of the heart can be demonstrated even by radiological examination. The electrocardiograph may even be normal in every respect. Mere inversion of T in leads 1 and 2 is not invariably a sign of coronary disease, —as it can sometimes occur in severe grades of aortic stenosis and hypertension. But E.C.G. changes are most often found in coronary artery disease.

Coronary thrombosis very seldom occurs as a result of syphilitic aortitis, in spite of the fact that in this latter condition narrowing of the orifice of the coronary arteries is almost the rule. But they may have a sudden death.

Anginal symptoms are sometimes indicative of diaphragmatic pleurisy, and the acromial pain so common in pleurisy, whether diaphragmatic or not, might mislead. The spread of anginal pain is easy to follow, but when the pain missed a part of its spread and occurred only at the wrist or elbow, the jaw or the back, the patient's description may be misleading.

Confusion may arise between gall bladder diseases and angina. Sometimes the patient may have both conditions, so that it is very difficult to decide which is the one troubling him at the moment.

Again, on the onset of pneumonia, especially in elderly people, while the temperature might be equivocal, a picture of cardiac shock might be presented and after the shock is over one may find himself faced with pneumonia, or acute pyelitis or some acute sepsis.

Contrary to the common notion, it may be mentioned that atheroma is never a cause of high blood pressure, though there is little doubt but that the latter ultimately tends to lead to atheromatous degeneration of the arteries. Syphilis never causes a general arteriosclerosis. The arterial involvement in syphilis is invariably focal. It must also be remembered that aneurysm of the thoracic aorta scarcely ever causes dysphagia with regurgitation of food, although it may occasionally be accompanied by some discomfort in swallowing; and lastly auricular fibrillation is, curiously, very rarely associated with subacute bacterial endocarditis or syphilitic disease of the heart.

It must be pointed out that even electrocardiographic changes may be misleading. Not only may fear and pain alter the heart-rate, blood-pressure, heart sounds and subjective sensations, but through action on the sympathetic and para-sympathetic nerves they may even alter the electrocardiogram as stressed by Paul White. With tachycardia the T waves are often depressed and on occasion excessively so; even inversion of T waves has been induced by sudden fright, as it has been also, but doubtless through a different mechanism, by drinking ice water has been noted by the same authority.

Drugs such as digitalis, atropine and quinidine and perhaps many others have their effect on heart giving a false impression of serious coronary disease—as was proved in the famous insurance racket in New York city some years ago, when a few unscrupulous doctors, lawyers and insurance clients conspired together to defraud the companies by the production of ill health and electrocardiographic changes by using large amounts of digitalis, these symptoms and signs being attributed to coronary disease. (*Paul White*).

Digitalis may produce lengthening of P–R intervals, depression of S–T segments and T waves. Atropine while producing

tachycardia lowers the T wave of the E.C.G., as well as does the inhalation of tobacco smoke; adrenaline lowers and may even invert the T wave in L_2

It is a common mistake to confuse congenital heart disease with an acquired one. We may, in conclusion point out a few suggestive signs in congenital heart disease. If the history of some heart trouble, particularly a murmur with or without cyanosis dates back from infancy it is likely to be a case of congenital heart disease. A loud hissing mid-precordial systolic murmur in the third or fourth left interspace means a ventricular septal defect, if it is the only sign. A systolic *cum* diastolic continuous machinery-like murmur in the pulmonary area—conducted towards the left shoulder implies patent ductus arteriosus. A displaced apex beat with a pulmonary systolic murmur may mean auricular septal defect, and radiology may reveal the huge pulmonary artery and its branches which are almost diagnostic. Dextrocardia is quite often acquired by pulmonary fibrosis or massive pleural effusion in the left side; it may also be due to pulmonary collapse on the right side. True congenital dextrocardia is a rare condition. Cyanosis with clubbed fingers and a pulmonary systolic murmur and possibly a thrill, in a child or young adult may mean Fallot's tetralogy. Hyperpiesia in a child may indicate coarctation of aorta.

Pitfalls are many in the diagnosis of common cardiac diseases. Palpitation, an extremely common complaint, is almost never pathological. Unless all these pitfalls are remembered a general practitioner is apt to make mistakes, to the great detriment of the medical profession, not to speak of making an otherwise normal person a cardiac neurotic.

HYPERVITAMINOSIS A: REPORT OF A CASE IN AN ADULT

A woman, 21 years of age, who had taken multiple vitamin capsules for over 7 months in a programme of self-medication for acne, was examined and found to have signs and symptoms of chronic vitamin A excess. Vitamin A capsules that contained 50,000 "units" each had been taken regularly 3 times daily, and in addition from 1 to 3 multiple-vitamin capsules containing 100,000 "units" of vitamin A had been taken daily. The patient complained of joint pains, fatigue and insomnia, swelling of the ankles, soreness of the mouth, accompanied by blisters on the tongue, ecchymoses and frequency of urination. Objective findings included acne, tenderness of the tibiæ, enlargement of the liver, and ecchymoses on the right ankle. Analysis of blood serum gave a normal value for carotene of 151 μg. per 100 cc. but for vitamin A a very high value of 832 μg. per 100 cc. X-ray examination of the long bones showed them to be normal. On discontinuing vitamin A the signs promptly disappeared and 10 days afterwards all pains in the legs and ankles had subsided and the tibiæ were no longer tender. Two months later the serum vitamin A had fallen to a normal value of 179 μg per 100 cc.—I. M. Sharman.—(*J. Amer. Med.*, 1956, *161*: 1157-1159, *Dept. Surg., Sch. Med.*, Indiana Univ., Indianapolis).

PITFALLS IN THE DIAGNOSIS OF COMMON DISEASES*

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It is indeed a matter of great importance to diagnose an illness correctly in order to be able to treat it properly. Often there are pitfalls in the diagnosis of many common ailments and one has to be very careful in order to prevent mistakes occurring. At times, inspite of the best efforts, mistakes *do* occur even at the hands of experts. The subject is of fundamental importance specially to the busy practitioner who is not able to devote full attention to the patient. History-taking is an art, the importance of which should never be under-estimated; if taken with pains it may give a clue to the diagnosis of the illness.

The following conditions may often land one into difficulties at times.

Malaria.—It is one of the common fevers met with in our country and there is a tendency to diagnose any acute febrile illness as malaria, if it starts with rigor. The pitfall lies in the rigor and the mistake can be avoided if we keep in view that any acute febrile episode can start with a rigor. We often come across cases where the diagnosis has changed from malaria to typhoid or tuberculosis and so on. Thus for instance, an young man of 38, got sudden rigor followed by a high temperature. The first reaction as usual was that of malaria and he was prescribed accordingly. The temperature persisted the next day and he complained of some burning sensation during micturition. There was a previous history of several such episodes which were not enquired this time. The urine showed pyelonephritis which was the cause of this fever.

Enteric group of fevers.—Again this is a common infective fever which can be diagnosed correctly, if one remembers its clinical features and strives to look for them. The toxic appearance, thickly coated tongue, relatively slow pulse, tympanitic abdomen and slight enlargement of the liver and spleen are some of the important signs. But every fever which continues into the second week may not be enteric.

Another pitfall in the diagnosis of the enteric fevers is the development of resistance of the typhoid group of bacilli to chloramphenicol. Quite often one comes across cases which are clinically typical of this disease and yet there is no therapeutic response to this drug; so one loses confidence in the diagnosis.

A young woman of 28 had continued pyrexia of over a week's duration diagnosed clinically to be typhoid fever. Full doses of

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* Specially contributed to the Antiseptic.

chloramphenicol administered for six days did not show the desired response and the condition of the patient caused serious anxiety. Subsequently, a Widal test was shown to be positive in all the dilutions. Chemotherapy with an increased dose and a few injections of streptomycin settled the fever in a few days.

Pleurisy with effusion.—It is a condition which if carefully searched for by the simple methods of palpation, percussion and auscultation, cannot be misdiagnosed. Percussion which seems to be a lost art provides a more reliable percussive response than do more complex, expensive and disturbing examinations by roentgen rays. The practitioner who is far too busy to examine cases by the most simple procedural ways is often landed in difficulties in diagnosing the above disease.

Diarrhoea.—Diarrhœa is a symptom which is difficult to associate with a firm diagnosis just at a single examination. Carcinoma is one of the serious causes to be considered and it is particularly the growth that is difficult to discover which is most likely to cause diarrhœa without pain and without passage of blood and mucus obvious to the naked eye. Cancer of the cæcum seems to be the most difficult to diagnose radiologically. One may feel a lump in the right iliac fossa from time to time and on other occasions this may be absent and the practitioner is liable to assume that he had just felt a loaded cæcum and an opportunity for a life-saving operation would have been lost.

No case of unexplained diarrhœa should be allowed to go without a very careful and thorough search and if nothing very much is incriminated beyond the persistence of occult blood in the stool, a laparotomy should always be done.

Certain cases of diarrhœa may be due to a hurried gastro-intestinal reflex. This is possibly due to anxiety-states in an individual. The stools are rather loose occurring specially on rising in the morning and perhaps once or twice after breakfast. Then the rest of the day passes quite peacefully. As time passes, there is a stool after each meal. There is no associated anæmia or loss of weight but there is a feeling of exhaustion. Radiological examination by a barium meal-study shows a remarkably rapid transit of the barium from the mouth to the anus. The stomach is usually hyperactive emptying itself in a quarter to half an hour and the cæcum is reached in anything from ½ to 3 hours and the splenic flexure a short time afterwards. These patients as a rule are of intense personality, ambitious, hard-working and never relaxing in mind. They are always thinking of their problems all the time. In some few one can trace the condition to intense anxiety which seems to reflect itself in the alimentary tract. We must deal if possible, with the underlying anxiety and the physical approach to this which is always successful by the administration of hyoscyamus and codeine which delay the rate of passage through the alimentary canal.

Gall bladder.—The gall bladder, like the appendix has no constant position in the abdomen although it is less capable of wandering than the latter. When it lies in its usual position inflammation or stone will as a rule produce typical symptoms and signs. In cases where it lies a long way lateral to its usual point, it may produce pain not across the epigastrium but well to the right side. It is true that visceral pain is usually felt fairly symmetrically across the middle line, at times the inflammation causes it to coincide with the actual position of the organ by involvement of the parietal peritoneum. If a gall bladder lies laterally and the fundus lies in continuation of the anterior axillary line or near about, the pain will occur in such a case in the right side of the chest aggravated by breathing, suggestive of pleurisy. Further the diaphragm gets inhibited resulting in a diminished resonance over the right base due to absorption of air from the immobilized lung. The picture thus presented is one of lobar pneumonia with all the symptoms and signs, whereas the basic lesion is abdominal. Initially one may find it extremely difficult to make a diagnosis on clinical grounds and the position will get settled after sometime only when the adventitious sounds of basal pneumonia are absent and respiration falls still further and the typical flush on the face is absent.

Gall bladder disease may simulate coronary thrombosis so closely as to present a great pitfall in diagnosis. This is more likely to occur if the organ is medially directed. The pain felt is across the lower part of the chest rather than the abdomen and may even be constricting in nature. There are quite a number of other similar features such as the same age and build, pallor of the face, sweating and vomiting. The blood-pressure and pulse may remain normal in coronary thrombosis for several hours. Examination of the abdomen, however, will reveal tenderness over the gall bladder but cases of congestion of the liver due to heart failure will also show similar tenderness. It may not then be easy to distinguish between liver and gall bladder tenderness particularly in an individual groaning under pain. It may look very simple to distinguish between the two but in actual practice it is usually very difficult.

Appendix.—Appendicitis tops the list of diseases of the digestive system which produce very straight-forward symptoms. It is easy to diagnose appendicitis when the attack is ushered in by a classical picture ; but difficulty will arise when this organ produces diverse and misleading symptoms. In retrocæcal appendix, there may be diarrhœa and pyrexia of uncertain origin off and on. This reminds me of an young man who complained of repeated attacks of diarrhœa with a rise in temperature

which gradually subsided in two to three days. He used to have a mild vague pain in the lower abdomen. At first the attacks used to be at long intervals but gradually the frequency increased to about one in every three to four weeks. When seen during the last attack he was definitely tender in the right iliac fossa. Appendicectomy revealed an inflamed adherent retrocæcal appendix.

When however, the appendix runs upwards along the side of ascending colon and in cases where it may be too long, it may be attached to the liver or gall bladder. Inflammation in this position may cause severe high epigastric pain with tenderness in the region of the gall bladder thus leading to the diagnosis of acute cholecystitis. Diagnosis of the actual condition could only be made after following the course of the disease as it subsides. It usually moves downwards towards the right iliac fossa, whereas gall bladder pain never moves in this direction.

Cases of appendicular colic are very often diagnosed spasm of the colon. The attacks are ushered in by sudden intense pain in the middle of the abdomen lasting for variable intervals and it soon subsides leaving behind no trace of any kind thus making it difficult to make a correct diagnosis. It is only by repeated examinations particularly during one of the attacks that one will find tenderness on the Macburney's point. As the condition is very erratic in its onset and the signs are vague, the patient feeling better in the intervals, one is liable to forget it. When, however after a time, a typical attack comes on, the correct diagnosis is made.

Coronary artery disease.—It is indeed surprising that we find coronary artery disease in so many strange ways or it may mimic other conditions so closely that it provides a formidable pitfall even for specialists in this branch. A few case histories will be of interest :—

A young lady of 40, suddenly got pain across the left upper chest radiating to the left shoulder. It was of fair intensity but not accompanied by any feeling of constriction, pallor or perspiration. She was examined by a specialist and labelled as coronary thrombosis—E.C.G. done on the 4th day revealed a normal pattern. The blood count and E.S.R. were normal and there was no rise in temperature. The patient in fact felt quite normal after the first episode but was complaining of pain on the left shoulder on movement all the time. Examination of the shoulder revealed peri-arthritic changes with limitation of movements. Thus a peri-arthritis of the shoulder was diagnosed as coronary thrombosis. The domestic back-ground was very interesting. She had married a widower who was always dancing to her tune !

A lady of 68 started getting angina of effort which improved gradually. After an interval of about six months she started

waking up in the middle of the night with severe pain in the occipital region. This was her main complaint at this time. Further enquiry revealed that she had some feeling of stiffness in the middle of the chest along with a sense of suffocation. An E.C.G. revealed no abnormality. Six months later she had a very severe attack of coronary thrombosis and died.

An adult male aged 69 had been getting angina of effort for about 2 or 3 years. He used to feel better in the intervals. E.C.G. had been done a number of times even after exercise but they had always been normal. Relief with glyceryl trinitrini was never complete. After sometime he was found dead in his bed, his lips and nails all blue, the death evidently being due to coronary thrombosis.

How commonly one sees gall bladder disease simulating coronary artery disease !

A man, aged 58 had often been complaining of pain in the lower chest in the middle specially on getting up early in the morning ; this was accompanied by the belching of a lot of wind. Clinical examination and E.C.G., revealed no abnormality. Plane X-ray of the abdomen revealed a gall bladder full of small stones. Surgery cured the symptoms.

Digestive system neuroses.—Quite often one meets with patients who suffer from flatulent dyspepsia with a feeling of distention after food or occasionally attacks of fairly severe pain in the epigastrium. This would come on suddenly and last for two to three hours and then gradually pass off leaving some degree of soreness in the upper abdomen. There may be slight jaundice on the next day if carefully observed. Examination between attacks will reveal tenderness in the usual position of the gall bladder which may be quite severe during an attack.

One is often tempted to make a diagnoses of cholecystitis or cholelithiasis and yet the cholecystogram is normal, making the diagnosis untenable. A fairly large number of cases of this type occur. The only explanation is that probably they are cases of patients who get a true spasm of the sphincter causing a temporary hold-up in the flow of bile. Such individuals are getting spasms of the various viscera here and there in the body producing varied symptoms.

Then there is the other group of cases who get frequent attacks of pain on the left side of the abdomen labelled as due to spasm of the colon. One should be very careful in making such a diagnosis, which must be done only when the spasm of the colon is actually felt in the form of a hard tender cord. Some organic lesion which may produce such symptoms, must be constantly kept in mind.

Cancer of the stomach.—Though the condition is not very difficult to diagnose when present, yet at times in cases presenting symptoms of anorexia, loss of weight etc., the radiological examination may prove to be a great pitfall in its diagnosis in some cases.

A man aged 58 complained of loss of appetite, loss of weight and some epigastric discomfort and nausea. There was nothing abnormal found on clinical examination. He was submitted to various examinations including radiology of the stomach. The barium meal pictures taken in series showed a constant filling defect in the stomach at one place. Subsequent X-rays and gastric analysis disproved the whole thing.

A case of gastric ulcer in a man aged 55, had several episodes of hæmatemesis. Two months after the last episode a barium meal study of the stomach revealed leather-bottle stomach. This was not in consonance with his clinical condition of voracious appetite and sound health. Repetition of the barium meal studies at a different place did not reveal similar findings.

Tuberculosis peritonitis.—This may occur in three forms—the ascitic, loculated and obliterative. Difficulty arises fairly commonly in the diagnosis of the obliterative variety, especially in its early stages when it develops as a primary disease. The onset of abdominal symptoms is generally preceded by a period of ill-health. The patient loses weight and strength, his appetite is poor and his temperature may rise slightly at night. After a period he complains of general abdominal discomfort. Constipation is common. The pitfall lies in the fact that signs of obliterative tubercular peritonitis are ill-defined. The abdomen gives a characteristic doughy or rubbery resistance on palpation and is somewhat distended. One has to become familiar with this characteristic feel of the abdomen on palpation to avoid missing the condition. There may yet be cases where besides the signs already mentioned the omentum may be rolled up as a thick cord stretching across the upper part of the abdomen. This may easily be mistaken for the liver, but the transverse colon generally forms a resonant band immediately above it, which will decide the issue.

CANCER IN THE SECOND BREAST

A. Kilgore, H. G. Bell and R. Ahlquist (*Am. J. Surg.*, August, 1956), in a series of 1200 radical mastectomies, found that cancers behaving like independent growths had developed in the second breast in 31 patients (2·6%). They consider that additional cases will yet appear among patients in the series who are still living. Of a group of stage I breast cancer patients, cancer developed in the second breast in 4%. The authors consider that if this figure is corrected for future cases among patients still living, the eventual incidence will apparently rise to about 6%, which is roughly three times the general incidence of unilateral cancer.—(*Medical J. of Australia*).

ANTIBIOTICS IN TRACHOMA*

(A Clinical Study)

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THIS study was undertaken in order to evaluate the relative efficacy of antibiotics in the treatment of trachoma.

Trachoma is a protean disease of the eye varying in its manifestations and degree of infectiveness. The incidence of trachoma is said to be high in Egypt and the Middle East where more than 90% of the population is affected. It is estimated that at least 20% of the people throughout the world are afflicted but the distribution is quite uneven. It is also fairly common in our country and presents a problem to ophthalmologists.

Trachoma may affect all persons, but those in the lower income groups who have to live in crowded rooms and insanitary surroundings under primitive and poor hygienic conditions are the most affected. Dust, foreign bodies, moisture, windy and dry seasons have their influence on the disease.

Our hospital incidence is 10% of the total eye cases seen in Mogan Hospital (Shimoga); 22·06% in Mysore Iron and Steel Works Hospital, Bhadravathi; 30% in Lady Curzon and Bowring Hospital, Bangalore, and 13·1% in Krishnarajendra Hospital, Mysore. The higher incidence at Bhadravathi and Bangalore is probably due to these being industrial areas. Males predominate (74·3%). The disease is as already stated, most common in the poorer labouring class of people living in crowded surroundings. The incidence among the new entrants recruited to the factory is 68·04%. In school boys, the incidence is 81·25%, the maximum incidence being among Brahmins, the farming class, and the Lingayets. In one factory with 840 employees, the survey revealed that 715 had trachoma, the incidence being 85%. No age is exempt though the majority of our cases were in the 18 to 40 years age-group.

Family history was positive in 55% of the cases in our series.

There seems to be a controversy as to whether the conjunctiva or the corneal condition is primary. All agree, however, that the conjunctival changes are more prominent in the upper conjunctival sac and one important feature of the disease is pannus-formation over the upper part of the cornea.

SYMPTOMS:—The disease may start either insidiously or all of a sudden, the former being more common. The acute phase of the disease is characterized by an intense conjunctival inflammation with dense infiltration and papillary hypertrophy. Usually the conjunctival discharge is scanty. Secondary bacterial infection complicates the clinical picture.

*Specially contributed to the ANTISEPTIC

The disease progresses in time to the well-established chronic phase with established pannus, the increased exudate forming the so-called grey veil over the upper half of the cornea and resulting in corneal opacity that interferes with the vision. The occurrence of cicatrical entropion, follicles and thickening of the lids is variable and of different degrees of intensity. In the majority of cases in our series, these changes were not of common occurrence.

The precise ætiological agent is not known and there is a considerable volume of literature on this subject which is all controversial and as yet unsettled. Halberstaeder and Prowazek first described the cytoplasmic inclusions of the disease and other investigators have shown the infectious virus to be of the size of a large particle and to belong to the psittacosis-lymphogranuloma group; they have provisionally placed the infectious agent between rickettsiæ and viruses. There appears to be no established immunity for this disease. The antibiotics have been tried recently in trachoma on the basis of the ætiological factor belonging to the virus group; and favourable dramatic cures have been reported in some and disappointing results in others.

Clinical results.—Prior to the advent of antibiotics and chemotherapy, the therapeutic measures were directed towards the reduction of inflammatory symptoms and secretions and the removal of the granules and hypertrophic tissue, shortening the duration and diminishing the liability to cicatrization and other serious sequelæ.

The antibiotics used in our present series, were :—penicillin, aureomycin, terramycin and chloromycetin in the form of drops and ointments in varying combinations :—These were prepared as fresh aqueous solutions daily from crystalline powders supplied in sterile vials. The total of 866 trachoma cases selected for the clinical study fell into the following age-groups.

Table I

Showing the Incidence of Trachoma in the Different Age-Groups Studied

	Age-groups						
	1–9	10–19	20–29	30–39	40–49	50–59	60–69
Total cases of trachoma 866	51	82	320	310	64	39	—

The stages of trachoma are given according to Maccallan's classification :—(*i*) incipient, early stage of infiltration; (*ii*) active inflammation, tarsal conjunctivæ are hyperæmic, subepithelial infiltration follicles; (*iii*) combined hyperæmia and scarring, including a form of brawny stage and (*iv*) the stage of healing and scarring throughout the eye.

Treatment.—(1) *Penicillin*:—Our experience with penicillin in trachoma was disappointing. In 200 cases, penicillin 10,000 units per cc. were instilled every 2 hours and penicillin ointment was applied 4 times a day. The cases were under observation for nearly six months. The associated secondary infection was brought under control. It is doubtful if penicillin has any effect on the primary condition and we cannot say if the drug acts well in the early cases as we rarely meet with incipient cases.

(2) *Penicillin drops and aureomycin ointment*:—In another 120 cases penicillin drops 10,000 units per cc. were instilled and aureomycin ointment applied 4 times a day. Aureomycin drops were not available. The results are shown in Table II.

Table II

Showing the Results obtained with Penicillin Drops and Aureomycin Ointment

No. of cases	Sex M.	Sex F.	Age group	Duration of condition	Method of treatment	Duration of treatment	Cured	Improved Subjectively	Not Improved
120	60	60	t9 o 60 years	1 to 10 years	10,000 units per cc. penicillin every 2 hours and aureomycin ointment 4 times a day.	3 to 6 months	Nil	110	10 had complicatioons like trichiasis, entropion, pannus

(3) *Aureomycin ointment 1%*:—78 cases were selected for aureomycin ointment therapy applied two hourly except during the night. Of these 8 cases with active pannus had oral administration as well (500 mg six-hourly for 6 days).

The clinical results are shown below :—

Table III

Showing Results of Treatment with Aureomycin Ointment alone

No. of cases	Sex M	Sex F	Age group	Duration of the condition	Method of treatment	Duration of treatment	Cured	Improved subjectively	Not improved
78	58	20	9 to 50	1 to 5 years	2 hourly ointment except during the nights	3 to 6 months	Nil	74	4 with complications entropion

(4) *Terramycin ophthalmic ointment:*—155 cases were selected for treatment with terramycin ointment applied, two hourly except during the night. Of these 15 cases had had previous aureomycin therapy, One case showed granules on the bulbar conjunctiva. Five cases showed sago-grain appearance on the upper eyelid. The clinical results are shown in Table IV, *p. 748.*

TABLE IV

Showing the Results of Treatment with Terramycin Ointment alone

No. of cases	Sex M	Sex F	Age group	Duration of the condition	Method of treatment	Duration of treatment	Cured	Improved subjectively	Not improved
155	105	50	9 to 50	1 to 3 years	2 hourly ointment except during the nights	3 to 6 months	Nil	147	8 of these 4 had entropion with trichiasis

(5) *Chloromycetin 0·5% ophthalmic drops and ophthalmic ointment*:—105 cases were treated with chloromycetin ointment and drops; the drops were applied 2 hourly and the ointment 4 times a day. Four cases which had fleshy-pannus had systemic administration of 250 mg. every 3 hours for 4 days with no dramatic results on the primary condition. Clinical results are shown below.

TABLE V

Showing Clinical Results of Treatment with Chloromycetin Drops and Ointment

No. of Cases	Sex M	Sex F	Age group	Duration of the condition	Duration of treatment	Cured	Improved	Not improved
105	77	28	9 to 50 years	6 months to 2 years	3 to 6 months	Nil	97	8 of which 4 had pannus and 2 with corneal ulcer and 2 with entropion

(6) *Aureomycin 1% ophthalmic ointment to right eye and terramycin ophthalmic ointment to left eye*:—The ointments were applied every two hours except during the night. Clinical results are shown below.

TABLE VI

Showing Clinical Results of Treatment with Aureomycin Ointment to Right and Terramycin to Left Eye

No. of cases	Sex M	Sex F	Age group	Duration of condition	Duration of treatment	Cured	Improved	Not improved
85	60	25	9 to 50 years	6 months to 2 years	3 to 6 months	Nil	80	5 cases had complications like pannus and entropion

(7) *Aureomycin ophthalmic ointment to right eye and chloromycetin ophthalmic ointment to left eye*:—The ointments were applied every two hours except during the night. Clinical results are shown in Table VII, *p. 749*.

TABLE VII

Showing the Results of Treatment with Aureomycin Ointment to Right and Chloromycetin Ointment to Left Eye

No. of cases	Sex M	Sex F	Age group	Duration of condition	Duration of treatment	Cured	Improved subjectively	Not improved
55	40	15	9 to 50	6 months to 2 years	3 to 6 months	Nil	48	7 cases not improved of which 3 had entropion and 2 fleshy pannus and 2 ptosis

(8) *Terramycin ophthalmic to right eye and chloromycetin ophthalmic ointment to left eye*; the ointment were applied every two hours except during the night. The clinical results are shown below.

TABLE VIII

Showing Results of Treatment with Terramycin Ointment to Right and Chloromycetin to Left Eye

No. of cases	Sex M	Sex F	Age group	Duration of condition	Duration of treatment	Cured	Improved subjectively	Not improved
68	45	23	9 to 50	6 months to 2 years	3 to 6 months	Nil	64	4 cases had complications like trichiasis and entropion

Conclusion.—The clinical results obtained with the use of these antibiotics in the treatment of trachoma lead us to believe that none of these antibiotics have any effect on trachoma *per se*, but they all play an important role in dealing with the secondary infection usually associated with the disease. Probably the amelioration of the subjective symptoms by the control of the secondary infection might have led various investigators to attribute these drugs dramatic properties of curing trachoma. No direct dramatic effect upon the underlying trachomatous condition was seen by us during our clinical observations. Trachoma patients treated with antibiotic solutions and ointment in various combinations every day for several months as recorded in the preceding paragraphs and tables failed to show any improvement in the clearing up of the pannus, or the disappearance and reduction in the size of the granules. However the subjective symptoms like lacrimation, photophobia, irritation of the lid margins, itching, redness of the conjunctiva cleared up within 48 to 72 hours and a partial subsidence of inflammation is seen giving an erroneous impression that the underlying condition of trachoma had disappeared or become very much improved. Many patients stop treatment altogether, under an erroneous belief that they have been cured of the disease. Some go to the

doctor again when they have a relapse of the primary condition after an interval of some months.

Discussion.—Thygeson, Desvignes, Morault, Poleff, Viennot-Bourgin believe that aureomycin has a viricidal action on the trachoma virus. D'andrade and Brede, Sarkies, Boase and Mohamed from Egypt believe that aureomycin is effective in trachoma by its effect in controlling secondary infection and in ameliorating the symptoms of lacrimation and photophobia. Shah from Pakistan has reported dramatic improvement following the use of aureomycin in trachoma. Toulant Larmanade reported that aureomycin in trachoma gave spectacular results in the treatment of trachoma. Tabone recommends the combined local and oral method to be effective in the treatment of trachoma. Lyons is of opinion that the results of aureomycin on Egyptian trachoma falls short of the results claimed in other countries. D'Andrade and Brede working in Lisbon, concluded that aureomycin is not a cure for trachoma but is very useful for associated infections, while the pathological back-ground remains unaffected by the therapy. Yukihiko Mitsui and Chietanaka of Japan consider that the use of terramycin and aureomycin yields good results in the treatment of trachoma but *not* chloromycetin. They say that even the follicles disappear in two or three months' treatment.

Michel Pijoan and Fredloe and Payne are of opinion that chloromycetin in adequate doses by oral daily administration consecutively round the clock for atleast 4 days reduces the lesions present in the eyes of trachomatous patients resulting in an amelioration of the condition. Magnol and Bietti have reported good results following the local application of chloromycetin. Freyche claims that chloromycetin is a specific therapeutic agent for trachoma.

Gupta of Lucknow is in favour of the oral administration of chloromycetin and reports that the drug has its greatest effect in the first and second stages of the disease as the conjunctival and corneal involvements clear up very early. Corneal ulcer, pannus nebular and macular opacities responded very well. He obtained 80% cures in the first and second stages of the disease and 20% were improved after 4 days' treatment, the drug not being found so effective in the 3rd stage of the disease with marked follicle scarring and other sequelæ.

As seen from the review of the literature cited above considerable differences of opinion exist on the specific action of these antibiotics on the virus of trachoma. The majority of investigators claim a specific effect and even report dramatic cures. I am inclined to think however, that the conclusions drawn are premature and not based on a proper evaluation of the type of infection, the time and the number of cases studied. Time is the

essential factor which will decide the specificity of any therapeutic agent in trachoma.

Summary.—Our clinical observations tend to show that these antibiotics are of not of much value so far as the primary condition is concerned. They are useful only up to a certain stage; *i.e.* controlling the secondary infection associated with the disease which gives the impression of a rapid over-all improvement in the clinical picture. In the Missouri Ozarks region where trachoma is not associated with secondary infections, these antibiotics have been shown to be valueless in tackling the primary condition.

The conflicting reports from different investigators in different parts of the world would appear to incline us to the view that we are either dealing with different strains of the trachoma virus which are not giving uniform results with the antibiotics or that the ætiological factor may be a virus not amenable to the viricidal antibiotics thus far known. If it is conceded that the ætiological factor is a virus, these antibiotics have no specific action against the changes that have already been effected by the virus in the tissues, as probably the drugs are not able to reach the virus. Therefore, it is justifiable to state that we are still uncertain about the ætiology of trachoma and that at best the antibiotics have been helpful in alleviating the subjective symptoms of the disease to some appreciable extent.

I express my thanks to Parke Davis and Lederle Laboratories for their liberal supply of chloromycetin and aureomycin for the clinical trials.

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THE TONSIL AND ADENOID PROBLEM

No large scale properly controlled trial into the value of adeno-tonsillectomy has ever been carried out. A Medical Research Council Report (1938) went so far as to describe the operation as "a prophylactic ritual carried out for no particular reason with no particular result." The most satisfactorily controlled study to date is that of McCorkle, Hodges, Badger, Dingle and Jordan (1955). During the course of the Cleveland Families Study, 26 children had their tonsils removed. As a group these had more than the expected number of respiratory infections before the operation and continued to have more after it. Figures when corrected for age, sex and season did not reveal any beneficial effects from the operation. Dingle (1956) concluded that tonsillectomy did not reduce either the frequency or the severity of common respiratory diseases.

Campbell (1939) considered that tonsillar remnants cause more troublesome symptoms than the original tonsil, yet incomplete removal would seem to be a common phenomenon. Gordon (1947) found remnants in 42·4 per cent of 1,000 children after tonsillectomy, Rhoads and Dick (1928) found them in 73 per cent, Campbell (1939) in 77·3 per cent, and Meyer (1946) said he believed that complete tonsillectomies were rarely performed.

All authorities seem to agree that removal of the tonsils and/or adenoids is a valuable procedure "in carefully selected cases," yet they disagree as to the proper indication for operation. *Nasal catarrh is not one.* Frequent colds or excessive nasal catarrh or sinus infections are not cured and may even be precipitated by the operation (Crooks, 1938; Illingworth, 1950). Griffiths (1937) found that infection of the accessory nasal sinuses was more common in those who had had tonsillectomy than in those whose tonsils were intact. He states that "in no circumstances should tonsils be removed for nasal catarrh." *Parental insistence should not be* one.

Sheldon (1954) does not regard several attacks of tonsillitis *per se* as indication for tonsillectomy, but considers that persistently enlarged glands at the angle of the jaw indicate that the tonsils are unhealthy and no longer able to serve their purpose. He also holds that certain appearances in the throat indicate chronic infection. Yet enlarged cervical lymph glands are very common and Fry (1957) found that 76 out of 100 consecutive children not suffering from any respiratory tract infections and apparently quite fit and healthy had "definite and palpable glands in the neck."

The operation does no good in rheumatic fever. It is of no value in nephritis (Rudebeck, 1946) and may do harm. Illingworth (1939) found that 18 out of 365 cases of nephritis immediately followed operation and that in 119 children with nephritis the operation was followed by an exacerbation in 29, one of which was fatal. Paton (1943) from a study of a group of school-girls concluded that removal of the tonsils increased the susceptibility to respiratory infections and that removal of the adenoids is followed by an increased susceptibility to middle ear inflammation. Kaiser (1930) also found that: "respiratory infections such as laryngitis, bronchitis and pneumonia not only are not benefited by tonsillectomy but actually occur more frequently in tonsillectomized children." The operation is a painful and upsetting experience for a child. Levy (1945) found that night terrors characterized the reaction of children under 3 and negativism and fears of the dark and strange men of children over 4. None of these studies can be accepted as proving the harmful effort of the operation, they do, however, suggest that sometimes it may do more harm than good.

A recent Medical Research Council Report (1955) states that their findings indicated that persons whose tonsils had been removed were more likely to develop the bulbar form of poliomyelitis than those who had not had the operation "even if years had elapsed between the removal of the tonsils and the onset of poliomyelitis."

If parents realized the harmful effects that the operation may have, the disagreement that there is within the medical profession about its value, and the strong probability of spontaneous improvement in symptoms between the age of 7 and 9, the pressure that they exert upon doctors to 'have them out' would be greatly diminished.—(*The British Journal of Clinical Practice*, March 1957).

TREATMENT OF PUERPERAL MASTITIS

Puerperal mastitis treated with local heat clears up more rapidly than when sulphonamides or penicillin is given.

The breasts are supported and bound, and thermophores are applied. A breast pump is used, but the baby is not weaned. Incision of the abscess is usually necessary. Average duration of illness so treated is about twenty-five days. With sulphonamide or antibiotic therapy, duration of illness is prolonged to thirty-one to thirty-four days. Formation of abscess is delayed by sulphonamides or penicillin.—(*Wien. Klin. Wchnschr.*, *68*: 930-932, 1956 via *Modern Medicine*, March 15, 1957).

HEPARINOID SUBSTANCES IN PLASTIC SURGERY*

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Plastic Surgery of the face is often followed, in the immediate post-operative period, by a disfiguring inflammatory œdema which not only causes discomfort to the patient but prolongs the period of convalescence, necessitating a longer period of staying away from work and other day-to-day activities. The value of any measure which can cut short this post-operative period of convalescence by preventing or clearing up the œdema rapidly, cannot be over-estimated ; to this end, I undertook clinical trials with a preparation containing heparinoid substances derived from animal organs and incorporated in a suitable cream base to ensure percutaneous absorption.

Material and methods.—The following varieties of cases were included in the trials which were conducted in my private practice and at the G.T. Hospital, Bombay, from 1955 to June 1957.

1. *Nose operations* :—(*a*) Fifteen cases of nasal reductions under local or general anæsthesia ; (*b*) ten cases of build-up of nasal contour by either a cartilage (auto or homo) graft, bone graft or acrylic implants ; and (*c*) two cases of narrowing of the nostrils.

The undermining that is necessary in nose operations has a tendency to produce swelling of the nose and lower eyelids which temporarily mars the affects of the operation. The ointment was applied to the operated area immediately after the operation in all cases.

2. *Facial scars* :—(*a*) Thirteen cases post-traumatic or following "Tropical sore ;" (*b*) and 5 cases of keloid scars due to burns.

The size of the scars varied from ½ inch to 4 inches. The scars were excised completely in 1 or 2 sittings and the gaps closed by wide undermining of the surrounding skin of the face so as to be able to suture without any tension. The ointment was applied in the whole area and in the suture line on completion of the operation. In the case of the keloidal scars, post-operative irradiation was also given.

3. *Linear contractures* :—Six cases of axillary and seven of neck contractures and four cases of flexion contracture of fingers.

The ointment was applied locally after the operation of the Z plasty in all cases.

4. *Osteotomy for ankylosis of the temporomandibular joint* : —Three cases of bilateral and unilateral were treated by wedge

* Specially contributed to the Antiseptic.

osteotomy of the mandible above the angle. The ointment was applied over the site of operation in all the cases.

5. *Eyelid surgery*:—Two cases of unilateral congenital ptosis were treated by sling operation of skin strip and advancement of the tarsal plate. The ointment was applied at the completion of the operation and the eye was bandaged for the first five days. At the second dressing the ointment was applied again.

In two cases, with wrinkles of the upper and lower eyelids, the wrinkles of the combined upper and lower eyelids were repaired simultaneously with the "face-lift" operation. In one case of "bags" of the lower eyelid, an early recovery was very essential so as to enable the patient to resume work on the stage. The ointment was applied locally in all these cases.

6. *Operation "Face Lift"*:—Five cases of this operation were included in the trial. The first two were done under local anæsthesia and the others under general. In the first case the ointment was started on the third day but in the other four, it was applied on completion of the operation. The last case was combined with repair of both the upper and lower eyelids. In the last three cases complete rotational face lift with dissection of the skin of the upper neck was performed.

Results.—Prior to the trials with this ointment the post-operative œdema was treated by conventional methods such as the application of cold compresses, etc.

It was noticed that after the use of this ointment, the post-operative œdema of the nose and lower lids in nasal operations was remarkably lessened or absent altogether. In the case of facial scars, keloids and linear contractures, the union of the operation scar was supple and soft. There was no evidence of delayed healing of the incision as all the skin sutures were removed on the fourth day at the latest.

Results in osteotomy for ankylosis of the temporomandibular joint were remarkable in that the period of hospitalization was markedly shortened.

In the cases of eyelid surgery and operation of face lift the post-operative œdema was very much reduced and the convalescent period was noticeably shortened.

Discussion.—The effects of hyperæmia that occurs in inflammation and following the use of counter-irritants are short-lived because of the thrombosis that occurs in these minute dilated blood vessels as a result of vascular stages and other factors. If the formation of micro-thrombii in these vessels could be prevented so as to perpetuate the hyperæmia, it is plausible that resolution would be quicker. The mode of action of this ointment containing heparinoid substances can be explained on this basis. It possesses a hyperæmizing action and the anticoagulant effect of the heparinoid substances prevents thrombosis from occurring in the dilated blood vessels thus perpetuating the hyperæmia.

Conclusion.—It is my impression that this ointment containing heparinoid substances, when applied routinely after plastic surgery, does help to a great extent to lessen the post-operative œdema and ensures a quicker convalescence. It also helps in the formation of soft and supple scars. It was also noticed that the post-operative discomfort was alleviated to a very great extent.

Acknowledgement.—My thanks are due to Messrs. Neo-Pharma (Private) Limited, Agents for Messrs. Luitpold-Work of Germany for their liberal supply of samples of Hirudoid used in these trials.

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TRANSIENT BLINDNESS DUE TO LOCAL ISCHÆMIA

Amaurosis fugax, or transient loss of vision due to temporary interruption of retinal blood-flow without cerebral or systemic hypotension, is notable by recurrent episodes of blindness, usually unilateral, which begin suddenly and persist for only a few seconds or minutes.

Blindness that persists longer than thirty minutes, with subsequent complete recovery, is probably a functional disorder rather than true amaurosis fugax, since ischæmia for such a long period would almost certainly permanently damage the retinal ganglia. Loss of vision may recur several times a day or at intervals of a month or more. Blindness may be total or may involve a sector of the visual field.

Sometimes, the attacks cease spontaneously; in other instances, blindness persists for longer than usual and vision is not completely recovered. Ophthalmoscopic examination of such cases reveals ischæmic retinal infarction or neuro-retinopathy.

Diagnosis of amaurosis fugax must usually be made from the patient's description of the attacks, since ophthalmoscopic examination during the actual blindness is rarely possible.

The cause of retinal ischæmia should be ascertained and treatment instituted to reduce the likelihood of permanent blindness. Migraine, retinal artery spasm associated with local retinal vascular disease or with carotid artery lesions. Raynaud's disease or a similar syndrome, or temporal or cranial arteritis may be responsible. Examination of the ocular fundi between attacks often reveals atherosclerosis or emboli in the retinal artery. In a few instances, no causative lesion can be discovered.

Therapy depends upon the underlying disease. Anticoagulants should be given if carotid artery disease is responsible. For temporal arteritis, cortisone should be given.—(*Illinois M. J.*, *111*: 21-24, 1957 via *Modern Medicine*, April 1, 1957).

PROLAPSE OF THE UMBILICAL CORD

W. G. Slade and J. H. Randall, (*Am. J. Obst. and Gynaec.*, November, 1956) report a study of 63 cases of prolapse of the umbilical cord among 15,578 deliveries at the University of Iowa Hospital (1940 to 1953). A survey of 24 different publications reporting 4296 cases of prolapsed cord gave an incidence of one case in 156 deliveries. Maladaptation of the presenting part through contracted pelvis, pelvic tumour or obstetrical manipulation disposes towards cord prolapse. In this series there was an incidence of 4·8% of contracted pelves with prolapse of the cord. The risk of cord prolapse in contracted pelvis should be anticipated by performing a careful pelvic examination following rupture of the membranes. The authors found prolapse of the cord most commonly in transverse or shoulder presentations, next in breech presentations, and least often in vertex presentations. There was a gross fœtal mortality rate of 42·8% in the series, mainly caused by delay in diagnosis of prolapse of the cord, a high operative delivery rate, and an increased incidence of prematurity. There was a 28·6% incidence of prematurity among these patients. The authors found the risk of prolapse nearly twice as great in *multiparae* as in *primiparae*; it was prone to occur with nearly equal frequency at all degrees of dilatation of the cervix. Multiple pregnancy carried a greater risk of prolapse of the cord on account of the increased incidence of prematurity, increased incidence of hydramnios and the high presenting part of the second twin. The fœtal mortality risk was more than twice as great when the presenting part was not engaged, and the degree of dilatation of the cervix at the time of diagnosis had a direct bearing on the fœtal mortality rate. There was a progressive increase in fœtal deaths with increase of time between diagnosis of cord prolapse and delivery of the baby. Operative delivery of patients in this series by forceps, breech extraction or cæsarean section was at a rate of 30% to 40%. The perinatal mortality rate was 55·5% for premature infants and 37·7% for mature babies. The stillbirth rate was 33%, fifteen times as great as the stillbirth rate for all deliveries. There was one maternal death in the series due to severe sepsis, and the risks of postpartum hæmorrhage and morbid puerperium were quadrupled. The authors emphasize the importance of early diagnosis and prompt treatment. Frequent and repeated checks of the fœtal heart beat and a routine vaginal examination soon after rupture of the membranes are considered valuable aids in early diagnosis. They recommend the following steps in treatment for prolapse of the cord with a viable baby: immediate postural treatment should be carried out; the presenting part should be held up by an assistant with a finger in the vagina until delivery is accomplished; the baby is delivered as quickly as possible, by the vaginal route if conditions are suitable otherwise by cæsarean section.—(via *Med. Jour. Austral.*, 1-6-'57).

THE "PRESYSTOLIC" MURMUR

H. T. Nichols *et al* who have studied the mitral valve by direct examination in the contracting human heart and who have made phonocardiographic registrations during catheterization, have found that the "presystolic" murmur of mitral stenosis occurs during the first rise in intraventricular pressure after the onset of the isometric period. The murmur is therefore in fact systolic in time. It is associated with a palpable vibration of the free edges of the valve. This vibration occurs during the phase of intraatrial displacement of the valve in valves having the free edge fixed at the commissures but elastic in the central portion. When the mitral valve leaflets are inelastic, the intraatrial ballooning and the associated vibration and murmur do not occur.—(*Am. Heart Jour.*, Sep. '56),

A REVIEW OF CHEST DISEASES WITH ILLUSTRATIVE CASE HISTORIES

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Lecture III*

Tuberculosis.—In this brief review of all diseases of the chest, it is possible only to touch on certain aspects of tuberculosis.

An analysis of a thousand consecutive open cases and a thousand radiographs studied at the Government Tuberculosis Institute, Madras, during 1936-37, was the subject of a paper published in the *Indian Medical Gazette*, for September 1939. The maximum incidence was in the age-group, 25 to 44 in men; 15 to 34 in women. More than 16% of the male consumptives were past the age of 45. This is an important point to be remembered as a large number of them pass off as subjects of chronic bronchitis. It was also noted that 6·9% of all the cases had wheezing at the time of examination. This wheezing due to fibroid tuberculosis, was often put down as further evidence of bronchitis. Such senile tuberculosis is one of the most important types from the point of view of public health. The grandfather is said to be suffering from bronchitis. He stays at home all the time and is particularly fond of the grand-children to whom he gives the tubercle bacilli, whether he gives anything else or not.

19·3% of the patients came from rural areas; 17·3% from semi-rural areas and 53·4% from urban areas.

On the basis of the occupational incidence of tuberculosis it was felt that tuberculosis surveys among mill-workers, press-men, tailors, *beedi*-makers and weavers were likely to yield valuable data. The occupation study also showed that as many as 16·7% of the open cases were in the category of food-handlers and children-handlers in which latter group were included teachers, domestic servants, motor drivers etc.

The study also showed that the number of children dead under the age of 10 years in tuberculous families was much more than in the general population. The risk to the child in the home was greater when the open case was the father and this was perhaps partly due to the set-back in the economic level of the family owing to the breadwinner's illness.

Of the 216 married women included in the study, 26·9% dated their symptoms from a previous child birth or abortion.

Only a third of the total of the thousand open cases had sought treatment earlier than three to six months after the manifestation of symptoms.

* Maharajah of Travancore Curzon Lecture delivered on 30th March 1957.

Specially contributed to the ANTISEPTIC

An analysis of the symptoms complained of, showed the great frequency of cough alone or together with fever. Hæmoptysis occurred in 26·4% of the cases.

Twenty years ago when this study was conducted, 82·7% of the cases were beyond the stage of suitability for artificial pneumothorax and 49·7% had tried various non-descriptive, non-allopathic remedies before finding their way into the Tuberculosis Institute. We are sure that the position is very much better today and many more cases of early disease come to the Tuberculosis Clinics. This aspect of the tuberculosis problem with particular reference to modern advances and chemotherapy will be dealt with again.

Incidence of Tuberculosis in India.—A country-wide sample survey has been undertaken by the Indian Council of Medical Research. It was decided to confine the survey to finding out the tuberculosis morbidity rate by X-raying the population and examining bacteriologically those having significant abnormal shadows in the X-ray pictures. It was also decided that the groups should be selected by sampling and at least 90 to 95% of the persons so selected should be examined. The size of the sample was restricted to (*a*) 30 villages (*b*) 10% of the population in six medium size towns and (*c*) 25 to 40 blocks of a size of 800 to 1000 persons each within the City. The work has not yet been completed and at the Delhi Conference in January last, Dr. Benjamin gave a report on the work so far done, pointing out the difficulties in the actual carrying out of such a survey in our country.

The number of active and probably active cases per 1000 of the population was obtained by taking together the number of cases marked tuberculous possibly active and tuberculous active and adding to them those established as bacteriologically positive among the remaining X-ray abnormals. This index has varied from 7 to 30 per 1000 of population but in most places the variation has only been between 15 and 24.

Taking 20 per thousand to be an approximate average it will work out to a rate of 2000 per 100,000 of the population. This confirms the estimate of active tuberculous cases which had been made earlier on the basis of certain sample surveys in local areas.

It would appear that the differences in the prevalence of the disease in cities, towns and rural areas are perhaps not so marked as had been generally assumed. The same lack of significant difference between large towns, small towns and rural areas can be noticed also in the infection rates as judged by the percentage of tuberculin positives determined during the BCG campaign.

The survey has also shown that the morbidity rates are lower for females than for males and they show a continuous increase with age. The prevalence in the age-group 35 years and over was considerably higher than in the age-group 5 to 35 years.

The fact that the vital statistics produced by different authorities in India are still hopelessly unreliable is best demonstrated by a reference to the Administration Report of the Corporation of Madras for the year 1955. It is stated that the mortality from pulmonary tuberculosis in the City of Madras is 27 per thousand of the population, a figure which is unbelievably low, being less than what obtains in many Western cities. Looking at it from another angle, only 1·3% of the 32,000 and odd deaths that occurred in the City during the year were caused by pulmonary tuberculosis. This would make tuberculosis an absolutely insignificant problem in the City of Madras. The fact is that a large number of tuberculosis deaths must have been included under pyrexias, respiratory diseases etc., without being specifically brought under the heading of pulmonary tuberculosis.

Artificial pneumothorax.—The twenty years before 1947 when streptomycin came to be used on a fairly large scale may well be described as the Pneumothorax and Pneumoperitoneum era in tuberculosis. It is not proposed to discuss at any length the indications, technique, complications and results of these two procedures which we have employed on hundreds of cases during these years. I should say that between the two, pneumothorax was employed more often and with better advantage than pneumoperitoneum.

Although during the last decade 1947–57 we have passed on to the chemotherapy era in tuberculosis, there is still the need in quite a number of cases for surgical measures to produce a complete resolution of tuberculous foci in the lungs. I don't agree with the view expressed by some persons in recent times that to-day there is scope only for resection of the lung and that all other methods of collapse therapy have no place whatsoever. I would here enter a plea for a greater use of artificial pneumothorax in a particular type of case in which chemotherapy alone will not suffice. It is still an extremely useful procedure provided it is managed by one who understands its proper use and limitations and a personal watch is kept throughout the period of treatment. Many patients who had had A. P. treatment in the early thirties are still alive and doing well. With modern drugs the procedure in the case where it is properly indicated, can be carried out with greater safety and success than before.

Scadding, Nicholson, and Hoyle, from their experience with a series of patients during fifteen years, favour the use of artificial pneumothorax. They consider the chief conditions for success to be :—recognition of certain contra-indications ; early division of pleural adhesions ; maintenance of only those pneumothoraces which were complete, and had adhesions remote from the diseased

area or limited to the superior mediastinum; and a minimum duration of three years, and preferably of five years in the presence of initial cavitation. They repeatedly emphasize the desirability of a single control of policy throughout treatment.

Drugs.—The three drugs that are now widely employed in the treatment of tuberculosis are Streptomycin, PAS and INH in the chronological order of their discovery but not in the order of their dependability. PAS is the least dependable and has the additional disadvantage of very frequently upsetting digestion. Of the other two, I have no doubt that streptomycin is the more effective in quickly producing a remarkable improvement in the temperature, cough and general well-being of the patient. However, many continental authorities believe that INH is the most valuable anti-tuberculous drug we have to-day.

In the actual administration of these three anti-microbial agents—the term antibiotic is not applicable to INH and PAS—it is now held by practically all workers that it is best to use the drugs in combinations of two and not to administer them singly. It is also considered inadvisable to give all three drugs together as it is best to keep one drug in reserve. Here again Freerksen of Germany who recently visited Madras is of the view that INH can be used alone and there is no advantage in combined therapy.

It has been established on the basis of carefully-controlled studies conducted by the Medical Research Council of Great Britain that the best combination is streptomycin *daily* with INH. At any rate, where the disease is acute, this is the best combination to employ. It may not be out of place to mention that four years ago, when the WHO team was with us and a discussion on antibiotics was arranged, I insisted on daily injections of streptomycin as being superior to the suggestion that was just then made by the American workers that streptomycin given bi-weekly was quite effective. In the average case, the schedule which I employ is :—1 g. a day for 20 days ; ½ g. a day for 20 days ; and ½ g. on alternate days for 20 injections, making a total of 40 g. Throughout this period the patient gets 100 mg. INH twice a day after food. For certain severe cases double the doses of streptomycin and INH has been employed for the first ten days of treatment. After the 40 g. of streptomycin have been given as indicated above streptomycin is stopped and the INH is continued together with Sodium PAS granules 4 g. three times a day. The combined oral treatment with INH and PAS is continued for 6 to 9 months depending upon the extent of the initial lesion. As I have already mentioned, in a small number of cases where it is felt that chemotherapy alone may not suffice, artificial pneumothorax is instituted somewhere between the 4th and 6th month of treatment.

Rest in bed is, to my mind, as essential a part of the treatment to-day as it was before the days of chemotherapy. It must be rigidly enforced at least for the first three months of treatment. It is surprising that there is still need for reminding medical men about the fact that while chemotherapy may interfere with the multiplication of the myco-bacterium and therefore produce an immediate and remarkable improvement in the clinical manifestations such as fever, cough etc., it cannot and does not very much alter the evolution of the pathologic process. The radiological resolution and complete disappearance of the lesions which constitute the target of our treatment, take almost the same amount of time as in the pre-streptomycin era. Certain studies are being carried out in different parts of the world including India to assess exactly the place of bed-rest when the patient is on chemotherapy at home.

A distinction must be made between domiciliary and ambulatory treatment, domiciliary implying the patient staying in bed at home and taking the treatment while ambulatory implies that the patient goes to the clinic to receive injections etc. and perhaps undertakes additional activity also.

Ambulatory Treatment.—At the recent international Tuberculosis Conference held at Delhi in January 1957 several workers from different parts of the world reported on their experiences with the new drugs in non-hospitalized patients. For example, Griesback from Germany said that out of 10,000 cases treated for four months or more, 75% were cured or improved. Six % deteriorated anyhow on any treatment. In Hongkong, of 2046 cases treated on ambulatory lines, 67% improved. The results were not worse than hospital-treated cases. Similar reports came from other places. In Cairo, 64% showed sputum conversion in less than six months. 45% showed closure of cavities. In France they reported on the remarkable drop of the rate of primary infection in school children from 61 per thousand to 12 per thousand. This reduction in the liability to primary infection of children exposed to bacilli is certainly a great gain. Bosworth from the U.S.A. made the observation that 45% of the cases registered could not be hospitalized in the U.S.A. That certainly is a remarkable statement when we compare the position with the much more difficult position in India. In the U.S.A. they insisted on three months' hospitalization at the onset. He also reported on 21,000 patients collected from 46 hospitals and of them, 25% remained positive at the end of one year. This of course included a large number of chronic cases which had not been treated on proper lines previously. In Madras Dr. Philip and I had reported on 100 open cases treated with streptomycin and INH over a period of three months. There

was a 91% sputum conversion, and 53·4% cavity closure while seventy per cent benefited radiologically.

[*Note* :—These data were later projected on the screen along with the other slides].

The main difficulty in ambulatory treatment is the possibility of failure. The causes of failure may be arranged as under :—

(1) Development of drug resistance.
(2) Inadequate duration of therapy.
(3) Failure of patients to co-operate.

Even with all these difficulties there is no doubt that modern chemotherapy has revolutionized the treatment of tuberculosis. In a paper contributed to a recent number of the *Indian Journal of Tuberculosis* I have stressed the view-point how our entire organization of tuberculosis control should be changed in the light of modern advances in chemotherapy.

A combination of two drugs is generally considered much safer than the use of a single drug by itself from the point of view of delaying the emergence of drug-resistant strains. However, INH alone has been recommended by certain continental workers. A recent report (*American Review of Tuberculosis*, December 1956) dealing with the results of a two-year treatment with INH alone is summarized in the following paragraphs :—

"There has been a common belief held by physicians as well as surgeons that cavities still open by the 6th to 8th month of chemotherapy will seldom close on more prolonged chemotherapy. Nevertheless some studies have shown a progressive trend of cavity-closure beyond the 6th to 8th month point and the results have encouraged a more conservative attitude.

"This is a report on a series of 45 patients maintained on Isoniazid therapy without the other measures for a period of two years. Such a long-term single-drug therapy was chosen more because the surgical services were overcrowded and there is a long waiting list than because of any deliberate inclination to keep the patient on a non-surgical programme.

"Isoniazid was given orally, three doses a day, the total dosage being 5 or 10 mg. per kg. per day and the administration was continued for at least 9 months. In 34 of these cases, after two years of observation, 83% had reversal of infectiousness and in 71% all cavities had been closed. Analysis of these results offers clinical evidence to suggest that the therapeutic efficacy of the single-drug isoniazid regimen is not dissimilar to the therapeutic efficacy of INH-Streptomycin or INH-PAS and that the higher doses of isoniazid must be more extensively investigated."

In this paper, no mention has been made about the emergence of INH-resistant bacilli in the treatment of failures where the sputum remained positive. It has been argued that the INH-resistant bacilli having low catalase activity were non-pathogenic and there is no danger of another human being getting infected with them and suffering as a result thereof. But there is considerable recent evidence to show that the INH-resistant bacilli are not always non-virulent. Perhaps only 15% of them

are virulent but it is a large enough number which cannot be ignored. At the conference, a panel of distinguished workers was asked by Dr. McDermott the Editor of the *American Review of Tuberculosis*, whether they would like to be infected with INH-resistant bacilli or sensitive bacilli. Most of them preferred to be infected with resistant bacilli but a minority and Dr. McDermott himself preferred to be infected with INH-sensitive bacilli.

While INH has been in general use for less than five years and even the optimum dose whether it is 4 mg. per kg. or as much as 10 mg. per kg. has not yet been agreed upon, a suggestion has been made that the drug should be used extensively in childhood infection. Based on the results of limited experiments in guinea-pigs, it has been suggested that every Mantoux-converter even though the primary infection has not led to progressive or active disease, should be treated with Isoniazid and that this should be considered a better programme of tuberculosis control than BCG vaccination. It has been further suggested that such extensive use of INH in primary infections should find the greatest application in under-developed countries like India.

There are several objections to this suggestion :—How are we going to find out when a person gets a primary infection? Have we got the means of carrying out repeated Mantoux tests in children right from the time of birth? Now, even if we know that primary infection has occurred and we start the child on INH treatment, how long are we going to keep up the drug? Varying periods from six months to two years have been suggested by those in favour of the administration of INH for mere Mantoux conversion. What will be the effect of such administration, particularly on the production of INH-resistant strains of tubercle bacilli and on the Mantoux reaction itself. There is evidence both in the experimental animal and to a limited extent in human beings that isoniazid administration serves in course of time to convert the Mantoux positive person into a negative reactor. It is obvious that INH administration interferes with the immunity that may be expected to establish itself as a result of the primary infection. Is that a safe and advisable position in a country like India where the chances of re-infection are very great? Another suggestion that has been made is that a BCG vaccination which would be resistant to Isoniazid must be created. The advantage of using such a BCG product will be to keep up the active immunity that we expect out of BCG at the time when the Mantoux conversion becomes negative as a result of the INH treatment. Such an INH-resistant BCG is only a hope and has not become a reality so far.

On this question of the treatment of Pulmonary Tuberculosis in childhood, the following comments appear in the *Lancet* of 14th July 1956 :—

"An attempt has been made to crystallize the different views held by 18 chest physicians on this important matter.

"Most of them are in favour of antibiotic treatment of segmental lesions but not of cases that have not yet gone beyond the phase of a primary complex. This seems to point to a belief in obtaining an immediate favourable effect rather than a long-term prophylactic one.

"There was a majority opinion in favour of giving antibiotics to children aged less than 2 years. Though this opinion seems to be founded on a belief of the prophylactic efficiency of antibiotics against blood-borne disseminations, this view did not seem to be sufficiently strongly held to support the giving of antibiotics to recently infected older children. Nor did there seem to be much faith that the administration of antibiotics in primary infection in childhood could influence the incidence of tuberculosis of adult type in subsequent years.

"It is significant that we still have to use such words as "belief" and "faith." Clearly our knowledge is sadly incomplete, and opinion was virtually unanimous that a planned trial was required."

Intravenous PAS therapy in pulmonary tuberculosis.—For two years, J. Paraf, P. Zivy. E. Rosenberg and J. Desbordes (Paris) have used infusions of 500 cc. of 3% PAS in various cases of pulmonary tuberculosis with no untoward reactions. The infusion is given daily within two hours for atleast 30 days and, if indicated, over several months. The first treatment is given very carefully with regard for possible reactions. It is important that the patient rests for a few hours before and after the treatment. The blood level of PAS after intravenous therapy is at least 10 times higher than after oral medication and remains elevated for about 20 hours. It was observed that intravenous therapy prevents streptomycin-resistance for over six months of treatment. Intravenous medication does not affect the gastro-intestinal tract so much as oral medication.

When intravenous PAS therapy has been started in the early stages of miliary tuberculosis and tuberculous meningitis and combined with streptomycin for several months, the statistics in these two diseases decidedly improved. Exudative pulmonary tuberculosis showed dramatic response to the treatment.

Cortisone in tuberculosis.—The use of corticoids in association with antibiotics in the management of severe infections is a matter on which there is still considerable difference of opinion.

[Note :—Two lantern slides showing the possible mechanisms of anti-toxic effects of adrenal steroids and the rationale of combined chemo- and hormonal therapy in severe infections were then projected].

In tuberculous conditions cortisone has been most frequently employed only in the meningeal type. In pulmonary tuberculosis it has been used much less frequently. Evans has treated 300 cases of lung tuberculosis since 1952; first with a drip of

ACTH, and since 1954 with cortisone or prednisone, usually for three weeks. Streptomycin and INH are of course given in the usual doses. He had no serious accidents in the course of such combined treatment and is of opinion that cortisone is valuable in selected cases of early predominantly inflammatory disease.

Prednisone is preferred in order to avoid the metabolic effects of cortisone. At the time of discontinuing the drug, it has been considered advisable to give ACTH to stimulate the endogenous cortisone production by the adrenal cortex. While it should certainly be wiser to use it only in hospitalized cases, 90% of the patients treated by Evans had their cortisone at home.

The Bellevue Hospital authorities in New York are very conservative in using steroids. Less than 50 cases in a series of 3000 have had cortisone in addition to chemotherapy. In pleurisy they have limited its use to very ill patients giving 20 to 40 mg. hydrocortone intra-pleurally. It is believed that where absorption of the pleural fluid is slow, cortisone accelerates the absorption.

Antimicrobial treatment must precede prednisone by at least one month. Although the use of steroids is generally restricted to acutely ill patients with recent exudative disease, it has been suggested that in chronic cases there may be a theoretical advantage in keeping a cavity open and allowing the bacilli to multiply with cortisone so that they may be vulnerable to the action of isoniazid.

B.C.G.—Dr. Dubos, a great authority on the bacteriology of the tubercle bacillus, speaking in a Symposium on *Tuberculosis in Infancy and Childhood* has made the following observations :—

"Dr. Strom grows BCG in the presence of P^{32} permitting the radio-active phosphorus to be incorporated into the body of the bacillus. That permits him to trace with a Geiger counter the travels of the BCG bacilli and the dispersion of the BCG bacilli in the organs of the animal host. I shall single out only two of the discoveries that he reported this morning. One permits him to show that avirulent tubercle bacilli injected into an animal which has previously been vaccinated do not get distributed as rapidly and as widely in the organs of the host as do the same bacilli injected into a normal non-vaccinated animal.

"So I believe we have completely objective proof that vaccination does minimize, does retard the spread of the bacilli from the point of injection.

"The second discovery—which I am very surprised has not been exploited; there should be a hundred workers studying this problem—is that if you follow the rate of urinary excretion of radio-active phosphorus from marked bacilli that have been injected into a normal animal and compare it with the rate of excretion in the urine of an animal that has been vaccinated, you will observe within the very short time of 1 to 2 hours a much larger amount of P^{32} being excreted in the urine of the animal that has been vaccinated. Since most certainly the P^{32} has been released from the body of bacilli, this is the most compelling evidence—in fact, absolute evidence—that

the vaccinated animal has the capacity to destroy within an hour after injection many of the bacilli of super-infection.

"In my opinion, this experiment is so crucial that it demonstrates once for all without any need for argument or other demonstration that vaccination endows the vaccinated animal with the ability to destroy the bacilli and to destroy them very rapidly.

"Second, I have noted that this discovery is the key that will permit us to analyse mechanisms whereby the vaccinated individual has acquired these bactericidal properties over the bacilli of super-infection."

L. Strom, another authority who had actually conducted the experiments concluded as follows :—

"The results of these investigations are perfect arguments of BCG vaccinations, that is, the BCG vaccination produces a specific immunity that increases the resistance to any virulent tuberculous infection. In other words, when people are vaccinated with BCG and are then exposed to tuberculosis under similar circumstances, they are no doubt better protected than non-vaccinated persons."

Pleurisy with effusion.—Pleurisy with effusion is one of the commonest respiratory affections. In one period of five years among 6712 medical cases in the General Hospital, there were 4852 cases of respiratory diseases of which 506 were cases of pleurisy with effusion. It will be seen that pleurisy with effusion has accounted for 10·4% of the respiratory affections. We have analysed a series of 880 cases of pleurisy with effusion seen during the five-year period 1948-53 in the Madras General and Stanley hospitals. We have included in this study only cases of idiopathic or primary pleural effusion which is rightly believed to be of tuberculous origin. Cases showing a positive sputum at the time the effusion was present, have been excluded from this series. Other cases with differing ætiologies are not included in this series of 880 cases but will be dealt with later.

It is now accepted that practically all these cases of so-called idiopathic pleural effusion occurring in young adults are tuberculous in origin on the basis of Mantoux conversion, the follow-up of the subjects for months after the episode of pleural effusion, occasional post-mortem studies and special attempts to culture the tubercle bacilli from the aspirated fluid.

Wallgren in his time-table of tuberculosis has called Stage III *"The Pleurisy Period."* This follows the Stage I six weeks after the infection characterized by Mantoux conversion and Stage II which takes about three months and may be marked by the malignant generalized forms of tuberculosis. Stage III or the pleurisy period therefore starts about 4½ months after the primary infection and may last about four months. The effusion is usually on the same side as the primary complex and a hypersensitivity reaction.

Tuberculous pleural effusion commonly follows Mantoux conversion when this occurs after adolescence but is extremely

rare before the age of fifteen although most persons have become positive at this age. Explanation for this may lie in the fact that the initial tuberculous infection is greater after adolescence because at that age larger droplets containing a greater number of bacilli are able to pass the lung defences and reach the terminal bronchi. It is postulated that the size of the droplets which reach the terminal bronchioles in children is very much smaller than in adults possibly because of the more efficient working of the ciliary epithelium and consequently the number of virulent organisms is correspondingly less. Since adults tend to receive a larger initial dose of infection, the primary complex remains active longer and hypersensitivity develops while the pleura is still subject to the action of tubercle bacilli with the result that fluid is produced.

Pleural fluid complicates obvious pulmonary tuberculosis much less commonly than might be expected and is probably due to the formation of tubercles on the pleural membrane or rupture of a small tuberculous cavity into the pleural space. This relative rarity is proportionate to the tendency of the bacilli to remain localized to the lesion and to obliteration of the pleural space in the vicinity of the lesion. The infrequent association of miliary tuberculosis with effusion may be due to the rapidity with which the infection spreads allowing little time for hypersensitivity to develop.

Irwin insists that in addition to the highly allergic pleura, there must be a direct infection brought about by the tubercle bacilli penetrating either from a sub-pleural parenchymal focus or from a caseous tracheo-bronchial lymph-node.

[*Note*:—Various tables showing the sex and age incidence, comparison with the age incidence of men and women with open tuberculosis studied by us some years previously, comparison of our age-groups with the position obtaining in Eberle's London series were all presented at the end of the topic].

In our series, there was a greater predominance of men compared to Eberle's 1365 patients which is perhaps the largest single study reported in the literature. This may be merely due to our hospitals having more accommodation for men than for women patients.

It is worth pointing out that only 44 out of these 880 cases have come from the Pædiatrics Department to which children under 10 are admitted. The reasons for the comparative infrequency of pleural effusions in children have been discussed already.

The number of cases occurring in the age-group 15 to 24 is distinctly higher in London than in Madras. The difference is more marked in men than in women. One possible explanation is that primary infection occurring in early adult life is much more common in England while in India, primary infection

has already occurred in childhood. In certain European studies it has been shown that BCG vaccination brings about a remarkable reduction not only in the incidence of meningitis in children but also in that of pleural effusions in young adults. It will be interesting to watch in future years this difference between the vaccinated and the un-vaccinated groups. The frequency of the leading symptoms, namely, fever, cough, pain and breathlessness are presented in another table.

Signs :—There is no need to go into the classical physical signs of pleurisy with effusion to an audience such as this. It must be mentioned, however, that sometimes increased breath sounds to the point of bronchial breathing and increased voice sounds may be associated with pleural effusion. This can be explained on the basis of a segment right at the depth of the passively collapsed lung remaining unaffected with its bronchus remaining patent and the intervening collapsed lung and the fluid in the pleural space acting as good conductors transmitting the bronchial breathing produced in the bronchus. The failure to realize this possibility has sometimes led to the wrong diagnosis of pneumonia in a case of pleurisy with effusion.

Biochemistry.—The protein content of a tuberculous pleural effusion is generally believed to be between 2·5 and 4%. Apparently, the result depends on the particular method of the estimation employed. For, among 99 patients in one hospital, the average was 1 g. while among 100 cases in another hospital, the average was 4·22 g.

Gelenger and Wiggers determined the sugar content of the pleural fluid in a small series of cases and concluded that the finding of 30 mg. or less per 100 cc. should be diagnostic of tuberculosis while a concentration of anything above 60 mg. per 100 cc. should eliminate tuberculosis as a cause of the effusion. In 38 of our cases (which is a larger number than those of Gelenger and Wiggers) the average was 70 mg. per 100 cc. with only three cases having 30 mg. and less. This would correspond with the more recent study of Calman *et al* and of Berry and Banerjee who found that the dividing line between tuberculous and non-tuberculous effusions is somewhere between 60 and 100 mg. rather than 30 mg.

X-rays.—In 458 (52·5%) cases, the side affected was the right; in 413 (46·9%) the side affected was the left. In 9 cases (0·01%) the effusion was bilateral at the time of the study. This slight predominance of the right side has been noted in other similar studies.

The extent of the effusion was classified into three degrees of severity depending on whether the fluid reached up to the 6th rib, 3rd rib or above it. 466 (53%) showed a small effusion. 313 (35·6%) a moderate effusion and 101 (11·9%) an extensive effusion.

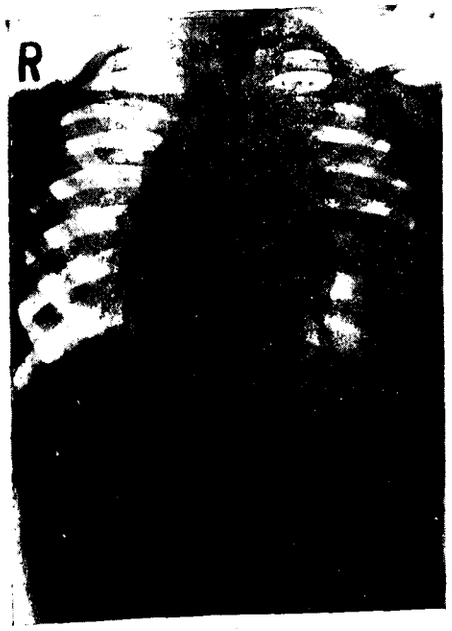

Fig. 1 Primary P-T with left phrenic paralysis due to mediastinal adenitis

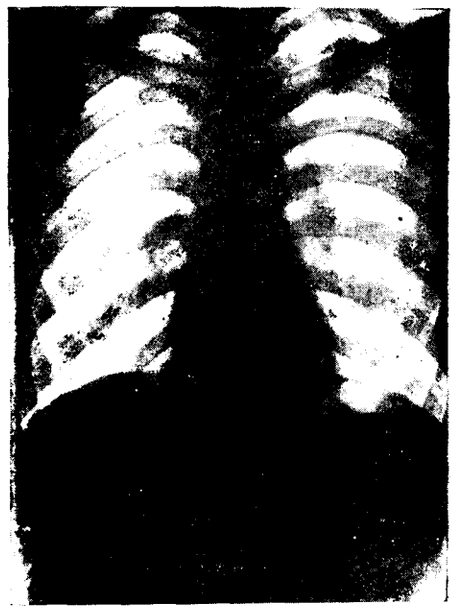

Fig. 2. Lesion behind the left clavicle

Fig. 2(a). Same as Fig. 2—spot film showing cavity

A

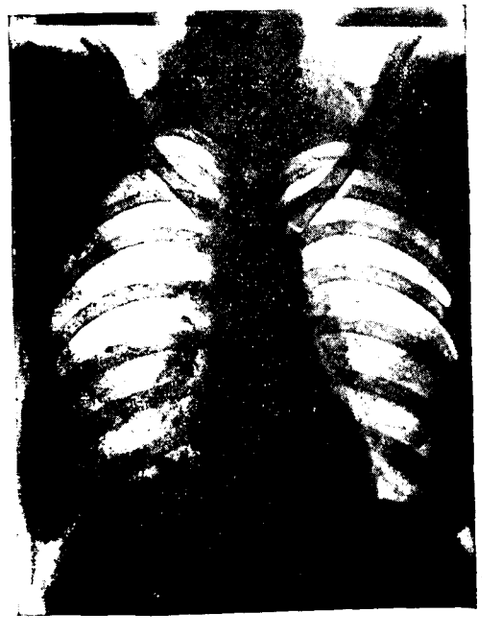

Fig. 3. Lesion right base not recognized in usual exposure

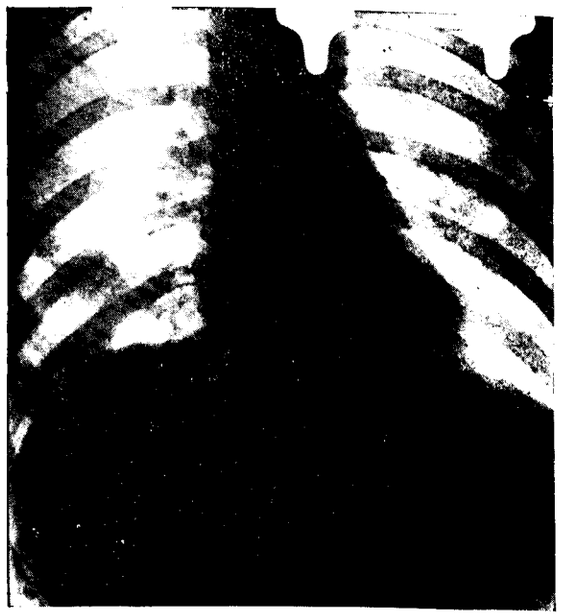

Fig. 3(a). Same as Fig. 3—spot film showing cavity

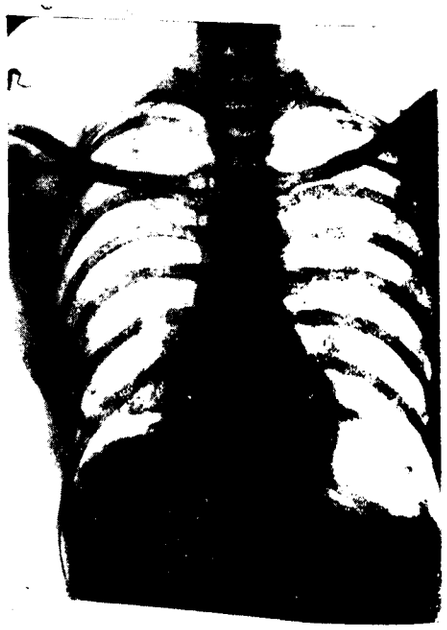

Fig. 4. "Benign" apical lesion right side

Fig. 7. Tuberculous pleural effusion, right

Fig. 7(a). Same as Fig. 7, after 17 months showing slow clearing

Fig. 5. Tuberculoma, right infra clavicular region

Fig. 6. Extensive fibrosis, right side

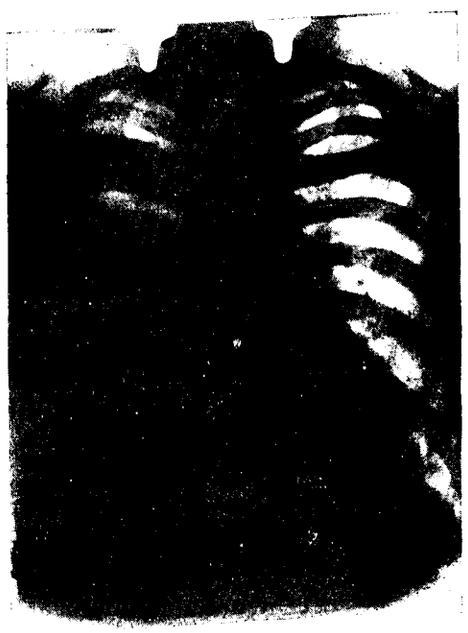

Fig. 8. Tuberculosis pleural effusion, right

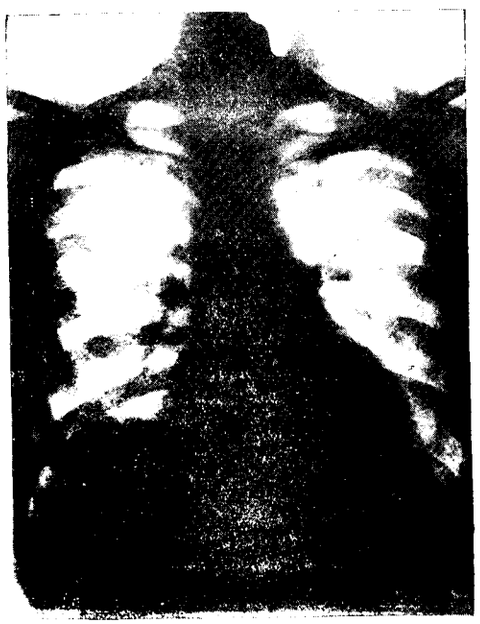

Fig. 8(a). Same as Fig. 8 after 4 weeks showing rapid clearing

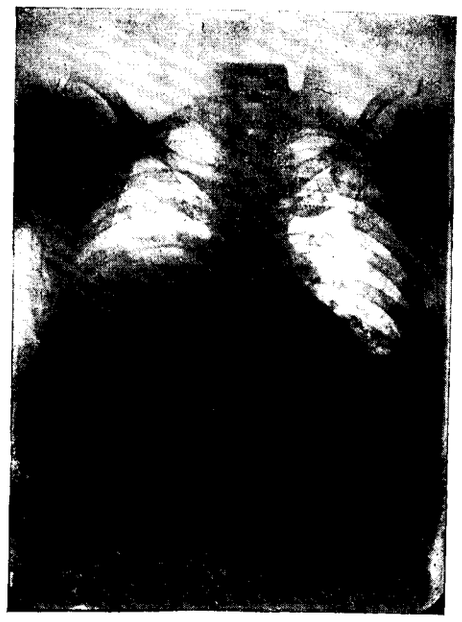

Fig. 9. Bilateral basal effusion

Fig. 9(a). Same as Fig. 9, showing clearing on left side only

Fig. 9(b), Same as Fig. 9, showing clearing on right side also

Fig. 10. Effusion extending from left pleural space into mediastinal space

Fig. 10(a). Same as Fig. 10 showing draining of mediastinal space after tapping left pleura

Fig. 11. Right interlobar effusion —P. A. view

Fig. 11(a). Same as Fig. 11, right lateral view

Fig. 12. Right pleural effusion in malignant lymphoma

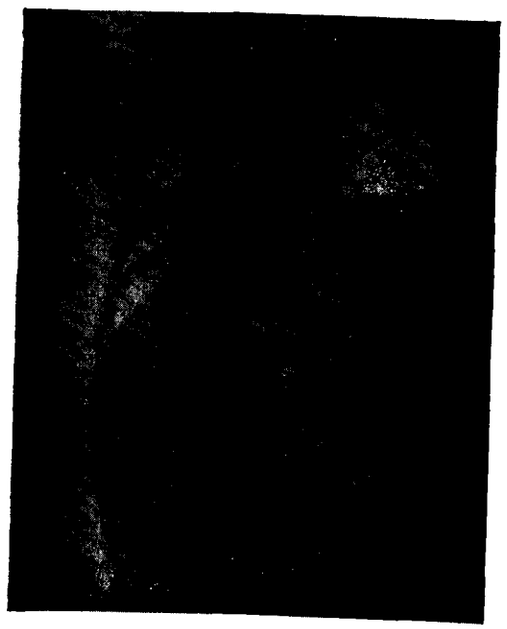

Fig. 13 Left pleural effusion (tapped) in malignancy secondary to primary hepatoma

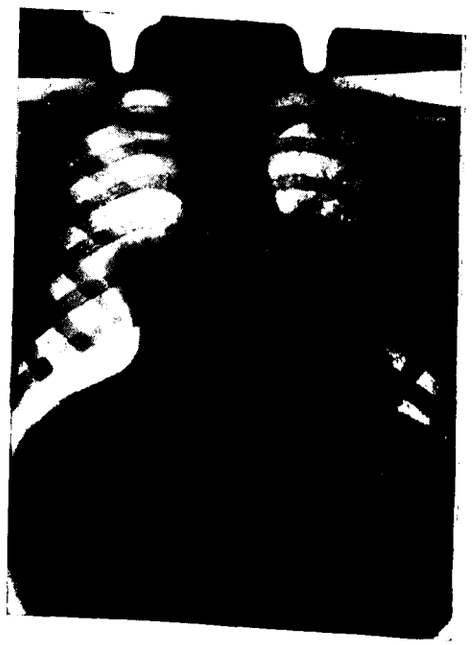

Fig. 14. Right pneumothorax due to compression injury

Fig. 14(a). Same as Fig, 14, oblique view to exclude fracture of ribs

Fig. 15. Right hæmo-pneumothorax due to compression injury

The X-ray appearances in a typical case with the curved upper border highest in the axilla do not require any emphasis. It is not, however, generally recognized that the costo-phrenic angle is actually less dense than the area medial to it and that this is an important point of distinction of pleural effusion from consolidation and atelectasis.

We need not here discuss the forces which culminate in the production of the typical X-ray picture. But sometimes the fluid may collect between the under-surface of the lung and the diaphragm without spreading freely into the greater pleural space. Such an occurrence can be readily mistaken for an elevated diaphragm and if this should happen on the right side, the patient in India may be unnecessarily treated for amœbiasis. We will show some X-ray picture of a case where such an infra-pulmonary effusion occurred on both sides, masquerading as elevation of the diaphragm, the left side clearing up earlier than the right. We will also show the appearances before and after aspiration in an unusual case of effusion extending from the left pleural space into the mediastinal space and so simulating a large mediastinal space-occupying lesion.

Prognosis.—28 (3·2%) died during the acute phase of the illness. Even this is a somewhat unusually high mortality rate, for recovery from the illness is the rule.

Although the immediate prognosis is usually good, the patients must be watched for 3 to 5 years for possible involvement of the lung parenchyma.

720 of 909 cases of pleurisy which developed during the period 1926 to 1935 in formerly healthy persons in Norway were analysed. In over half of the patients the onset was between the ages of 15 and 25.

148 (20·6%) became tuberculous. 120 of the 148 cases developed parenchymal lesions within five years after the pleurisy. But more than half of them occurred within the first year. Cases of tuberculosis were seen to develop even up to 30 years.

In the pre-streptomycin era, the incidence of pulmonary tuberculosis and the time of its occurrence in other parts of the world were very similar to the experience reported above by the Norwegian workers.

TREATMENT :—92 patients (10·5%) were treated with streptomycin and PAS. The wisdom of treating primary and post-primary manifestations such as pleural effusions with specific chemotherapy has been discussed under the heading of tuberculosis. While primary infection with a natural tendency for spontaneous healing is treated on general lines without chemotherapy, there is some more support in recent literature

for the employment of specific drugs in the presence of pleural effusions.

For instance, *the American Review of Tuberculosis* for December 1956, contains a report of the U.S. Veterans Administration Cooperative Studies of Tuberculosis. A comparison is made between 382 patients who received various periods of chemotherapy and 209 who received no chemotherapy. All patients in both series were hospitalized. However, the treated and untreated series were not concurrent in time nor was there random selection for chemotherapy against untreated controls.

Patients having a demonstrable parenchymal lesion at the onset of the effusion were excluded from the study.

Antimicrobial therapy was not uniform as to the agents used or the duration of the therapy.

The total rate of tuberculous complications, excluding recurrent effusion was 19% in the untreated group and 4% in the group which received chemotherapy.

The time taken for the complete clearing of the opacity in an X-ray picture may be very variable. Although on an average it takes about three months, it has been as short as four weeks without specific drugs and there has been an absence of complete resolution even after 19 months of chemotherapy. As a matter of fact, residual opacities have persisted for the rest of the patient's life.

While a diagnostic paracentesis thoracis was carried out practically in every case, 289 cases (32·8%) required a therapeutic paracentesis on account of one or other of the usual indications for the procedure. Regarding the actual technique of aspiration, the best position to put the patient in is to make him lean forward on a heart-rest with pillows over it. This will give much better access to the side to be aspirated and also make it easier to tilt the patient gently as required. This position is to be preferred to the one that is often used, of the patient leaning on the sound side on a back-rest.

I personally do not believe in pleural shock as a clinical entity, considering the insults that the pleura stands up to, in the management of pleural effusions.

Non-tuberculous effusions.—Among the non-tuberculous causes of pleural effusion acute rheumatic fever and malignant disease are well recognized. It is usually believed that the effusion in malignant disease is hæmorrhagic but this is by no means constant. A serous effusion can occur in the case of malignant disease and a hæmorrhagic one in the case of tuberculosis.

Poosam, female, age 42 was treated in November '52 for a simple serous effusion on the left-side. She was re-admitted seven months later with signs of fluid on the same side. This time, however, the fluid was blood-stained. While under observation, the X-ray showed typical secondaries in the right lung. She had throughout the first and second admissions a markedly enlarged liver, particularly the left lobe. Autopsy showed a primary hepatoma with secondaries in both lungs, the secondaries actually showing a pattern of the liver chords.

The lymphomas in which one may include Hodgkin's disease (para-granuloma, granuloma or sarcoma), lympho-sarcoma and reticulum-cell sarcoma, may give rise to a pleural effusion. An effusion was noticed in 23 out of 90 cases of Hodgkin's disease in Jackson and Parker's series, although it has been less frequent in our series, being only 5 out of 115. It may not be out of place to draw your attention to the fact that the diagnosis of the lymphomas may sometimes be exceedingly difficult in clinical practice.

In only three cases of tropical eosinophilia out of several hundred studied was an eosinophilic effusion noted in the pleura.

On occasions a small pleural effusion has been noted as part of a tertiary pulmonary amœbiasis.

Another rare but interesting non-tuberculous cause is a localized interlobar effusion occurring in the course of congestive heart-failure. This has been termed a vanishing tumour of the lung as the so-called tumour disappears with the proper treatment directed to the congestive failure. William Boucot and Marshall mention that only 18 cases of vanishing tumour of the lung have been reported in the literature up to 1950. I shall show you X-ray pictures of a case of such a localized inter-lobar effusion seen by us in 1952 in a case of mitral stenosis with congestive failure before and after treatment. In 1956 we saw another case of vanishing tumour, also in a case of mitral disease with congestive heart failure, thanks to the courtesy of Dr. P. K. Krishnan Kutty.

Spontaneous pneumothorax.—The well known causes of spontaneous pneumothorax are familiar to you. You are aware how the cases are divided into tuberculous and benign, depending upon the ætiological factor and how a tuberculous spontaneous pneumothorax seldom remains as such but is followed by effusion within the first 48 hours of the rupture so that it rapidly becomes a hydro-pneumothorax. Indeed, in about 10% of cases in the pre-streptomycin era, the condition became a pyopneumothorax. On the other hand, where the pneumothorax is benign and is due to the rupture of a localized emphysematous bulla or a congenital cyst in the lung, the important features are (*i*) it

remains a pneumothorax throughout with no liability to an effusion following; (*ii*) there is a great liability to recurrences and (*iii*) as the name indicates, the air is rapidly absorbed and the prognosis is excellent.

Since Perry wrote in the *Quarterly Journal of Medicine*, (1939) on spontaneous pneumothorax in the apparently healthy there has been a certain amount of confusion with regard to the commonest cause of spontaneous pneumothorax. If spontaneous pneumothorax is defined as a condition where air enters the pleural space from the side of the visceral pleura, there is no doubt that in our country and at the present time, at any rate, tuberculosis accounts for the largest number of cases. Even in the case of the so-called localized emphysematous bulla, such a bulla is often secondary to, and is located in the vicinity of the scar of a healed Ghon's focus of primary tuberculosis. In the ultimate analysis, therefore, even a certain number of cases of benign spontaneous pneumothorax is really the result of an antecedent tuberculosis infection.

While talking about cystic disease of the bronchi, I referred to pneumothorax complicating cystic disease in my series of cases. I do not propose to say anything about a tuberculous spontaneous pneumothorax, as the clinical and radiological appearances are familiar to you.

I have seen five cases of rupture of the lung occurring in the course of bronchial asthma. In 4 of them and in most of the cases mentioned in the literature, the rupture involves alveoli located medially so that the air escapes into the mediastinal space, goes up to the neck where a collar of surgical emphysema can be recognized. The condition is referred to as Hamman's syndrome.

[*Note*:—A slide showing a benign spontaneous pneumothorax where the air was in the usual lateral position complicating bronchial asthma with eosinophilic lung was shown on the 28th].

Blast-like injury to the lungs in civilian practice.—By blast is meant the compression and suction wave which is set up by the detonation of high explosives. There occurs first a momentary wave of high pressure and then a negative "suction" pressure due to the fact that the positive compression wave has reduced the density of the air behind it to below normal atmospheric pressure. Like the pressure component the suction component of the blast wave only lasts for the fraction of a second but, as a rule, for a longer period than the compression wave.

Three possibilities have been suggested regarding the causation of the pulmonary lesions:—

(1) They are due to the lowering of alveolar pressure by the suction wave acting through the respiratory passages with a consequent rupture of the alveolar capillaries.

(2) They are caused by the distention of the lungs with air.

(3) They are due to the impact of the pressure wave on the chest wall.

A series of experiments were conducted by Zuckerman for the Research and Experiments Department of the Ministry of Home Security in 1940. He concluded on the basis of those experiments that the last of the three possibilities is the correct one and that injury to the lungs is mainly caused by the impact of the blast wave on the body wall.

Lockwood has reported on men who were wounded and killed by a close-up shell or bomb explosion without an apparent external wound. These men had a rupture of the visceral pleura of the lungs or a complete active collapse of the lungs. A hæmorrhagic exudate into the alveolar and interstitial tissue has also been demonstrated in many cases.

The need for the recognition of such internal injuries without external wounds and the fact that in such patients with asphyxia the Schafer method of artificial respiration will prove not only ineffective but even harmful, have been stressed.

In a careful search of the literature on the subject I have not been able to find reports of injuries of a similar nature and due to a similar mechanism in civilian practice. One paper entitled "Blast Injury to the lung in Civilian Practice" in the *American Journal of Roentgenology* refers to an explosion which occurred during peace time.

Chengalvaroyan, age 9, was playing in a street in Chintadripet, Madras. A hand-cart laden with some weight knocked him down and went over his chest partly. When the boy was extricated from underneath and brought to the General Hospital (this was in 1944) he had superficial abrasions on the chest wall, no evidence of fracture of the ribs clinically or radiologically and a pneumothorax on the right side. Five years before I saw this patient, while at Madurai I had conducted a post-mortem on a child three years old who had met with death under identical conditions. The child had no injury to the thoracic parietes except superficial abrasions but had bilateral pneumothorax. I have since come across four other cases, in each of which a hand or bullock cart had run over the chest. Two were middle-aged adults who were travelling in their bullock-carts during night and had fallen down while asleep and were caught under the wheel.

The X-ray pictures of the last case seen two months back in Dr. K. P. G. Menon's Unit were shown.

Another case in this group was a five months' old infant whose X-ray picture was shown. She was taken to bed perfectly all right without any symptoms whatever and suddenly

during the night the child screamed and was found to have become intensely dyspnœic. The child was brought to the Stanley Hospital next morning when we discovered there was a spontaneous pneumothorax without any external injury whatever. The mother was unusually fat and the only explanation that we could offer was that this was another example of compression injury brought about by the mother rolling over the infant in her sleep. The air got absorbed and the lung re-expanded uneventfully.

My thanks are due to my Units, past and present, especially to Drs. Ranganathan, Thiruvengadam and Mani who have been responsible for all the facts provided, though not for the fancies; to Mr. Govindarajulu, the photographer, for his willing help.

PENICILLIN TREATMENT FOR MENINGITIS

Massive penicillin therapy for meningococcic or pneumococcic meningitis reduces mortality and lowers incidence of residual effects.

For infants about 1,000,000 units of water-soluble penicillin per kilogram of body weight is given daily. Dose is about 600,000 units per kilogram for young children and about 500,000 units per kilogram for school children. The medication is usually given intramuscularly every three hours; with severe disease, the interval between injections may be shortened to two hours or the antibiotic may be given intravenously. Dosage is reduced when the leucocyte count in the spinal fluid is sharply decreased and the patients condition definitely improved. Usually, medication is then continued for about ten days. For pneumococcic meningitis, the initial dose is given for at least ten days.

Sulphadiazine is sometimes given toward the end of penicillin therapy. For pneumococcic meningitis, tetracycline or chlorampenicol is also used.

Of 34 patients given penicillin for meningococcic meningitis, only 2 died. Both of these children had Waterhouse-Friderchsen syndrome; 2 other children with this condition recovered. No permanent residual effects were observed. Only 1 of 12 infants with pneumococcic meningitis died. —(*Deuts. Med. Wchns.*, *81*: 2114-2117, 1956 via *Mod. Med.*, 4-1-1957).

BREAST CANCER RELATED TO MARITAL STATUS

Frequency of breast cancer is greater among single women over 35 years of age than among married women of the same age group. Among younger women, incidence of breast cancer does not vary with marital status.

Susceptibility to breast cancer in women decline sharply after the climacteric, and difference in age at menopause is likely to cause difference in frequency of cancer of the breast. Natural menopause occurs at the same age in single and in married women. However, artificial menopause, which is usually performed about eight to ten years earlier than natural menopause would occur, is about 30% more frequent in married than in single women, makiug the average age at cessation of the menses and consequent reduction in cancer susceptibility lower in the former group.

Protective effect of artificial menopause is substantiated by the finding that incidence of artificial menopause is lower among patients with breast cancer than among healthy women or patients with breast cancer than among healthy women or patients with benign breast disease or rectal, colonic, or gastric cancer.—(*Modern Medicine*).

Cases and Comments

THE USE OF UNSATURATED FATTY ACIDS IN PSORIASIS

(Record of Observations in 46 Cases)

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AND
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The first observation on the role of unsaturated fatty acids in nutrition was made by G.O. and M.M. Burr in 1929. By completely eliminating these essential unsaturated fatty acids in the diet of experimental rats they produced a clinical picture consisting of the appearance of scales over the skin, necrosis of the tail, dehydration of the animal, nephrosis and calcification of the renal tubules, hæmaturia, loss in weight and appetite and ultimate death. This complexity of symptoms has been termed "*Burr and Burr syndrome*" and these symptoms completely disappeared when unsaturated fatty acids were added to the diet. These observations were confirmed by Hansen and G.O. Burr in 1946.

The role played by unsaturated essential fatty acids in metabolism.—Linoleic, Linolenic and Arachidonic acids are termed essential fatty acids because they cannot be synthesized in the body. They form part of phosphatides and have an influence on cellular activity. They play a very important part in the metabolism of glycogen which is very essential for the life of the organism and in this vital role they are to be supplemented, with vitamin B complex, especially pantothenic acid, methionine and cortico-adrenal, thyroid and pituitary hormones. It has been observed by Richardson and Hogan that larger quantities of linoleic acids are necessary in the diet to prevent the development of the Burr and Burr syndrome when the vitamins of the B complex group are withheld in the diet.

In phosphorus intoxication, the synthesis of glycogen is made possible by the addition of unsaturated fatty acids in the diet, more especially those with a higher iodine number. Unsaturated fatty acids are naturally found in maize oil, linseed oil, nut oil etc. It has also been proved that in cases of digestive disorders, especially those of fat resorption, the body generally becomes poorer in highly unsaturated fatty acids.

Indication for trial in psoriasis.—Midana and Murtula have proved by determining the glycæmic curve by the double glucose-tolerance test of Staub Traugott, that modification of carbohydrate metabolism was found in about 28% of cases of psoriasis. This test consists in administering at a 90 minutes interval, two doses of 20 g. of glucose and then of determining the glycæmia

level at 30 min., 60 min., and 90 min., intervals after the first administration and 30 min., 90 min. and 120 min. after the second, and herein they noted an increase, in the glycæmia level after the second administration of glucose exceeding the values obtained during the first, followed by a lowering of the glycæmia curve which however does not return to its initial value in the space of two hours. With the addition however, of unsaturated fatty acids in the diet it is possible to bring down the abnormal graphic curve of Staub Traggot to normal. This feature coupled with the fact that in psoriasis, fat digestion is most often at fault, which in turn reduced the absorption of unsaturated fatty acids from the food eaten, led us to try unsaturated fatty acids therapy in psoriasis and the results appended below are highly encouraging.

Choice and selection of cases.—Only adults were chosen for study between 15 and 65 years of age; cases were mostly from those attending the skin department of the Government Stanley Hospital, Madras during a period of six months between March and September 1956. Every adult was asked to take two capsules of 0·4 g. 'F 99' capsules (each containing linoleic and linolenic acids) daily one before breakfast in the morning and another before mid-day meals, for a period of six-weeks, and in addition F 99 ointment was applied externally once a day over the patches. Most of the cases had in addition, Vitamin B complex orally and a few were given Vitamin B_{12} parenterally.

Complications.—These preparations were well tolerated and only a few patients exhibited disagreeable symptoms. Some suffered from acid eructations, while a few experienced a burning sensation when the ointment was applied over. Indeed most of the patients enjoyed better digestion.

Conclusion.—46 cases were chosen for study; 22 cases showed marked improvement and in a few cases the patches had completely disappeared; 9 cases exhibited slight improvement and the rest did not respond at all. It is interesting to note that the majority of those which showed marked improvement were those of recent origin with fewer relapses.

Random thoughts.—It would certainly be worth while from the nutritional and public health points of view to analyse the Vanaspatis sold in the market. These hydrogenated fats are devoid of essential unsaturated fatty acids and their iodine number is low. Probably if these Vanaspatis are *not* consumed in our daily diet there may be no necessity for unsaturated fatty acids to be used therapeutically.

Oil-baths.—Are they essential? Probably some of the essential unsaturated fatty acids found in the vegetable oils used for massage and inunction may be absorbed by the skin and

can be of great therapeutic value. Do people taking regular oil-baths suffer less from skin diseases? This is a good question to ponder over and find an answer.

No.	Name	Age	Sex	Duration from 1st onset	No. of relapses	Duration of treatment	Results and Remarks
1	M.N.	23	M	1 year	2nd	6 weeks	Complete remission
2	L.	40	F	6 years	3rd	2 ,,	Treatment stopped
3	K.	25	F Daughter of No. 2	2 ,,	2nd	4 ,,	Completely cured Exfoliative type
4	E.	39	M	not known	10 to 12	6 ,,	Much improved
5	T.R.	65	M	20 years	every year	6 ,,	Slight improvement
6	P.R.	40	M	1 year	,,	6 ,,	Good result
7	N.D.	45	M	5 years	3rd	6 ,,	Improved
8	Dr. P.	49	M	10 ,,	1	6 ,,	Completely cured
9	M.	26	M	1½ ,,	—	4 ,,	No improvement
10	K.J.	14	M	6/12	—	6 ,,	Good improvement
11	M.C.	50	M	6/12	—	6 ,,	Completely cured
12	S.	38	M	4 to 5 yrs.	2nd	6 ,,	Slight thinning of scales
13	N.S.	38	M	1 year	—	6 ,,	No improvement
14	P.	41	M	12 years	4	6 ,,	Good results
15	K.D.	30	M	1/12	—	6 ,,	Completely cured
16	P.	20	M	7 years	3	6 ,,	Good results
17	V.R.	46	M	2 to 3 yrs.	2	3 ,,	Stopped due to complication (extreme fatigue)
18	L.G.	39	M	10 years	8	6 ,,	Slight improvement
19	F.	44	F	3 ,,	1	6 ,,	,,
20	T.G.	52	M	2 years	1	6 ,,	Good improvement
21	R.	29	M	1/12	—	4 ,,	No improvement
22	G.S.	35	M	3 years	2	6 ,,	Good improvement
23	R.R.	50	M	15 ,,	2	6 ,,	Good results
24	M.S.	35	M	1 year	—	6 ,,	Slight improvement
25	R.S.	40	M	2 years	—	6 ,,	No improvement
26	R.N.	40	F	1 year	—	6 ,,	,,
27	S.	57	M	10 years	8	6 ,,	,,
28	N.	41	M	1 year	—	6 ,,	Completely cured

No.	Name	Age	Sex	Duration from 1st onset	No. of relapses	Duration of treatment	Results and Remarks
29	R.K.	32	M	9 years	4	6 weeks	Fair results
30	M.K.	22	M	1 year	—	2 ,,	Good results
31	K.	20	F	1/12	—	6 ,,	No improvement
32	K.A.	40	M	6/12	—	6 ,,	Good results
33	M.	35	M	7 years	2	4 ,,	Extensive typo showed improvement in some placcs
34	R.J.S.	26	M	2½ ,,	—	6 ,,	Good results
35	M.M.	63	M	7 ,,	4	6 ,,	,,
36	S.	30	M	6 ,,	2	6 ,,	No improvement
37	J.T.	60	M	5 ,,	—	6 ,,	,,
38	S.T.F.	26	M	2 ,,	—	6 ,,	Completely cured
39	M.	37	M	5 ,,	3	3 ,,	Treatment stopped no improvement
40	A.K.M.	50	M	8 ,,	3	3 ,,	,,
41	R.S.J.	42	M	6 ,,	3	6 ,,	Good results
42	M.N.	26	F	4 ,,	2	6 ,,	No results
43	T.S.R.	47	M	9 ,,	4	6 ,,	Good results
44	V.N.	51	M	6 ,,	3	6 ,,	No improvement
45	P.	48	M	11 ,,	6	6 ,,	Slight improvement
46	R.K.	29	M	3 ,,	1	6 ,,	Complete cure

Acknowledgements.—We are grateful to the Dean of the Government Stanley Hospital for permitting us to publish this report. We also express our grateful thanks to the House Surgeons who helped us in the collection of the data. Our thanks are also due to Messrs Diva Laboratories Ltd., Zurich and their representatives Messrs Biddle Sawyer and Co., (India) Private Ltd., for their liberal supplies of F-99 capsules and ointment for our clinical trial.

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SURGICAL JUDGEMENT

The primary surgical approach to a patient in my teaching is, "Can I justifiably get this person out of having an operation, not into having one?"

The surgeon whom I would select to tend my family or me must first know when not to cut, then when and where to cut, how to cut, and when to [illegible]ting.—Charles W. Mayo, There is no substitute for surgical [illegible]rgery, June 1956 via *Current Medical Digest*, March '57).

PHLYCTENULAR CONJUNCTIVITIS TREATED WITH VITAMIN C

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THIS is an inflammatory condition of the bulbar conjunctiva, —rarely palpebral—in children five to ten years of age, rarely in adults, characterized by the formation of small, round, grey, and yellowish nodules or blebs (phlycten) one or more in number slightly raised above the surface at or near the limbus.

The cause of the disease is not definitely known. But it is believed to be an allergic condition caused by endogenous bacterial protein mainly tuberculous. But sometimes all signs of tuberculosis may be lacking. It may be due to longstanding mild infections—chronic adenitis or tonsillitis. Some times it is associated with eczema of lid and cheek, and also of other parts of the body.

A section of a simple phlycten shows a triangular area of intensive infiltration, the apex of which is in the deeper layer with numerous phlyctens. Lympho and polymorphonuclear leucocytes are found when there is muco-purulent conjunctivitis along with it.

One or more nodules 1-4 mm in diameter, grey or yellowish in colour are seen raised above the surface near or at the limbus with congestion around it. Phlyctens may also be seen in the cornea which are grey and raised above the surface. It is yellow when the epithelium breaks down forming an ulcer. Symptoms are few if the phlyctens are simple ; discomfort, irritation, reflex lacrimation are common. There may or may not be photophobia. Blepharospasm and photophobia are severe when the cornea is involved.

Complications are due largely to continuous and vigorous rubbing of the eye and partly due to the situation of the phlyctens near the cornea. Phlyctenular ulcer—"Fascicular ulcer" which is serpiginous in shape is not uncommon. Sometimes ring ulcers are seen which may even perforate. Phlyctenular pannus is common in untreated cases.

Since the disease is alarming and causes great anxiety, various medicines have been tried and there is always a search for newer and better remedies. The treatment currently advocated is both local and general :—

Local :—Eye bath with bland lotion ; application of yellow oxide of mercury ointment ; insufflation of calomel powder ; atropine lotion-drops for corneal complications ; cortisone drops-yielding good but temporary results ; and eye shade or goggles.

General :—It is usually anti-tuberculous *i.e.*, streptomycin, calcium-gluconate, nicotinic acid etc ; general tonic regime—good

food, cod liver oil, vitamin ABD complex and fresh air. Some advocate B_1 for elimination of allergens. But the treatment remains inconclusive yet.

Case reports.—Six cases of phlyctenular conjunctivitis were treated by me using vitamin C with dramatic results and no recurrence.

Case 1.—M.D., Hindu female, aged 14 years, was suffering from phlyctenular conjunctivitis. She had had treatment elsewhere previously with bi-weekly intravenous injections of 10 cc. calcium gluconate 10% and daily injections of streptomycin—penicillin for nearly 10 days and calomel powder locally. The condition did not respond to this treatment and the phlycten did not disappear. I saw her in September 1955 and administered 10 cc. calcium gluconate 10% with vitamin C 200 mg. intravenously. Curiously enough the phlycten disappeared on the next day. A day later, another injection was given. To improve her general health, adexolin by mouth and vitamin B complex were prescribed. Her general health improved and there has been no relapse so far.

Case 2.—Baby, Hindu, male, aged six in poor health with phlycten near the limbus. Cervical lymph nodes were enlarged. No tonsillitis and no signs of tuberculosis were discovered clinically. The boy was having streptomycin ¼ g daily with adexolin by mouth for about 10 days. Locally yellow ointment was being applied. But the phlycten had not disappeared. I gave him vitamin C 500 mg. intramuscularly. The phlycten completely disappeared on the second day. Adexolin liquid and vitamin C 100 mg. tablets with orange juice by mouth were prescribed and continued for a month. One year follow-up has shown no relapse.

Case 3.—K. D., Hindu, female child aged 8 years. Phlycten near the limbus. Irritation and lacrimation were severe. Cervical lymph nodes were not enlarged and no signs of tuberculosis could be detected clinically. Mouth was not unhealthy. I administered vitamin C 500 mg. with glucose sol. 25% 25 cc. intravenously. Locally normal saline wash several times a day. The result was dramatic with the complete disappearance of the phlycten on the next morning. No lacrimation or irritation was complained of. Another injection was given on the third day and she became all right with no recurrence for one year.

Case 4.—R.L.S., Hindu, male child, five years of age was brought to me with fever, cough, enlargement of tonsils. On examination, his lungs were clear. Cervical lymph nodes were found enlarged. Penicillin and sulpha drugs were prescribed by me. No fever and cough on the next day. On the third day he developed phlyctenular conjunctivitis. He was then given vitamin C 500 mg. intramuscularly and the phlycten disappeared after 36 hours. Vitamin C tablets 100 mg. daily and adexolin liquid were prescribed. He came to me for few days more for the treatment of pain in the cervical glands and he was given Icthyol—Belladonna paint externally and dicrysticin intramuscularly. The pain subsided after a few injections; he did not turn up afterwards and so I could not follow up the case.

Case 5.–N. L., Hindu, male child, aged six years, health fair, but with phlycten at the limbus. Pain, lacrimation, photophobia were the symptoms. Lungs clear, no cervical lymph nodes, nor tonsillitis. Vitamin C 500 mg. intramuscularly was given and the phlycten almost disappeared on the next day with no congestion and no complaint. On the third day the phlycten disappeared completely and with another injection he was all right.

Case 6.—K. C., a boy of 4 years, having phlycten near the limbus. He had been treated elsewhere with streptomycin ¼ g. daily intramuscularly and yellow ointment locally for about a fortnight. Adexolin liquid by mouth was prescribed but there was no good result. On examination of the chest, nothing abnormal was detected. Cervical lymph nodes and tonsils was slightly enlarged. The appetite was good and he was otherwise having normal health. I gave him Vitamin C 100 mg. with orange juice daily. Locally normal saline wash. On the fifth day, there was no congestion in the eye and the phlycten had disappeared. He was then advised to use Celin tablets with orange juice daily for 10 days more. The case could not be followed up as his father was transferred to another station.

Conclusion.—It is difficult to come to any definite conclusion about the value and specific action of Vitamin C on phlyctenular conjunctivitis, merely on the basis of this small number of 6 cases treated by me with dramatic response. But I commend this line of treatment to my professional brethren for more extended trial and report of their findings. It is just possible that the tubercular diathesis which is given such importance in the ætiology of the condition may not play any part at all, otherwise why should the patient become all right after a single injection of Vitamin C and continue to remain so during the follow-up over a pretty long time ?

Acknowledgement.—I am grateful to Dr. A. N. Mullick, p.m.s.i., Civil Surgeon, Gorakhpur for his kind permission to publish this report.

ROENTGEN CRITERIA OF IMPENDING PERFORATION OF THE CÆCUM

L. Davis and R. Lowman (*Radiology*, April, 1957) made measurements of the greatest transverse diameter of the cæcum on a film of the abdomen, taken with the patient in the prone position, in 19 cases of large-bowel obstruction with cæcal distention, the distention having been induced artificially by the injection of air and barium. On this basis a diameter of nine centimetres was established as the critical figure beyond which danger of perforation exists. The reduction in mortality when therapeutic measures are instituted before complete perforation, while the caecal mucosa is still intact, indicates the need of a criterion of this nature.

PROGNOSIS IN STRABISMUS AND ORTHOPTIC TREATMENT

T. K. Lyle and J. Foley (*Brit. J. Ophth.*, March, 1957) deplore the practice in many clinics of the routine course of orthoptic treatment, which is recommended and carried out indiscriminately in all cases of non-paralytic strabismus. They suggest that proper selection of cases will result in a higher proportion of patients with good binocular vision and save the needless worry and expense at present being undergone by large numbers. Results depend on the following factors: (*a*) the age of the patient; (*b*) the age at onset of strabismus; (*c*) the mode of onset (that is, constant from onset or intermittent); (*d*) the duration of the strabismus before the visual axes are aligned by operation or other means. The following conclusions are drawn in relation to non-paralytic strabismus: (i) Convergent strabismus: (*a*) accommodative (wholly or in part): orthoptic treatment is valuable in all types, coupled with correction of refractive error and in some cases operation (*b*) non-accommodative: if of early onset (birth to eighteen months, operation within two or two and a half years of life and no orthoptics; if of later onset (two to three years), operation and then orthoptic treatment may be of great value; if of late onset (three to five years), operation *plus* adequate orthoptic supervision is the treatment of choice; (ii) divergent strabismus: operation is required in most cases; orthoptic treatment, alone in a few cases of intermittent divergence will suffice. The treatment of congenital paralytic strabismus is adequate operation at an early age.

RECENT CONCEPTS OF CASTLE'S INTRINSIC FACTOR

O. Neal Miller, reviews recent work on this interesting subject and presents new hypotheses, supported by experimental study, concerning interrelations of intrinsic factor and vitamin B_{12}. His conculsions are:—

The concept that intrinsic factor acts only on the intestinal mucosa and only to facilitate absorption of vitamin B_{12} from the intestine may soon become untenable. The demonstration that intrinsic factor can stimulate the uptake of vitamin B_{12} by liver and other tissue slices suggests that this action of intrinsic factor in facilitating absorption of vitamin B_{12} is wide spread and may work in all tissues. The demonstration that intrinsic factor can facilitate the exchange of vitamin B_{12} on a B_{12}—protein complex isolated from hog intestinal mucosa and also can enhance B_{12} combining on serum proteins suggests that intrinsius factor may act to exchange or combine B_{12} on receptor proteins inside of cells of the various tissues, thus facilitating absorption, and on the proteins of the blood, in order to conserve the vitamin and prevent its excretion by the kidney. In order for this type of action to be the universal action of intrinsic factor one must assume that intrinsic factor, with a 5,000 to 15,000 molecular weight, is absorbed into the blood stream as has been suggested, and is circulated throughout the body. If this is true, it would appear that intrinsic factor may be similar to a hormone that is secreted by the gastric mucosa, is absorbed and circulated throughout the body, and is without a particular target organ but rather has a generalized action on all tissues similar to the generalized action of growth hormone on the tissues.—(*The Bull. Tulane Univ. Medical Faculty*, May 1957).

HABITUAL TOBACCO CHEWING increases pulse rate and blood pressure, decreases skin temperature, and causes deterioration of the ballistocardiogram. David L. Simon and associates of the University of Cincinnati and the Cincinnati General Hospital believe that nicotine absorption induces the circulatory changes. The same effects, excluding ballistocardiographic anomalies, are observed in cigarette smokers.—(*J.A.M.A.*, *163*: 354-356, 1957 via *Modern Medicine*, April 15, 1957).

STIBINOL "100" IN LEPROSY REACTION

A. T. ROY,

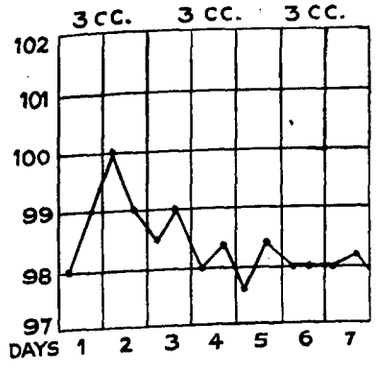
Medical Officer, Purulia Leprosy Home and Hospital, Purulia, W. Bengal

LEPRA reaction is a condition which nearly always constitutes an acute exacerbation of the disease, with many new lesions, an increase of old lesions which become erythematous, swelling of nerves, painful extremities, burning sensation and fever of varying degrees according to the intensity of the reaction. This condition can be successfully managed in a short time using the following line of treatment :—

(1) Pot. antimony tartrate 2 cc. to 4 cc. One per cent saline solution intravenously on alternate days 4 to 6 injections (·02 g. to ·04 g. form in saline). (2) Fantorin—The few cases that do not improve with Pot. ant. tartrate are usually treated with Fantorin, a trivalent antimony preparation for parenteral use, the dose being 2 to 4 cc. intravenously or intramuscularly and 4 to 6 injections on alternate days. (3) Mercurochrome—Still some other cases that do not respond to antimony in any form are given Mercurochrome 1% intravenously on alternate days using 3 to 5 cc. (6 or more injections.) Mercurochrome specially helps the reacting cases with nerve pain. Other drugs like Fluorescin and Sodi bicarb intravenously may also help when other remedies fail.

The object of this paper is to record the results obtained with Stibinol, a new preparation of Sodium antimony gluconate containing 100 mg. pentavalent of metallic antimony in each cc., in the treatment of lepra-reaction cases. A variety of lepra-reaction cases was selected for the trial of this drug which was given intramuscularly on alternate days in 2 to 4 cc. doses.

CHART No. 1

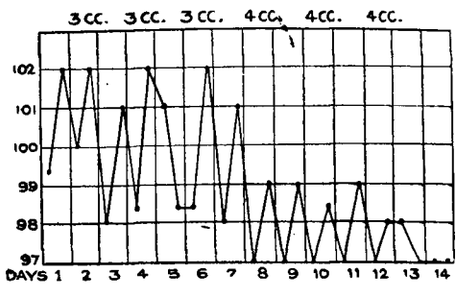


Case reports.—CASE 1.—S., female, 26, had an acute reaction with nodules, swollen ears and fever etc. She was given 3 cc. intramuscularly on alternate days. Three such injections brought her temperature down to normal. All the swelling and nodules also subsided (*see Chart No. 1*).

CASE 2.—B., male, aged 30 was admitted with acute reaction on 9-1-'57. Had severe joint pain and œdema. He was successfully treated with 6 injections of P.A.T. in 11 days. He had another

reaction soon after, which subsided with 6 intravenous injections of P.A.T. He was again admitted with another reaction on 16-4-'57. This time Stibinol was tried. He was given 4 injections of 3 cc., and 3 injections of 4 cc. on alternate days which eliminated all his nodules and he was discharged from hospital. He has not had any further reactions (*see Chart No. 2.*).

CHART No. 2



Case 3.—R., female, aged 20 was admitted with severe left ulnar pain and burning sensation in left hand along the nerve. She was running a subnormal temperature. With 3 injections of Stibinol 3 cc. intramuscularly, her pain and burning sensation subsided and she was discharged from hospital. (*see Chart No. 3*).

CHART No. 3

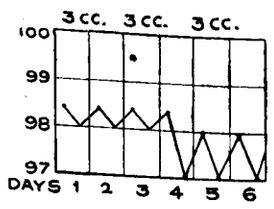
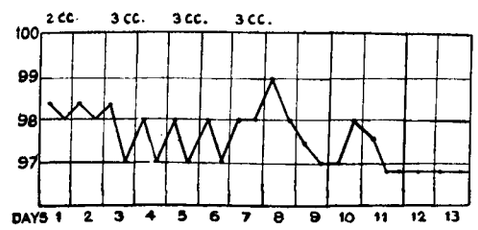


CHART No. 4



Case 4.—R., a female, aged 24 was admitted with pain in her joints. The pain subsided with 1 injection of 2 cc. and 4 injections of 3 cc. (*see Chart No. 4*).

Case 5. P., a male aged 24, was admitted on 29-4-'57 with reaction and pain in joints and fever, temperature 102°F for 3 days. He was given 2 Stibinol injections of 3 cc. each and also Mist. Sodi salicylas orally. He was discharged on 10-5-'57. He

CHART No. 5

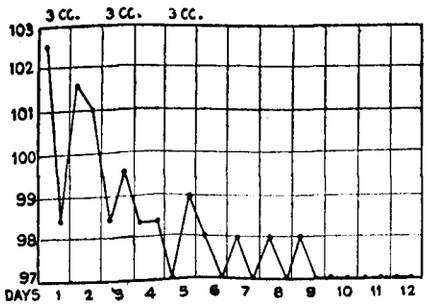
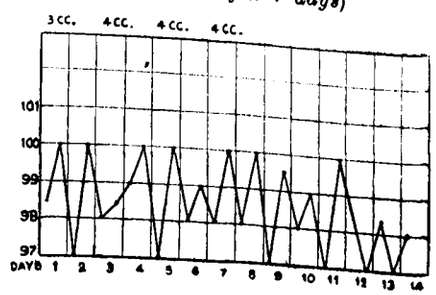


CHART No. 5—*(contd.)*
(Readmitted after 7 days)



was readmitted with reaction and severe pain in joints and fever 100°F. for 6 days. He was given Stibinol injections, one of 3 cc.

and 3 of 4 cc. and was given Mist. Sodi salicylas and was discharged on 30-5-'57 (*see Chart No. 5*, page 799).

Case 6.—B., male, out-patient had a slightly raised old resolved patch with severe burning sensation. After 6 injections of 3 cc. he got rid of the burning sensation and has had no temperature.

Conclusion.—The above findings indicate that Stibinol has the same effect as any other medicine used in treating leprareaction cases. It is cheaper than Fantorin.

I am grateful to the Brahmachari Research Institute, 82/3, Cornwallis Street, Calcutta-4 for a free supply of the Stibinol used in this trial.

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THE CHANGING PATTERN OF LEUKÆMIA

There are striking differences in the published estimates of the relative incidence of acute and chronic leukæmia, extreme values for the acute form being 26% (Morganti and Cresseri, 1952) and 61% (Gunz and Hough, 1956). There is evidence that the incidence of leukæmia varies with social status and geographical location (Hewitt, 1955). There has been a change in the relative age-incidence of acute and chronic leukæmia since 1940, at least in the age-group 15 to 55.

Lea and Abbatt obtained details of 655 cases of leukæmia which occurred in the Armed Forces between September 4, 1939, and December 31, 1955.

The following data were recorded in each case: sex, date and place of birth, date of onset of leukæmia, date of death or duration of disease until December 31, 1955.

The incidence of acute leukæmia, in all ages, was remarkably constant in each of the five-year periods of onset, being 60·1%, 58·4%, and 59·1%. Comparison of the mean age at onset of the two types, however, showed an increase in the acute type and a decrease in the chronic. It was found that the increase in the mean age at onset of the acute type had the same degree of significance as with the previous definition, and that the decrease in the mean age at onset of the chronic type was again not significant.

The facts ascertained were:—(1) The mortality from leukæmia in the general population is known to be increasing sharply, both in this and in other countries of the world.

(2) There are two peaks in the mortality from leukæmia, in infancy and from middle age onwards, and this is true for both sexes.

(3) In the age-group 20 to 34 there has been virtually no change in the mortality from leukæmia.

(4) Ionizing radiation is known to be leukæmogenic both in animals and in man (Warren, 1956, Medical Research Council, 1956).

(5) Radiation is the only known leukæmogen to which every living thing on the planet is to some degree exposed (Spiers, 1956).

(6) There has been an increase in the man-made contribution to background radiation, both from the appurtenances of civilisation and as a result of nuclear explosions (Medical Research Council, 1956).

(7) There has been a significant increase in the mean age at onset of acute leukæmia since 1940.

From the above facts they draw the following conclusions :—

(*a*) It is improbable that the increase in the incidence of leukæmia can be solely due to heavy doses of irradiation, such as from radiotherapy or from close association with nuclear explosions. The Medical Research Council (1956), investigating leukæmia and ankylosing spondylitis, found only 37 cases of leukæmia in a heavily irradiated population of 13,352 patients over a period of twenty years, and it is obvious that there cannot be many such populations in existence.

(*b*) Though we are not here dealing with the leukæmia of infancy, it seems probable that, at least in some cases, it is associated with irradiation *in utero* (Stewart *et al*, 1956). Such irradiation is delivered to embryonic tissues and, compared with background levels, constitutes a high radiation dose.

(*c*) We are left with an excess of cases of leukæmia occurring after the age of 35 in people who have not been subjected to heavy doses of radiation. In the absence of evidence for genetic determination of these cases it is reasonable to assume that they arise as a result of some agent acting after conception. Such an agent may well be exposure to long-term low-dose radiation. If we accept this hypothesis, it is necessary to postulate either a certain minimal cumulative dose or a time lag after the exposure to the responsible agent, and/or leukæmia to be the result of a somatic mutation. The results of experiments on animals suggest that a somatic mutation is the most probable explanation (Loutit 1957), and that in man there is a latent period before leukæmia is detectable by present techniques. A latent period has been found in leukæmia occurring in cases of irradiated ankylosing spondylitis and in those following the Japanese atomic bombing. Japanese cases were still occurring, apparently with undiminished frequency, ten years after the bombing (Medical Research Council 1956).—(*The Lancet*, February 23, 1957).

STIMULANT DRUG FOR SLEEPY DRIVERS

Dexedrine may be safely administered to selected patients to prevent automobile accidents due to fatigue and loss of alertness. Before the drug is prescribed, investigation to detect causes of fatigue and sleepiness requiring medical care is advisable. For uncomplicated sleepiness or fatigue, the driver should be urged to rest periodically, to avoid hazardous and excessively prolonged driving, and to concentrate on the road.

A trial dose of Dexedrine should be given to familiarize the patient with the effects before the drug is taken while driving. Dosage is 5 mg. every three or four hours. The patient should understand that he must stop and rest if Dexedrine fails to relieve fatigue.

Prolongation of wakefulness for as long as forty-eight hours does not impair body chemistry, metabolism, or mental ability.—(*Ohio M. J.*, *53* : 176-178, 1957, via *Mod. Med.*, April 15, 1957).

The Antiseptic

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Editorials

CANCER CONTROL

(Tele-Cobalt Plant Inaugurated in Madras)

A NEW epoch in Cancer-control was ushered in at the Adyar Cancer Institute on the 5th of September 1957 with the inauguration by the Madras State Governor, Mr. A. J. JOHN, of a Tele-Cobalt plant, the greatest development to date in the therapy of cancer. A part-gift from the Atomic Energy of Canada and acknowledgement of the original radio-therapeutic studies conducted at the Institute, the plant is the first ever of its kind in Asia, and marks the advent of the greatest application of atomic energy for human welfare into our country.

The problem of cancer has agitated the minds of scientists since the beginning of this century and has continued to do so in an increasing measure as the disease has enlarged its hold. Cancer incidence is growing relentlessly despite a better understanding of its nature and improved combat methods. In India, the disease has been gradually strengthening its hold. Cancer accounts for nearly 300,000 deaths a year in India and for nearly 40,000 deaths every year in the Madras State. The vital problem in cancer is its effective treatment. Most cancers can be treated and cured "(*a*) if the disease has not spread too extensively locally or disseminated to distant regions of the body, (*b*) if there has been no ill-judged interference with cancer by people not adequately qualified and (*c*) if scientific treatment is undertaken in time". And as Dr. KRISHNAMURTHI has further pointed out "It is essential in the interests of the patient's safety for the patient himself or for his doctor to refer any case on the slightest suspicion of cancer to a specialized Cancer Centre. The treatment of cancer has attained that degree of scientific precision

and needs such a team of specialists and a quality and quantity of equipment that no individual medical man or an one-man institution can undertake it any longer. The advent of scientific radiotherapy has revolutionized the treatment of cancer and has extended the scope of curative surgery to stages of the disease hitherto considered hopeless. And the advent of Tele-Cobalt therapy has revolutionized radiotherapy itself."

It is a matter for gratification that a Tele-Cobalt unit, which has been described as the "latest advance in radiotherapy that has revolutionized the treatment of cancers so far considered unfit for any kind of radiational treatment has been installed in the Institute, whose scope of usefulness has been thereby greatly increased.

'Cobalt 60 is a radioactive isotope. When the inert element Cobalt 59 is subjected to a neutron bombardment in an atomic reactor, its atomic structure changes and it becomes unstable. This instability leads to disintegration in the process of which energy is released. This energy is called "Gamma Radiation." This "Gamma ray" is a very powerful form of energy and requires nearly a 40-inch-thick pure concrete wall to stop it from getting through. Only a three million volt X-ray machine can produce a "ray" equal to the Cobalt 60 "Gamma ray."

In the Tele-Cobalt plant a large quantity of radio-active Cobalt is housed in such a manner that the rays are cut off by heavy lead shields in all directions except on one. The width of the emerging "beams of rays" can be altered to any dimension by means of electrically-moved lead-shutters or shut off altogether by an electrically-operated mercury barrier. All the movements of the machine are precisely controlled by electrical gadgets. The width of the "ray" beam is exactly by a "light" beam.

The value of Cobalt therapy has assumed huge proportions because it has enabled cancer therapists to surmount quite a few of the biological difficulties associated with conventional X-ray or radium therapy.'

The advantages claimed for this new therapy are:— "(1) The beam of rays is so powerful that it can reach the most deep-seated tumours in the human body in sufficient strength and volume to destroy them. (2) The damage to the skin is negligible. (3) The quality of the Cobalt beam distribution is such that an effective quantity of radiation can be delivered to a cancer with almost no injury to the surrounding normal organs. (4) The "ray beam" is almost mono-chromatic and not a "mixed beam as in radium. (5) The general disturbance of body function is minimal. (6) The method of application and treatment is simple and easy. (7) Radio-active Cobalt is cheap and getting cheaper every day as more and more of it is produced."

We are told that very soon India herself will be producing radio-active Cobalt, and the treatment will then be even cheaper than with ordinary X-rays. Radium, on the other hand, is growing costlier as it gets less and less in availability. Apart from the Cobalt replacements every 5 to 10 years, the maintenance of the equipment is stated to be easy and to cost little.

"In the use of such a powerful radiation, however, every careful physical and biological calculations have to be made for every individual case. Blood cell and blood chemistry checks have to be constantly maintained. A team of radio therapist, biologist, physicist and biochemist is indispensable if Tele-Cobalt therapy is to be used effectively and safely. Tele-Cobalt in careless hands carries all the dangers of atomic radiation."

The establishment of the Cancer Institute, Adyar, is thus the consummation of an unremitting endeavour of the Women's Indian Association over nearly 20 years. The Women's Indian Association set out on the "Himalayan task of building a modern Cancer Institute with ardent faith in the nobility of their purpose." They collected about 2 lakhs of rupees. In May 1952, the State Government alienated six acres of land for the building of the Institute. The foundation-stone of the Cancer Institute was laid in October '52 by our Prime Minister Sri Jawaharlal Nehru and in June, '54, the first block of the Cancer Institute was opened by Shri C. D. Deshmukh, the then Finance Minister.

Research is the key-stone to scientific progress. No scheme of cancer-control can be effective in the absence of continuing and persistent research. Research—statistical and experimental—alone can give us a clue as to the origin of the disease and guide us as to its methods of control.

The clinical and non-clinical departments of this Institute are equipped with the most modern scientific equipment of which one can well be proud. The Radio-diagnostic Department possesses a 100mA Watson Plant with a tilting couch and Screening stand with the latest technical advances like tomographic attachment incorporated to facilitate accurate and easy handling.

There is also a mobile 25mA Plant, which again is a gift from the All-India Trade Union Congress. For radiotherapy, they have a high voltage X-ray machine, the latest type of stationary beam model—a Watson 250 K.V. X.F.-type—the one most generally recommended for routine clinical use. The unique feature of this machine is the specially designed intravaginal applicators, for treatment of Cancer of the uterine cervix.

The needs of this Institute are still many. The pressing need is the provision of more wards to house the patients and a home for the incurable cancers. The organization of medical relief is as much the peoples' responsibility as that of the State.

The fight against cancer requires a large amount of money. An appeal for funds has been issued by Dr. P. Arunachalam and Dr. (Mrs.) Muthulakshmi Reddi; they rightly state that the installation of the Tele-Cobalt unit is only a milestone in the progress of the Cancer Institute. Research is especially expensive, and it will be scarcely practicable to depend upon gifts from abroad. The Governments, State and Central, have been of some assistance, but the Institute also has to make its contribution. This, it can do only with help from the public.

It is obvious that there is no more deserving cause than the eradication of a most painful and lingering disease.

This Institute therefore, deserves the liberal and wholehearted support of the Central and State Governments and also of the public who stand to benefit by this enterprise.

PROGRESS OF PUBLIC HEALTH IN INDIA

Replying to the debate on the Health Ministry's demands in the Lok Sabha the Union Health Minister, Mr. D. P. Karmarkar, stated that there had been all round progress in bringing down the incidence of Malaria, Tuberculosis and other diseases in the country, and that the Union Government was prepared to co-operate with all State Governments in fighting filariasis to the extent that finances permitted. It was the intention of the Central Government to establish a T.B. Clinic in almost every district in every State. Researches were being conducted for finding out a suitable drug for curing leprosy. He regretted that the Health Ministry could obtain provision in the current year's Budget only for five crores instead of their demand for fifteen, to implement the water supply schemes in full. We were indeed glad to be told by Mr. Karmarkar that India was now producing more and more drugs and chemicals and that the value of the drugs produced in the country had now gone up to 45 crores and that the imported drugs amounted only to 12 crores.

Mr. Karmarkar stated that he had no partiality for any system of medicine and Government would like to take advantage of every system in vogue. In fact the State Governments had been asked to send their proposals regarding the assistance required by institutions of indigenous systems of medicine. The Government had decided to carry out experiments in Jamnagar to evolve a scientific basis of Ayurvedic medicine. It is the earnest desire of the Central Government and Health Ministries that Ayurveda should take the best from the modern allopathic system and that the modern system should profit by all the best that is found in Ayurvedic system.

There is no doubt that the vast majority of people in India, almost 80 per cent, live in rural areas where adequate medical relief is not to be had and they depend almost entirely on the indigenous systems of medicine handed down traditionally from generation to generation of practitioners of those systems. And the popular feeling is that they are able to get medical aid which is much cheaper than the allopathic treatment to obtain which they have to travel long distances at extra cost and risk of exposure and jolting to the patients. During recent years there has been a persistent demand for the resuscitation of the indigenous systems of medicine like the Ayurveda, Unani, Siddha and Homeopathy and both the Central and State Governments have been extending their sympathetic consideration and help to promote researches into these systems so as to bring them into a line with the western systems by suitable integration.

President Rajendra Prasad declared open a T.B. Hospital at Pulayanarkottai in the outskirts of Trivandrum on the 12th August last the foundation stone for which was laid by him in February 1956. This hospital has now 116 beds but it is proposed to increase it to 300. In the course of his address President Prasad said that while they had established hospitals and clinics and proposed to establish more of them, he would suggest that "in this effort of yours to eliminate tuberculosis, you may utilize, even though it may be on a small-scale, the Indian Ayurvedic system also, because I am told it has got remedies which may prove very successful. It is believed by people in many parts of the country that the ancient system is still very much prevalent in this part of the country, and there are physicians who are well-versed in Ayurveda. You can perhaps, with their help, start some clinics here and there, if at least to test how far the system can be best utilized for the elimination of T.B.

"My idea is that the Ayurvedic system in the long run is very much cheaper than the allopathic system and if you can incur some expenditure even by way of experimentation, I am quite sure it will not be a waste, which may prove helpful, not only to you, but to other parts of the country also."

We quite appreciate the earnest desire of our beloved President to try out every possible means of controlling the spread of tuberculosis in the country as cheaply as possible. He was quite aware of the fact to which he also referred in his address, that modern medicine had made vast strides and had succeeded in practically eliminating tuberculosis in some countries. These methods have since been put into operation in India also and good results are already beginning to be manifest. In India we have the added advantages of the tropical sun and open air-life to which the majority of our people are normally accustomed

and still the disease has been with us levying a heavy toll every year.

As our President said unless and until we have succeeded in removing the basic root causes, namely, our social habits, modes of living and more than these the chronic state of malnutrition, we may not succeed entirely in eliminating tuberculosis. The best method of prevention lies therefore, in a general improvement in the habits of the people and also in the provision of good food to all in adequate quantities. In our Welfare State every attempt is being made to raise the living conditions of the people to attain a higher standard of life and so we may confidently look forward to a general all-round decline in the incidence of tuberculosis and other preventable diseases at no distant date.

THE STATE HEALTH INSPECTORS IN CONFERENCE

INAUGURATING the State Health Inspectors' Conference at the Office of the Director of Public Health, Madras, in July last, Sri M. A. MANICKAVELU, the State Health Minister, said that though their Association had been in existence for about 40 years it had not made itself felt. He conceded that they were doing very useful work and were really handicapped for want of proper scales of pay and other amenities and that something could be done to improve their states in the near future. We are glad that the Minister was aware of the responsibilities of these hard working officials; in the matter of environmental sanitation and in improving the condition of the rural areas, the Health Staff have really onerous duties to perform and the Minister agreed that they should be placed above want and that some enthusiasm should be created in them so that they may carry on their work efficiently. He asked the Association to adopt resolutions in regard to their claims and requests and forward them through their President to Government

Sri Dr. N. RAJAGOPALAN, Director of Public Health, stated that the Health Inspectors had not had a fair deal when the question of fixation of their pay was considered ten years ago. He requested the Minister for Health to consider their case sympathetically, as the duties they have to perform are becoming increasingly important particularly in connection with the BCG campaign and the working of the Primary Health Centres. The scales of pay they are now getting are certainly not commensurate with their duties and responsibilities and therefore, need revision to be on a par with several other non-gazetted officers entrusted with similar executive work in other departments.

The resolution relating to pay and allowances adopted by the conference appear to us to be very modest and deserving of sympathetic consideration and prompt implementation by the

State Government. We quite welcome the Health Inspectors' resolution requesting Government to increase the duration of the Sanitary Inspectors' course from one year to two years so that each candidate will be enabled to undergo the special training in Malariology, Leprosy, Nutrition, Minor ailments, BCG Vaccination and Yaws control during the course itself. It is well to remember that the spade-work has always to be done by the subordinate officers working in the districts, who form the backbone of the Governmental machinery.

RURAL MEDICAL RELIEF

(Contributed)

THE problem of rural medical relief has been agitating the minds of the Central and States Governments and the public for several years and we have not yet found a satisfactory solution—satisfactory and feasible in every respect. Nearly 80% of the people of India live in villages without adequate facilities for proper medical aid. Though there have been numerous talks, discussions and suggestions from all quarters, high and low, the end results have not been satisfying so far. The medical profession has obviously not applied itself seriously to this problem as a whole. So the appeal made the other day by Sri Dr. U. KRISHNA RAU, Speaker of the Madras Legislative Assembly, while addressing the new medical graduates at a reception given to them by the Muslim Medical Graduates' Association is indeed quite welcome and refreshing. He exhorted the doctors and students of medicine not to brush aside the question of rural service but to ponder deeply over the problem and find a practical solution. A genuine spirit of service to suffering humanity should really actuate the members of this noble profession who should always try to emulate the examples set by eminent doctors like Dr. IDA SCUDDER, Dr. SOMERVILLE, Dr. VAN ALLEN and others, but for whose pioneering efforts and self-sacrifice the very popular and large mission hospitals at Vellore, Ranipet, Neyyur and Madurai would not have come into being.

Dr. KRISHNA RAU made a very good suggestion at this meeting which should not fail to appeal to every thinking person and to all the State Governments in the country. "The ideal thing," said he, "will be to upgrade village hospitals and extend all facilities to doctors there. I feel that doctors who are young and newly married and those who are on the eve of retirement can without much difficulty be posted to serve in rural areas." In fact one would like that Government should go a step further and make it incumbent on every new entrant to the service to agree to work in rural hospitals for at least two years and Government in their turn should offer them the same scales

of pay, prospects as are given to the regular cadre of medical officers and also provide them with necessary amenities for decent living.

The advice given to the new graduates by Dr. Krishna Rau in regard to their career, and conduct in the profession was indeed very timely and wholesome. "Life as a medical man is not a bed of roses. They have to work hard and that always round the clock. They must keep up-to-date in their knowledge of all subjects connected with their work by reading the latest articles in medical journals and by attending clinical meetings and discussions." He made a distinction between a "good doctor" and a "successful doctor", and said a "good doctor" might not always be a "successful doctor," and a "successful doctor" would not necessarily be a "good doctor." They had to make their choice sufficiently early as to what they should be. If they wanted to be a "good doctor", besides being kind and considerate, they should be available for service at all times, should make a thorough examination of their patients and be as moderate in their fees as possible. "They should also strictly observe professional ethics, should never attempt to undercut their brother doctors, should give the correct treatment and should keep the secrets of their patients. In addition to their professional work, they must engage themselves in social work."

Need we say that such excellent advice coming from a successful and seasoned medical practitioner-*cum*-politician deserves to be cherished and practised by all members of the profession?

R. Chari.

PSYCHOMOTOR ASPECTS OF ULCERATIVE COLITIS

J. Groen and J. M. Van der Valk (*Practitioner*, November, 1956) discuss psychosomatic aspects of ulcerative colitis. Cecil D. Murray first discussed this aspect of colitis in 1930. Since then it has been widely considered. The authors state that psychogenic causes have very much to the force since 1930. It is stated that individuals of a particular personality structure are liable to ulcerative colitis, and that the condition may commence within twenty-four to forty-eight hours of some mental conflict, even a coarse verbal offence. There is no fighting, weeping speech or action; the effect is internal. Individuals affected are sensitive infantile personalities, dependent and passive, craving sympathy, affection, admiration and protection, egocentric, self-seeking, hesitating, uncertain, and showing inadequacy and inferiority, as well as petty traits such as exaggerated decency, dislike of the vulgar, neatness in dress, carefulness, association with people of higher rank, a sense of cleanliness, pseudovirility or housekeeper neatness. The authors conducted certain tests on four patients with colonic fistulæ, and they recorded changes in colour and vascularity in the colon of these patients as a result of emotional stimuli of different kinds. The impression gained was that psychic stimuli caused changes in the vascularity of the colon in ulcerative colitis. In treatment, psychotherapy, small doses of corticotropin, full diet, fluids, electrolytes and blood transfusions are advocated. The authors emphasize that the psychotherapy of ulcerative colitis should not be put off as a last resort. Early psychotherapy by the patient's own doctor is desirable.-(via *Med. J. Austral.*, 18-5-'57).

GLEANINGS FROM THE MEDICAL PRESS

SURGERY

Lumbar puncture headache in relation to sex, age, and cerebrospinal fluid findings.—(C. B. S. Schofield, *Brit. J. Ven. Dis.*, *33*: 30-33, March 1957, via *J. of Am. Med. Assoc.*).

The causes of post-lumbar-puncture headache seem to be many and varied. Factors helpful in reducing the number of such headaches include the skill of the operator and the use of a fine-gauge needle. The position of the patient during lumbar puncture appears to play a part in the incidence of headaches, those who were lying in the left lateral position during lumbar puncture; having fewer headaches than those who were sitting up. Measures of doubtful value include the use of drugs, giving isotonic sodium chloride solution intravenously, or inserting an atropine suppository after lumbar puncture; opinions are divided about the value of rest. The author reviewed the incidence of post-lumbar-puncture headaches as reported by patients attending the clinic of the department of venereology of the Newcastle General Hospital after diagnostic lumbar punctures performed (between January, 1945, and July, 1951) either on admission to the clinic and before treatment or as part of the final tests of "cure" before discharge. Lumbar puncture was performed with the patient sitting on a table, his shoulders supported by the assistant, and with the operator sitting on a chair. A local anæsthetic was used, if for no other reason than that the fine needle makes the initial skin puncture and also finds the interspinous space. Twenty-gauge Pitkin and Dattner needles were available in all the lumbar puncture kits. A piece of freshly-cut adhesive tape was applied as a dressing and left on for 2 days. The patient was allowed to leave the clinic immediately after lumbar puncture, if he had no complaints, otherwise he rested until fit to go home. The only exceptions to the above technique were in young children and some adults who were not considered to be co-operative, *e.g.*, mental defectives. In these, puncture was performed under general anæsthesia in the right or left lateral position.

In the course of 2,291 diagnostic lumbar punctures, headaches were reported on 148 (6·5%) occasions. The incidence was higher in those with acquired (7·2%) than in congenital syphilis (0·8%) and in those with normal (7·3%) than with pathological fluids (1·8%), varying, in the latter, in inverse proportion to the severity of the spinal fluid findings. In patients with acquired syphilis and normal fluids, the incidence of headaches dropped with increasing age, except for a definite rise in women at the menopause, confirming the functional element in the causation of post-lumbar-puncture headaches. The authors believe that the low incidence of headaches was due, in the main, to the experience of the staff, the operators, and their assistants. It was a rule in the department that an operator could make only one attempt at a lumbar puncture; if he failed, he did not traumatize the area with further attempts, but withdrew the needle, and the patient was sent home. Another attempt could be made on the next visit, but patients were not told this. The equipment for lumbar puncture was kept in first-class condition. Lumbar puncture kits, after use, were cleaned and then examined to make sure that the needles and stylets were sharp and fitted correctly. If not, they were sharpened before the kit was reassembled and autoclaved. The decline in post-lumbar-puncture headaches with increasing age, observed in patients with normal spinal fluids, was also observed by anæsthetists, although their series might not be strictly comparable with those of venereologists in that they introduced various foreign material intrathecally.

Atrial septal defect and its surgical treatment.—(*Lancet*, pp, 1261, June 22, 1957).

Doctors Bedford, Seelors, Somerville, Belther and Besterman in an article in the *Lancet* give their experiences of the surgical treatment of atrial septal defect in 100 consecutive cases. In their opinion, uncomplicated fossa-ovalis defects can be closed under hypothermia with little operative risk and this should be done preferably before the age of 20 when the heart and pulmonary vessels are in tact. But even after the age of 40 and when the heart is grossly enlarged, operation may still give good results.

Atrio-ventricular defects cannot safely be closed under hypothermia. Obstructive pulmonary hypertension with a seriously elevated vascular resistance is regarded as being usually a contra-indication to surgical closure of an atrial septal defect. The closure of atrial septal defect by open heart surgery under hypothermia is discussed and the results of operation in 40 cases are given. There was only one fatality. In most cases the results have been satisfactory.

Rectal biopsy as an aid in the diagnosis of amœbic dysentery.—(*Lancet*, April 13, 1957, pp. 774).

In an article in the April '57 issue of the *Lancet*, Sir Philip Manson-Bahr discusses rectal biopsy in the diagnosis of amœbic desentery and other disorders. He and Mr. Muggleton obtained biopsy material by scraping the suspected area of the rectal mucosa with a long-handled Volkmann spoon, crushing the small fragment under a cover-glass and examining it immediately with a low-power objective of the microscope. Of 30 cases of amœbic dysentery, amœbæ or cysts were found in 23 by stool examination and in 15 by biopsy. But the active vegetative form of Entamœba histolytica was found in 7 cases by the proctoscopy scrape-preparations. 3 of these 7 had no previous history of amœbic infection. In the more acute phases of the disease diagnosis by examination of material obtained through the sigmoidoscope has been in common use for many years and has been repeatedly recommended by Sir Philip Manson-Bahr.

Retropubic prostatectomy.—(*Transactions of the American Urological Association, 23 :* 1956).

Dr. Harry G. Cooper has reviewed 500 retropubic prostatectomies that he performed during the years 1947–1955. A comparison is made with other types of prostatectomies carried out by other surgeons, as well as himself.

The popularity of the retropubic approach has increased. In the 3-year period, 1950–52, twice as many retropubic prostatectomies were done as in the previous 3-year period ; the incidence has remained fairly constant since that time at approximately 25 per cent of all prostatectomies. This is contrary to the opinion of some authors who have reported that the retropubic is the proper or best approach in the *majority* of cases. We considered it the best approach in 20 to 30 per cent of cases.

There is no doubt that the retropubic approach has a place in treating the obstructing prostate. It is not the complete answer to the treatment of this serious problem, but it has many advantages and few disadvantages. Technically, it is a more difficult operation that the suprapubic, but the mortality rate is lower and no fistulas should occur. Strictures are less common following retropubic prostatectomies than following transurethral prostatectomies. Incontinence and impotence are less common following retropubic prostatectomies than following perineal prostatectomies.

All four types of prostatectomies have their place. No single procedure answers all problems, and Cooper quotes Doctor Rush with whom all urologists should be in agreement : "The method of prostatectomy should be adopted to meet the needs of the patient ; not the patient forced to conform to the limited skill of the surgeon."

The urologist cannot neglect any avenues of approach to the prostate, but should master them all.

Prostatic smear diagnosis—(*British Medical Journal, 1* : 822, 1956 via *J.A.M.A.*, April 1957).

Tergusson and Gibson stated that the interpretation of the cytology of prostatic smears requires special experience and is likely to be practised only in specialized centres. In performing prostatic massage, an attempt should be made to obtain the secretion from the apex of the gland, as that from the base is often contaminated by vesicle exfoliation. The smeared slides are fixed with Schaudinn's fluid and stained with hematoxylin and eosin. In carcinoma of the prostate, abundant cells can be expected in the smear unless excessive scrirrhous reaction has blocked the ducts. The normal prostatic cells usually occur singly or in small groups with regular nuclei. In contrast, the malignant cells occur in groups, their nuclei are irregular, larger, and hyperchromatic, and little cytoplasm is present. Other cells seen may be transitional bladder cells, histiocytes, blood cells, or spermatozoa. After œstrogen therapy, glycogen-filled cells and squamous cells appear. The results of 100 cases that were later available for histological examination of the prostate gland were analyzed and a definite cytological diagnosis was recorded. Of 38 cases where smear diagnosis indicated carcinoma, this was confirmed in 36 ; of 7 others whose smears suggested malignancy, this was confirmed in 2 ; and in the remaining 55, whose smears appeared normal, only 2 were found to have a malignancy. Thus, this technique had an accuracy rate of 95·7%.

INDUSTRIAL MEDICINE

Pneumoconiosis.—(*Br. J. Clin. Pract.*, March 1957).

DIAGNOSIS :—If pneumoconiosis is diagnosed, the affected workman becomes entitled to compensation. Three criteria are available to the clinician :—an appropriate industrial history, a complaint of dyspnœa and relevant radiological changes (McVittie, 1949).

In many forms of pneumoconiosis pulmonary fibrosis is commoner in men engaged in specific tasks in the industry. The possibility of dust disease can also be assessed on the basis of the number of years of employment. An accurate industrial history is therefore, often useful in supporting or excluding the diagnosis.

The radiological changes are sometimes difficult to detect and assess in the early stages of dust fibrosis. Consequently different observers may disagree about interpretation (Fletcher and Oldham, 1949).

Valuable evidence regarding the significance of the X-ray changes can be obtained by comparing chest films with sections of the lung removed at autopsy. If the sections are prepared by the technique of Gough and Wentworth (1948) the anatomical changes can be clearly seen by transillumination.

In the later stages of dust diseases when the lung lesions are more established, the X-ray signs are usually specific and easily recognized by trained observers.

In clinical practice it is a common experience to find that the assessment of dyspnœa due to pneumoconiosis is made more difficult by the coexistence of another lesion such as heart disease (Dunner and others, 1952).

Clinical management and treatment : —It is not possible to restore the fibrosed lung to its normal state. Management is directed towards symptomatic treatment, preventing complications, advising the patient regarding his future employment and assisting him in obtaining any compensation to which he may be entitled.

In many cases clinical examination reveals an element of bronchial spasm. In these, benefit may be obtained from antispasmodics in the form of inhalations (Fletcher and Gough, 1950).

Clinical observation has shown that acute pneumonia may cause rapid and permanent worsening of symptoms, hence upper respiratory infections should be regarded as serious and treated energetically. Many forms of dust disease become complicated by right heart failure and in these the treatment is similar to that for congestive heart failure due to any other chronic lung disease. In many cases active tuberculosis supervenes, and such patients may be improved by rest, isoniazid and P.A.S. In 1954

Miall and others used these drugs in treating a series of patients with coal workers' massive pneumoconiosis and showed that the treatmcnt made no appreciable difference to the disease. Most authorities do *not* use cortisone in treating pneumoconiosis because it may activate any associated quiescent tuberculosis.

The lesions of dust diseases are almost invariably bilateral and widespread, hence surgical resection is impracticable.

OBSTETRICS & GYNÆCOLOGY

Pelvic tuberculosis.—(*Lancet*, June 22, '57, page 1289).

Chemotherapy has transformed the prospects for tuberculous infection of the genital tract in women. This is not a common disorder, but the increasing investigation of women with minor gynæcological disturbances is revealing an unexpectedly large proportion of cases of pelvic tuberculosis. A frequency of 5·3% has been found among nearly 2000 patients complaining of infertility and this is regarded as a minimal estimate. Other common presenting symptoms such as pain, abnormal uterine bleeding, amenorrhœa and vaginal discharge have led to the discovery of this underlying disorder, often without any palpable abnormality in the pelvis. Pelvic tuberculosis must always be borne in mind as a potential cause of persistent gynæcological symptoms especially when infertility co-exists. The diagnosis is usually made by histological study of the endometrium. The specimen should be obtained as late in the cycle as possible to give the slow growing tuberculous focus as long as possible to develop. Before the advent of chemotherapy, treatment was restricted to general health measures, a sanatorium regime or X-ray therapy to suppress ovarian activity and rest the genital tract. A change has taken place in the present day treatment with streptomycin and P.A.S. The treated patients received a three-month course of streptomycin 1 g. and P.A.S. 12 g. daily as outpatients. Of 43 patients treated, only 5 showed bacteriological evidence of recurrence, whereas of 44 untreated cases 11 had to be removed from the trial because of clinical deterioration. Unfortunately, after the treatment infertility usually persisted. Later experience suggests that longer course of treatment may still further reduce the incidence of recurrence and that P.A.S. and isoniazid by mouth are less likely to have serious side-effects or to cause the patient to default.

Spinal anæsthesia in more than thirty-four thousand vaginal deliveries.—(*West. J. Surg.*, Dec. 1956 via *Med. Jour. of Australia*).

G. A. Macer reports results of spinal anæsthesia (single dose) in 34,936 vaginal deliveries. Various adverse criticisms of spinal anæsthesia in obstetrics are mentioned, and mortality rates due to inhalation anæsthesia are given. The patients reported were all delivered vaginally and had the spinal anæsthetic given by the *accoucheur*, either specialist obstetrician or general practitioner. The incidence of spinal anæsthesia at the two hospitals concerned was 69%, and had increased to over 80% in 1954. The author considers that the administrator of spinal anæsthesia should be well trained and adhere to a proven technique. The author uses hyperbaric solution of 5·0 to 6·0 milligrammes of Tetracaine U.S.P. in 2·0 cc. of 10% glucose solution. The anæsthetic is usually given within an hour of expected delivery and the level of anæsthesia is controlled by tilting the table. There were no maternal deaths from anæsthesia in this series, no serious neurological complications, no infections around the site of injection, and no case of purulent meningitis. Adverse effects reported by the author were :— hypotension, headaches and meningismus. There were less than six cases of severe hypotension in the series, and the condition responded to treatment when recognized promptly. Headaches are an annoying complication in 10% to 18% of patients. Their incidence and severity have been reduced by improvements in technique. Symptomatic treatment with bed rest is the only treatment necessary in most cases. Meningismus is thought to be caused by intradural extravasation of blood and is characterized by nuchal spasm and headaches. The author does not consider spinal anæsthesia to be the perfect anæsthetic for childbirth, but it is the most satisfactory one available. A properly given spinal anæsthetic is not considered more hazardous than inhalation anæsthesia. No increase in the incidence of post-partum hæmorrhage or retained placenta was observed with spinal anæsthesia. The fœtus is said to be better oxygenated and rarely requires resuscitation, and spinal anæsthesia is considered advantageous for the premature infant.

Cortisone for obstetric complications.—(*Lyon Medical, 197* : 25-32, 1957, via *Modern Medicine*, April 15, 1957).

Administration of cortisone is beneficial for many complications of pregnancy. Apparently, cortisone therapy does not cause abortion or fœtal injury in human beings.

Since carbohydrate tolerance is decreased and insulin resistance is increased in diabetic patients during pregnancy, cortisone should *not* be given to these women.

Hyperemesis gravidarum may be alleviated by cortisone therapy. The hormone decreases anterior pituitary secretion and reestablishes the equilibrium disturbed by pituitary hypersecretion of gonadotropins.

Cortisone is useful in *haemorrhage* caused by hypofibrinogenæmia, acting as an antagonist to maternal antibodies that delay coagulation. The hormone also increases capillary resistance and is therefore beneficial for *uteroplacental apoplexy*.

Administration of 100 mg. of cortisone intramuscularly at the same time as blood transfusion may be helpful in *obstetric shock* caused by acute adrenal insufficiency. Cortisone may be given in postabortive and postpartum *pelvic infections* to inhibit fibrosis.

Herpes gestationis and *vulvar pruritus* of pregnancy are often alleviated by hydrocortisone ointment.

With *eclampsia* and *preeclampsia*, cortisone treatment may be employed to inhibit adrenal secretion of mineralocorticoids. The electrolyte and fluid balance must be carefully controlled.

Addison's disease during pregnancy is also treated with cortisone, as is *Cushing's syndrome*. Pregnancy often exerts a beneficial effect on *rheumatic diseases*. However, if no remission occurs, larger doses of cortisone are usually necessary to control symptoms. Cortisone is also prescribed during pregnancy for patients with *asthma, lupus erythematosus, dermatomyositis*, and *haemolytic anaemia*.

MEDICINE & THERAPEUTICS

Mitral stenosis in old patients.—(*Acta. Med. Scand.*, *156* : 99-103, 1956 via *Mod. Med.*, 15-4-'57).

Signs of coronary heart disease or aortic stenosis and auricular fibrillation suggest mitral stenosis in old persons. Heart failure is the cause of death in approximately 40% and embolism in about 35% of elderly patients with rheumatic heart disease.

Longevity of these patients with mitral stenosis may be explained by slow development of coronary heart disease, permitting the patient to survive without symptoms of the valvular lesion and eventually die from an unrelated cause.

Of 476 patients treated for rheumatic heart disease between 1949 and 1955, 83 were over 70 years of age and had mitral stenosis. Of these 83 patients, 66 were women. Aortic lesions were also seen in 37%. Information concerning rheumatic infection was obtained from 36 patients ; in 15 of these, more than fifty years elapsed between the initial rheumatic episode and the onset of heart failure. More than 37% of the patients survived with heart disease for more than ten years.

Auricular fibrillation was observed in 77% of patients with mitral stenosis only and in 61% of those with mitral-aortic lesions.

Errors in cardiac diagnosis.—(*Univ. Minnesota M. Bull. 28* : 266-276, 1957 via *Modern Medicine*, July 15, 1957).

An erroneous diagnosis of congestive heart failure stems directly from inability to estimate the height of the venous pressure. This is most conveniently done by determining the uppermost level of venous pulsation in the internal jugular vein and noting the vertical distance above the angle of Louis. The upper limit of normal pulsation is 3 cm. Other causes of increased venous pressure, such as increased intrapericardial, intraabdominal, or intrathoracic pressure, tricuspid stenosis, and obstruction of the superior vena cava, should not be overlooked.

Observation of the venous pulsation in the internal jugular vein may also reveal a giant A wave associated with tricuspid stenosis, pulmonary hypertension, and pulmonary stenosis. With nodal tachycardia and complete heart block, similar waves are created by contraction of the auricle against a closed tricuspid valve.

Attention to the quality of the pulse reveals a moderate degree of collapse in high output states and slight aortic insufficiency. The plateau type of pulse with aortic stenosis, the pulsus bisferiens with combined aortic valve disease, and the small pulse of mitral stenosis should be noted. Pulsus paradoxus, commonly believed to be pathognomonic of pericardial disease, may be seen after forced expiration in normal persons or with respiratory obstruction or gross cardiac dilatation.

The split mitral first sound is best heard just to the left of the sternum in the fourth space and is usually normal. The sounds result from a slight delay in closure of the tricuspid valve over the mitral valve and should not be mistaken for the presystolic murmur of mitral stenosis. With the split, no continuous crescendo ending with the first sound is heard, nor is the loud, short, high-pitched opening snap of the mitral valve. This snap may often be palpated, as well as heard, in the third or fourth intercostal space and is the consequence of high atrial pressure suddenly forcing open the stenosed valve in early systole. The snap is almost always mistaken for a split P_2, which, however, is not heard in the same location. Tricuspid stenosis, much rarer, produces a similar opening snap but, like all tricuspid sounds, is much louder in inspiration.

Systolic ejection clicks are heard in both the aortic and pulmonic areas, occurring almost immediately after the sound of mitral closure.

These and the aortic ejection sound are often ignored or mistaken for split first sounds. Ejection murmurs of the semilunar valves begin with the ejection sound, which initiates the murmur. The click may be used to discriminate the systolic murmur of aortic stenosis, which, when best heard at the apex may be confused with the murmur of mitral regurgitation.

The late systolic murmur is a frequent pitfall. The sound, at first too low to be audible, occurs in the latter part of systole and is nearly always mistaken for the presystolic murmur of mitral stenosis. The murmur is usually innocent, although a late accentuation is suggestive of mitral stenosis.

Functional apical diastolic murmurs are commonly found in congenital heart disease with a left-to-right shunt, anæmia, complete heart block, ventricular septal defect, and patent ductus arteriosus. The sounds are the result of torrential blood flow through the atrioventricular valves.

Guides to antibiotic treatment of pulmonary disease.

1. Make an ætiologic diagnosis.
2. Identify pathologic character of the lesion.
3. Search for underlying mechanism (*e.g.*, bronchial obstruction, aspiration, bronchiectasis, etc.)
4. Choose best antibiotic and adjunctive regimen.
5. Change antibiotic regimen only for clear indication.
6. Identify irreversible residues and treat if necessary.

REVIEWS OF BOOKS

The Medical Annual—1957. 75th issue. Edited by Sir Henry Tidy and R. Milnes Walker with 45 other contributors. 570 pages. 52 plates and 46 text illustrations. (John Wright & Sons Ltd., Medical Publishers, Bristol-4). Price sh. 38/6d.

This, the Seventyfifth Year-book of Treatment and Practitioners' Index maintains the high standard of excellence of its predecessors. We congratulate the editors on their maintaining this standard in a very efficient manner. Every one of the contributors is an authority in his own field and so their contributions bear the stamp of authority.

There is a special article on 'Nutrition and Vitamins' by Prof. Leslie J. Harris. This article contains useful information not only to individuals suffering from specific diseases but also to the general public as well. Such common subjects as Bread, Food Contaminants, Slimming Diets, Fatty Acids and Atherosclerosis, Mineral Elements in Nutrition are discussed in detail. There is another special article on 'Hypothermia,' which has, in recent years, assumed special importance. A well-written article on Blood Coagulation by Dr. A. S. Douglas gives in a very clear manner the latest theories on this subject. Another article requiring special mention is that on "Prostatic Enlargement" by Dr. E. W. Riches. The articles on Diabetes, Medical and Surgical Aspects of Gastric and Duodenal Ulcer, Child Psychiatry, Mitral Valve Surgery are all very well written. The Practitioners' Index at the end of the book gives all the recent pharmaceutical and dietetic preparations, medical and surgical appliances. A list of English and American Medical Works and new editions published during the preceding twelve months is also given. There is a very thorough general index. The plates and the illustrations are very good and the general get-up of the book is also good. In our opinion the book must be on the table of every medical practitioner.

U.K.R.

A Textbook of Gynæcology—By K. M. Masani, M.D., F.R.C.S., F.I.C.S., Honorary Gynæcologist, King Edward VIII Memorial Hospital, Lecturer in Obstetrics and Gynæcology, Seth Gordhandas Sunderdas Medical College, Examiner in Obstetrics and Gynæcology to the Universities of Bombay, Madras, Gujerat and Baroda. 1957 : 775 pages, 2nd edition with photographs and illustrations. (Popular Book Depot, Lamington Road. Bombay-7). Price : Rs. 25.

Dr. Masani, has in the compilation of this book, had the help of Dr. B.N. Purandare who has collaborated in writing the section on the Ovaries ; of Dr. E. J. Borges in the section on Malignant Growths of the Genital Organs ; of Dr. Fernandes in the section on Venereal Diseases and of Dr. N. S. Vahia in the chapter on Psycho-sexual disturbances. This second edition maintains the excellence of the first. Most of the chapters have been revised and some rewritten. At the end of each chapter is given a very useful bibliography. There is a very useful chapter on Pre-operative and Post-operative Treatment of Gynæcological Operations. The illustrations are very useful. The printing and the general get-up are very good. This book will be of immense use to graduates appearing for higher examinations and for general practitioners in tackling their day-to-day problems.

U.K.R.

Pharmacology for Medical Students in Tropical Areas—By Roger A. Lewis, A.B., M.D., formerly Visiting Professor of Pharmacology, Seth Gordhandas Sunderdas Medical College. Pp. 524. (Popular Book Depot, Lamington Road, Bombay-7). Price : Rs. 15.

This book gives a clear and concise discussion of the up-to-date material on pharmacology. It begins with a section on General Pharmacology in which are discussed such important subjects as 'The Scope and Definition

of Pharmacology, General Principles of Drug Action, Metabolism of Drugs, Chemical Structure and Biological Effect, Dose Affect Relationship, Biological Assay' etc. The succeeding sections deal with Chemotherapy of Infectious Diseases, Drugs acting on the skin, mucosa and gastrointestinal tract, central nervous system, autonomic nervous system and heart and circulation. There are chapters on Allergic reactions and their treatment, Metabolic diseases and substitution therapy and the Prevention and Treatment of nutritional deficiencies. Appendix A contains simple exercises in practical pharmacy. There is a table of doses for adults and children and another on simple exercises in experimental pharmacology. The book is bound to be of great use to students, teachers and general practitioners.

U.K.R.

BOOKS RECEIVED

Physiology of the Nervous System—By E. G. Walsh. Pp. 563. Longmans Green & Co., London, New York, Toronto. Distributors in India :—M/s. Orient Longmans Private Ltd., 36-a, Mount Road, Madras-2.

[Price 50sh.

CORRESPONDENCE

To the Editor, Antiseptic, Madras.

Sir,

Recently an old man, 60 years old, collapsed after an intramuscular injection of Vitamin BT (Benerva) 100 mg. and Vitamin B_{12} (Macrabin) 500 mg., given separately and expired within five minutes, from sudden heart failure.

He was a chronic diabetic with features of neuritis. Moreover, he had an attack of Influenza (a mild one), one week before the course of injections commenced, and was weak and anæmic. His urine sugar was 2% with no albumin or acetone bodies.

Blood sugar had not been estimated. When the first injection was given, 3 weeks before this incident, he developed some palpitation and giddiness but became all right after taking a cup of coffee. Subsequently, the dosage of Macrabin was reduced to 100 mcg. and he took 6 injections of both Benerva-100 mcg and Macrabin, 100 mcg each, after which he stopped taking the same. After 15 days the same injections were resumed with the same dosage and the regrettable incident happened.

He was given the injections all through by a doctor of long standing and experience and with due care and caution.

I shall be very much obliged if you or any of your learned readers will throw some light on this matter, especially, as to the causation of the death and its prevention in future.

P.O. Hirakud Colony,
Dist. Sambalpur,
Orissa.
14th August, '57.

Yours faithfully,
R. C. Bohidar,
M.B., B.S. (Pat),
Chief Medical Officer,
Hirakud Dam Project

Reply

Ref. Letter of Dr. R. C. Bohidar

Sudden anaphylactic type of reactions occasionally fatal have been reported after intravenous injections of Vitamin B1. That is why it is not considered advisable to give the drug by the intravenous route. However, the reaction is not common after intramuscular injections. In the case under report, it should be regarded as an anaphylactic reaction.

A longstanding diabetic is bound to have coronary insufficiency. The theoretical possibility is the occurrence of a sudden coronary occlusion coinciding with the injection.

[*Note* :—The above reply was given by Dr. K. S. Sanjeevi, M.D., Professor of Medicine, Madras Medical College—Ed. Antiseptic].

NEWS AND NOTES

Manufacture of Vitamins

A number of schemes for the manufacture of vitamins have been approved by the Government of India.

Two of them are for the manufacture of synthetic vitamin 'A' from lemon-grass oil which is available in the country. Each of these schemes envisages an annual production of 10 million mega units of vitamin 'A' of the value of Rs. 50 lakhs.

The production of shark liver oil, which is rich in vitamin 'A', has more than doubled during the last two years. The production in 1956 was 59,500 gallons valued at about Rs. 14·3 lakhs as against 27,158 gallons in 1955 valued at over Rs. 6·5 lakhs Shark liver oil is produced by three Government factories in Bombay, Kozhikode and Trivandrum.

A licence has been granted to a firm under the Industries (Development and Regulation) Act, for the manufacture of Vitamin B-12. It will have a capacity of 1·2 Kg. per year valued at Rs. 12·37 lakhs. Production is expected to commence by March 1958.

Another scheme for the manufacture of Vitamins B-1, B-2, B-6, C and D is now under Government's consideration. The question of producing some of these vitamins under the State-owned National Industrial Development Corporation is also being examined.

Licences have also been issued to two firms for the production of two other vitamins *viz.*, nicotinic acid and amide. The total capacity will be about 15 tons per year. One of these has already gone into production.

Madras City Pharmacist's Association

At a special meeting of the City Pharmacists' Association held on August 4, at the General Hospital with Dr. K. Narayanamoorthy, President, in the chair, it was resolved to request the Government and the State Pharmacy Council to abolish the system of annual renewal of registration for the Registered Pharmacists, as it was not in consonance with the rules of other sister Councils like the Medical Council and the Nurses Council.

Two other resolutions were adopted, one requesting the Government not to impose any fresh examination for those who had passed the Compounder's examination but had not registered their names in the Pharmacy Council, and the other to request Government to give effect to the recommendation of the Central Pharmacy Council in the matter of enhancing the pay scales of the Pharmacists immediately.

Match-size X-Ray Tube

Dr. Leonard Reiffel, Head of Physics Research at Armour Research Foundation, has developed an X-ray machine smaller than a match stick, The instrument has been tried for industrial applications. It uses a radioactive isotope as a power supply. Coupled with an image intensifier the small radiation generator could be carried in a physician's bag for at-the-spot pictures of fractures. Dr. Reiffel has found Strontium-90, the harmful element in atomic bomb fallout, to be very satisfactory as an isotope for the unit.

Family Planning—12 Information Centres For Madras City

Twelve Family Planning Information Centres will be opened in the City by the Madras Corporation shortly.

These Centres, six for mothers and six for fathers, in the Triplicane-cum-Mirsahibpet - cum - Mylapore area, served by the Pudupakkam Family Planning Clinic, comprise the pilot scheme of an overall family-planning advisory scheme, which the Government proposes to entrust to the Corporation for implementation.

The Government expects the pilot scheme to enable a careful evaluation of the results, preliminary to its extension throughout the City. When in full swing the scheme will require the location of two Family Planning Information Centres, one for fathers and the other for mothers, in each Division. The former will be located in the Births and Deaths Registration

Offices and the latter in the Maternity and Child Welfare Centres. The procedure to be followed will be :—

A full-time tutor, preferably a staff nurse and an Ayah will be in charge of a mothers' centre, while each fathers' centre will have a part-time male tutor, preferably from among Corporation teachers and a part-time canvasser, the centres working from 6 p.m. to 8 p.m. Suitable birth and death registration clerks will be appointed part-time domiciliary canvassers to contact fathers in their areas and will be paid 50 nP. honorarium per case. The convassers will contact fathers with three or more children and persuade them to visit the Centre and send their wives to Mothers' Information Centres. Tutors of Mothers' Information Centres will visit mothers and persuade them to attend the centres.

The work of the Information Centres will be supervised and controlled by Family Planning Clinics.

World University Service Free Medical Service

The consultation Clinic of the World University Service situated at the Madras University Union "The Pavilion," Spur Tank Road, Chetput, Madras-31, was opened on 1-8-'57 and will work till the end of March 1958. Top-ranking doctors and surgeons and specialists in E.N.T., Eye and Skin are available at the Centre for free consultation by University students. Students requiring advice of a consultatant should come with a letter from the college doctor (or the Principal in the case of colleges with no doctor on their staff). It is not proposed to carry out any actual treatment at the Centre. However, in the case of students whose parents or guardians have a monthly income of less than Rs. 100, an attempt will be made to issue costly drugs free of charge as also spectacles.

The clinic will, for the present, function for two days in the week. The consultants will attend the clinic as follows : Thursday : 3 to 4 p.m. Surgeons and Physicians ; Saturdays : 3 to 4 p.m. Specialists in E.N.T., Eye and Skin. Students should be present before 2-30 p.m.

Medical Aid to Families of N.G.Os.

The Madras State Government have directed that the medical concession admissible to members of the families of the N.G.Os. and other entitled personnel be *extended to their parents*, who are residing with and are solely dependent on them.

The Government have issued an amendment in this connection to the Madras Medical Attendance Rules. The N.G.Os. had represented to the Government for reimbursement of medical expenses incurred on behalf of their parents, as, under the present rules, the parents of N.G.Os. or other entitled personnel, are not eligible for medical concession.

Medical Aid in Kerala

30 More Hospitals to be Opened

Addressing a meeting at Trichur on August 8, Dr. A. R. Menon, Health Minister, Kerala, said that the Government would open 30 more hospitals including four big ones in Kerala in the course of the year and reorganize the Trichur Civil Hospital with accommodation for 500 beds. It was their intention to spend Rs. 24 crores for medical relief in the course of five years and attend to the expansion of Ayurveda, leprosy hospitals, maternity clinics and T.B. sanatoria.

Medical College in Kozhikode

Dr. A. R. Menon, Health Minister, Kerala, declared open the Kozhikode Medical College on 5-8-'57 at a meeting held at the Government Head Quarters Hospital.

The Minister assured the students that they would have all facilities and that Government would spare no pains to make the college a well-equipped one and as efficient as any other college in the land.

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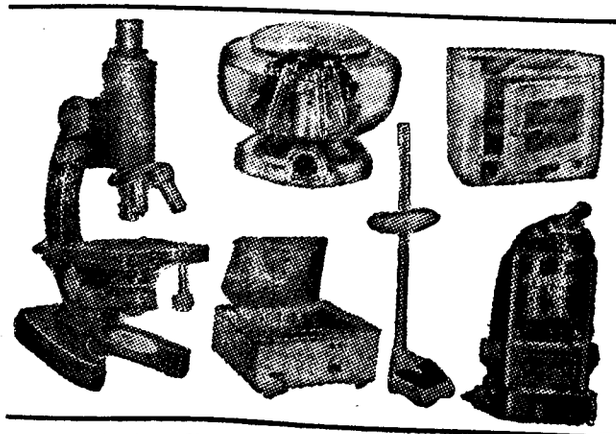

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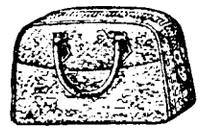

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Vol. 1 No. 11 Regd. No. 9, M. 429 NOVEMBER, 1957

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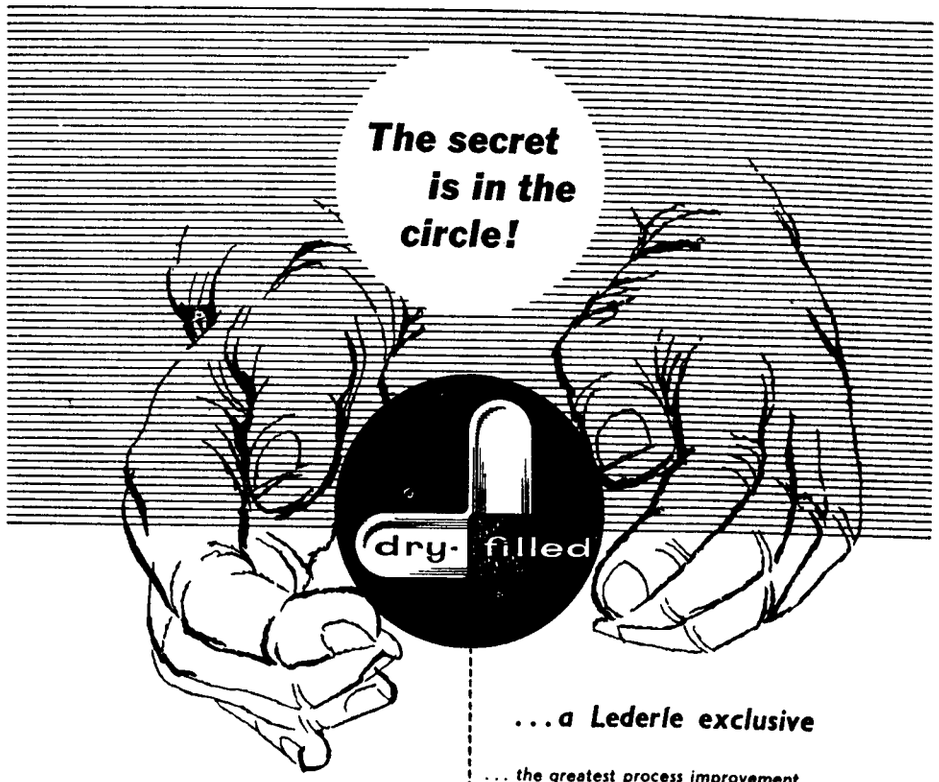

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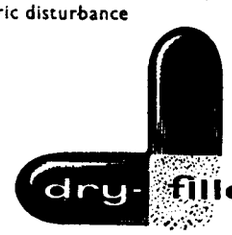

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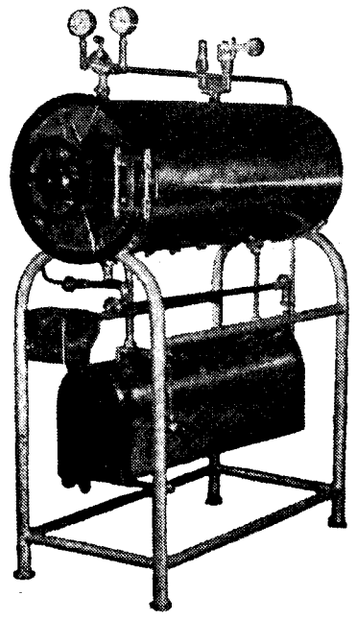

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INDEX TO ADVERTISERS NOVEMBER, 1957

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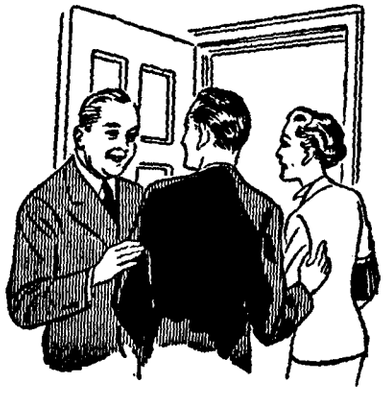

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Dalda—*its role in nutrition*

McCarrison in one of his addresses remarked: "The general dietetic error lies not in quantity, but in quality." Faulty nutrition is no doubt common in this country, but it is not so much lack of food as lack of the right kind of food, particularly vitamins and fats.

In a statistical survey of Vitamin A deficiency —judging by poor dark adaptation—more than half the children from working class homes in England were found to be deficient by Harris and Abbasy in 1939. Both in Africa and India, skin changes due to lack of Vitamin A were present in 80% of some groups of children (Nicholls, L-Indian Medical Gazette : 1933). This is also emphasised in Health Bulletin No. 23 (1956), issued by the Nutrition Research Laboratories, Coonoor. Vitamin A deficiency is the single factor responsible for a large number of nutritional deficiency diseases. The daily allowances for an adult are in the neighbourhood of 3,000 to 4,000 International Units of Vitamin A.

Vitamin A is found in only a very few foods, of which the most common are eggs, milk and butter, and for that reason it is important to realise that their Vitamin A content is not constant, but depends on the diet of the hens and cows. Besides, these animal foods are expensive and beyond the reach of many. Therefore, Fitzgerald Moore, in a practical discussion of the whole problem, concludes that the only hope of a solution is to reinforce local vegetable oils and fats with Vitamin A concentrates. As is well known, the Food Fortification Sub-Committee of the Indian Council of Medical Research thought on the same lines, and recommended that 700 International Units of Vitamin A should be added to every ounce of Vanaspati. This recommendation was accepted by the Government and to Dalda we add 700 International Units of Vitamin A in addition to 56 International Units of Vitamin D.

Fat must be included in ordinary diets—because of its high calorific value and its protein-sparing action. But we have no exact knowledge of the quantity required. It is probably advisable that not less than 45-60 grams (1½-2 oz.) should be consumed daily. Most diets in India are very low in fat.

Dalda is a cooking fat made from pure vegetable oils according to strict Government specifications. It is manufactured from ordinary edible oils of everyday use by refining and hydrogenating them. Seven hundred International Units of Vitamin A and 56 International Units of Vitamin D are then added to every ounce—which is as much as good quality ghee contains. Dalda is easily digested and utilised by the body on account of its low melting point. The standards of quality are so high that Dalda compares favourably with its other counterparts such as "shortening" and "margarine" used extensively in the United States, England and other European countries. Each ounce of Dalda yields 250 calories, as much as 1 ounce of any good quality ghee and over twice as much as an ounce of wheat or rice. Dalda is, therefore, a very valuable addition to the average Indian diet.

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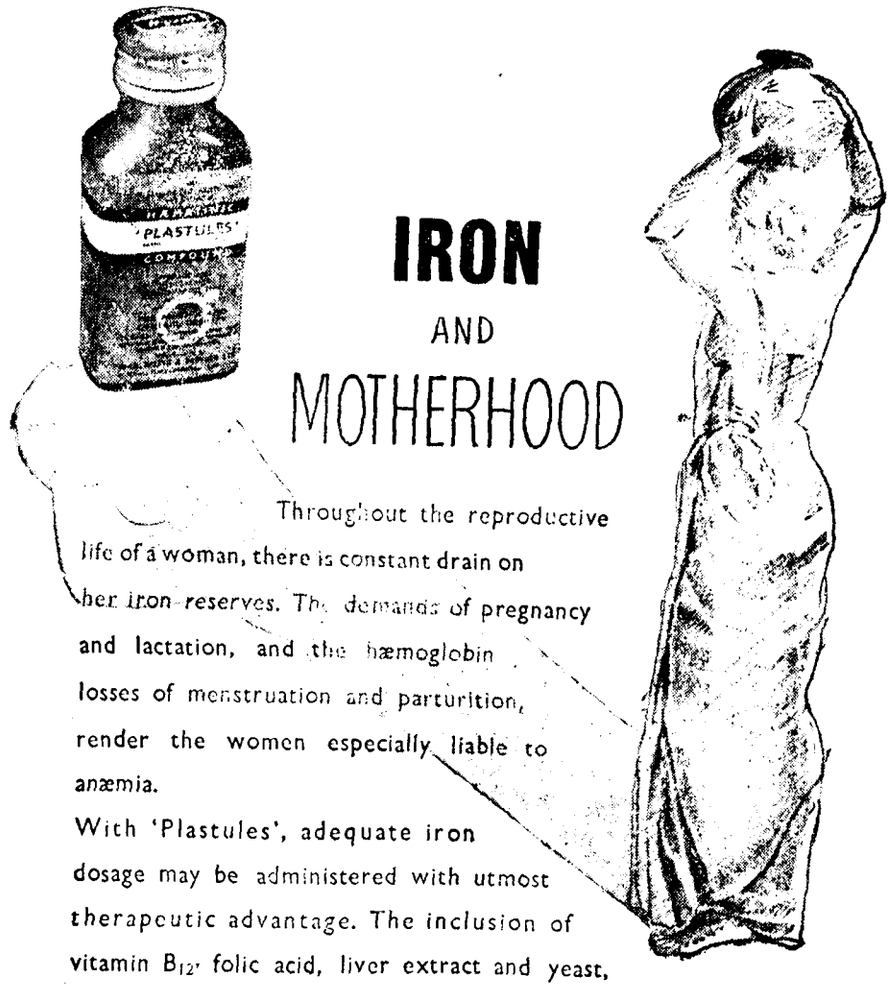

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Original Articles

EVOLUTION OF THE SCIENCE OF PHARMACY IN AYURVEDA*

P. M. MEHTA, M.D., M.S., F.C.P.S., F.I.C.S.,
Director, Central Institute of Research in Indigenous Systems of Medicine, Jamnagar

PHARMACY AND PHARMACEUTICS form a very important and substantial part of medicine. As the proverb goes, 'the proof of the pudding is in the eating of it;' so the value and merit of medical science depends in a large measure on the effect of the medications administered. The wealth of medical advancement, therefore has to be judged largely by the richness in the variety and quality of the pharmacopœia and pharmacy.

It may fairly well be asserted that the wealth of the "Materia Medica" of a nation is an indication of its degree of civilization. Civilization may be classified into three successive stages, *viz.* : (1) the adoptive, (2) the adaptive and (3) the creative. This applies exactly to the growth of the drug science or pharmacopœia of a country.

The natural thing that occurs in any part of the world is for the people to obtain their drugs from Nature by copying the habits of the lower animals in this regard. Leaves, fruits, flowers, and other plant-parts, as also mineral and animal parts form even to-day the major part of the world's pharmacopœia. Man utilizes drugs as found in nature. It is the *adoptive* stage. As life becomes more and more complicated and an urban civilization is developed, the problem of preservation becomes more and more acute. Man's genius rises to the occasion and invents mechanical devices to extract and preserve the useful

*Specially contributed to the ANTISEPTIC

parts and ingredients of drugs, so that man is independent of the vagaries of seasons and the drug is made available at all times and at all places. The drug is adapted to suit man's tastes and environment. This is the *adaptive* stage. Next, man attempts to cast away this thraldom to nature and begins to combine and divide the parts so that new chemical products are made, which are superior in effect to those found in the state of nature. That indeed is the beginning of the scientific pharmacopœia which has now made enormous progress and evolved new and wonderful drugs: *e.g.*, sulphonamides, penicillin and other antibiotics. This marks the evolution of the science of drugs from the adaptive to the *creative* stage.

The materia medica of the people in any country, grows rich in vegetable, mineral, animal or other types of drugs, depending on the flora and fauna and the climatic, social, cultural and religious conditions of that country.

The number of drugs known to the different countries and nations in ancient times are:—Babylon and Assyrian: 300; Egypt: 700; Hypocrate: 400; Theophrastres: 500; Hindus: 760; Chinese: 265; Persian-Herbal: 584 (10 cent.); and Avicenna: 760.

In the middle-east and the west, the source of vegetable fat is the olive seed; the word 'Oil' is derived from it (Olea-Olive). In India the sesamum (gingelly) seed is the main source and is known as *'til'* in Sanskrit. *'Taila'* means oil in India. This furnishes an example of how geographical facts influence the concepts and terminology in medicine. In the western pharmacopœia all vegetable greases are referred to as 'oils' or 'oleagenous substances, whereas in India they are *'tailas,'* each deriving its origin from the words 'olive' and 'til' respectively. Words like camphor, ginger, and sandal denote their place of origin, *i.e.* India.

Thus the history of drugs is essentially the history of civilization and science. The greater the number of drugs in use by a people, the more complex is their medical science and also the methods of therapeusis. It is obvious that the complexity of drugs, their preparation and application indicate the advances in the science and social life of a people. From the magical spells and simple green leaves and roots the history of drugs has developed into the highly technical and scientific synthetic drugs of the modern day, reflecting the state of human life and civilization at each stage of its growth. The history of drugs is in short, the history of man from his earliest fight against disease, pain and premature death.

I. Vedic period.—Veda is spoken of as having six limbs, *viz.*, phonetics, grammar, etymology, astrology, canons of ritual and prosody.

वेदाङ्गानि षडेतानि शिक्षाव्याकरणं तथा
निरुक्त ज्योतिषां कल्पः छन्दो विचितरीत्यपि

Out of these, (कल्प) or the canons of ritual are defined as (क्रमं कर्मप्रयोगाणां कल्पं तल प्रचक्षते) *i.e.*, the order of rituals is spoken of as *Kalpa.*

Ayurveda was considered to be on a par with the Vedas; and as in the Vedas, we get a section on *Kalpa* (कल्प) so in Ayurveda too, we have *Kalpa* meaning the canons of pharmaceutics.

Ayurveda, *i.e.*, the science of life, had its birth in the Vedic age. We find references to it in the earliest Sanskrit literature, which takes us back to more than 3000 years B.C. In the early stages its precepts must have been handed down by word of mouth like all other vedic literature. In the simple society of those days the medical needs of the people must have also been simple unlike in later times. We find that herbal medicines alone were used and the Vaidyas used to grow the herbs in their house gardens or to fetch them from jungles where they grew wildly and extensively. From the very beginning a sort of sanctity attached to the practice of the healing art. The administration of medicine was accompanied by a recital of *mantras* for the appeasement of the God believed to be responsible for the ailment. It must have aided the action of the medicine by infusing faith in the patient's mind. This mixture of religion and medicine may be accounted for by the fact that the Rishis were the fountain heads of this knowledge in those days. The Rishis retired from the world and the quest of knowledge became their sole purpose in life and the imparting of it to disciples their only social duty. The religious association may be said to be responsible for making the practice of medicine a philanthropic mission, a characteristic which was attached to it, till very recent times.

It is probable that magic and black art were practised to some extent in the *Misra Desa* (Egypt) which is called the *Syama* or the black country. It is likely that the word *Syama* may be the origin of the words *kiimia,* alchemy and chemistry. The secret prescription for the preservation of mummies is an instance to prove their advanced knowledge in chemical pharmacy. We are getting more and more enlightenment on Mohenjodaro and from the findings that have since come to light; we learn that *Silajit* (mineral pitch) and other drugs have been found there even after thousands of years of oblivion. This definitely shows that this special branch of knowledge had greatly developed also in India.

The art of preserving dead bodies was not unknown in ancient India. In Ramayana, *Ayodhya-khanda,* we find that the corpse of

King DASARATHA was preserved in medicated oil. In *Vishnu Purana* we find that the corpse of MIMI was preserved by being embalmed with fragrant oils and resins.

In *Kasi-khanda*, there is the description of the corpse of a Brahman's mother being preserved in the following manner. The corpse was washed and then embalmed in (यक्षकर्दम *i.e.*, specially medicated balm) and enveloped severally with *Netra-vastra* or flowered muslin, silk cotton, coloured cloth and Nepalese blanketing. The corpse was conveyed in a copper coffin from Rameswaram to Kasi (Banaras).

II. The golden period of Ayurveda, 600 B.C. to 600 A.D. —Pharmacy had reached the scientific stage at this period, as is evidenced by the master-classics of Charaka and Susruta. They evolved the all-comprehensive concept. Charaka declared : —

नानौषधिभूतं जगति किञ्चिद् द्रव्यमुपलभ्यते ।

"There is no substance in the world which is not medicine."

They knew the uses of practically all the known substances, as evidenced by the enumeration in the following verses ; all substances are classified differently in three groups :—animal, vegetable and mineral.

तत्पुनस्त्रिविधं प्रोक्तं जङ्गमोद्भिदपार्थिवम् ।
मधूनि गोरसाः पित्तं वसामज्जाऽसृजामिषम् ॥
विण्मूत्र चर्मरतोऽस्थिस्नामुसङ्गनखाः खुराः ।
जङ्गमेभ्यः प्रयुज्यन्ते केशा लोमानि रोचनाः ॥
सुवर्ण समलाःपञ्च लोहाःससिकताःसुधा ।
मनःशिलाले मणयो लवणं गैरिकाञ्जने ॥
भौममौषधमुद्दिष्टमौद्भिदं तु चतुर्विधम् ।
वनस्पतिस्तंथा वीरुद्वानस्पत्यस्तंथौषधिः ॥
मूलत्वकसार निर्यासनाल (ड) स्वरसपल्लवाः ।
क्षारा क्षीरं फलं पुष्पं भस्म तैलानि कण्टकाः ॥
पत्रानि शुङ्गा कन्दाश्च प्ररोहाश्चोभिदो गणः । च. सू. १. ६८-१२

Honey, milk, bile, fat, marrow, blood, flesh, excrement, urine, skin, semen, bone-sinews, horns, nails, hoofs, hair, down and inspissated bile are animal substances used in medicine.

Gold, ores, the fine metals, sand, lime, red and yellow arsenic, gems, red ochre and antimony are mineral substances used in medicine.

The vegetable group is divided into four classes (the direct-fruiters, creepers, flowery fruiters and herbs). Root, bark, pith, exudation, stalk-juice, sprouts, alkalies, milk, fruit, flower, ash, oils, thorns, leaves, buds, bulbs, and off-shoots are plant products used in medicine. (*Charaka Sutra I* : 68-72).

In addition to the above classifications, clear instructions are given regarding the kind of country, season and climate for the collection of herbs, selection of herbs and the methods of storage.

Regarding country, we have detailed descriptions in *Charaka Kalpa, 1* : 8.

त्रिविधः खलु देशः जाङ्गलः, आनूपः, साधारणश्चेति ।

"Place or clime is of three kinds :—*Jangala* or arid land, wetland and ordinary land." Then follows a description of the three kinds of land.

तत्र देशे साधारणे जङ्गले वा यथाकालं शिसिरातपपवनसलिलसेविते समे सुचौ प्रदर्शिणोदके श्मसान - चैत्य - देवयजनागार-समा - श्वभ्राराम - वल्मीकोषरविरहिते कुसरोहिषास्तीर्णे स्निग्धकृष्णमधुर मृत्तिके सुवर्णवर्णमधुरमृत्तिके वा मृदावफालकृष्टेऽनुपहतेऽन्यैर्बलवत्तरैर्द्रुमैरौषधानि जातानि प्रसस्यन्ते ॥ (च. क. १, ९.)

Of them the herbs that grow in the ordinary or *Jangala* land, which are subject to normal seasonal cold, sun, wind and rain, which have grown on level and clean ground with water on its right side, where burial grounds, sacred tombs, places of sacrifice to gods, places of assembly, pits, pleasure gardens, and ant-hills and saline soils are not present in the vicinity, where the sacred and the ginger grasses grow, whose earth is black and sweet or golden and sweet, which has not been ploughed up or in any way damaged or devastated by sturdy trees growing over it ; the drugs growing in such land are commended as good.

Regarding the season and time of collecting the herbs *Charaka* says in *Kalpa-sthana, 1* : 10. "Of them such drugs should be culled as were put forth in their proper season and have attained their fulness of growth, taste, potency and smell....."

In this verse detailed descriptions are given as to how and when the herbs should be culled.

तेषां शाखापलाशमचिरप्ररूढं वर्षावसन्तयोर्ग्राह्यं, ग्रीष्मे मूलानिशिशिरे वा शीर्णप्ररूढपर्णानां, शरदि त्वक्कन्दक्षीराणि, हेमन्ते साराणि, यथर्तु पुष्पफलमिति ।

Of them again the branches and leaves which have recently grown should be gathered between the rainy season and the spring. The roots should be gathered in summer or in winter, from trees whose ripened leaves have been shed ; the bark, bulb and milk of plants in the autumn and the pith at the end

of autumn (*Hemantharithu*), and the flowers and fruit in their proper seasons.

Minute instructions regarding the selection of drugs are given in detail in *Charaka's, Chikitsa-sthana, 1* : 38-40.

ओषधीनां पराभूमिर्हिमवान् शैलसत्तमः ।
तस्मात्फलानि तज्जानि ग्राह्येत्कालजानि तु ॥
आपूर्णरसवीर्याणि काले काले यथाविधि ।
आदित्यपवनच्छायासलिलप्रीणितानि च ॥
याम्यजग्म्यान्यपूतीनि निर्व्रणान्यगदानि च ।
तेषां प्रयोगं वक्ष्यामि फलानां कर्म चोत्तमम् ॥ च. भि. २१२-३८-४०

"The best of habitats for medicinal plants is the Himalayas, the most majestic of mountains. Fruits grown in the Himalayas are therefore, to be properly culled every season, while rich in juice and potency, mellowed by the sun, wind, shade and water, not pecked by bird or beast, unspoiled and unmarked with cuts or diseases. We shall now describe the modes of administration and the excellent effects of these fruits."

Very valuable instructions are given in *Charaka's Kalpa-sthana,* 1 and 2, regarding storage of herbs.

गृहीत्वा चानुरूपगुणवदाजनस्थान्यागारेषु प्रागुदारेषु निवातप्रवार्तकदेशेषु नित्यपुष्पोपहारबलिकर्मवत्सु, अग्नि-सलिलोपस्वेद-धूम-रजो-मूषक-चतुष्पदामनभिगमनीयानि स्ववच्छन्नानि शिकयेष्वासत्य स्थाययेत् ।
च. क. १-११.

Having thus been culled and placed in suitable containers, they should be stored in houses with doors opening to the east or the north. Translation in a room which is windless except for one window, in a house where every day flower-offerings and sacrifices are made and which is proof against fire, water, moisture, smoke, dust, mice and quadrupeds. The vessels should be well covered and kept securely tied in swings.

In order to ascertain the action of the drugs on the human body, the great sages evolved the five determinants *viz.*, taste (रस), quality (गुण), potency (वीर्य), post-digestive effect (विपाक) and specific action (प्रभाव).

This system enabled them to study thoroughly all the drugs useful in therapeutics. These drugs were chiefly administered through the mouth and hence the arrangement of *Rasa* or tastes came into prominence, the sense of taste playing an important part in the oral administration of drugs. This arrangement and metaphysics of taste in six categories is a speciality of Ayurveda and it has been arranged so as to fit in well

arithmetically with the *Tridosha* theory. The properties and action of inedible drugs were experienced by senses other than that of taste and so a comprehensive scheme of twenty or more kinds of properties was evolved which could be tested by other sense-organs. Some drugs acted more powerfully than usually expected and so (वीर्य) potency of the drug became one of the determining factors. Another peculiarity of Ayurveda is its theory that the drugs while entering the body undergo a process of digestion. As a background to this theory, the concept of Ayurveda that diet and drugs fall in the same category is worthy of attention. The *Upanishads* consider food also as medicine (अन्नं भषेजम्). The difference between diet and drugs is not fundamental, taste is predominant in diet (रसविशेष) while potency is predominant in drugs (वीर्यविशेष), and it is but a natural corollary that just as diet gets digested in the system, so do also drugs. It is on this sound fundamental theory that Ayurveda forbids the administration of a second drug before the first is digested. Thus comes (विपाक) post-digestive effect, the form that a drug is turned into after being digested and its action on the body; these form the subject matter of (विपाकज्ञान) *Vipagagnana.* Last comes the specific action (प्रभाव) of a drug. Even in this modern scientific age, not to talk of the so-called empirical age of knowledge, no scientific explanation can be given for the specific properties of certain drugs, because they are beyond the ken of even the present advances of science. When the knowledge of specific action attains perfection, there will be no need for research but so long as there is scope for research, we must admit that our knowledge is incomplete.

These five-fold deliberations on drugs cover the whole field in a comprehensive way. As Ayurveda has conceived diet and drug as one, the properties and the actions of the substances that comprise our diet have been subjected to the same processes of study and exposition as those of the drugs. This is really a special peculiarity of Ayurveda.

The varieties of preparations.—Charaka in the first chapter of *Kalpa-sthana* declares thus regarding the varieties of preparations:—

नानाविधदेशकालसंभवास्वाद्-रस-वीर्य-विपाक-प्रभावग्रहणाद् देह-दोष-प्रकृति-वयो-बलाग्नि-भक्ति-भाल्य-रोगावस्थदीनां नानाप्रभाववत्त्वाच्च, विचित्रगन्ध-वर्ण-रस-स्पर्शानामुपयोग-सुखार्थमसंख्येयसयोगानामपि च सतां द्रव्याणां विकल्पमार्गोपदर्शनार्थं षड्विरेचनयोगशतानि-व्याख्यास्यामः ।
च. क. १-६.

"Taking into consideration the fact that drugs differ with the type of land, season, source, flavour, taste, potency, post-digestive effect and specification and also that men differ in

regard to their body, morbid tendencies, constitution, age, vitality, gastric fire, proclivities, homologation and stage of disease, we will here describe six hundred purgative preparations that are pleasing in the variety of their flavour, colour, taste and touch although the extent of the possible preparations from these drugs is innumerable." (*Charaka Kalpa, 1 :* 67).

The various processes known to modern pharmacy are nearly all presented in the aphoristic list given by Charaka.

करणं पुनः स्वाभाविकानां इत्याणामभिसंस्कारः । संस्कमो हि गुणान्तरधानमुच्यते । ते गुणास्तोयाग्निसन्नकर्षस्रौचमन्थनदशकालवासनभावनादिभिः कालप्रकर्षभाजनादिभिश्चाधीयन्ते

"Preparation is the process which modifies the natural properties of substances. That process will also modify radically the properties of substances. Such modification is brought about by dilution, application of heat, clarification, emulsification, storing, maturing, flavouring, impregnation, preservation, and also by the material of the receptacle used.

This shows that the art of pharmacy had reached a very high level in those days. The ten different arts described by Sukracharya comprise practically all the processes known to modern pharmacy :—

MEDICAL ARTS

1. मकरन्दासवादीनां मद्यादीनां कृतिः कला ।	The art of preparing flower-juices and other intoxicating liquors.
2. शल्यगूढाहृतौ ज्ञानं शिराव्रणव्यधे कला ।	The art of extracting buried arrows, spears etc., and of the incising of open wounds and blood vessels.
3. हिंग्वादिरससंयोगादन्नादीपाचनं कला ।	The art of cooking different dishes with the various *rasas* combined in different proportions.
4. वृक्षादिप्रसवारोपपालनादिकृतिः कला ।	The art of grafting and planting and the culture of plants.
5. पाषाणधात्वादिहतिस्सदूस्मी करण कला ।	The art of melting and reducing to ashes, stones, minerals and the like.
6. यावदिक्षुविकाराणां कृतिज्ञानं कला स्मृता ।	Knowledge of the preparation of all things that can be prepared from the juice of the sugar-cane.
7. धात्वौषधीनां संयोगक्रियाज्ञानं कला स्मृता ।	Knowledge of the combination of minerals and herbs.
8. धातुसांकर्यपार्थक्यकरणं तु कला स्मृता ।	The art of combining and isolating minerals.
9. संयोगापूर्वविज्ञानं धात्वादीनां कलामृता ।	The science of producing new compounds of minerals.
10 क्षारनिष्कासनज्ञानं कलासंज्ञं तु तत्स्मृतम् । कलादशकमेतद्धि ह्यायुर्वेदागमेषु च ॥	The art of extracting the *kshara-rasa* out of minerals.

शु. अ. ४. प्र. ३. पा. २६०

A full-fledged culinary art will be possible only in India, and the works on (सूदशास्त्र) and (पाकशास्त्र)—the science of cooking—bear testimony to this statement. Even today, India will perhaps stand first in the world in the art of cooking.

The manufacture of sugar was a sort of monopoly in India. When the soldiers of Alexander saw sugar for the first time, they called it sweet chalk. Sugar began to be exported to the West in larger quantities after the twelfth century A.D., but even then it was imported by those countries as a medicine and was available to them at a very high price.

Thirdly, the use of spices, native to the tropical zone is a distinguishing feature of India. Cloves, cinnamon, cardamoms, ginger, saffron etc. were responsible for the foreign invasions of India more than any political or cultural motives. Italy, Arabia, Portugal, Holland and England fought wars, devised strategies and organized plunders in order to capture the spice-market.

Fourthly, the sense of smell which is more keen in the orientals than in the occidentals, has played no small part in the pharmaceutics of our country. The Himalayas carry numerous varieties of sweet smelling flora whereas the Alps abound in flora which are only pleasing to the eye.

Fifthly, a Vaidya always used to be the presiding officer in the royal kitchen.

All these forces together resulted in evolving medicated food which was both medicine and food at the same time. Besides, the practice of administering some medicines to princes and aristocrats varying with their tastes and pursuits of pleasure, gained favour. The abundance of sugar helped in devising varied preparations of wine.

India was quite conversant with the uses of salt. Charaka enumerates fifteen kinds of salt, such as सैन्धव, सौवर्चल, काल, विड, पाक्य, आनूप, कूप्य, वालुक, एल, मौलक, सामुद्र, रोमक औद्भिद, औषर, पाटेयक and पांशुज, They prepared various kinds of alkalies and alkaline salts (क्षार) from vegetable, animal and mineral products.

Preparations of medicated *Ghrita* (घृत) were common in those days and even today *Ghrita* is a special feature of Indian pharmacy. In addition to these special factors, the vastness of the country, the varying seasons, the progress of civilization and the increase in the pursuits of pleasure provided a great impetus to the progress of pharmacy.

The Field of Pharmacology.—

द्रव्यस्य परीक्षा - इदमेवंप्रकृत्यैवंगुणमेवंप्रभावमस्मिन् देशे जातमस्मिन्नृतावेवं गृहीतमेवं निहितमेवमुपस्कृतमनया च मात्रया युक्तमस्मिन् व्याधावेवंविधस्य पुरुषस्यैव तावन्तं दोषमपकर्षन्युपशमयति वा, यदन्यदपि चैवं विधं भेषजं भवेत्तच्चानेन विशेषेण युक्तमिति । च. वि. ६. ७.

"And of that material this is the test: that it is of such and such a nature, of such quality, of such efficacy, is born of such a season, gathered in such a manner, preserved in such a way, medicated thus, and in such dosage administered, in such and such a disease, to such a person, either eliminates or allays such and such a humour. And if there be any other administered medication in a similar manner, should it also be examined." (*Charaka Vimana 8 :* 87.)

Charaka says that medicine is of two kinds :—

भेषजं द्विविधं च तत्
स्वथस्योर्जस्करं किञ्चित् किञ्चिदार्तस्य रोगनुत् ।

"Now medicine is of two kinds: *viz.*, one which promotes vigour in the health, and the other which is destructive of disease in the ailing."

The drugs are therefore, also of two kinds: one that goes for positive health and the other that belongs to the curative group. The group of drugs for positive health are sub-divided into two :-

स्वस्थस्योर्जस्करं यत्तत्द वृष्यं तद्रसायनम् ।

"One is (वृष्य) the virilific and the other is (रसायन) the vitalizer."

On going through the description of these two processes, we are really surprised to find that the ideals and the practical life of people in those days were, indeed very noble and high.

While explaining the word (रसायन) *Rasayana*, Atreya describes the properties of a *Rasayana* as follows :—

दीर्घमायुःस्मृतिं मेधामारोग्यं तरुणं वयः ।
प्रभाववर्णस्वरौदार्यं देहेन्द्रियबलं परम् ॥
वाक्सिद्धिं प्रणतिं कान्तिं लभते ना रसायनात् ।
लाभोपायो हि शस्तानां रसादीनां रसायनम् ॥ च. चि. १-१-८)

"Long life, heightened memory and intelligence, freedom from disease, youth, excellence of lustre, complexion and of voice, optimum strength of body and the senses, utterances that always get fulfilled, the reverence of people, body-glow: all these does a man obtain by the use of vitalizers. The vitalizers are so called because they help to replenish the vital fluids of health." (*Charaka Chikitsa, 1* : 7-8).

What a noble conception of health ! The virilifics were used for the purpose of producing progeny of the highest calibre. Progeny was considered to be the preserver of the traditions, ideals and aspirations of man. The use of virilifics was

recommended solely for this purpose. Moreover, they gave positive health and immunity against diseases and also retarded ageing.

These two superb concepts were held in such high esteem that they came to be recognized as two specialized branches of octopartite Ayurveda.

Atreya has classified the drugs into fifty classes according to their properties and each class contains ten drugs (*Charaka Sutra, 4 :* 8); this is the simplest, easiest and most systematic classification.

न हि विस्तरस्य प्रमाणमस्ति, न चाप्यतिसंक्षेपोऽल्पबुद्धीनां सामर्थ्यायोपकल्पते, तस्मादुभयतिसंक्षेपेणानतिविस्तरेण चोपदिष्टाः । एतावन्तो ह्यल्पमल्पबुद्धीनां व्यवहाराय, बुद्धिमतां च स्वालक्षण्यानुमानयुक्तिकुशलानामनुक्तार्थज्ञानाय । (च. सू. ८-२०

While there is no limit to the number of possible decoctions, a very brief enumeration will not help the physician of limited intelligence ; therefore, we have given an enumeration that is neither too brief nor too expansive. This is quite adequate for the mediocre for all practical purposes in treatment ; and for the highly intelligent who are proficient in the art of inference from innate qualities, this will serve as a guiding principle for a comprehensive knowledge of drugs not mentioned here.

(To be continued).

DIABETES AND TUBERCULOSIS

Before the introduction of insulin, tuberculosis was found in almost 50 per cent of diabetics at post-mortem examination. Dolger points out that the diabetic under treatment is not more susceptible to infections in general than is the non-diabetic. Certain infections, however, especially in the presence of ketosis, appear to find in the diabetic particularly fertile soil, *e.g.*, infections of the urinary tract and staphylococcal infections of the skin. Before the introduction of antibiotics a pneumococcal type III otitis media or mastoiditis was known as a "diabetic otitis." Sosman believed that primary tuberculosis characterized by hilar and basilar lesions could be nick-named "diabetic tuberculosis" because of its prevalence in the diabetic population. Boucot found this to be a reflection of the increased frequency of activity of the tuberculosis in diabetics. The diagnosis of tuberculosis in the diabetic is probably the most important factor in treatment. Early diagnosis is of utmost importance and yet only too infrequent. The onset of the tuberculous process is insidious, as it is in the non-diabetic. The symptoms are also similar but are often clouded by symptoms of the diabetes which has gotten out of control. Early diagnosis must be radiographic diagnosis. One must be on the alert and subject diabetic patients who show a sudden change in insulin requirements or who lose weight, to prompt X-ray examination of the chest. In addition, routine chest X-rays, at least annually, should be done on all diabetics, more frequently in those who are underweight. All too often, among diabetics, tuberculosis is discovered only after the disease has become moderately or far advanced.

Two clinical features of tuberculosis exist more commonly in the diabetic and are probably also related to the greater severity of the disease. One of these is the increased incidence of pulmonary hæmorrhage. The second is the greater likelihood of breakdown of the apparently stable, chronic case.

The best treatment of tuberculosis in the diabetic, of course, is prevention. A programme of adequate nutrition, along with insulin therapy, is of the greatest importance. Weight loss, when necessary, should be regulated at a reasonably slow rate. Fad diets are to be condemned. In addition, general hygienic measures are of utmost importance to the diabetic. Avoidance of known contacts need only be mentioned.

Treatment of both diseases must be aggressive. The beneficial effect of maintaining optimum nutrition with insulin has been stressed by all writers. It is of interest that the good results observed in the status of the tuberculosis, after the diabetes was treated with insulin, led physicians in the 1920's to use insulin in the treatment of the tuberculous non-diabetic. On the other hand, hypoglycæmic reactions also must be avoided because of the danger of aspiration and spread of the lung disease. The diet should be nutritious and relatively high in calories in order to maintain or increase the weight of the patient. Weight loss, even of obese patients, should be postponed until after the tuberculous process is well under control.

As far as drug therapy is concerned, in most cases it is wise to use all three drugs available; dihydrostreptomycin, two or three times a week, PAS and isoniazid in the usual doses are employed. These drugs have little, if any, effect on the diabetes.—*(Journal of the Mount Sinai Hospital*, New York, July-August, 1956).

POSTPARTUM OBSTRUCTION OF THE LARGE BOWEL

After delivery, mechanical obstruction of the large bowel may result from pressure of the enlarged uterus on the sigmoid colon at the pelvic brim. The condition is most common after cæsarean section but may occur after vaginal delivery.

Slight to moderate abdominal distention occurs within twenty-four to forty-eight hours post-partum, and the uterus is immobile in the pelvis. Crampy lower abdominal pain occurs as distention increases; pain soon becomes generalized as the small bowel is affected. Peristaltic waves may be seen passing toward the right lower quadrant. If the mesentery is mobile, cæcal volvulus results; subsequent compromise of the blood supply sometimes causes cæcal gangrene and peritoneal irritation. At this stage, vomiting, and electrolyte imbalance are common.

If obstrution is detected early, the patient is placed in an exaggerated knee-chest position and the uterus is gently moved out of the pelvis by a finger in the rectum, permitting passage of gas. Abdominal pain ceases almost immediately. A rectal tube may be inserted. During the period of acute disturbance, suction through a Levin stomach tube may be instituted to prevent further distention, and intravenous fluids may be given. In most instances, the uterus becomes freely movable in the pelvis within forty-eight hours. Usual post-partum care is then instituted.

If volvulus or cæcal gangrene has occurred, therapy is surgical. A lower laparotomy incision is made, the volvulus is untwisted, and the gangrenous area is exteriorized as a cæcostomy through a separate muscle-splitting incision. Resection may be necessary if gangrene is extensive. The cæcostomy is closed at a later operation.—*(Postgrad. Med., 21*: 231-235, 1957 via *Modern Medicine*, July 15, 1957).

PITFALLS IN THE DIAGNOSIS OF SOME COMMON GYNÆCOLOGICAL DISORDERS*

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THE general practitioner is often confronted with gynæcological problems, and so he has to be conversant with the diagnosis of common gynæcological disorders, in the first instance; and it is only after this resource is exhausted, that a specialist has to be called in for help. Hence a study of the pitfalls in the diagnosis and treatment of such disorders will be helpful.

I. Acute gynaecological emergencies.—1. *Ectopic gestation*:—The characteristic history of atypical amenorrhœa, pain in the lower abdomen and vaginal bleeding are very often mistaken for a threatened abortion, and the case is treated as such for days and sometimes for weeks. Attention to the condition may be missed till profuse intraperitoneal hæmorrhage has occurred and a gradual lowering of the hæmoglobin levels, directs one's attention to the condition. Stress has to be laid on the sequence of symptoms. In ectopic gestation, pain is of a severe, sometimes colicky type, and almost always precedes the hæmorrhage. Secondly, the hæmorrhage is never profuse, but is protracted, and of a brownish tinge whereas in uterine abortion, it is profuse and fresh. In a threatened abortion, bleeding and pain are minimal.

2. *Urinary disturbances* with an ectopic gestation are often mistaken for those due to a retroverted gravid uterus. Tubal abortion with a large pelvic hæmatocele causes reflex dysuria and retention of urine, and the soft boggy mass of clotted blood in the pouch of Douglas is easily mistaken for a retroverted gravid uterus. Attempts at correction of the supposed malposition and even postural methods may be tried, sometimes with an alarming deterioration of the situation. In doubtful cases, examination under anæsthesia and colpocentesis settle the diagnosis. This is very important as in tubal abortion with a pelvic hæmatocele, operative treatment is imperative, while a retroverted gravid uterus, seldom requires operative correction.

3. *Tubal inflammation* can often simulate an ectopic gestation. The symptom of pain and irregular bleeding, together with adnexal masses may be present in both. In ectopic gestation however, the mass is often unilateral, the uterus may be in an anteverted position, and febrile and toxic disturbances are not marked whereas in an inflammatory condition of the salpinx, febrile disturbances are marked, the lesion is often, bilateral, and the uterus is often retroverted and fixed.

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*Specially contributed to the ANTISEPTIC

II. Infertility.—It is often not realized that the female is responsible for 30% of cases of infertility, the male for another 30% and both for yet another 30%. The male partner therefore, requires investigation as well as the female.

The commonest pitfalls, which many general practitioners and even specialists may fall into, are that the investigation begins and ends with the female and invariably a dilatation and curettage are done; both patient and doctor are satisfied with this. No attempt is made to study tubal patency, and obtain evidence of ovulation by endometrial biopsy or other tests. Unnecessary operations even of a major nature are undertaken on the woman, without an examination of the husband's seminal fluid. The curetted endometrium is rarely sent for a histopathological examination. It is being realized that endometrial tuberculosis is a very important cause of infertility and unless the endometrium is studied histologically a diagnosis will be missed and needless hormonal and other treatment indulged in with no fruitful results.

III. Irregular vaginal bleeding.—Dysfunctional uterine hæmorrhage, also known as functional uterine hæmorrhage occurs most commonly at the two extremes of the sexually active period especially near the menopause. Such disturbances are erroneously considered to be common accompaniments of the menopause and symptomatic treatment is undertaken without a proper gynæcological examination. Most cases of this type might have an organic cause like fibromyomata, adenomyosis or certain rare ovarian tumours, besides that very *important* but much neglected condition of *carcinoma* of the genital tract. No case should be treated as dysfunctional uterine hæmorrhage, until a thorough gynæcological examination including endometrial curettage and biopsy of cervical lesions has been done, and malignancy excluded.

It should be borne in mind, that no irregular bleeding in a female at any age, however trivial, is physiological and therefore, merits thorough investigation. Much valuable time is wasted on symptomatic and empirical treatment with hæmatinics and hæmostatics and the various hormones. By the time, the patient is brought to the specialist, the disease is so far advanced and the patient has become so anæmic that she has become unfit for any useful therapy.

1. *Carcinoma of the cervix*: is one of the most dangerous lesions that may be so missed and therefore, requires special mention. The best part of a year is often lost due to delay by the patient in the initial stages and by the doctor, who institutes symptomatic treatment without a gynæcological examination. A digital and especially a speculum examination and sometimes a rectal examination alone will settle the diagnosis. *Early diagnosis* is the sheet anchor in the treatment of carcinoma of the cervix. The disease is insidious and painless in its onset and hence is neglected by the patient. Pain and distress come late and the whole evolution of the disease is a matter of some 18 to 24 months in all from the commencement of the disease. All cases of irregular vaginal bleeding and leucorrhœa occurring in parous women, particularly those over 30 years call for a most urgent and thorough gynæcological examination, if only for an early detection of cancer of the cervix.

Post-menopausal hæmorrhage is likewise a warning of malignancy, particularly of the cervix, body of uterus, tubes and ovary.

IV. Ovarian cysts and fibromyomata.—An early pregnancy can simulate a small ovarian cyst. In early pregnancy the uterus is very soft, round and cystic and asymmetrically enlarged (Pisca-Wick's sign) due to the extra softening of the site of implantation of the ovum and very often it is mistaken for a cystic condition of the ovary. When in doubt, biological tests and if these are not available, a re-examination after a few weeks will settle the diagnosis.

A distended bladder has eluded many a doctor into a false diagnosis of an ovarian cyst. If it is remembered that no pelvic examination or abdominal examination should be undertaken without emptying the bladder, this error would seldom occur. Large, soft fibromyomata or ovarian cysts may be mistaken for pregnancy and *vice versa*. Particular attention should be paid to the other concomitant signs and symptoms and pregnancy should always be excluded in every case of abdominal tumour, occurring in a woman in the sexually active period of life, if necessary, by a radiological examination.

V. Displacement of the uterus.—A downward displacement of the genital tract can sometimes be missed by failing to examine a woman in the standing posture, very much like one of the herniæ.

Inversion of the uterus may be simulated and masked by a large fibroid polypus and one has to keep in mind that both may co-exist.

Summary.—The above list is not exhaustive, but some of the commonest errors in diagnosis of the common gynæcological disorders have been mentioned, as gathered from personal experience. Careful history-taking and clinical examination are very necessary in gynæcological problems as the symptomatology is often very similar in dissimilar pathological conditions. Particular mention is made of menstrual disturbances and vaginal bleeding which may be due to the most simple disturbance of a physiological function such as menstruation or to the most sinister condition, namely, malignant disease of the genital tract, particularly of the cervix uteri.

A 36 YEAR STUDY OF DISEASES OF THE CHEST ON A UNIVERSITY CAMPUS

A total of 7,640 students and faculty members were examined for chest conditions at the clinic for the diagnosis and treatment of tuberculosis and other diseases of the chest at the University of Minnesota Students' Health Service between 1920 and 1956. Many of these persons showed no evidence of clinical disease, 86 had bronchiectasis, 8 had pulmonary cysts, 98 had spontaneous pneumothorax, 545 had pleural adhesions, 19 had sarcoidosis; and chronic hypertrophic emphysema was observed in a few persons. The diagnosis of reinfection or a clinical type of pulmonary tuberculosis was given to 1,063 persons. Students of nursing and medicine made up a major portion of those with clinical tuberculosis. Tuberculin-testing of students entering these schools quickly screened out those who had not previously been infected with tubercle bacilli, and periodic testing of these persons promptly identified those who became infected while in school. Periodic examinations of medical and nursing students as well as those in other schools and colleges on the campus including tuberculin testing, and roentgenograms of the chest were made from the time they entered the University until graduation. The effectiveness of these methods was remarkable.

The opinion, which has long been held, that primary tuberculous infections are much more serious when acquired in adulthood rather than in childhood has *not* been substantiated by the authors' observations. Students who become infected while in school and after graduation tolerated the infection in the same manner as those infected as children. When it was realized that only gross lesions cast demonstrable shadows with adequate consistency, the tuberculin test was recognized as the most important diagnostic agent. This alone justifies the diagnosis of primary tuberculosis. The 1,063 persons with diagnosis of tuberculosis fell into 2 groups. The first group included those who had clinical disease before entering the school. The lesions were well controlled in many of them, while others were still under treatment. Because tuberculosis is a notoriously relapsing disease, a close check was kept on all students entering the university after having had clinical tuberculosis, although they had apparently recovered. For tuberculous students under their jurisdiction, the Veterans Administration supplied reports of periodic examinations. For students previously treated in local sanatoria or by private physicians, periodic reports were requested from the sanatoria or from the private physicians. The second group of students with clinical tuberculosis were those who were first found to have the disease on entrance or those in whom it developed while they were on the campus. Between 1934 and 1955, there were 218 entering students who had been previously treated for pulmonary tuberculosis. When their conditions were originally diagnosed, 85 had minimal disease and 133 had advanced disease. During the same years, tuberculous lesions were found in 277 students on admission or while they were in school. Of these, 229 had minimal disease and 48 had advanced disease when it was first detected.—(*Jour. Lancet*, 77: 117-128, April 1957 Minneapolis via *J.A.M.A.*, 6-7-'57).

FUN OF MEDICINE

To me the real charm, the real joy, the real fun of medicine lies in 4 things: *first*, the rapid progress, in which we share or are professionally damned; *secondly*, the complex and baffling nature of any patient with any disease; *thirdly*, the human relationship of the doctor and the patient; and *fourthly*, the relations of the doctor with other doctors, part of which is the maintenance of professional ideals of medicine.—(via *Current Medical Digest*).

CLINICAL TRIALS WITH RASTINON (D 860, TOLBUTAMIDE) IN DIABETES MELLITUS*

A Report on 102 Cases Treated with this Oral Antidiabetic Drug

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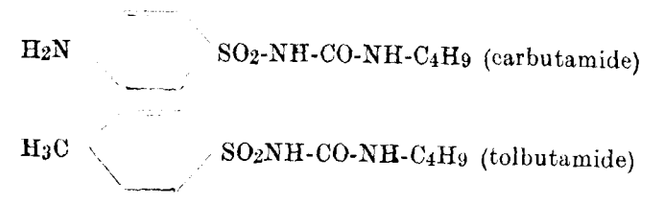
SEVERAL months have elapsed since the advent of oral hypoglycæmic drugs for use in diabetes mellitus. Since the discovery of BZ 55 (carbutamide), constant research has been carried out for improving this drug; this has resulted in the availability of Rastinon (D 860, tolbutamide) for use as an oral antidiabetic drug with minimal toxic reactions.

Tolbutamide is chemically 1-butyl-3-p-tolylsulphonylurea and differs from its predecessor, carbutamide (1-butyl-3-p-aminobenzenesulphonylurea) in the fact that a methyl group has been substituted in place of the para-amino group of the latter.



Tolbutamide is a pure white crystalline substance with a molecular weight of 270·34 and dissolves readily in acetone and alcohol and forms soluble salts with alkalies. It is practically insoluble in water. The chemical structure of this compound, with a methyl group instead of the amino group in carbutamide, is considered a definite advantage owing to the absence of any likely undesirable toxic effects on bone marrow and liver in long range therapy which is necessary in diabetes mellitus.

During the last 8 months Rastinon tablets were made available to us for clinical trials on over 100 diabetic patients, and this has enabled me to furnish the following detailed report on the use of the drug in diabetes. In this connection, a brief preliminary clinical report on the use of Rastinon on 40 cases was published about 3 months ago. This clinical trial with Rastinon was carried out in continuation of the previous clinical trials with Invenol (carbutamide) for a period of about 6 months. As a result, the majority of patients who were receiving Invenol before, were later switched over to Rastinon therapy and the results have been assessed.

A series of over 102 patients was subjected to Rastinon therapy and an analysis of the results was considered. Fifty of

* Specially contributed to the ANTISEPTIC.

these patients were already getting oral Invenol therapy while the other 52 patients were fresh cases who did not have any prior oral antidiabetic therapy. The lower age limit was the criterion in the selection of our cases, and all the cases selected were over 25 years of age, juvenile diabetics being carefully excluded in this series. Diabetics with varying durations of the illness ranging from 2 months to 17 years, with previous regular or irregular insulin-treatment for periods of from a few days to 15 years, as well as cases without any prior insulin or dietetic treatment, were included in these clinical trials. Cases with any surgical or serious medical complications and frank cases of diabetic ketosis were not subjected to this oral antidiabetic therapy.

A glucose tolerance test for every patient was done before starting the therapy, and a complete blood examination consisting of R.B.C., W.B.C., differential count and platelet-count was carried out in every case prior to the treatment. Blood cholesterol estimations were carried out in most of the cases and blood urea in a few necessary cases, especially those associated with hypertension or nephropathy. Almost all the patients previously taking Invenol and the majority of patients treated with Rastinon alone were given this treatment as out-patients only, while a small number of patients in the latter series were treated as in-patients. All the patients were prescribed a standard diabetic diet, the importance of dietetic regime being stressed all the time. A post-prandial random blood-sugar estimation at a particular time with simultaneous urine examination was done every alternate day during the first week of treatment, and then once a week, and later once a fortnight. Urine was examined more often qualitatively only for sugar and the results were expressed as +, ++, +++, ++++ and so on. In the light of previous experience with the administration of carbutamide, we concluded that more frequent blood-sugar estimations were not absolutely necessary for the clinical evaluation of the drug, apart from the fact that the parties resent such frequent blood examinations. The W.B.C., differential and platelet counts were frequently checked up during the course of treatment to look for any possibility of development of agranulocytosis or thrombo-cytopænia. Cases where the blood cholesterol values were high were checked up again after some days' treatment to assess the progress of the cases. In many such cases with this treatment, the cholesterol values came down to within normal limits.

In general, we administered the same dosage in the treatment to all cases irrespective of the severity of the diabetic state (as indicated by blood sugar levels) or the age of the individuals or previous insulin administration. We administered, in divided doses, 4 tablets on the first and second days, 3 tablets on the third and fourth days, and 2 tablets daily onwards. In a few cases, however, we tried an increased dosage schedule (6 tablets on the first day, 4 tablets on the second and third days and 3 tablets daily thereafter) to see if this would give quicker results, and we found that the response to this increased dosage scheme was not appreciably different. This has already been reported in my previous article. The maintenance dose of 2 tablets was reduced to 1 tablet in a few isolated instances or increased to 3 tablets daily in many cases according to the response to the blood sugar levels. During the therapy with Rastinon, we found that 3 tablets had to be continued for long periods in some cases to achieve clinical results.

All the patients receiving the drug were constantly checked-up regarding their physical condition and their diabetic state, and were asked to report in case they noticed any unusual symptoms or complications in their illness or any possible untoward effects of the drug.

Therapeutic effects and clinical results.—The clinical results on the 102 patients were assessed separately among the 52 cases treated with Rastinon alone and among the 50 cases who were being treated with Invenol and then switched over to Rastinon therapy. In addition, an over-all assessment of the clinical results of all the 102 cases has also been reported.

In a large number of cases the blood-sugar levels definitely came down to normal or near normal levels in the course of 15 days' treatment with Rastinon tablets, and thereafter these cases continued to maintain near normal levels with the maintenance dose of the drug. Such cases were classed as "*Good Results.*"

In a few other cases the improvement in the blood-sugar levels occurred only after a period of 3 to 4 weeks and the blood sugar levels were not lowered down to normal levels, although they were definitely lower than the levels prior to treatment. Such cases were classed as showing "*Satisfactory Results.*"

In a small number of cases the blood-sugar level failed to show any improvement and was even higher than the previous levels during therapy, and in these cases Rastinon therapy had to be discontinued after a month and the patients had to be given insulin injections. Such cases were classed as giving "*Poor Results.*" In isolated instances patients were started back on Invenol with clinical and biochemical improvement.

In the overall analysis of 102 cases, it was noted that 66·7% of the cases responded successfully and 18·6% improved satisfactorily with Rastinon, while in the remaining 14·7% of cases the drug had to be stopped owing to a complete absence of response.

TABLE I

Showing the Overall Results of 102 Cases

Total No. of cases	Good	Satisfactory	Poor
102	68 (66·7%)	19 (18·6%)	15 (14·7%)

The 15 cases yielding poor results included two diabetic patients of young age below 30 years. One of these actually became worse with Rastinon therapy with marked ketosis and so had to be started on rigorous insulin therapy. During the assessment of therapy we did not attempt any exact correlation between the duration of previous insulin treatment or the duration of disease and the response to the drug, since we had already analysed these facts during our clinical trials with Invenol.

In 3 persons who were getting insulin previously Rastinon itself did not show much improvement. Insulin was administered in smaller doses to supplement the effect of Rastinon and these cases improved quite satisfactorily, and the dosage of insulin necessary for these individuals was definitely much smaller than their original insulin dosage. In one case insulin could be discontinued and the metabolism was stabilized with Rastinon alone. No case of pure renal glycosuria was included in the present series, although a few diabetics with low renal threshold have been included.

We further analysed our cases separately into those who received only Rastinon (52 cases) and those who received prior Invenol treatment and switched over to Rastinon therapy (50 cases). These cases were classed in different age-groups in order to find out the varied response.

TABLE II

Showing the Results of 52 Cases Treated with Rastinon only

Age group	No. of cases	Good	Satisfactory	Poor
Below 35 years ...	4	2 (50 %)	1 (25 %)	1 (25 %)
35 to 45 years ...	12	5 (42 ,,)	5 (42 ,,)	2 (16 ,,)
45 to 55 years ...	25	17 (68 ,,)	5 (20 ,,)	3 (12 ,,)
55 years and above ...	11	8 (73 ,,)	2 (18 ,,)	1 (9 ,,)
	52	32 (62 %)	13 (25 %)	7 (13 %)

It will be seen that in these 52 cases treated with Rastinon, 32 cases (62%) responded quite successfully and 13 cases (25%) improved satisfactorily while the remaining 7 cases (13%) failed to respond.

Among the 50 cases, of whom 40 were fully controlled and 10 not controlled with Invenol therapy and who were switched over to Rastinon therapy, the results were as follows :—

TABLE III

Showing the Results of 50 Cases

Previously Treated with Invenol and subsequently Switched over to Rastinon

Age group	No. of cases	Good	Satisfactory	Poor
Below 35 years ...	2	1 (50 %)	—	1 (50 %)
35 to 45 years ...	12	8 (67 ,,)	1 (8 %)	3 (25 ,,)
45 to 55 years ...	20	12 (60 ,,)	5 (25 ,,)	3 (15 ,,)
55 years and above ...	16	12 (75 ,,)	2 (12·5 ,,)	2 (12·5 ,,)
	50	33 (66 %)	8 (16 %)	9 (18 %)

It will be clearly manifest from the above analysis that the best response to oral therapy with Rastinon was obtained in the mature type of diabetes met with in older age-groups of 35 years and above, although an occasional younger age-group diabetic also responded to oral therapy. It seems, however, definite that no upper age-limit need be fixed for the use of the drug, and Rastinon may be administered in any advanced age with reasonable success. Out of the ten cases which were not controlled with previous Invenol treatment and which were switched over to Rastinon therapy, one case responded satisfactorily after two weeks' treatment with Rastinon.

During the clinical trials it was observed that although the most successful results were noted by improvement in the blood-sugar levels within 15 days' time, certain cases showed a marked-ly delayed response to the drug. The delay may be as long as 3 months or even more. The blood-sugar-lowering was found to be gradual in almost all the cases and very low blood-sugar levels, less than 80 mg. %, were never observed. The renal threshold level for glucose was also not found to be very much altered in our cases. Discontinuance of the drug for a week or two was tried in a few cases. It was found that in most of these cases the drug had to be restarted sooner or later as otherwise the blood-sugar level increased. However, with the reinstitution of therapy, metabolism was once again balanced.

A few illustrative cases taken from our series are presented below :—

1. Mr. Y., 32 years ; weight 112 lbs., with diabetes of 8 years' duration ; history of bronchial asthma during childhood ; G.T.T. blood-sugar levels between 202–357 mg. % ; was subjected to Rastinon therapy in the usual manner. The post-prandial random blood-sugar level gradually came down to 153 mg. % in two weeks' time and thereafter further settled down to near about 130 mg. % ; weight increased to 116 lbs. after three months'

control of the diabetic state. This was a case of good response to the drug in an young individual of minimal weight.

2. Mrs. M.N., 52 years; weight 147 lbs., with a history of diabetes of 15 years' duration; was taking large doses of insulin regularly for over 8 years (160 units for a day) without any reasonable control of the diabetic condition. This patient showed marked nephropathy and raised blood cholesterol (300 mg. %). The G.T.T. levels were between 350 and 600 mg. %. After the institution of Rastinon therapy with small doses of insulin, the blood-sugar level settled down to round about 210 mg. %. The insulin dose (40 units lente insulin) had to be continued for a reasonable control of the diabetic state. The nephropathy improved along with improvement of patient's general condition. This was an unusual complicated case of diabetes mellitus which was unresponsive to massive doses of insulin which, however, responded satisfactorily to Rastinon with added small doses of insulin.

3. Mrs. T.B., 39 years; weight 114 lbs., with diabetes of 3 years' duration and history of epileptic fits since 9 years, with G.T.T. levels between 294 and 395 mg. %, was started on Rastinon therapy. Even after a period of 6 weeks no noticeable improvement in the blood-sugar levels was noted, and so injection of 20 units lente insulin was ordered along with the tablets and later the insulin was gradually withdrawn, and within a period of over 4 months the blood-sugar level was lowered and maintained at normal levels (round about 160 mg. %).

4. Mrs. M.N.R., 65 years; weight 142 lbs., with diabetes of 14 years' duration with irregular insulin therapy (once in a way) and G.T.T. levels between 224 and 355 mg. %, was subjected to treatment with Rastinon. Even though no improvement was noted after a month, the patient insisted on continuing the therapy and after a period of over 3 months the blood-sugar levels did settle down round about 168 mg. %.

The two cases Nos. 3 and 4 illustrate that a very much delayed response to the drug is possible and negative results may be ascertained only after a long period of treatment provided there is no contraindication to the use of the drug over long periods.

5. Mr. L.C., 39 years; weight 264 lbs., with diabetes of 8 years' duration; G.T.T. 150–250 mg. % with marked hypertension and nephropathy, was subjected to Rastinon therapy. Blood-sugar levels came down only to 210 in about a month's time and remained round about this level. This was only a satisfactory response to the use of the drug in a patient who had kidney damage.

During the course of therapy no serious toxic effects of the drug were noticed in any of the cases. In two cases allergic skin manifestations of the nature of erythematous skin rashes with urticaria were noticed and antihistaminics did not ameliorate the condition, and so the drug had to be discontinued. In these two cases, however, the diabetic condition was well controlled (post-prandial random blood-sugar between 100 and 150 mg. %) and the patients were on the maintenance dose of the drug (two tablets a day) for over a week. Although they were instructed to report to us regularly once a week, they came to us only once, when the random blood-sugar and the blood counts were within normal limits; they did not turn up afterwards.

In our series of 102 cases the W.B.C. and platelet counts did not show any appreciable change at all. No disturbances of kidney or liver functions were noticed during this therapy. Hypoglycæmic symptoms of a mild nature were noticed only in isolated instances.

The patients felt subjectively improved in their diabetic condition especially in those cases where the blood-sugar levels came down and remained normal. The polyurea and polydipsia improved. Also pruritus promptly improved in many cases. Even diabetic nephropathy showed some improvement in many cases after the institution of this therapy. An increase in body-weight was noted in a few instances.

Tolbutamide—carbutamide: comparison of clinical results.—After the wide use of carbutamide and the subsequent use of tolbutamide, we were able to record a few differences in our clinical experience with the two drugs.

1. In view of the absence of para-amino group, tolbutamide is bound to be less toxic than carbutamide, and our experience has confirmed this. Tolbutamide can, therefore, be given for prolonged periods in even higher dosages.

2. It was noted that carbutamide produces a quick fall in blood-sugar levels in responsive cases, while with tolbutamide the fall is very gradual and appears to be more physiological. Further very low blood-sugar levels (as low as 39 mg. % or too low for estimation) were observed with carbutamide therapy, while with tolbutamide such results were never observed.

3. During carbutamide treatment, the renal threshold for glucose was never raised; on the contrary, we gained the impression that in a few cases the threshold level might have been lowered. This was never found to be the case with tolbutamide.

4. A state of euphoria and well-being irrespective of improvement of blood sugar levels seen with carbutamide, probably due to a central action, seemed to be absent in tolbutamide therapy.

Site and mode of action.—Although the hypoglycæmic effect of these sulphonylureas has been definitely established, their

mode of action is still not well-known. The theory of the alpha cells or glucagon being involved in the hypoglycæmic activities of the sulphonylurea preparation has been definitely negatived by clear studies on these cells. The action of these drugs on peripheral glucose utilization has also been investigated and found negative. Stefan S. Fajans *et al* have clearly demonstrated that the sulphonylurea compounds do not suppress the pituitary-adrenal system and do not antagonize the peripheral effects of adrenal corticoids and do not block the hyperglycæmic effects of adrenalin or glucagon. No definite potentiation of insulin activity was demonstrated in these cases. The fact that the drug has no effect on blood-sugar utilization and that it produces no effect on blood pyruvic acid and lactic acid levels shows that it inhibits the formation of glucose from the liver, and the site of action on liver metabolism appears to be within the glycolytic cycle somewhere below the level of glucose-6-phosphate. Since it appears that the presence of some insulin or insulin precursor in the pancreas is necessary for the action of tolbutamide, the pancreas plays a definite role in the action of the drug. A direct action of tolbutamide on the formation or release of insulin from the islets of Langerhans seems to be the best explanation for the acute effect of the drug. Anyway these new drugs have definitely thrown new vistas in the metabolism of diabetes and they have definitely stimulated our thoughts and ideas in metabolic studies much more than they really would stimulate the beta cells to produce insulin, if they do so at all.

Conclusions.—As a result of our extensive clinical trials with carbutamide and tolbutamide, we have gained the following impressions on the use of the drugs :—

1. It is definite that tolbutamide must be much less toxic than carbutamide owing to the absence of the amino-group and hence it is eminently suited for prolonged administration in a disease like diabetes mellitus.

2. Tolbutamide is a definite oral hypoglycæmic agent and, although its blood-sugar-lowering action is very gradual and slow as compared with carbutamide, it appears to exert its action in a more physiological manner and hence is a more suitable anti-diabetic drug.

3. Like carbutamide, tolbutamide shows best response in the mature type of diabetes. But excessive weight and obesity are not necessary for the success of therapy with Rastinon. Any case with mature type of diabetes in persons over the age of 30, of any duration or previous insulin therapy seems to be worth a trial.

4. Diet still remains the basis of treatment of diabetes mellitus even after the advent of this oral therapy. A change

to liberal diet in well-controlled cases with tolbutamide produces, however, an imbalance in the metabolism. Although in well-controlled cases the drug can be discontinued for short periods, an uninterrupted maintenance therapy seems to be ideal. We feel that there are at least quite a few cases of diabetics whose metabolism was controlled better under oral medication than with parenteral insulin. This leads us to surmise whether there is certainly a difference between the actions of endogenous and exogenous insulins.

5. We gained the impression that these drugs are particularly suitable for cases of diabetes mellitus with cardiovascular complications like congestive failure, angina pectoris or coronary insufficiency, since such patients react badly to insulin. In some cases of cardiac decompensation, tolbutamide became less effective when the decompensation improved, and accordingly an increased dose of the drug or insulin was found necessary. This is probably due to the congested liver keeping down the hyperglycæmia to a certain extent.

6. Cases with marked ketosis or pre-coma state or severe surgical complications must be considered unsuitable for this oral form of diabetic therapy. Once these complications are controlled, the patients may be switched on to Rastinon therapy along with or without insulin.

7. The effect of the drug as noticed by the lowering of the blood and urine sugar levels often appears within the first two weeks, although it may sometimes be delayed as long as two or three months. The usual maintenance dose of the drug appears to be two or three tablets, although an increased dosage has been advocated by some. Prolonged use rather than increased doses of the drug in resistant cases seems to yield the desired results.

8. The effectiveness of sulphonyl ureas in lowering the blood-sugar levels and testing the responsiveness of the diabetic patients to D 860 by a 1 g. intravenous sodium Orinase (D 860) test has been described by Braverman, Drey and Sherry (1956). In this test, diabetics who subsequently responded to oral D 860 therapy showed an average 2-hour fall in blood-glucose of 26% following the test dose with sodium Orinase. According to these authors, diabetics who have a much smaller response to this intravenous screening procedure do not respond to oral D 860. We did not use this screening test but we observed that the effect of the drug may be quite delayed in many cases (*for example*, cases 3 and 4 reported above), and we wonder whether such a test would be reliable at all. Hence sulphonyl-ureas can be used without hesitation in any moderately severe case of diabetes and the results watched.

9. The advent of the new oral antidiabetic drugs has really stimulated our thoughts regarding the metabolic changes in diabetes mellitus. Since this drug is relatively free from any major side-effects, it may find wide application in the therapy of diabetes mellitus. It is hoped that still more improved drugs are likely to be discovered and likely to prove ideal in oral antidiabetic therapy, which doctor and patient are keen to have.

Summary.—A clinical trial with Rastinon (tolbutamide) was carried out in 102 cases out of which 50 cases were previously taking the oral antidiabetic Invenol (carbutamide) and were later switched over to Rastinon. The remaining 52 cases did not have any prior oral antidiabetic therapy and were treated fresh with Rastinon.

An overall success rate in therapy with good results in 66·7% of cases and satisfactory results in 18·6% has been recorded.

A comparison and distinction between the use of tolbutamide and carbutamide has been made and tolbutamide was found to be a definitely advantageous preparation over carbutamide.

The subjective improvement and the minimal side effects noted have been mentioned along with the theories and data of the mode and site of action of the drug.

Our own observations and conclusions on the use of the drug have been set forth.

I wish to thank the Dean, Dr. C. K. Prasada Rao, M.D., for granting permission and facilities for the clinical trials of the drug. I acknowledge with thanks the unfailing and continuous supply of Rastinon tablets for clinical trials by Messrs. Hoechst-Fedco Pharma (Private) Limited. I also wish to thank Dr. Sam G. P. Moses, B.Sc., M.D., and Dr. N. L. Kantha Rao, M.B., B.S., for their great help in carrying out the clinical trials and Dr. S. Kandaswamy for the biochemical tests.

NOTE :—*As this article was going to the press, the "British Medical Journal" of August 10, 1957 was made available to us and we note that the findings of the British authors on Tolbutamide are in accordance with ours, especially with regard to the "delayed type of response" to the drug.*

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TREATMENT OF MUMPS ORCHITIS with a corticosteroid produces rapid remission of local and systemic symptoms. George W. Zeluff and Fatherree of Baylor University, Houston, administer 20 mg. of ACTH intramuscularly four times a day. If treatment is begun early, residual testicular damage may be prevented. (*Ann. Int. Med. 46* : 852-856, 1957 via *Modern Medicine*, July 13, 1957).

ACUTE ABDOMINAL EMERGENCIES *

(Management of common conditions)

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THE abdomen has been described as a 'temple of surprises' and even after centuries of research and volumes of reports it remains so. John Morley, discussing 'Abdominal Emergencies,' described them as acute emergencies of spontaneous or non-traumatic origin. Such emergencies have taxed the ingenuity of surgeons through ages. In the past decade, the introduction of antibiotics, newer ideas of electrolyte and fluid therapy, advances in anæsthesia and improvements in surgical technique, have greatly improved the overall picture.

DIAGNOSIS :—*Symptoms and signs* :—The dominant symptom in any abdominal condition is pain. And, probably nowhere else, is there greater need for a careful analysis of the history and the application of a sound knowledge of the physiology of pain, than in the diagnosis of the acute abdomen. The diagnosis is made more often by a proper evaluation of the history and physical signs than through laboratory assistance.

Abdominal pain may be defined as any deep pain felt in the anatomic boundaries of the abdomen. Kellgren emphasized that it is important to remember that although it commonly arises from abnormal conditions of the abdominal viscera and peritoneum, this is not invariably so ; lesions of the chest like basal pleurisy, of the spine like tabes dorsalis and of the abdominal wall are frequently the cause. Another important fact about the pain is that better-localized pain is from the more superficial body structures of which we are conscious as a result of the daily experience of palpation and movement, whereas, diffuse pain is obtained from the viscera and deep-lying somatic structures of which we are normally unconscious. This diffuse pain is projected to the region of those deep structures in which pain is well localized, and which are enervated by the same spinal segment which enervates the stimulated structure.

Such pain always has certain associated phenomena, muscular rigidity being one of them. It follows the pain closely in intensity, so that with intermittent colicky pain the abdominal wall can be felt to harden with each spasm and later to relax as the pain subsides. Continuous pain gives rise to continuous contraction. Rigidity is not peculiar to abdominal disturbances, but is most intense when produced by stimulation of the parietal peritoneum or pleura. Often the abdominal pain is associated with visceral disturbances and skin tenderness. Of greater importance is the referred deep tenderness. This isolation of

* Specially contributed to the ANTISEPTIC.

the deep tender spot is of paramount importance in localizing the site of the lesion. It should not be confused with referred tender spot. Pressure on the deep tender spot causes increase of the whole pain-symptom complex, which is not the case with referred tender spots.

General observations.—General signs of temperature, pulse and blood-pressure are of paramount importance particularly when observed for a certain length of time. The maxim should be to "watch and see and not "wait and see." The main decision to arrive at is whether the lesion is obstructive or inflammatory, or a combination of both. This decision again depends on the patient's own account of pain, with special attention to the mode of its onset, distribution, intensity, continuity or its intermittent character, and on the presence or absence of associated tenderness on palpation and muscular rigidity.

Ancillary aids.—Ancillary aids to the surgeon are (*i*) the blood-picture, (*ii*) skiagraphy of the abdomen and (*iii*) paracentesis of the abdomen. A finding of leucocytosis with polycytosis in the blood-picture points towards an inflammatory lesion. Skiagraphy, in expert hands, gives information not only of obstruction or infection but will also localize the obstruction to a fairly accurate area. Some suggestive signs of strangulation, have also been described. The conditions for such accurate judgement are a flawless skiagram (Scout film in various positions) and an experienced eye; both of them are not however, easily combined. Faily once said, "actually I have derived but little aid from this form of radiography."

Of greater import is a diagnostic paracentesis in cases of acute abdomen. The method is not as dangerous as it may seem at first sight. Under local anæsthesia or even without anæsthesia a needle may be introduced into the abdominal wall at a point which is dependent and most likely to collect reactionary fluid. The bowel is not easily punctured even when the needle is manipulated inside. Even if the bowel gets punctured no harm would result. A Potters needle, which has an aperture a little away from the tip, if available is useful. The examination of fluid obtained gives a variety of information (*Clearance 1954*). Blood aspirated from the peritoneal cavity does not clot because it gets defibrinated and points to a hæmorrhage inside. Blood, which clots, may have been drawn from an inadvertant puncture of a vessel in the abdominal wall. Hæmorrhagic dark fluid may point to a strangulated bowel. A similar fluid is obtained in acute pancreatitis. This fluid has a raised amylase content even after the serum amylase content has fallen to normal (*Keith*). A perforated ulcer produces a cloudy, purulent fluid. The bacteriology of the fluid may be studied to decide the proper antibiotic therapy to adopt. A few common conditions will now be discussed.

1. *Acute appendicitis*:—Of the inflammatory conditions of the abdominal viscera, acute appendicitis heads the list; as in acute appendicitis, so in other acute conditions, there has been a tendency for variation of symptoms because of the use or abuse of antibiotics. Because of the early use of antibiotics, often in inadequate doses, the clinical picture has often been misleading. The pulse, temperature, other local signs and often the blood-count, may sometimes be difficult to interpret. The following example clearly emphasises the point:

K.G., aged 17 years, was admitted for an acute attack of pain in the abdomen, 36 hours after onset. The pain had a tendency to localize in the right lower abdomen. He had vomited only once. The pulse rate was 76 per minute and the temperature was normal. The abdomen showed a deep tenderness in the right iliac fossa. There was no rigidity. He had already had 15 lac units of crystalline penicillin intra-muscularly in divided doses of 5 lac units at 12 hourly intervals. Rectal examination showed some tenderness in the right pelvic region. The total white count was 10,000 with 70 per cent polymorphs. Even in the absence of unequivocal signs of acute inflammatory lesion, it was thought safer to explore. An extremely angry-looking appendix was removed. The tip was near about bursting. Thus, there was complete disparity between the signs of the case and the pathology revealed; such examples can be multiplied, and it is thus clear that physical signs may be misleading. Often because of the cover of antibiotics, the general reaction of the inflammatory lesion may be masked. In such circumstances, it is obvious that it is better to err on the side of exploration than on the side of conservatism. The procedure assumes greater importance in our country where there is a peculiar hesitancy towards operation and even if the patient improves by conservative therapy, he may not turn up on the appointed date for lab appendicectomy.

Often, there has been too much reliance on antibiotics Montgomery pointed out that chemotherapy and antibiotic therapy help better where a definitive surgery has been performed and the source of contamination removed, but where the conservative method was practised, antibiotics did not seem to lower the mortality appreciably.

In children.—Ochsner of Chicago (of the Ochsner-Sterren regime) insisted that the delayed treatment should not be employed in children. This does not imply that adequate time should not be allowed in correcting dehydration and keeping the patient in the best condition for operation. Ladd, whose experience in this field is unrivalled, confirms this view. What is true of children is probably equally true of old people.

Appendicitis with peritonitis.—Ochsner framed his famous method of treatment for such cases. There is plenty of evidence that some cases of this type respond favourably, for his method aims at aiding nature to transform the diffuse peritonitis into localized infra-umbilical or pelvic collection of pus that can be removed by simple drainage. But this desired process does not occur in all cases with the advent of antibiotics and there has been no appreciable reduction in mortality or morbidity with this procedure but the results of definitive surgery have greatly improved (Baily). It has been shown that drainage of the peritoneum alone without removal of the offending appendix, before localization of the peritonitis, has rarely saved the patient's life. In some instances it might even have hastened the end. On the other hand, the expeditious removal of the appendix in such cases together with supra-pubic drainage has given extremely satisfactory results. Antibiotics have helped surgery but not replaced it. Thus, except in very delayed cases where it is thought that the appendix must be buried in such dense adhesions so as to make removal almost impossible, the removal of the appendix is the safest procedure. By such a regime, the mortality of unperforated appendix has been brought to near about zero and in cases with perforation, to about 5 per cent. Montgomery emphasizes the superior role of surgery and considers antibiotics to be only supportive in value.

Acute salpingitis and diverticulitis.—These are conditions similar to appendicitis and are often confused with it. While the decided line for acute salpingitis is conservative, except in cases of pyosalpinx where excision is the better procedure, diverticulitis should be treated on the lines of acute appendicitis. Often, after opening the abdomen for acute appendicitis the appendix may be found to be normal. In such cases, apart from the removal of appendix, the tubes and diverticulum must be searched for and dealt with as outlined above.

Perforated peptic ulcers.—The symptoms and signs of this condition are unmistakable. The only confusion which may arise is with a perforated appendix. In doubtful cases it is better to open the abdomen first by a grid-non incision and remove the appendix if it is perforated. If not, the removal of the appendix is still advisable. However, in such a case the abdomen has to be opened anew in the upper part and the perforation sought for. The classical method is a simple closure of the leak. With the availability of powerful antibiotics and newer anæsthetic techniques, surgeons have been encouraged to perform gastric sections at the same time. After a comparative study, Benjamin F. Byrd Jr. has found that simple closure of peptic ulcer gives better results than definitive surgery at the same time. It has been shown that the ulcer may heal after simple closure or if a need for section arises the mortality in late section is much lowered.

Acute cholecystitis.—Acute cholecystitis is not an indication for immediate operation (Baily). As a rule watchful inactivity during the attack and a late cholecystectomy are safer. The patient must be put on rest, antibiotic and intravenous fluid therapy. Antispasmodics and sedatives in liberal quantities are needed. Intra-gastric suction lessens the patient's discomfort. The danger of perforation on such a regime is infinitely small. A return of pain, and vomiting and a rise in the pulse-rate indicate failure of the treatment. In such cases operative procedure has to be resorted to. Cholecystostomy and drainage after removal of stones is less shocking and is often the maximum that a weak patient can withstand, However, this procedure leaves the greatly swollen walls of the gall bladder, swarming with streptococci, and does not relieve the patient of septic infection. In the case of patients in a better condition, the rational procedure of choice is cholecystectomy either classical or by the Thorek method which leaves a portion of the gall-bladder wall attached to the liver surface. The mucous membrane of the gall bladder piece left is destroyed by electro-coagulation. With the advent of antibiotics a swing towards major surgery has been noticed. In perforation of the gall bladder, usually the patient's general condition is too weak to permit of anything more than simple drainage.

Acute-pancreatitis.—Considered opinion is now in favour of non-operative treatment in severe cases. Glucose is omitted in intravenous infusions ; if a localized abscess is formed it must of course be drained.

Acute-peritonitis.—If the cause is not ascertainable by physical examination and ancillary aids, it is better to open the abdomen. Often, a perforated appendix is found and may be removed. In other cases the cavity may be drained and according to the bacteria detected in the pus, vigorous antibiotic therapy may be instituted. Supportive intravenous fluid therapy is of great importance. Intra-gastric suction relieves distention. Calcium pantothenate, given in booming doses by the intra-muscular route every 8 to 12 hours, lessens distention and relieves paralytic ileus in primary peritonitis and in ileus of the post-operative period.

Intestinal obstruction.—Intestinal obstruction accounts for a large number of cases of acute abdominal emergencies. The classical symptoms are pain, vomiting and absolute constipation with distention. The signs may be distention, visible peristalsis and fluid in the abdominal cavity. It is important to distinguish mechanical obstructions from paralytic ileus. It is in these

cases where a distinction has to be made between simple mechanical obstruction and strangulation on the one hand and peritonitis and paralytic ileus on the other, the help of a 'scout film,' abdominal paracentesis, blood count etc. are helpful. John Morley emphasized that recognizing the presence of acute obstruction is far more important than guessing its precise cause which is often discovered only at operation.

In the presence of intestinal distention which is often present, the modern tendency is to decompress the obstructed intestine by gastric or intestinal aspiration. It is a common experience that many a patient with acute obstruction, has been drowned in his own vomit during the operation owing to neglect of this little precaution. It is a good rule not to allow the patients to reach the operation table without a Ryle's tube above and a flatus tube below.

A small thready pulse, cold extremities and sunken features will show that the circulation is failing owing to the loss of water and chlorides from the blood. The blood volume must be restored by an intravenous drip of normal saline for two or three hours. This active watchful delay of 2 or 3 hours not only gives time for observation and better chance of diagnosis but also reduces the surgical risk to the patient.

The extent of surgery to be performed on such cases depends on the cause of obstruction and the general condition of the patient; with a better control over the patient's general condition, there has been a tendency for curative surgery. Thus for lesions of the right colon, a hemicoliotomy may be performed. In weaker patients the least is undertaken. Short-circuiting of an obstruction, exteriorization of the gangrenous loop, or even iliostomy may be life-saving.

Volvulus of sigmoid and often of the small intestine is found to be the cause of obstruction. An unduly long mesentery and peculiarities in dietetic habits have been held responsible for this frequency of volvulus in Indians by Sir Henege Ogilvie. Wilms (1906) has pointed out that with a long pelvic loop a physiological volvulus of 180° may occur without symptoms and is the starting point of the clinical attack.

In children the common cause of intestinal obstruction is intussusception. It is early recognized because of bouts of intermittent pain, a sausage-shaped lump and blood on the examinating finger per rectum.

In the treatment of intussusception, hydrostatic pressure, a form of therapy elaborated and refined by Australian surgeons, has given excellent results in infants. Saline is injected into the rectum under a 3½ feet pressure-head. The fluid is kept inside for 4 to 5 minutes at a time. On repeating the process the

method may succeed in 60 per cent of cases. In comparatively refractory cases, the Scandinavian technique of barium enlarge and manipulation under fluoroscopy, succeed in another few per cent. The remainder need surgery. In surgery, reduction by milking is attempted; if unsuccessful it is better to do a quick excision and anastomosis than closing the abdomen or doing an *ileostomy*.

Bacteria have assumed a larger role in recent thinking about strangulation obstruction. If bacteria are as important as some suggest (*Blain, Cohn*) proper antibiotic therapy should solve the problem of strangulation. To a limited extent this is true with adequate blood, plasma and electrolysis to support. The major factor however, has been the time-lag after which the patients seek surgical advice. In late cases a chain of pathological reactions is set up which, by itself cause a high mortality even if the bacterial infection is controlled or even eliminated.

Comments.—In the era before the advent of antibiotics, modern anæsthesia, and the blood-bank, many surgeons were afraid of performing extensive and definitive operations on patients who were desperately ill as a result of abdominal catastrophies. Shock was considered a contraindication to surgical intervention; localized peritonitis was considered a reason for avoiding exploration; and the philosophy of the surgeon was to do as little as possible and to hope for the best. With the introduction of improved measures of anæsthesia, blood-banks and antibiotics, surgeons now realize that it is not the operation which causes the death of critically ill-patients but the disease for which the operation is performed. If the operation does not correct the pathology, the patient is doomed and might as well have had no operation at all. The elimination of the source of contamination is most important in the management of acute abdominal emergencies. If this is done, the patient has a better chance of recovery than he has, after a small operation which diverts the local stream but leaves the source of infection inside. Another important, but less realized factor in the mortality from acute abdominal lesions is determined by the time-lag with which a patient responds to the surgeon. In all kinds of emergencies the mortality rises in geometrical proportion after 24 hours of the onset of the condition. This does not require any great improvement in the technique of surgery, nor the search for better antibiotics but needs the educating of the public and the private practitioner who is the first to be consulted. The value of educating the public has been amply demonstrated in Australia where after intensive propaganda, the average time that elapsed before the patient reached the surgeon, was reduced to 17 hours with consequent marked improvement in the results obtained.

Summary.—1. The pathogenesis and clinical value of some of the important signs and symptoms in acute abdomen, have been discussed.

2. Recent trends in the management of common acute abdominal conditions have been indicated.

3. An evaluation of the role of surgery has been made in the light of the newer antibiotics and recent advances in fluid therapy and anæsthesia.

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IMPORTANCE OF THE PATIENT

This tendency for medicine to become too mechanistic, I regard as somewhat objectionable and somewhat, but not entirely, grievous. We doctors ourselves tend to accept too readily a mechanical result without much question and often with a childlike simplicity. Now, I'll admit that some mathematical machines are so stupendous that I would never utter a word against them. But in medicine one is not treating an X-ray film, a chemical reading, or a tracing by a string galvanometer, but a real live human being—the patient. I submit one ought to take an occasional peep at the patient, because we are actually treating the patient. Not only is it necessary to look at the patient as a whole, it is often desirable to look at him from different points of view. At one time a prevailing form of architecture was known as Queen Anne in front and Queen Mary behind. And, indeed, some people sometimes appear differently at different times even on the same day. And I may just whisper that doctor may work better with a live patient before him. Even a hair-do, or its absence, can have significance.—(Roger I. Lee, *The Happy Life of a Doctor*, Little, Brown & Co., 1956 via *Current Medical Digest*, June '57).

ISOTOPES IN MEDICINE: A REVIEW*

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"SCIENCE is like fire, you can burn your house or you can cook your food"; this is true of atomic energy. Our memories are still fresh with the havoc caused by the atom bomb during the last world war. Atomic explosions, caused by bombs bursting over Hiroshima and Nagasaki in Japan which resulted in a tremendous loss of life, will never be forgotten.

The atom is however, no longer considered solely as a weapon of destruction, thanks to Pandits, who have devoted their energies towards harnessing the energy of the atom to the benefit of mankind. Research has now been extended to the use of atomic energy practically in every sphere for the benefit of mankind.

Thus radioactive isotopes, an outcome of atomic energy, are in great use today, and playing a mighty role in research, agriculture, industry and medicine. In the first place they are of great help to research workers and the information gained is passed on to farmers, doctors or industrialists. Food production may be greatly increased by their use in agriculture and by studying the deficiencies in different soils, and in different fertilizers and finding out new fertilizers. Radio-isotopes can be used for food-preservation which will obviate the need for costly refrigeration. Radio-active substances have been used for studies in photosynthesis and for finding out how plants produce their food. If this process can be learnt, then food can be grown artificially by what is called "test-tube" farming. They have also enabled us to understand the mechanism of certain reactions in the body which would not otherwise have been possible.

The history of atomic energy may be traced far back to 400 B.C. when a Greek philosopher Democritus pointed out that things were composed of invisible, indestructible bits of matter. After that, very little was heard of it for twenty-two centuries until John Dalton showed by experiments that elements go to form compounds. He also showed that elements were composed of tiny particles called atoms. Thomson proved the existence of the electron, the negatively charged particle in the atom. The mass and charge of the electron were measured by Millikan, who found the mass of electron to be only about 1/1835 of the lightest atom, hydrogen.

As the atom is electrically neutral, it was thought that there could be something else besides the electron which must be

*Specially contributed to the 'ANTISEPTIC.'

having positive charges equivalent to the negative charges of the electron. It was shown that electron is only 1/40,000 of an atom. So it was questioned about the rest of the mass of an atom. But how to peep into the small space was a problem. Henry Becquerel (1895) answered this by the discovery of radioactivity.

Later on in 1911, Rutherford was able to prove that a positively charged portion of atom, the proton, was a tiny nucleus inside it, even smaller than the electron. Subsequently in 1913 Neils Bohr, Rutherford's student proved that electrons rotate around a nucleus. In 1932 Chadwick discovered neutron, one more component of atom. Carl Anderson, in 1932 discovered a fourth particle of matter, the positron. It is a positive electron with the same mass as electron (which is negatively charged). Lawrence, in the same year invented the new weapon for atom-smashing—the cyclotron.

Credit for the discovery of radium and the cause of radioactivity of uranium goes to Marie Curie in 1898, but Ernest Rutherford, studied the properties of radium and found alpha, beta and gamma rays. Alpha rays cannot penetrate through thin aluminium foil and it has a velocity of 10,000 miles per second. Beta rays can pass through thin aluminium foil but not through the sheet aluminium and they have the same velocity as light. The gamma rays can pass even lead sheet and they are electromagnetic.

The fact that adding or removing a neutron, changes the mass of an atom without affecting its charge furnished the explanation for the different behaviour of two atoms of the same element. In most cases atoms vary in weight. Thus such varieties of elements are called "Isotopes" (*Greek* : *iso*—same ; *topes*—place). Thus isotopes can be defined as elements of same charge but different mass. They are varying versions of a given element. These isotopes may be naturally occurring or artificially prepared. There are also non-radioactive isotopes which are stable. Some elements have both stable and radioactive isotopes. All atoms which as a result of disintegration give off one or more radiations as alpha, beta and gamma are called radio-active.

In 1933, Irene (Curie) Joliot, produced the first artificial radioactive isotope. Since that time hundreds of radioactive isotopes have been formed. Almost every element is now known to have one or more isotopes.

Artificial radioactive isotopes are prepared by exposing stable elements to bombardment with certain subatomic fragments such as alpha particles, protons, deuterons or neutrons. These subatomic particles may be from naturally occurring isotopes or from cyclotron or from a chain-reacting uranium pile. Formerly radio-isotopes were produced in minute quantities in

cyclotron but now they are produced in large quantities in an atomic reactor. There are different types of reactors for different special purposes, such as creation of power, production of radio-isotopes, testing of materials etc.

Radioactivity can be detected by special instruments like Geiger-Muller counter and Scintillation counter. Alpha and beta rays can best be detected by Geiger-Muller counter but it is insufficient for detecting gamma rays. The Scintillation counter has advantage over Geiger-Muller counter in that it makes the detection of gamma radiations possible with much greater efficiency.

Artificial isotopes offer great possibilities in medicine. *Firstly*, they can be used and taken into the body, where it gives off its beneficial radiations, for a few hours or days, depending on the element, then its life is over and no harm is done to the body. *Secondly*, the great advantage of artificially prepared radioisotopes is that, they are chemically the same as the usual element. Thus when injected into the body they behave like the element except that they emit radiations.

Since their discovery artificial isotopes are receiving much attention in the medical world for diagnostic and therapeutic purposes.

As radio-isotopes are harmless and their chemical behaviour in the body is similar to normal elements, the radio-isotopes of food-stuffs, essential minerals, and other substances can be taken and metabolic studies made. One can follow the course and concentration of these substances in blood, urine, bones and other body-tissues and fluids when given to experimental animals. This is the basis of the '*tracer technique.*' The physiological role of certain minerals essential for organic function but which are present in minute quantities in the body has been clearly demonstrated by the isotope tracer methods. Tobias[54] devised a special technique to detect the presence of small amounts of elements such as gold, manganese, iron, zinc, iodine and many others, in tissue samples. This will prove to be of value in trace analysis in the fields of pharmacology and toxicology.

One of the great assets of the radioactive element, is radioautography[10]. The rays emitted can cause changes in photographic films which are similar to those caused by ordinary light. Thus we can have 'permanent records of the exact nature and location of isotopes ; the tissue removed, is cut into thin sections and when exposed to a sensitive photographic emulsion, we get an idea whether the organ has picked up the element or not, and if it has, its relation to the cellular configuration of the organ. Thus radioactive isotopes of calcium, strontium, phosphorus, and iodine have been used to demonstrate their behaviour in the body. This autoradiographic method is also of use in safe-guarding the

individual who may be working with any source of ionizing radiations. A small piece of film in a light-proof special holder is tied over the front of the worker's chest or on his wrist while he is at work and after developing it, one can find out the exact amount of radiation to which that individual has been exposed and if this is found to be more than 3*r* per week the technique should be improved.

Permeability, absorption and distribution studies have been greatly facilitated by the use of the tracer technique. It has enabled us to study the diffusion processes in mammalian erythrocytes especially of sodium ions, where there is no net transfer of sodium ion demonstrable by routine chemical methods. Cohn and Cohn[7] used sodium *in vivo and in vitro* studies (using labelled sodium Na^{24}) and demonstrated that the cells were permeable to sodium ions. They found that concentration of radio-active sodium in cells after intravenous injections, relative to plasma showed a steady increase rising nearly to 80% of the value expected for equilibration. Similarly Harvesy and Hahn[13] carried out certain investigations with rabbit erythrocytes using isotopic potassium K^{42} and demonstrated that the plasma potassium replaced cellular potassium to the extent of about 25%. It has also been indicated by the work of Brooks [1, 2] Mullins[25] etc. that the penetration of ions into the cells is associated with metabolic processes which govern interchange equilibria between extracellular and intracellular ions and that it is not brought about in the living because of some physio-chemical "selective" permeability effect based on membrane potentials.

The tissues in the body are in dynamic equilibrium. The metabolites are continuously passing in and out of the living cells but it is so regulated that the composition or structure of these cells is not ordinarily affected. In order to understand how this happens it is essential to study the interaction in enzyme systems under physiological conditions. This has been achieved by the use of isotopes, undertaking metabolic turnover in relation to the intact organism. Sites of synthesis of various metabolites have also been detected by these studies. An important investigation in this respect refers to studies regarding phospho-lipid synthesis. The understanding of the effect of radiation on the metabolism in the intact organism is one of the important aspects of physiology for a study of which tracer methods have proved very useful.

Isotope technique has made it possible to determine accurately intracellular and interstitial fluid volume (space) of the cells of an organism. The advantage of the isotope dilution method is that the indicator employed can be a normal component of the extra-cellular space, and one not lost perceptibly by metabolism in various organs. Similarly tracer methods have been extended

to the determination of extracellular and intracellular space for all ions of biological interest *i.e.* "Sodium Space," "Chloride Space" and "Bromide Space." These ions are confined mainly to extracellular space and therefore can be used to determine extracellular space.

Experiments have been conducted in animals and synthesis of glycogen, fatty acids and cholesterol from deuterium has been demonstrated in the rat fœtus showing that these compounds are synthesized in the fœtus.[11]

Isotopes of nitrogen, carbon, phosphorus and iron have been extensively used for studies in blood physiology.

The old concept about the life-span of red blood corpuscles which was assumed to be one month was revolutionized by the tracer technique. The average life span of red cells in normal human males and females were found to be 120 days and 109 days respectively.[16] The life span of erythrocytes has also been studied by using N^{15} labelled glycine in diseases like polycythæmia vera, sickle-cell anæmia, perinicious anæmia and it has contributed to a better understanding of these conditions.[19, 32]

The investigation of 'Haem' synthesis *in vivo* and *in vitro* by using glycine labelled with N^{15} or C^{14} is one of the present fields of studies. It is a well known fact that glycine is utilized in the synthesis of hæmoglobin. By using labelled glycine one can determine the rate of formation of hæmoglobin, and thus of red cells and their pattern of destruction without altering the physiological state of the organism. These investigations can be undertaken in normals and in various blood diseases.

A useful isotope in blood physiology is that of iron Fe^{59} (half-life 7 days), which emits both beta and gamma rays. The labelled iron has been used in studies of iron metabolism. We can picture the way of iron uptake of the body by placing the counter on different parts of the body after intravenous injection of the radioactive iron. Rex-Huff[14] measured the rate of iron utilization in the body and its incorporation into the red cells in normal and pathological conditions like refractory anæmia, polycythæmia vera, leukæmia, pernicious anæmia, and in frequent blood donors. The red cells-iron renewed in 24 hours in normals was calculated to be ·85 per cent of the red cell mass per day, while in polycythæmia it was found that iron incorporation in the red blood cells was as fast as 4 per cent. In patients with high red cell counts secondary to congenital heart disease, the red cells were replaced at the normal rate of 0·85 per cent.

Fallacies which were encountered in the determination of blood volume by the dye methods have been adequately overcome by the isotope dilution technique which is relatively simple.

Radioactive phosphorus which emits beta rays and has half a life of approximately two weeks, is the most widely used isotope. P^{32} labelled red cells have been used by Hevesy[15] *et al* in the determination of blood volume. Blood from a normal subject or patient is incubated for two hours with an isotonic solution of sodium radiophosphate; more than 40% of this labelled phosphate will enter and label the red cells. These labelled red cells are injected into a person whose blood volume is to be determined and then by a simple dilution technique the blood volume can be determined by comparing the counts of diluted phosphate labelled red cells with the standard. Then by the aid of Hæmatocrite one can determine the total red cell mass, total plasma volume and total blood volume.[4] This determination of blood volume can be done in normal, as well as in pathological conditions like polycythæmia vera, secondary polycythæmia, chronic and acute leukæmia, nephritis, cirrhosis, pernicious anæmia and cardiac failure.

These studies have been extended further and P^{32} labelled red cells have been used by Berlin[4] to study the dilution of marrow blood with peripheral blood. It has been shown that in all marrow punctures there is more or less dilution of the marrow sample with peripheral blood; this explains the unreliability of marrow puncture especially with reference to total nucleated cell count which hitherto was not understood properly.

A rapid equilibrium with the body fluids is attained after the administration of isotopic water (deuterium) so that the sample for isotopic assay can be taken one hour later.[26] Isotopes of water and labelled red cells have been used for finding blood volume and extracellular fluid in normals and diseased conditions like polycythemia vera, secondary polycythemia, chronic and acute nephritis, cirrhosis, pernicious anæmia and cardiac failure. The unreliability of carbon monoxide method for blood volume has been well answered by red cell labelled method. We get 20 per cent higher values of blood volume with carbon monoxide method as compared to labelled red cells method.

Isotopic method is a good and accurate technique for estimating the dynamics of circulation in health and disease. Pan and Strajman[35] have carried out interesting work not only by using radioactive water but also radioactive carbon monoxide, radioactive sodium, P^{32} labelled red cells and they found their rates of mixing in normal subjects and in patients of cardiac disease with and without œdema, and in patients of nephritis with œdema. With sodium there are first two very fast components of 30 sec. and 2 mts. indicating fast mixing of salt in blood and extracellular water. With radioactive carbon monoxide or ordinary carbon monoxide again two fast components and then slower ones of 10 mts. indicating the disappearance of carbon

monoxide into myoglobin and then there occurs slow excretion of carbon monoxide in exhaled air. In cases of cardiac failure all the four components are slower. If, in cases of œdema curves are extra polated it is found that about 23 per cent of fluid is extra-cellular fluid as compared to 17 per cent in normals. In cases of nephritis with œdema, where cardiac function is normal all the four components are as in normal, only the extracellular fluid being increased.

Circulation-time can be measured with greater accuracy by the use of isotopes. Quimby,[31] Elkin,[5] Burch[5] and Mufson[27] employed tracer sodium (Na^{24}) labelled sodium chloride for measuring the circulation-time in a variety of congestive heart and peripheral vascular diseases. It has been shown by this technique that circulation time is increased in scleroderma, thrombo-angiitis obliterans, and other peripheral circulatory diseases. These workers further studied the usefulness of various procedures in restoring the circulation in the above mentioned conditions using the same technique.

Isotopes also help us in the proper understanding of capillary permeability. Transfer across the placenta has received much attention and it has been reported that the smaller the number of tissue layers between maternal and fœtal circulation, the more rapid is the transfer. It was also found that there is a correlation between the uptake per unit-weight of fœtus and the fœtal growth-rate. Wright *et al*[38] using labelled sodium, showed that there was a great retardation of venous flow in the legs of women during labour as compared to non-pregnant women. During puerperium the rate of venous flow returned rapidly to normal.

Extensive studies have been carried out to calculate the dosage and usefulness of P^{32} in the diagnosis and treatment of different diseases like polycythæmia vera, myelogenous leukæmia, lymphatic leukæmia, monocytic leukæmia, Hodgkin's disease and various lymphosarcomas.

Early studies on patients with acute leukæmia and terminal chronic leukæmia who were given radioactive phosphorus orally or intravenously, showed that P^{32} became concentrated in relatively high doses in the leukæmic cells and bone marrow. The uptake of P^{32} is high in the body, though excretion in urine and stools is slow.

Studies on patients suffering from polycythæmia vera carried out for about 10 years have revealed that they respond well to treatment with P^{32} and their blood picture could be kept within the normal limit[18].

Early attempts were made to treat Hodgkin's disease, lymphosarcoma, multiple myeloma and 100 cases were so treated. These studies revealed that there are less chances of

P^{32} being useful in these conditions, because they are diseases of lymph-nodes rather than of bone marrow[21].

Lola Kelly[17] has used radio-active isotopes of phosphorus (P^{32}) for studies of nucleic acid metabolism in normals and animals having malignant tumours. Similarly sodium phosphate labelled P^{32} has been used to compare the uptake of the element by normal and malignant tissues. In normal cases liver, lymph gland and muscle will show a rapid uptake and rapid loss as compared to slow metabolising tissues like bone and brain which will retain phosphorus much longer and in which the uptake is also much slower. In cases of tumour it is found that rapidly growing malignant tissue has a special affinity for the element and shows a quick turnover. Marshak[29] showed high concentration of phosphorus in tumour tissue because of the fact that growing tissue needs phosphorus for the manufacture of nucleo-protein. Tuttle[33] *et al* demonstrated a high concentration of phosphorus in leukæmic nuclei. P^{32} is selectively taken up by the bones after its administration. It has therefore, been used with some success in the treatment of malignant bone disease and blood dyscrasias.

An interesting fact has been noted by Low Beer[22] that after intravenous injection of radio-phosphorus the surface radio-activity is markedly increased in malignant tumours as compared to normal or benign tissue.

Yet another application of P^{32} in therapy is in the treatment of superficial skin cancer. A small absorbent blotting paper containing sodium radiophosphate cut to the size of the lesion is used for this purpose for 72 hours.

Semi-quantitative procedures for localization of areas of inflammation and internal abscesses using G.M. tubes on body surface employing radio-active Barium ($Br.^{30}$) have also been advised[30].

Studies of the pattern of uptake and retention of iodine in normal and hyperthyroids can be made by using radio-active iodine. It has been shown that the thyroid shows special affinity for iodine and iodine is incorporated into thyroxine *via* diiodotyrosine. Similar studies have been made with hyperthyroid and other thyroid diseases. Therapy with radio-active iodine has been widely extended on the basis that active thyroid tissue absorbs the major fraction of labelled iodine administrated. Thus radio-active iodine has been used in the treatment of hyperthyroidism and thyroid adenocarcinoma. Using radio-iodine Mortin[25] *et al* have demonstrated the synthesis of thyroxine and diiodotyrosine in organs other than thyroid, like muscle and intestine.

Another important radio-isotope is that of carbon, C^{14} particularly of value in studies of hormones, vitamins, carbohydrates, proteins, fats, antibodies, and carcinogenic hydrocarbons. Hardi Jones[16] studied many of the labelled compounds such as organic amino-acids and glucose in the study of the metabolism in animals and studied the rate at which animals exhale labelled carbon dioxide after intravenous injection of these labelled compounds. The studies were compared in normals and in cases of tumour.

Gofman[12] *et al* has used the ultra-centrifuge and radio-active isotope in studies of atherosclerosis in man. The site of deposition of labelled lipoproteins with P^{32}, and of cholesterol labelled with H^3 in atherosclerosis in rabbits has been studied.

Isotopic studies has been utilized in the preventive branch of medicine, especially immunology. Bour-Snell[6] *et al* have shown that labelled antigen can be prepared by phosphorylation of plasma-proteins using phosphorylating reagents, or sulphonation with S^{35} labelled mustard gas-sulphone. Labelled antigens have been prepared and immunity processes better elucidated by using these labelled antigens.

Isotopes are also coming to our rescue in the field of virology. P^{32} labelled tobacco-mosaic virus has been prepared and used for studies on mice by Libby.

Lastly, isotopes have been used in preventing disease by acting as insect-killers. One can find out the life-cycle of the insect by giving a small amount of the radio-isotope to the insect and then tracing the habitat of the insect. We can thus get an idea about the methods useful for the control of the spread of diseases by insects. The methods are much more elaborate and easier than the older methods.

From the review set forth above, it will be observed that radio-active isotopes have come to occupy an important place in medicine and if the energy spent every day in devising deadly atomic weapons which will destroy mankind, is utilized for the use of radio-activity in medicine, it would go a long way in the further understanding of various physiological, and pathological processes and in relieving human suffering.

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POSTOPERATIVE ABDOMINAL MUSCLE SPASM

After laparotomy, muscle spasm may cause attacks of agonizing pain in the rectus muscle lasting half a minute or less. Probably, rough retraction tight retraction, tight retention sutures, and use of long rectus-splitting incisions predispose to abdominal muscle spasm. Muscle-relaxing drugs may make the muscle more irritable post-operatively. Persons with tense, apprehensive personalities are most susceptible to this condition.

Body movements or relax abdominal muscle contractions may precipitate the spasms. Onset is usually during the first forty-eight hours after surgery. Pains usually subside by the time the sutures are removed but sometimes continue beyond the period of hospitalization.

Pain may be as severe as renal colic, sometimes arousing a patient who has been made somnolent by narcotics. The rigid, painful abdomen may suggest peritonitis.

Repeated procaine injections into the incision control the pain. Chlorpromazine (Thorazine) in large doses may also be helpful. Patients should be advised to avoid sudden turns and motions of the abdominal muscles.—*Arch. Surg., 74* : 801-808, 1957 via ***Modern Medicine,*** July 15, 1957).

NADISAN AND ITS EFFICACY*
IN CASES OF
PULMONARY TUBERCULOSIS
COMPLICATED WITH
DIABETES MELLITUS

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I HAD the unique opportunity of visiting the Laboratories of Messrs. C. F. Boehringer & Soehne, Mannheim and Veb Chemische Fabrik Von Heyden Radebenl-Dresden, East Germany in October 1956 when the question of utility of anti-diabetic drugs by oral administration was discussed by my friends and myself with the scientists in charge of the production units of the above manufacturing concerns. In the course of our discussion it was brought out that these drugs were used only in cases of diabetes uncomplicated and the effect of oral administration of the drugs was not tried in cases of pulmonary tuberculosis complicated with diabetes. It was also mentioned that prolonged administration of a sulpha drug may have some effect on the diseased lung tissue as well.

A suggestion was made by me that these drugs should be tried in cases of pulmonary tuberculosis complicated with diabetes and that I would be glad to give a clinical trial in a few cases in my practice. This suggestion was very kindly and promptly accepted by the departmental heads, and Messrs. Neo-Pharma (Private) Ltd., Bombay through their representative at Madras placed at my disposal sufficient quantities of Nadisan for clinical trial. The clinical trial lasted for more than 8 months during which I treated a dozen cases for purposes of observation so that some tentative conclusions may be drawn on the usefulness of these products in the treatment of pulmonary tuberculosis complicated with diabetes.

Nadisan.—*General*:—No conscious selection of cases was made; all cases of pulmonary tuberculosis with diabetes, whatever their condition were utilized for the trial.

Administration of the drug:—The drug was administered after estimating the blood-sugar as well as the urine-sugar one or two days previous to the administration of the product. The mode of treatment was 5 tablets of Nadisan 0·5 g. each on the first two days, 3 on the next two days and two thereafter. In some cases the dosage was reduced to one or half tablet as the case may be, depending on the level of the blood-sugar and urine-sugar. The best time for administration of the drug was found to be immediately after breakfast, lunch and dinner, three times a day. Later when it came to 2 tablets per day,

* Specially contributed to the ANTISEPTIC.

one was taken with breakfast and the other with dinner. When the dosage was still reduced to 1 tablet per day, it was taken with the breakfast.

I give below a short history of six cases treated with Nadisan on the above lines together with my conclusions drawn from the data obtained.

Case 1:—Mr. J., aged 46, was admitted for pulmonary tuberculosis involving practically the whole of both lungs with cavitation in the upper half of both lungs. His sputum was positive for tubercular bacilli and his temperature was ranging from 100 F to 103 F. The blood examination revealed that E.S.R. was 90 in the first hour and a marked increase in polymorpho-nuclear cells. His blood-sugar on 2-2-'57 was 390 mg. and urine-sugar 4·5%. His weight was 140 lbs.

He has been a diabetic for the last 6 years, almost from the age of 40. His family history showed that his father was a diabetic and died of carbuncle about 4 or 5 years ago. He was treated with antibiotics both by injection and by oral administration and by injections of insulin, 50 to 60 units twice a day. It was noticed that though the temperature came down and the patient was feeling better, yet insulin had to be continued in higher doses. In March 1957, Nadisan was started and at that time blood-sugar was ranging between 250 and 300 mg. After a lapse of 6 months, his weight has increased by 12 lbs., the sputum has turned negative and the blood-sugar does not go beyond 120 mg. On 1-3-1957 when Nadisan was started, the blood sugar was 290 mg. and on 20-8-1957, it was only 112 mg., and from that day onwards he is taking only one tablet of Nadisan at breakfast time. In this case, three things were noted: (1) There was a gradual drop in the blood-sugar even in the first week of administration of the drug on the lines mentioned above, and in two weeks, this came down from 290 to 190 mg. The blood-sugar on 14-3-1957 was about 190 mg. The urine sugar also showed a tendency to come down from the first week onwards, and even after the dosage was reduced to 1 tablet per day, there was only a trace of (urine) sugar. (2) Even though he was a diabetic for over six years and had had heavy doses of insulin, twice a day, yet for the last six months, with one tablet of Nadisan per day, he has been maintaining a satisfactory state of health with only a trace of sugar in the urine and about 112 mg. of blood-sugar. (3) In this patient who has had treatment with streptomycin and I.N.H. and induction of pneumoperitoneum, the resolution in the lung tissue was more marked after the introduction of Nadisan in the treatment than before. Hence the administration of this sulpha drug encouraged the healing process, and the last picture taken on 20-8-1957 showed that the whole of the left lung was practically clear and the right lung showed scattered opacities in the middle third.

The only drawback that was noticed in this case was that in the course of six months, he developed furunculosis on his face and chest on two occasions which yielded to the addition of penicillin to the streptomycin that was taken.

Case 2:—Mr. K., Superintendent of a commercial firm, was admitted with diabetes and pulmonary tuberculosis involving the upper half of the right lung with cavitation in the upper third. His weight on admission was 120 lbs., disclosing a loss of 40 lbs. in the course of 3 months. His blood-sugar was 296 mg., urine-sugar was 2½ to 3% and sputum was positive for tubercular bacilli. He was given the ordinary anti-tuberculous treatment with streptomycin etc. and insulin twice a day. The progress was satisfactory with gradual improvement in weight, and in March 1957, the temperature was round about normal and his weight was 150 lbs. with 250 mg. of blood sugar. In spite of the improvement in the general condition including weight, there was no improvement so far as the diabetes was concerned. He was given insulin twice a day, about 60 to 80 units daily. Nadisan was started in April 1957 on the same dosage schedule mentioned above, and it was noticed that on 1-9-1957, his blood-sugar came down to 110 mg., urine-sugar to *nil* and his weight had gone up to 162 lbs., registering an increase of 10 lbs. after the commencement of Nadisan treatment. His sputum continued to be negative and he is now having only half a tablet per day.

Case 3.—Mr. K., a bus conductor was admitted in September 1956 for hæmoptysis with high temperature. His sputum was positive for tubercle bacilli complicated with diabetes with 3 to 6% sugar in the urine. This patient was in a very precarious condition with severe hæmoptysis and was first treated for the control of bleeding. It has been my experience that the administration of insulin in cases where there is hæmoptysis has always a tendency to encourage hæmoptysis rather than stop it. Hence, as a general rule, I do not advocate the administration of insulin in any case of diabetes where there is hæmoptysis. As a routine, insulin is stopped till the blood has completely disappeared from the sputum and is then re-started if necessary.

Apart from streptomycin and I.N.H. this patient was also treated by induction of pneumothorax on the right side. The collapse was quite satisfactory and hence pneumothorax was continued. Till June 1957, he was treated with pneumothorax on the right side; he had insulin injections twice a day and also antibiotics. His condition improved, the sputum became negative and his weight increased from 130 to 154 lbs. But the diabetic condition was still in the same stage. About the first week of June, he had neuritis involving the right shoulder as well as the right arm. Since he was a diabetic and insulin did not relieve the pain, he was started on Nadisan and by the

middle of August, his neuritis was relieved and blood-sugar was reduced to 140 mg. when last seen at the end of August. In June when Nadisan was first started, the blood-sugar was 342 mg. with 4% sugar in the urine and a trace of acetone was also present.

Case 4:—Mrs. G., had pulmonary tuberculosis involving the whole of the upper half of both lungs with a cavity on the right side. Her urine showed 3% sugar when she came under observation in January 1957. She had been a diabetic for over 10 years and the tuberculous disease was of two years' duration. She was treated on general anti-tuberculous measures with injections of streptomycin, I.N.H. and P.A.S. and administration of insulin twice a day. This patient had a certain amount of anaphylactic reaction towards insulin after a period of one month. Hence from that day onwards, administration of Nadisan was started. Then, the lung condition improved and the sputum became negative. But after the administration of Nadisan for about 3 months, somewhere in the middle of May, she developed a very severe pruritus all over the body, more in the face and in the lower limbs. Anti-histamine drugs were administered, and Nadisan was discontinued for some time. Re-starting of this drug in smaller doses brought back the pruritus, and therefore Nadisan had to be given up.

Case 5:—The patient was a doctor who was admitted with pleural effusion on the right side with signs of dyspnœa, cough and temperature. He was aged 52 and his diabetes was of 10 years' duration. Since he had dyspnœa and high temperature, it was decided to aspirate the fluid from the right pleural cavity and replace it by air. This procedure was adopted in addition to anti-tubercular treatment and insulin injections. In the course of about 8 days, after aspiration, the temperature gradually dropped down and the general condition improved. Sputum was also negative for tubercle bacilli; blood-sugar was 250 mg. After a stay of two months in the institution, he was started on Nadisan as it was found difficult to continue insulin injection daily. After a lapse of 6 months, the dosage has now been reduced to 2 tablets per day, one in the morning and one in the night, and the blood-sugar varies from 110 to 150 mg. the last one taken in the first week of this month showing 135 mg. The urine sugar has also come down to ½ per cent.

Case 6:—The patient is a carpenter by profession, aged 46 suffering from tuberculosis complicated with diabetes of 3 years' duration. I had no occasion to give him insulin, and he was straightaway started on Nadisan in January 1957. Being an illiterate, he had to be kept under observation for blood-sugar examination for a week in the first month, once in two months thereafter and later once in 3 months. He showed improvement

towards the last week of August when his blood-sugar was only 120 mg. and urine-sugar just a trace. His lung condition showed marked improvement with no toxic symptoms. He is now able to work for about 4 to 5 hours a day as a carpenter.

Tuberculosis and diabetes are met with very frequently in combination, and therefore, the treatment of such cases requires greater attention than cases of tuberculosis uncomplicated with diabetes. Before the discovery of insulin there was no approved method of treatment for diabetes, and very many cases of tuberculosis died of diabetes or its complications. On the other hand, when treatment was directed more to diabetes, the lung condition got worse. Hence it must be conceded that in cases of tuberculosis complicated with diabetes, treatment should be undertaken for both the conditions and therefore, every attempt must be made to control both diabetes and tuberculosis. Hence the administration of insulin regularly with a certain modification of the diet of the patient is a pre-requisite in the treatment of tuberculosis whatever may be the mode of treatment adopted for this disease.

Since 1946, there has been a revolution in the treatment of tuberculosis. By the demonstration of the usefulness of antibiotics, the measures that were in vogue previously are now being gradually abandoned and are replaced by anti-tuberculous drugs. It is gratifying to see that the administration of anti-tuberculous drugs in judicious combination has always resulted in successfully arresting the tuberculosis disease. The real difficulty is that the most important anti-tuberculous drug, *viz.*, Streptomycin has to be administered intramuscularly either daily or on alternate days or once in 3 days. If a patient happens to have diabetes in addition to tuberculosis, he had to take 2 to 3 injections a day, one for Streptomycin and two for insulin which frequently causes a certain amount of inconvenience and annoyance to the patient. Very frequently, this has been the cause for abandoning treatment in some cases. When the administration of anti-diabetic drugs by mouth came into vogue, it was in a way a great solace to the patients suffering from tuberculosis complicated with diabetes. Hence the study of Nadisan has shown that the judicious administration of this drug even in random cases (as was done in the cases reported above) definitely brings about an appreciable improvement and that it can replace insulin to a very great extent.

In the treatment of tuberculosis, in addition to the control of tuberculous disease by anti-tuberculous measures, it has been the principle that the general resistance level of the individual should also be raised by supplementing or adequately increasing the intake of rich food so that he may put on weight and thus gain strength to resist the disease to a greater extent. Unfortunately in tuberculous cases which are complicated with diabetes,

the intake of rich food has a tendency to increase the sugar content, both of blood as well as urine, and therefore a regulation of diet is called for. In the cases mentioned above, however, regulation of diet was not enforced and all the patients were allowed to eat, just as usual, and it has shown (in a limited way) that restricted diet is not always called for and that a liberal diet could be allowed to these individuals.

The following conclusions be drawn from the case reports cited above :—(1) In cases of pulmonary tuberculosis complicated with diabetes, Nadisan can well replace the use of insulin ; (2) the diet need not be altered or cut down, but normal food can be allowed to the patients ; (3) there is a definite indication that the tubercular condition in the lung shows a better resolution with Nadisan than when insulin is used ; and (4) in most of the cases there is an improvement in weight ranging from 5 to 10 lbs. in the course of two months.

So far, the complications noticed were :—Gastro-intestinal complications like vomiting, pains etc. occurred in two cases in the first week of administration of Nadisan. Withholding the drug and re-starting it on smaller doses usually got over these complications. In one case, there was pruritus and it recurred when Nadisan was re-started. One of the changes that was noticed during the administration of Nadisan was that in 3 of the 6 cases, there was an increase of cosinophilia in the blood count from 25 to 30%. The blood counts are being taken once in 3 months in order to see how long this increase lasts.

The following few points noticed in the course of Nadisan treatment may be of interest : —(1) Even in cases where insulin has been used for over a year or more for diabetes, response to Nadisan has been fairly satisfactory (*See Case No. 1*); (2) even in people of 40 to 45 years, the administration of Nadisan has not produced any untoward results ; but has definitely shown an improvement in the diabetic condition ; and (3) in one case septic infection in the form of cellulitis recurred ; but this did not stand in the way of Nadisan being resumed after the surgical complication had disappeared.

Encouraged by the good results obtained in tuberculous cases complicated with diabetes, I was emboldened to use Nadisan for a recent case of diabetes in a lady aged 46 who showed symptoms of diabetes for the last one year. Her blood-sugar was 140 mg. and urine-sugar 1%. She was started with 2 tablets of 0·5 g per day for one week and then the dosage was reduced to half a tablet per day. After about one month, she is now sugar-free in the urine and the blood-sugar is only 98 mg. This shows that though only in one single case, even when the disease is of recent origin and the patient is young, the administration of Nadisan when under observation is likely to do good.

I am sincerely thankful to Mr. H. H. Bruesch, delegate of Messrs. C. F. Boehringer and Soehne, Mannheim, West Germany who kindly called on me at Madras and discussed the question of clinical trial of Nadisan in cases of tuberculosis complicated with diabetes, and placed at my disposal sufficient quantities of the drugs for trial in about 8 cases. I am also gratoful to Messrs. Neo-Pharma (Private) Ltd., Bombay and their representative at Madras for the prompt supply of the drugs and for the help rendered.

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Cases and Comments

PRIMARY PULMONARY HYPERTENSION

(With a case-report)

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AND
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THE term '*cor pulmonale*' was originally introduced by McGinn and White (1935) to describe cases of acute right-sided heart failure resulting from pulmonary embolism; it is now used as a synonym for pulmonary heart disease irrespective of the mode of onset. Chronic cor pulmonale or pulmonary heart disease may be defined as hypertrophy and eventual failure of the right ventricle resulting from disease of the lungs or disorder of the pulmonary circulation. Some degree of pulmonary hypertension is always present, but it is usually less in the larger group of cases resulting from disease of the lungs in which hypoxia is more prominent.

Many lesions of the lungs and pulmonary blood vessels can give rise to chronic cor pulmonale. Samuel Gram (*The Practitioner*, March 1956) classifies the causes of chronic pulmonary heart disease as under :—

I. Emphysema or pulmonary Hypoxia.—(*a*) Primary chronic emphysema with or without bronchitis and (*b*) secondary emphysema resulting from other diseases of the lung *e.g.* pneumoconiosis, bronchiectasis, fibrocaseous tuberculosis; asthma, congenital cystic lung, severe kyphoscoliosis.

II. Diseases of the pulmonary arteries or pulmonary hypertension.—(*a*) Primary pulmonary hypertension; (*b*) secondary pulmonary hypertension: (*i*) due to diseases of the pulmonary arterioles, polyarteritis nodosa, schistosomiasis, amyloidosis, sarcoidosis, scleroderma, Ayerza's disease, syphilis; (*ii*) due to lesions of the pulmonary artery: aneurysm of pulmonary artery, obstruction of pulmonary artery or conus by aortic aneurysm.

III. Following subacute pulmonary heart disease.—(*a*) Repeated pulmonary emboli or single organized massive pulmonary embolus; (*b*) miliary secondary carcinomatosis of the lungs: (*i*) pulmonary arteriolar embolism; (*ii*) pulmonary arteriolar thrombosis.

It will be seen that by far the most important factor which gives rise to chronic cor pulmonale is chronic obstructive emphysema. The second group consists of cases where there is no

disease of the lung parenchyma and yet the pulmonary artery pressure is very high.

This paper deals with the second type of disorder; and an interesting case treated by us is reported:—

Case report.—M. L., male, clerk, aged 35, complained of dyspnœa, cough, and discomfort in the chest of 9 years' duration. In 1948, the patient had a motor accident, but escaped unhurt. Since then he developed a dry cough, and dyspnœa on exertion which continued till 1955 when the symptoms persisted throughout the year. He never had any expectoration or hæmoptysis, wheezing or orthopnœa. There was some effort intolerance and fatigue, and some discomfort in the chest. There was no anginal pain, nor any giddiness or syncope at any time. No œdema was observed during the course of the illness.

History:—His personal, family, and past history did not reveal anything of significance.

Clinical examination:—The patient was of an average height, poor build, and fairly nourished and weighed 86 lbs. He showed evidence of peripheral cyanosis, (lips, ears and nails) and there was slight puffiness in the lower eyelids. The jaw was poorly developed, the teeth were crowded, and the palate was highly arched. There was no clinical evidence of œdema. No clubbing was observed. The hands were cold.

Cardiovascular system:—The pulse was 106 per minute, regular and of low volume. B.P. was 110/70 mm. Hg. On inspection of the præcordium no pulsations were visible. Epigastric

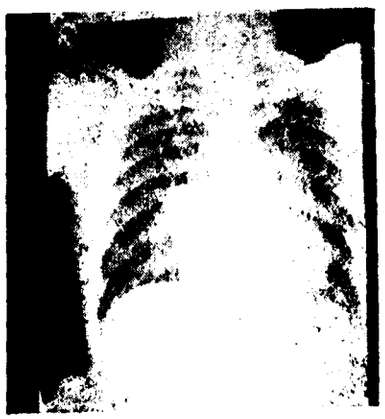

Fig. 1. Skiagram of the chest P.A. view. [See p. 864.

Fig. 2. Skiagram of the chest R.A.O. view after barium swallow. [See p. 864.

pulsations were present. The neck veins were not engorged. On palpation, the apex beat was not palpable. There was a mild

heave palpable along the left sternal border at the level of the 3rd and 4th inter-spaces. Percussion showed evidence of bilateral cardiac enlargement. Auscultation of the heart showed characteristic accentuation and close splitting of the pulmonary second sound. No murmurs were detected.

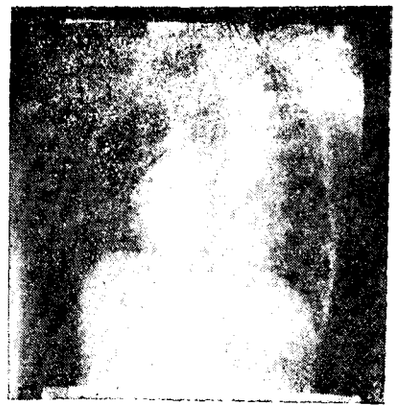

Fig. 3. Skiagram of the chest L.A.O. view. [See p. 864

Respiratory system:—The expansion of the chest was normal. There was no evidence of emphysema. The percussion note was normal. The breath sounds were vesicular and no adventitious sounds were heard indicating that the lungs were dry. Abdominal examination did not reveal any enlargement of the liver or spleen. There was no hepato-jugular reflex.

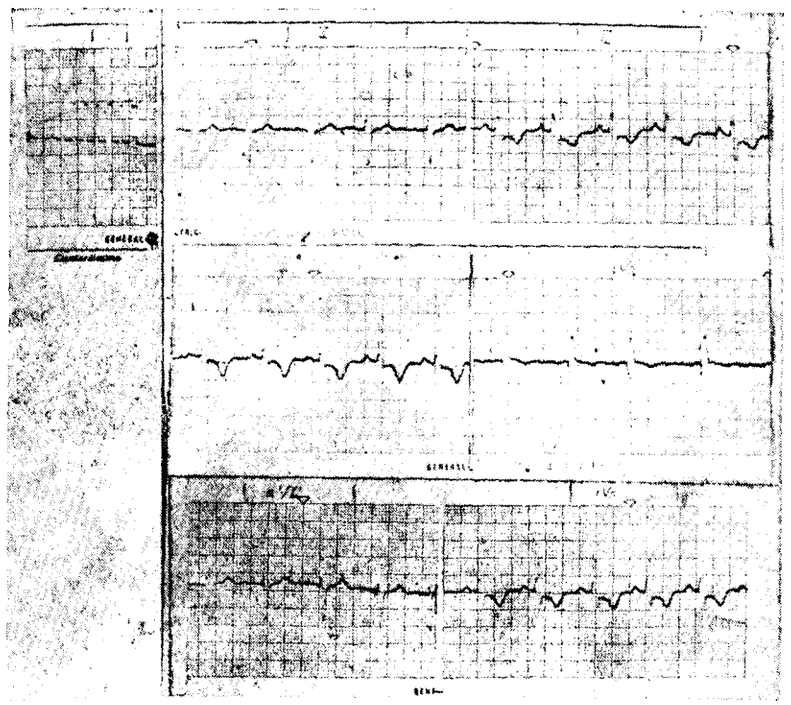

Fig. 4. E.C.G. standard and uni-polar limb leads. [See p. 864.

Investigations:—Blood examination showed a total white cell count of 11000/cmm: Differential cell count:—Polys. 72%, Lymphos. 27%, Eosinophils 1%: and a red blood cell count of

5 million per cmm. Hæmoglobin was 98%. Kahn test was negative. Stools and urine did not show anything abnormal.

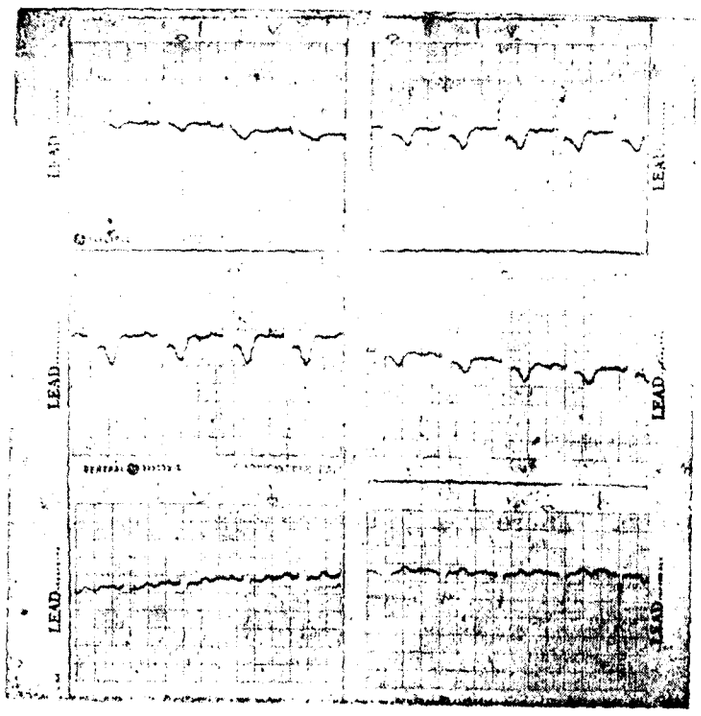

Fig. 5. E.C.G. præcordial leads.

Radiology :—Skiagram P.A. view showed generalized enlargement of the heart shadow (*See Fig. 1*, p. 862). Aortic knuckle shadow was inconspicuous. The pulmonary are was prominent. Hilar shadows showed evidence of marked dilatation of the pulmonary arteries and their main branches. The peripheral lung fields were clear. R.A.O. view showed unduly prominent pulmonary conus and right ventricular enlargement (*See Fig. 2*, p. 862). L.A.O. showed left ventricular enlargement (*See Fig. 3*, p. 863). Screening showed normal diaphragmatic movements and conspicuous hilar pulsations.

Electrocardiography : showed evidence of spiky P wave, which was not unduly prominent and classical evidence of right ventricular hypertrophy and strain. Right bundle branch block was present (*See Fig. 4*, p. 863 *and Fig. 5* above).

Discussion.—Primary pulmonary hypertension also described as idiopathic, essential or lone pulmonary hypertension may be defined as a condition of high pressure in the pulmonary artery associated with right ventricular hypertrophy for which no cause can be found outside the pulmonary vessels. Under the heading of primary pulmonary arteriosclerosis some cases of primary pulmonary hypertension have been reported. By 1935, Brenner found reports of only 15 pure and well-authenticated cases. During the past 20 years and particularly since the introduction of cardiac catheterization many more cases have been described. The disease is rare and there are still about 100 reported cases with necropsy-control in the world's literature.

Aetiology :—The ætiology of this condition is not known. The symptoms usually appear between 30 and 40 years of age. Cases have been reported in patients as young as 6 months and as old as 74 years. According to Short (1956), the disease is more common in females, than in males. The case under report was a male aged 35 years. Dresdale *et al* (1954) suggested the possibility of a hereditary factor in some cases.

Pathology :—The most important changes are found in the heart and lungs. The heart is moderately enlarged. The characteristic feature is the enormous hypertrophy of the right ventricle There is usually dilatation and hypertrophy of the right atrium but the left-sided chambers are normal or small.

Lung tissue appears healthy on macroscopic examination. Pulmonary infarction and rarely congestion and even œdema may be present. The pulmonary artery trunk and its branches are dilated and there is a thickening of the intima. The segmental arteries are prominent in a cut-section. The most important changes are present in arteries which are less than 1 mm. wide. Microscopic examination shows generalized thickening of the intima producing obstruction or even occlusion of the small arterioles. The nature of the arterial lesion is unknown.

The liver, spleen, and kidneys, and other systemic organs usually show chronic venous congestion and occasionally infarction.

Clinical features :—The clinical picture of primary pulmonary hypertension is that of right-sided heart-failure suddenly appearing most commonly in persons between 30 and 40 years of age and progressing to a fatal termination.

The earliest symptom is dyspnœa on exertion which dominates the whole course of the disease. Later orthopnœa, paroxysmal dyspnœa, and hæmoptysis may develop. Unlike chronic obstructive emphysema, winter cough is characteristically absent in primary pulmonary hypertension. Other symptoms are weakness, dizzy attacks and pain in the chest. Pain in the chest on effort is felt by a majority of the patients with primary pulmonary hypertension. It is usually described as a feeling of tightness or constriction across the chest which may radiate towards the arms. Except for the fact that it is always associated with dyspnœa, pulmonary angina cannot be distinguished from the pain of coronary occlusion. Probably both have a similar origin, but in the case of primary pulmonary hypertension it is the right rather than the left ventricle which suffers from ischæmia. The patient may complain of other types of pain in the chest *e.g.* a sense of oppression behind the sternum due to pulmonary embolism or pleuritic pain resulting from pulmonary infarction.

Epigastric pain due to enlargement of the liver may be present. Syncope may occur either on effort or at rest. Effort syncope is due to acute right-sided heart failure. Sometimes attacks of unconsciousness may occur.

Physical signs :—Cyanosis may or may not be present, and when present is mainly peripheral due to the low cardiac output; it is mostly present in the exposed parts such as the cheeks, lips, ears, and fingers. Clubbing is practically absent except in children. Signs of venous congestion appear later. Changes in the form of the venous pulse and enlargement of the jugular veins occur. Radial pulse is small due to the low cardiac output, and the extremities are cold. Blood-pressure is low. Signs of congestive cardiac failure appear in the form of cardiac liver and œdema.

Right ventricular enlargement occurs. Cardiac impulse is diffuse. Palpation in the second intercostal space may show abnormal pulsation of the pulmonary artery. On auscultation the second sound is very characteristic and is well heard all over the præcordium. In the pulmonary area, the second sound is split, and accentuated. Triple heart rhythm is generally present. In the pulmonary area, there may be an abrupt sound or click in early systole and this may be followed or replaced by an ejection murmur. Systolic murmur is not commonly present in the apex, less often in the third or the fourth left intercostal space. A diastolic murmur is audible in some cases. Most commonly it is the blowing murmur of pulmonary incompetence which immediately follows the second heart sound and is best heard where this sound is most intense. Rarely a delayed diastolic murmur may be heard.

The lungs do not show any adventitious sounds on auscultation. In other words, they are completely dry.

Investigations :—Blood : A slight polycythemia is usual. A polymorphonuclear leucocytosis is present in some cases. The arterial oxygen saturation is usually reduced to between 80 and 90% and may be as low as 70%. The cause of arterial anoxæmia is not known.

X-ray examination :—The most important feature is the dilatation of the pulmonary artery trunk which is sometimes aneurysmal. The right and left pulmonary arteries though enlarged are not as pulsatile as in atrial septal defect. There is moderate enlargement of the right ventricle and right auricle while the left-sided chambers are normal or small. Lung vascularity is not increased but rather reduced. There may be evidence of old or recent pulmonary infarction (*Short*, 1951).

Electrocardiogram :—E.C.G. shows right heart hypertrophy, right axis deviation, a dominant R deflection in the right-sided chest leads ($V_{1, 2}$), a prominent S wave in the left-sided leads ($V_{6, 7}$) and tall pointed P waves. Sinus rhythm is present. Right bundle branch block is frequently present.

Cardiac catheterization :—By the use of catheterization it is possible to measure the pulmonary artery pressure and the pulmonary arteriolar resistance, and exclude the presence of congenital heart disease and mitral disease. In primary pulmonary hypertension the pulmonary systolic pressure during rest is between 70 to 100 mm. Hg., though a higher pressure may be present. The cardiac output is usually reduced to half the normal figures.

Angiocardiography :—Angiocardiography shows the prominence of the so-called pulmonary conus which is due to the enlargement of the pulmonary trunk. It may be helpful in excluding thrombo-embolic obstruction of the pulmonary trunk or its main branches.

Diagnosis :—The diagnosis is made by excluding other diseases which are known to be potential or predisposing causes of pulmonary hypertension. The points in favour of the diagnosis of primary pulmonary hypertension in this case are symptoms of dyspnœa on exertion, absence of congestive signs in the lungs, absence of X-ray evidence of structural lung disease, low blood-pressure, close splitting and accentuation of the 2nd sound in the pulmonary area, hilar dance, and right sided enlargement of the heart. Ithas not been possible to explain the left ventricular enlargement in this case.

The condition must be differentiated from :—

(1) *Chronic lung disease* :-The diagnostic features of chronic lung disease are : a history of chronic repeated winter cough, deep cyanosis, and congestive signs in the lungs confirmed by X-ray evidence of structural lung disease. (2) *Congenital heart disease* : a history of disability, cyanosis, or a cardiac murmur dating from childhood or infancy are points in favour which can be excluded with certainty by cardiac catheterization. (3) *Mitral stenosis* : complicated by severe pulmonary hypertension may be difficult to distinguish because, in such a case, the characteristic diastolic murmur may be absent. Accentuation of the first sound, X-ray examination showing left auricular enlargement or calcification of the mitral valve and cardiac catheterization help to differentiate this condition. (4) *Pulmonary embolism* : repeated attacks of dyspnœa, pain in the chest, evidence of venous thrombosis and X-ray pictures help to exclude this condition.

Prognosis : is bad as most of the patients with primary pulmonary hypertension die within 2 to 11 years.

Treatment : —No effective treatment has yet been devised. Dresdale (1951) suggested priscoline, but it has not proved effective. Priscol 25 to 50 mg. t.d.s., aminophylline 3 gr. t.d.s.

CYSTS IN THE LOWER JAW

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Cysts or Cystic diseases of the lower jaw are as common as those in any other bone; five cases of the cysts of the lower jaw were treated by me. Where the bone is not enlarged but shows a cystic appearance in the X-ray picture, the diagnosis may be difficult and must be differentiated from :—(1) osteitis fibrosa

Fig. 1. A case of root abscess left side which can simulate a cyst.

Fig. 2. A case of alveolar abscess right side which simulates a cyst.

cystica; (2) osteo-clastoma; (3) enchondroma, (4) single or multiple myeloma; (5) hydatid cysts; (6) metastatic carcinoma; (7) root abscess, alveolar abscess and localized abscess of the jaw.

We do not usually come across composite odontome, fibrous odontome, and cementome. I report below my experience.

Fig. 3. The woman with alveolar abscess showing prominence.

I. Dental cyst (Radiculo-dental cyst).—This type occurs in late adult life. The cyst is unilocular. It has a tooth above in the alveolus. It may attain a big size. The lining is usually of squamous, and very rarely of columnar epithelium. It contains serous or mucoid material. When infected, the epithelial lining is destroyed and replaced by fibrous tissue.

II. Dentigerous cyst (Follicular odontome).—It occurs in young adults and after second dentition. At the site of the cyst the tooth will be missing. The cyst grows slowly; there is an unerupted tooth inside with the roots placed in the jaw. Cement, dentine and the roots are imperfectly developed. The cyst wall is lined with squamous epithelium usually, and columnar epithelium rarely, and the cyst contains glairy fluid. It is supposed to arise from the dental follicle.

III. Adamantinoma (Multilocular cyst-enamel cell tumour). It often occurs in early adult life, but is also found in old age. The lower jaw is usually affected and the common site is the angle. It is simple and grows slowly. Very rarely it gives rise to metastasis. It may also appear in the tibia and in other long bones. The tumour may be solid or cystic. It has a loculated surface and thin walls. There is greater enlargement on the alveolar surface, than on the lingular. From the enlargement and thin wall there may be 'egg-shell crackling.' Ulceration and infection within the tumour may modify the appearance.

Case 1. *Dental cyst*:—P.R., female, 55. Came in 1951 with swelling of the lower jaw on the right side, since 4 years. The teeth above the swelling were present and she was getting foul pus into her mouth. There was no pain.

Fig. 4. Big dental cyst right side lower jaw with tooth present in the alveolus.

X-ray picture showed a big cyst placed in front of the angle of the lower jaw on the right side. The teeth were present in the alveolus of the cyst; they were loose above and infected. General condition was fair. B.P. 170/110, pulse 82, not anæmic; immature cataract in both eyes and vision was defective.

18-10-'51:—Seconal 1½gr. and omnopon given; under local anæsthesia all molars on the right side of the lower jaw were removed; at and in front of the angle of the lower jaw novocaine was infiltrated submucously. The alveolus of the cyst and the whole dorsal aspect was guttered with a chisel over the cyst anteroposteriorly. All discharge was aspirated with a suction apparatus; Tinct. iodine was applied to the cavity which was then packed with acriflavine gauze.

Post-operatively the whole cavity was allowed to heal by granulation from the bottom. Now and then hydrogen peroxide gargles were given. It took more than a month to heal up.

Case 2. *Dental Cyst*:—Mrs. S. A., aged 45, female (1952) had a fairly big swelling at the angle on the right side of the lower jaw, of 7 years' duration. The alveolus in relation to the swelling was edentulous after the loose teeth came off. No discharge into the mouth.

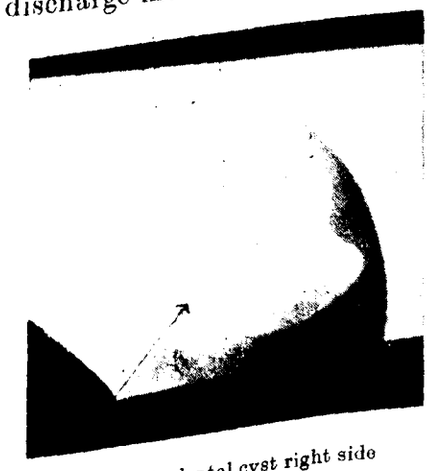

Fig. 5. Big dental cyst right side of the lower jaw.

X-ray picture showed a big cyst with a thin bony wall, suggestive of a dental cyst. General condition was fair; B.P. 120/80; no glycosuria.

7-4-'52:—Seconal and omnopon, local infiltration submucously were given near the swelling; the roof of the swelling was guttered; contents and serous fluid aspirated; Tinct. iodine applied to the cavity which was packed with acriflavine gauze.

Frequent change of gauze-packing and hydrogen Peroxide gargles given. It took about four weeks for the cavity to fill and heal up completely.

Case 3. *Dentigerous cyst*:—V. N., 13, girl (1952). Swelling of the right lower jaw near the angle; gradually increasing in size; without teeth above the swelling; no pain; but there was deformity; prominence in the region of the angle and in front of it. The alveolus in the swelling did not contain teeth; incisors, canine and premolars were present, but molars were absent. X-ray picture showed cyst of the lower jaw on the right side of the angle, and in front of it containing root elements within the cavity. General condition was good.

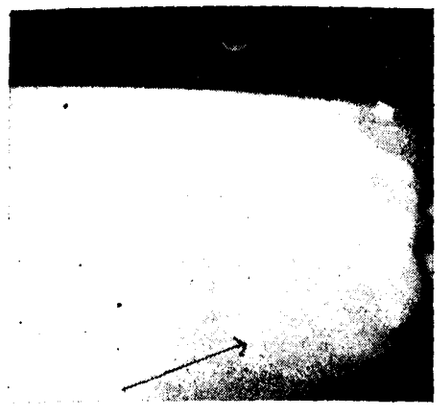

Fig. 6. Big dentigerous cyst with tooth elements in the cavity.

24-8-'52:—Under local anæsthesia, guttering was done, removing the roof, aspirating, sponging out glairy material and scooping out dental elements. Tinct iodine pack was kept for a while to destroy the mucous lining and then removed after 1(minutes. The usual course of gargles, and packing was don till the cavity filled up and healed.

Case 4. *Dental cyst*:—K. V., 56, female (1955). Swelling of the lower jaw on the left side in the region of the angle of 8 years' duration. Gradually increased in size and teeth near the cyst became loose and fell out; no pain. Asymmetry of the cheek and difficulty in chewing hard things were present; no discharge and hence no infection.

Fig. 7. Swelling in the region of the angle of the left jaw.

X-ray picture showed a big cyst in the region of the angle of the lower jaw on the left side; alveolus above was endentulous; cavity did not

Fig. 8. Large cyst in the lower jaw on the left; teeth fallen off.

contain tooth elements. It was taken as a dental cyst.

2-9 '55. Under local anæsthesia bone-guttering was done in the roof of the cavity through the mouth and the lining was destroyed with Tinct. iodine and the cavity was packed.

Case 5. *Adamantinoma*:—K. A., 50, male adult had gradually increasing swelling in the region of the chin and lower jaw of three years' duration.

The swelling was of the size of an orange projecting forwards and downwards from the chin, arising from the lower jaw. There was not much swelling on the oral aspect, though submandibular ducts were raised and lay on the inner aspect of the swelling. Incisors, and canines were present over the tumour, hard in consistency; egg-shell crackling was not elicited.

X-ray picture showed spherical swelling arising from the front and inferior aspect of the lower jaw. Uniform destruction of bone and thin shell of bone forming the wall; the appearance was suggestive of adamantinoma.

29-11-'55:-The patient was given Pethidine, atropine and induction pentothal and tubarine, endotracheal intubation and maintenance with gas and oxygen.

A horse-shoe incision was placed along the lower border, the mucous surface was infiltrated with saline to facilitate easy

Fig. 9. Swelling of the chin due to adamantinoma in the body of lower jaw. Teeth present though irregular.

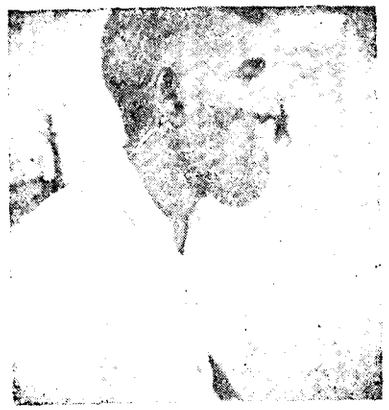

Fig. 10. Side view of the patient with adamantinoma, body of the mandible.

dissection and separation of the mucosa from the bone; The submandibular ducts were intubated with 1 m.m. polythene tubes to make them visible, and to prevent injury. The mucosa was incised along the gum margins, separated from the bone; the incision was deepened, from below to separate the diseased bone from the soft tissues, dissecting into healthy bone; the bone was cut with Gigli saw, protecting the soft tissues from saw movements; after diseased portion was removed, the teeth near the ends of fragments were extracted; wound closed in three layers, mucosa, muscles and fascia, and skin; hæmostasis was obtained with coagulation. Drainage was put in during post-operative period; a lot of saliva collected in the mouth which the patient was unable to spit out. I was afraid during the post-operative period of (1) œdema of the larynx; (2) falling back of the tongue causing respiratory obstruction; because the tongue had lost most of its muscle origin from the jaw; (3) loss of symmetrical apposition of bite of lower jaw; and (4) respiratory infection because of a slow dribbling back of the saliva.

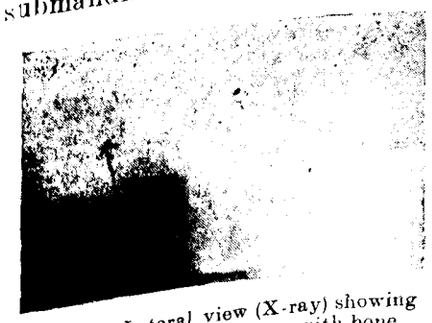

Fig. 11. Lateral view (X-ray) showing bone spherical expansion, with bone destruction and thin shell of wall.

Biopsy (suggestive of adamantinoma).—The mucosal and skin wounds luckily united very well. For the movements of the tongue there was no fixing body. While chewing, bits of the remaining jaw bone had movements in all directions

impeding even swallowing. Speech and even spitting were difficult. I therefore, felt that unless a suitable bone-graft was made, (1) there will not be simultaneous and synchronous action of fragments, (2) speech, chewing, swallowing, and spitting cannot improve unless there was some fixture for the muscles of the tongue, (3) bone-graft was desirable to improve the contour of the face. The angle of a rib served the functions of the portion that was removed (*i*) to bridge a bony gap, (*ii*) to give synchronising action to the fragments, (*iii*) to keep them apart, from being pulled towards each other, (*iv*) to give a fulcrum for the tongue from which it can act. So it was felt the angle of the rib with periosteum must be taken, kept, and fixed to the fragments.

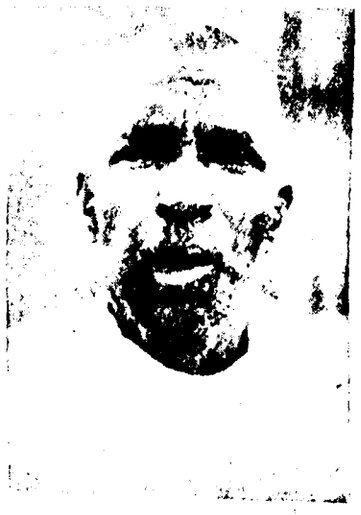

Fig. 12. Front view of the face after excision, inability to bring the lips together and put out the tongue.

Fig. 13. Side view after bone grafting with angular portion of the rib.

6-1-'56:—Atropine, pethidine, induction pentothal flaxadil, endotracheal intubation were given and anæsthesia maintained with gas and oxygen under assisted respiration.

Curved and oblique incision postero-lateral near the 7th rib on the left side ; 5" of the 7th with equal length from the angle on both sides with periosteum removed and kept ; the pleural injury that occurred was repaired on full expansion of the lung, and wound closed in layers. The old incision in the chin opened out on the skin and bed made up of the fragments ; graft was kept fixed to the fragments and the wound was closed.

It was lucky the graft remained in position alive and served its purpose. There was fair improvement in speaking, spitting, mastication, deglutition and in the contour.

I had the opportunity of treating five cases of cysts of the lower jaw during the last five years. Three of them were dental cysts, one a dentigerous cyst and one was an adamantinoma. Either during guttering or after I never had any pathological fracture at the sites of disease, where the excision of the diseased portion was not done in dental and dentigerous cysts. In the last of our cases where excision was made, the function improved after bone-grafting

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Editorials

THE FIFTH MADRAS STATE OPHTHALMIC CONFERENCE (1957)

(Contributed)

INAUGURATING the Fifth Madras State Ophthalmic Conference at Courtallam on the 14th September 1957 Sri Dr. U. KRISHNA RAU, Speaker of the Madras Legislative Assembly, stated that the problems facing the ophthalmologists were both national as affecting the nation as a whole, and internal as affecting the teaching and research in the subject and that they cannot be dissociated from other health problems like the prevalence of infectious and venereal diseases, malnutrition, unsatisfactory sanitation, hygiene and ventilation in schools, factories, all of which play an important role in the development of eye-conditions. Ultimately therefore, all problems affecting the most sensitive organ of the human body—the eye—must form part of the general health programme of the people.

Sri Dr. L. MAHADEVAN, Chairman of the Reception Committee, in welcoming the guests paid rich tributes to the services rendered by Dr. KRISHNA RAU and Dr. P. SIVASUBRAMANYAM of Ceylon in the cause of medicine.

Sri Dr. P. SIVASUBRAMANYAM, D.O.M.S., F.R.C.S. (Lond.), a distinguished ophthalmologist from Ceylon, who presided over the Conference delivered a very interesting and instructive address on "Some Reflections on Corneal Grafting in the East," in the course of which he referred to the incidence of corneal blindness which is appallingly high and for which ulcers, injuries, interstitial keratitis and phlyctenular affections were largely responsible. The scope for keratoplasty in the Eastern countries being therefore unlimited, Dr. SIVASUBRAMANYAM discussed at

length the available resources, difficulties and limitations to the procedure and stressed the need for tackling the problems facing the profession in a realistic and practical manner.

[We propose to give our readers in a future issue a short resume of this valuable address along with abstracts of other papers of great interest which were read at this Conference.]

In his lucid and short but comprehensive address Dr. Krishna Rau discussed briefly the more important and pressing ophthalmological problems like blindness, keratomalacia, accidents and injuries to the eye, the need for the provision of controlled eye-camps and the rehabilitation of the blind.

The problem of blindness and its prevention is indeed one of the major problems facing the country. In tackling the problem of blindness, propaganda is most important as the public must learn the value of preventive measures in the eradication of blindness. They must adopt well-known measures such as vaccination in the prevention of smallpox, attention to nutrition which will prevent keratomalacia and such other aids. Propaganda by lectures, by cinema demonstrations, by notices in the Press and by talks before the public is very necessary to convince the people of the prevalence of blindness and of the methods that can be adopted to eradicate it.

The last census (1951) showed that a little more than 100 people in every 1,00,000 were blind ; females being in excess of males (116 : 105). Dr. Krishna Rau considered that this excess may to a certain extent, be due to our Indian women spending most of their time in smoky, ill-lit and ill-ventilated houses and living under conditions inviting affections of the eye. The chief causes of blindness are keratomalacia, small-pox, syphilis, tuberculosis, leprosy, gonorrhœal affections of the eye, cataract, glaucoma, injuries and irritant remedies; much of this is preventable and the majority is certainly curable. The tragic part is that children are affected in many cases early in life and have to spend the rest of their lives in this unfortunate state of blindness.

Keratomalacia, which is a nutritional disease due to lack of vitamin A and proteins is the most important cause of blindness in children. They can be relieved with the administration of vitamin A. The condition recurs unless attention is given to general nutrition. The State should give poor children free milk and should evolve a diet that is rich in proteins. At Madras, in the Pædiatric Department of the General Hospital and at the Nutritional Research Laboratories at Coonoor experiments are being made to find out such a diet and it is hoped that these experiments will produce fruitful results. Similarly, ophthalmia neonatorum, syphilis, and small-pox are all preventable if

appropriate preventive measures are adopted. Trachoma, another important cause of blindness is not so prevalent in South India as in the North and with the advent of the wider-spectra antibiotics, its incidence will decline. Accidents and injuries due to crackers, *Gilli, Dhandu*, are also causes of blindness and should be prevented. Cataract and glaucoma are also important causes of blindness. Couching is still prevalent in our State in spite of the legislative enactments forbidding it.

As Dr. Krishna Rau rightly pointed out, it is the duty of the State to provide adequate facilities for giving suitable and effective treatment to eye conditions. Ophthalmic departments are now functioning in all District Hospitals of the Madras State except in the Ramanathapuram and Chingleput Districts, where also they will shortly be opened. But this alone will not be enough, for nearly 90 per cent of the blind people come from rural areas and to be effective ophthalmic relief should be made to reach them direct in their homes.

The Madras State Government have made a beginning in this direction by sanctioning mobile ophthalmic units with headquarters at Madurai and Madras to cater to the needs of the villagers within a radius of 100 miles from each centre. Trained medical and nursing staff and adequate equipments will be taken to the villages at which eye-camps lasting for 10 to 15 days will be established, where sufficient pre-operative and post-operative care will be given to all patients operated in the camps. While on the subject of eye-camps, Dr. Krishna Rau strongly disapproved of the many eye-camps which are being run in India by laymen. They are certainly objectionable and should be prohibited at all costs. The running of eye-camps on a mass scale even by qualified medical men should also be prohibited, for sufficient pre-operative and post-operative care is not bestowed and cannot obviously be bestowed on the patients in these camps owing to their short itineraries with inadequate equipment; mere operative skill is certainly not the only factor in removing cataracts.

Dr. Krishna Rau strongly protested against the recognition of these camps and the official support given to them in some States. We quite agree with Dr. Krishna Rau and we are glad to say that Dr. D. V. Venkappah, the new President of the Indian Medical Association, expressed the same view at a recent social gathering of medical men in Madras. Dr. Krishna Rau then pleaded for the provision of necessary facilities for the rehabilitation of the blind and commended the good work being carried out at Tiruchi, Palamcottah, Poonamalle and other places where the blind men after sufficient training were able to undertake various industrial pursuits. It is our sacred duty to

take special care that the blind men are given suitable jobs in industry. Because of the loss of vision, nature enables these people to acquire extra dexterity with their hands and greater keenness in their other senses, which they will use to great advantage and proficiency. In foreign countries many blind men are rehabilitated and given suitable jobs in industry. The education of the blind is also a very important aspect of rehabilitation. By teaching them through the Braille system they are enabled to read and understand what is going on around them.

Referring to the intensive post-graduate training in ophthalmology which the Elliot School at Madras offers to medical graduates he said that it has resulted in specialists in eye diseases being available in all the large towns in this State.

Judged by the number and variety of subjects which were discussed at this conference, we should say it was a momentous session of great educative value.

R. Chari

LEPROSY RELIEF

(Annual Meeting of the Hind Kusht Nivaran Sangh, Madras Branch)

The report of the Madras State Branch for 1956 which was presented at the annual meeting of the Hind Kusht Nivaran Sangh, presided over by Mr. M. A. Manickavelu, the State Minister for Health, is a record of useful and silent work done by the association at its various centres in order to afford relief and rehabilitation to the unfortunate victims of this dire disease. The Sangh has as usual closely cooperated with the State Government and with the other voluntary agencies engaged in this humanitarian work. The Central Government, it was revealed at this meeting, was willing to give further and greater financial help for leprosy relief, provided they speeded up their efforts in such work. The Madras State Government was spending Rs. 2·5 lakhs every year on leprosy relief given in its own institutions and another Rs. 1·5 lakhs on subsidies granted to several private institutions engaged in this work. We were glad to hear from the State Health Minister that though about two million people were stated to be suffering from leprosy, fortunately about 80% of them were stated to be non-infectious and that all agencies should pool their efforts to tackle the problem on a large scale. He exhorted the people to emulate the example of the foreign missionaries who were engaged in this noble work.

Sri T. N. Jagadisan, Honorary Secretary, presented the report which stated that though rehabilitation on an organized scale had yet to take place, the Sangh and its branches kept intimate touch with the patients. Besides helping them to improve their condition, they had in a few cases obtained

employment. The friendly and human touch between the Sangh workers and the patients was a most valuable part of the work of the Sangh.

Dr. Dharmendra, the new Director of the Central Leprosy Teaching and Research Institute, Tirumani, Chingleput District, stressed the need for a balanced approach in tackling the problem.

The war against leprosy which was widely prevalent in Europe in the Middle Ages was strenuously fought and ultimately won even with the limited resources then available as regards medicaments and knowledge of preventive medicine. With the numerous modern discoveries and advances in our knowledge in the field of medicine, we are at present in a definitely more advantageous position in combating leprosy. It should therefore, be possible to tackle the problem from different angles and make an all-out effort to eradicate it from our midst.

A heartening feature of the growth of leprosy relief work during the past 15 years has been the enthusiastic participation of voluntary organizations, such as we have in this State.

Dealing with the socio-economic problem, Dr. Dharmendra urged the need to ascertain the psychological and financial repercussions on the patient when he lost his job on account of the "ignorant" fear of his employer about leprosy. He pleaded for more opportunities for employment of leprosy-patients at the rehabilitation stage, and reservation of employment opportunities for them.

The brief reports included in the report on the working of the District Branches and of the Leprosy Homes and Sanatoria at Tirumani, Karigiri, Kumbakonam, Malavanthangal, Tuticorin Vadathorasalur and Tholurpatti, show sustained progress in affording treatment and rehabilitation facilities. The work of other agencies in the Madras City and in other district centres has also been exceedingly good. We find from the reports that the enthusiastic and selfless workers engaged in leprosy relief all over the country are every moment conscious of the fact that 'what is most needed in leprosy relief is treatment, as well for the sake of the patients themselves as for the first and ultimate step in the control of leprosy, stopping the disease in its early stages, preventing the evolution to new deformities and to new infective cases, and making most of the infective cases non-infective by ambulatory treatment.' Leprosy patients are themselves becoming tremendously conscious now of their disease and the possibility of cure and rehabilitation by modern therapy. This is a happy augury as the outlook is becoming more and more hopeful. Let us hope that in the not very distant future, leprosy would have left our shores for good.

PROBLEMS OF THE DENTAL SERVICES AND DENTAL EDUCATION IN INDIA

THE progress in the development of the dental services in India has been very slow, as we had occasion to point out in our issue of April last, because it did not receive in the past adequate consideration and encouragement from the powers-that-be. There has however, been a gradual awakening in recent years, amongst the people of the land to the need for dental care and Governments are also becoming increasingly alive to the urgency of the problem. The All India Dental Association has also been active in its efforts to interest the Union Government in this problem.

The Bhore Committee's recommendation in the matter of Dental Education and Dental Services stressed the need for (1) a considerable expansion of the training facilities; (2) a regulation by means of suitable legislation of the dental training and the practice of the profession and (3) organizing dental services so as to make them readily available to all people in urban as well as in rural areas.

This Committee estimated that at least 70,000 dentists would be required to meet the needs of the entire population of India on the modest basis of one dentist for every 5,000 people. Twenty more dental colleges would be required capable of turning out 100 graduates every year so that the nation's total ultimate requirements of dental personnel would be met in 35 years. This indeed is an ambitious programme! We have now in India only seven dental colleges, training candidates for the B.D.S. degree of the respective universities; two of these are in Bombay and one each at Calcutta, Madras, Amritsar, Lucknow and Patna. We believe an eighth one planned for Delhi has been or will soon be set up. The total number of dental graduates who would enter the profession every year will not exceed two hundred from all these colleges.

We learn from a statement issued by Dr. C. S. RAMAN, President of the Madras Dental Council, and recently published in the local daily press that "in the whole of India, we have in Part 'A' about 1,000 qualified dentists and in Part 'B' about 2,800 registered dentists in the Dental Register. We have to admit that the existing total num ber of practising dentists falls considerably short of the basic requirements suggested in the Bhore Committee's report and at this rate, it is highly doubtful whether the problem of the shortage of dental man-power would be solved at all for a good many years to come?"

It must, in this context, be realized that there is a great dearth of teaching personnel even for the existing seven or eight colleges and the universal complaint is also about the lack of adequate funds, and equipment in these institutions. Unless these are forthcoming in the required strength, the opening of more colleges will by no means solve the problem.

The Second Five-Year Plan has provided Rs. 1·5 crores for the expansion of the dental programme by opening 20 more colleges and 250 dental clinics to be attached to all district headquarters hospitals in India; but we would like to stress here and now that the requisite personnel and equipment should first be secured before launching on the construction and opening of more dental hospitals and clinics.

As a temporary expedient we feel that it may perhaps be worth-while giving a number of senior and capable medical officers in the surgical units in the larger hospitals, a short course of training, say for six months in dentistry at the existing Dental Colleges, and posting them to the dental clinics to be set up in Headquarters Hospitals, with an extra special allowance. Those who show a special aptitude and a *flair* for this type of work may be appointed to assist the Professors of Dentistry in the existing colleges serving as understudies for a year or two before they are considered eligible to teach independently in the colleges to be newly opened. By this method it may be possible to quicken the fruition of the Second Five-Year Plan regarding personnel for the dental services without *seriously lowering* the standards of medical education. We sincerely hope the Centre and States Governments will give their serious consideration to this suggestion.

On the question of regulation of dental education and practice of the profession of dentistry, the Bhore Committee's recommendation has been implemented by the Dentists' Act of 1948. Dr. RAMAN has however, raised a very practical issue arising out of this implementation which appeals to us as a relevant and pertinent matter for the consideration of the Indian Dental Council and the Health Ministry of the Union Government. He says "The Dentists' Act of 1948 will no doubt prohibit in future the practice of dentistry by unqualified persons, but will ensure after many years to come dental service to the community only by qualified persons." This is doubtless most desirable but it may be asked, especially at a time when there is a tremendous shortage in the dental man-power, absence of adequate training facilities in the country and the closure of Part 'B' Registers completely, how best are we going to cater to the dental needs of the vast population in India during the long intervening period." In other words, we are in the same or perhaps a worse predicament with regard to the dearth of dentists, as we are with qualified medical personnel for affording medical relief to the vast rural population of India.

Under these circumstances, the Dental Council and the authorities concerned will have to review the situation and devise ways and means to solve this problem facing the dental profession as a whole in India.

Special Article

NEWSLETTER FROM THE UNITED STATES

(Science Information Bureau, 34 East 51 Street, New York 22—New York U.S.A.)

WITH the growing public awareness of disease and an interest in medical problems comes the time-consuming necessity for doctors in private practice to explain to their patients in detail the nature of their disease. One doctor in private practice is using *visual education to teach patients* what is wrong with them. J. B. Gregg, an otolaryngologist, describes in the July 13 issue of the *Journal of the American Medical Association* (*164* : 1213, 1957) how he uses lantern slides to demonstrate ailments to his patients. With some patients, Dr. Gregg has found the slide technique useful for allaying the fears associated with a contemplated operation. Dr. Gregg says that when slides are used, interview time with a patient can be shortened by one-third to one-half. Reaction of patients is invariably favourable and the physician-patient relationship is often improved.....There may be a *relationship between dental enamel faults and brain defects* in children, according to W. F. Via, Jr. and J. A. Churchill writing in the August issue of the *A.M.A. Journal of Diseases of Children* (*94* : 137, 1957). The amount of enamel formed at various prenatal stages is well-established. It is also known that certain prenatal events which may cause brain damage, also cause normal enamel growth to cease. Position of the enamel defect indicates time and length of cessation of normal enamel growth.

In a study of 100 children with cerebral disorders, 68 had enamel faults. Of these 68 abnormal children, 44 had a history of possible brain damaging events which happened at the time the tooth defects occurred. The possibility of a relationship between brain damage and enamel faults should therefore, be kept in mind. It is also possible that previous brain damage could influence the growth of the enamel thus creating an indirect relationship.

Leff and Nussbaum report in the April 11 issue of the *Annals of the New York Academy of Science* (*65* : 520, 1957) on a four-year investigation of 43 patients with congestive heart failure. The purpose of the study was to determine the effectiveness and safety of administering large cumulative doses of the *oral organomercurial*, Mercloran (chlormerodrin), following several years' therapy with Mercardan (meralluride sodium).

Of 43 patients, only 5 required occasional booster shots of Mercardan to enhance the effectiveness of the oral organomercurial. Results of the study showed that Mercloran is an effective, safe, and potent agent that gives continuous diuretic action. The results with Mercloran were particularly impressive in the older age groups and it was evident that the aged can tolerate oral organomercurials well without renal toxicity.

Treatment of retinoblastoma with a radioactive isotope, $Cobalt^{60}$, has produced encouraging results, according to Dr. Williams reporting in the May issue of the *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, (*77* : 786, 1957). Dr. Williams says that best results have been obtained when the malignant tumour involves less than one-third of the retina. If more than one-third of the retina is affected, surgical excision is employed. Of 28 patients treated with $Cobalt^{60}$, 27 appear cured although 5 of them do not have vision.....*Animal bones are being used successfully as graft material for human beings*, according to Losse in the August 3 issue of *Science News Letter*, (*72* : 74, 1957). The new material is called anorganic bone. It comes from cows and is treated with an organic solvent called ethylenediamine which dissolves all the material that might decay.

Anorganic bone has many advantages over the human bone usually used for transplants. It can be obtained in unlimited quantity ; it requires no refrigeration or special handling ; it can be kept indefinitely in a closed container and simply autoclaved before use. It is easy to shape and its porous quality makes it ideal for revascularization because the newly-formed blood vessels can work their way through the many small cavities thus providing a passage-way through which new bone cells can travel. Eventually, the patient's new bone growth replaces the anorganic material and the remodelling process is complete.

Dioctyl sodium sulphosuccinate (*Colace*) *has proved highly effective in relieving severe constipation* and impacted fæces. As a wetting agent, Colace permits penetration of oil or water into the hardened stools.

Feigen reports in the January issue of *California Medicine*, (*86* : 41, 1957) on the use of dioctyl sodium sulphosuccinate in the successful treatment of 17 children with severe constipation. In all cases, large fæcal impactions of the rectum were relieved with the use of 15 to 30 drops of dioctyl sodium sulphosuccinate per day *plus* dietary adjustments and the administration of a flavoured petrolatum. Within six weeks, all patients were having normal daily bowel movements.....

Certain eye changes that occur at death may also indicate whether or not it is too late to *revive a patient after sudden cardiac arrest*, according to Kevorkian in the August 10, issue of the *Journal of the American Medical Association* (*164* : 1660, 1957). When the heart stops beating, blood in the veins of the retina becomes segmented or interrupted and blood in the arteries disappears completely. With an ophthalmoscope it is possible to see if the segments of blood in the veins of the retina are still moving. If they are, the heart is still beating and the chances are good that resuscitation efforts will prove successful..... *Early rehabilitation of patients with spinal cord injuries* has many advantages, according to Berns and co-workers reporting in the August 3, issue of the *Journal of the American Medical Association* (*164* : 1551, 1957). Prolonged bed-rest increases the chances of complications developing in the areas of urology, neurology, psychology, and orthopædics. Early rehabilitation not only minimizes the complications and shortens the length of hospital stay, but also reduces the total cost of the programme.

Of 31 patients with spinal cords injuries, 20 developed complications and required considerably more time for their rehabilitation than the 10 who did not develop complications. .....

GLEANINGS FROM THE MEDICAL PRESS

OBSTETRICS & GYNÆCOLOGY

Vitamin B_{12} and pregnancy.—(*Presse méd., Paris,* March 30, 1957, via *J. of Amer. Med. Assoc.*, p. 1621, 1957).

Vitamin B_{12} can be assayed by biological methods that are difficult and costly and by the more widely employed microbiologic test. Lactobacillus organisms are used for the microbiologic assay. After reviewing vitamin B_{12} assays on gravid animals, the author describes studies on women during pregnancy, delivery, and lactation, on normal and prematurely born infants, and on women with anæmias that occurred during pregnancy. Vitamin B_{12} deficiency in animals causes disturbances in the reproductive function, such as death of the fœtuses, hæmorrhagic or degenerative lesions, and malformations. Vitamin B_{12} deficiency in pregnant women generally becomes manifest in the 5th or 6th month of pregnancy. The assay of vitamin B_{12} in the normal newborn infant is generally higher than that in the mother, except when the mother has had a definite vitamin B_{12} deficiency during pregnancy. The placenta is low in vitamin B_{12} content and plays an active role in the transfer of the vitamin only at the end of pregnancy. The prematurely born infant often shows a deficiency of Vitamin B_{12}, but the administration of this vitamin produces contradictory results in these infants.

Maternal hypovitaminosis is the rule during lactation. The Vitamin B_{12} content is elevated in the colostrum and in the milk during the first several weeks of lactation, and, then, it decreases, but it can be increased by the oral administration of the vitamin to the mother, particularly in combination with cobalt. Intramuscular injection of Vitamin B_{12} in the mother will effect a more prolonged vitamin increase in the milk. Certain forms of megaloblastic anæmias in pregnant women can be successfully treated by giving Vitamin B_{12}, but treatment with folic acid is sometimes more effective. The author recommends the routine administration of Vitamin B_{12} to pregnant women, particularly during the last trimester of pregnancy, and to premature infants. The standard prophylaxis and treatment of the anæmias of pregnancy in France consist of the administration of iron, folic acid, and Vitamin B_{12}.

Rupture of cæsarean section scar. (*J. Obst. and Gynaec.*, Brit Empr., *64* : 113-118, via *Mod. Med.*, 1-8-'57).

If other circumstances are favourable, vaginal delivery may be attempted in a woman who has previously had a lower-segment cæsarean section. Rupture of the cæsarean scar is less likely after lower-segment section than after the classical operation, and symptoms are less severe if rupture does occur.

Among 762 women with viable pregnancies after classical cæsarean operation, the scar ruptured in 2·2%, including 4·7% of those in labour and 8·9% of those who delivered vaginally. In contrast, only 8, or 0·5%, of 1,530 women with viable pregnancies after lower-segment section had uterine rupture. Rupture occurs before labour more frequently in women who have had classical cæsarean operations.

Rupture of a classical cæsarean scar is usually manifested as severe abdominal pain, collapse, and tenderness. Uterine contractions cease and the shape of the abdomen is altered, with the fœtus becoming palpable beneath the abdominal wall. Fœtal heart sounds usually stop.

Shock and collapse are less common with lower-segment scar rupture. Pain and tenderness of the old scar are the most usual features. Bulging of membranes through the tear to produce a swelling in the lower abdomen is a definite sign of rupture. Fœtal parts may be palpable in the immediate area of the scar, but rupture usually is not extensive enough to permit expulsion of the fœtus into the abdominal cavity. Uterine contractions usually continue after lower-segment scar rupture. Hæmaturia indicates coincident bladder tear and requires immediate treatment.

Of 100 women with ruptured classical scars, 5 died. All of 55 patients survived rupture of lower-segment scars. Fœtal mortality was 73% with classical rupture and only 12·5% with lower-segment rupture.

"Physiological studies on the human placenta".—(*Journal, Bowman Gray School of Medicine, 15* : 1, March 1957).

Through the study of diffusion properties of certain substances in the maternal and fœtal blood, endeavours have been made to uncover the pathology in toxæmia of pregnancy. A group of control (normal) patients were injected with antipyrine, and studies of the maternal and fœtal (cord) blood were done to determine the rate of diffusion of this substance through an apparently normal placenta. The results obtained were then compared to the values determined from a group of patients with toxæmia of pregnancy who underwent similar methods of study. It was found that concentrations of antipyrine in placental blood were less in patients with toxæmia of pregnancy during the first 20 miuutes after the injection. It took 7 to 10 minutes for the antipyrine to equilibrate in the fœtal arterial and venous blood.

The placental blood was withdrawn by transabdominal needle aspiration after the site of the placenta was located by roentgenogram. Evan's blue was injected in the maternal blood to serve as an indicator of the fœtal, placental, needle site as the dye did not diffuse across the placenta. A soft tissue mass was demonstrated on lateral view by X-ray just prior to injection of antipyrine during labour in order to insure that damage to the intestine and fœtus did not occur. The patient was watched closely for hæmorrhage and injection was not done until delivery was imminent. Irradiation, to the maternal gonads was less than one roentgen by this method.

Antipyrine studies suggested that in toxæmia there is a decrease in uterine–placental diffusion rate and that there is a reduction in placental blood flow, maternally.

Radioactive sodium, which has a molecular weight of 24 as compared to a substance such as antipyrine with a molecular weight of 324, was injected in a second group. It was found that the diffusion rate of the sodium across the placental tissues in toxæmia was even less than that of antipyrine. It was thought that this could possibly be explained on a basis of selective diffusion such as that which exists when an ion is associated with a more diffusible substance in a membrane equilibrium (The Donnan theory of membrane equilibrium). However, it was pointed out that there may be other explanations for this apparent selective diffusion of various substances across the placental membranes.

MEDICINE & THERAPEUTICS

The fatty acids of the blood in coronary-artery dsiease.—(*Lancet, 1:* 705-708, April 6, 1957, London, via *Jour. of Amer. Med. Assocn.*).

The observation that atheromatous plaques are predominantly lipid in composition has encouraged many attempts to correlate the incidence of coronary artery disease with abnormalities of lipid metabolism. The development of gas-liquid chromatography by James and Martin in 1956 has made possible the direct isolation, identification, and analysis of all the fatty acids between C_6 and C_{20} from a few milligrams of mixed fatty acids. James *et el* used this technique in 12 patients with coronary artery disease and in 12 healthy persons of the same age and sex. For the purpose of this analysis the blood was divided into red-blood cell, plasma-phospholipid, and plasma acetone-soluble fractions. In the red-blood-cell and plasma-phospholipid fractions, there were no detectable differences between the proportions of any fatty acids in the patients and their controls. In all 3 fractions, the mean proportions of the "essential fatty acids" (linoleic and arachidonic) were about the same in the patients and in the controls. Hence

these observations do not support the hypothesis that deficiency of these "essential fatty acids" is a factor in the genesis of coronary artery disease.

In the acetone-soluble fraction of the plasma (containing cholesterol esters and glycerides) there was some suggestion of an increase in the combined proportions of mono-unsaturated C_{14}, C_{16}, and C_{18} acids in the patients as compared with the controls. The ratio of the most abundant of these acids (oleic) to its corresponding saturated acid (stearic) was higher in the patients with coronary artery disease. The existence of a significant difference in the ratio of oleic acid to stearic acid in the patients with coronary artery disease suggests that the disease may be a consequence of some fault of metabolism rather than of diet, as is usually held. It must be emphasized, however, that the acetone-soluble fraction of the plasma lipids, in which these differences are observed, is a mixture of glycerides and cholesterol esters. Until these two lipids can be studied separately it is unlikely that a clear picture of the differences between the patients and their controls will emerge.

Cardiac massage.—(*Lancet*, Aug. 10, 1957).

In the treatment of cardiac arrest the importance of early manual compression of the heart is now rightly recognized. One result is that cardiac massage may be done by doctors inexperienced in the technique, and perhaps liable in their haste to harm the heart itself. Several workers have drawn attention to the localized petechial hæmorrhages that are occasionally seen in the epicardium at necropsy after cardiac massage, and others have reported localized rupture of the ventricle. Detailed studies of the resulting structural changes are few.

Adelson has reviewed the anatomical and clinical data in a series of cases where the patient died either during or after cardiac massage. To ensure that all the acute changes found in the heart might be attributed to manual compression, cases of acquired, or congenital malformation, and of direct injury from accidental or homicidal violence, were excluded. The results are classified in four groups—no heart damage, and slight, moderate, and severe damage. A few subepicardial or subendocardial petechiæ indistinguishable from those found in people who have died of shock or anoxia were accepted among the cases classified as having no heart damage. Multiple petechiæ or zones of haemorrhagic extravasation, often associated with small intramyocardial haemorrhages, represented slight damage; extensive haemorrhagic extravasation in any area was classified as moderate damage; and gross lacerations of the heart, such as perforation of a ventricle constituted major damage.

Severe damage to the heart was found in only 6 of the 60 cases reviewed. In 4 of these there was evidence of pre-existing heart-disease, such as an old infarct. In 40 cases the heart was apparently normal before arrest; yet only 16 of the whole series could be classified as having no damage following massage. This indictment is somewhat softened by the fact that 7 patients with moderate damage survived the period of massage for several hours. Moreover, in a further 7 patients effective cardiac action returned after massage of varying duration—105 minutes in 1 case and at necropsy no evidence of cardiac damage was found.

The wide range of pathological changes in this series of cases seems to be more closely related to the way in which treatment was performed than to its duration. The hearts were massaged by doctors with differing grades of experience; and it seems that lack of care and skill are the most important factors responsible for damage to the heart.

OPHTHALMOLOGY

Epiphora.—(*The Portland Clinic Bulletin*, March, 1957).

Robert E. Fischer, M.D., Department of Ophthalmology of the Portland Clinic divides the causes of epiphora into two main groups:—One is excessive formation of tears. The other is interference with the drainage of tears from the conjunctival sac.

(1) *Excessive formation of tears.*—Among factors contributing to excessive tearing are: emotional disturbances, hay fever, contact with irritating fumes, congestion of the nasal sinuses and chronic infection of the lids or conjunctivæ. Usually both eyes are affected. When there is excessive lacrimation in only one eye, it is always necessary to look for unsuspected foreign bodies, corneal injuries or trichiasis.

Treatment is, of course, directed towards the factor responsible for the excessive lacrimation.

(2) *Faulty drainage of the conjunctival sac.*—Improper drainage from the conjunctival sac may occur when abnormal contractions of the orbicularis muscle fibres prevent normal passage of tears through the punctum and canaliculus. Ectropion of the lower lid or eversion of the punctum may not permit the tears to enter a normally patent drainage system. The ectopion, in its turn, is frequently caused by Bell's palsy, scarring of the lid following trauma, and senile relaxation of the lid. In these patients, surgical repair is necessary to re-establish proper apposition of the lid and punctum to the globe.

Obstruction of the lacrimal system is another cause of improper drainage from the conjunctival sac. This may occur at the punctum, in the canaliculi, in the lacrimal sac, or in the naso-lacrimal duct. The obstruction may be due to congenital defects, injuries, infection, foreign bodies, or œdema of the mucosa.

If the punctum appears normal, obstruction may be present in the canaliculi, tear-sac or naso-lacrimal duct. In the canaliculi constriction occurs, particularly, after laceration in this vicinity. To maintain patency, dilatation with probes may be necessary.

In the tear-sac or in the naso-lacrimal duct, obstruction is frequently associated with mucoid or mucopurulent discharge. At times the discharge is seen to well up through the punctum following gentle pressure over the lacrimal sac. At other times, irrigation of the lacrimal sac, by means of a lacrimal needle inserted into the punctum, is necessary to establish the diagnosis. The irritation is also an effective therapeutic measure.

In infants obstruction is usually due to a congenitally imperforate naso-lacrimal duct. As a rule, the obstructing tissue is a thin membrane at the juncture of the tear-sac and the duct. Simple irrigation of the sac may be sufficient to establish a normal passage. If not, the insertion of a small Bowman lacrimal probe into the sac and tear-duct is an equally simple but more effective procedure. It is more easily accomplished in infants less than a year old than in older children. After the age of one, it may be necessary to use general anæsthesia.

Acute dacryocystitis will, of course, cause epiphora. However, the immediate issues are pain and the sequelæ of acute infection. Therefore, antibiotics are given promptly. In addition, heat is applied locally. Along with these measures, incision and drainage are done when indicated. Following subsidence of the acute infection, normal drainage of tears will at times be re-established. On the other hand, obstruction and chronic dacryocystitis frequently ensue.

In patients with chronic infection of the lacrimal sac and obstruction of the naso-lacrimal duct, the surgical approach often offers the only opportunity for complete cure. Many operations have been devised for dacryocysto-rhinostomy, or fistualization of the lacrimal sac and the nasal cavity. The classical Mosher-Toti operation has given the most successful results in the experience of many surgeons.

In this operation, an incision is made in the skin anterior to the tear-sac and is carried down through the periosteum. The periosteum and sac are reflected backward and laterally so that the floor of the lacrimal fossa and upper end of the bony canal are exposed. Cutting through the bone, a window is made to the nasal mucosa.

The nasal mucosa is then excised flush with the margins of the bony window. The entire nasal half of the tear sac is also excised. Only the lateral wall of the sac, with the ostia of the canaliculi, is retained. The tip of the middle turbinate may or may not be removed, depending on the adequacy of the nasal passages. Finally, the deep fascial layers and the skin are closed.

The procedure is well tolerated. Failures are rare. Even if the bony window were to close over later, which is unusual, the danger of persistent mucopurulent discharge would no longer be present because the infected sac has been removed.

Failure in congenital cataract surgery—(*Am. J. Ophth.*, January, 1957).

F. C. Cordes lists the complications of surgery in congenital cataract. He places glaucoma, pupillary displacement or occlusion and retinal detachment at the top of the list; corneal changes, epithelialization of the anterior chamber, uveitis, sympathetic ophthalmia, endophthalmitis and panophthalmitis occur much less frequently. He analyses the results of a histo-pathological examination of 56 eyes removed after various operative procedures for congenital cataract, and finds that 46% of the patients had glaucoma and 41% had retinal detachment (the average interval for the appearance of detachment being 22·2 years after the last needling). He draws the following conclusions: (i) Linear extraction is the safest procedure. (ii) If the pupil will not dilate well, a full iridectomy is mandatory. (iii) Multiple needlings seem to be the least desirable of all procedures. (iv) Early restoration of the anterior chamber at the conclusion of the operation by the injection of air is a worthwhile procedure.

SURGERY

Cancer of the tongue: A study based on 653 patients.—(S. Cade and E. S. Lee, *Brit. J. Surg.*, *44*: 433-446, March 1957, Bristol, England, via *J. of Am. Med. Assocn.*).

During the 30 years that have elapsed since Cade and Evans gave a preliminary report on treatment of cancer of the tongue with radium, Cade and associates have made observations on 653 patients. Whereas in 1925 there were 10 men to 1 woman among the patients with cancer of the tongue, this ratio has gradually fallen to 2:1. They differentiate between "small" and "large" rather than early and late lesions, since reliable statements about the length of the history were rare. The lymph nodes had become involved in 57% of the patients when first seen, and in about half of the remaining 43 the lymph nodes became involved later. Histologically, all but 8 of the tumours were squamous cell carcinoma. In Britain today the commonest ulcer of the tongue is cancer, although trauma, gumma, tuberculosis, infection around a foreign body, and actinomycosis may occasionally cause confusion. Biopsy should always be done. The authors observed no harmful effects from it, provided adequate treatment followed promptly.

In interstitial radium therapy, the implantation was carried out under general anaesthesia, with an endotracheal tube and a throat pack. The position of the standard radium needles is checked by roentgenograms; this is necessary for the calculation of the dose. With a dose rate of from 40 to 50*r* per hour, a total dose of 7,000 to 8,000*r* can be given in 7 days. The authors carried out 573 tongue implants in 507 patients. Conventional roentgen therapy with 200 or 400 kv. has proved disappointing, and these rays should be used only in the form of 2 million volts. The authors used teleradium units whenever external irradiation seemed indicated, and recently they used radioactive cobalt. They believe that radical surgery is rarely necessary, primary radium resistance or post-irradiation recurrences being about the only indications for radical operations.

Surgical therapy is preferable to radium therapy, however, for the treatment of cervical lymph nodes. A total of 461 of the 518 patients treated up to the end of 1950 could be traced; 124 of these survived for at least 5 years. The authors conclude that interstitial radium therapy permits the delivery of an adequate dose of radiation within a week. The postradiation effects are moderate and subside in about 3 to 4 weeks. Scarring is minimal, and the functional result is good. Primarily radio-resistant lesions can be recognized early and operated on without delay. Teletherapy is the method of choice in lesions of the posterior part of the tongue, in large tumours, and in cases deemed unsuitable for needling. Palliative and radical surgery are reserved for selected cases. The treatment of choice for cervical lymph nodes remains radical or block dissection of the neck under certain well-defined conditions. Taking into account the great palliative value, the authors believe that radium therapy remains the method of choice in the great majority of patients.

Posterior penetration as a complication of peptic ulcer.—(*Guthrie Clin. Bull.*, *26*: 139, 1957).

Shallenberger, P. and Cardwell, C. believe that posterior penetration as a complication of benign peptic ulcer is often overlooked in ulcer management, and so draw attention to this condition by citing with the pertinent literature a small series of 27 cases which were seen at their hospital.

Posterior penetration may be defined as those ulcers which penetrate to the serosa and those perforating into contiguous tissues but not freely into the peritoneal cavity. It is this type of situation which often represents the clinically intractable ulcer and in the vast majority of these cases, *surgery is the only real hope for relief*. When a patient's chronic ulcer distress becomes real pain requiring narcotics and fails to respond to medical treatment, almost invariably it represents a change to an ulcer complicated by penetration.

With the simple ulcer only visceral nerves are involved whereas penetration reaches the somatic nerves in the mesentery and adjacent tissues. This accounts for the better localization, increase in intensity and shift of location of the pain depending upon what contiguous tissues are involved.

Often the pain is referred to the back when the somatic nerves involved refer to the back, but this is true in only about half of the cases.

The most commonly invaded structure is the pancreas. This usually causes pain about the umbilicus, going around either side to the lumbar regions or straight through into the mid-lumbar area. Rarely it may go down. Probably the second most common area involved is the lesser omentum. This pain is usually referred higher in the back going up to the scapular region.

The ages of the 27 patients ranged from 27 to 74 with the average about 50. Six (approximately 20 per cent) of these cases were gastric ulcers and the remainder were duodenal. All patients had had ulcer symptoms before. Forty-one per cent had symptoms for more than 10 years, 44 per cent for more than one year but less than 10, while only 15 per cent had symptoms of less than a year's duration. Six of the patients had no previous medical treatment but the remaining 21 had been under various medical treatments before surgery.

Regarding the symptomatology, all developed an increase in epigastric pain and many required narcotics prior to surgery. Thirteen had radiation of the pain into the back. Many noted that the pain had become refractory to food and alkali.

All but one (who was 74 years old) were subjected to surgery. Sub-total gastric resections were done on 19 patients. Gastroenterostomies were done on six, two of whom had vagotomies. One patient was explored and closed because it was technically impossible to do a subtotal resection. There was only one death following surgery in a patient who developed stoma obstruction after gastrectomy. He died shortly after a gastroenterostomy for relief of obstruction.

One patient who had a gastroenterostomy developed a free perforation of a marginal ulcer which was closed and he did well postoperatively.

REVIEWS OF BOOKS

Govt. College of Integrated Medicine, Madras, Decennial Souvenir, July 1957

This souvenir was published on the occasion of the completion of the first decade of the College. This institution was started as a School of Indian Medicine in 1925 in response to a desire that the ancient systems of medicine should be encouraged. Many changes have since taken place and a ten years ago the College was formed.

There are interesting articles in this souvenir. Dr. B. Govindaraja Shenai, the present Dean, has written a short article on the development of the College. Dr. A. Srinivasalu Naidu, the former Dean has written about Medical Education and Medical Relief. The Souvenir Committee has published a chapter giving details about the various stages of development of the College. There are other interesting articles by Dr. K. S. Aiyer, Dr. V. Narayanaswamy who give a short history of the systematic development of *Ayurveda*; another on statistics about tuberculosis by Dr. N. Vijayaraghavan. Dr. Mir Fida Hussain, Vice Principal gives a brief history of the Unani system of medicine. Dr. C. S. Uthamaroyan writes about the origin and development of the Siddha System of Medicine. Mr. K. Raghunath Rai, General Secretary of the G.C.I.M. Union writes a very interesting chapter on 'Student's Welfare Activities.' The Souvenir is well got-up, neatly printed and is profusely illustrated.

Anyone desirous of having an idea of the development and the status of integrated medicine in Madras will find this a useful handbook. U.K.R.

Bengal Immunity Research Institute—Five Year Report (January 1951 to December 1955).

This book contains an account of the main activities of the Institute for the period January 1951 to December 1955. It also gives an account of the lines of research as well as a list of publications embodying the work of the institute. It shows commendable progress in the good work that is being done at the institute. U.K.R.

BOOKS RECEIVED

Parasitology (Protozoology and Helminthology) in relation to Clinical Medicine—By K. D. Chatterjee, M.D. Associate Professor of Medicine, R. G. Kar Medical College, Calcutta. Pp. 185. Distributed by S. Bhattacharyya & Co., 50-2, Dharamtala, St., Calcutta 13. Price Rs. 12-50.

Diagnostic Surgery—By Pravat C. Sanyal, F.R.C.S. Pp. 684. Distributors: Popular Book Depot, Lamington Road, Bombay-7. [Price Rs. 22·50

Mankind Against the Killers—By James Hemming. Pp. 134. Orient Longmans Private Ltd., 36-A, Mount Road, Madras 2. Price Rs. 2.

PREPARATIONS AND INVENTIONS

Thymocin manufacturers Messrs. T. M. Thakore & Co., 43, Churchgate St., Fort, Bombay-1. This is stated to be a preparation for the preservation of teeth from decay. It is claimed to be useful in pyorrhœa, tooth-ache, Vincent's stomatitis, Rigg's disease. The preparation is stated to contain iodine, sodium chloride, thymol, tannic acid, menthol, camphor, cinnamon, ipecac, glycerine etc. and so it seems to be well formulated and likely to be useful. It is available in two ounce bottles.

NEWS AND NOTES

All-India Dental Poster Competition 1958

Once again this year the All India Council of Dental Health is running a poster competition which is open to school children, college and art students. The subject of the competition must be "*Dental Care*", to be used for educating the public on how to look after their teeth. Designs can be in any number of colours done to a maximum size of 18" x 24". The closing date for the Competition is 20th December 1957 and all details can be obtained from the Honorary Secretary, All India Council on Dental Health, 64 Mohamedali Road, Bombay 3.

Trophies and replicas are being donated by Geoffrey Manners & Co., Private Ltd., Manufacturers of 'Anacin' tablets, Forhan's Toothpaste and Kolynos Dental Cream. There are also many other valuable prizes which will be donated by patrons of the Council.

World Red Cross Conference

India was host to what was the most representative international gathering so far held within her borders when the International Red Cross Conference met at Delhi from October 28 to date.

Nearly 400 delegates and observers from about 80 countries attended—a wider representation than at the UNESCO or international conference on tuberculosis held here last winter.

Over 75 of the 77 member Red Cross Societies of the world responded to the invitation to the conference. Ninety Governments who are parties to the Geneva Conventions—bedrock of the Red Cross Society's activities—were invited and most of them have sent delegates to the conference. Besides, 58 international and national organizations like UNESCO, UNICEF and ILO were invited and many accepted the invitation to send observers.

This international Red Cross Conference, the 19th to be held, was the first of its kind to take place in India and the second in any Asian country during the 98 years of the organization's life.

The conference was presided over by Rajkumari Amrit Kaur, Chairman of the Indian Red Cross Society.

President Rajendra Prasad, who is also the President of the Indian Red Cross Society, inaugurated the Conference which was addressed also by Prime Minister Nehru and Vice-President Radhakrishnan.

A New Cancer Discovery

A MIE University professor has succeeded in spotting a special substance in cancer cells, believed to have a vital bearing on the cause of cancer or its growth.

Prof. Takekazu Kosaki has discovered in exhaustive research extending over a period of 14 years, that cancerous cells contain a lipid-like substance called *Malignolipin*.

Malignolipin, according to the professor, was found to dissolve easily in water, ether and alcohol but to be insoluble in acetone. It had a peculiar affinity to porphyrine, which plays an important role in the breathing of the cell, and was present mostly in the active portions of cancer cells. His research, moreover, led to the disclosure that non-cancerous cell immersed in porphyrine assumes *a blue colour* when viewed through a fluorescent microscope under ultra-violet light while cancerous cells *glow red from* porphyrine's combination with malignolipin.

It was thus reported to be possible to differentiate a cancer cell within a few minutes.

Prof. Kosaki expressed the belief that if it becomes feasible to check the presence of malignolipin readily in some sort of a simple blood or urine test, this would greatly facilitate cancer detection.

Pædiatric Nursing

8 Fellowships for study in Madras

The United Nations International Children's Emergency Fund Execu-

tive Board, meeting at U. N. Headquarters at New York, has approved a sum of $ 2,123,000 (about Rs. 1·01 crores) for UNICEF programmes in India.

The allocation of $ 1,546,000 proposed for this programme would provide equipment and supplies for 250 primary health centres and 750 subcentres, 80 hospitals, and 70 laboratories; sanitary equipment for 2,200 schools; and vehicles and equipment to improve the health administration in approximately 75 districts.

It has already allocated in the past 12 months more than $ 2·1 millions for the provision of aid on similar lines. All the 14 States will benefit under this programme being carried out in conjunction with the Community Development Programme.

Besides $ 5,000 (about Rs. 23,800) has been allocated for eight fellowships for nurses to study pædiatric nursing at the Pædiatric Department of Madras Medical College.

In addition to the $ 2,123,000 allocations for programmes for India $ 33,000 will be utilized for inter-regional fellowships for study in Mother and Child Welfare at the Calcutta Centre.

Anti-Malaria Drive

Work in S.-E. Asia

Dr. M. G. Candau, Director-General of World Health Organization, in a survey of the progress made by the Regional Committee of the Organization in South-East Asia to eliminate malaria stated that while Burma had made an "invaluable contribution" in combating malaria, the progress achieved in the rest of the S.-E. Asian countries was "extremely gratifying."

Ceylon, was almost entirely free from the disease. Burma had exceeded its target of protecting eight million people from malaria by 700,000 in 1957. Siam and Afghanistan were on the point of providing protection to their entire population in the malarial regions, while Nepal was making a promising effort.

India, which has a population almost twice that of the other countries of S.-E. Asia, would soon have covered 200 million of its people with its National Malaria Programme.

Dr. Chandra Mani was elected for the third time as Regional Director for the S.-E. Asia region of the World Health Organization at the plenary meeting of the Regional Committee. Our congratulations to him.

Alwaye D.D.T. Factory

India's second D.D.T. Factory at Alwaye in Kerala State, is expected to begin trial production in October 1957.

The factory, which will have a capacity of 1,400 tons of technical D.D.T. per year, is expected to attain full production by the beginning of 1958.

The factory, which is being put up in collaboration with an American firm, will cost about Rs. 80 lakhs, and provide employment for 250 persons — technicians, skilled and unskilled workers and other staff. Raw materials for the factory will be obtained from chemical works in the neighbourhood and from the coke ovens of Sindri and the steel works.

Central Health Service

Selection Committee set up

The Government of India has taken in hand the constitution of a Central Health Service. A Selection Committee with a member of the U.P.S.C. as Chairman and a representative each of the Ministries participating in the scheme has been constituted to grade the various officers who are to be included in the Central Health Service. The Selection Committee has already started its deliberations.

An Advisory Committee has also been constituted to advise the Government in matters relating to the Central Health Service. The Committee consists of the Joint Secretary, Ministry of Health as Chairman, and the Director General of Health Services, the Joint Secretary, Ministry of Labour and a representative of other participating Ministries by annual rotation as members.

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