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PREVENTION OF TUBERCULOSIS*

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It is becoming increasingly apparent that the eradication of tuberculosis depends as much on efficient preventive measures as on the cure of those suffering from the disease. Methods of prevention are changing and will have to change in the future. With increasing success, they will have to be more strictly enforced if a progressive decline in the morbidity of the disease is to be maintained. As the incidence of infected persons declines the search for infectious individuals must be intensified. Complacency and relaxation in the search for active cases and the care of those with a primary infection may result in local epidemics of acute disease in children and young adults, with a possible rise in the morbidity figures for the whole country. There are some who believe that the present decline in mortality is part of a curve with a period of approximately a hundred years. Although the figures have not much statistical value, some evidence for this may be obtained from the tuberculosis mortality curve for the last three hundred years. Little can be said for or against such a hypothesis, but we do know that mortality figures have declined in almost every country in the world and that morbidity figures are beginning to follow in the same way, but at a slower rate.

Prevention is not so much concerned with mortality as with incidence, although death removes infectious cases and is in itself a preventive measure. A rapid decline in the number of deaths with a much slower fall in the number of new cases means that there are an increasing number of persons with either active or arrested disease in the country. Whilst this is happening, it means a larger amount of work in the chest clinics in following up the notified cases.

From recent surveys we can conclude that there are fewer infectious persons about and that the actual number of tubercle bacilli being disseminated is less in this country than it was a year or more ago. Similar trends may be observed in most European countries, but there are certain places in the world, such as Hong Kong, Bengal, and parts of Nigeria, where the situation is not so favourable. Progress against tuberculosis has been very erratic throughout the world and many countries are in a worse plight than we were fifty years ago, with 90% infected in the 10-15 age group. On the other hand, in Holland, Scandinavia, and parts of America the infectivity figures are only 2% in the 10-15 age group. This uneven distribution of tuberculous

infection must be borne in mind when considering preventive measures, for as the world grows smaller each year by increasing facilities for rapid transport opportunities for the spread of disease become greater.

It is against this global background that we must examine the problem of prevention of tuberculosis to-day.

Factors that have Brought About the Present Position

Many factors have operated to produce the satisfactory state that has developed as regards tuberculosis in this country. Although antibiotics have recently accelerated the fall in mortality and morbidity rates by reducing the risk of exposure to infection, the foundation of the work that has produced these results lies in the slow but steady improvement in the standard of living of the community, aided by the establishment of an efficient public health service. These will reduce mortality and morbidity to a certain level. Further reduction requires special effort, which has to be increasingly efficient as the disease becomes rarer. The fundamentals of prevention against tuberculosis are to reduce the risk of exposure to infection and to increase the resistance of the individual against the development of active disease if infection takes place. The former is ensured by the discovery and control of infectious cases and efficient treatment of those with active disease, and the latter by a high standard of living.

The well-known antituberculosis measures that have been adopted in many countries will lead to circumstances in which the infectious tuberculous person in the community will be a rarity, but where he does exist he will be a serious menace and can start a local epidemic of acute tuberculosis. I emphasize the word "acute" because with the absence of continuous exposure to natural infection the inherent resistance of the human herd is likely to decline. This might mean that the incidence rate of active disease will follow very closely the infection rate.

If my assumptions are correct, I think it will be agreed that we are coming to a time when our approach to the problem of preventing tuberculosis will have to be modified to meet the new situation of a small number of chronic infectious cases in the population, a large number of non-infected persons, and the possible decline in the inherent resistance of the herd. To these conditions must be added the danger of easy communication with countries where infectious tuberculous persons are numerous.

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The principles of prevention can be presented very simply. In any community we have four groups of people: (1) the known active cases, (2) the unknown active cases, (3) persons who have been infected and have healed lesions, and (4) those who have never been infected.

To prevent tuberculosis it is necessary to treat group 1 subjects and render them non-infectious and, if possible, arrest the disease; to discover those in group 2 and treat them as group 1. To maintain the resistance of those in group 3 so that they do not relapse; to protect those in group 4 from virulent infection, and, if they are likely to be exposed to infection, to give them B.C.G., and at the same time maintain their general resistance to infection.

Methods that have Sufficed up to the Present

In the United Kingdom we have emerged from a period when tuberculosis was a common disease. It is, however, necessary to remember that when exposure risk is high preventive methods can produce much improvement with comparatively little effort, but as the incidence of infection declines it becomes increasingly difficult to find the foci of infection from which new cases can arise. A safe milk supply free from live tubercle bacilli has reduced the incidence of bovine infection to an insignificant proportion. Contact examination has revealed many active or potentially active cases. The miniature mass radiography service has operated in many parts of the country, and up to the present has justified itself. Whether it can do so in the future, when the number of cases discovered in those willing to be examined becomes smaller and smaller, is open to argument.

In addition to these methods there is the obvious one of examination of the sputum of patients with symptoms of chronic respiratory disease.

Although these methods have achieved a fair measure of success, it would be most unwise to think that they will suffice for the future. It must be noted that there are still an average of 700 new cases of tuberculosis being notified each week. Each one of these cases, unless treated and controlled, can be a serious danger to healthy persons and particularly to tuberculin-negative individuals. There is therefore no room for complacency, and no one should think that the battle against tuberculosis is won. As mortality and morbidity decline, so new methods will have to be introduced, otherwise we shall reach a state of stagnation with a hard core of infection and chronic disease which can be a great danger to future generations.

Future Approach to the Problem of Prevention

The adoption of new methods does not necessarily mean discarding all previous ones. The fundamental principles remain. Whatever modifications we introduce it will always be necessary, so long as the possibility of infection remains, to establish and maintain a good standard of living with an adequate and balanced diet as a prime necessity to prevent the development of active disease. In countries where infection rates and incidence of disease are high the old methods of contact examination and mass miniature radiography will still suffice, but where the rate of discovery by mass examination is less than 2 per 1,000 adults in the general population examined, or the tuberculin-positive rate at the age of 14 years is less than 15%, then other methods must be introduced. These are: (1) the world-wide use of B.C.G. vaccine in children over 12; (2) periodic tuberculin-testing of all children under 12 years; (3) the revision of the use of miniature radiography; (4) the extended use of antibacterial drugs in the treatment of primary infection; (5) special attention to the older age groups in the population; (6) provision for vaccination of migrants to countries where infection is prevalent; (7) establishing a register of active

cases; (8) greater co-operation from the public; and (9) giving the general practitioner readier access to facilities for chest radiography.

I must stress that to carry out this programme will mean much extra work for the staffs of chest clinics. The success against tuberculosis in Scandinavian countries has been largely due to the liberal staffing and generous equipment of the chest clinics. Our efforts to prevent tuberculosis will be handicapped in the future if the staffing and accommodation of chest clinics, particularly in rural areas, are not adequate for the increasing work they have to do.

Universal Use of B.C.G. Vaccine

It will be agreed that B.C.G. is a preventive measure, but it has three disadvantages: the immunity conferred is partial and temporary; if B.C.G. is given to infants it rules out the use of tuberculin as a diagnostic and case-finding agent; and it can produce, through overconfidence, relaxation of essential preventive measures. In places where the risk of exposure to infection is high these disadvantages are outweighed by the advantages, but where the risk is low and infection is infrequent the disadvantages assume more importance, and then most authorities are inclined not to advocate mass vaccination of infants and children. In every part of the world the risk of infection increases during adolescence, so that vaccination at some period during schooling should be universal. Contacts of all ages who are tuberculin-negative should be vaccinated.

If we refrain from vaccinating infants and young children, the tuberculin test can still be used for diagnostic purposes and as a method of case-finding. As exposure to infection becomes more rare, the importance of primary infection, when it does occur, becomes greater. It is therefore essential, in the absence of mass B.C.G. vaccination of infants and young children, to carry out periodic tuberculin-testing so that any recent primary infection can be controlled and progressive disease prevented. If serial tuberculin-testing is not done then there can be only administrative reasons for objecting to extensive B.C.G. vaccination of children.

Serial Tuberculin-testing

Assuming, therefore, that in Great Britain B.C.G. vaccination is reserved for contacts, schoolchildren over 12, adolescents, and older age groups, we are left with infants and young children for serial tuberculin-testing. It is at present accepted that where an infectious case is known to exist all contact children must be tuberculin-tested. Serial tuberculin-testing is only an extension of that scheme to establish the testing of all children at the ages of 2, 5, 9, and 12 years as a routine. Any positive reactor would be considered as an index case, and search for the infectious contact would be made. Gedde-Dahl (1952) in Norway and McDougall *et al.* (1953) in this country have used the method successfully. It would mean allocating staff for this work. There is no reason why health visitors and nurses should not do the testing. At present the reading of the test is the responsibility of the doctor, but consideration should be given to the training of nurses and health visitors to do this work and give B.C.G. if necessary, as is done in Scandinavia. It must be appreciated that serial tuberculin-testing of children would involve a great deal of labour and organization, and cannot be done under present staffing conditions.

Furthermore, serial tuberculin-testing will lose much of its value as a preventive measure if a greater effort is not made to x-ray periodically all those whose work brings them in contact with children. Every chest physician knows that this is a matter of vital importance, and we should look forward to the day when every person working with children will have to have a chest x-ray examination.

Growing Importance of the Tuberculin Reaction

Some years ago, Sir Pendrill Varrier-Jones said to me that before we can eradicate tuberculosis we must discover the

lesion before it causes signs or symptoms. Myers (1954) has said that it is completely illogical not to treat an infectious disease at the earliest possible moment.

With serial tuberculin-testing we can, in children, discover the primary lesion in its earliest stages. After school age the issue is complicated and a positive tuberculin reaction does not necessarily indicate active disease but only that infection has occurred. In these age groups we have to rely on the cruder investigation by radiography, but in young children it is highly probable that we can clamp down on the disease in its very earliest stages and render it harmless by suitable antibacterial drugs.

In preventive work, it is important to appreciate the significance of the primary infection. A recent primary infection means that there is an active infectious case in the neighbourhood which must be discovered. The primary lesion can be cured and with proper care need not become active again and cause further spread of infection, but if it is mismanaged it can develop into a serious clinical and public health problem. It is therefore necessary to have the greatest respect for the primary infection, and in children the tuberculin reaction is the key to the problem.

The Tuberculin-positive Child

The naturally tuberculin-positive child must be taken much more seriously than in the past, particularly if the tuberculin reaction is severe or the conversion is known to be of recent origin. A persisting positive tuberculin reaction indicates that there are live tubercle bacilli in the tissues, but not necessarily an active lesion. These bacilli are causing, or can cause, an active lesion. All primary infections cause for a period an active lesion, the fate of which is decided by the inherent resistance of the individual, the magnitude of the dose, and the power of the organism to multiply. These are unknown and at present immeasurable quantities, and although we know that in most cases the lesion will heal, we cannot be sure that it will do so. Furthermore, there is always the fear that the herd resistance of the community to tuberculosis will decline in a country with a low infection rate. If so, then the possibility of a progressive primary lesion following infection will be more real in the future than in the past.

In a recent survey of 3,955 children by Enell (1955) in Stockholm, 65.3% of non-vaccinated children developed symptoms of clinical tuberculous lesions following the primary infection. In the vaccinated only 1.22% acquired symptoms. One explanation of this high incidence of active disease is that the herd resistance is declining. If this occurs then non-vaccinated children and young adults are in great danger of developing progressive disease when in contact with an infectious person.

For these reasons all my own unvaccinated patients under the age of 10 years with a positive tuberculin reaction and no radiological evidence of a lesion are given twelve weeks' treatment with P.A.S. and isoniazid to ensure, if possible, the healing of the primary complex. Children of all ages with a positive tuberculin reaction are, so far as is possible, x-rayed, and if a lesion is seen in the film which has the characteristics of active primary tuberculosis streptomycin with P.A.S. or isoniazid is given, the length of treatment depending on the severity of the lesion, the minimum period being six months.

I believe that the management of the naturally tuberculin-positive children in this manner will cause little or no discomfort, and in most instances will not disturb the normal routine of the child's life.

Extended Use of Miniature Radiography

Mass miniature radiography is satisfactory for case-finding and prevention when there are plenty of cases in the population surveyed. Where the morbidity of the disease is low, and still more so where the number of infected persons is low, it becomes wasteful, expensive, and clumsy as a method

of prevention. Most authorities agree that the mass examination of schoolchildren is unprofitable, and as the number of negative tuberculin reactors becomes greater in the higher age groups the same reason will make mass examination of adolescents unprofitable. On the other hand, the examination of selected groups, especially of elderly males, becomes more and more important. Unfortunately, these are the age groups in which the least co-operation is found.

The response in mass radiography surveys of cities has not, on the whole, been too encouraging. The gratifying achievement of the Rhondda Survey with 89% of the population examined was greatly due to the enthusiasm of Cochrane *et al.* (1952), who encouraged intensive home visiting, but even here there was a falling off in the higher age groups.

Another successful localized survey, again mainly due to intensive home visiting, was that of the Cambridge village of 1,430 inhabitants done by Smith (1956) with 91.6% response.

Other surveys show lack of co-operation of the public to a greater degree: 30% of all adults in the Salford Survey, 60% in a part of Edinburgh, and 60% in Blyth (*Med. Offr.*, 1956).

In most of these surveys there is a lack of co-operation in the higher age groups. Where some compensation is possible on discovery of the disease, the response is better. This comes out clearly in the Rhondda Survey, where the miners were much more co-operative than the non-mining population, and in the Pittsburg Survey, where the insured class responded better than the non-insured class.

In Australia compulsory methods have yielded good results, but these methods require powers that do not exist in this country.

Unfortunately, it is the persons who are reluctant to be examined who are the ones most likely to be suffering from active tuberculosis, and therefore it is essential to capture them.

Personally, I would say that fear is the greatest deterrent. Fear of the consequences, which may be social, medical, or economic. An unusual reason for non-co-operation in an x-ray survey of vagrants in a large common lodging-house was given to me by the warden. He said the elderly men of no fixed abode are quite unimpressed by being told that the x-ray examination will tell if they are healthy or not. They look upon the doctor as being in league with the police and the x-ray film as a kind of finger-print by which they may be identified in the future. Other persons, when they are asked to be examined, half suspect that the doctors think there is something wrong with them already. Others just cannot be bothered, and this applies to adolescents and young adults.

The second deterrent is apathy, which is more difficult to overcome than fear. A third reason for not being x-rayed is reluctance to be thought peculiar if others are not being done. The crowd can be so easily led by a dominating personality.

How are we to overcome these deterrents? Firstly, I think we must make the public regard chest radiography in the same light as they regard examination by the stethoscope. It must be the normal procedure in a medical examination. If any person with chest symptoms seeks medical advice and a chest x-ray film is not taken, then that person should instinctively feel that the examination has been incomplete. Much could be done by training senior schoolchildren to expect a chest x-ray examination when undergoing a medical examination, or visiting a doctor for a chest complaint.

Secondly, when a pre-employment health certificate is required it should state that the chest has been x-rayed. This should be considered essential for all those whose employment brings them into contact with children.

Thirdly, although there is a danger in placing too much reliance on radiography at the expense of ordinary clinical history-taking and physical examination, both medical

students and qualified practitioners should be told much more frequently that a chest x-ray film should be obtained at some time in all cases attending out-patient clinics, especially in those with any chest symptoms, however slight. These measures would do much to bring the younger folk to the x-ray plant.

Special Consideration of Elderly Persons

There is little doubt that the hard core of tuberculous infection in a country in which the mortality and morbidity rates have been substantially reduced will lie in the older age groups, and particularly in the males. Radiography and sputum-testing must be relied upon to reveal these cases. Some may be discovered by contact examination or the sudden appearance of tuberculin allergy in children who have been subjected to serial testing. We have seen that there are difficulties in persuading these elderly folk to be examined. I do not think the influence of the general practitioner has been brought to bear on this problem as much as it might be. I also think that if general practitioners and medical officers of homes for elderly persons and institutions for infirm would insist on a recent chest x-ray film more frequently, a considerable amount of unknown tuberculosis would be discovered.

It is not likely that propaganda will be of much value in persuading elderly persons to have a chest x-ray examination. It is therefore necessary for all doctors who come into contact with them professionally to take every opportunity to advise an x-ray and a sputum examination to make sure that no pathological chest condition is being overlooked.

The Static Unit

In order to carry out the proposals I have made it is essential to provide the necessary facilities. At present they do not exist. The present mobile mass miniature radiography units do not fulfil the need. They have served their purpose, but now must be augmented largely by static units based on hospitals and chest clinics. Some highly mobile units will still be required in each region for special surveys in schools and factories where there is reason to believe there are active cases. Mobile units will also be needed in areas where public transport is difficult or not available.

The static units that have been established are proving their worth. The one at Finsbury under Dr. Brett has discovered tuberculosis at the rate of 7.7 per 1,000 examined (Brett *et al.*, 1956). Of the male cases 62% and of the female cases 37% were infectious. Some other static units have done even better than this. It is significant that the highest yield came from doctors' patients and volunteers. The efficiency of the static units that have been established for discovering tuberculosis is much higher than that of mobile units and they are much less costly to maintain.

I would therefore advocate static miniature radiography units in all large towns, but it is essential that the service thus provided shall be completely free to all. Rural areas where transport facilities to the static unit are poor will have to be served by highly mobile units which will visit the area frequently and regularly. A service of this kind has been started by Dr. Jarman in the rural areas of Wales. At these visits it is hoped that all contacts, non-vaccinated positive reactors, symptom cases from general practitioners, special groups, and those who wish to have an x-ray examination of the chest will come to the unit. I would also advocate establishing a miniature x-ray unit in all large general hospitals so that every patient entering the hospital, as either an out- or in-patient would automatically have a chest x-ray examination.

It is important that all static units are associated with the chest clinic and that arrangements are made for the dual reading of the films by competent persons. This means a closer relationship between the chest clinics and the mass radiography services than at present. It also means that the present free service of the mass radiography units must be

extended to the static units. Paediatric departments in hospitals also have a responsibility in this respect, and close liaison between them and the medical staff of the chest clinics should be encouraged.

All persons working with children and all individuals attending general practitioners for any chest complaint, particularly elderly persons, immigrants, and casuals, should be sent to the static unit without charge, and abnormal conditions referred to the chest clinic for further investigation.

One hopes that in the future a miniature chest x-ray film will be taken in all cases that have not had one within the last two years when attending a general hospital for any purpose. Children who are known contacts of tuberculous persons should be x-rayed at least every twelve months for five years after the contact is broken. The static unit would make this possible without great expense.

I believe that these measures would discover pockets of infection that are at present unknown.

Role of Isoniazid in Prevention

In the past two years many observers have stated that isoniazid-resistant organisms have a low pathogenicity to guinea-pigs. The reports are not so definite with regard to mice and men. Walsh McDermott (1955) is of the opinion that isoniazid, used alone, gives results equal to those of streptomycin and P.A.S. Ferebee and Palmer (1956) have shown that the drug actually protects guinea-pigs from developing tuberculosis. There is already a considerable amount of literature on the subject from which it has been concluded that isoniazid can be used as a cure and as a preventive. There is no doubt that isoniazid has remarkable anti-tuberculosis properties and is definitely bactericidal to the tubercle bacillus, but I do not think there is sufficient information to believe that tuberculosis in any community will disappear by prescribing prolonged treatment of all active cases with isoniazid. Nor is the evidence at present strong enough to maintain that the protective power of isoniazid is so great that it will prevent tuberculosis developing in children. Controlled trials with careful follow-up of patients must be organized; but until these have been completed it is wise to continue treatment with a combination of antibiotics and at the same time persist with B.C.G. and public health measures to prevent the development of the disease.

Problem of Immigrants and Emigrants

Our preventive measures will be only partially effective if we confine them to searching for infectious cases in our midst and take no steps to prevent infectious cases coming into the country, or protecting susceptible individuals emigrating to countries where the infection rate is high. Let it be said quite definitely that everybody proceeding from Great Britain to such countries should be advised to make sure, for their own safety, that they are tuberculin-positive before they depart. This means tuberculin-testing and giving B.C.G. to negative reactors.

With regard to immigrants, the problem is not so simple. Four groups of individuals have to be considered on entry to the country: (1) the person who has active tuberculosis, (2) the person who has an arrested lesion which may have had treatment in the past, (3) the healthy individual who may develop tuberculosis after arrival, and (4) the seaman who is found to be tuberculous whilst in port and for this reason cannot return with his ship.

It is not the function of this paper to go into details of administration to deal with these four groups, and, although there is no power for it to be required, it would be an advantage if all aliens could have a chest x-ray examination periodically, prior to reporting to the police. All immigrants with a British passport might be informed where they can obtain a chest x-ray examination and how this can be arranged. I do not think that much tuberculosis is imported by immigrants, but the proportion developing tuberculosis

after arrival is likely to be higher than the normal morbidity rate. This is because the circumstances under which some of the immigrants live are favourable to the development of tuberculosis. General practitioners should be warned of this and requested to keep a special look-out for the disease in this group of the population.

An investigation on the Irish immigrant has been carried out by Hess and McDonald (1954), who think the problem is serious enough to demand B.C.G. vaccination of Irish immigrants before leaving Ireland, with provision of a follow-up scheme in Britain.

Establishing a Tuberculosis Register of Infectious Cases

It would be valuable to know the number and location of all infectious cases in the country. This sounds an easy proposition, but it gives rise to a number of problems, the chief of which are: (1) establishing a uniform degree of search for the tubercle bacillus in determining infectivity; (2) the period of time that must elapse in a case of active tuberculosis since the last positive finding, in order to establish non-infectivity; (3) the influence of chemotherapy and particularly isoniazid on infectivity; and (4) the difficulty of defining activity.

At present the notification register is a great asset to preventive work, and, although it gives little or no information on the number of infectious cases, it is an indication of the potential danger of tuberculosis to the community and permits preventive measures to operate. Scotland has established an intimation register based on Form 7B, from which it is possible to establish a live register of infectious persons.

As the tuberculosis problem becomes smaller, a similar return could, with advantage, be adopted in England and Wales. It would be necessary then to keep registers of all persons suffering from tuberculosis and of those that are discharging tubercle bacilli.

Greater Co-operation from the Public

The co-operation of the public in preventive measures is essential for success. Great progress has been made since the war, mainly due to the excellent work of the old guard of tuberculosis officers and the present chest physicians, the health visitors, and the educational activities of the N.A.P.T., but Hartston and Gore (1953) have shown how great is the ignorance of the average person on tuberculosis, especially on its infectivity.

Nearly fifty years ago Sir Robert Philip (1937) said: "Individuals and communities must be shown that the disease is maintained through ignorance and folly, and that its removal lies completely in their hands. Explicitly and without panic, the people must be taught from day to day that tuberculosis comes of their disregard of physiological law for themselves and for their cattle. Thereby a higher standard of national and personal cleanliness will be evolved, in the presence of which the tubercle bacillus will be gradually discounted."

This is still true to-day, and, although the lesson has been learnt by the majority in our own country, there are many overseas territories where it still has to be appreciated. There are, however, points in our health education that need stressing and others which need decrying.

Among those that need stressing I would place: (1) The importance of diagnosing and treating the primary lesion in all age groups, and particularly in children. (2) That B.C.G. vaccination, although a valuable preventive measure, does not offer complete protection against tuberculous infection. (3) That tuberculosis cannot be eradicated by the use of antibiotics alone. (4) That healthy living under good conditions and adequate diet and rest are the best safeguards against tuberculosis. (5) The seriousness of spray infection by uncontrolled coughs and sneezes. (6) The patient must not think the disease is trivial just because he can be treated

at home, and the advice of the chest physician must still be followed in every detail. (7) That the tuberculin-negative person is in danger when in contact with an active case of tuberculosis.

It is not necessary or wise to give the impression that: (1) tuberculosis is now no longer a disease of national importance, (2) all persons are equally susceptible to tuberculous infection, (3) it is always dangerous to live or work with a tuberculous person, (4) tuberculous persons are sub-standard workers, and (5) rest of mind and body are no longer necessary when antibiotics are prescribed.

Public co-operation can be obtained through education or regimentation. The former is better than the latter, but both may at times be necessary. I think that much greater effort should be made to make children and adolescents more health conscious, which means teaching them to avoid the predisposing causes of ill-health. More could be done in the schools, using films, illustrated stories, and puppet plays, to bring the means of obtaining good health to the senior boys and girls. Dr. R. A. Hoey, medical officer of health of Aberbargoed, has done pioneer work in this direction, with good results. It is important, however, to do all this work with the co-operation of the general practitioners and the health visitors.

Role of the General Practitioner in Prevention of Tuberculosis

Thousands of patients come to general practitioners daily for medical advice; for, however much the National Health Service has changed the work of the general practitioner, it has not eliminated him from being the first line of the profession in closest contact with the suffering members of the population. Here, therefore, lies the great opportunity for early diagnosis, initial advice, and prevention of the spread of any infection.

But the general practitioner must himself be well informed. Refresher courses are being arranged in tuberculosis and diseases of the chest by the Tuberculosis Educational Institute, and some medical schools have included lectures and demonstrations on tuberculosis in their postgraduate studies.

I feel sure that the majority of general practitioners wish to have information on the radiological diagnosis of tuberculosis and chest diseases, and I think they should be encouraged to carry out tuberculin tests, but, most important of all, they should be pressed to use their influence to persuade their patients with symptoms of respiratory disease to have a chest x-ray examination.

Conclusion

Although the practice of medicine is an art, it does not mean that we should tolerate inefficient methods. Labour and material are too precious to be wasted; therefore we must strive to produce the maximum results with economy of man-power and efficiency in administration.

In the prevention of tuberculosis the removal of general predisposing causes of ill-health is essential. On this foundation we can establish our special measures for the discovery of active infectious cases and the protection of the healthy from developing the disease. But the responsibility for the prevention of tuberculosis does not rest only on the medical profession. It must be borne by all sections of the community. The co-operation of the public is of paramount importance. If they refuse to co-operate in measures designed for their own good and persist in actions that are harmful to others, then some pressure must be brought to guide them in the right way. It is in this that the physician needs the help of the informed layman and others who can influence public opinion, because to obtain permanent

progress the individual must eventually be willing to act, without compulsion, for his own benefit.

Tuberculin-testing, miniature radiography, B.C.G. vaccination, and antibiotics are the four cardinal points of the compass that must be our guide to the eradication of tuberculosis, but the compass must be firmly based and binnaced by sound general public health measures. The importance of the primary infection and the lesion it produces can hardly be overestimated, for the initial reaction of the tissues to this invasion influences the subsequent course of the disease. It is therefore essential that future preventive measures should be directed, in the first instance, to discovering and treating the primary lesion whenever it occurs. To do this serial tuberculin-testing of children and establishing free static miniature radiography services in all large towns are advocated. Every effort must be made to prevent the spread of infection from persons with active disease who live in or enter countries where the incidence of infection is low.

This is the major reason why tuberculosis has become an international problem. The more favoured nations must assist those in whose country the disease is still a major public health problem, not only because of the danger that lies at the door, but because the elimination of disease and relief of suffering are duties that the healthy must accept for the benefit of all mankind.

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NEUROPSYCHIATRIC OBSERVATIONS IN THE WESTERN REGION OF NIGERIA

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It is proposed in this article to discuss in outline the various neuropsychiatric problems studied in our psychiatric day hospital and to inquire whether, and in what sense, a neuropsychiatric day hospital is of value as an instrument of investigation and therapy in this particular social environment.

It is important to define the attitudes of the African to sickness in general and to mental illness in particular. There is also a great need in our entire management of the patient to consider and treat him within his social environment. Insight may thus be gained concerning the therapeutic and educational training towards a stable mental health programme for the Western Region of Nigeria.

The whole question is of practical, even immediate, importance because within the next few years we shall be

evolving our own methods of investigation and treatment—methods which have strong bearing on our social organization.

The Peoples and Social Conditions

The area which is classified as the Western Region is inhabited by a large number of tribes speaking different dialects or languages and having very diverse cultures. The population is about 6½ million, and the principal tribes are Benin, Yoruba, Urhobo, Itshekiri, Western Ibo, and Western Ijaw.

This great diversity of tribes and cultures makes any survey of neuropsychiatric problems of this area peculiarly difficult, and the task is not rendered easier by the almost complete ignorance about some of the customs of the smaller tribes. There is also the lack of any complete or reasonably detailed study of the mental disorder occurring among any one people in the Western Region.

For practical purposes the social strata of the people dealt with can be divided into three broad categories: (1) the Westernized (Europeanized) group; (2) the marginal group; and (3) the largely untutored and comparatively primitive group.

In the first group are patients whose cultural standards range between that of a legal practitioner and a qualified nurse. The marginal group consists largely of those who have been described as occupying the artificial region of no-man's-land—that is, not belonging to either group. They are usually daily paid labourers and the lower artisan class—with varying degrees of illiteracy but urbanized to a considerable degree. In many areas the older generations are becoming increasingly dependent on the younger, who are able to earn good wages since the only source of liberal cash is wage labour in distant towns. The primitive group, which is disappearing gradually, has been and still is our immediate preoccupation.

Although the socio-cultural factors vary among the tribes there are significant points of similarity between the various tribal institutions and those of the other less developed areas in the world. In a simpler society, in the words of Lin Yutang, man lives a life closer to nature and closer to childhood, a life in which the instincts and emotions are given free play and so contrasted against the life of intellect, with a curious combination of narcissism, omnipotence of thought, and arrogance of the spirit, of profound wisdom and foolish gaiety, of high sophistication and childish naïveté. A strong sense of social security in a closely knit society, well-organized and well-defined kin groups with definite mutual obligations and affection, reinforced by ancestor cult, are well exemplified in this type of culture.

Western Nigeria is predominantly a country of peasant farmers, and the main sources of economy are cocoa, kola nuts, and palm products, though quite a large proportion have now taken to trades of various kinds. In the Benin-Delta region the chief occupation is in the timber and rubber industries. Fishing is relatively important in Western Ijaw and in the villages lying on the Niger delta and on the coast.

The Western Region of Nigeria is rapidly changing culturally and socially, and the most recent advances in these spheres are spectacular, but nevertheless traditional tribal customs still flourish in considerable strength, mostly in rural areas.

According to the native law and custom, marriage is potentially polygamous in the sense that there is, during its subsistence, no legal impediment to the contracting of another marriage (or of an unlimited number of other marriages) by the husband. It has been said that this practice reflects adequately the fundamental inequality between the sexes which seems to be typical of African social systems (Phillips, 1953).

From the racial standpoint the Western Region is fairly homogeneous, being entirely negroid. In the Benin-Delta