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The Problem of Tuberculosis.

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When the problem of tuberculosis started no one knows and no one knows when it will be solved.

I propose to sketch first a brief history of tuberculosis from earliest times to the present day showing how knowledge has come to us occasionally in spurts, but as a rule by slow degrees. Secondly, to show how by improving the general health of the people the death rate has been reduced in spite of unavailing efforts to find a specific drug to combat the disease. Thirdly, to survey the effort (in the way of dispensaries, sanatoria, etc.) that has been made to educate the people of Great Britain to avoid the dissemination of tubercle bacilli, because ultimately it is the bacillus that causes the disease. Fourthly, to insist upon the importance of early diagnosis, and finally, to consider the problem in this country.

THE HISTORY OF TUBERCULOSIS: Evidence that it was known to the ancient civilizations is shown by cuneiform inscriptions on tablets in Babylonian Ruins. References to tuberculosis are made in the Bible and the Talmud. It seems that Hippocrates was the first physician to make an attempt to classify it. His difficulties were very great. After all tuberculosis may be acute or chronic, cæsating or fibrotic, and as we know its naked eye appearances in the lung vary considerably. His classification held good for many centuries. Even in those days they held the belief that it was contagious and over two thousand years ago country air and especially the air of pine forests was recommended. Nothing further of any importance seems to have been done to further the knowledge of tuberculosis for about 1500 years, but from around 1700 A.D. onward, a steady stream of research led up to Laennec’s work in 1819. None of these theses seem to have been accepted without considerable difference of opinion. Laennec’s work clarified and simplified the pathological and clinical aspects of pulmonary tuberculosis. Even his work was not accepted without opposition. The next step was to determine whether tuberculosis was infectious. Laennec evidently did not believe in the communicability of tuberculosis. Finally Villemain published his famous thesis “On the cause and nature of Tuberculosis and the Inoculation of the same from Man to Rabbit.” This was a very remarkable piece of work and excited much discussion for as yet the tubercle bacillus had not been isolated. It was in 1882 that Koch discovered the tubercle bacillus. This discovery settled once and for all the specificity of tuberculosis. This, then, is a brief resume of the history of tuberculosis which ends here, for from the time of Koch’s brilliant work little or nothing dramatic has been done in this direction.

THE FALL IN THE DEATH RATE FROM TUBERCULOSIS. The death rate from all forms of tuberculosis in Great Britain is about 10% of the total number of deaths. Nevertheless the rate has dropped very considerably in the last 80 years. The proportion of deaths from Tuberculosis since 1850 has dropped to one third. How has this come about? Various factors have contributed. The economic position in those days was such that children, mothers, and fathers, worked side by side in badly ventilated and unhygienic workshops and Factories for 12-14 hours daily. This may have been a direct contributory factor to the high death rate. Laws have slowly improved the conditions of the worker. Children and female labour have been prohibited, working hours have been cut down, working conditions for adult males have been vastly improved. Food supplies have improved in the last 80 years and the working class are better able to afford good food. They get a better balanced ration. Better housing accommodation and sanitation have, one may say, been forced upon the working classes. Inspection of houses prevents filthy refuse-
heaps. Overcrowding is not allowed. The sale of milk and meat from tuberculous animals have been prohibited as far as possible.

These various laws act in two ways, not only do they improve the general health of the people but prevent the dissemination of the bacillus which undoubtedly, is the cause of tuberculosis.

It is interesting to note that the death rate went up during the War, not only in Great Britain but also in neutral countries. This increased death rate was due to the increased cost of living, bringing in its course a deficient and unbalanced ration among the poorer classes; and also the fact that very young people were working in munition factories under conditions such as prevailed in the earlier industrial ages.

In addition to these various legislative actions which aim at improving the general health of the people, Great Britain has other means of specifically dealing with tuberculosis. This is the "Tuberculosis Service." There is first of all a Dispensary with specially trained Medically Officers who examine all cases of tuberculosis which have been notified by the family doctor (all such are notifiable), and decide what is to be done with them. They examine all contacts, i.e. all people who have been in contact with the affected person either in their homes or at their work. Their other duties are to examine any individual who may think he is suffering from the disease. Having made, or confirmed a diagnosis of tuberculosis, it has to be decided whether the case can (1) be treated at home, and if so, to see that all care is taken of the patient and also that the sputa etc. are dealt with. (2) If a case is suitable for a Sanatorium. (A Sanatorium is meant for cases whose condition can be improved; that is for cases who have a limited degree of disease of the lung and where it is thought that under treatment the individual may be able to return to his former occupation.)

If the case does not fall under either of these categories then it goes to a Tuberculosis Hospital. In addition, Farm Colonies have been established, these are training schools for the arrested and healing cases—a place where they can learn some useful trade or occupation and instead of being a drain on the state, become economically self supporting.

The Dispensary therefore subserves a very useful function as is shown by the fact that the first one in England started in 1909, and now there are several hundred.

Now what specific methods have we had for dealing with the individual who develops tuberculosis? Various remedies have been advocated for the cure of tuberculosis. In 1890 Koch announced the discovery of Tuberculin and the results of its use and for which he claimed success. The results of its use were disastrous primarily because it is only a factor for harm, but in 1890 especially the disasters occurred largely through the excessive doses. Anyhow it fell into disrepute for many years. Some years after, the profession started to use it again but in much smaller doses. To-day it is hardly ever used and even the few who do so, claim that it is only useful in certain types of cases. Besides Koch's Tuberculin of which he had three kinds, numerous other makes have been put on the market.

The next effort was Friedman's Turtle Vaccine. The idea being that the tubercle bacilli from a cold blooded animal would have a better effect. Certain drugs and metabolic salts have also been advocated. The first of any importance was Leonard Rogers Sodium Morrhuate. The best that can be said of it is that it seems harmless.

Spahlinger's treatment was never put on the market and a mystery has always surrounded it. His idea was that every complication was caused by a type of tubercle bacillus, i.e. a certain strain of bacillus caused hæmoptysis, another variety pleurisy, and so on. In all somewhere over 30 types, and by having sera and vaccines from these strains all you had to do was diagnose your type of bacillus and give that particular serum. Nothing has been heard of Spahlinger for some years now.
The latest drug is Sanoerysin—a gold salt preparation. Koch originally discovered that gold salts (depending on their strength) had the power of inhibiting or killing tubercle bacilli in vitro. Sanoerysin is a thiosulphate of gold and was lauded as a cure. Unfortunately like all these other drugs it is in the opinion of most workers absolutely useless. Unlike Sodium Morrhuate it is also a dangerous method of treatment.

So far then our efforts to find some specific substance for the treatment of tuberculosis have failed. All these substances have been used to heal diseased organs. Calmette has introduced a method of trying to prevent the disease. His method is to vaccinate either by mouth or subcutaneously a dose of his B.C.S.—B.C.G. (Bille-Calmette-Serium) as a virulent strain of tubercle bacilli which was grown continuously under certain conditions for many years until it was found to have lost its virulence for all species of animals but still retained the power of producing antibodies when administered to a non-tuberculous animal.

Calmette has now vaccinated many thousands of infants starting a few days after their birth. He claims that the death rate from tuberculosis has been very considerably reduced. A large number of these infants are the off-spring of tuberculous parents. Calmette's critics maintain that his figures showing the lowering of the death rate amongst infants is incorrect. Also, and this is most important, that although these organisms used in Calmette's vaccination introduced into the body in a non-virulent form do not, however, remain so but become virulent tubercle bacilli, and produce the disease. Time alone will demonstrate the truth. If Calmette is right then it is a piece of work greater than anything that has been done in the annals of tuberculosis and apart from the prevention of this disease will save the world millions of pounds per annum. It is much more likely too, that we will eventually find a preventive rather than a cure for tuberculosis. Healing of tubercle takes place by throwing out scar tissue around the lesion, and as this fibrous tissue contracts, it limits the blood supply to this part. Within this scar tissue the bacillus remains alive. It is a matter of great difficulty for a drug to penetrate these parts. Much easier will it be to find some substance such as we have for the prevention of small-pox.

When we turn to the specific treatment of tuberculosis we encounter many difficulties in assessing the value of the particular treatment. All these difficulties bring out the natural healing powers of the individual. We know that given hygienic conditions and complete rest, conditions that apply particularly in a Sanatorium—a fair proportion of tuberculous lesions will heal, or at least become arrested. We also know that healing of the lungs will depend on the site of the lesion—lesions above the clavicle for instance will heal more readily than those immediately below it. So that if a remedy is to be tried it is very difficult to determine whether it is the remedy or the natural powers of the body that has produced the good result. In other diseases such as syphilis, pernicious anaemia or even diabetes we can test the blood and prove that their specific treatments are doing good but in tuberculosis we cannot do so. We have in pneumonia the same difficulty as in tuberculosis, i.e. a large proportion get better whatever the treatment and it is impossible to judge the value of any special drug.

HEREDITY IN TUBERCULOSIS: Children born of tuberculous stock are often weaklings, they are not born with tuberculosis but acquire it within a few weeks of birth from the parent. That is the present idea and the question of heredity as a potential factor does not exist.

INFECTION depends on many factors. The most important is the dose of the organism, and the degree of its virulence, the state of health at the time of infection and the patient's environment.

THE DIAGNOSIS: It is not within the scope of this paper to discuss methods of diagnosis in detail. May one say that students in this country have more opportunity than their overseas brothers to handle
tuberculous chests. Overseas it is exceptional to have these cases in the wards for more than a day or so. In this country, because we have little or no proper accommodation, the wards are overcrowded. It is only by constantly examining chests that knowledge will be acquired. Do not think that there is any easy way by which to "spot" tuberculosis. Don't be led by the Radiologist. It is your business to lead him. An X-Ray photograph is very useful but not any better than your eyes, ears or hands.

In going over the Annual Reports of the Johannesburg General Hospital one is struck by the figures of the admissions and the death rate from tuberculosis amongst natives. I am not going to bother you with tables of figures, but over the last few years there are about 200-250 admissions with a death rate of round about 80%, whereas amongst Europeans there are about 150 admissions with a death rate of about 20% to 25%. What do these figures indicate. Is there any difference in the manner in which tuberculosis affects the two races producing a death rate more than twice as high in the native? In adult Europeans there is a natural degree of resistance to the disease which the infant European or the adult native has not got. What the nature of this resistance is, no one knows, but what it does do, is to prevent a rapid dissemination of the disease through the organs of the body. In other words when an adult European develops clinical tuberculosis his natural powers of resistance throw out scar tissue limiting the progress of the morbid condition. European infants or natives have no natural resistance and the disease becomes general with rapid caseation or breaking down of the lung.

To take figures again—Professor Lyle Cummins found that in France during the War, the S.A. Native Labour Corps had 186 cases of tuberculosis per 10,000, with a death rate of 167, whereas British troops had an incidence of 10 per 10,000 with a death rate of 0.5. Very striking figures! What explanation is there for this great discrepancy both in the incidence and in the death rate? One could say that it is due to natural or acquired immunity that Europeans have gathered from constantly being in contact with tubercle bacilli. That will not hold good, however, as it is only the adult European who develops this resistance or immunity to the disease. The European infant and child of tender years has a very high incidence and also a very high death rate as compared with the adult European. What has been suggested as an answer to the above difference is that adult European picks up small doses of tubercle bacilli and slowly immunises himself so that when he does get the disease instead of it running a rapid and fatal course it is limited by the throwing out of scar tissue. On the other hand the infant who has not much time to become immunised gets an overdose of bacilli, develops an acute caseating type of disease with rapidly fatal results. This holds good for the natives who were all carefully examined before going to France.

These are the views that are held at the present moment which account for the differences amongst adult Europeans and natives, and one wonders if these views are correct.

What steps are we taking in this country to handle the disease?

In the Transvaal we have not got accommodation for a single female case in any special hospital. At Springkell Sanatorium, which belongs to the Mining Industry, there are a few male beds available. There are no beds for children. It was said that for the purposes of treatment tuberculosis may be divided into various types. The very bad cases should be segregated in a special hospital at much less cost per bed than in the Johannesburg General Hospital. A bed in the General Hospital costs 15/- a day whereas a bed at the Chronic Sick Home would cost a good deal less for the less advanced cases, that is, for the cases which would improve with special treatment. We should have a Sanatorium and associated with it a Farm Colony.
There are a few beds at Nelspoort Sanatorium but it has many disadvantages. It is situated in the middle of a desert, miles away from anywhere. Segregation does not mean isolation. The tuberculous is a human being; he wants to see his friends, even his relations occasionally. It is the only Sanatorium for the whole of the Union. The result is that each patient's stay is limited, they have to give way for the new arrivals instead of being able to stay long enough to ensure a good result. For children with surgical tuberculosis we have no accommodation at all except the Sick Children's Hospital.

For natives we have no accommodation at all. If they don't die in the Non-European Hospital they just go out and disseminate their bacilli amongst their friends until they die. No steps of any kind are taken to prevent this wide sowing of the seed of tuberculosis.

We have got a very big native population on the Witwatersrand and it seems that it would be a reasonable idea to try to do something for these sufferers. It also seems reasonable to stop the wholesale distribution of bacilli which may infect not only the native, but the white. If a Dispensary were started it would be a step in the right direction. One was started here some time ago but no attempt was made to educate the native about it. It might as well have been part of the Out-patient Department of the Hospital and so it died.

One realises that there would be all sorts of difficulties in running a Dispensary for Non-Europeans but it could be done and finally will have to be done. It will be heart-breaking work for the man who runs it. The people will resent his coming to their dwellings and making them live a fairly hygienic life. We had the same trouble in London with the first Dispensary but with tact and hard work the objection to our "interference" was slowly overcome. The same opposition will undoubtedly be encountered in this country, but the enormous benefit which will accrue from such an institution will more than compensate for the difficulties of its inception.

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Tumors of Bone.

By A. Lee McGregor, F.R.C.S. (Eng.), M.Ch. (Edin.).

The classification of bone tumours has been almost as unsatisfactory as that of tumours of the testis. A great deal of confusion has been caused by people using the same term with a different meaning and by the use of different classification by the pathologist, the radiologist and the clinician.

In 1923 the Clinical Pathological Association of the United States appointed a committee to go into the matter and establish a classification of general utility. The result was the adoption of the classification acceptable at once to pathologist, radiologist and clinician. Further it was decided to circularise the entire profession and incite Medical men to send their specimens of bone tumours to institutes where trained pathologists could make exact diagnoses and keep records for purposes of reference.

The greatest advances made in our science in this country have been in this sphere and it seems obvious from what has already been done, that