

This plan is the parent of all regional schemes of health services. It represented an honest and able attempt to reconcile conflicting medical interests for the benefit of the public. It is regrettable that medical and public opinion was not at the time enlightened enough to give adequate consideration to this report. The proposal might have been worked out on an experimental basis in one or two areas. Something of the kind was indeed attempted in Gloucestershire, but through lack of central encouragement it achieved only partial success.

The State's Concern for Hospital Services

It remained true, therefore, that all the resources of medical science were not available for the community as a whole. The wealth of new knowledge, demanding in its branches individual study, technique, and constant application; makes the general practitioner of to-day unwilling to undertake major operations or to pronounce the final opinion upon difficult problems of disease. There are many cases in which, in the interests of the patient, recourse must be had to a specialist who has made a close study of a particular disease or condition—for example, the orthopaedic surgeon, who is preventing the onset of crippling and treating cripples with new methods. But, over and above the need for the specialist, the modern diagnosis and treatment of many diseases demand large hospitals and clinics equipped with expensive apparatus and laboratories. Deep x-ray therapy in cancer, radium treatment in the same disease, a department of thoracic surgery, are notable instances of this need. These fully equipped institutions are expensive to provide and maintain, yet for the effective prevention and treatment of disease they are essential. Many lives are lost annually and much unnecessary disease and suffering occur because these facilities are not universally available. Sometimes the patient's condition is either never diagnosed or he is sent for diagnosis at too late a stage.

Informed of these matters, the Ministry of Health turned its attention to improvement and extension of the hospitals in the country.

The Local Government Act of 1929 enabled local authorities to provide for the hospital needs of sick persons in their areas in the following ways: (1) through existing Poor Law infirmaries (Public Assistance Hospitals) for necessitous sick persons; (2) by appropriating Poor Law infirmaries as public health hospitals; (3) by building new public health hospitals; (4) by making arrangements with suitable voluntary hospitals in their areas for the care of sick persons. In these different ways the hospital provision in the country was increased and much improved. Voluntary hospitals during the past thirty years have been greatly dependent on local authorities for contributions for services rendered—hospital beds, maternity and child welfare clinics, tuberculosis dispensaries, and V.D. centres. This was particularly so in London, but it also applied to the provinces.

In my Annual Report to the Ministry of Health, 1937, I drew attention to the growing provision of specialist and pathological services by local authorities and advocated co-ordination, integration, and development of these services with a general practitioner service for the benefit of the community. This process of peaceful evolution had to be abandoned. The coming of war altered the situation. The Emergency Hospital Service came into being and demonstrated the practicability of successful co-ordination of the work of voluntary and local authority hospitals, while the Medical Research Council, with the support of the Ministry, established a comprehensive Public Health Laboratory Service.

National Health Service Act

In 1942 the Medical Planning Commission of the British Medical Association produced a valuable draft interim report, and Sir William Beveridge's *Report on Social Insurance and Allied Services* appeared. Following on this came the White Paper entitled "A National Health Service" (Cmd. 6502), published in 1944, in which the Coalition Government made proposals for the establishment of such a service. In 1946 Parliament passed the National Health Service Acts, by which the Minister of Health and the Secretary of State for Scotland are to promote a comprehensive health service for the improvement of the physical and mental health of the people of England and Wales and Scotland, and for the prevention, diagnosis, and treatment of illness. Thus, in the course of a hundred years the work of preventive and social medicine, work for the most part, as we have seen, inspired and directed by the medical profession, comes to full fruition.

In new ways and with new methods the medical profession will carry on the great traditions of their predecessors in the promotion of national health. As Disraeli said in 1877, "The health of the people is really the foundation upon which all their happiness and all their powers as a State depend."

ADMINISTRATION OF MEDICINE*

BY

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LECTURE I

The "appointed day" is near at hand and we stand on the brink of the abyss, some say, and others say of the Millennium. It is pertinent therefore to study the great wartime service experiment of a planned national service. It might be that there are lessons to be learnt from it which would help us in this new experiment of a planned civilian medical service, and certainly there will come from such a study suggestions for the improvement of the medical services of the Armed Forces.

The Army Medical Service in the late war was a reasonably successful experiment in planned medicine. Too close an analogy between that service and the possibilities of the National Health Service cannot be drawn, since there are many medical problems in civilian life which do not confront us in the Army in wartime and many problems peculiar to active service which have no relevance in civil life.

The Army Medical Service had to deal overseas with a population predominantly male between the ages of 18 and 60; a population receiving standard wages, wearing standard clothes, eating standard food, living it is true very varied lives but under obedience and subject to direction in the fullest sense. The Services provided a complete medical, surgical, and dental service for several million individuals under every climatic condition and in spite of every difficulty of communications by land or sea.

By the end of the war a comprehensive service was provided which though far from perfect yet ensured that every man in the Service was better looked after from the health point of view than he had been in peacetime before he joined the Service, and far better than it will be possible to look after him in civil life for a long time to come.

*The Croonian Lectures (abridged) delivered at the Royal College of Physicians of London on Nov. 18 and 20, 1947.

Preventive Mepacrine

The first piece of medical planning with which I was associated was in connexion with the prevention of malaria in 1943. Algeria and Tunisia face the Mediterranean, have the Sahara at their backs, with high mountain ranges in between, and with a fertile strip less than 80 miles deep between the mountains and the sea, watered by streams which run down from the mountains and intersect the country with deep "oueds" or river valleys, all of which are highly malarious. Since the lines of communication lay through the river valleys, although the intervening uplands were dry and waterless, it was decided that malaria could not be prevented by sanitary methods alone, and that it was necessary to place all the United States, British, and French Forces engaged on preventive mepacrine. The wholesale use of preventive mepacrine at that stage of the war was not the commonplace which it has since become. All we had at that time to guide us were a few reports of comparatively small-scale experiments made in various other parts of the world under dissimilar conditions.

Having decided that suppressive mepacrine should be given, the first problem was that of dosage. There were two schools of thought at that time: first, that two 0.1 g. tablets twice a week were effective, and secondly, that complete suppression could only be obtained by taking 0.1 g. daily. For various reasons, one of which was a doubt about the available supply, we decided at a joint conference of United States and British officers to adopt the first plan of dosage. My American colleagues were a little doubtful about the necessity for the general use of suppressive mepacrine and were inclined to favour selective mepacrinization of the troops in dangerous areas only. We took the view that as there was constant movement in and out of these malarious belts it was safer to make a universal rule, and this view was finally adopted. Colonel Perrin Long, the United States Army consultant, warned us that we might have trouble with toxic effects when mepacrine was given on a wide scale to hundreds of thousands of men, and quoted some work in the United States in which mepacrine had been given to medical students and convicts.

Since ours was an Allied Headquarters and this was the first large-scale experience of United States and British collaboration in the field we were anxious to make our orders uniform, and a joint administrative order laid down that from a certain date mepacrine should be taken by all troops on the Tuesday and Friday of each week, one 0.1-g. tablet to be taken after the midday meal and one after the evening meal. The British order was sent up for Staff approval before issue, but before it was printed the United States deputy surgeon who was considering the matter thought that it would be better if his troops took the two tablets together after the evening meal so that if toxic effects occurred they would for the most part be at rest and therefore the less affected. He consulted the chief surgeon, who was also the British Director of Medical Services, and he agreed, and the United States order was issued and in print before anyone else had a chance to see it, and when we did see it, it could not be recalled. Since we thought the alteration was of little importance and we were anxious to have uniform orders, we amended our own instructions to conform with those of the United States, although the method of dosage was not the one we had previously agreed upon.

We decided to give mepacrine to the troops at the various bases and on lines of communication before giving it to fighting troops, chiefly as a dress rehearsal of the application of mepacrine discipline and more in fear of psychological than of clinical reactions.

Unlucky Accident

All went well on the first and second mepacrine days, but on the third day the Forces were struck as with one of the plagues of Egypt. When I reached Headquarters the next morning, I found that more than half the staff were absent, some of those present looked pale, hollow-eyed, and shrunken after a night of vomiting and diarrhoea. Reports and messages streamed in every minute reporting that whole units and formations were incapacitated and unable to function. On that day and to a lesser extent on succeeding days the base Force of thousands of men was partly disorganized. The symptoms were really severe and consisted mainly of explosive vomiting and equally violent diarrhoea; intense headache and a high temperature were present in many cases, and all sorts of genuine cerebral as well as psychogenic symptoms. Nobody died, so far as I know, but many took a long time to recover, and the efficiency of units was at least 33½% diminished for two or three days. No enemy act of sabotage could have been more effective than this well-meant administrative order issued on our advice. Rapid decisions had to be taken. The First Army was due to attack in a few days' time and was also due to start taking mepacrine. What was an inconvenience at the base might well be a disaster in the forward areas, and orders were immediately issued to delay the taking of mepacrine until after the impending battle. Meanwhile immediate rapid tests and investigations were being carried out which showed that perseverance produced rapid tolerance in all but an insignificant minority. There was considerable pressure by some sections of the Staff to abandon universal mepacrine, but the medical authorities, though shaken, stood firm, and the order was maintained although the dosage was altered, and finally it was extended to the now victorious First Army without any further ill results.

Later, experiments carried out by the N.R.C. and the M.R.C. with various forms of administration and scales of dosage showed that, by an unlucky accident, we had selected the only combination of time and dosage which gave a high proportion of toxic results in control cases.

Although the policy was not altered, these spectacular events were a disastrous accompaniment for a propaganda campaign in favour of malaria prevention which was already meeting with stubborn opposition from many quarters, both high and low.

The result was that mepacrine discipline was inclined to be slack and half-hearted in many units, especially non-combatant ones. Army hygiene officers and their non-medical assistants, with the help of the French, did wonders in malaria control and education in spite of the shortage of time and equipment, but personal precautions including mepacrine were by no means universally followed. Army health propaganda, like civilian health propaganda, needs an epidemic of death to drive it home, and it was death in North Africa and the fact that the Eighth Army nearly came to a standstill in Sicily which eventually drove the point home, and from then on mepacrine discipline became adequate, if never so perfect as it appears to have been in the Pacific.

Obligatory Report on Every Death

A different type of medical planning is illustrated by the history of the treatment of malaria in North Africa. Malaria appeared in earnest in June, 1943. At first there were a few cases of benign tertian malaria, and then a very severe and deadly form of malignant tertian malaria occurred with an ominous number of deaths. I was quickly apprised of this by physicians with whom I was

in close touch by reports and visits, and also by the special reports on medical deaths which were a rule of the theatre. When I was a medical divisional officer in Egypt, G.H.Q. Middle East issued an order that the officers in charge of medical divisions should write a complete report on every death, giving the symptoms, course, treatment, and post-mortem findings, and send it to Headquarters. We cursed bitterly at the time, but I found it such a salutary mental and moral discipline myself that as soon as I arrived in the North African theatre an administrative order was issued to make these reports obligatory. It is impossible to overestimate the value of these reports in Army medical planning. Not only did they give information about the symptomatology and course of diseases but showed up at once difficulties of diagnosis, errors and difficulties of diagnostic technique, faults in administration, shortages of drugs, and the quality and judgment of the medical personnel. I am sure they were unpopular, but they eventually saved many lives by the information which they gave and the reforms they were instrumental in initiating.

Study of the early death reports made it at once apparent that parenteral quinine was not being given or was not being given early enough; that many medical officers were not aware of the very varied and to them unexpected manifestations of malignant tertian malaria; that slides were not being taken as an invariable routine in cases of pyrexia; that pyrexial patients were being treated in camp reception stations or units not equipped with microscopes and parenteral quinine; that treatment was being delayed until patients reached general hospitals; that it was being held up in general hospitals by delays in diagnosis; and that patients were being killed by being evacuated from unit to unit unnecessarily.

An urgent directive was issued to every unit dealing with all these points and pointing out with greater emphasis the dangers of delay in giving parenteral quinine and the negligible dangers of giving it, and pointing out the snags and faults of diagnosis and the importance of speed in diagnosis and especially of speed in treatment.

The effect of this dissemination of information and of the orders which were issued and the sense of urgency produced by them, as well as the rapidly increasing experience of medical officers, was at once apparent in the abrupt fall in the death rate, although the number of cases was increasing. Soon death occurred only in really fulminating cases, in newly arrived and inexperienced units, or in prisoner-of-war hospitals where the dissemination of information and pooled experience was less rapid.

I have given a rather longer account of this than the present interest warrants chiefly to show how quickly results can be obtained by planning which depends on a good source of information and a rapid, ready way of disseminating the result. If the staff of hospitals had been left to learn by their own experience, they would probably eventually have reached the same conclusions, but only after long delays and detours and with considerable irregularity in standards, and their individual efforts to effect administrative improvements would have met with infinite delays and obstruction.

I do not wish to give the impression that medical practice in a theatre of war was conducted by a series of inspired directives and orders of almost divine wisdom. I imagine most medical officers remember more foolish orders and instructions than they remember wise ones, but information did not flow in one direction only. Constant information was being received either orally or by letter from all the specialists in the Command, and it was possible

to disseminate the summative collective information of the whole theatre and other kindred theatres.

Use of Sulphonamides

I will give another example of how this double flow of information worked. Impetigo and desert sores were a very prevalent condition causing much disability. Sulphonamides, including sulphadiazine and sulphathiazole, were found very effective in treatment and were generally used. Dermatological cases formed a large percentage of all the cases treated in any military general hospital, and since there were only two trained dermatologists in the whole Force two dermatological centres were formed at strategically placed hospitals into which all the cases presenting difficulty in diagnosis or treatment or thought to require evacuation from the theatre were collected. Both the dermatologists reported that they were seeing a large number of men who were suffering from sulphonamide sensitization which was proving refractory to treatment, and that many of them were having to be sent home to England. This information was rapidly confirmed, and it became obvious from study of the cases that the original condition for which most of them had been treated was some local skin infection, and that sensitization had either followed prolonged application of sulphonamide pastes to the skin or occurred in those who, having at one time had sulphonamides applied to the skin, subsequently took them internally for some fresh condition. There was nothing new about sulphonamide sensitization. What was new was the rapid knowledge of the numbers involved and the incapacity produced. Orders were issued that sulphonamides were not to be used for superficial lesions which would heal readily by other means. The reasons for the order were explained and the serious loss of valuable man-power which was occurring was stressed.

The order was at first an unpopular one, especially with regimental medical officers and forward medical officers who saw only the beneficial results of treatment in the first few days, rarely saw the end-results, and often did not recognize them when they did. However, by degrees, with further information and publicity, even the dubious were convinced and cases almost disappeared except for a few treated by medical officers newly arrived in the Command.

This of course was an example of treatment by decree, and it may seem a shocking thing that a doctor should not be allowed complete freedom to treat a patient as he thought fit. In fact, no medical officer in the Army could be made to treat a patient in a manner contrary to his medical conscience, but in a Service where all the patients were under military discipline, unable to choose their medical advisers or their conditions of life, there is a corresponding responsibility thrown on the medical services to see that the patients have the best possible medical care and attention and that nothing is done which could impair their efficiency or ability to fight. Very few instructions of this particular nature were in fact issued. Reliance was placed on advice supported by as much information and explanation as possible; this was effective because the information was, on the whole, accepted and the Service doctors themselves had often contributed the information or experience on which it was based.

Standardization of Treatment

In the Army treatment sometimes had to be standardized for various reasons. Official standard courses of treatment for malaria were prescribed. This was necessary because of the number of cases, the varying standards of experience, and the fact that cases from the forward areas had to be treated in transit, often through three or four units. Treatment by individual predilection in such cases would obviously have had chaotic results.

The potential loss of man-power from malaria could be a serious one in a semi-tropical theatre. It was found that some medical officers were invaliding men home to England after they had had two or three relapses, whereas other medical officers were not finding this course necessary. It was obviously undesirable that there should be an unnecessary drain of useful men from the theatre or that there should become apparent to the soldier an easy way of being invalided with little or no danger to himself. Therefore it was arranged that cases of chronic malaria were to be invalided from two centres at the base where there were experienced officers whose special schemes of treatment and skill in assessment ensured that no man was lost to the theatre unnecessarily.

All the findings of medical boards were studied, and when it was observed that men were being invalided or downgraded for conditions which were preventable special measures were designed in order to remedy the conditions which made this loss of man-power and efficiency necessary.

Reports of diseases and epidemics new to the Force were constantly being received, together with descriptions of symptoms and treatment found effective or ineffective and of new laboratory investigations and experiments, and with suggestions calculated to improve the handling, treatment, and disposal of patients. These reports and suggestions were collected and then made available as information to all the doctors in the Force, or used in forming new decisions or administrative orders which resulted from them.

I will not weary you with an account of detailed planning. I have said enough to suggest how by general co-operation and shared experience, and planning resulting from it, the medical services of C.M.F. eventually became a living unit ready to deal with emergencies as they arose and a coherent instrument to deal with any medical situation. You will now be suspecting that I am about to outline a scheme for administering and organizing the region like military districts. Nothing is further from my thoughts. Wartime Army medical methods rendered necessary by circumstance are effective and acceptable in time of war to doctors united in a single purpose but are quite unacceptable in a free and independent civilian community. What I hope to do in my subsequent Lecture is to suggest how organized Medicine in time of peace can plan to combat disease as the Medical Service, organized in quite a different way, could be used to combat disease in time of war.

Suggested Improvements

I now propose to make some suggestions for the improvement of the Army Medical Service overseas, which may seem an extremely rash, not to say presumptuous, proposition on my part. What suggestions I propose to make, however, are strictly my own, and I give them for what they are worth. Nearly all my suggestions are designed to make the Service more efficient in the event of another war, which unfortunately cannot be regarded as an impossible contingency. It has been said that the country always goes into a new war with the preparation and planning suitable to the previous one. That would seem in some respects an overstatement of our preparedness, but there is some truth in it, and one might aim at a worse target. The 1939-45 war was expected to be completely different from the one in 1914-18, but in effect medically and surgically the problems were substantially the same, and the last war only different from the previous one by being more widespread, more mobile, and less lethal so far as our Forces were concerned.

In the first place, from the administrative point of view, the medical services should cease to be under the control

of the Adjutant-General and should be a separate health branch of the Staff, with complete freedom of access to the councils of the Commander-in-Chief instead of having to pass their recommendations and observations through intermediaries who at present have the power of suppressing or altering them.

Secondly, there would appear to be few very strong arguments for maintaining three separate medical services, whereas great economy in personnel and increased efficiency could be promoted by an amalgamation. The general medical and surgical problems are much the same in the three Services and can be simplified only by uniform action and uniform administration. There are problems peculiar to each of the Services. The R.A.F., for example, has special physiological and possibly special psychiatric problems of its own; the Navy and the Army have problems peculiar to each of them, mainly of a physiological character, but their special needs could be served by special formations within the main general service. If it should prove impossible to amalgamate the three medical services, then at least medical procedure and documentation should be the same for all the Services.

Thirdly, the standing of the Regular Army Medical Service from the professional point of view could be much higher than it is. This standard can be raised only by allowing a much larger number of medical officers to be promoted to the higher ranks on the strength of their professional ability instead of making it necessary for them to give up their professional pursuits in order to become administrators and thus ascend the normal ladder of promotion. Up to the outbreak of the last war every regular officer was faced with the position that, if he wished to remain active in his profession, he would have to content himself with the rank of major or else take his chance of being one of the four men in the Corps promoted mainly for professional ability: the consulting physician, the consulting surgeon, director of pathology, and the director of hygiene. Before the war even the officers in charge of medical divisions were often chosen more as administrators than for their professional ability. Further, the Army did not often give the professional man the scope and experience to perfect him in his work. The pathologist and the hygienist were the best off, and it is precisely in these two professional categories that the reputation of the Corps stands highest. Of the medical men in the Regular Army the names best known to the civilian world at least have been those of Army pathologists. In hygiene, the professional branch of the Corps which has been most favoured and most developed, the reputation of the Corps is second to none, and as a result British military hygiene is the best in the world, better than the American and infinitely better than the German or any other Continental country. It is no coincidence that higher promotion is possible for a comparatively large number of doctors who continue to practise these branches of their profession.

Promotion

To raise the professional standards in peacetime two things are necessary—better prospects and more opportunities for experience. It ought to be possible for some officers at least to rise to the rank of full colonel without having to give up their professional work. Standing in the way of this possibility will be found an almost insurmountable barrier called "Establishment." This is an almost holy thing sponsored by the Treasury which certainly prevents the many abuses it was designed to prevent but very often stands in the way of many reforms which justice and common sense dictate. There is a fixed establishment of full colonels. This means that only 85 men in the whole Corps can hold this rank at the same time.

If you reach the age of 57 before there is a vacancy in this arbitrary quota you can never make the rank of full colonel and must retire as a lieutenant-colonel, with one-third less pension than you would get if you were promoted. Your arrival in the holy 85 depends only nominally on merit, but largely on the lottery of death of your seniors or on the fact that you joined the Service at the end of a particular week thirty years ago instead of at the beginning or that your name began with a W instead of a B. Promotion to higher rank on account of professional service is only one part of the problem.

Improvement of the standard of professional attainment is the necessary corollary. Much can be done by secondment, by travel fellowships, courses, and the like, but no real improvement can be expected unless there are improved opportunities and clinical facilities. It is impossible for the Army population to provide the necessary clinical material, and I believe the only solution is for the Service to have Army hospitals of large size in every garrison town at home and overseas and to provide medical care for civilians as well as Army personnel. In London, and possibly other centres, there should be a first-class fully equipped general hospital large enough and with a sufficiently skilled personnel to provide the best possible teaching and training for Army medical officers. The Treasury would stand in the way of this development, I am sure, but these hospitals could easily be fitted into the scheme of the National Health Service. Failing this arrangement, the only alternative is wholesale secondment to civilian hospitals, but this would be an unsatisfactory expedient.

Use of Medical Man-power

During the late war there was much said in this country about the Army waste of medical man-power. In neither of the two theatres in which I served was there avoidable waste of personnel, but on the other hand the overseas personnel were persistently and consistently overworked. Some may criticize the use of doctors as regimental medical officers attached to the fighting troops. The actual volume of work requiring medical training done by these officers may be comparatively slight, but the effect on morale in an action or in difficult circumstances is immense ; also the medical officers are, as a rule, as reluctant to leave the units to which they were attached as the troops are to let them go.

Proper and accurate records are essential in a planned medical service, but writing them takes up a lot of time that could be more expertly used. The provision of adequate secretarial help and adequate office equipment would effect a saving in medical man-power of between 1 and 2 in 15. The right use of these records requires a proper statistical system and statisticians at every Headquarters. I believe these would pay a heavy dividend by providing the exact knowledge necessary for accurate planning.

The Stores and Equipment Branch of the Army Medical Service overseas needs complete reorganization. The inevitable shortages, the disorganization of transport, and the hazards of war are difficulties enough without adding the handicap of an archaic system or lack of system. I do not think that in any essential respects the United States Medical Service was better than our own, but it certainly was in regard to stores, and more particularly in stores management. Whereas my time and that of my colleagues was greatly taken up with efforts to secure the supply and distribution of the drugs and equipment which, considering all the difficulties, arrived in ample quantities from England, my American colleagues rarely gave their own a thought ; they assumed that there were no shortages, and these assumptions were usually correct, but if there were

shortages they could find out at once where they occurred and how they could be remedied.

What I have said is meant to be constructive criticism. I have made it because I am proud of the Service in which I worked during the war, and I look back on it and my colleagues with affection, because in spite of the necessary or unnecessary irritations of Army life as a doctor I think most of us felt that we were able to do what we thought best for our patients, and I know that we civilians in the Army owe our professional freedom and our professional status to the inspiration of Sir Alexander Hood and his advisers. At one time, in case there might be any bureaucrats amongst his officers, Sir Alexander Hood told them that he depended for his advice on professional matters on his consultants and advisers, and on his administrators for carrying out the policy based on that advice.

LECTURE II

The National Health Service Act, whatever its drawbacks and handicaps and whatever mistakes it may make and will make, does render possible the planned solution of many problems hitherto insoluble. The Act places a general duty upon the Minister of Health to promote a comprehensive Health Service for the improvement of the physical health of the people, and, as it imposes the duty, it fixes the responsibility upon him. Administration may not be able to suggest new solutions to medical problems or may not be able to find new solutions, but it can at least make known solutions effective, and known solutions exist for the problems of tuberculous infection.

The morbidity and mortality rates of tuberculosis have been falling for years, with only occasional interruptions due to war conditions (Table and Fig. 1).

Deaths from Tuberculosis in 1938

Tuberculosis (all forms)	26,176
" (respiratory)	21,930
Crude death rates at all ages to a million living:	
Tuberculosis (all forms)	635
" (respiratory)	532

COMPARATIVE MORTALITY INDEXES
(BASE YEAR 1938 TAKEN AS UNITY)

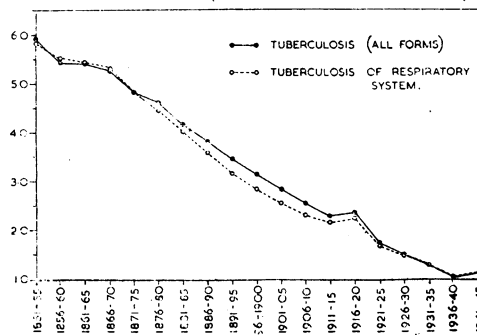


FIG. 1

It would be encouraging to be able to find recorded on the chart sudden drops in incidence or mortality produced by the introduction of this or that public health measure or this or that new treatment ; but no such correlation can be presumed, although it can be with the general rise in the standard of living, nutrition, and housing. The war-time increases of morbidity and mortality both in the last war and in this one indicate the importance of malnutrition and crowded conditions on the spread of communicable diseases, especially tuberculosis, and suggest that when everyone has enough room in which to live, enough to eat, and enough room in which to work the incidence of tuberculosis will diminish to vanishing-point. There is nothing improbable in the eradication of tuberculous

disease by non-specific hygienic measures alone. It would only be following the path taken by typhoid fever, typhus, dysentery, and a host of other diseases, in which good plumbing, pure water, and cleanliness have achieved more than all the inoculations and treatments devised by doctors.

We cannot afford to wait even if the mortality and morbidity are rapidly falling. There are still some 30,000 deaths a year from the disease in England and Wales alone. There are some 60,000 new cases notified yearly and certainly many more unnotified, and also some quarter-million cases under treatment and observation. The incidence of the disease is greatest amongst the young and active with their most useful years in front of them. There are few of us who cannot remember young and brilliant men and women among our acquaintances who have been first crippled and then killed by this disease. It is still the most important cause of serious disease in the country. There are many diseases of which the aetiology is uncertain which can only be defeated, if at all, by long and patient research, but diseases which are caused by known infective processes of a bacterial nature should not be beyond our powers of control. It is for the Minister to bring all the efforts of the medical profession to a close focus on the disease with the aim of abolishing tuberculosis in these islands in our time. The primary object of such a campaign must be the elimination of tuberculous infection. Is this possible? I believe we can go a long way towards it.

I will start by considering the easiest problem first—that of eliminating bovine infection. If it is found possible to do this the more difficult problem of eliminating human tuberculosis might be nearer to solution.

Bovine Infection

In 1945, according to the report of the Minister of Health, 10,510 new cases of non-respiratory disease were notified

and 4,059 deaths were reported from tuberculosis of organs other than the lungs.¹ It is impossible to say how many of these cases suffered from bovine infection. Dr. W. A. Lethem states that probably 70% of the cases recorded as non-pulmonary are in fact caused by the bacillus of human infection.² It is probable that this is not an overstatement, but it would be interesting to know what percentage of cases of tuberculosis are never notified at all in spite of the regulations. Probably bovine infection is notified less reliably than pulmonary tuberculosis. The Minister of Health in his annual report is inclined to use the figures of the deaths from tuberculosis of persons not previously notified as tuberculous as a sort of yardstick to show the reliability of notification. It is significant that in 1944 the deaths from pulmonary tuberculosis which had not been notified were less than 10% of the whole, whereas in non-tuberculous infection they were 25% of the total.³ Where there is little or no danger of spreading infection doctors are hesitant to notify tuberculosis unless the disease is going to require special treatment involving the assistance of the Tuberculosis Officer, which is very frequently not the case in bovine tuberculosis; and the diagnosis of the disease is often presumptive, based on radiological or clinical evidence. Even if the incidence tables do not show the true morbidity of bovine disease they do show an even steeper fall in incidence than do the tables for pulmonary disease, and merely confirm what we have all observed—namely, the comparative rarity of glandular and bony tuberculosis in children and young adults in London hospital wards and out-patients compared with what we remember less than twenty years ago. The fight against bovine tuberculosis is already half won. It should require little more to win it completely.

There are two methods open to us: the elimination of tuberculosis in cattle, and the elimination of the danger from infected milk.

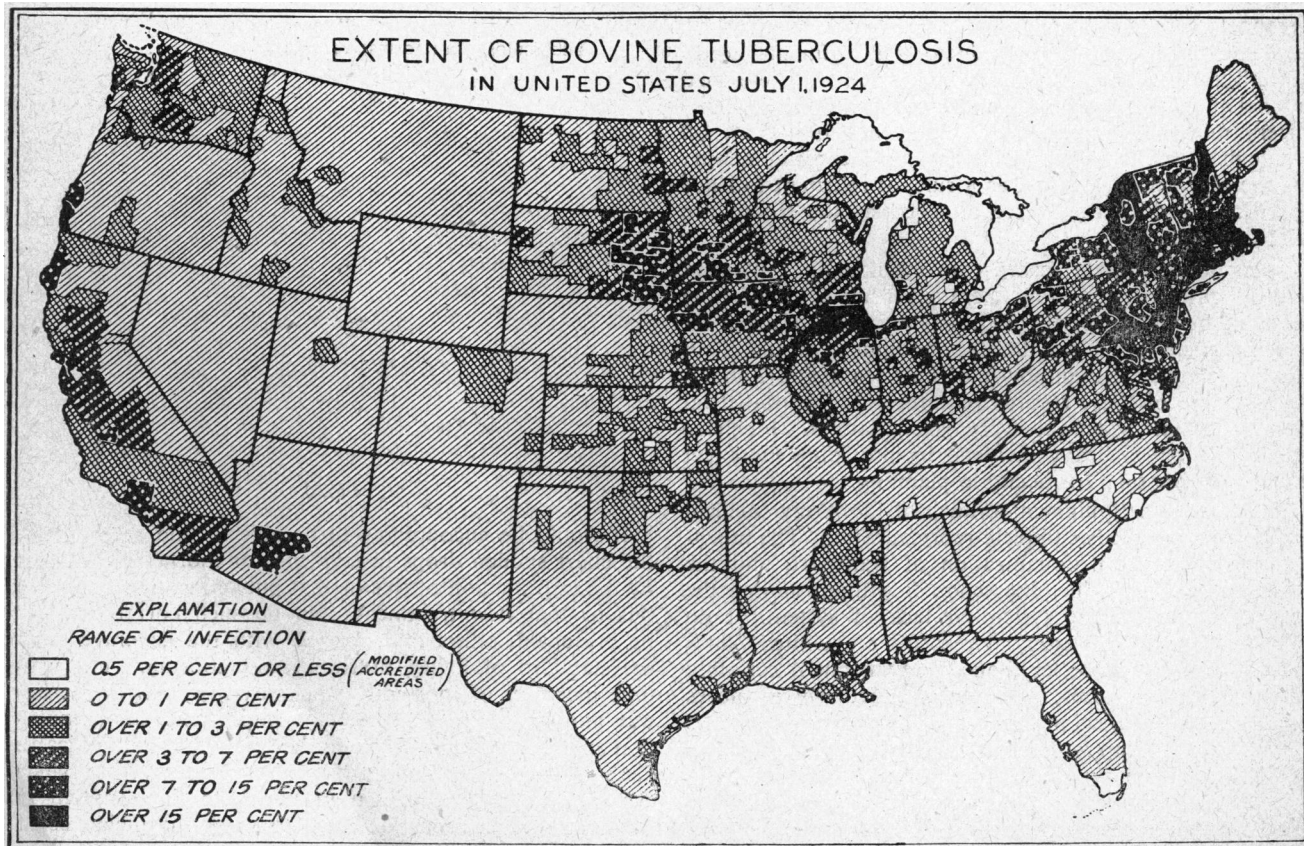


FIG. 2

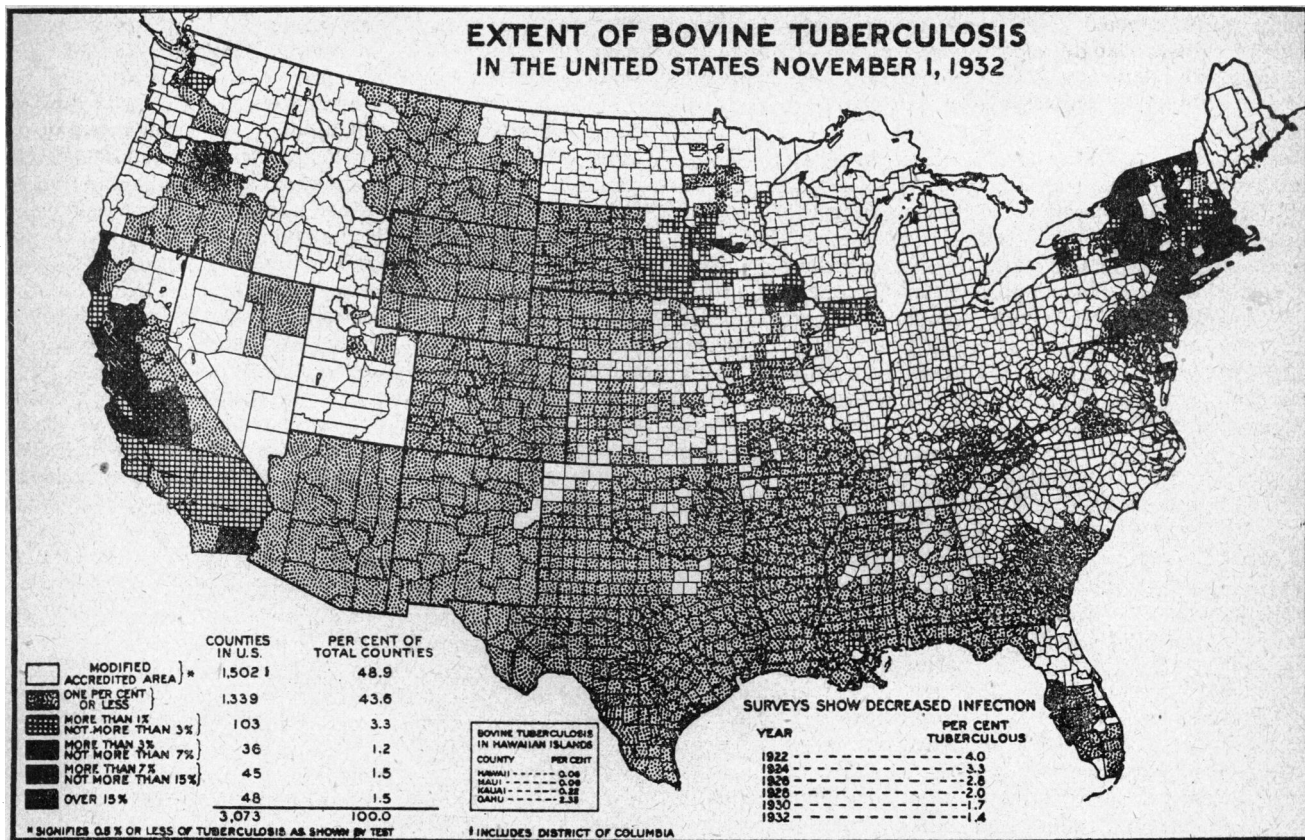


FIG. 3

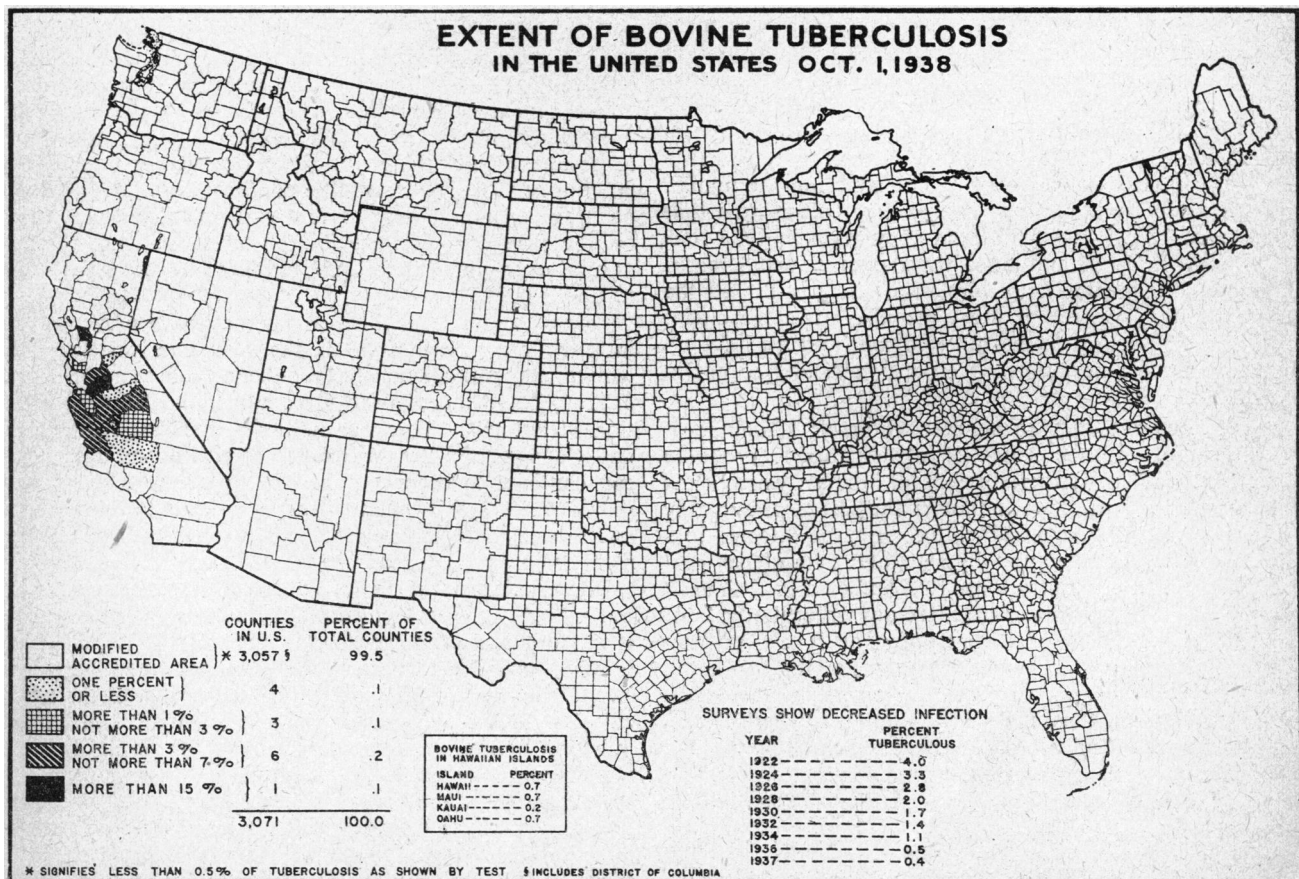


FIG. 4

If the country were immensely rich and there was a ready source of uninfected fresh stock the problem could be solved by mass slaughter of infected cattle. In 1934 the report of the Cattle Diseases Committee of the Economic Advisory Council stated that about 40% of cattle react to tuberculin and are therefore presumed to have contracted tuberculosis.⁴ The post-mortem figures in abattoirs tended to support this figure, although Mr. J. N. Ritchie in 1945 suggested that the figure for infection of cattle was now probably nearer 30-35%, with a progressive downward trend.⁵ Britain and Denmark are said to have the highest incidence of bovine tuberculosis of any European countries, but I suspect that this is only because they keep the most accurate and careful records. The percentage of infected cattle in the United States has never been as great as the percentage in this country, but the achievement of the Tuberculosis Eradication Section of the United States Bureau of Animal Industry has been remarkable. I can best illustrate their results by means of Figs. 2-4.

In 1932 the modified accredited areas represented 48.9% and in 1938 99.5% of the total counties. The white areas on the maps represent modified accredited tuberculosis-free areas where the incidence of bovine infection as shown by the tuberculin test is less than 0.5%. The only area still waiting to be cleared up is part of California, where I gather Dr. A. E. Weight, who is in charge of this great project, meets with a certain amount of active and passive resistance to his measures. Incidentally, in the early days of this campaign the Militia had to be called out on several occasions before the veterinary surgeons could do their work. Propaganda has caused a change in public opinion, and the success of the campaign has now almost eliminated opposition; the survey which produced the map of 1938 involved tuberculin tests on 26,000,000 head of cattle, which gives some idea of the task in a country over 50 times the size of England and Wales. The method adopted was mass tuberculin-testing with killing of reactors. Compensation at a nationally fixed rate was paid to owners of slaughtered cattle. Cattle were not allowed to cross a State boundary until they had been tuberculin-tested and proved to be non-reactors. In 1908 the overall average of infected cattle was 10%; in 1936 it was 0.7%. The effect on the human mortality rate from non-respiratory tuberculosis was that it fell from 22 per 100,000 of the population in 1916 to 5 per 100,000 in 1937, and since these figures include cases of tuberculous meningitis of human origin they are all the more striking. America is justly proud of its achievement in almost eradicating bovine tuberculosis, and we have no right to complain because their troops were advised not to drink English milk.

It is hardly the time to suggest wholesale slaughter of British cattle, and the slaughter of reactors is probably wasteful since it is not certain that all animals which react to tuberculin are infective, although they have presumably been infected. With a possible 40% of cattle infected in a time of scarcity, eradication by slaughter is a bigger proposition than in a country with 10% infected in a time of plenty. Short of slaughter, are there any other methods of preventing the spread of bovine infection? Sir William Savage has suggested one method—namely, the formation of non-reactor and reactor herds.⁶ Non-reactor herds are already in existence as T.T. herds, but he suggests forming herds of so-called healthy reactors which could be kept under close clinical supervision for the elimination of clinical cases and kept under special sanitary conditions—a sort of sanatorium herd of cows with segregation of the newly born calves and careful pasteurization of the milk. Another suggestion made by the Committee on Animal Disease in 1934 involves the formation of tuberculosis-free areas. A start might be made with Wales or self-contained areas of

Scotland, and the areas already far on the road towards freedom from tuberculosis could then gradually spread over the country. Success in one large area would have a catalytic effect on all the rest.

Some progress is being made with B.C.G. vaccination of non-reacting calves and the building up of vaccinated herds. More could be done to detect animals excreting tubercle bacilli in their milk by taking specimens of milk and tracing infected milk. All this means that more veterinary surgeons will have to be trained, for the number is already inadequate for the comparatively small number of cattle in T.T. and attested herds. A necessary part of any plan is to improve the housing and living conditions of herds, which, though improving generally, are often deplorable.

The present financial and economic conditions will, however, prevent the enforcement of many necessary reforms and delay the eradication of bovine tuberculosis at its source. Fortunately there is no need to wait for this, since bovine infection in man can be completely eradicated by the pasteurization of milk.

Pasteurization of Milk

It is amazing that this country, which claims, and I believe claims rightly, to be a pioneer and leader in hygiene and preventive medicine should lag behind other countries in the enforcement of this life-saving measure. Whatever may be the reasons which have prevented the adoption of pasteurization, it should be the primary duty of the Minister of Health to introduce legislation to enforce universal sterilization of milk, against which there can be no argument of fact but only arguments of a spurious economy. Medical authorities, the Medical Research Council, the Royal College of Physicians of London, the British Medical Association, and experts in hygiene have recommended its adoption for years. Vast areas of America and Canada have shown the way. The Minister has a chance of making a spectacular and effective contribution to the health of the country. I cannot put it better than does Professor Wilson, who says in his book, *Pasteurization of Milk*: "To refuse to act on this knowledge and to allow the continuation of a wholly unnecessary amount of suffering, invalidity, and death may be justifiable on grave economic grounds but can no longer be excused on the plea of ignorance except by those who, through natural or acquired defect, are too blind to see or too dense to understand."

One of the factors which so far may have prevented the introduction of legislation is the fear that pasteurization would run counter to the production of accredited and T.T. milk and therefore to the eradication of bovine infection in animals. That has not been the case in America and Canada, and the spread of accredited and T.T. herds can continue to be encouraged by bonus payments. Raw milk is the vector of many diseases other than tuberculosis, and its sale should be no more legal than the sale of infected meat or contaminated water.

The eradication of bovine tuberculosis is the acid test of our sincerity in dealing with tuberculosis. If the remedy is in our hands and we do not apply it the responsibility is ours—and the Minister's. We do not know what will happen when we are successful in eradicating bovine tuberculosis. It is comparatively easy to get figures of clinical infection by the bovine bacillus. What we do not know is what percentage of the population has been infected by such bacilli without clinical symptoms worthy of note. How many of the transient adenitis cases and undiagnosed infections of childhood are due to "bovine infection"? How much of our acquired immunity to human tuberculosis do we owe to healed bovine infection? Shall we in casting out one devil take unto ourselves seven devils, each worse

than the first? Are we by eliminating bovine infection eliminating a sort of natural or wild inoculation of bovine B.C.G.? We do not know, but it is a risk which we can surely take if we are at the same time trying to eliminate infection with the *Bacillus tuberculosis* of human type.

No such direct attack can be made on the human infection as is possible with bovine infection. It must of necessity be a lengthy process, but I believe if tackled energetically it might be possible to extinguish it in less than a generation.

The campaign against tuberculosis has already been carried far along the road to success by many organizations, many individuals, and by social legislation and social evolution. The campaign has two possible methods of attack: by increasing the powers of resistance and by eliminating the possibility of infection.

B.C.G. Inoculation

The only method of increasing our powers of resistance in any specific way at present known to us is by the use of attenuated vaccines, especially living ones. It is remarkable how little work seems to have been done with B.C.G. in this country, considering the immense amount done in France during the past 26 years and in the Scandinavian countries. It is also remarkable, considering the length of time that inoculations have been given, that we still have so little certain knowledge of the effect which mass inoculation might have on the morbidity and mortality from tuberculosis. A short series of favourable but much criticized figures from France,^{8,9} the Gothenburg series of Wallgren¹⁰ (done without controls), the controlled American series of Park and Kereszturi,¹¹ and the observations of Heimbeck,¹² of Ustvedt, of Rinvik,¹³ and a few other observations on small groups make up the sum total of the available published evidence which has built up among those with most experience of the use of B.C.G. an optimism which runs through all the range from immoderate to moderate. It is not surprising that the figures for infants and children are so difficult to obtain and so difficult to interpret.

It is easy enough to prove the value of B.C.G. in animals kept under standard conditions. The human subjects of an investigation have to be observed for many years, during which it is impossible to control their subsequent exposure to infection, their varying degrees of natural resistance, and all those factors, chemical, nutritional, mental, and physical, which contribute to fluctuations in resistance in a manner which we only dimly understand. The figures of Heimbeck¹² on nurses in 1936, and more recently of Ustvedt, do however give us some suggestive evidence. Heimbeck found that, among 571 nurses who showed a positive von Pirquet reaction, only 4.2% (24 cases) showed any evidence of tuberculosis during the period of observation and that no patients died. On the other hand, among 275 nurses who had a negative reaction 35.2% (97 cases) showed evidence of tuberculosis and 10 of these 97 died. He then took a group of 355 negative reactors and vaccinated them with B.C.G.: of 210 who became positive as a result only 1.9% showed evidence of tuberculosis, with no deaths; and of 102 who remained negative in spite of vaccination 23.5% (24 cases) developed tuberculosis, with 3 deaths.

Ustvedt's figures for a group of nurses and students, given at the meeting of the Tuberculosis Association at Edinburgh last summer, showed that of 668 positive reactors 5.2% developed the disease, with a death rate of 0.18%; that among 284 negative reactors there was a morbidity of 33.8%, with a death rate of 4.2%, during a period of observation similar to that of the first group. Hewing established a control series: he treated 341 non-reactors with B.C.G.,

and this group showed a subsequent morbidity of 4.1% and a death rate of 0.3%. The morbidity may be subject to differences of interpretation, but if only the mortality from tuberculosis is considered the evidence is striking although the numbers are small. The available evidence leaves the general impression that B.C.G. does produce some immunity in human beings, and there is renewed interest in the subject in this country, largely the result of the visits of Scandinavian physicians since the end of the war. Now is the time to start large-scale controlled experiments here either on infants or on adult groups of exposed individuals such as nurses and medical students.

It is not probable, however, that B.C.G. will in fact play a major part in the campaign against tuberculosis. Even in the countries which have studied the problem most closely mass inoculation has not been tried on any large scale and most workers hesitate to apply it. Among the most valid reasons for this hesitation are the doubts concerning the duration and degree of the immunity produced and the doubts concerning the relation the development of allergy bears to immunity; the occurrence of cold abscesses of the skin in a small percentage of cases, especially in children, and the difficulty of standardizing strains of B.C.G. are additional factors.

Whatever the place of B.C.G. inoculation in the prevention of tuberculosis may be it cannot absolve us from the need to eliminate known infection, since at the very best acquired immunity is never complete but always relative.

Mass Radiography

There are only two possible human sources of tuberculous infection: one is the known case of pulmonary tuberculosis; the other is the more dangerous and possibly more common undiagnosed ambulant case. Mass radiography is the key to the problem of the latter group: the Medical Research Council Report, "Mass Miniature Radiography of Civilians," shows that in the fairly large groups examined by various teams significant lesions were found in not less than 1% of the apparently normal persons examined, that about one-third of these were in need of treatment, and that one-half of this latter group had tubercle bacilli in their sputum. These are terrifying figures, for if this distribution were equal throughout the 41,000,000-odd inhabitants of England and Wales alone it would mean that there were over 100,000 as yet undiagnosed cases of tuberculosis in need of treatment of which about a half were a source of infection for their fellows. Fortunately, this even distribution is extremely unlikely, as the M.R.C. survey was carried out entirely on volunteers in Greater London in factories and Government offices. The figures do, however, mean that there are in wide areas throughout the country thousands of undiagnosed cases capable of spreading infection. It would at first sight seem obvious that mass radiography units should be set up throughout the country, at least in all urban areas. To provide the apparatus and train the teams would take time but would not be impossible. I imagine that in two years the organization could be perfected, and there is no doubt that this would be desirable.

Shortage of Beds and Staff

It is therefore all the more tragic that at the present time the effects might be disastrous. Medical services are quite inadequate to deal with even the present number of cases: the sudden discovery of thousands of others might bring about complete breakdown. There are neither the doctors nor the ancillary staff nor the beds necessary for the proper treatment of the cases already diagnosed. The number of beds available is actually falling because of difficulties in providing the hospitals and sanatoria with nurses and

domestic staff, but even before the war the number of beds was very inadequate, and the quality of the beds was often, and still is, lower than it might be. The Ministry of Health's figures for June, 1947, show for England and Wales 32,801 possible beds for the treatment of tuberculosis, with a waiting-list of nearly 8,000. The waiting-list, long though it is, does not really give the true picture. Hundreds, possibly thousands, of cases are not even put down on the waiting-lists because the bed situation appears so hopeless, and the patients are therefore treated at home for want of better arrangements. There are probably also a fairly large number of patients who have not been notified for various reasons although they should have been. The death of 3,468 unnotified cases of pulmonary tuberculosis in 1945 gives only a small idea of the number of unnotified cases in the country. Because of the long waiting-lists cases are not kept in sanatoria as long as desirable, since their physicians are always conscious of the untreated cases awaiting admission. It also means, unfortunately, that only the earlier cases are admitted at all, because more can be done for them individually. The worst cases, the most dangerous from the infective point of view, are left at home.

The present housing situation produces tragic situations which tuberculosis officers are powerless to remedy owing to the shortage of beds. Shortage of beds means the spread of infection among contacts and delay in treatment, the effectiveness of which is in inverse proportion to the delay in initiation. Can this primary problem be solved? I believe it can be if a determined effort is made. In the first place, if every general hospital reserved even 5% of its beds for the primary treatment of tuberculosis a great deal could be achieved. Such hospitals already carry the staff capable of assessing the cases and, if necessary, initiating collapse therapy, which assists recovery and helps to make the sputum tubercle-free. Even if the shortage of sanatorium beds makes it necessary to discharge the patient to his home to await admission after his initial treatment much valuable time will have been gained, and in addition it will have been possible to teach the patient the elementary principles of hygiene, so necessary to prevent the spread of the disease when the patient once more joins his family or fellows. Admittedly these patients will exclude an equivalent number of other types of cases, but there are few types which are so dangerous to the community if left unadmitted and untreated and for which so much can be done by early and efficient treatment. Many of the non-tuberculous cases which now fill our hospital beds could be as well treated in out-patient departments if these were better organized, better equipped, and more lavishly staffed. There is no other type of case for which it is so difficult to secure admission to the general hospitals as the tuberculous case—largely, of course, because of the danger of infection, but also because so many physicians are coming to regard pulmonary tuberculosis as being as much outside their responsibility as the case of syphilitic infection now is.

Special Tuberculosis Hospitals

In addition to the provision of beds by general hospitals I believe that special hospitals for the tuberculous should be a high priority in every region. The buildings probably already exist as E.M.S. hospitals or E.M.S. attachments and as disused fever hospitals. The main problem is staffing. The medical staff I believe to be already available or, if the appointments were there to be filled, could readily be trained. There are more young men being trained and having an interest in work on diseases of the chest than ever before, but the real problem is the nursing and domestic staff. It is true that surgical treatment has complicated the nursing problem in sanatoria and tuberculosis

hospitals, but in general the nursing staff do not need to be so numerous or so skilled as in general hospitals, and here is a great opportunity for the use of auxiliary nurses. More use could be made of convalescent patients, or employment might be given to patients whose treatment is completed and the domestic staff be reinforced with displaced persons. Desperate diseases sometimes need desperate remedies. I believe that with an appeal to the imagination and to the pocket the staff could be found. It depends on whether the fight against tuberculosis is treated as an exceptional emergency, which I believe it is, or is allowed to be swallowed up in the ordinary tangle of priority precedents and resulting frustration.

The great advantage of tuberculosis hospitals is that they can be local, and they have the great advantage over sanatoria that the patients can be near home, can have visitors, and can be under the eye of the tuberculosis officers. I do not suggest that these hospitals can altogether replace sanatoria, but they can make the patient more able to take advantage of sanatorium treatment if he is lucky enough to have any. I do not underestimate the advantages of country air, country food, and pleasant scenery, but fortunately the days are long past when it was considered that tuberculosis could only be treated among pine trees and at a freezing temperature. If sanatoria can be provided for all, so much the better; but, provided that the doctors are skilled, tuberculosis can be nearly as well treated within sound of Bow Bells as it can in the country.

The Services should treat all their own cases for at least a year after diagnosis instead of discharging them into civilian life. They can provide the staff, and the buildings are available. I know that by agreement with the Ministry of Pensions and the Ministry of Health they do maintain a small number of beds for tuberculous cases because of the failure of the civilian service; but they could do much more, and I consider that they should accept responsibility for Service pensioners at least for a number of years until the civilian service is more adequate. The Services would, I believe, willingly do much more than at present, but their budgets have been cut to the bone so that they are financially unable to take on what they reasonably regard as a civilian commitment. Surely they should have a special additional grant of money for this work.

There is nothing revolutionary about the experiment of providing institutional treatment for patients with tuberculosis, but it is an experiment that has never been tried in this country, and the results are incalculable.

Social Implications

One of the most useful modern developments of the anti-tuberculosis campaign is the attention given to the social side of the disease. It often happened, and still does happen, that patients restored to health by good treatment are forced by lack of advice, lack of opportunity, or because of financial stringency to return to the same work and the same conditions which led to their breakdown in health. After-care committees, public and private organizations, and treatment allowances are helping to prevent this, but they need further development. The Minister has stated to a deputation that under the new Act treatment allowances for tuberculous patients will have to fit into the general pattern of sickness allowances, whatever that may mean. I hope that he will remember not only the benefit to the individual but the special necessity for keeping infective cases out of unsuitable industries. Special industries and special factories are being developed for tuberculous patients. This movement is only in an embryonic form, but I believe it is capable of great development. County branches in connexion with colonies are also capable

further development, but I do not think that tuberculous patients in great numbers are prepared to live permanently separated from their fellow men. The one thing tuberculous patients wish to do is to live like their fellows and not be treated as we at one time treated our lepers—incidentally with apparent success.

Conclusion

I have made no new suggestions for the eradication of tuberculosis, but I am suggesting a campaign on a scale and of an intensity that have not so far been possible.

The Act gives the Minister his opportunity to appeal to the imagination of the country and make a solid contribution to the health of the people by concentrating on the elimination of a preventable infection. Nearly a quarter of our doctors served in the Forces in the late war and were brought into closer touch with preventive medicine than ever before. They have seen at first hand epidemics of typhoid, of typhus, of dysentery, of diphtheria, of smallpox, of malaria, of poliomyelitis, and a host of other diseases, and have taken an active and successful part in their prevention and suppression all over the world. They await the National Health Service with doubt and speculation. An imaginative and successful campaign against tuberculosis would show that the National Health Service means more than interference with general practice, subsidies to hospitals, and a curtailment of the liberty of the individual.

Figs. 2, 3, and 4 are reproduced from Arnold R. Rich's *Pathogenesis of Tuberculosis* (Thomas, Springfield, Ill.).

REFERENCES

- ¹Statistical Review of England and Wales (1945). Registrar-General. London.
- ²Lethem, W. A. (1946). *Med. Off.*, 75, 82.
- ³Summary Report of Ministry of Health (1945). London.
- ⁴Tuberculosis in War Time. *Med. Res. Coun. Spec. Rep. Ser. No. 246* (1942). London.
- ⁵Ritchie, J. N. (1946). *Proc. R. Soc. Med.*, 39, 216.
- ⁶Dalling, T. (1946). *Ibid.*, 39, 214.
- ⁷Wilson, G. S. (1946). *Pasteurization of Milk*. London.
- ⁸Calmette, A. (1927). *Vaccination préventive contre la Tuberculose par "B.C.G."*. Masson, Paris.
- ⁹Chaussinand, R. (1931). *Vaccination contre la Tuberculose par le B.C.G.* Paris.
- ¹⁰Wallgren, A. (1941). *Arch. Kindheil.*, 122, 65.
- ¹¹Park, W. H., Kereszturi, C., and Mischulow, L. (1933). *J. Amer. med. Ass.*, 101, 1619.
- ¹²Heimbeck, J. (1936). *Tubercle*, 18, 97.
- ¹³Rinvik, R. (1944). *Acta paediatr., Stockh.*, 32, Suppt. p. 42.

THE HEALTH AND MUNICIPAL HOSPITAL SERVICES OF LONDON

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The organized public health service of this country is just a century old. Never before in its history has such a change occurred as will happen on July 5, 1948. The background of its development may be divided into three phases. During the first phase the main attack was on environmental causes of disease, particularly the infectious diseases, including cholera. During the second the services to promote the health of school-children, of expectant and nursing mothers and young children, and to prevent the spread of tuberculosis and venereal disease were developed. During the first phase health authorities erected fever hospitals, and during the second sanatoria and maternity hospitals.

During the third phase, which began in 1930, an effort was made to integrate the public hospital service, which had grown up as part of the Poor Law system, with the preventive medical work of the major local authorities. Applying this to London, it should first be explained that

for local government purposes there are several Londons, and this article refers only to the Administrative County of London. It has a population of 3,389,680, and is increasing as those evacuated during the war return, but its pre-war population of over 4,000,000 may never be attained again. The County includes within its boundaries the City of London and the 28 Metropolitan Boroughs.

The London County Council replaced in 1889 the Metropolitan Board of Works (1855-89), and ten years later the parishes and vestries disappeared as public health authorities and the 28 Metropolitan Boroughs were created. To complete the background it must be mentioned that until 1930 there were in the County of London 25 Boards of Guardians. Among their responsibilities was the care of the destitute sick, and they had provided a considerable number of hospitals, some quite modern. They also provided a domiciliary service for the sick by means of District Medical Officers. There was also the Metropolitan Asylums Board (established in 1867), which provided hospitals for certain mental and fever cases, including smallpox, which were unsuitable for retention in the Poor Law infirmaries and for tuberculosis and long-stay cases in children. The Boards of Guardians were also the authorities for vaccination and for the registration of marriages, births, and deaths.

Reference must also be made, in order to get a complete picture of the public health and medical services of London, to the London Port Sanitary Authority, established in 1872 and administered by the Corporation of the City of London; the Metropolitan Water Board, set up in 1903; and the London Insurance Committee, formed in 1912. The development of the various services can now be given.

The County and the Boroughs.—The distribution of functions between the County and the Borough followed no broad pattern. I will say no more about the City other than that it has all the duties and powers of a Metropolitan Borough and also some of those of the County Council.

The L.C.C., 1889-1930

Until 1930 the main responsibilities of the County were the following. The Council was (and is) the main drainage authority. It is the housing authority for large schemes, both for slum clearance and for building houses, either inside or outside the County, for general housing. It makes by-laws relating to sanitary matters, but they are administered by the Boroughs. It is the town-planning authority; and it provides large open spaces and open-air swimming pools.

The above concerns the environmental services, but the personal health services were of great importance and were growing rapidly. The County Council has been the Education authority since the abolition of the School Board in 1904. In 1907 the school medical service was born. It began simply as inspection and the selection of children who needed special education because they could not profit by the education provided in ordinary schools. Thousands of children were referred for medical treatment. Their parents often could not afford private treatment. They flooded the out-patient departments of the hospitals, to the discomfort of the staff—so much so that one exasperated ophthalmic surgeon, after seeing the hordes of children overcrowding his department week after week, relieved his feelings by writing on the blackboard in the waiting-hall a phrase which ended, "Damn the L.C.C."

There was a tussle at this stage between Dr. James Kerr, the Council's school medical officer, and the B.M.A., led by Sir Victor Horsley. The former wished the Council to provide its own school clinics for the treatment of school-children. The B.M.A. urged that voluntary hospitals and