hardly appeals to us. Yet it is more important in tuberculosis than in leprosy. From a hygienic standpoint we cannot be satisfied with any method of treatment that ignores the purpose of prevention. Can we say too often that the best treatment of pulmonary tuberculosis is its prevention? Now, all the results of sanatorium treatment show that as a measure of prophylaxis sanatorium treatment largely fails. It is stated that sanatorium treatment does not cause tubercle bacilli to disappear from the sputum in more than 20 per cent. of the cases; 80 per cent. of the infectious cases leave the sanatoria as foci of infection. The best training and the best regulations cannot remove the danger, though they minimize it. Such persons are all the more dangerous if they expel tubercle bacilli from their lungs when they think themselves cured. No doubt on an ideal plan those who leave sanatoria, as those who enter, should not discharge infectious sputum, but, as matters are, many enter and leave sanatoria with tubercle bacilli in their sputum, especially in the case of the sanatoria for the better classes. In this respect, then, sanatoria are not of the same public service as hospitals for consumption. On the other hand, evidence shows that tuberculin treatment has this great advantage, that in a far greater number of cases tubercle bacilli disappear from the sputum. Of cases treated by Turban with tuberculin, only 1 out of 20 had tubercle bacilli in sputum at end of treatment. Of similar cases treated in other ways, 7 out of 21 had tubercle bacilli at end of treatment. Accordingly, as a measure of prophylaxis tuberculin should be used in all sanatoria.

Tuberculin treatment can be carried on without loss of employment. For the poor, therefore, who have to earn their daily bread the treatment may well be recommended. The majority of my early cases have suited themselves, and many of them have hardly lost a day's work. Although the treatment has involved many thousands of injections, there has never been even a small accident, not even a small abscess. This is surely the best testimony of the care with which the preparations are made and dispatched.

ESTIMATION OF THE EFFECT OF TUBERCULIN.

Space will not allow me to do more than mention the latest development in the matter of specific treatment. Koch has at length devised a means of estimating the effect of tuberculin treatment. The object of treatment is to immunize the tissues against the tubercle bacilli and its toxins. In most other diseases immunity is brought about by the formation of certain specific protective substances that reach the blood and lead to the phenomenon of agglutination. The agglutination phenomenon is probably a more or less accurate measure of the degree of acquired immunity. In tuberculosis, as a rule, such agglutinative properties generally fail to develop, and accordingly the disease does not naturally produce its own proper remedy. But in animals by various methods immunizing substances can be artificially elaborately, so that the agglutinating power may be raised from 1 in 10 to 1 in 1,500 in goats and 1 in 3,500 in donkeys. Similarly Koch has found that by the use of various forms of tuberculin in human beings the agglutinative substances can be increased so that the power of agglutination is raised from 1 in 10 to 1 in 50, 1 in 100, even 1 in 175, 1 in 200, 1 in 250, even 1 in 300. Agglutination, valueless as an aid in diagnosis, is likely to be very valuable as a gauge of success in tuberculin treatment.

Thus there is absolute scientific proof that tuberculin of various forms used in various ways—by subcutaneous and even intravenous injection—does lead to the production of protective or immunizing substances in the blood. To quote Koch's own words:

That in phthisical persons the appearance of the power of agglutination is bound up with the formation of protective substances we think may be deduced from the fact that the state of health visibly improves from the moment the serum has acquired agglutinating properties. The appetite returns, and correspondingly the weight increases, often to a considerable degree; night sweats cease; rales greatly diminish, and also the amount of sputum. In many patients the sputum ceases altogether, and therewith, of course, tubercle bacilli disappear. The most striking phenomenon in this regard was the state of the temperature. In such patients, who had no high temperature, we have never seen, after the reaction had passed away, any rise of temperature that could have been regarded as the result of these reactions. On the contrary, we have regularly observed that in phthisical patients with fever, moderate and medium degrees of fever have been favourably influenced by the reactions. At first a fall of temperature, only transient, occurred on the third or fourth day after the reaction, at the very time when the process of immunization sets in. The temperature then remains low for

several days but again gradually rises. If again a powerful reaction is produced the temperature again falls, and the fall is more persistent than after the previous reaction. By repeated reactions such rises of temperature can be permanently arrested. In individual cases we have succeeded even in causing high fever of a pronounced hectic type to disappear; therefore, the condition of fever is now no longer a contraindication as was the case in the use of the old tuberculin. We have only excluded from treatment such cases as are in too weak a state, or those in whom the destruction of lung is so extensive that improvement is out of the question.

All these results were shown in cases of phthisis in the second and third stages.

The time will come when it will be generally admitted that Koch has not only taught us all we know of the etiology of pulmonary and other forms of tuberculosis, but has found also a remedy which in skilled hands will prove an inestimable boon to the large section of humanity afflicted with pulmonary tuberculosis.

THE ADMINISTRATIVE CONTROL OF THE TUBERCULOUS DISEASES.

By H. COOPER PATTIN, D.M.CANTAB., D.P.H.,

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THE British Congress on Tuberculosis, which was held last year in London, will be memorable for more than the dicta of Professors Koch and Brouardel. It will be memorable as the first organized effort made in these islands to bring clearly into focus the magnitude of the task which lies before the community in the campaign it is urged to wage against the tuberculous diseases. Professors Koch and Brouardel committed themselves to statements each of which requires for its confirmation fuller and clearer evidence than the Professors themselves furnished. Koch says that bovine and human tuberculosis are not transmissible reciprocally, and Brouardel that alcoholism is the most potent factor in the propagation of tuberculosis. Neither of these gentlemen provides us with adequate proof of the truth of his proposition. On the other hand, the facts brought to the knowledge of the Congress in its various sections provide us with only too much evidence of the need of a national and systemic campaign against the tuberculosis; and even there we did not get all the facts.

The Congress, with a judgement with which I do not quarrel, in so far as it prevented attention being diverted from the most common and dangerous of the tuberculosis, practically confined itself to debating and resolving how best to deal with the tuberculosis which affects the lungs, and is commonly called phthisis. Of this form of tuberculosis over 40,000 persons are certified to die every year. It is reasonable to assume that for every person dying from this disease there will be at any given time ten times as many living with the disease in a slighter or severer form. Nearly half a million persons are, upon this computation, actually suffering from tuberculosis of the lungs in some stage. But this figure does not represent the total number of those who are the victims of the tubercle bacillus.

The Primary Site of Infection.

In the district with which I am associated officially nearly two out of every five deaths certified to be due to the tuberculosis are caused by forms of the disease other than phthisis. It is my belief that closer investigation into the true antecedents to death would heighten the proportion of the deaths due to non-pulmonary forms of tuberculosis. In my opinion, too, pulmonary tuberculosis is the primary lesion much more rarely than commonly is assumed to be the case. I believe this to be true of those who die of phthisis. My experience in dispensary and general practice before taking up municipal work led me to form this opinion. In fact, I came to the conclusion that phthisis is rather evidence of the development of the disease than of its invasion. It can be affirmed safely that if a victim of any other type of tuberculous disease live long enough the lungs are certain to become implicated, which implication, in many instances, masks the original seat of infection. My personal experience being limited to a little over 1,000 cases, inclusive of all kinds of tuberculosis, I am not entitled to dogmatize upon the matter, and can only express the hope that my *confrères* who are in practice, and in particular those

who have opportunities for performing necropsies, will make careful and systematic investigations into the origin of such cases of phthisis as come under their observation. If they do not find a large proportion in which the lung mischief is really a secondary indication of the general ailment, I shall be considerably indebted as well as surprised. Every physician can recall cases in which he has felt certain in his own mind that a patient was in the incipient stage of tuberculosis, and in which the most exhaustive examination of the lungs has failed to reveal the faintest symptom of their implication; in fact, he will have been obliged to say that they are unaffected. And yet, in a few weeks' or months' time he will have been only too certain that the lungs have been infected. What is the explanation? That the mischief has begun, as such *post-mortem* information as I have at my command tends to show that it most commonly does begin, in adolescents and adults, that the mischief has developed in the glands about the "roots" of the lungs—perhaps lain quiescent there for years—and then has subsequently invaded the pulmonary tissues. What is actually the mode of entrance into these glands would be too speculative a topic for me to discuss here.

I do not for a moment deny direct inhalation, but I am satisfied that to say, as Professor Koch said in the course of his address to the London Congress, that "in by far the majority of cases of tuberculosis the disease has its seat in the lungs, and has also begun there" (the italics are mine) is assuming a little too much. At any rate, the fullest clinical and *post-mortem* evidence should be furnished. Professor Koch went on logically enough: "From this fact it is justly concluded that the germs of the disease, that is, the tubercle bacilli, must have got into the lungs by inhalation." If the premiss be admitted the conclusion cannot be denied.

What is certain is the fact that one type of tuberculosis, the intestinal, affects children chiefly, and them at the milk-feeding ages particularly; and that in these cases it is very difficult to believe—not so much that the tuberculosis is not due to inhalation as that it can be directly due to inhalation into the lungs. Even in those cases of tuberculosis where the active seat of the mischief is in the lungs, it is a fact that tuberculosis of any part of the windpipe is rarely a primary affection, being indeed almost invariably secondary to lung trouble, and generally attributed to the passage from the lungs of bacillus-bearing sputum. The accidental conditions which furnish a suitable nidus for the development of the tubercle bacilli in the lungs may reasonably be expected to prevail and at times to be even aggravated in the windpipe.

These favouring conditions are local patches of congestion and abrasions of the protective epithelium, such as accompany bronchitis, whooping-cough, measles, small-pox, and typhoid. In the latter case the state of acute general debility would naturally affect the resistance of all the tissues and organs of the body. The broad fact remains that primary tuberculosis of the greater air passages, as contradistinguished from the pulmonary tissues, commonly is regarded as and accounted a rarity.

However, these are points of more immediate interest to pathologists than to practitioners, and I will content myself, for the present, with repeating that very much fuller clinical and *post-mortem* evidence is wanted to justify the current ascription of the primary tuberculosis to the lung tissues, even in cases of undoubted phthisis.

Intimation of Pulmonary Tuberculosis to the Sanitary Authority

Taking all the known facts and factors into consideration, we have to consider if it be possible to exercise a State control of and over the tuberculous diseases. At the British Congress on Tuberculosis the State Medicine Section practically confined its attention to the notification of phthisis and the provision of sanatoria for the phthisical. The discussions on meat and milk supplies, doubtless in consequence of Professor Koch's address, lacked actuality, and either erred on the side of over-emphasis or were perfunctory. It seemed to me that too much stress was laid upon the pulmonary type of tuberculosis, an insufficient amount of attention being thus paid to the other types. In speaking in the discussion upon notification, I referred to a paper which I had communicated to the International Congress of Hygiene and Demography at Budapest in 1894, on The Tuberculoes in England and Wales, in

which the obligatory notification of all the tuberculous diseases had been advocated—a position the propriety of which subsequent experience and more extended observation has strengthened and confirmed. To confine ourselves, therefore, as the Section did, to recommending voluntary notification of phthisis, seemed and seems to be a very milk-and-watery proceeding. It amounts at most to a possibility of obtaining a knowledge of some of the houses in which there are cases of pulmonary tuberculosis, but promises only a very ineffective semblance of control. The limited utility of voluntary notification is dependent upon this possible knowledge of house infection. Wherever a case of phthisis has been notified steps can be taken to secure disinfection of the dwelling before a new person or family inhabits it, or after a death has occurred. The addresses of fatal cases can be obtained easily, whether notified previously or not, from the weekly returns sent in to the medical officer of health by the district registrars. In my own district 95 per cent. of the dwellings in which deaths from phthisis took place last year were disinfected without any previous notification of this disease. The medical officer of health can inform himself of the existence of tuberculous disease in dwellings by desiring his district inspectors to inquire upon their house-to-house visits if there is any one suffering from "consumption" in the dwelling, and by further directing them to communicate the addresses of such to himself. If the health department number among its health officers a lady inspector or inspectors the information is likely to be more complete, as these officials are granted freer access to the interiors of the dwellings, and commonly get on more friendly terms with the occupants. Under any system of voluntary notification the information is bound to be of so partial a character as leads me at any rate to dispense with it very cheerfully. Many medical men, for example, do not consider themselves entitled to divulge the condition of their patients even to the medical officer of health unless they have the legal warrant for doing so that is provided by an Act of Parliament which makes notification obligatory. Many patients for the like reason assume a corresponding attitude; and generally it may be said that voluntary notification is of small account in attempting to control the tuberculoes. Of course I know that experienced medical officers of health think that valuable educational work is effected by distributing handbills or cards containing directions for dealing with the spittle of the phthisical, their sleeping accommodation, etc. But really any medical man who neglects to give the necessary directions damns himself *ipso facto* as incompetent if not worse; and for outcome of the British Congress all the newspapers have been propagating accurate information respecting the danger of spittle, and especially of tuberculous sputum.

I attach more importance to systematic instruction in all the schools of the kingdom concerning the means of infection with consumption than to distributing cards to the phthisical. Not that I wish to discourage the latter. A clearly printed code of directions as to the mode in which one may avoid infection and lessen its danger cannot do harm to any one, and may do good to many. If it do this to one person the practice will be justified. The valuable information which may be obtained through notification is that which relates to the house conditions and home and workshop surroundings of the patient. A mode in which a medical officer of health can acquire reliable information as to house infection with tuberculosis is to obtain from the medical officers of the union infirmary in his district a list of the home addresses of all pauper phthisical patients who are admitted to the wards of the infirmary. It is a fairly common practice for a poor person to gain admission to the union infirmary during an acute attack of the disease, and then, in the fateful hopefulness which is such a pathetic characteristic of the consumptive, to go out again on recovering his average healthfulness. If the home address of such a one be communicated to the health officer, the dwelling or sometimes the workplace can be cleansed and disinfected before the return of the patient, various sanitary defects be remedied, and the friends provided with instructions as to the bedroom accommodation, the measures to be adopted for preventing the possible propagation of the disease through spittle, etc. The corresponding information might be furnished very properly by the house-physicians of all public hospitals respecting phthisical

patients who may attend the out-patient rooms as well as of those admitted to the wards. In these and other ways it is possible even now for a medical officer of health to inform himself of the whereabouts of a good deal of tuberculous mischief; and I am pretty well satisfied that the principal sources of danger are aggregated in the affected person's workplace and dwelling.

Intestinal Tuberculosis.

So far I have been referring to the pulmonary type of tuberculosis—that at present (and I cannot say improperly) appropriating the attention of the public eye and ear. The intestinal type of tuberculosis, at any rate in children, hitherto has been attributed, in the main, to the consumption of the milk of tuberculous cattle. It has been my belief for years, and one which I stated in the paper already mentioned at Buda-Pesth in 1894, that too much influence has been attributed to infection of the milk from the udder of the cow, to the dairy, in fact, and too little to the dwelling; for it is my belief that a good deal of the infection of milk with tubercle bacilli takes place after the milk has left the cow and has come into the dwelling. Taking note of the fact that the children of the poor, those amongst whom intestinal tuberculosis is most prevalent, are precisely those children who get, as food, relatively the least amount of milk, I have long been unable to accept the doctrine that the mischief was due entirely to tuberculous disease in the cows.

Another feature of such milk as the children of the poor obtain is its relative poorness in natural fat. Now it is a matter of common knowledge that fats have an exceptional food value in the feeding of the tuberculous and those predisposed to tuberculous disease; as is witnessed by the tons of cod-liver oil which have been poured down human throats, and by the suet dumplings, etc., which enter into the dietary of consumptives, I am told, in German sanatoria.

I stated in my Buda-Pesth paper what I hold still—that besides infection of the milk, whether by the cow or in the home, the relative absence of fats in the food of poor class children, and the stale, used-up atmosphere of many of their homes, as well as the frequently unclean character of these latter, constituted important factors in predisposing the children reared in such habitations to fall victims to this disease. It is easy to realize (given the presence, from whatever source, of tubercle bacilli in the dwelling) how the infection of milk may occur, for such milk as the poor buy is left frequently in a basin or other uncovered vessel, and exposed to facile contamination within the actual living room.

I remember, when we had a medical meeting in the County of Norfolk to consider the desirability of forming a branch of the National Society for the Prevention of Tuberculosis, stating then that I thought too much attention was being deflected from the possibility of milk infection within the home to the probability of milk infection at the dairy, and going on to predict that if—as I hoped would be the case—every tuberculous cow in the kingdom were got rid of, there would still be found a large amount of intestinal tuberculosis among children. I went on to urge what I urge here: the importance of protecting milk from becoming infected after it has reached the dwelling. Milk can easily be protected by keeping it in a clean covered vessel and sterilizing it by repeated heating nearly to the boiling point.

In any attempt at a State control of the tuberculosis types other than the phthisical cannot be overlooked. For it will not be disputed that any localized discharges, etc., from such persons are likely to be carriers of the bacilli, and therefore potential agents in propagating the tuberculous ailments. Taking all which facts into consideration, it will be seen that to confine oneself to voluntary notification of the pulmonary type of tuberculosis is to play but not to cope with the problem before us.

Compulsory Notification of all Tuberculous Diseases.

Now, it seems to me that to set out upon a national campaign against the tubercle bacillus and all his works, as we are supposed to be setting out, without first informing ourselves of his whereabouts and numbers, is on a footing of practical folly with the conduct of a general who should set out to fight human foes without first learning the numbers and disposition of the enemy. To secure this indispensable information, if we are not to make "much ado about

nothing," it will be necessary to make the notification of all types of tuberculosis disease obligatory. This was the course I urged in 1894 at the Buda-Pesth Congress: Non-compliance with the requirements of the law to expose the offenders to the infliction of penalties and all the undesirable publicity which accompanies prosecution. It is not necessary to pass an entirely new Act of Parliament to secure compulsory notification of the tuberculous diseases. A single clause could be added to the Infectious Diseases Notification Act, stating that on and after a certain date its provisions, penalties, etc., shall apply to the tuberculous diseases; or, if what in my part of the country is known as "The Sanitary Yamen"—the Local Government Board—could be prodded into taking the initiative, some, possibly many, sanitary authorities would add tuberculous phthisis, at any rate, to their lists of diseases notifiable compulsorily. The existing legal machinery would supply all necessary powers to enforce the notification.

I know very well the arguments that are used against obligatory notification. They amount in substance pretty much to the following contentions:

1. That "public opinion" is not "ripe" for it.
2. That notifications in consequence would be incomplete, and that the sufferers themselves would object to have their infirmity made known even to health authorities.
3. That the visitation of the premises, etc., by the medical officer of health and the issuing of instructions by him would lead to "disturbance" of the confidential relations subsisting between practitioners and patients.
4. That the inherent difficulties of diagnosis would make it difficult to arrive at such a positive opinion as would justify notification in many cases.
5. And finally, that compulsory notification, with its consequential administrative measures, would constitute an unwarrantable and undurable interference with the liberty of the subject.

Let us give for a few moments the fullest importance which can be attributed reasonably to these objections, and then weigh them against the advantages to the commonwealth which may be looked for if notification of the tuberculosis be made obligatory.

For the sake of brevity I hereinafter confine my observations to the pulmonary type of tuberculosis. To begin then with:

1. The objection that "public opinion" is not "ripe." It is not an *ad captandum* reply to say "How do you know?" to the propounders of this most hoary of objections, in the special circumstances. As a matter of fact they do not know, and with the assurance born of ignorance assert implicitly that their own opinion of the ripeness or immaturity of "public opinion" corresponds with fact. I dispute the proposition *in toto*, and all the more strenuously because I have left the political nursery too long to be frightened by such a bogey. "Public opinion" upon a matter of this kind would be the most fallacious of guides, and the public has the sense to know it. If the objectors to obligatory notification believe that the public puts not its trust in experts they may have some grounds for waiting for the precious opinion to become, in their own opinion, riper. But I affirm that the public puts quite pathetic trust in the dicta of experts; for example, note how "public opinion" accepted the vapourings of our Pall Mallian experts over the duration and character of the Boer war on its outbreak, if you want a crucial illustration of its value. Any way, I am quite satisfied that if the Council of the College of Physicians would make of itself "a motley to the view," and walk in procession clad in academicals and preceded by the beadle, etc., to Whitehall and there affirm, *coram populo*, that obligatory notification of tuberculosis was desirable, it would be found that "public opinion" was what gardeners call "rotten ripe." I, who have seen the inhabitants of a cathedral city accept cheerfully the proposal to schedule diarrhoea among its notifiable diseases, simply because the medical officer of health said that the suggestion of the Local Government Board that local authorities should do so was in the special circumstances—it was at the time of the cholera scare—really a sensible suggestion—I who have seen this feel that I was born too near a wood to be affrighted at such an owlet as is "public opinion," in any stage of ripeness, upon such a matter as the value of obligatory notification in a national campaign against the tuberculosis. The next objection:

2. Is that notification, if obligatory, would be incomplete, inasmuch as some doctors and many patients would object to

notify the fact of the existence of tuberculous disease, even to the health authorities. Granted, and to the full; but it should be obvious that with voluntary notification the incompleteness must be to this as is the waist to the little finger. With the law to help us to do our duty, I fancy the doctors would not hanker after the publicity of magisterial proceedings, and would notify with zealousness. Nor do I fancy that any would be lay evader of the legal precept would care to have his or her state made a matter of notoriety as the injudicious alternative to notifying quietly the facts to a discreet medical health officer. And if a medical officer of health be not discreet, then that of itself is good ground for getting rid of him, as being palpably unfitted for his office.

3. It is predicted that the notification to the medical officer of health of the affected dwelling, and the possible visit from that officer, with the issue by him of a card of instructions, would disturb the "confidential" relations which exist between the practitioner and the patient. This objection is but a tissue of hypotheses. First of all, it is pretty certain that the medical officer of health would neither wish nor be able to visit every notified dwelling; and it is more certain that, being a discreet man, he would not wish to see every patient. His main purpose would be fulfilled when the abode of every sufferer was registered, and a card of instructions delivered, these latter giving special directions as to notifying (under penalty) removal, so as to facilitate disinfection of the dwelling before it could be occupied by another. In fact, I should be perfectly satisfied with a notification couched in the most general terms—for example, "I certify that in such and such a dwelling there is a case of tuberculosis. (Signed) Hippocrates Galen, M.D." etc. The mention of the name of the patient being voluntary, the notification of the dwelling (the really important matter) being obligatory. Then the medical officer of health, either in person or through a staid and discreet male or female inspector, would learn whether the sufferer laboured in any workshop, etc.; and where, so as to insure that he took all the due precautions there, leave the printed official directions as to notifying removal, etc., and, like the Arab, "silently steal away." Objection 3, in short, is only a "bogey," born of misapprehension, prejudice, and fear.

4. The inherent difficulties of diagnosis, etc. Well I know from practical experience what these amount to, and am not affrighted; but, to calm the Galenic breast, I should be satisfied to claim notification of such cases only as could be shown by bacteriological examination of the expectoration or of any other secretion or excretion to be giving out bacilli. (Such bacteriological examination to be performed at the expense of the public.) I fancy that, under these circumstances, few capable practitioners would remain for very lengthy periods in "honest doubt."

5. That compulsory notification, with its consequential administrative measures, would constitute an unwarrantable and unendurable interference with the liberty of the subject. This is the crowning and coping objection! It would rather constitute a warrantable and endurable interference with the liberty of the bad subject to endanger his neighbour which he at present selfishly abuses. If the purport of notification be explained clearly it is difficult to see how any valid ground of objection can be raised to its enforcement. Nay, I go further, and without citing the experience of New York and South Australia, where notification of pulmonary tuberculosis is compulsory, will affirm that no intelligent democracy of Anglo-Saxon origin will suffer for much longer the claims of the whole community to be protected from danger, to be overridden by the sentimental praters about liberty of the subject, when such liberty means a licence to endanger. The immediately practicable administrative measures are those detailed—information as to presence of the disease in dwelling and workshop, directions as to treatment of discharges, disinfection after death or removal, etc.

Administrative Preventive Measures.

Administrative steps which I should like to see taken would be a legal requirement that no consumptive person should be permitted to land from a ship without notification of his destination being sent to the medical officer of health by the ship's doctor. A notification that tuberculous passengers had been borne would, of course, be required by the port sanitary authority, so that the cabin which had been

used by the consumptive could be disinfected before it was occupied by another person. Similar notification should be required from the friends when known consumptives proposed to stay at health resorts, etc., the object being in all cases to secure disinfection of the dwelling or part of a dwelling occupied by the tuberculous before another person inhabited it.

Severe penalties against spitting upon the floor, etc., of railway carriages would be requisite to prevent infection of these by consumptives in transit. (One hopes the day will yet dawn in England when either plain wood or washable leather will constitute the upholstery of our railway carriages; at present they are constructed apparently with the special intention of being exceptionally capable disseminators of disease). Bear in mind our definition of a consumptive, namely, a person who is giving out in any secretion or excretion tubercle bacilli. The suggested measures would constitute no intolerable burden upon any decent citizens. The private practitioner would see that his patient was provided with a spittle bottle and the public officer would supervise the disinfection of the dwelling. Either of these could, and both probably would, give suitable directions about the treatment of the sputum, the one to protect his patient from re-infecting himself, the other to protect the public from a preventable affliction. It is only by means such as these that any rational as well as national campaign can be waged against the tuberculoses.

Of course one expects and would like to see other measures taken concurrently with notification—namely, the provision of sanatoria for the recuperative treatment of the victims of tuberculous diseases. In process of time one reasonably can expect every sanitary authority to possess its sanatorium for consumptives, or to be a contributor with other authorities to the maintenance of one. The fact that the German insurance societies find it pays them to pay for the treatment of their tuberculous members in such sanatoria may be expected to weigh with the purse-preservative instincts of ratepayers. For, although it would carry us too far afield to enter upon the computation here, I am disposed to affirm that the British ratepayer would be astonished if he knew how much the tuberculous diseases are costing the country at the present moment in union infirmaries, and through needless loss of labour, time, etc. Indeed, it is probable that the erection and maintenance of sanatoria will prove a direct, as it unquestionably will prove an indirect, economy. Admission to any sanatorium would, of course, carry with it notification to the district sanitary authority of the house from which the inmate came, so that its disinfection and improvement could be taken in hand before the possibly cured ex-inmate again returned.

A side issue, which inevitably will assume greater proportions as time progresses, is the housing question as affected by any attempt at the administrative control of the tuberculoses. It will not be enough to disinfect the inside of affected dwellings. Local authorities will have to face, and their medical officers be prepared to advise, condemnation of many dwellings, not so much on account of size, probably, as because of deficient sunlight and the absence of sufficient space to provide a free currency for the air, and therefore for adequate ventilation. The occurrence of tuberculosis in a dwelling so situated will increase enormously the moral claim to have it proclaimed unfitted for human habitation. But to carry the required weight it is all-important that the notification of the tuberculosis shall be obligatory. To the lay mind an infectious disease which is notified in accordance with an Act of Parliament only is really serious.

Conclusions.

In conclusion, before setting out upon an attempt to control the tuberculoses, we need:

1. Reliable information as to their whereabouts, which, in my judgement, can be acquired by obligatory notification only.
2. Rigorous adoption of consequential administrative measures as to destruction of sputum, etc., and disinfection and improvement of affected dwellings, and sometimes their condemnation and removal.
3. Provision of sanatoria for recuperative treatment either by sanitary authorities singly or conjointly.
4. Instruction in all elementary schools in the means of

propagation, and the methods of prevention, in dealing with tuberculous diseases.

With the adoption of the above measures we may hope greatly to diminish the untimely yield of human lives which is now garnered annually by the tubercle bacillus; to say nothing of the lessening of the pain and misery which too often make those who should be healthy and useful members of our national family pathetically hopeless and practically dangerous.

ON A MODEL SANATORIUM FOR CONSUMPTIVES.

By SIR LAUDER BRUNTON, M.D., F.R.S.,
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WHILE on my holiday in August last year I took the opportunity of visiting various health resorts. Amongst others I went to Nordrach and to Wehrawald. Nordrach has now become a household word, but I had never heard of Wehrawald until I met my old friend, Professor Bäumlér, at the house of Dr. Fraenkel in Badenweiler. Professor Bäumlér insisted that I must by all means visit Wehrawald, which is a new sanatorium for consumptives, because it exhibits the most perfect model yet built of what such a sanatorium ought to be. Wehrawald is situated in southern Baden, and is most easily reached from London by taking train to Basel and thence to Wehr, from which a carriage takes one in about two hours or two hours and a-half to the sanatorium, a journey of

General view.

about twenty-five hours in all from London. The drive from Wehr through the Wehrthal is exceedingly beautiful, the valley, or rather gorge, being so narrow that in some places the carriage road is built out into the stream, which completely fills up the whole distance between the precipitous sides of the gorge. The banks are so steep that on looking at them one wonders how any trees can find a place, and yet

the sides of the gorge are covered with pines on both sides up to the top.

As we near the sanatorium the valley opens out into an oval basin which has apparently been the bed of an ancient lake, and right in front we can see the sanatorium on a jutting projection from the hillside, with pines above, pines below, and pines on each side of it. It faces south, looking down into the open basin I have just mentioned, and is in full sunshine the greater part of the day, while the hills behind shelter it from the northerly winds. Below the sanatorium and a little to one side of it lies the village of Todtmoos, with a hydropathic establishment, and above it a small pilgrimage church. The sanatorium lies 2,824 ft. above the sea level and the site has been made for it on the slope of the hill by cutting the ground away behind and building it up in front. The sanatorium itself consists of three parts—a central building, 5 stories high, for the reception of patients, and two side wings projecting backwards at either end. Both these wings are only 1 story high, so that they do not interfere with a free current of air round the main building.

The western wing is devoted to medical, surgical, and hydrotherapeutic examination and treatment. The eastern wing contains the administrative offices, dining room, kitchen, scullery, and servants' hall. The dining room is a large, well-lighted, airy room, 52 ft. long, 32½ ft. wide, and 18 ft. high; it is ventilated by means of an electric fan on the roof. On one side are large windows looking into the forest, and the opposite wall is almost completely covered with mirrors, so that wherever a patient sits he almost seems to himself to be dining in the open air. The central building, which faces due south, is 197 ft. long, and in front of the ground floor is a verandah 263 ft. long, the ends of which bend forward to the south, and afford protection from winds—east, west, or north. On the verandah are numerous deck chairs, in which the patients lie enjoying the sunshine and fresh air. It is supported by a series of arches which form a long vaulted passage running the whole length of the verandah, and freely open to the air, so as to provide a convenient walk for the patients in bad weather. At the east end of the verandah is the doctor's house, and at the west end a small pavilion. These protect the verandah itself still further from easterly or westerly winds. In front of the building is a terrace, on which there are two buildings, each about 50 ft. long, in which the patients may lie instead of in the verandah.

Footpaths lead in every direction through the pine woods at the back of the house, with numerous benches on which the patients may rest when tired, and here and there in the woods are also small pavilions where in favourable weather patients may lie the greater part of the day.

The entrance for people arriving in a carriage is at the east side of the building, but for those who are living in the sanatorium there is an entrance from the verandah which opens into the hall. From the eastern entrance one passes into a corridor which runs along the back of the main building and up the western wing, but the eastern wing is entirely separated by doors, so that no smell can come from the kitchens or dining-room into the main building, and there is a separate corridor for service connecting the kitchens with the stairs, so that meals may be carried to patients in their own rooms without coming through the main corridor. Along

the front of the building, in succession from east to west, are a reading-room, a library, a drawing-room, the entrance hall, and ladies' and gentlemen's cloakrooms, where warm wraps can be conveniently kept for any change of weather, and where boots or shoes can be at once changed without the trouble of a patient going up to his or her own room. Each patient has a separate division, so that there can be no possibility of infection through clothing. In the western wing are baths and douches for ladies and gentlemen, an operating-room, waiting-room, consulting-room, dispensary, and a laboratory where sputa can be examined, or other chemical and microscopical investigations can be made.

As the side wings are only one story high the first and succeeding floors have no wings. They are devoted entirely to bedrooms, all of which face the south with the exception of two in each story, the one of which faces east and the other west.

First floor.