more impossible, if this can be, for one human brain to assimilate the whole of these facts and put them to practical use. The burning question even now is, How many of these facts is it desirable—should we say necessary—for a general practitioner to know?

What I wish to further is the teaching of anatomy in such a manner that the finite mind may obtain and retain those which are essential. I consider that this requires a good deal of "heterodoxy" in the relating of anatomy to surgery.

A British Medical Association Lecture

ON

THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS.*

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BY

W. ARNOTT DICKSON, M.D., M.R.C.P.Ed.,
F.R.C.S.Ed., D.P.H.,

TUBERCULOSIS OFFICER, GLOUCESTERSHIRE; MEDICAL SUPERINTENDENT,
STANDISH HOUSE SANATORIUM; CLINICAL MEDICAL OFFICER,
GLOUCESTERSHIRE COUNTY COUNCIL.

(With Special Plate.)

To attempt, in however sketchy a fashion, to cover the ground indicated by the title of this address, appears little short of ridiculous. But a bird's-eye survey, if it can be compassed, admits of some sort of perspective, and thus helps to compensate for its superficiality. It is in this hope that I shall put before you, not a synopsis of the monstrous literature which has grown up on the subject, but a brief and I hope practical summary of the procedures on which I mainly rely for diagnosis and treatment in the tuberculosis department of Gloucestershire, the county to which I am attached.

That county, it may be mentioned, shows significant variations from other counties in its arrangements for carrying out the medical services statutorily imposed on it. As regards tuberculosis, there is a fusion of the offices of tuberculosis officer and sanatorium superintendent, which is, or ought to be, very valuable; and the county also possesses a treatment scheme, peculiar to itself, initiated over eight years ago through the pioneer work of the county medical officer of health (Dr. J. Middleton Martin). Under this scheme fifteen centres have been opened throughout the county staffed by the local practitioners and designed to treat the various types of cases for which a local authority has responsibility. The doctors have at call the services of the recognized consultants in the area. This scheme has recently been commended to the Council of the Association by the Gloucestershire Branch as the ideal method in a county area of securing the co-operation of private practitioners in public health services. An integral part of the scheme is that cases raising the suspicion of tuberculosis are grouped for examination at my periodical visits. As these out-stations are additional to the usual dispensary organization it will be seen that the opportunities provided for a second opinion are particularly good. My experience in the county comprises over 14,000 patients, and the sanatorium under my charge has 250 beds. For the sake of simplicity I shall, in what follows, exclude children from consideration.

DIAGNOSIS.

It is a curious fact that doctors, in the matter of diagnosing tubercle of the lung, tend to fall into two groups: those who on the strength of a suspicious symptom or so, with occasional indeterminate signs, such as a few scattered rales, are prepared almost light-heartedly to label a case tuberculous; and, on the other hand, those who wait

till physical signs cry aloud for judgement. For a department like mine, needless to say, the line of least resistance is: when in doubt, diagnose tubercle. There is an ever-present danger that this diagnosis becomes simply a dumping ground. Yet a lifelong handicap may be imposed on a patient because of an ill-founded diagnosis of pulmonary tuberculosis, and however successful a sanatorium may be as a general convalescent home, that is not its function.

Of the cases sent to us year by year we give an opinion that tuberculosis is not present in between 30 and 40 per cent. It may be objected that early cases are being missed, that the golden opportunity is being allowed to escape. This, of course, is the bugbear of a tuberculosis officer's life. To that objection I reply, first, that in a large number of cases an alternative diagnosis is established. The symptoms are found to be due to diabetes, or cancer, or heart disease, or syphilis, or pernicious anaemia, or some other debilitating or wasting disease. I have also seen quite a number of young girls whose symptoms were dependent on an unsuspected pregnancy. These conditions, and many others, which like them have nothing to do with the lungs, have been found during the ordinary dispensary examinations.

In the second place, I reply that, with regard to lung cases, we have to face a formidable test of the accuracy of our negative diagnoses. Unless the patients remove from the county altogether, the fact of a subsequent notification of tuberculosis, by whomsoever made, is known to us. And should any of these patients die, and the word "tuberculosis" appear at all on the death certificate, that fact also infallibly reaches us. This furnishes a severe and continuously operating check on our accuracy or otherwise. There is, fortunately or unfortunately, nothing resembling it in ordinary general or hospital practice. From these ultimate tests we have so far emerged without finding cause to modify our standards.

But assuming that a patient is suffering from tuberculosis, we are doubtless all at one in wishing to have the diagnosis established, if possible, at an earlier stage than it commonly is at present. The need for this is admitted on every hand, though the frequent assumption that early diagnosis necessarily implies a good prognosis is not always well founded. Delayed diagnosis is not necessarily the fault of the doctor. Two weeks ago I saw at a dispensary a man who had seen his doctor for the first time only the day before. He had not lost a day's work; he said he felt well and took his food well. His only complaint was undue tiredness. Yet his temperature was 102° F., and he had active tuberculosis of most of one lung, with a large cavity. There must be few diseases which can advance to such a stage without arousing the urgent interest of the patient in his own condition. But this is rather an exceptional case. I think it must be admitted that there are other cases, even in considerable numbers, where the opportunities for examination have occurred and in which any doubt as to the diagnosis might have been resolved earlier by everyday clinical methods.

I hear very often the statement that chest cases are extremely difficult. Admittedly an obscure chest case may present as difficult a problem possibly as any met with in practice; but my point is that such cases are not nearly so common as some medical men suggest. Certainly I see many cases in which the diagnosis is *too* easy—cases which should cast no strain whatever on the clinical acumen of the examiner, but which have managed to get through the meshes of the diagnostic net.

SCHEME OF EXAMINATION.

Let me put before you, shortly, elementary though it may be, the scheme which I adopt for the investigation of a case of suspected pulmonary tuberculosis.

First the medical history is taken, and the symptoms elicited. There are some writers on tuberculosis who do not hesitate to diagnose on symptoms alone. I do not agree with them. Even haemoptysis, that most dramatic and significant of symptoms, may lead one astray. Having obtained the patient's story (and this well repays the time spent on it) he is then examined, stripped to the waist. It is surprising how often this first principle of chest examination is violated. If at all possible, the patient should

* The lecture was illustrated by numerous lantern slides.

stand facing a window. I know from experience the impossibility of making a reasonable examination of a patient in bed in a miner's cottage.

The usual routine of inspection, palpation, percussion, and auscultation is then proceeded with. It is not safe to omit any of these methods. Inspection should be conducted at some distance from the patient—six to eight feet. It is a method frequently neglected, yet in cases of extensive thickening of the pleura the limitation of movement on the affected side may be the only physical sign easily ascertained.

Palpation, apart from its customary uses, may give to the trained fingers a sensation of muscular rigidity over a lesion which is readily discernible.

Percussion, I have come to the conclusion, is a more difficult art to master than our teachers warned us. It should, in my opinion, invariably be light, very light. Apparently it requires more practice than it generally receives. In any case, the failure to detect differences in percussion note is frequent, which is unfortunate, as percussion is a more valuable guide in diagnosing early tuberculosis than is auscultation, since infiltration precedes catarrh. It is a useful rule to compare not only the apices, which may both be affected, but also the apices with the axillary region. Perhaps, in view of recent writing on the subject, it is well to make clear that the term "apex" is here used in the loose fashion usual in this country, and is not restricted to the anatomical apex above the clavicle.

The demarcation of Krönig's areas is valuable in early cases, and the use of a skin pencil has other advantages. It is an aid to concentration, it makes the examiner commit himself, and is ocular proof of a complete examination!

Auscultation is more commonly relied on than percussion, and for most examiners appears to be easier. In cases of difficulty, interrupted auscultation—that is, the comparing of each phase of respiration separately—should always be practised; and it is inspiration which demands the closest attention. The difference in breath sounds at the apices is universally recognized. It is sometimes forgotten that there is a corresponding difference at the bases, the respiratory murmur on the right side being decidedly weaker.

Some of the pitfalls in auscultation may be mentioned. An effusion may give rise to auscultatory signs almost indistinguishable from a cavity—tubular breathing in its purest form, and whispering pectoriloquy. On the other hand, a cavity may indubitably be present and give none of the classical physical signs we were taught to associate with it. There may also be great difficulty in distinguishing between pleural rales, the rales of active disease, and the rales more or less permanently present in fibrotic cases, though the distinction is important. It is not possible to lay down an easy guide to differentiation. This must be largely a matter of experience.

The examination, even up to this stage, takes one a long way. In the majority of cases of tuberculosis sent to me it settles the diagnosis. For although sputum examination may clinch the matter before physical signs are discoverable, I hardly ever see patients at that stage. And if a patient with symptoms indicative of pulmonary tuberculosis has evidence of consolidation at the upper part of a lung, the diagnosis may be made practically with certainty. Tuberculosis may have signs confined to a base, but this is so uncommon that it is a safe enough rule never to diagnose it in the absence of tubercle bacilli in the sputum.

Sputum Examination.

It is literally essential that the sputum be examined in every case; repeatedly if necessary. This is fundamental. It is a mystery why this simple test is not universally applied. Only a small proportion of the total number of patients sent to me have had their sputum examined before I see them, though many of them have had both symptoms and sputum for months. Not once, but hundreds of times, have I seen delay in diagnosis that could have been avoided by the exercise of this elementary precaution. A positive sputum, barring the extraordinarily infrequent accident, settles the diagnosis. The possibility of "carriers" is of the merest academic interest when we are discussing

patients with symptoms. One negative sputum result is of little value. But three negative reports, provided the specimen is purulent, should receive great weight. It is not suggested that a progressive tuberculosis cannot be present in the absence of tubercle bacilli in the sputum. In miliary tuberculosis, as is well known, the organisms may never be found by that examination. But, personally, I make a point of overhauling the diagnosis with an open mind after three negative sputum results. In such cases a Wassermann reaction is obtained, x-ray examinations are repeated, special sputum tests are undertaken, and an injection of lipiodol may be given. The evidence should be strong before a chest case with definite physical signs and sputum is accepted as tuberculous in the consistent absence of the tubercle bacillus.

Pleurisy with effusion, if present, can hardly escape the examination I have described. It should always be regarded as tuberculous, and treated as such unless there is an obvious alternative explanation. I invariably put in a needle in such cases. If serous fluid is found two important points have been settled: (a) empyema has been excluded, and (b) the diagnosis has been established beyond all doubt. This is a point of some moment, for should the fluid happen to be absorbed quickly and completely, and later the need for serious treatment is questioned, it is an advantage to have one's diagnosis of effusion based on evidence which is incontrovertible. Incidentally, it is curious to note how the position of the apex beat does not always get the place of cardinal importance it deserves in suspected effusion.

To come to more general considerations in examination, it is unusual to have active tuberculosis proceeding with a normal temperature. In any case of doubt a record of the morning and evening temperature should be kept for a fortnight. The usual precautions should be observed as to the patient having been at rest for at least half an hour before the temperature is taken, and no food or drink taken for a similar period. I am assuming that the temperature is to be recorded in the mouth. In spite of all that has been written on the superiority of the rectal temperature, you may rest content with the oral method, which is very much simpler and sufficiently reliable.

The pulse frequency is often a difficulty, as many nervous patients show an abnormally high rate owing to excitement. A low pulse rate is a good sign, and it is often useful to try the effect of exercise. The old form of exercise known as "20 chair" is as good as any. The pulse frequency should return to its starting point in two minutes. A consistently high pulse rate is an unfavourable feature in prognosis.

X Rays.

No physical examination of the chest can be considered complete nowadays without an x-ray examination, though it is not always essential. But if nothing has been found clinically, a negative diagnosis is greatly strengthened if nothing is found by this method also, and the extent of involvement of the lungs, in a positive case, can be ascertained with enhanced accuracy from an x-ray film.

The reading of the film is often a difficult matter. For the majority of medical men the report of the radiologist must be taken, and this is a variable quantity. It may be said of x-ray examination, as of so many other things, that it is a good servant but a bad master. I have on many occasions seen films and reports on the same patient by different radiologists, and the comparisons are instructive. During the past few years I have compared many hundreds of x-ray films with the clinical findings. As a rule they correspond reasonably closely, but a film may be invaluable in revealing a condition inaccessible to clinical examination, and, as suggested above, this may include early cavitation. At other times a film may show nothing when signs, to auscultation at least, are obvious. This is particularly noticeable in cases of unresolved pneumonia in its later stages. As x-rays do not reveal catarrh, you may get a film showing an apparently normal chest when one side is bubbling with rales. In primary tumour of the lung, which is said at some of the chest hospitals to be getting much commoner, the diagnosis can frequently be settled at once by x-rays, particularly after the shadow has been

sharply delineated by the introduction of air into the pleural cavity. The condition, fortunately, does not appear to be on the increase in my county.

TESTS FOR TUBERCULOSIS.

A word must be said on the various tests for tuberculosis, of which much has been heard from time to time. Tuberculin has been used as a specific test in hundreds of thousands of cases. The von Pirquet skin test has been performed, I suppose, in every country of the world, and a voluminous literature has grown up on it. We made a thorough trial of this test at the sanatorium which I control, doing over four hundred inoculations, almost equally divided between children and adults. At first commercial tuberculin was used, and then a special brand kindly supplied for the purpose by the Wellcome Laboratories. My experience is that, using ordinary methods with presumably ordinary skill, this test is, for diagnostic purposes, of no value whatever. I go further—it is so fallacious that it may easily be worse than useless. In patients known to have tuberculosis, with tubercle bacilli in the sputum, some doing well and some doing badly, it was impossible to forecast the result, which appeared to have no relation either to the presence of active disease or to the prognosis. In known cases of tuberculosis the test was negative in almost as many cases as it was positive. This is an exceptionally bad result, but Dr. Charles McNeil, in the *British Medical Journal* of October 12th, 1929, has to admit, after a panegyric of the test, that it "may . . . fail to appear in an actually tuberculous condition." This has been shown to be the case also in guinea-pigs.

The ophthalmic tuberculin reaction is little short of barbarous, and ought never to be employed.

The intradermal reaction has been very widely used within the past few years. A study of Professor Lyle Cummins's article in the *British Medical Journal* of February 23rd, 1929, will show that this also is of no practical value in this country, however useful it may be in deciding the progress of infection in non-immunized communities.

The complement fixation test, corresponding to the Wassermann reaction in syphilis, has been very disappointing, and is a broken reed when its assistance is most required.

During the past ten months, through the good offices of Dr. E. N. Davey, pathologist to the Gloucestershire Royal Infirmary, it has been possible to make arrangements for blood from patients at our county sanatorium to be submitted to the Verne test. I believe this test is being carried out at only one or two laboratories in this country, and, briefly, it consists in mixing the patient's serum with a preparation of resorcin and assessing numerically the resulting cloudiness in an elaborate and sensitive colorimeter. Up to the present over 200 tests have been made from my patients, and the least that can be said is that the results are extremely interesting and the method appears to be very promising. It is, of course, too early to pass judgement, but it certainly seems to be the best laboratory aid to diagnosis yet devised.

In the differentiation of diseased lung conditions there is a procedure which is possible only in an institution, but which is so valuable within its limited sphere that it is worthy of mention. It consists in taking an x-ray picture of the chest after the introduction into the bronchi of lipiodol. This is a poppy-seed oil heavily impregnated with iodine, thus rendering it opaque to x rays. The lipiodol may be introduced into the bronchi in various ways. The laryngologists do it through a bronchoscope. No one but a laryngologist would think of that. The usual method is by a tube inserted into the trachea through the crico-thyroid membrane. This is the method I have almost invariably employed, using the trocar and cannula devised by Dr. Chandler. It seems perfectly safe, and, provided the patient's confidence is obtained, is not unduly difficult. It is possible also, in some cases, to drop lipiodol over the base of the tongue and persuade the patient to inhale it. This may be very successful or a complete fiasco. Lipiodol is simply invaluable in the diagnosis of bronchiectasis; without it this diagnosis is very largely guesswork.

TREATMENT.

The history of the treatment of pulmonary tuberculosis is littered with the wreckage of discarded "specifics." These "specifics" obtained their temporary vogue largely because of two factors, which are not peculiar to the treatment of tuberculosis, and for which allowance must always be made in trying a new remedy. The first is the fight normally put up by the human body against any infection—a fight which in a proportion of cases is to be successful whatever remedy be used, or even no remedy at all. The second is the enormously important psychological factor. The hope which we are told "springs eternal" finds in any new treatment a stimulus and a justification. That explains why patients frequently say they are greatly improved when in fact they are not. It must also be—and this is a more difficult point—the explanation of an actual improvement, which later falsifies our hopes. But the influence of the mind on the body is a very large problem indeed, of which at present most of us see only the fringe.

At our county sanatorium we consider it a duty to examine as many as possible of the quasi-scientific measures which are confidently put forward from time to time. Calcium, for example, has been much lauded in treatment. We tried it in about fifty cases, giving a three months' course of subcutaneous injections of collosol calcium, reinforced by parathyroid extract by the mouth, and found its benefits not appreciable. Similarly antimony, garlic, pig's spleen, and numerous other drugs and extracts have had their enthusiastic advocates. Some of them are worth trying, but not one is specific or of general application. Sanocrysin, a double thiosulphate of gold and sodium, used intravenously, is still on its trial, and reports vary as to its virtue. It has the advantage of providing a line of attack, speculative though it may be, in cases where the doctor is at his wits' end to try to stay an advancing bilateral disease. It may produce definite symptoms of metallic poisoning, and, unfortunately, patients tend to lose weight while the treatment is in progress. We have had several cases where it was very successful, both in arresting active disease and in getting rid of tubercle bacilli from the sputum in chronic cases.

For the ordinary case of pulmonary tuberculosis employment of the general measures summed up in the term "sanatorium treatment" gives the best chance of recovery.

It is at times salutary for a doctor, who is freely prescribing treatment of all degrees of severity for his patients, to consider what line he would adopt if he were himself the patient. Putting that question to myself, I answer it without hesitation. Should it be my evil fortune to contract pulmonary tuberculosis I would start by going to bed under the best conditions possible, and staying there for six months. I would rely on no drug treatment whatever, unless possibly to meet some troublesome symptom, and I should expect to be well on the way to recovery at the end of that time. This factor of rest is of enormous importance. It is very striking, in patients with lung disease, and also a surgical condition necessitating prolonged immobilization—for example, spinal disease—to see how completely quiescent the lung condition becomes apparently as the direct result of this immobility. And rest is the factor which in ordinary practice is sadly neglected. The patients with raised temperatures who go out long walks in search of fresh air—their name is legion, and the results are disastrous. A patient with an oral temperature of 99.2° or over should spend the next day in bed. Among the insured population, and indeed all classes of the population, it is extraordinarily difficult to secure a sufficiency of rest, and the discipline of institutional life is almost always necessary even to approximate to what is needed.

Suitable food in reasonable quantity is another essential. It is an old saying that a hearty eater never takes tuberculosis. While this may be open to some doubt, there is no doubt whatever about the fact that a capricious and failing appetite is a serious bar to recovery. A well-balanced diet is best. It is not necessary to insist on an abnormal consumption of fats.

Fresh air day and night is now a well-recognized necessity; this need not be elaborated.

Regulated exercise and work have their undoubted place.

These are the essentials of sanatorium treatment, and they should be applied in every case, whether in or out of an institution.

Drugs are of value when indicated by symptoms. An irritating useless cough should be allayed, a productive cough may be aided by expectorants; suitable medicinal treatment aids a failing appetite. Drugs should not be used for night sweating. The proper cure for that is hyper-oxygenation. Haemoptysis is an urgent symptom for which it is necessary to do something at once. Many drugs have been recommended, too many—a suspicious sign. Evidently no one of them can always be trusted. But whatever drug is used the essential thing is to follow a definite line with assurance. Put the patient to bed, propped up somewhat, and if he seems to require it, do not be afraid to give one dose of morphine, 1/4 grain, hypodermically. Its drawbacks have been greatly exaggerated. Allow only one reliable person at the bedside. An icebag is of no real value but may comfort the patient. I give either calcium chloride intravenously or haemoplastin intramuscularly if the haemorrhage is of any size. Both appear to give good results. Calcium lactate, 15 grains thrice daily, is subsequently given by the month for a fortnight in the hope of preventing a recurrence. But the only certain method of stopping haemoptysis is collapse of the affected lung by the induction of artificial pneumothorax. This is an indispensable weapon in the therapeutic armoury.

I am frequently asked what should be done for a pleural effusion. The proper course, if the fluid is in quantity, is to withdraw it and replace by air by means of a pneumothorax apparatus, and so continue the advantage gained from collapse of the lung. If no air replacement is proposed, and the amount is not causing distress, there is no reason why it should not be left for weeks. But if the effusion is sufficiently large to produce troublesome displacement of the mediastinal contents it should be partially withdrawn—only partially, however, as rapid expansion of the collapsed portion of lung must be avoided. And do not forget that the patient must be treated for the tuberculosis, of which the effusion is a symptom.

If the effusion is purulent in a tuberculous patient he would be a bold man who treated it as an ordinary empyema and excised a rib. The chances of a healthy scar are remote. A good treatment is to withdraw the purulent effusion and wash out the pleural cavity with weak iodine solution or other mild disinfectant. The wash-out is done from above, while the diluted pus is withdrawn from the base. It may take a gallon or two before the fluid runs through clear, and the lung is then kept collapsed by air. The process will probably have to be repeated more than once, but it gives good results, which cannot be said for ordinary surgical intervention.

I shall say nothing about tuberculin treatment, which is not being used to any extent in pulmonary tuberculosis, though its value is undoubted in genito-urinary cases. Ultra-violet light, the panacea of the moment, is of very problematical value in lung tubercle.

SURGICAL TREATMENT.

Mechanical and surgical methods of treatment are becoming commoner and more successful. The most important example is the collapsing of a diseased lung by the induction of artificial pneumothorax, a procedure which has already been mentioned.

The theory of this treatment is simple enough. It must be remembered that normally the lungs are kept expanded beyond their elastic tension by the virtual negative pressure in the pleural cavity. If air is introduced in sufficient quantity between the layers of pleura then the lung collapses completely. The virtue of collapsing and so resting a tuberculous lung is, I think, obvious. The lungs are constantly in a state of distension, and expand and contract twenty to thirty thousand times in the twenty-four hours. They have no chance of rest. And here is a method which as effectively rests a diseased lung as a splint rests a joint. The induction presents no special difficulties, but is not devoid of danger, and fatal accidents have been known to occur. The cases must be chosen with care, and x-ray films are essential. Unilateral cases are, of course, the ideal

ones, but this limitation need not be strictly enforced. There is always a possibility that, in an otherwise suitable case, we may be defeated by adhesions.

The collapse should be kept up for at least two years, but patients may be capable of quite strenuous work with a completely collapsed lung. I am satisfied that in many cases collapsing a lung is veritably a life-saving procedure.

Phrenic evulsion, producing paralysis of the diaphragm on that side and the consequent obliteration of a large part of a diseased base, has a limited field of usefulness, but

Chart showing effect of artificial pneumothorax on weight and temperature.

within that field is reliable, and its use might well be extended.

The only other method I shall mention is thoracoplasty. This is the most severe surgical proceeding for the treatment of pulmonary tuberculosis which is being used at the present time with any success. It is the logical sequel to an unsuccessful artificial pneumothorax. By a very extensive removal of rib the diseased lung is permanently collapsed and the disease arrested. In expert hands—and it requires very expert hands—the results are wonderfully good, considering that it is a somewhat desperate remedy for a desperate condition. Gravesen, whom I had the pleasure of seeing do the operation at the Vjelefjord Sanatorium, Denmark, is probably the greatest exponent of the method. When I saw him his figures were: 155 patients operated on; 42.5 per cent. fit for work two years and more after operation. Tudor Edwards, at the Cardiff Annual Meeting in 1928, gave the results of 59 cases; of these, 54 per cent. were either well or much improved. In a very recent private communication he tells me he has now done over 100 cases, with no deaths in the last series, and that the "apparent cures" show a higher percentage than the Cardiff figures. It must be admitted that these results are very remarkable.

To sum up treatment: reliance has to be placed chiefly on rest, food, and an abundance of oxygenation of the tissues; symptoms must be treated as they arise. I have purposely omitted any reference to such difficult and dangerous complications of pulmonary tuberculosis as laryngitis and enteritis. A course of sanatorium treatment is, as a rule, of real value; and the possibility should never be lost sight of that some of the modern methods of lung collapse may transform the whole aspect of a case.

Cases Illustrating the Importance and the Limitations of X-ray Examination.

Both patients were young men. No physical signs could be found in the chest in either. Neither case had sputum.

CASE A (Fig. 1).—Diagnosed tuberculous peritonitis and admitted to a surgical ward at Standish House. The x-ray photograph of the lungs was taken as part of the routine examination, and shows typical military tuberculosis. The patient was consequently transferred to another institution. Two days later he showed signs of meningitis, and within a week he was dead.

CASE B (Fig. 2).—There was haemoptysis of half a pint coming on a few hours after a blow from the starting handle of a back-firing bus. The condition was diagnosed by an expert radiologist after two examinations as extensive advancing tuberculosis. A month after this film was taken the man was allowed to return to work as a driver, and he has kept absolutely well since (two and a half years), putting on over 2 st. in weight.

In the one case x-ray examination settled a highly important diagnosis at once; in the other it was gravely misleading.

S. VERE PEARSON: PATHOGENESIS OF
PULMONARY CAVITIES.

FIG. 1.

FIG. 2.

K. H. PRIDIE: RETROGRADE NEEDLING.

FIG. 1.—Antero-posterior view of needles after insertion.

FIG. 2.—Lateral view of needles after insertion.

W. A. DICKSON: DIAGNOSIS AND TREAT-
MENT OF PHTHISIS.

FIG. 1.

FIG. 2.