acute disease in the majority of instances. In cases of enlarged infundibulum one usually feels the thud of the closure of the pulmonary semilunar valves easily as they lie superficially, and are closed too forcibly. The general rule then is that if you find extension of the cardiac dullness in the upward direction suspect pericardial effusion, and if such effusion be at all abundant you will find the shape assumed by the dull area as a whole to be more or less pyramidal, the apex of the pyramid above, the base below.

When an enormous quantity of effusion is present the dullness may encroach considerably upon the area of the left lung, and there is a possibility of the effusion being mistaken for a pleuritic one. If care is taken to examine the back this can hardly happen. Mention of this possible confusion in diagnosis reminds me to call your attention to certain pulmonary physical signs which are occasionally present at the base of the left lung behind the pericarditis, and which may simulate the signs of pneumonia. They are a change in the percussion resonance characterised by a diminution in the volume of the sound, with sometimes an approach to tympanic quality, and even the presence of a few crackling sounds like crepitation with inspiration. In some cases even bronchial breathing is heard. These signs appear to be the result of encroachment of the effusion on the base of the left lung, and are therefore naturally limited to cases accompanied by a very considerable amount of effusion. I mention these signs simply to put you on your guard against being led to a diagnosis of pneumonia by them. True pneumonia is often associated with pericarditis, but the pneumonia is generally the primary disease, and affects, as a rule, the left lung. In simple pericardial effusion, however extensive, although the resonance of the left lung at the base may be interfered with, there is not likely to be absolute dullness behind, and though the pericardial dullness may approach the posterior axillary line, it will hardly pass beyond it.

Of course, given pericardial effusion, there is no reason why there should not also be in certain cases left pleuritic effusion, when the dullness at the left base would be absolute, as happened in the case of our patient recently in the wards, and in his case it would seem to have been the pleurisy rather than the pericarditis that occasioned the pain on the left side on November 9th.

Auscultation.

Auscultation in most cases of pericardial effusion reveals to us the presence of a friction rub. This is usually double, to and fro, and varies greatly as regards quality of the sound, being sometimes fine and grazing, at other times very harsh and rough. When friction sound is fully developed it completely covers the heart sounds or murmurs that may be present. It gives an unmistakable suggestion of its cause, conveying a distinct impression of the rubbing of two surfaces together. Moreover, it is generally increased by pressure with the stethoscope, and is little conducted beyond the pericardial region, although there are exceptions to this rule. If in the undeveloped or receding stage of pericarditis one or other or both the cardiac sounds are heard with a friction rub or graze, such friction bears no definite relation to the cardiac sounds, but seems to occur independently of them. This is, as you know, very different from that which is the case with regard to endocardial murmurs, for they bear definite relationship to the sounds they accompany. An endocardial murmur runs off from or runs up to a cardiac sound.¹ A friction sound is generally fairly uniform and continuous in its course, but at times it is more or less interrupted, so that a triple rhythm may seem to be assumed. Sir George Johnson believed that he had recognised a triple rhythm due to the contraction of the auricle producing a rub, as well as the systole and diastole of the ventricles. However, I doubt if this was the explanation of the triple rhythm. We must remember that the systolic and diastolic cardiac sounds fall very far short of representing in duration the systolic and diastolic movements of the heart. For instance, in mitral regurgitation it is common to hear the first sound followed by a systolic murmur, the murmur showing that the contraction of the ventricle is still proceeding after the sound has ceased. We may consider that friction may be heard at any time of cardiac movement, and when we reflect that practically as soon as systole is over diastole begins, it is no wonder that in most cases a friction rub is an almost continuous to-and-fro sound.

As already stated, friction is usually first detected at the base of the heart, in the vicinity of the great vessels, for it is here probably that the greatest amount of movement takes place; otherwise the site of the maximum intensity of friction sound varies infinitely, not only in different cases but in the same case at different times of its course. In the small triangular area where the heart is uncovered by lung friction is apt to be specially distinct. No amount of effusion will necessarily annul friction sound, as the heart has free movement.

Pleuritic friction sound occasionally takes on cardiac rhythm over the heart; but when the stethoscope is moved off the lung to the small triangular area in which the heart is exposed it is usually no longer heard, and the heart sounds are pure.

Usually friction sound gives to the observer an unmistakable impression of the mode of its production, and this is true even of the fine grazing varieties of the sound. But there are two endocardial murmurs that together may occasionally be mistaken in a hurry for friction sound or *vice versa*. I refer to a double aortic murmur unaccompanied by any cardiac sound in the technical sense of that word. But the history of the case, the arterial condition, and the other physical signs of aortic incompetence will always prevent error, unless the two pathological states—aortic incompetence and pericarditis—should coexist.

NOTE.

¹ A very rare variety of diastolic murmur in mitral stenosis is the only exception to this rule that I am aware of.

REMARKS ON THE PURE-AIR TREATMENT OF PHTHISIS AT HOME.

By ARTHUR RANSOME, M.D., F.R.C.P., F.R.S.,
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DURING the last few months many papers have been written giving high praise to the sanatorium treatment of phthisis, and, in my opinion, these laudatory notices have been fully justified by the results. These institutions for the "open-air" treatment have, in truth, many advantages. They are expressly adapted for their purpose; with all the needful appliances, shelters, galleries, or verandahs, and their windows open fully to the ceiling of the rooms. Most of them are newly-erected upon healthy sites, on dry, pure, and porous subsoils; and they are appointed and furnished with a view to the avoidance of dust; hence they have a minimum of microbic impurity in the air. Special attention is paid to the food of the patients; and systematic supervision is kept up by both nurses and doctors. The example of the inmates, and their general well-doing, makes it easy to carry out the otherwise unpleasant discipline, and, in most of these places there is an air of general contentment. All these circumstances renders the treatment in sanatoria more perfect than it can be in most private houses.

But there are many persons who cannot or will not be treated in sanatoria. There are fathers and mothers whose cure would be greatly interfered with if they were separated from their children; sons and daughters who are unwilling to leave their parents; delicate persons who shrink from the public life of a sanatorium, or even of a nursing home. There are also large numbers of persons who, having been "greatly improved" by a residence of from three to six months in sanatoria are yet susceptible to reinfection, and who must, for many months, continue to pursue the open-air treatment at home. Add to these the many patients who, owing to the present deficient accommodation, are unable, for many months, to obtain an entrance to any well-equipped institution; all these persons need efficient open-air treatment, and most of them greatly desire that it should be carried out at home.

Under certain stringent conditions, I think that it is quite possible to do this, and it may be of some service to point out in what ways it may be accomplished.

CLIMATE.

Sanatoria are for the most part placed in carefully sheltered situations, yet fully exposed to the air and sunshine. Our

homes are planted wherever the convenience of the chief inmates is best served. Only in the case of the rich, or of those who have entirely retired from all kinds of business, is the healthiness of the site the chief object in view. Can we then neglect entirely the circumstance of climate and site, and at once attempt to begin our treatment at any home? I think that most of us would answer this question in the negative.

Our views in regard to climate have indeed undergone considerable modification in recent years. Not long ago our records of cases of cured phthisis would chiefly have included the names of those favoured persons who had been able to go to Egypt, the Riviera, or to some other fashionable health resort; and a medical man who neglected to recommend to a consumptive some such place would have been regarded as entirely wanting in medical knowledge. Since this time a distinct change has come over the opinions of most medical men. Some now regard the question of climate as of quite secondary importance; others, "that the favourable influence pertains to the change, rather than to the particular climate chosen" (Austin Flint); others, again, limit the advantages of climate to the opportunities for comfort, exposure to air and sunshine, for good feeding, and for a total change of the habits of life. The number of those who take extreme views in regard to climate is, however, fortunately still small.

Although it may be acknowledged that phthisis occurs in all climates, and that cures of the disease also occur occasionally under the most adverse meteorological conditions, it yet cannot be admitted that all climates are equally suited to its open-air treatment. In the first place, we have to remember that, for the open-air treatment, abundance of sunshine and a perfectly pure atmosphere must be sought for; hence all places on low-lying, damp, impure subsoils are unsuitable. In the next place, the patients we have to deal with are, for the most part, delicate, tender beings, who have to be carefully guarded at the outset from the sensation and even from the idea of draughts. After a few weeks of treatment they usually become inured to much stronger currents of air than they can bear at first; but, owing to the initial delicacy, they require shelter from strong winds.

Any homes, therefore, in which the treatment is to be carried out, should be protected from strong winds, and especially from strong sea breezes. They should never be close to the seashore. We may add to these requirements the importance of a low degree of humidity and a small rainfall, and, though not strictly connected with climate, we may put in a plea for some æsthetic advantages.

It is of great importance that a patient's mind should be kept bright and cheerful by pleasant surroundings, and we might even put in a plea for euthanasia in hopeless cases. As a patient once said to Dr. Walshe, with reference to Madeira:

I know I go there to die, but to die amid the glories of beautiful Nature, cradled in an atmosphere as balmy, as redolent of flowers, as its sun is glorious. Here, too, I should die, but die cribbed and confined in a room narrow as sunless, smoky, foggy, cheerless.

It will thus be seen that the climate, or perhaps rather the locality, in which the home is situated, cannot be neglected in considering its fitness for home treatment. Let us suppose, however, that the home is placed in a perfectly desirable locality; that it is sheltered from strong winds; that it is somewhat raised above the level of the surrounding country; that the air is dry and pure, and not polluted from any source, especially by manufactures, by human or animal emanations, manured fields, etc.; that the subsoil is dry and pure, and well drained; and, lastly, that its outlook is not too uninteresting, and that there are the means of simple amusements in its immediate vicinity.

THE HOUSE.

Notwithstanding all these advantages, before we decide that the residence is entirely suitable, we have to ask whether this house is the same as that in which the patient lived before the open-air treatment was adopted.

I have elsewhere expressed my conviction that many of the cases of cure of phthisis, supposed to be due to change of climate, were really due simply to change of residence. In an old house, it is well known that there is a great excess of microbial life floating about in the atmosphere; and, in a house that has been inhabited for some time by a phthisical

patient, there are probably lurking in some dark corner active colonies of the bacillus of tubercle, nourished by the organic vapours of the house, and ready to float into the atmosphere, and to settle in the susceptible lungs into which they may be breathed.

A consumptive person has already proved himself to be vulnerable by the specific microbe; and his damaged lungs must present many suitable nests in which it can incubate and start a fresh attack of the disease. On account of the danger of reinfection, therefore, it is most desirable that, before commencing the new method of treatment, the patient should either change into a new house, or that the old one should undergo renovation from top to bottom, and that all surfaces should be well brushed over, after Professor Delépine's method, with a 1 per cent. solution of chloride of lime. In old houses, also, I have been in the habit of recommending a thorough disinfection by atmospheric ozone, which is easily carried out. In some cases it would be sufficient to restrict these cleansing and disinfecting operations to the rooms and passages which will be visited by the patient; but in all cases the cellars, if any, should be thoroughly cleansed and ventilated, as impure air from this source is often drawn up into the house. The drainage of the house must also be ascertained to be thoroughly efficient.

The "shell" of the dwelling being thus rendered so far satisfactory, it will then be necessary to turn our attention to the plenishing and decoration; at any rate, of those portions of the house likely to be visited by the patient. The main object to be kept in view must be the prevention of the formation and the harbouring of dust. The walls should be distempered or covered by washable materials, whether paper or paint; the floors waxed or prepared with paraffin, or, if old, covered with "cork carpet;" and all angles or insettings corners should be carefully rounded off, so as to prevent any accumulation of dust. There should be no heavy hangings, nor carpets; only strips of matting or drugget, or small mats, which could be daily put out-of-doors.

The furniture should all be of the simplest pattern consistent with comfort; and should be chosen with a special view to prevent the lodgment of our chief enemy, dust. Hence pictures with projecting frames should be banished, and, if possible, there should be no cornices which cannot be wiped over with a damp cloth. Light and easily cleansed screens should form part of the furniture of each room; and the windows must be made to open widely, and as near the ceiling as possible. Ready means of summoning an attendant, by an electric bell, must be provided, and it would be well if some one, whether a servant or a member of the family, could be told off to look after the patient.

In certain cases, in which it would not be practicable to carry out all these directions, the difficulty might be overcome by adopting Dr. Johns's method of erecting a sleeping hut, in which the patient could entirely take up his abode. The important conditions in this arrangement would be that it should be placed on a raised platform, on pure, dry soil; and that it should be in a sheltered situation.

INDIVIDUAL TREATMENT.

When our patient has been suitably housed, the principles of the treatment to be pursued may be considered. They may, perhaps, be advantageously grouped under the following heads:

1. *Aseptic Treatment.*

I trust that it is unnecessary again to insist upon the fact that phthisis is a "filth disease," that its specific cause, the tubercle bacillus, is nourished, and retains its virulence, only in presence of organic impurity, especially such impurity as is to be met with in dirty, ill-drained, badly lighted, overcrowded tenements. Professor Delépine and I have also shown that it rapidly loses all infective power in pure air and sunlight. These facts explain the first necessity in the treatment of the disease; namely, pure air and abundance of sunshine.

We have seen the arrangements relating to the residence, which are deemed necessary in order to secure these requisites; but the patient will have to take measures to prevent the pure home from becoming contaminated by his presence in it. Hence the absolute need for all the well-known precautions with reference to the disposal, disinfection, and destruction of all bacillary excreta.

There is a further reason, apart from the bacillus itself, for insisting upon a germ-free atmosphere; that is, the danger to a consumptive of all kinds of septic organisms. It is well known that among the worst and most rapid cases of phthisis are those in which there is a mixed infection, and in which various micrococci assist the tubercle bacillus to gain an entrance to fresh parts of the frame or to intensify its morbid action.

The modern treatment of phthisis is in truth simply a branch of what might be called "antiseptic or aseptic medicine," in analogy with "aseptic surgery." Just as the surgeon takes the most elaborate care to cleanse his hands, instruments, and dressings from all possible contamination, and wards off from wounds all septic organisms, so must the physician purify the atmosphere surrounding his patient and guard his lungs from all danger of admitting to their recesses any pathogenic organism.

Hence the importance of the adoption of measures directed against all kinds of septic organisms. Fresh air and sunshine have probably some power over these organisms as well as over the tubercle bacillus; but I believe that the chief natural agent arrayed against them is atmospheric ozone. In such a climate, and in such a situation as I have described, there is usually an abundance of this agent in the air outside the house, and though in an ordinary bedroom with its carpets and upholstery it is scarcely ever present, I have ascertained that it is to be found even in the centre of a room furnished and ventilated as I have described. Notwithstanding this, however, in some cases when the patient has been confined to his room by fever or hæmorrhage I have thought it well artificially to impregnate the air of the room with ozone.

But the aseptic treatment of phthisis need not be limited to the purification of the atmosphere. It should extend to the body of the patient, hence the need of insistence on baths, washing of hands before meals, clean clothing, etc. There are some practitioners, especially some who profess the open-air method, who entirely neglect the use of drugs; but I venture to assert that they are wrong. Doubtless it is right to relegate these agents to a second place in comparison with pure air and sunshine, but it is impossible to resist the evidence of the good effects of such medicines as creosote and iodoform. These drugs undoubtedly do much good in many cases, and it is highly probable that they do so by their antiseptic power, not necessarily by their power over the bacillus itself, but perhaps by their efficiency in cleansing the intestinal canal, and perhaps by increasing the resistance of the tissues to attacks of the specific microbe. In any case they are often useful, and should not be cast altogether aside.

2. Rest.

The importance of rest to the injured organ has so recently been insisted on that it is only necessary to briefly recapitulate its advantages.

(a) In repose there is scarcely any motion of the ribs; there is little or no disturbance of the underlying inflamed tissues, and no dragging upon any adhesions which may have been formed between the two layers of the pleura. In the semirecumbent posture, therefore, on a cane deck chair, is afforded the best chance of subduing inflammation, of preventing cough, and preventing extension of the disease.

(b) The continuous warmth of the body during exposure to the open air is better kept up in the recumbent position than in any other.

(c) It conduces to gain in body weight. During repose in a semirecumbent posture digestion is more easily carried on, and absorption and assimilation are better performed. In most cases the patient puts on flesh with more or less rapidity.

(d) It greatly assists the blood-making organs, and leads to an increase in the hæmoglobin. One of the results of rest, combined with fresh air, is the speedy improvement in the complexion of our patient.

3. Graduated Exercise.

Complete rest in bed has its dangers as well as its remedial power. It is acknowledged that in phthisis our aim must be to raise the bodily powers to the highest point we can consistently with safety. This is not possible in absolute rest, hence, as Dr. Walters remarks in his excellent work on Sanatoria (p. 38):

In all cases [in which it is safe, which he specifies] exercise is needful according to an ascending scale. We may begin with passive motion or very gentle massage, followed by resisted movements in the recumbent position. After this very gentle walking exercise may be tried, at first restricted to a few yards at a time on level ground. As the invalid gets stronger the length of his walk is gradually increased.

In the BRITISH MEDICAL JOURNAL of July 22nd, 1899, I have ventured to point out that

the degree of rest that must be imposed will depend (1) upon the presence or absence of fever, and (2) upon the digestive and assimilative powers. The degree of exercise (1) upon the muscular and bodily vigour of the patient; (2) upon the extent of movement allowed by the disease to the ribs in forced respiration, and especially to the bones over the site of the injured parts of the lungs.

4. Full Feeding.

Careful feeding of our patient can be carried out just as well in a private home as in a sanatorium, and very often his individual tastes can be better consulted. It is important, however, that the amount of food taken should be as methodically ascertained and recorded. It is admitted by all that full feeding is a necessity, but there are various opinions as to "fattening" our patients. In my opinion it is, in truth, not a question of fattening, but of strengthening our patients. If the fattening gives more power of resistance against the advance of the microbe, which it often does, then the fattening is good; but it is certainly not the mere putting on of adipose tissue which is of importance, but the general increase of bodily vigour by massage and passive exercises, the improvement of the blood, and the general growth of muscular and nerve power.

The method of feeding also must be adapted to each individual. It is absurd to insist upon the procrustean method of applying the same measure to all patients, and the attempt to do so savours too much of quackery, and of the Continental mode of turning each special form of treatment into a "cure." For many persons doubtless the regulation of three large meat meals a day, with nothing between, may serve a good purpose, but to drag on everybody into the same line is assuredly not physiological feeding. While there are some who cannot take anything between the three larger repasts, there are others who are much the better for a tumbler of milk and a biscuit in the interval.

5. Increase of the Power of Resistance.

There is not much to be said on this head. All the means already mentioned may be regarded as tending towards this end, and, if we must single out any as especially important towards it, it will be to the feeding and judicious rest and exercise that we must look.

6. The Prevention and Treatment of Accidents.

This is of great importance, and needs all the skill and constant attention of the medical attendant. The chief accidents we have to fear are, (a) perforation, (b) hæmorrhage, (c) inflammation.

Every patient in whom ulceration is going on, or who has aneurysmal sacs, is exposed to these risks. The first two usually occur without warning; and it might well be supposed that they would be inevitable; yet something may occasionally be done to ward them off. By means of as much rest as is possible to the injured parts, and by the general nourishment of the body, and plentiful supplies of oxygen and ozone, we may often arrest the ulceration, and may minimise the danger of the breaking down of tissue.

In hæmorrhagic cases, by careful dieting we may prevent too heavy a strain being thrown upon the vascular system; and we must limit to the utmost all over-exertion and all forms of excitement. In such cases we should diminish the supply of strong animal foods, and should encourage the use of nourishing vegetable and farinaceous and milk foods, and should limit the amount of fluid to be taken at any one time. It has also been shown that something may be done to increase the coagulability of the blood by the persistent use of calcium chloride.

Inflammatory attacks usually give some warning by rise in temperature, and by some degree of *malaise*. By watchfulness on these points, therefore, we may often stave off an attack, or may prevent its passing from under our control. Many of these seizures, also, are toxic in their nature; and, under the pure-air treatment, their occurrence is rendered less likely. It is remarkable how seldom any of those who pass their days in the open air fall victims to catarrh.

It must not be forgotten, however, that in the lungs of most consumptives there is an abundance of organisms, many of them of a septic character, which lie in wait for a suitable opportunity for attacking the system when it is at its weakest. Nothing gives so favourable an opening to these micro-organisms as a sudden chill or an unequal exposure of the

body to cold. It depresses the vital powers, and gives a nervous shock, such as will often precipitate an attack upon the weakest portion of the frame. It is on this account that it is so important to guard our patients from unequal draughts of cold air; and, though one cannot but look with interest upon the experiments in hardihood which are being made in some sanatoria, it is also with much misgiving, and, for my own part, I would rather take the experience of Drs. Brehmer and Dettweiler as my guide. It is not necessary to say anything here as to the treatment of an attack of inflammation; but we shall do well not to neglect some of the traditions of our predecessors.

Suitable Amusement.

This is not the least important of the requirements. If the family are willing to help efficiently this can be carried out even better at home than in a sanatorium. Most forms of *al fresco* entertainments are admissible; always provided that the patient does not become excited, increase the rate of breathing, nor get overtired.

CONCLUSION.

In conclusion, I would repeat that it is impossible to carry out all the stringent conditions of successful "pure-air" treatment without the constant supervision of a medical man; and the services of a well-trained nurse, or an intelligent and trustworthy attendant specially detailed for the purpose; but I venture to submit that none of the conditions which have been mentioned are unattainable except in the homes of the very poor, and for these persons suitable asylums should be provided at the public expense.

THE APPLICATION OF BACTERIOLOGY TO PUBLIC HEALTH.*

By WALTER C. C. PAKES, D.P.H.CAMB.,

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[ABSTRACT.]

THE examinations which may aid the public health service are those in connection with the diagnosis of diphtheria, enteric fever, tuberculosis, anthrax, glanders, pneumonia, erysipelas, tetanus, influenza, cholera, and various septic disorders.

As medicine may be divided into curative and preventive, so the bacteriological examination may be either for diagnostic or for preventive purposes. Mr. Pakes therefore divided his paper into two parts: (1) Diagnostic examinations; and (2) preventive examinations.

1. DIAGNOSTIC EXAMINATIONS.

(a) *Tuberculosis.*

Concerning this disease he said: We can speak of at least three races of the tubercle bacillus—human, bovine, and avian. It is, perhaps, doubtful whether this last-named is really pathogenic to man, but there is little doubt that human and bovine tubercle are merely varieties differing chiefly in virulence. Theobald Smith¹ has shown that, at least for guinea-pigs, the bovine tubercle bacillus is distinctly more virulent than the human. This great virulence of bovine *B. tuberculosis* is of vast importance, because it is children who are the great milk consumers. The young of all animals are, *cæteris paribus*, more susceptible to bacterial invasion than adults, and therefore we have the conjunction of a more virulent bacterium and a more susceptible subject.

The peculiar staining reaction of the *B. tuberculosis*—the difficulty with which it takes up the stain, and its power of retaining the stain in spite of treatment with decolorising agents—appears to be shared with only two other bacteria, *B. lepræ* and *B. smegmæ*. The former is practically unknown in this country; the latter can be, and perhaps often is, mistaken for the true *B. tuberculosis*. It is of far wider distribution than has been supposed, having been found in sputum by both Pappenheim² and A. Fraenkel,³ and by several observers in urine and even in milk. It differs from the

B. tuberculosis in its pathogenicity, not being pathogenic to guinea-pigs; in its cultural reactions; and, finally, in its failing to resist the decolorising action of absolute alcohol after being stained with warm carbol-fuchsin.

Several methods of staining have been suggested in order to eliminate the smegma bacillus in the diagnosis of tuberculosis. Perhaps the simplest is merely a modification of the well-known Ziehl-Neelson method. If this method leaves any doubt, then that of Honsell⁴ will certainly clear up any doubt.

Modified Ziehl-Neelson Method.

1. The material (whether it is sputum, pus, milk, or the centrifugised deposit of urine) should be spread very carefully, so that a not too thin but even film is obtained.

2. The film is then dried in the air, and passed three times through the flame of a Bunsen burner.

3. The preparation is stained for five minutes in hot (60° C.) carbol-fuchsin, and washed well in water.

4. Wash in absolute alcohol until every trace of stain which can be removed from the coverslip has been removed, and wash in water.

5. Immerse in 25 per cent. sulphuric acid for about five or six seconds, and again wash in water.

6. Counter-stain for about three seconds in carbol methylene blue, wash dry, and mount.

Honsell's Method.

1. The film is prepared and stained with warm carbol-fuchsin, as in the first method, but after washing in water it is dried.

2. It is then immersed in acid alcohol (absolute alcohol 97 per cent., HCl 3 per cent.) for ten minutes, and washed with water.

3. Counter-stained for several seconds in equal parts of a saturated alcoholic solution of methylene blue and water, washed in water, dried, and mounted.

As we know, therefore, that these smegma bacilli will under certain conditions be evident under the microscope, it behoves us to adopt some such method as above suggested, in order to eliminate the danger of mistaking them for tubercle bacilli.

There are two or three points in connection with the diagnosis of tuberculosis which should be emphasised. In early cases of phthisis, when the lesions are very small, and only a few tubercle bacilli are present in the sputum, it sometimes becomes a matter of difficulty to find them. When this is so, the first sputum coughed up after waking should be examined. Secondly, in these very early cases it is essential to be sure that one is really examining material which has come from the lung. It not seldom happens that there is some inflammation of the fauces, which leads to an erosion of the faucial mucous membrane, and a specimen of sputum may consist entirely of squamous epithelial cells and mucus. In such a case it is the rarest thing to find any tubercle bacilli in the specimens. In examining the urine it is absolutely necessary in nearly every case to submit it to the action of the centrifuge, for it very seldom happens that tubercle bacilli are in sufficiently large numbers to be able to find them without the greatest difficulty in the ordinary urine. Whenever possible, it is advisable to examine a catheter specimen, and, as in the case of the sputum, the urine which has collected in the bladder overnight should be drawn off. It is in urine chiefly where the danger of mistaking the smegma bacilli occurs.

In tuberculosis of the intestines it is sometimes possible to find the bacilli in the fæces. If a very careful inspection of tuberculous fæces be made with the naked eye, small masses consisting of mucus and pus will be found. These masses should be picked out, washed gently in water, and then spread upon a coverslip, stained *secundem artem*, and examined. It is not worth the trouble of examining fæces for tubercle bacilli unless these masses can be found; not because it is impossible that the case can be one of tuberculosis, but because it is impossible to decolorise the fæces without decolorising any tubercle bacilli which might be present.

(b) *Diphtheria.*

[Since 1894, 1,836 cases have been examined at Guy's Hospital. When the routine examinations began, Mr. Pakes made a long series of examinations to determine whether it was possible to diagnose the growth by the naked-eye appearances. After making some 200 such observations, he came reluctantly to the conclusion that a naked-eye examination is all but useless. He now relied entirely upon the microscopic appearances of the organisms in stained specimens.]

The method of preparing the specimens is as follows: The culture is examined with the naked eye to see if there be present more than one kind of colony. It sometimes happens that there is a very characteristic growth upon the blood

* Read before the Incorporated Society of Medical Officers of Health, January 12th, 1900.