

moribund, I believe this treatment will prove eminently successful. Our views of peritonitis will, I am certain, soon undergo an immense alteration. The terms 'septicæmia' and 'septic peritonitis,' for which Mr. Spencer Wells is mainly responsible, and which have appeared in the mortality column as the explanation of the deaths after ovariectomy, are simple nonsense, and have led us astray altogether. In future we shall treat the peritoneum on the same principles as we treat other suppurating cavities, and with quite as secure results."

I have nothing to alter in these sentences. The success of drainage in saving many of the cases which formerly died, proves that if we remove from the peritoneal cavity material which is over and above its absorptive power, or if we remove, in a similar way, its own effusion, under circumstances when its absorptive power is temporarily in abeyance and threatening, with the life of the patient, to be permanently destroyed, we can put a stop to all the trouble. It seems to me that, whilst there are cases of peritonitis which are really septic, that is, when some kind of poison gets into the peritoneum and speedily affects the whole system, just as the bite of a cobra does, they are in the minority, and that the great bulk of cases are not of this character at all, but are purely local, and that if we can help the peritoneum temporarily by drainage we can secure a triumph. In the cases of chronic peritonitis, this is constantly the case. One of these from my last series will suffice to illustrate my success.

E. T., aged 18, was sent to me in April last by Dr. Justin McCarthy of St. George's, Shropshire, who kindly gave me the following details of her history. She had been for some time under the care of an irregular practitioner, and came under Dr. McCarthy's care in a state of the greatest emaciation. Seldom had he seen anyone more emaciated, unless in the last stage of phthisis—the skin drawn tightly, as it were, over the cheek bones, and all the bony prominences visible under the skin. The abdomen was enlarged, the temperature about 102°, and the pulse about 120. The chief symptoms were vomiting and diarrhoea. When she came under my care, I found her quite as Dr. McCarthy described, and the presence of a large quantity of fluid in the peritoneum was apparent. I opened the abdomen on April 17th, and removed about three pints of purulent fluid, and a quantity of white flocculent clots. I emptied and cleansed the cavity as well as I could, and fastened in a drainage-tube. The tube remained in about a week, and, during that time, a large quantity of purulent fluid and small pieces of purulent lymph were discharged. When the stitches were removed, the wound opened completely, and several large masses of this white purulent clot were extracted, one of them being as large as a normal human kidney. The wound healed in June, and about September she had completely recovered her health. I saw her on October 31st, a stout robust young woman, whom I never would have recognised as the girl who came to me only six months before.

This is the kind of operation which would have been regarded as madness about five years ago, but I think its success is enough to justify my rule concerning all these cases—"When the doctor is in doubt, and the patient in danger, make an exploratory incision, and deal with what you find as best you can."

I have not yet had such an opportunity, as for a long time I have much desired, in trying the operative treatment in puerperal peritonitis. There is not so much hope in this field for its success, as I think there can be little doubt that the majority of these cases are purely septic. But, as very few of them escape, I think it would be worth trial; and I wish some of my brethren who are unfortunate enough to see these cases would give me an opportunity of trying it. The only difficulty is, that it is like tracheotomy in croup, it must be done before it is too late, and perhaps it may be done unnecessarily. This, however, is an argument against a great deal of our practice, both surgical and medical.

I cannot close this brief and incomplete record of my most recent practice without speaking, as I have done before, in terms of the highest praise, and with unfeigned gratitude, of one to whom I owe much of my success, for his constant readiness and presence of mind in difficulty, and for his marvellous dexterity as an assistant—my friend Mr. Raffles Harmer.

[A detailed list of the cases, prepared in a tabular form, for purposes of reference and identification, accompanied the manuscript of Mr. Tait's paper, but through want of space we have been unable to publish it.—Ed. B. M. J.]

MEDICAL MAGISTRATES.—Messrs. E. T. Atkinson, and T. Carter, have been placed on the Commission of the Peace for Richmond, Yorkshire.

ON THE DIAGNOSTIC VALUE OF THE TUBERCLE-BACILLUS.

By J. DRESCHFELD, M.D., M.R.C.P.,

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NOT many months have elapsed since Koch published his researches on the tubercle-bacillus, and already we possess a number of observations showing the great diagnostic value which these pathogenic organisms have. Koch having demonstrated the presence of these bacilli in the sputum of phthisical patients, and Ehrlich having described an easy and reliable method for their detection, ready means were thus obtained to test the accuracy of Koch's observations. Leaving out of consideration prophylaxis and treatment, and considering the question simply from the diagnostic point of view, it became a matter of great importance to answer definitely certain questions.

1. Are the bacilli present in the sputa of all cases of phthisis?
2. Are they present in the earliest stages, when there are as yet few, if any, physical symptoms?
3. Are they absent in all other non-phthisical lung-affections?
4. Is there any relation between the quantity of the bacilli found or their particular stage of development and the degree and progress of the lung-affection, or, in other words, what is their prognostic value?

Answers to some of these questions have already been given by several observers: Balmer and Fränkel (*Berliner Klinische Wochenschrift*, 1882, No. 45, p. 679), Guttman (*Berliner Klinische Wochenschrift*, 1882, No. 52), D'Espine (*Revue Médicale de la Suisse Romande*, December 1882), Lichtheim (*Fortschritte der Medicin*, No. 1, 1883), and Heron (*Lancet*, February 3rd, 1883). As yet, however, the observations are few, and the results not altogether concordant. Considering the importance of the subject, and the necessity for extensive observations, I beg to be allowed to give briefly the results of my own investigations, which I commenced shortly after the publication of Ehrlich's paper, and have continued ever since.

The material used was, in all cases, the expectorated sputum, more or less fresh. (It happened repeatedly that, in the sputum of the same patient, when allowed to stand for a day or two, the quantity of bacilli found was larger than when first examined. This seems to point to a further growth of the bacilli in the sputum.) The method employed consisted, till recently, in Ehrlich's method or Gibbes's modification. Since the publication of Rindfleisch's modification of Ehrlich's method (Schill, *Deutsche Medicinische Wochenschrift*, 1883, No. 2)—which simply consists in warming the anilinfuchsin or anilin-gentian solution, having the cover-glass with the sputum floating on it, over a flame till the fluid begins to steam—I have used this method, as it allows the whole process to be finished in five to seven minutes, and gives very satisfactory results. In many cases, the specimen so treated, after thorough washing in alcohol containing 2 to 5 per cent. of nitric acid, may be at once examined without a second staining, and shows the red bacilli standing out well in the unstained rest of the sputum; when, however, other bacilli are present, as in putrid bronchitis, or where the sputa have stood for some time, I find (contrary to Lichtheim) that the second staining with methylin-blue facilitates very much the detection of the tubercle-bacilli, if present.

Summarising briefly the results of my observations, I found the tubercle-bacilli present in all cases (forty-six) of phthisis where the physical symptoms were well marked. The patients were to a great extent hospital patients, either out- or in-patients; and their ages varied from fifteen to forty, and most of them were in the second or third stage of phthisis. In some, the disease was more acute; in others, of a chronic type. In the sputa of all, tubercle-bacilli could be detected, though the quantity varied very much, as will be shown again hereafter. In all these cases, the diagnosis of phthisis could be arrived at easily without the presence of the bacilli.

These results, so far, agree with all but one of the other observers, of whom Balmer and Fränkel found them in all their hundred and twenty cases of phthisis, D'Espine in twenty, Heron in sixty-two, and Lichtheim in all his cases but two (and in these only one examination was made, and in one case the process seemed arrested). Guttman alone states that he found the tubercle-bacilli in one-fourth of his cases only.

Of far greater importance is the detection of the tubercle-bacilli

in the earliest cases of phthisis, where the physical examination makes the diagnosis often a matter of doubt as to the presence or absence of phthisis. So far, we have but few observations. Hillier (*Deutsche Med. Wochenschr.*, No. 47, 1882) examined the sputa of three patients suffering from hæmoptysis without any physical symptoms of lung-disease, and found tubercle-bacilli in two out of the three cases; and inoculation with the sputum of one of these produced tuberculosis in two guinea-pigs. Lichtheim (*loc. cit.*, p. 5) detected the bacilli in a patient who, according to his statement and that of his relatives, had only suffered from cough and pyrexia for a fortnight, and whose physical examination revealed nothing abnormal. In some other cases, however, of very early phthisis, Lichtheim was not successful. As, however, all these cases were private patients, and allowed but a very limited examination of the sputa, and as in some the diagnosis of phthisis remained doubtful, Lichtheim himself does not lay great stress on these cases.

So far, I have only been able to examine three cases of doubtful nature. In two, there were no physical signs whatever, and in the third the presence of apex-catarrh only; but in all three the bacilli were abundantly present in the sputum on the very first examination. As these cases present somewhat interesting features, I will briefly allude to them.

A. S., aged 31, a gentleman whom I have known for years, and treated for various ailments, but who, though a phthisical family history, had himself never suffered from cough, and was in the enjoyment of very good health, consulted me on December 27th for hæmoptysis, which had attacked him on the morning of that day. He could not in any way account for it, except for a very slight fall he had on December 25th, which, however, did not hurt him in any way. The physical examination showed absolutely normal relations; neither was there loss of flesh, loss of appetite, or pyrexia. Examination of the sputa on December 29th showed abundance of tubercle-bacilli. The hæmoptysis continued, though in a lessened degree, for some time. There appeared also morning cough, with expectoration. The general health, however, remained very good, and the physical condition of chest unaltered. The sputum, however, continued to contain the bacilli. For the last fortnight, the hæmoptysis has stopped; otherwise the patient's condition remains the same both as regards cough and bacilli.

A. M., clerk, aged 25, was seen by me for the first time on November 17th, suffering from hæmoptysis and cough, loss of appetite, and slight loss of flesh, all of which symptoms dated only four weeks back. There were no physical signs of phthisis to be detected on examination. The sputa, tinged with blood, were rich in tubercle-bacilli. The patient was ordered iodoform in pills and as an inhalation; and his general condition improved; the hæmoptysis stopped; he gained weight; but the physical examination a few days ago showed dulness over the right apex, and bronchial breathing, and the sputa still contain the bacilli.

F. A., aged 38, I saw with Mr. French of Northwich, on January 30th this year. The patient had exceptionally good health till November 1882, when he commenced to suffer from slight cough and expectoration. This soon yielded to treatment, but with the commencement of this year, cough and expectoration returned; the appetite remained very good; there was no pyrexia, but slight loss of flesh: no hæmoptysis. Physical examination showed the presence of slight apex-catarrh on right side. The patient, at the time of my visit, expectorated a small quantity of tenacious mucus; this, when examined, was found swarming with tubercle-bacilli. It is interesting to note, in this case, that the patient, whose previous history and family history were exceptionally good, lost his wife from acute phthisis about twelve months ago, and had nursed her most assiduously during the whole of her illness.

Considering the constancy with which the bacilli are found in cases of fully developed phthisis, and the absence of these organisms, as will be presently shown, in non-phthisical diseases of the lungs, I cannot help looking upon the first and third case (about the second there can be but little doubt) as cases of incipient phthisis; and though, owing to the short time both cases are under observation, nothing can be said as regards the prognosis of the cases in question, yet the presence of the bacilli insured the early diagnosis in what would otherwise be still doubtful cases. While these cases then tend to show that even in the earliest stages of phthisis the tubercle-bacilli are present, it would be equally interesting to determine whether their absence in such doubtful, but suspicious cases, would negative the diagnosis of phthisis. It is obviously difficult to arrive here at some definite conclusions, as we have abundant proof, both clinical and pathological, that incipient phthisis may be arrested in its course, and that, therefore,

recovery from such a condition of doubtful incipient phthisis to the normal condition, would not warrant us in excluding the presence of tubercular disease, unless by some accident or intercurrent disease the anatomical proof was forthcoming. Such a contingency, however, is not likely to happen often, and at present we have no such observation to record.

The next point in our inquiry was directed to test the absence of tubercle-bacilli in lung diseases, other than phthisical. It is here chiefly where Koch's great discovery will aid us most materially in the diagnosis, and also in treatment of lung disease. So far, all observers who have examined into this subject, are agreed that no tubercle-bacilli are found in any other lung disease but phthisis, without, however, giving an analysis of the cases examined. Aided by my clinical clerks, I have examined the following cases without finding bacilli in the sputa.

Chronic Bronchitis and Emphysema.—Six cases.

Bronchiectasis.—One case. The sputa very rich in the ordinary bacteria.

Pleurogenic or Fibroid Phthisis.—Two cases. One case, the result of pleuro-pneumonia, showed excessive retraction of one side. Physical examination gave all the signs either of a dilated bronchus, or a cavity in the affected side. The sputum was muco-purulent, but contained only the bacteria of putrescence.

Pneumonic Kionosis.—One case. The patient was a miner; the sputum, however, was not examined during life; the *post mortem* examination showed marked anthracosis, with softening of the lungs in some parts, and the presence of small cavities in both apices. Microscopically no tubercle could be found in sections of the lung, and the secretion in the cavities showed absence of tubercle-bacilli.

In contrast with this case, I may mention the case of a stonemason who had suffered from symptoms of bronchitis, with loss of flesh and profuse expectoration. On physical examination, no dulness was to be detected, but subcrepitant rales in both cases, and the sputa contained numerous tubercle-bacilli. The patient has, since then, developed marked signs of phthisis.

Catarrhal Pneumonia.—I tried to examine the sputa in three children suffering from catarrhal pneumonia after an attack of measles. I found, however, great difficulty in getting proper sputa; several times the sputa brought to me consisted almost entirely of saliva. In one case, however, a girl, aged 12, who suffered from catarrhal pneumonia in both bases, there was abundant expectoration, but no tubercle-bacilli could be found in the sputum.

In a boy, aged five, with marked dulness and retraction of left side and slight hæmoptysis, the diagnosis between chronic pneumonia and phthisis, was considerably aided by the presence of tubercle-bacilli in the sputum. The subsequent history of the case proved the correctness of the diagnosis.

Syphilitic Lung Disease.—O. G., aged thirty, an out-patient, admitted November 14th, 1882, complained of hoarseness, cough, night sweats, and loss of flesh. Physical examination of the chest showed retraction of right side in its anterior upper part, diminished movements, excessive dulness, diminished breathing, and diminished vocal fremitus over the affected part. There was slight dulness, with diminished breath-sounds in the right infrascapular region. On laryngoscopic examination, typical syphilitic ulcers were seen on the fauces, and marked hyperæmia of the vocal chords. On inquiry, the patient now gave a history of syphilis, for which he had been treated six years before at the infirmary. Repeated examination of the sputa showed no tubercle-bacilli. An antisyphilitic treatment was marked by great improvement; there is, however, yet a patch of dulness, with lessened breath-sounds, though smaller in area in the right mammary region.

At the time the above patient was under treatment, my attention was drawn to another case, which showed signs of cavities in the lungs, and had been looked upon as a case of phthisis. One morning the patient showed us a tubercular syphilitic eruption, which had only recently appeared; a more careful examination showed the cicatrix from an old syphilitic glossitis, and the remains of an iritis; the sputa were now examined for tubercle-bacilli, but with negative results, though several different specimens of sputum had been taken. The treatment was now changed to an antisyphilitic one, and for a time the patient did exceedingly well; latterly, however, he has suffered much from loss of appetite, and, in consequence, fell off in flesh again; though the physical signs had rather receded than progressed.

I will now only refer to two more cases, interesting, as the physical symptoms pointed to phthisis, while the sputa were free from tubercle-bacilli.

The one case is a patient under the care of my colleague, Dr.

Leech, who suffered from symptoms pointing to phthisis (dulness and slight retraction of left apex, diminished breathing, with moist rales, and diminished chest movements on that side, cough with considerable amount of mucopurulent expectoration, loss of flesh, but no hæmoptysis); repeated examination of the sputa showed absence of the tubercle-bacilli, and the further progress of the case now shows that the symptoms were due to some growth or mass obstructing the left bronchus.

The other case is a patient now under my care, suffering from diabetes, with excessive, though not fetid expectoration and symptoms of phthisis. The sputa show no tubercle-bacilli, but contain large masses of a mycelium fungus (even if examined immediately after they are coughed up), which stains well with gentian-violet, but which can be easily distinguished from Koch's bacillus, by the size, form, and arrangement of its several parts. The chest symptoms are most probably due to some form of necrosis, a pathological condition often formed in cases of diabetes; possibly we have here some peculiar form of mycosis, for which the bronchial secretion in diabetes would form a favourable soil. The further progress of the case may give the solution of this question.

In all the above given observations, the sputa only were examined for bacilli, and I need not again draw attention to the valuable diagnostic aid we derived from the presence or absence of the bacilli in the different forms of obscure lung disease. But as the bacilli seem to occur wherever we have the tubercular process going on with any amount of intensity, the bacilli will aid us in the diagnosis of tubercular disease in other organs, if those organs themselves either are so situated as to be accessible to inspection (mouth, larynx), or form secretory organs whose secretions pass out of the body (intestines, urogenital tract). Already we possess a few observations on this subject. Fränkel (*Berl. Klin. Wochenschr.*, 1883, No. 4) found tubercle-bacilli in the secretion covering laryngeal ulcers in fifteen out of sixteen cases of laryngeal phthisis, by simply brushing the ulcers and examining the secretion covering the brush. Lewin (*ibid.*) could confirm this observation, though Guttmann (*ibid.*) could not detect the bacilli in two cases of laryngeal phthisis examined similarly. The tubercle-bacillus would thus be of great diagnostic value to distinguish between syphilitic and tubercular laryngeal ulcers. Lichtheim (*loc. cit.*) found the tubercle-bacilli in cases of tubercular enteritis in the diarrhoeic stools; they were not found in very large quantities, but they were found in every specimen examined.

Rosenstein (*Centralbl. für die Med. Wissensch.*, 1883, February 3rd) detected the bacilli in the urine of a patient who had symptoms of tubercular disease of the epididymis, the lungs being perfectly free. Lichtheim detected the bacilli *post mortem* in the contents of the pelvis of the kidney in a case of tuberculosis of the kidneys; and hence it is only reasonable to suppose that, in cases of tuberculosis of the urinary tract, the bacilli would be found in the urine.

Lastly, Ransome having detected the bacilli in the expired air of phthisical patients, and C. R. Smith having given, in a recent number of this JOURNAL, a ready method of detecting them in the expired air, it behoves us now to see whether, in cases of acute miliary tuberculosis, especially in children, where there is no expectoration, the bacilli are present in the expired air.

I may also mention that Fränkel (*loc. cit.*) found numerous tubercle-bacilli in the pus aspirated from a scrofulous or tuberculous joint, and I can confirm this observation, as, in a marked and advanced case of phthisis under the care of my colleague Mr. Jones, with tuberculous arthritis of the ankle-joint, numerous tubercle-bacilli were found in the pus evacuated from that joint.

We come now to the last point of our inquiry, as to the prognostic value of tubercle-bacilli in the sputum.

Balmer and Fränkel (*loc. cit.*) believe, as the result of their numerous observations, that the prognosis of a given case depends on the number of the bacilli, and their full development. In the rapid cases, with pyrexia, sweats, etc., the bacilli were very numerous, large, and spore-bearing; they also found that the quantity increased with the advance in the destructive process of the disease; in phthisical persons where the process is very chronic, or where the disease is arrested, or where there is no pyrexia, the bacilli very few in number, small, and badly developed. D'Espine on the other hand, found no such relations between the bacilli and the process of the disease. Lichtheim believes that the bacilli are only found in the profuse puriform sputum of phthisical patients; that they depend on the existence of an ulcerative or rather destructive process in the lungs, communicating with the air-passages; and they are found wanting when, in spite of an existing tuberculosis, the destructive process is absent. They would, according to him, therefore, not

occur in the acute miliary tuberculosis. Heron, on the other hand, seems on the whole to agree with Fränkel.

From the results of my own observations, I feel compelled to differ from Fränkel. I found very numerous fully developed bacilli in cases of phthisis, where there was little pyrexia, and where the process was slow and chronic; and I found but a scanty quantity in some cases of acute phthisis with profuse expectoration; thus, in a case which has just terminated fatally, and where *post mortem* examination showed dilated bronchi, small cavities, and marked tubercular infiltration of both lungs, and where the illness only extended over a little more than three months, repeated examination of the profuse and purulent sputum showed the bacilli in very sparing numbers. In several cases where the disease seemed to remain in *statu quo*, or where there were marked signs of amendment, the sputa continued to contain the bacilli in very much the same proportion as before. On the other hand, I cannot agree with Lichtheim, but rather believe, from the observations on the three cases of very incipient phthisis, that the bacilli occur very early in the sputum, before there are any signs of ulcerations, and when the sputum is by no means purulent. The presence of the bacilli in acute miliary tuberculosis I have as yet had no opportunity of examining into.

As the result of these observations, I think I am justified in saying that, though the bacilli in the sputum are of the greatest diagnostic importance in pulmonary phthisis, and though they occur in cases where there are as yet no physical symptoms whatever, we are not as yet justified in making the prognosis dependent either on their quantity or their fully developed state as found in the sputa.

Since the above was written, we have had two further additions to our knowledge on this subject. Licht (*Deutsche Med. Wochenschr.*, 1883, No. 5), observed 72 cases of phthisis, and found the bacilli present in all; and Dettweizen and Meissen (*Berlin Klin. Wochenschr.*, No. 7, February 12th, 1883), found them in 85 out of 87 cases of typical phthisis. As regards the prognostic value, both observers come to conclusions similar to those arrived at by me.

ON THE TREATMENT OF CERTAIN FRACTURES OF THE LOWER END OF THE FEMUR.*

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THERE are certain fractures, through the lower end of the shaft of the femur, that are apt to be associated with a peculiar deformity, and to require, in consequence, a special treatment. These fractures are generally, either just above the condyles, or are directed through the shaft within a few inches of that spot. The fracture may be either transverse or oblique. It is more usually of the latter variety; the obliquity is often extreme, and its general inclination is from behind downwards and forwards. The more transverse fractures are probably due to direct violence; the more oblique, to a force indirectly applied. The position of the upper fragment is practically unaffected, while the upper end of the lower fragment is drawn forcibly backwards into the ham by the action of the gastrocnemii muscles. The lower fragment is, of course, always drawn upwards, and from the twofold displacement, it follows that it may cross the axes of the upper fragment at a considerable angle, while it will lie behind that portion of the bone. These fractures are very often associated with a secondary vertical fracture, that extends into the knee-joint, between the two condyles, and that thus produces what is known as the T-shaped fracture. It is not implied that all fractures, through the femur above the condyles, are associated with this displacement; probably the majority are not. There are, indeed, many circumstances that would oppose such a displacement. There is, for instance, no reason why the obliquity of the fracture should not be such that this particular deformity would—after shortenings had occurred—be impossible. Many muscular and tendinous fibres are attached along the bone across the fracture line, and the deformity mentioned would not be possible, without a considerable laceration of these fibres. If the fracture takes place when the knee is bent, the condition of the gastrocnemii would be such that it would hardly be capable of forcibly dragging the lower fragment backwards at the time of injury. This is of consequence, since it would appear that, not a few of the fractures about this part, that are due to indirect violence, are caused by falls upon the bent knees. It is common, in museum specimens, to find the two fragments overlapping (the upper in front of the lower), and the upper end of the

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