which died the third day after inoculation. The post-mortem findings were similar to those found in the rats but usually more marked in severity. The spleen was enlarged and showed hæmorrhagic and anæmic infarcts, the liver showed necrosis, and the bone marrow was very soft, and scattered through the reddish marrow were numerous greyish areas.

Four guinea-pigs were inoculated, also intraperitoneally. Two, inoculated with 15 cubic centimetres of blood showing from 20 to 30 spirochætæ per field, showed parasites in small numbers the following day (1 to 40 fields) and died on the third day showing in the heart blood from one to ten spirochætæ in each microscopical field. The temperature showed a marked rise, reaching 104°. Two, inoculated with five cubic centimetres of infected blood, showed parasites in the peripheral circulation two hours later. The spirochætæ increased in number until the next evening, when from one to two per field were seen and then decreased. After the third day the blood examinations were negative. The temperature fell to normal and both are still alive (one 36 days and the other 27 days after inoculation). In the guinea-pigs which died slight enlargement of the spleen was the only visible finding.

One dog (nine months old, mongrel), Experiment 1018, was inoculated intraperitoneally with 15 cubic centimetres of citrated blood showing numerous spirochætæ. Two hours later parasites were found in the peripheral circulation; they increased in number till the next evening when there were from five to eight in one field of the stained specimen and then decreased. On the fourth day no parasites were found and the blood has since remained free from spirochætæ. Sub-inoculations into rats proved negative. Within six hours of the inoculation the temperature rose from 100° to 103·2° and after the third day fell to normal with no subsequent rise.

One pony, Experiment 1019, was inoculated intraperitoneally on Jan. 16th with 17 cubic centimetres of pure heart's blood from a rat showing from five to 20 spirochætæ per field. Seven hours later four spirochætæ were seen in one-half of the film specimen of blood. At the same time the number of leucocytes was increased. The parasites increased in number during the next day until, in the evening, from one spirochæta in two fields to from one to 25 parasites per field were seen. They were still present on the third day but on the fourth day had disappeared and have remained absent since. Corresponding to the appearance of the spirochætæ the temperature rose from 98·6° to 103°, maintained that level for three days, and fell on the fifth day to 99·8°. No rise of temperature has been observed since.

One monkey, an adult *Cercopithecus*, was inoculated subcutaneously with one cubic centimetre of blood (from 60 to 80 spirochætæ per field). Parasites in small numbers were seen in the blood 24 hours later. A corresponding rise of temperature was noticed. The spirochætæ increased in number and disappeared after three days. At certain intervals the parasites were seen in the peripheral blood, being present for a few days and then disappearing again.

Monkeys showed blood infection after an incubation period of five days after the bites of infected ticks. In monkeys which died from the infection the spleen and liver were found to be the most markedly changed. The spleen was considerably enlarged and contained anæmic infarcts of varying size and extent corresponding to the duration of the disease. In some cases the spleen substance contained very numerous small necrotic areas about a millimetre in diameter. The liver contained hæmorrhagic areas and small necroses. The bone marrow was soft and greyish-red in colour.

From the above experiments it is apparent that we have been able to infect with the spirochæta of African tick fever in addition to monkeys, a horse, a dog, rabbits, guinea-pigs, rats, and mice. The rabbits, rats, mice, and some of the guinea-pigs have succumbed to the infection. Previous observers have not been able, so far as is known up to the present, to infect any animal other than monkeys with the spirochæta *Obermeieri*. These experiments lead to the conclusion that the spirochæta of the African tick fever differs from the *Spirochæta Obermeieri*. While the animal reactions are different from those of the *Spirochæta Obermeieri*, the pathological anatomical lesions are the same as those described in human beings who have succumbed to the infection by *Spirochæta Obermeieri*.

THE PRESENCE OF THE SPIROCHÆTA PALLIDA IN SYPHILITIC LESIONS.

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As it is still a debateable point whether the spirochæta pallida is a direct cause of syphilis, I thought it advisable to record briefly the following observations made upon cases of primary, secondary, tertiary, and congenital syphilis. In every case the surface of the syphilitic lesion was carefully cleansed and then firm pressure was applied for a short space of time until a small quantity of serum was evacuated. Film preparations which were made from this fluid were stained by my modification of Leishman's stain as published in THE LANCET of August 19th, 1905, p. 522. The spirochætæ by this method stand out quite clearly and definitely and are stained a faint purple colour.

The following is a list of the cases examined by me from July, 1905, until the present time:—

CASE 1.—A child suffering from congenital syphilis. Condylomata were present around the anus. Large numbers of the spirochæta pallida were found to be present.

CASE 2.—A male, aged 30 years, suffering from secondary syphilis. The spirochæta pallida was found to be numerous in film preparations made from the mucous papules in the mouth.

CASE 3.—A female, aged 25 years, suffering from a gummatous ulcer situated on the front of the leg. Film preparations were made from the surface of the ulcer but no spirochætæ were found.

CASE 4.—A male, aged 30 years, suffering from a primary chancre on the glans penis. Typical examples of the spirochæta pallida were obtained from the chancre.

CASE 5.—A female, aged 21 years, suffering from general secondary syphilis. No spirochætæ were obtained either from the skin eruptions or from two cubic centimetres of blood withdrawn from the patient's thumb into a sterile solution of citrate of soda.

CASE 6.—A male, aged 25 years, suffering from a primary chancre on the glans penis. The spirochæta pallida was present in films made from the chancre.

CASE 7.—A female, aged 40 years, suffering from a syphilitic eruption on the face. No spirochætæ were obtained.

CASE 8.—A female, aged 20 years, with a gummatous ulcer on the leg. No spirochætæ were seen.

CASE 9.—A child, aged one year and four months, suffering from condylomata around the anus. Numerous spirochætæ were found to be present.

CASE 10.—A child, aged one year and two months, suffering from congenital syphilis. Large numbers of the spirochæta pallida were obtained from the condylomata around the anus.

CASE 11.—A male, aged 32 years, suffering from a primary chancre on the penis. No spirochætæ were seen.

CASE 12.—A male, aged 40 years, with a gummatous ulcer on the ankle. No spirochætæ were observed.

CASE 13.—A female, suffering from a large suppurating swelling on the left side of the mouth which was incised and from the interior large numbers of the spirochæta pallida were found to be present. This swelling was found to be a *gumma*. The patient also had other evidence of *tertiary syphilis*.

CASE 14.—A child, aged four years, suffering from a primary chancre on the lip. The spirochæta pallida was found to be present.

CASE 15.—A female, aged 30 years, suffering from a softened *gumma* of the arm. Three cubic centimetres of fluid were withdrawn from the interior of the mass and centrifugalised. Film preparations were made from the deposit but no spirochætæ were found.

CASE 16.—A male, aged 32 years, suffering from secondary syphilis. Numerous spirochætæ, which resembled the spirochæta pallida, were obtained from mucous patches around the mouth and also the spirochæte of Vincent.

CASE 17.—A female, aged 30 years, suffering from a gummatous ulcer of the leg. No spirochætæ were found.

CASE 18.—A male, aged 18 years, suffering from a small

hard chancre on the end of the penis which he had noticed for only a few days. Numerous spirochætae were found to be present.

CASE 19.—A male, aged 25 years, suffering from congenital syphilis, developed a primary chancre on the penis. Numerous spirochætae were seen in film preparations made from the chancre. This interesting case was under the care of Mr. Cuthbert S. Wallace, to whom I was much indebted for permission to examine it.

CASE 20.—A male, aged 18 years, suffering from a primary chancre on the penis. Film preparations were made from the chancre and the spirochæta pallida was found to be present.

Large numbers of other cases of suspected syphilis, soft sores, and other varieties of infection were examined, but in no instance was the spirochæta pallida seen. In several instances a small rounded body was noticed at one of the terminal ends of the spirochæta. This was not observed in all the spirochætae, but in many cases was a very noticeable feature.

In conclusion, it will be observed that the spirochæta pallida has been seen in six cases of primary syphilis, two cases of secondary syphilis, one case of tertiary syphilis, and three cases of congenital syphilis, but whether these changes are dependent upon the spirochæta pallida requires the necessary proof before it can be accepted.

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A PROBLEM IN DIAGNOSIS.¹

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I.

THE problem hereunder stated is a good example of the breadth of the field that we doctors have to cultivate, and of the need of taking into consideration, not merely the medical aspect of a case, but the broad facts of the constitution of human nature, in order to interpret rightly the symptoms of disease—at any rate in that department of medicine which deals with disorder of conduct.

I was asked to see a gentleman in a Midland city who was said to be "a chronic, quiet, steady alcoholic," and, on arriving at his house, was received by his wife, the practitioner in charge of the case being temporarily detained elsewhere. The lady seemed to me to have an air of weary resignation, as if she had borne for a long time a burden almost beyond her strength; and from her I gathered that her husband was in bed with a broken leg, having been recently knocked down by an omnibus—an accident not very unlikely to happen to a chronic alcoholic. She made no reference to his drinking habits, and appeared to me cautious and reticent in talking about him, as if she were afraid of making some admission. At any rate, I gained very little information from her in the 20 minutes or so that elapsed before the doctor arrived. From him I learnt that the patient was a man of independent means and of no occupation, a scholar of a celebrated college at Cambridge, and a man of much intelligence and culture. The patient was in the habit of drinking about a bottle of whisky a day, but I gathered that it was not so much his drinking habit, as his curious mode of life, that demanded my attention. He spent the greater part of every day locked up in his own room, and denied himself to everyone. He took, I was told, no interest in anything, and could not be induced to follow any occupation. He had, however—and this seemed contradictory—spent nearly two years in a slum in Birmingham, living in a garret by himself, and devoting himself with energy and zeal, and with no small success, to ameliorating the lives of the slum dwellers. He had continued this life until his health had broken down and he had been obliged to return to his home, his wife and children. It appeared to me difficult to reconcile this life of ardent self-sacrifice with the account that he took no interest in anything; and, as there seemed to be no other feature in the case, and as it was not clear to me why my services had been invoked, or on what point my

advice was needed, I suggested another interview with the wife.

On putting these questions to her, point blank, her answer was,—“My husband is impossible; he takes no interest in anything.” Inquiring as to specific subjects, however, I found that he did in fact interest himself in certain important matters. He interested himself in the education of his children; in the choice of proper schools for them; in the *locale* of the summer holiday; and in other matters; but still “not as another man would.” He used to be very social; and now he shunned society altogether. He took no interest in his pecuniary affairs and allowed his brother to manage them for him. On further inquiry, I found that the “impossibility” did not consist in coming home drunk, using violence to his wife, or making scenes with the servants or visitors; nor was he unbearably ill-tempered or irritable. He was never really drunk, although he drank a great deal. There appeared to be nothing very tangible or positive; all that was specifically complained of was his lack of interest. All this was very unenlightening and unsatisfactory; but the “impossibility,” whatever its nature, was so real that his wife had once obtained a separation from him and was now contemplating another.

I then visited the patient. I found him in bed, with his leg in splints; a fine, well-made, athletic, healthy-looking man, about 40 years of age. He received me with well-bred ease and courtesy, and answered all my questions with engaging frankness and candour. There was not, either in his appearance or in his manner, or in anything he said or did, anything that in the least suggested unsoundness of mind. “Yes, he had been knocked down by an omnibus; near his own home. Could not say how it happened. Supposed he was mooning along, and not attending to what was going on about him. Was not drunk. No, could not say he was in the habit of mooning along like that, but supposed he sometimes did so. Yes, it was quite true that he had no interest in life; could not account for it, but so it was; had been so for some years. Yes, he spent a good deal of time locked up in that room. What did he do? Went to sleep most of the time (laughing). Yes, he drank,—drank about a bottle of whisky a day. Kept up the practice all the time he was living in the slums. Supposed I might say he had been successful there,—well, very successful, if I liked. No, in spite of that, he could not say he took any interest in the work. Meant to go back to it, though, as soon as he was well enough. Why did he drink? Really couldn't say. No, he had no craving for it. No, it was not a necessity to him. To drown his trouble? Well, perhaps it was. What trouble? Couldn't say he had any particular trouble. *Tedium vitæ*? Well, yes, he supposed so. No, no reason for it, merely he could not interest himself in anything. As a pick-me-up? No, didn't think he drank on that score.”

There was nothing very enlightening in this; so I took him over his past life. “Oh! no; he was not always without interests. Used to live in the country, and took great interest in country pursuits. Hunted a good deal; was a magistrate, and chairman of the county council. Gave all this up, and came to this city, where, it was true, he was comparatively nobody. Why? Well, he had mechanical tastes,—that bureau there was full of models, mostly unfinished, and he hoped to get into touch with manufacturers. No, he had not patented anything yet. Could not say the disappointment had afflicted him much, but perhaps it had. Might be the cause of his drinking—couldn't say. Travelled? Yes, he had been to the West Coast of Africa. Yes, the West Coast. Yes, he supposed it was odd to choose ‘the Bight of Benin, where one comes out where a hundred go in.’ No, did not go on business; no, nor exactly for pleasure; no, nor for scientific investigation. What did he do there? Lectured to the blacks. Like it? No, he didn't like it. Came back after a while, tired of it. Then he had been in Manchuria. Yes, during the war. I read in the papers an account of the Yalu, and I said ‘That's the place for me.’ Did not stay long, however. Was summoned home on urgent business. Then he took to slumming. Carried on a kind of little Toynbee Hall, by himself, and supposed I might say he had been successful. Couldn't say he took much interest in it though. Couldn't take interest in anything. Yes, he was going back as soon as he recovered, and had got a man to take his place while he himself was away.”

His vital organs were sound; his digestion was good; his urine was normal. He had been seen by many physicians, but no definite diagnosis appeared to have been made, and

¹ The unessential details of this interesting story have been altered for the obvious reason that the protagonist cannot be recognised through the story.—ED. L.