ON "FOULBROOD."¹

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THIS is an epidemic of bee-hives affecting especially the larvæ, and resulting in the death of the larvæ, which degenerate and form a yellowish and black stringy material at the bottom of the cell—the "foulbroody matter." Mr. Cheshire, who has chiefly investigated the matter, finds that the disease is not confined to the larvæ, but affects the adult bees, more especially the workers, which die off in large numbers. He also found it as a local disease affecting one of the ovaries of a queen-bee, and leading to infection of the ova of that bee. If the foulbroody material is examined, it is found to contain numbers of oval bodies, which have been described by some as micrococci, by others as one of the *Saccharomyces* (*cryptococcus alvearius*). Mr. Cheshire, however, found that these bodies were not present in the juices of the larvæ—that there one only saw moving bacilli—and he has made out the same fact with regard to the adult bees affected with the disease. He therefore regards it as a bacillar disease.

In August last he brought me some foulbroody material to see if the organism could be cultivated, and it is the result of this research which forms the subject of the present communication. And I may say shortly that from this material I got a growth of bacilli exactly resembling in size and appearance those seen in the juices of the larvæ and adult bees, and that these bacilli produced large spores, which were evidently the bodies seen in the foulbroody material.

In cultivation in agar agar the bacilli vary in size, their average length being $\frac{1}{2500}$ of an inch. They are somewhat pointed at their ends, and very often have a clear space at one side near the end, but this is not constant. Their average breadth is $\frac{1}{3000}$ of an inch. The spores are largish oval bodies averaging in length $\frac{1}{1250}$ of an inch, and in breadth $\frac{1}{2000}$ of an inch.

They do not grow below 17°C. They grow most rapidly at the temperature of the body. Very few spores are formed at 17°C., but they appear rapidly and in large numbers at the body-temperature. The reaction of the medium is not of very great importance, but a neutral material is best.

Their growth in meat-jelly (10 per cent. gelatine) is very characteristic, and quite different from that of any other organism with which I am acquainted. So peculiar is it that a cultivation of this bacillus can at once be detected by the naked eye. If an infected needle be plunged into a tube of this material, growth occurs on the surface and along the track. On the surface the bacilli shoot out and form a ramifying layer, the characters of which will be presently described. Along the track irregularly-shaped masses appear, and in a few days processes are seen to shoot out from these masses, which may extend a long distance from the track, being thickened at various parts. If jelly is poured out on a glass plate, allowed to solidify, and then the infected needle drawn over it, we see the explanation of the peculiar appearance seen along the track; bacilli shoot out from various parts of the track, and very soon a circle is formed; from this circle fresh shoots pass out and form circles again further on; these circles becoming filled with bacilli give rise to the apparent thickenings and nodules seen in the course of the shoots. The bacilli cause liquefaction of the gelatine, which assumes a yellowish colour and gives off a urinous or fishy odour—the same odour as that of the infected hive.

They grow in agar agar jelly at the temperature of the body; but the cultivation, like the cultivations of other bacteria in the same material, is not sufficiently characteristic to be of use as a diagnostic.

On potatoes they grow slowly, and form a yellowish layer.

In milk they grow well, and in a few days cause the coagulation of the milk, which also assumes a yellowish colour, and gives off the odour previously described. The coagulum is not firm, but is like a tremulous jelly, and may remain for some days without the separation of any fluid; by and by, however, it becomes liquid, and ultimately, after some months, assumes the appearance of a dirty yellowish glairy fluid. It is very slightly, if indeed at all, acid.

They grow extremely slowly in blood-serum, and there form very long filaments with comparatively few spores.

With a cultivation in milk, Mr. Cheshire sprayed a comb containing a healthy brood, covering up the comb with a piece of cardboard with a lozenge-shaped space in the centre. The larvæ in the cells corresponding to the lozenge-shaped space all died of foulbrood, while the others remained healthy.

He has also fed bees with another cultivation of these organisms, and a number of them died of foulbrood. One day while I was testing some milk in which they had grown, a large blue-bottle fly settled in it and commenced to eat. I put a large glass funnel over the dish, leaving sufficient air for the fly. When I came 22 hours later the fly was in the sitting posture on the table, and was dead. Its juices were full of these bacilli, as shown both by microscopical examination and by cultivation.

Other animals are more or less refractory to this bacillus. I have kept cockroaches for days in a box in which was milk containing these bacilli mixed up with sugar. None of them died, but I cannot be certain that they ate the material. I inoculated two mice and one rabbit with a cultivation without effect. I injected half a syringe of a cultivation subcutaneously into two mice: one died the following day, the seat of injection being very oedematous and full of these bacilli, and there were also a few in the blood; the other mouse remained well. At the same time I injected a guinea-pig subcutaneously. It died six days later with extensive necrosis of the muscular tissue, but no true pus. These bacilli were present in the necrosed tissue, and also in small numbers in the blood. I have since injected three guinea-pigs subcutaneously without effect.

The conclusion to which we have come is, that without doubt this bacillus, growing in the juices of the affected larvæ and adult bees, is the cause of the disease.

A very important part of the work done on this subject by Mr. Cheshire is the discovery of a method of curing this disease. He gives the workers in an infected hive a mixture of carbolic acid and syrup (1 to 500) as food, and finds that very soon the dead larvæ are removed, and fresh and healthy larvæ occupy their cells.

SEVERE VOMITING IN PREGNANCY, DUE TO ALCOHOLISM: WITH REMARKS.

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THE case related by Dr. Horrocks in a recent issue of the JOURNAL encourages me to forward the particulars of the following case, which may prove of interest to many.

A. B., aged 39, married fifteen years, mother of four children, the youngest 7 years old, ceased menstruating early in May 1884. Within a few weeks from this time, she suffered considerably from nausea and vomiting, which gradually increased in severity and frequency until, at the time of my first seeing her in the latter end of August, the vomiting was incessant, and she was unable to retain anything whatever on her stomach. So severe was the retching, and so grave were the symptoms, that the question of inducing premature labour was raised; and for this reason I was asked to see her in consultation with her medical attendant.

I found the patient propped up in bed, with a flushed congested appearance of the face. The conjunctivæ were injected; the tongue foul, coated, red, and irritable at tip and edges; the breath was offensive; the voice was hoarse and subdued. She held a basin in front of her, and for the last three or four days had been vomiting almost incessantly, straining herself to that degree that it was feared some untoward event would happen unless the vomiting was arrested. On inquiry, I ascertained that the bowels were loose and irritable, acting five or six times, at least, in the twenty-four hours. The urine was reported free from albumen, but loaded with lithates. There had been a slight discharge of blood from the vagina a few days previously, but no pains as of threatened abortion. For days past, the patient had taken nothing but brandy and soda, champagne, iced soda, and milk in small quantities. Her pulse was rapid, weak, and irritable; temperature normal. The skin was moist and clammy. The chest and abdomen were examined carefully, but no well marked abnormality detected to explain the persistent vomiting. On examining *per vaginam*, the uterus was found to be considerably enlarged, apparently about the size of four months' utero-gestation. It was fairly normal in position, the cervix being fleshy and somewhat granular.

In consultation with her medical attendant, I ventured to suggest that the vomiting seemed to be due, not to the pregnancy, but to the immoderate imbibition of alcohol; and that I considered her condition so desperate that, if labour were induced, she would probably succumb. Taking the husband into our confidence, the decision we had arrived at was plainly and distinctly stated; and, with his full consent, I was empowered to speak to the patient herself on the

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