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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subject. She had sufficient good sense to understand the motive for our appeal to her to give up at once all alcoholic liquors, and, as it subsequently proved, sufficient moral control over herself to carry out her resolve.

A mixture of bromide of potassium with compound tincture of lavender and aromatic spirit of ammonia was prescribed, to relieve the distressing sinking and craving; and another, with bismuth, nuxvomica, morphine, and hydrocyanic acid, to be taken occasionally, to allay the vomiting. The importance of supplying nourishment in the form of nutritive enemata, with or without opium, to allay the irritability of the bowel, until such time as small quantities of jelly, beef-tea, etc., could be retained by the stomach, was insisted on. Under the watchful care of her medical attendant, the treatment indicated was carried out thoroughly, with the result that the vomiting ceased within twenty-four hours, the patient was enabled to retain small quantities of nourishment, and ultimately went to her full time, being safely delivered of a son, both mother and child doing well.

In a letter from the practitioner about six months later, announcing the fact that she was safely over her confinement, he told me that "she proved most sensible and tractable, with a little management, and the secret of her recovery was one glass of Sauterne at lunch and one at dinner, and nothing else in the way of stimulant."

REMARKS.—The case illustrates the extreme importance of differentiating the vomiting in pregnancy from that of pregnancy. My firm conviction is, that had premature labour been induced on the assumption that the vomiting was due to the pregnancy, the patient would inevitably have succumbed. Her general health was such that even the shock of induction would probably have proved fatal, to say nothing of the risks of exhaustion and septicæmia.

Although in this case there was a clear history of the abuse of stimulants, preceding even conception, I think it cannot be too strongly urged that extreme care should at all times be exercised in suggesting champagne, brandy and soda, and such like remedies, with a view of relieving the sickness generally associated with early gestation. In strict moderation, such remedies may be of service in some cases; but I have no hesitation in saying that, speaking generally, they only aggravate the sickness and increase the tendency to gastric disorders. We have yet to learn that there is one constant factor which will explain the vomiting of pregnancy. It may be said this is not a case in point; and yet, if we go carefully into the history of these cases, we shall generally, or at least frequently, find that in a large percentage of them there is something, perfectly apart from the position or even condition of the uterus itself, to explain the vomiting. Each case must be treated on its merits.

A CASE OF TETANY, WITH REMARKS ON THE CAUSE AND PATHOLOGY OF THE DISEASE.

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J. P., aged 29, 5 ft. 5½ in. in height, 128 lbs. in weight, married, a stoker, was admitted to Wakefield Prison March 27th, 1884, being then in good health. He was employed at oakum-picking for seven days, subsequently in the cook-house, the temperature of which ranged from 70° to 80° Fahr. His cell was on the ground-floor; and, owing to its peculiar construction, his bed at night had to be laid down behind and close to the door, where he was exposed to a considerable draught of cold air. The temperature of the cell seldom exceeded 55° Fahr.

On April 14th, while sending the mess up the lift, he had a sudden feeling of weakness, followed immediately by diarrhœa. For this, he was treated in his cell for four days, when he recovered, and returned to the cook-house.

He continued in good health until April 21st, 1884, going to bed at night in his usual health. At 11 P.M., he awoke with a numbness in both hands; on rubbing them together, he found that there was no distinct feeling in them; when he touched the tips of his fingers, he had a sensation as if the "funny bone had been struck." At midnight, he had spasms in both hands. The position of the hands and forearms was similar to that described below. On April 22nd, the spasms appeared several times during the day. At night, the feet became affected in a similar manner. The hands were flexed on the forearms, and the forearms on the arms. The fingers were flexed at the metacarpo-phalangeal joints, and extended from there to the tips. The tips converged to one point, with the thumbs lying across the palms underneath the fingers. The hand had the appearance of a cone, the base being formed by the metacarpus, and the sides by the

converging fingers. The feet were extended, with the soles looking inwards; the whole foot having the appearance characteristic of equino-varus. He had some difficulty in masticating. In speaking, great effort required to be made; the tongue seemed to roll in a lump. On passing urine, he felt as if he had lost the power to empty his bladder. His whole body was covered with sweat, the face, more particularly, being bathed in it. The attacks occurred occasionally. He gradually recovered under good feeding and rest in bed, and was comparatively well within seven days. He remained several weeks under observation, and no further signs of the disease were shown.

Little of importance is known of the pathology of this disease. *Post mortem* examination has not revealed any characteristic lesion in the motor area of the cord. Hitherto, much attention has been directed to the motor phenomena, to the exclusion of the sensory. It is highly probable that the primary disorder is one of sensation. In typical cases, the sensory disturbance emerges first in point of time. Tetany is probably a functional disorder, whose basis is laid in abnormal irritability of sensory nerves, by and through which reflex discharges are induced from the ganglionic area of the anterior horns of the cord. Impairment of nutrition precedes the attack in the majority of cases. Assuming that there is in the healthy body a series of impressions continuously streaming through the posterior roots to the spinal cord, where they are transferred to the motor roots (see Landois, vol. ii, p. 828), it is conceivable that these normal impressions may be highly reinforced by ordinary stimuli acting on the abnormally irritable sensory nerves. The conduction of extensive reflex spasms takes place from the posterior roots to the ganglia of the posterior, and then to the anterior cornu, and lastly, into the anterior roots (Landois, vol. ii, p. 859). Extensive reflex movements may take place when the discharging stimulus is very strong (*loc. cit.*, p. 844). Assuming an excessive irritability of the sensory nerves, ordinary stimuli may be regarded as relatively strong.

We should expect to find these reinforced impressions acting with particular force on the more unstable motor elements of the cord, namely, the accessory structures whose instability is always very great. Nor should we be disappointed in our expectations, for, on analysing the groups of muscles involved, we should find those muscles most involved whose functions are highly specialised, for example, the muscles of the hand and forearm, the finer movements of these groups being controlled by the median group of ganglion cells in the anterior horn, a group peculiarly unstable in character. In the case recorded above, the scanty diet and diarrhœa were fitted to produce grave impairment of nutrition. The variations in temperature, with the cold draught passing over his bed, were stimuli strong enough to produce reflex spasms.

It should be mentioned that, on recovery, the sensory phenomena were the first to disappear, then the spasms, both passing off in an inverse order to that of invasion.

OBSTETRIC MEMORANDA.

PLACENTA PRÆVIA LATERALIS.

A. C., aged 30, unmarried, was seven months gone in her third pregnancy, and had had slight hæmorrhage during the fourth month. On the morning of her confinement she got up at 7 o'clock, feeling quite well; but, after she had begun to move about, severe flooding set in, causing her to fall fainting on the floor. After some stimulant had been administered, she was assisted into bed, while the flooding continued, and weak and infrequent pains gradually came on. She was not seen for three hours, owing to the nature of the message having been misunderstood, and she then had lost a large quantity of blood, both in liquid and clots, and was pale and faint, and complained of loss of eyesight. The pulse, however, remained good, and the pains, though weak, became more frequent. The os was found to be fully dilated, and the bag of membranes tense under a pain, and unruptured, but no presentation of the child was perceptible. The membranes were ruptured, during a pain, with the aid of a hair-pin straightened, and protected by the finger; and the hand, previously carbolicised, being introduced, came first upon a loosened tongue of placenta, extending well down to the cervix, on the posterior aspect of the uterus. This was still further separated with the fingers, and, as the head was found to be very high up, and the presentation inclined to be transverse, with the breech towards the placenta, a foot was at once seized and brought down before the occurrence of another pain, and the case was left to nature, pressure being applied to the abdomen, and ergot administered. No chloroform was used, but version was very easily effected, and borne without the slightest