being noted after absorption as before. The results of the direct agglutination tests and the agglutinin absorption reactions clearly indicated a *Br. abortus* infection.

Blood Culture.—15 c.cm. of the patient's blood withdrawn on February 5th at the commencement of an evening rise of temperature gave completely negative results.

Urine.—A centrifuged deposit of urine (February 5th) which gave negative results on culture was inoculated subcutaneously into a guinea-pig. The animal was killed after twenty-one days. The post-mortem appearances showed nothing abnormal, and no organisms could be cultivated from the lymph glands at the site of inoculation, the liver, spleen, or heart blood. The guinea-pig's serum agglutinated *Br. abortus* (Hog) in a dilution of 1 in 80, and the *Br. melitensis* strains in dilutions of 1 in 20 to 1 in 40. These findings are inconclusive, normal serum effects being probably sufficient to account for them.

Prior to the onset of the attack the patient had not been in the habit of drinking an unusual quantity of milk. During December, 1929, he visited a farm three times, but did not partake of any milk there. On December 12th he visited Lancashire and had porridge with milk and a glass of milk at Preston, while later in the day he drank milk in Manchester. He returned to Edinburgh the following day. It is of interest that Wilson and Nutt (1926)² reported that 8.8 per cent. of mixed milk samples obtained in Manchester contained *Br. abortus*. The source of infection in this case, however, remains obscure.

Points of interest in the case are:

1. The patient had no close association with cattle, and was not in the habit of drinking unusual amounts of raw milk.
2. The apparent physical well-being of the patient even in presence of severe pyrexial attacks.
3. The clean-cut results of agglutinin absorption reactions, pointing definitely to an infection with *Br. abortus*.
4. Spontaneous disappearance of symptoms after the relatively short period of six weeks from the onset of the illness.

REFERENCES.

¹ Cruickshank, J. N., and Cruickshank, R.: *British Medical Journal*, February 1st, 1930, p. 195. ² Wilson, G. S., and Nutt, M. W.: *Journ. Path. and Bact.*, 1926, vol. xxix, p. 141.

A CASE OF ABORTUS FEVER IN NORTHERN IRELAND.

BY

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THE literature on the subject contains records of seventeen cases of *Br. abortus* infections in man in the British Isles. Sixteen of these have been reported from England and Wales and one from Scotland. The case I wish to record is the second known to have occurred in Northern Ireland, a previous one having been reported to the Ulster Medical Society in February, 1930. An inquiry conducted by the Ministry of Agriculture of Northern Ireland in 1928 revealed the fact that contagious abortion in cattle is widespread in the country and is a very important disease. This being so, it seems remarkable that more cases of *Br. abortus* infection in man have not been recognized in Northern Ireland, which is so largely agricultural.

A farm labourer from County Down, aged 42, was admitted to the Royal Victoria Hospital, Belfast, on January 19th, 1930, as a possible surgical emergency. He gave a history of indefinite malaise about three weeks previously. This had lasted about a week, after which he had fairly severe abdominal pain, with headache, fever, and some diarrhoea. On examination he had considerable flushing of the face with a definite bluish tinge about the lips; the tongue was dry and coated, the breath foul. There was general abdominal tenderness, most marked in the lower half of the abdomen, and an enlarged and tender spleen. The lungs showed some patches of dullness with prolonged expiration about the level of the eighth rib posteriorly. The optic discs were rather hazy in outline. The heart, central nervous system, and urine showed nothing of note. There was a moderate degree of pyrexia (100° F.). The case seemed to be one of enteric infection, but the Widal reaction was negative for *B. typhosus* and *B. paratyphosus* A and B. A radiogram of the chest revealed nothing abnormal.

The patient was transferred to a medical ward for further investigation. The temperature chart showed pyrexia up to about

102° F. in the evening, with a fall of three to four degrees in the morning. A further Widal reaction on January 24th was again negative for *B. typhosus* and *B. paratyphosus* A and B. The lung signs had by this time cleared up, but the spleen remained enlarged and tender. The patient's serum was then put up against *B. typhosus* (O), *B. paratyphosus* C, and *Br. abortus*. Agglutination occurred with *Br. abortus* to a dilution of 1 in 250.

After the initial severe symptoms the patient felt quite well except for moderate sweating in the evening when the temperature rose. Physical examination revealed nothing abnormal except the enlarged spleen, which diminished in size as the illness progressed. A blood count in the fourth week of illness showed: red cells 5,200,000 per c.mm., haemoglobin 90 per cent., white cells 7,300. There was a slight relative lymphocytosis.

In the account of the disease given by Dalrymple-Champneys¹ enlargement of the spleen is stated to be fairly constant, but in the cases reported by Wordley,² Bloxsome and Davey,³ and Norman and Robert Cruickshank⁴ no enlargement of the spleen was found. The case reported here showed marked enlargement of the spleen, which gradually diminished as the fever subsided. In Nightingale and Wilson's⁵ case no mention is made of the spleen, but probably there was no enlargement noted.

Agglutination of Patient's Serum.

January 26th: 1 in 25 (++) ; 1 in 50 (++) ; 1 in 125 (++) ; 1 in 250 (trace).

February 2nd: 1 in 25 (-) ; 1 in 50 (-) ; 1 in 125 (++) ; 1 in 250 (++) ; 1 in 500 (++) ; 1 in 1,250 (+).

February 13th: 1 in 25 (-) ; 1 in 50 (++) ; 1 in 125 (++) ; 1 in 250 (++) ; 1 in 500 (++) ; 1 in 1,250 (trace).

It will be noted that the two latter tests show a pro-agglutinoïd zone.

Various attempts were made to isolate the organism. A blood culture incubated at a lowered oxygen tension for eight days was sterile. Samples of bile were obtained by a duodenal tube and planted out on Conradi, blood agar, glycerol agar, and in glycerol shake agar tubes. No growth of *Br. abortus* was obtained from any of these. A catheter specimen of urine inoculated on the same media was sterile.

That this is a case of *abortus* fever seems proved by these facts. There was a febrile illness somewhat resembling an enteric infection, but with no agglutination of the paratyphoid-typhoid organisms by the patient's serum. The patient's serum agglutinated *Br. abortus* in fairly high dilution, and also the patient's occupation brought him into association with cattle.

I am indebted to Dr. S. B. Boyd Campbell, physician, Royal Victoria Hospital, for his kind permission to publish these notes, and to Dr. J. S. Campbell for his advice in carrying out the bacteriological investigations.

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- ² Wordley: Two Unusual Cases of Fever, *Lancet*, December 17th, 1927, p. 1290.
- ³ Bloxsome and Davey: *Brucella abortus* Infection in Man, *Lancet*, October 19th, 1929, p. 818.
- ⁴ Cruickshank and Cruickshank: Abortus Fever, *British Medical Journal*, February 1st, 1930, p. 195.
- ⁵ Nightingale and Wilson: Isolation of *Brucella abortus* from a Case of Undulant Fever, *Lancet*, November 30th, 1929, p. 1143.

A CASE OF UNDULANT FEVER.

BY

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THE following account of a case of undulant fever appears worthy of record in view of the diagnostic difficulty and its clinical interest.

A cotton merchant, aged 39, was seen by me on January 12th of this year. He had pyrexia, slight soreness of the throat, constipation, and a white-coated moist tongue, but no other symptoms. During the following seven days his temperature, after reaching a maximum of 102°, fell gradually to normal. As his wife had recently been under treatment for bronchial catarrh succeeding a febrile cold, and as a throat swab yielded a growth of streptococci, the case was diagnosed as a febrile cold associated with a streptococcal throat.

After a few days' apyrexia the patient went to Llandudno for a change, but returned in a hurry with a temperature which

rapidly rose to a maximum of 104.6° on January 29th. The throat had cleared and there was now an entire absence of symptoms except constipation. The striking feature of the case at this time was the general well-being and the alertness of mind despite the temperature—a state of affairs contrasting strongly with the ordinary typhoid picture. The pulse was disproportionately slow in comparison with the temperature. The blood gave a positive Widal reaction for *B. typhosus* up to a dilution of 1 in 150, but was negative for *B. paratyphosus* A and B; in view of the clinical picture I was, however, reluctant to accept a diagnosis of typhoid fever.

At this point I became aware of two facts of which previously I had been ignorant—namely, that the patient kept a herd of Jersey cows, more or less as a hobby, and that he had had cases of *abortus* fever in the herd. One heifer had recently aborted after $7\frac{1}{2}$ months' gestation, and the milk from this animal had been used in the house. On February 4th Dr. Cohen of Liverpool was called in consultation; he agreed that the case was one of undulant fever, and that the possibility of typhoid fever might

be ignored, the Widal reaction being modified probably by repeated war-time T.A.B. inoculation.

A further blood test was now performed by Dr. Grace of the Chester Royal Infirmary, with the following results. On three occasions the serum gave an agglutination to *B. typhosus* up to a dilution of 1 in 300; *Br. abortus* was agglutinated twice up to a dilution of 1 in 200; and *M. melitensis* up to a dilution of

1 in 200, using the standardized agglutinable emulsions supplied by the Medical Research Council. A blood count showed: red cells 4,500,000 and white cells 3,750 per c.mm.

The second period of pyrexia lasted for nine days, and up to date (February 13th) there has been an apyrexial

period of eight days. The urine and faeces were not examined bacteriologically, nor was a blood culture made. The spleen was not enlarged, and there was no sign of spots or any kind of rash.

The most striking features of the case were the disproportionate slowness of the pulse, the mental alertness, and the state of general well-being despite the high temperature.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SURGICAL EMPHYSEMA FOLLOWING DENTAL TREATMENT.

THE occurrence of surgical emphysema of the face and neck as a sequel of dental treatment would seem to be an incident worthy of being placed on record.

On the evening of February 13th I was called to see a young married woman, aged 24, who was complaining of pain and swelling on the left side of her face and neck as far down as the clavicle. On examination I found that the left side of the face from the orbit downwards, and the left side of the neck as far down as the clavicle in front, and the scapula behind were slightly swollen, and on palpation were definitely crepitant, indicating the presence of air under the skin. I learned that a few days before she had had a small apical abscess of the left lateral upper incisor tooth drained through the nerve cavity by her dentist. She had the nerve cavity treated with antiseptics on several occasions, and in the afternoon of the day on which I saw her she had the cavity cleaned and filled. While the dentist was drying out the cavity with hot air she felt a sudden pain just below the left eye, and said her face felt as though it had been blown up by a bicycle pump. Presumably, when the dentist blew the air into the cavity, he must have occluded the opening of the cavity with the end of the instrument, and in this way forced the air up the nerve channel; from this it escaped through the infra-orbital foramen under the skin, and from there spread down the cheek and into the neck. The air took about four days to absorb.

Winchester. C. B. S. FULLER, M.C., M.D., M.R.C.P.

UTERINE FISTULA.

WITH NOTES ON THE TREATMENT OF FISTULAE AND SINUSES.

I do not know whether the following method for marking out the track of a sinus or fistula has been previously described. It is specially useful for anal fistulae and other similar conditions in which it is extremely difficult to follow all the windings of the track.

The sinus or fistula is first well syringed with sodium bicarbonate solution, 1 drachm to the pint, in order to remove all pus. Aqueous methylene blue solution is then forced in by a syringe, gauze being held tightly round the nozzle in order, as far as possible, to prevent the solution coming back past the nozzle. If the methylene blue solution is forced in properly, all the walls of the sinus or fistula will be coloured dark blue, and it is the easiest thing in the world to follow the track. If, then, everything blue is removed one may be certain that one has cleared out the whole track.

An interesting case I had recently illustrates a further use of this method.

A young woman on whom I had twice performed Caesarean section had some sepsis of the abdominal wall after the second operation. A small abscess formed, which was opened, and the patient left the hospital soundly healed. Seven months later she came back with a small sinus in the middle of the scar, from which she complained that there had been a profuse discharge of blood for three days recently. The bleeding had then stopped. Thinking that it was a stitch abscess I anaesthetized her, and after forcing in methylene blue proceeded to open up the sinus. A piece of silk, firmly attached, was found in the sinus. Knowing that the only silk used at the last Caesarean section was that employed in suturing the uterus, I proceeded to make a vaginal examination to determine the position of the uterus. I then found that methylene blue was coming out of the vagina. The uterus was found to be adherent to the anterior abdominal wall opposite to the opening of the sinus. It had doubtless been anchored there by the sepsis following the last Caesarean section.

The case was then clear—the sinus was a uterine fistula. Subsequent inquiries revealed the fact that she was menstruating at the time of the discharge of blood from the sinus; so this was obviously menstrual blood. I removed the uterus, and the patient left the hospital with a sound abdominal wall.

Mandalay, Burma.

W. F. BRAYNE, M.B., Ch.B.,
Lieut.-Colonel I.M.S.

Reports of Societies.

ETHYLENE ANAESTHESIA.

At a meeting of the Section of Anaesthetics of the Royal Society of Medicine on May 2nd, with Dr. R. E. APPERLY in the chair, the subject of ethylene anaesthesia was discussed.

Dr. R. J. CLAUSEN said that, although previous investigations had been recorded, the use of ethylene anaesthesia dated from 1923, when Luckhardt of Chicago reported cases. References were more frequent in the literature of the United States and Canada than in that of this country, but the subject was dealt with in a paper by Fairlie of Glasgow at the Annual Meeting of the British Medical Association last year (*Journal*, November 16th, p. 891). The gas, the chemical formula for which was C_2H_4 , was colourless, with a characteristic smell, part of which might be due to impurities. It was highly inflammable, and, when mixed in suitable proportions with air, oxygen, or nitrous oxide, was explosive. The speaker's own experience included 371 administrations, 92 of which were for dental extraction, and most of the others in gynaecological cases. With few exceptions McKesson's gas apparatus was used. The longest duration of anaesthesia was two hours twenty-five minutes; in four other cases it was over two hours. The preparation and premedication of the patient followed