from the placenta was free but not excessive. No vessels, except those of the cord, required ligature during the operation. The edges of the sac were fixed to the abdominal parietes with a continuous catgut suture. The upper and lower $1\frac{1}{2}$ in. of the abdominal incision were closed by mass sutures of silk-worm gut. At the end of the operation, which lasted an hour and a quarter, the patient was nearly pulseless. No superficial vein being visible the deep brachial veins were exposed in the upper arm, and 4 pints of hot saline with $\frac{1}{2}$ oz. of brandy were injected; hypodermic injections of strychnine were also given.

Death.—The patient completely recovered consciousness with a slow, steady pulse; but three hours after operation the pulse again failed, and, in spite of stimulation, death occurred five hours after operation.

COMMENTS.

Case I is an example of the common variety, in which, after rupture of the tube, the blood, being slowly and intermittently poured out, is limited to the lower abdomen by adherent omentum and intestines, from which are derived the bacteria which infect the blood clot. Portions of blood clot found to be incorporated with the peritoneum covering the pelvis and viscera should not be disturbed. Their complete removal is impossible, while partial removal only injures the peritoneum, which, if left undisturbed, is quite capable of dealing with these adherent clots. The majority of cases of this class recover after removal of the affected tube and the loose coagula.

Case II exemplifies the fulminating type of haemorrhage following rupture. I have on several occasions noted the fact that some strain or extra exertion—in this case the result of a purgative—has immediately preceded the rupture. In some instances strong purgatives have been taken in order to produce abortion.

Case III illustrates what is probably the most usual condition found after rupture of the tube, not involving the death of the fetus, which continues to develop between the layers of the broad ligament. Operation was performed in this case because pain was continuous and the patient was daily becoming weaker. Death from cardiac failure could only be attributed to the shock of the operation on an already enfeebled patient.

Haemorrhage during the operation was moderate, and quite insufficient of itself to account for the fatal issue. Operation gave the patient her only chance, but should have been performed at least two and a half months earlier.

NOTES OF A CASE OF REPEATED EXTRA-UTERINE GESTATION ON THE SAME SIDE.

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The following case is of interest not only because extra-uterine gestation occurred twice on the same side, but owing to the comparatively early period at which rupture occurred in both instances (seven weeks and five weeks respectively), and the rapidity with which the tube must have again become pervious after the first rupture.

A woman, aged 33, complained on March 26th, 1905, of pain in the back and hypogastric region, and of a slight haemorrhagic vaginal discharge. She had suffered from a "nervous breakdown" two years previously. Menstruation had occurred regularly every twenty-eight days and lasted four days, and had never given rise to any discomfort. She was married in November, 1904. Menstruation took place about the end of January, 1905, and had not recurred. On March 25th she began to feel indefinite pain in the abdomen, which gradually became more severe, and a vaginal discharge began the following afternoon. On March 27th the discharge was more profuse and some blood clots were passed. Vaginal examination revealed a slightly enlarged uterus, with a patulous cervix almost admitting one finger, and low down in the right inguinal region there was a rounded, non-pulsating tumour about the size of an orange, suggesting the possibility of either an extra-uterine gestation or a fibroid tumour. As the symptoms were indicative of abortion, the cervix was dilated and an attempt was made to empty the uterus, but only pieces of a thickened mucous membrane were brought away. For the next fortnight the patient was treated with hot fomentations and corrosive sublimate douches, and the discharge gradually lessened. Pain in the right inguinal region persisted, and the tumour seemed unchanged. On April 9th Dr. Haultain saw the patient in consultation, and thought that the case was one of extrauterine gestation, although there was a possibility that the tumour might be a

fibroid. As pulsation was absent, it was thought safe to continue palliative measures, and at Dr. Haultain's suggestion an icebag was applied over the tumour. The benefit following its use was most striking, as within a few hours of its application all tenderness and pain had disappeared; after this the tumour began to diminish in size. On April 21st Dr. Haultain again saw the patient; it was now found that the tumour could no longer be palpated externally, and on vaginal examination all that could be made out was a thickening of part of the right Fallopian tube near the uterus to an extent not exceeding the diameter of a man's thumb. By May 1st this thickening had diminished considerably, and all symptoms had disappeared. There was now practically no doubt that the condition had been one of ruptured extrauterine gestation. Menstruation returned in June, and occurred once a fortnight till August, when it resumed its normal type.

I was again asked to see the patient on January 12th, 1906. Menstruation had occurred in the last four days of November, and had been scanty. No period occurred in December. On January 9th a slight vaginal discharge took place. Next day she had a bad attack of abdominal pain and diarrhoea, and what seemed to be an ordinary menstrual flow began. On January 12th a tumour, closely resembling that found during the first illness, was discovered in practically the same situation, although it seemed in closer relationship with the uterus, which was again slightly enlarged. The cervix was soft. An icebag was again applied, and hot douches twice daily were ordered. On January 15th a complete cast of the uterus came away while a douche was being administered. This was examined microscopically in the laboratory of the Royal College of Physicians, and found to be a decidua. From February 18th to 23rd a very profuse brown discharge took place, and then completely stopped. The tumour rapidly decreased in size, and on March 9th a thickening of the right Fallopian tube, giving the impression of a swelling about the size of a small walnut, in close relationship to the uterus, was all that could be made out. On March 18th a normal menstrual period began.

My impression is that the second ovum had reached a point nearer the uterus than the first, and the patient is of opinion that the second "lump" was lower down than the first. The question of operative treatment has been considered, but the patient and her husband are averse to that course; and, in view of the favourable outcome on both occasions, I do not feel justified in strongly insisting upon it. The patient has, of course, been warned about the urgency of seeking medical advice regarding the occurrence of even apparently trivial symptoms. The application of an icebag on both occasions made all the difference between acute suffering and comparative comfort.

A CASE OF PUERPERAL SEPTICAEMIA DUE TO THE DIPLOCOCCUS PNEUMONIAE.

BY

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OWING to the rarity of recorded cases of puerperal fever in which the presence of the *Diplococcus pneumoniae* has been established, we have thought the following case worthy of a detailed report:

Jane B., aged 24, was delivered on June 16th, 1905, in poor surroundings, of a male child.

She had had two previous children, healthy, and born at full term.

A single examination was made, some hours before labour commenced, the usual precautions being taken. The midwifery attendant was not present at the birth of the child, but there seems to have been no difficulty. The child was full time and alive.

The temperature remained normal till the fourth day after delivery (June 20th), when it ran up to 102.8° F. and the pulse-rate to 130. On vaginal examination the os was patulous, but nothing abnormal was felt. The uterus was more than usually tender, the lochia and milk were suppressed, and there was constipation. The uterus was washed out with lysol, and quinine administered.

On June 21st the temperature was still high, 102° F., and the pulse-rate was 135. The abdomen was slightly distended, and towards evening vomiting commenced. The patient refused to come into the hospital, so a further douche was given. A purge followed by an enema resulted in a free movement of the bowels. On examination of the chest a few fine crepitations were heard at the base of the left lung behind, and the question arose as to whether the patient was not suffering from pneumonia rather than puerperal fever.

On the following day (June 22nd) she was admitted to Guy's Hospital. On admission the temperature was 102.8°, the

pulse 148, and respirations 48. The abdomen was slightly distended, but not rigid; it moved on respiration, and there was very little tenderness on pressure. There was continual vomiting of brownish fluid, offensive but not faecal in odour. She had diarrhoea with very foul motions. The patient complained of pain down the left side of the trunk, and crepitations were heard at the base of the left lung. The uterus was only very slightly tender bimanually, and the os was patulous. There was still neither vaginal discharge nor secretion of milk.

A hypodermic needle was inserted into the median cephalic vein and a sample of blood drawn off for bacteriological examination; 20 c.cm. of antistreptococcal serum (Burroughs and Wellcome's polyvalent) were injected at noon, and the uterus was washed out with mercury perchloride (1 in 2,000). At 7 p.m. the condition was practically the same—the serum had produced no effect; 30 c.cm. of serum (Lister's) were injected. At midnight the temperature had fallen a degree, to 102°, the pulse, however, keeping at 140, and the respirations at 48. As the vomiting and diarrhoea still persisted, a pint of saline was injected into each axilla. A further dose of serum was given (20 c.cm. Burroughs and Wellcome), and strychnine and iced champagne ordered.

June 23rd. The temperature, which fell in the night to 101°, quickly rose again, and was 104° at 10 a.m. There was very little alteration in the pulse-rate, which ranged between 140 and 148, or in the respirations, which kept steadily at 48. The vomiting and diarrhoea ceased. Crepitations were now heard at both bases. During the day 30 c.cm. of Lister's and 20 c.cm. of Pasteur's serum were injected.

Towards midnight vomiting and diarrhoea again set in, and the pulse, though not more rapid, was markedly feebler. A further dose of serum was given (20 c.cm. Lister's), and 2 pints of saline were infused into the median cephalic vein (the needle being directly inserted through the skin). Also three pints of saline were infused subcutaneously.

June 24th. The patient became delirious and was evidently dying. The temperature had fallen to 99°, but the pulse and respirations maintained their previous rate. The diarrhoea and vomiting again ceased, as the result, perhaps, of 20 min. of tr. opi given every night. Râles could be heard at both bases behind, though there was a fair entry of air on each side. Another 20 c.cm. of serum was administered at 10 a.m. After this the patient became rapidly worse, injections of digitalis, strychnine, and adrenalin failed to rouse her, and she died at 11.30 a.m.

Immediately after death the needle of a hypodermic syringe was inserted into the chest at the position of the heart apex to draw off some blood for examination. Some pericardial fluid was first drawn off, but on inserting the needle at a higher level and nearer the sternum, some heart blood was withdrawn. Both specimens were saved for bacteriological examination.

At the autopsy, made June 26th, all the organs were very much altered by *post-mortem* changes, the weather being warm. The interior of the uterus was shreddy, but otherwise normal. There were no placental remains, nor any pus in it. The peritoneum showed no evidence of inflammation. There were a few ounces of fluid in the pericardium. No pleurisy was found, but there was some oedema of the bases of the lungs, to which the crepitations heard are to be attributed.

Bacteriological examination made by Dr. Eyre, Bacteriologist to Guy's Hospital.

1. The blood drawn off from the vein on June 22nd was examined, and an organism was found which morphologically resembled the *Diplococcus pneumoniae*. Cultivations made from the blood were typical of this organism. On June 27th

a loopful of the growth on blood agar was inoculated into the peritoneal cavity of a rabbit. The animal died forty-eight hours later, and an examination showed that this was due to acute pneumococcal septicaemia.

2. Cultivations were made from the pericardial fluid and heart blood drawn off immediately after death on the 24th. From both these pure cultures of the *Diplococcus pneumoniae* were obtained. A rabbit inoculated on June 28th died on June 30th from acute pneumococcal septicaemia.

This case is open to criticism at one point, and that is the absence of any bacteriological examination of the interior of the uterus. The local signs were certainly never strongly marked, and at first the question of pneumonia was raised. However, beyond the crepitations due to oedema at the bases of the lungs, no further pulmonary signs or symptoms developed, and the autopsy failed to disclose any point of entrance for organisms other than the endometrium. The whole course of the illness, with its suppression of lochia and milk, dirty tongue, vomiting, diarrhoea, etc., was typical of puerperal septicaemia.

In 1903 Mr. Foulerton and Dr. Bonney¹ first drew attention in this country to primary infection of the puerperal uterus by the *Diplococcus pneumoniae*. In that year they brought before the Obstetrical Society the case of a patient who died of pneumococcal septicaemia. The organism was cultivated from the material obtained from the interior of the uterus, no examination being made of the body fluids either before or after death. Abroad, Weichselbaum in 1888, Bar and Tessier in 1896, and Colin in 1899 had demonstrated the presence of this organism in puerperal cases.

Since their first case, Mr. Foulerton and Dr. Bonney,² in the course of a systematic examination of cases of fever after miscarriage and labour, have found this organism in three more cases; whilst from two other cases they have isolated an organism which they have little doubt is the *Diplococcus pneumoniae*. Experiments on animals in these two cases failed, and so they do not regard the organism as being absolutely identified. It is worthy of note that, in one of the latter cases, the patient was attended by the same practitioner who had been in attendance on one of the cases in which the identity of the organism was absolutely proved.

These 6 cases were met with in an examination of 54 cases of fever following miscarriage or labour at full term, in 39 of which bacteria, of one kind or another, were found. From this one would draw the conclusion that pneumococcal infection of the puerperal uterus is not a very rare event, were it not for the fact that many other observers have failed to record a single case. Neither Kronig in 179 cases, Whitridge Williams in 151, nor Vogel in 24 cases met with an instance of this infection; but doubtless in many cases of mixed infections the *Diplococcus pneumoniae* has not been identified, unless specially sought for.

In none of the cases above alluded to was the organism cultivated from the blood during life or immediately after death, so far as we are aware.

It is worthy of note that Doyen found the *Diplococcus pneumoniae* in the healthy vagina in one case; and Mr. Foulerton and Dr. Bonney, in an examination of the discharge from the cervix of thirty non-pregnant women, found an organism which, in every particular except pathogenicity to the lower animals, resembled the *Diplococcus pneumoniae*.

On the other hand, Whitridge Williams³ has examined a series of ninety-two pregnant women, with an elaborate technique to avoid accidental contamination, and has only found non-pathogenic organisms, and hence concludes that "auto-infection" does not occur.

Certainly in this case no claim can be made to auto-infection, as an examination was made within a few hours of the birth of the child, but the possibility of such infection was brought to the notice of one of us recently in the case of two patients who died from puerperal septicaemia. In both of these the child was born before the arrival of the attendant, and it was stated definitely that in neither case was any vaginal examination made, nor had any difficulty been experienced in the expression of the placenta.

So far as clinical symptoms are concerned, this illness ran a severe and rapid course; the temperature rose on the fourth day after delivery, and the patient died on the eighth day. We find no particular features, either in this case or in the others recorded, which would indicate

infection by the *Diplococcus pneumoniae* rather than by other forms of organism.

As might be expected, the treatment by antistreptococcal serum was without any appreciable result on the course of the illness. Though the temperature fell slightly after the injections, the pulse and respirations were not affected. The identification of the *Diplococcus pneumoniae* was only completed by the result of the inoculation experiments, and so came too late to modify the vigorous antistreptococcal treatment pursued.

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- ¹ *Obstet. Trans.*, vol. xlv, 1903, p. 128. ² *Ibid.*, vol. xlvii, 1905, p. 11.
³ *Trans. Amer. Gyn. Soc.*, 1898, p. 141.

A NOTE ON

THE ETIOLOGY OF GRANULOMA PUDENDI.

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THOUGH granuloma pudendi is extremely prevalent in British Guiana, the first adequate clinical description of it, by Conyers and Daniels,¹ only appeared in 1896. Later this was added to by Daniels,² Ozzard,³ and Fowler,⁴ and the disease has now acquired a position in manuals on tropical diseases, Galloway,⁵ in 1897, describing the pathological characters of the lesion. Though a better knowledge of the disease has shown it to occur in the New Hebrides, Solomon Islands, New Guinea, India, and North Australia, a particular causative factor has not been discovered.

During the past few weeks in British Guiana I have had an opportunity of examining cases of granuloma pudendi, and in three successively have demonstrated spirochaetes.

CASE I.—An extensive granuloma in the height of its activity, spreading up into the groin. Excised by operation. Smears made from the growth, just superficial to its fibrous base, but yet well below the surface, showed many spirochaetes when stained by Leishman's method. These were short and much resembled the *S. refringens*. On staining by Giemsa's method, others were visible; some of these presented a different character, having closer-wound spirals and being straighter and more rigid than the above. They were more like the *S. pallida*, yet, so far as I could remember from specimens seen recently in England, not exactly similar.

CASE II was almost exactly similar in the number of spirochaetes, their distribution, and reaction to stains.

CASE III is more interesting, in that extremely few spirochaetes were found when staining by Leishman's method, though always of the *refringens* type. Giemsa's method, on the contrary, demonstrated not a few of the closely-twisted spirilla which I have mentioned above.

All three cases were in black women, natives of British Guiana.

The readily-stained spirochaete, I have little doubt, is *S. refringens*. The second spirochaete gives cause for hesitation. If it be the *S. pallida*, this fact strongly supports the view of the minority that this granuloma is a manifestation of syphilis. However, in the present state of knowledge it is useless to speculate on the identity of spirochaetes.

I hope to pursue the subject later and forward a further report indicating its distribution, with the result of inoculation and cultivation experiments.

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A NOTE ON SYPHILIS AND CANCER, ETC., AND ON SOME PROTOZOA.

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Syphilis and Spirochaetes.

THE recent discovery of mobile spirochaetes in the primary and secondary, cutaneous and glandular lesions, and in some tertiary lesions of acquired syphilis, and in the skin and viscera of congenital syphilis, is of the highest interest in pathology. Dr. Schaudinn's¹ description of the *Spirochaeta pallida* of syphilis needs no confirmation, coming as it does from one of the ablest of modern protozoologists²; but if confirmation were needed, it has had it

amply. The organism (Fig. I, 4 and 5) is characterized by the numerous (10 to 26) spiral turns and by their permanence, as well as by its physical properties, which

include a low power of refracting light, whence the name "pallida." The commoner spirochaetes, such as the *Spirochaeta refringens* (Fig. I, 3), possess the spiral form only when in movement.

Before the appearance of Schaudinn's preliminary note² on another spirochaete (*S. ziemannii*) which during part of its life-cycle infests the white blood cells of birds, and during the remainder of its life-cycle

different parts of the body of the common gnat, bacteriology had claimed spirochaetes, confusing them with the spiral bacteria or spirilla. Now

we know that they are protozoa of most complicated life-history, including various forms, some of which, compared to the spirochaetes, are giant cells.

It will be instructive, in passing, to glance at some of the stages of *Spirochaeta ziemannii* depicted by Schaudinn as he found it in the bowel of the gnat, where, as with the malaria parasites, the fertilized mobile ovum cell (oökinet) undergoes development (Fig. II, 1). The original description (translated) reads:

The giant oökinet rounds itself off and produces in the gut of the gnat an enormous number of trypanosome-like offspring which change into true spirochaetes. The spirochaetes are thus not bacteria, but flagellates.

Now syphilis is a disease in which, as we know, the parasites' life-cycle is completed within the human host, so that if the *S. pallida* has to do with causing the disease, the other larger forms must be found in the tissues. They

Fig. I.—1. Molluscum body with oscillating particles; 2. Flagellate bodies derived from same; 3. *Spirochaeta refringens*, a common spirochaete. 4. *Spirochaeta pallida* of syphilis. 5. *Spirochaeta pallida* of syphilis (?) dividing (3, 4, 5 are after Schaudinn from *Deut. med. Woch.*, October 19th, 1905).

Fig. II.—*Spirochaeta ziemannii*, after Schaudinn. Stages in the intestine of the common gnat: 1. Oökinet, or adult mobile fertilized parasite. 2. The same, later stage elongated and coiled, and with several nuclei. 3. The same, still later stage, much convoluted, with multiple nuclei. 4. The same, rounded off, and giving rise to a multitude of small trypanosomes which change to spirochaetes.