used in our tubes. From our observations we do not consider that a division into four amoebulae takes place, as a rule, within the cyst. After the *Entamoeba* has completely emerged, the cyst-membrane left behind appears like a very delicate, single-contoured, usually spherical ring (Fig. 7); only by careful focussing at a particular level can the break in the wall be made out, which represents the dissolved area (Fig. 8).

We have seen excystation of amoebae which had no chromidial block in the protoplasm (Fig. 6), as well as of others which possessed this structure (Fig. 8); so that one of these conditions cannot be said, apparently, to represent a riper phase, as regards readiness for excystation, than the other. For a little while the liberated *Entamoeba* remains more or less rounded and sluggish; but soon it begins to throw out the typical clear, blunt pseudopodia of the *histolytica* type, these often welling out laterally in the characteristic manner. We have not yet been able to carry out direct observations further at this period, and cannot say, therefore, whether the *Entamoeba* proceeds to divide into four, and, if so, how soon this occurs. Indeed, from our living observations, we could not tell whether the amoebae which excysted had always four nuclei, or whether individuals with only one or two nuclei also had been able to excyst.

When we have ascertained that excystation was proceeding actively in the tubes, we have always subcultured from them into the expression-liquid of blood-agar tubes, to which either two parts of citrated blood or equal parts of citrated blood and fresh serum were added. These new tubes were then placed in a vacuum and incubated at 37° C. At from eighteen to twenty hours after the excystation period we have seen both small and moderate-sized active *histolytica* forms in these cultures, a few of the larger individuals containing red blood cells. It is a moot point whether any multiplication had occurred, beyond probably division of some of the originally encysted forms into four; and even in regard to this we do not feel certain. In spite of all our efforts so far, the growth of bacteria has always been excessive and gave no promise of successful cultivation of the *Entamoebae*. On one or two occasions, twenty-four hours later—that is to say, from forty-two to forty-four hours after excystation—we have found one or two amoebae still alive but moribund.

To our surprise, the above method, which has proved so successful for the excystation of *E. histolytica*, has entirely failed to produce excystation of *E. coli*, and by none of the other methods tried have we been able to induce this form to excyst. We have evidence, however, that the small "*minuta*" form, which we have recently described,¹ excysts in the same manner as *histolytica* (*tetragena*), using the same method; and this bears out our view as to the close relationship of these two forms.

In the case of *Lamblia*, also, we have been unable to induce excystation. From the appearances of the cyst contents which we have observed, we are strongly of opinion that only a single individual will be liberated and not two separate individuals. In other words, we consider, as we have previously stated,² that conjugation and not division occurs within the *Lamblia* cyst. Wenyon³ has expressed the view that these cysts are multiplicative, and represent, indeed, the endogenous form of multiplication shown by these parasites within the host. In our opinion this view is mistaken, and does not take into account the biological factors (environmental conditions) which influence both encystment and excystation (Cropper and Drew,⁴ Woodcock and Lapage⁵). Not to enter into details here, we will only point out that when permanent (resistant) cysts, such as are passed out with the faeces, are formed in the bowel, conditions other than those prevailing in the region where encystment is occurring are necessary for excystation and the commencement of a fresh cycle of activity. Equally as is the case with the cysts of the parasitic *Entamoebae*, for instance, we have little doubt that these *Lamblia* cysts only undergo excystation on passing down the alimentary tract of a fresh host and coming into contact with its digestive juices. From our experience of multiplication in flagellates we should say the process takes place very rapidly; and it is quite likely that it occurs mainly amongst those parasites which are attached to the epithelium.

Had time permitted we had intended to use the above described method of inducing excystation of the cysts of

E. histolytica to test the vitality, and consequently the infective power, of the cysts, when kept under different conditions for varying lengths of time; much more evidence is needed in regard to this point on account of its great hygienic and sanitary importance. The chief experiment which we have had opportunity to carry out, so far, in this direction has been to keep cysts in a very slowly running current of water for fifteen days and to ascertain that certainly some were still alive at the end of this period. By this time the debris was practically freed from faecal bacteria, apart from those normally occurring in the water, and free-living protozoa (ciliates and flagellates) were present. We should say, therefore, that water which has been contaminated with cyst-containing faeces may remain a source of infection for a considerable period.

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AMOEBIc DYSENTERY IN A MAN WHO HAD NEVER LEFT ENGLAND.

BY

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AMOEBIc DYSENTERY occurring in the British Isles is remarkably rare. Most of the cases hitherto recorded have been conditions of intestinal ulceration associated with liver abscess which have only been diagnosed *post mortem*. Thus Dickinson,¹ in 1862, described the occurrence of a hepatic abscess of considerable size with ulceration of the large intestine in a woman who had never been out of England. In 1881 Dickinson² again recorded a second case, that of a man aged 36, who also had never left England. *Post mortem*, ulceration of the large intestine was found coexisting with a liver abscess. In the same year Moore³ described a further case, that of a child aged 3½, who died with two hepatic abscesses and extensive ulceration of the large bowel. She had never been out of London. Amoebae are not mentioned in connexion with any of these cases, though the organism is said to have been discovered by Lamb⁴ as early as 1859, subsequently being more fully described under the name *Amoeba dysenteriae* by Lösch in 1875.

Saundby and Miller,⁴ however, in 1909 recorded the case of a man aged 42, in whom, *post mortem*, were found extensive ulceration of the large intestine and a liver abscess. Amoebae were demonstrated both in the intestinal ulcers and in the abscess cavity.

In none of these cases was the diagnosis made until after death, and it remained for Marshall,⁵ in 1912, to report the first case occurring in the British Isles which was diagnosed during life. This was a man who had never left Scotland, and in whose stools amoebae were repeatedly demonstrated; he made a good recovery. An ex-soldier, living near this patient, had spent some time in India, but gave no history of dysentery. Amoebae were not found in this man's faeces, and feeding experiments on a cat gave negative results.

Our patient was a private, who enlisted at the beginning of 1915. Prior to enlistment he had always lived in or about Manchester. The great majority of the men in his unit had been abroad at some time, but none had been out of England during the present war. Of three men who were sleeping in the same room as the patient only one had been abroad. This man had served in the South African war, where he had had diarrhoea of three days' duration only, which never recurred. His faeces, as well as those of five others in the unit, including the cook, who were said to have had dysentery abroad some years ago, were examined, with negative results. One, however, showed encysted forms of *Entamoeba coli*.

The patient, rather a stout man, aged 39, but looking considerably older, was admitted to hospital on February 16th, 1916. He had had no previous illness up till the onset of his present

complaint. Ten days before admission he complained of slight abdominal pain which increased in severity. Diarrhoea did not commence until four days later; from that time the number of motions varied from six to twelve per day, and were associated with some degree of tenesmus. It was not until the fourth day of diarrhoea (two days before admission) that he noticed "blackish blood" in the stools, and from this time onwards they continued to be blood-stained with an average of about twelve in the twenty-four hours.

On admission the temperature was 99° F., and the pulse 80. The tongue was furred, the teeth discoloured and carious, and he complained of pain across the lower part of the abdomen. There was marked tenderness in the left iliac region, and also to the right of the umbilicus, but no rigidity of the abdominal wall. The liver and spleen were not enlarged, and nothing was felt on rectal examination. The faeces were dark in colour, and contained mucus and dark red blood. A microscopical examination of the motion the following day revealed the presence of a large number of *Entamoeba histolytica*.

On the patient's fourth day in hospital emetine treatment was commenced. One grain of emetine hydrochloride was given by hypodermic injection daily for fourteen days (one-third of a grain in the morning and two-thirds of a grain at night).

During the first three days after admission the number of motions averaged twelve in the twenty-four hours; they were quite loose, and contained a quantity of blood and mucus. After six days of emetine treatment the number of motions had fallen from twelve to four in the twenty-four hours; they were still loose, and contained mucus but much less blood. Three days later the motions had diminished to three a day; they were loose, but there was only a small quantity of blood, and the patient was feeling much better. On the twelfth day with emetine the motions, though still inclined to be loose, were free from blood, and for the first time amoebae were absent. On the last day emetine was given the patient had but one motion, semi-solid, with a little mucus but no blood. Five days later the motion was fully formed, and mucus and blood were absent. From this date the patient progressed favourably without further incident.

The faeces were frequently examined throughout the illness, and active forms of *Entamoeba histolytica* were found up till the tenth day of treatment with emetine, but at no time afterwards. No cystic forms of the parasite were ever seen, although the motions were examined until three weeks after the patient's recovery, and no bacilli of the typhoid-dysentery group were isolated.

The blood tested as regards agglutinating power against the dysenteric organisms "Shiga," "Flexner," and "Y" types, proved negative.

The tongue, which was furred from the beginning, continued so until about the seventh day with emetine injections, when it began to clear. It was quite clean when they were stopped. The liver was frequently examined, but at no time was any enlargement noted. Abdominal pain persisted with diminishing severity until, practically, the motions were fully formed. During the first ten days in hospital he frequently complained of considerable pain after defaecation. The tenderness to the right of the umbilicus, mentioned on admission, had quite disappeared by the ninth day of emetine treatment, while that in the left iliac region did not disappear until three days after the motions were quite normal.

As regards temperature, at no time was it above 99.4°, which point it frequently reached during the first ten days after admission, but from this time onwards it was normal. Although we failed to find pathogenic amoebae or their cysts in the faeces of those men examined, it is possible that the carrier was among other men in the unit who had been transferred to duties elsewhere before the patient came under observation.

The case we have recorded, therefore, appears only to be the second reported as occurring in Britain in which amoebic dysentery was diagnosed as a primary condition, and during life.

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SIXTEEN cases of plague have been notified in Hong Kong since January 1st.

The *Boston Medical and Surgical Journal* states that it has been computed that there are now more than two hundred open-air schools and classes for tuberculous and anaemic children in the United States. Massachusetts heads the list with 86, of which 80 are in Boston; next come New York with 29 and Ohio with 21. The first school of this kind was opened in 1907, and in 1910 there were only thirteen at work. It is estimated that there should be in cities one open-air school for every 25,000 of population.

THE TREATMENT OF PUERPERAL SEPSIS BY UTERINE SUCTION AND DRAINAGE.

BY

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THE suction tube has all the advantages with none of the dangers of the uterine douche. In at least two cases I have seen the uterine douche convert a smart sapraemia into a rapidly fatal general infection, whilst in another case it set up acute, presumably chemical, peritonitis. Whilst I was administering the douche the woman was seized with agonizing abdominal pain, which was quickly followed by general collapse and rapidly developing abdominal tenderness and distension. The douching was at once stopped, but the patient died five hours after the onset of the acute pain.

Dr. Goodall¹ has collected sixteen examples of chemical peritonitis following intrauterine douches. He says:

My eyes have been opened recently to the great ease with which fluid can be forced from the uterine cavity into the peritoneum. This was first brought to my notice by the frequency with which watery fluid was found in the peritoneal cavity after curettage. In not a few cases I have been astounded at the amount, and have examined the uterus for evidence of puncture, but this was never found. But the condition was readily explained when, later, Dr. Chapman began to inject a strong solution of iodine into the uterus in carcinoma cases in order to kill out the malignant cells and prevent their contaminating the field of operation. It was then found that, though a minimum of force was used, invariably the pelvic peritoneum was deeply stained, and contained fluid iodine in variable quantity.

To illustrate the patulousness of the Fallopian tubes Dr. Goodall narrates a case of congenital atresia of the sigmoid. The abdomen was markedly distended, and dark liquid blood was coming in spurts from the vagina. On operating, the abdomen was found full of blood and meconium, the sigmoid having ruptured. At the autopsy, four hours later, blood was still coming from the vagina.

In the cadaver Dr. Goodall has injected methylene blue into the uterine cavity with douche-can and cannula, imitating as closely as possible the technique of operative work. With a pressure of only two feet of elevation, and in some cases only eighteen inches, and with a temporary obstruction to the outflow, such as is frequently caused by clots and fragments of tissue, he was able to send fluid into the peritoneal cavity through the Fallopian tubes. Hence, he says, the risk of chemical peritonitis, not to speak of septic peritoneal contamination.

Then it should be possible to remove retained decidua from the uterus by means of the suction tube, and obviate the need for the deadly curette and the dangerous digital exploration of the uterus. The method of treatment is illustrated in the following cases:

CASE I.

On August 4th, 1914, I was asked to see a primipara, aged 25 years, who nine days before had been attended by a qualified midwife, who is also a trained hospital nurse. The labour was normal, and the placenta came away intact in about twenty minutes. When I saw the patient she had a temperature of 103.5° and a pulse of 140. The lochia had been and were normal and odourless, but the large uterus was retroverted. The uterus was reduced and a saline ordered. Next day, after vaginal douching, a gauze drain was put into the uterus, and renewed daily. For three days the temperature hovered round 103°, the patient was apathetic, semidelirious, had intense headache, there was some abdominal distension, and the lochia became fetid. On the thirteenth day after delivery a glass Budin's catheter, to which the inlet end of a Higginson's enema syringe was attached, was passed into the uterus. To secure the syringe to the Budin's catheter the inlet valve was removed. The tube of the syringe between the bulb and the catheter was held firmly and the bulb squeezed, so as to drive out the contained air through the nozzle. On releasing the pressure on the bulb, the valve behind the nozzle closed and prevented the return of the air. There was then a vacuum in the syringe, and on releasing the pressure on the tube, between the bulb and the Budin's catheter, suction was exerted through the catheter within the uterus. No air was drawn into the uterus, although the suction drew into the orifices of the catheter thick, grumous, semipurulent masses, which were too big to pass through, and, when the catheter was withdrawn, came with it. Reintroduction of the catheter and suction drew out more of these thick pieces. The vagina was syringed, and a gauze drain was inserted into the uterus. The next day the patient was free from headache, and the temperature had fallen to 100.8°. The fetor of the discharge was less, though the labia were swollen and red, and an abscess with no well-