has to be introduced at more than one point, because the adhesions divide the cavity of the pleura into two or more chambers. Of course, the ideal patient for the induction of artificial pneumothorax is one who has unilateral disease without any excess of pleuritic adhesions.

14. Death has occurred from pleural reflex, the stimulus being reflected through the pneumogastric nerve to the heart. This is obviated by the narcotics administered before and at the time of the operation, and also by the warming of the nitrogen, a precaution on which Brauer and Lucius Spengler lay great stress, though they do not suggest a method for carrying it out. Death has also occurred from gas embolism. This is guarded against by observing the suction test for blood. I have known rapid oedema of the lung to follow the operation, which is thus limited; it should not be performed when there is marked emphysema or any of those conditions which are associated with cyanosis and marked dilatation of the right side of the heart.

The apparatus which I use, made by Messrs. Reynolds and Branson, Ltd., of Leeds, seems to offer some improvement on the older instruments which I have seen used by

other workers. It is simple, well made, accurate, and clean. The nitrogen is generated from the air as required, by means of a pyrogallate solution. It can be warmed by filling with hot water the bottle into which it is to pass; to maintain the heat a hot water jacket may be used. It is an additional precaution against sepsis to fill this bottle with a solution of hydrarg. perchlor. 1 in 5,000. The manometer is so constructed that it acts as a safety valve, allowing no greater pressure than 10 in. of water. It permits of direct communication with the patient, not merely through the nitrogen jar, so that the actual pressure within the pleura can from time to time be controlled—a point of great importance, emphasized by Saugman as well as by Brauer and Lucius Spengler.* Brauer has "found it useful during refills, in doubtful cases, to scent the nitrogen strongly, so that the breath of the patient might furnish an indication as to whether or not the needle had entered the lung." Vere Pearson, in making the same suggestion, refers to the sensation of the patient. Where the primary puncture method is used this precaution may well be taken always, and not merely for refills in doubtful cases. A little peppermint may be put for this purpose on cotton-wool in one end of the tube leading from the nitrogen flask to the patient. A short sterile glass tube close to the needle should contain a plug of sterile cotton-wool. The depth to which the needle enters during primary puncture should always be noted, for guidance of the operator during subsequent refills.

Dr. Neumann, of Davos, who demonstrated the incision method before Dr. Nathan Raw and myself, dissects down to the pleura, cutting through the fascia and separating the intercostal muscles with a blunt instrument in the direction of their fibres. Having exposed the costal pleura, which is recognized by its white fibrous appearance, he punctures it, still using the blunt needle. The obvious danger of this method is sepsis, an accident which can be avoided by sufficient care. The dissection is not

* Saugman, who obtains his nitrogen from iron bombs under pressure, whence it is transferred to a glass cylinder, suggests that the gas should be allowed to flow through the needle before it is inserted, until there is an equilibrium of pressure between the nitrogen in the cylinder and the atmosphere. This is not necessary when the nitrogen is generated by the method to which I have referred.

repeated for a refill, the puncture method being used instead. I have myself induced artificial pneumothorax by incision, but so far my impression is in favour of the primary puncture method. The operator will find the dissection on the cadaver much more simple than on the living patient. For me it is not so much a question of deciding as to the better method of inducing artificial pneumothorax as of deciding whether that or thoracoplasty is to be preferred, especially as the latter operation can now be done by experts with lightning rapidity and without a general anaesthetic.

REFERENCE.

¹ *Die Technik des künstlichen Pneumothorax.*

A CASE OF INFLUENZAL MENINGITIS.

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WHILE it would be incorrect to describe influenzal meningitis as a rarity, at the same time instances of this affection are sufficiently uncommon to deserve being placed on record from their clinical, therapeutical, and bacteriological interest.*

Batten,¹ in 1910, brought the literature up to date by publishing 14 cases of Langer, Douglas, Dudgeon and Adams,² and others, with the addition of 5 cases which he had observed himself. At the same time, he reviewed 26 cases which Cohoe had published. In the same year Ritchie³ published 3 more instances, and Douglas² 1. In 1911 Sayce⁴ gave 7 examples, in which, however, the organism isolated presented some deviation from the type originally described by Pfeiffer. Considering, therefore, that the influenzal organism is a definite cause of meningitis, we venture to publish the following case as a further contribution to the literature:

The patient, a male child of 13 months, was admitted to the East London Hospital for Children on October 6th, 1912.

The history was that he had been a strong, healthy child till a month previously, when he had whooping-cough. The acute attack had passed off, but he had been left with a troublesome cough, and was said to twitch at times, and have some difficulty in getting his breath. On the evening of admission he had suddenly started "fitting," and was brought up within half an hour of onset.

On admission he was very rigid and had marked retraction. The head was held twisted to the left as well as retracted. The eyes were staring and directed to the left. Knee-jerks were present; Babinski extensor and Kernig's sign obtained. There was some impairment of the note at both bases and tubular breathing at left base. Many crepitations of bronchial character scattered over the rest of the chest. The examination of heart, abdomen, throat, and ears revealed nothing abnormal.

On October 7th rigidity was a little less and the child could swallow, but during the night it had had to be fed by nasal tube. Spinal fluid was withdrawn, 10 c.cm.; it was under increased pressure and turbid. It contained albumin, 85 per cent. of polymorphs, and a short bacillus.

On October 8th stiffness and head retraction more marked, and the child moaned continuously. Signs of pneumonia were more definite, and more widespread on the left side. Lumbar puncture was again performed, and, after withdrawing 10 c.cm.

* J. G. Forbes, in the *Quarterly Journal of Medicine*, 1908, p. 109, published the results of the examination of cerebro-spinal fluid in 140 cases with cerebral symptoms treated at Great Ormond Street Children's Hospital. Of these, 109 were various forms of meningitis, 57 being tuberculous, 36 meningococcal, 9 pneumococcal, 5 streptococcal, 1 staphylococcal, and 1 due to the *B. coli*. In no case was the *B. influenzae* the causal organism.

of fluid, the thecal space was washed out with sterilized normal saline solution until the fluid draining away was clear. This spinal lavage was repeated on October 9th, 10th, and 11th, and urotropin gr. iij was given every six hours; but, although the temperature seemed to be coming down gradually and the fluid becoming clearer each day, on the evening of October 12th the child died.

The Cerebro-spinal Fluid.

Lumbar puncture was performed five times, and a total of about 55 c.cm. of turbid cerebro-spinal fluid was obtained. Centrifuged film preparations stained by carbol-thionin consisted almost entirely of polymorphonuclear leucocytes and numerous small, slender bacilli. Most of the organisms were free, but a good proportion of them were intracellular. The bacilli were Gram-negative, and a differential count gave polymorphonuclears 86 per cent., mononuclears 14 per cent.

Cultural Characteristics of the Organisms.—A good growth, consisting of discrete, fine, translucent colonies, was obtained on blood agar at 37° C. in forty-eight hours. The term "dew-drops," used by some authors, is a good description of the appearance of these colonies. In broth no growth could be obtained anaerobically, and none on agar or gelatine at 22° C. There was no action on litmus lactose, maltose, mannite, cane sugar, or dextrose. On cultivation some longer forms of the bacilli were noted. Pure cultures were obtained on blood agar in every instance.

At the necropsy cultures were taken from the fluid in the descending cornu of the right lateral ventricle. The influenza bacillus was recovered in pure culture. Further investigation showed that the cultural characters of this organism agreed with those of the bacillus obtained during life from the cerebro-spinal fluid.

Film preparations made *post mortem* from the purulent exudate revealed polymorphonuclear cells and a few small bacilli, which were mainly extracellular.

Fig. 1.—Showing the polymorphonuclear leucocytes with bacilli both inside and outside the cells. Ocular No. 6; Zeiss objective $\frac{1}{2}$. Drawn under the camera lucida. Stained by carbol thionin blue.

Post-mortem Report.

Brain.—The entire ventricular system showed dilatation, and was filled with turbid cerebro-spinal fluid.

Spinal Cord.—No evidence of involvement of the membranes.

Meninges.—Thick yellowish pus occupied the interpeduncular space and covered the superior and anterior surfaces of the frontal lobes. The anterior poles of both temporo sphenoidal lobes were capped by the purulent exudate, which was also distributed in random scattered patches over other portions of the cranial vertex. The pus was odourless and the vessels of the brain and meninges were intensely injected.

Heart normal.

Cranial bones and middle ears normal.

Lungs.—Right lung was oedematous and congested. In the left lung an area of confluent bronchopneumonia occupied the lower lobe and the lower half of the upper lobe. Excised portions sank in water. A creamy layer of adhesions was found on the pleura covering the left lower lobe. There was no free pus in the pleural cavity. A section of the lung showed microscopically a layer of fibrin forming a network on the pleura, and having some round cells entangled in its meshes. The pleura deep to this showed a band of dense white fibrous tissue containing numerous fibroblasts and thin-walled blood vessels. There was marked round-celled infiltration of the walls of the smaller bronchi, and desquamation of epithelial cells into their lumina. The alveolar walls were congested, and the alveoli themselves were filled with cells principally of the epithelioid and plasma varieties, but among these was a certain number of polymorphonuclear leucocytes.

Trachea and oesophagus were normal. Bronchial glands congested, but not enlarged. The liver, spleen, kidneys, all normal except for a little cloudy swelling. The stomach, intestines, peritoneum, mesenteric glands were all normal.

Various writers have met with some differences in the morphology of this organism. Although in direct film preparations from the fluid only small short bacilli within the limits of 1.5 to 2.5 μ were found, on cultivation long thread-like bacilli were observed to be mingled in comparatively small numbers with shorter forms. Sayce

notes that the organism in his cases produced colonies similar to Pfeiffer's, was non-motile, stained feebly with Loeffler's blue, Gram-negative, and aerobic. It differed from Pfeiffer's in that some thread forms were always present, and that on primary direct cultivation (not only on subculture) stout large bacilli were formed, together with numerous filaments often very long. Professor Hewlett⁶ states that the preparations from cultures show long twisted chains and threads of bacilli aggregated so as to form networks and convolutions. These chains or threads are composed of bacilli placed end to end, and united by a continuation of the cell membrane. In our example no stout bacilli as described by Sayce were found, except that although cultures taken at autopsy formed absolutely typical colonies on blood agar, a few rather swollen bacilli were noticed in the films, but these were quite uncommon, most of the organisms presenting the usually described features. Lastly, Ritchie publishes some excellent microphotographs showing thread forms of the bacillus, and he also utters a word of caution, which we make no apology for quoting in full:

It is thus impossible to dogmatize as to whether the organism isolated from the sporadic cases of meningitis with which we are here concerned, is identical with the organism occurring in the respiratory tract in influenza. In the meantime it is sufficient to say that there exists a group of cases which often presents pyaemic characters, in which meningitis is a very common occurrence, and in which the only organism present is a haemophilic bacillus having the characters of the influenzal bacillus.

The example recorded by Dudgeon and Adams was of

Fig. 2.—Film preparation from a pure culture of the organism on blood agar. Showing the predominant minute short type of bacilli, together with the longer filamentous forms described. Ocular No. 6; Zeiss objective $\frac{1}{2}$. Gram preparation, counter-stain saffronin. Drawn under the camera lucida.

the pyaemic variety and appears to have been among the earliest noted. Unfortunately it was impossible for us to amplify our results by means of animal inoculations.

As regards the diagnosis of influenzal meningitis, nothing has yet been noted which can enable the observer to differentiate it from the post-basic type. It is true that in some instances wild delirium is marked, but this seems by no means common. In the case above recorded the sudden "fitting" with rapid transition to rigidity was striking, and perhaps important clinically, since one of the cases noted by Batten began in the same way.

From the statistics available, the prognosis is undoubtedly very bad, and is certainly the more severe the younger the patient. Sanger's example of a boy aged 9, who recovered, was for some time the youngest recovery recorded, but Batten's case of a child 14 months old, who was improving long after the acute stage had passed off, shows that even at the earliest age a fatal prognosis should not be absolute. The cases that survive are so few that ultimate prognosis is very difficult. In the last instance mentioned there had been blindness, which was gradually passing off at the time when Batten published his paper. A patient of Sayce was ill six months, and developed a flaccid paralysis, while Mya, in 1902, had a case which recovered but was left with a hemiplegia.

Treatment seems to have little effect upon the disease. Vaccines have been given, but the results do not appear to be encouraging. The patient aged 14 months, to whom Batten refers, was given urotropin gr. x every four hours, and recovered. In the case we describe urotropin was used, but the dose was much smaller.

The other method of treatment, namely, spinal lavage, already referred to, was at first promising, and certainly at

the necropsy the cord showed less involvement than the brain. In other examples the cord appears to have been affected to an equal extent with the brain, but in this one there certainly was less pus in the thecal space and less softening of the tissue of the cord.

While the treatment by other means is so unsatisfactory, it seems reasonable to suggest that both urotropin and spinal lavage are worthy of further trial.

In conclusion, we desire to thank Dr. Eustace Smith for kindly permitting us to publish the notes of the case.

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THE EFFECTS OF EMETINE ON ABSCESS OF THE LIVER.

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I REPORT the following case in evidence of the effects of emetine injections on amoebic abscess of the liver; also because in the near future *post-mortem* examinations of cases of amoebic abscess of the liver are perhaps likely to be of greater rarity than heretofore.

History.—The patient, a male Cingalese labourer, aged 20, was admitted into the General Hospital, Colombo, on February 7th, 1913, complaining of fever, cough, and a swelling in the epigastric region. He had had parangi at the age of 7, and dysentery at the age of 17. For the three months previous to the date of admission he had fever which he ascribed to malaria, but which was no doubt due to the epigastric swelling, this being a liver abscess.

State on Admission.—He was exceedingly weak and emaciated, and complained of a chilliness and feverishness towards evening, accompanied by sweating, and of a sense of discomfort after food. There was a prominent swelling in the epigastrium suggesting a sense of fluctuation. The spleen was not palpable. Over the heart there was a haemic murmur; the lungs were clear. The general leucocyte count was 16,720. His evening temperature was 99.2°.

Operation.—Emetine hydrochloride $\frac{1}{2}$ grain was given subcutaneously on February 11th, and the following day an exploring needle was plunged deeply into the epigastric prominence. As is not infrequent in these cases, no pus appeared in the syringe, but on its withdrawal, after repeated suction, a yellow bead was noticed in the cannula. An incision was then made through the right rectus muscle, and the liver was found free from adhesions to the parietal peritoneum. The general peritoneal cavity having been packed off with gauze, the liver was incised, and 1½ pints of grumous bile-tinged pus were evacuated. Digital exploration disclosed a large loculated cavity, the walls of which, in certain directions, were quite beyond reach of the examining finger. It was flushed out with sterile water. A double drainage tube was inserted so as to fit tightly the margins of the liver incision, and gauze was carefully packed around it.

Progress.—Some foul discharge subsequently escaped, and was copious at first, but later diminished considerably in amount under treatment with $\frac{1}{2}$ -grain doses of emetine daily for four days. The abscess cavity was also irrigated daily with iodine lotion (tinct. iodi 5j, sterile normal saline Oj), and 4 oz. of quinine bi-hydrochloride solution (gr. x ad 3j) was kept in on two occasions.

The patient made good progress until February 18th—six days after operation—when, in my absence, the drainage tubes were inadvertently removed and reinserted. This interfered with the newly-formed adhesions between the liver and the anterior wall of the abdomen, allowing pus to escape into the general abdominal cavity. From this time the patient's health declined; his pulse became feeble and irregular; persistent vomiting and violent diarrhoea supervened; the discharge became foul and ochry yellow in colour from the presence of bile, and he died on February 21st—or about nine days after the operation.

Necropsy.—A loculated abscess cavity was found occupying the anterior aspect of the right lobe of the liver, of a capacity of about 4 oz.; only $\frac{1}{2}$ in. thickness of liver tissue lay between the abscess and the visceral surface of the liver. A deep recess was found leading into a saccule in the immediate vicinity of the gall bladder near the neck of which the tissues had been worn down to the thinness of parchment, and had tapped the beginnings of the hepatic ducts. The walls of the abscess and its contents were deeply bile-stained. Pyogenic membrane merged into normal liver substance through a thickness of $\frac{1}{2}$ in. Microscopic examination of this part showed the rapid transition from inflammatory cells to fibrous tissue enveloping here and there single liver cells and groups of them. There were also several buff-coloured islets of pus organized

into coherence and solidity; microscopically these areas showed inflammatory cells packed together, with filmy, fibrous strands between individual and groups. There was a considerable quantity of pus in the general peritoneal cavity; the mucous membrane of the colon showed a few scars of old ulcers.

REMARKS.

The noteworthy points of this case are:

1. The cavity in the liver, which at the time of operation contained 1½ pints of pus, was found nine days later to have a capacity for only 4 oz., while a very rapid advance of fibrosis was proceeding through a thickness of tissue that measured $\frac{1}{2}$ in.

2. Several separate foci of pus had been rendered inert and crystallized into solid, buff-coloured islets, which disclosed microscopically the very beginnings of fibrosis. Mere evacuations of pus and local treatment could not account for this latter phenomenon, even if they did for the former. In this connexion it may be pointed out that Rogers¹ has recorded a case in which encystment of a small liver abscess occurred under emetine.

As for the etiology of the case, I failed to find any motile amoebae even by staining processes, but the clinical history of the case is strongly suggestive of an amoebic origin, and it has been shown by Rogers that in 98 per cent. of liver abscess in the tropics amoebic dysentery is the cause; Wenyon,² too, has recently produced evidence to show that the *Entamoeba histolytica* of Schaudinn is the same as the *Entamoeba tetragena* of Viereck, or rather that Viereck's is the true life-history of the pathogenic amoeba that Schaudinn discovered and named.

It was not the liver abscess itself which caused the death of this particular patient, but the inadvertent removal of the drainage tubes which has been mentioned. No harm would have been done thereby if I had stitched the liver to the anterior abdominal wall at the time of the operation, but as I had no reason to anticipate the action in question I adopted my usual practice in dealing with liver abscess. In future I should give preference to Rogers's method of dealing with liver abscesses—namely, to aspirate them, inject emetine hydrochloride (1 grain to 1 oz. of water) before withdrawing the cannula, sealing the puncture with collodion, and repeating the procedure on a further occasion if required. This is because the *post-mortem* findings of the case now recorded suggest that emetine besides having a specific action on the amoebae may also be an organizing and cicatrizing agent of some value. In Rogers's words, the abscess will be found to dry up.

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HAEMORRHAGE IN A NEWLY BORN INFANT.

By

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I RECENTLY had to make for the coroner a *post-mortem* examination of a child 1 day old, who had died from severe haemorrhage (melaena, and haematemesis).

I found the stomach and small intestine full of blood. On washing the blood away I found the mucous membrane presented several ulcerations with bleeding points, from which the blood had come. The case seemed to me to be one of irritant poisoning, but on interrogating closely every person who had had anything to do with the child, I convinced myself that the child had had nothing but a little cold water. The midwife, however, informed me that when the child was born it was covered with a fetid "slime," which had come from the mother's passage. Not only was the child's head covered with this "slime," but some had entered the child's mouth, so much so that the midwife had to hold the child up by its feet to enable the "slime" to drop out of the mouth, and had also to resort to artificial respiration. I came, therefore, to the conclusion that the ulceration and the haemorrhage had been the result of direct bacterial infection such as occurs in dysentery and in enteric fever. The coroner, a medical man, accepted my view, and directed the jury accordingly.

I am no expert in these matters, but a noted bacteriologist, with whom I discussed this case, strongly urges that it should be placed on record.