petrous bone to its internal tip, involving the inner ear, and appearing to be conveyed along the auditory nerve to the meninges. There was a small collection of thick pus lying between the dura mater and inner half of the petrous bone; in the Fallopian aqueduct pus was also found. No sinus thrombosis was present. Microscopical examination of films from both the meningeal exudate and the pus in the middle ear showed pus cells with numerous pneumococci; examination of the discharge from the external auditory meatus, during life, had shown *Staphylococcus aureus* and a Gram-negative bacillus, but no pneumococci were seen or cultivated.

3. *Empyema of Sphenoidal Sinus*.—The autopsy showed well marked meningitis with massive fibrino-purulent exudation, limited almost wholly to the basal region of the brain; there were a few small patches of purulent exudate in the neighbourhood of the great longitudinal fissure. The sphenoidal sinus was found to be filled with pus and also the posterior ethmoidal cells; the nasal fossae and other bony sinuses appeared normal. Films of the pus, both from the sphenoidal sinus and meninges, showed pneumococci.

In all cases the purulent exudate extended down the spinal cord. With regard to organs other than those already mentioned, the heart, liver, and kidneys invariably showed cloudy swelling; the spleen was occasionally enlarged and the pulp somewhat soft.

DIAGNOSIS.

Meningitis having been diagnosed by the rigidity of the neck muscles, Kernig's sign, etc., its causative organism can only be determined by bacteriological examination of the cerebro-spinal fluid. Even in the presence of pneumonia meningitis is not necessarily pneumococcal, as, in occasional cases of cerebro-spinal fever, a bronchopneumonia may at first mask the meningeal symptoms. The majority of the cases described above were sent into hospital with a diagnosis of cerebro-spinal fever; it was only upon finding pneumococci in the cerebro-spinal fluid that their true nature was revealed. It is frequently possible to diagnose tuberculous meningitis clinically, but, at the present time, it is safer to regard any other examples of meningitis as meningococcal until proved otherwise.

PROGNOSIS.

The prognosis of pneumococcal meningitis is exceedingly grave, and it is doubtful if any severe cases ever recover. Hemenway¹ reported the case of a child, aged 2 years, suffering from pneumonia, who on the twelfth day developed head retraction and signs of meningitis. Lumbar puncture revealed a clear fluid under pressure, from which pneumococci were cultivated. The meningeal infection, however, must have been very mild, as the cerebro-spinal fluid was clear, showing no cellular reaction, and the case recovered. Four cases of recovery are mentioned by Broadbent,² three being children and one a soldier. The latter does not appear to have lost consciousness, although the cerebro-spinal fluid was cloudy, and yielded a growth of pneumococci; the course of meningitis was of about twenty days' duration. Netter Shand³ and Carnarvon Brown⁴ have also recorded instances of recovery; that of the latter observer was a severe case, but unfortunately, beyond the statement that pneumococci were found in the cerebro-spinal fluid, nothing is said of the bacteriological findings. Shand's case was apparently very mild, the patient, aged 28 years, showing no deviation from normal consciousness, and recovering after a few days.

TREATMENT.

The treatment of pneumococcal meningitis is at present most unsatisfactory. The nine cases recorded here serve to demonstrate the failure of repeated lumbar puncture. Each patient was punctured at least once daily, and in some cases every twelve hours, the subarachnoid space being drained on each occasion, until practically no more fluid would flow. As a result of the drainage the symptoms were occasionally alleviated for a time, but the ultimate result was not affected. Vaccines may be of value, but it is seldom that a case lasts sufficiently long for vaccine therapy to have an effect.

We have found hexamine of no value in the treatment of meningitis. Since the chief therapeutic properties of the drug appear to be due to its oxidation into formaldehyde, which takes place only in an acid medium, it probably has little or no action in meningitis. In the course of the chemical examination of numerous samples of cerebro-spinal fluid from cases of meningitis, we have found less than 2 per cent. giving a very faintly acid

reaction. The fluid is usually faintly alkaline, but occasionally neutral; the indicators used were litmus, phenolphthalein and methyl orange. Hexamine can be detected in the cerebro-spinal fluid within an hour of administration by the mouth, but the Burnam-Ramini test fails to demonstrate the presence of free formaldehyde.

Lamar,⁵ working with monkeys, showed that sodium oleate attacked and dissolved pneumococci, and, when combined with a specific antipneumococcal serum, had a decided therapeutic effect on pneumococcal meningitis, even when the organisms were multiplying in the blood stream. The action, however, is restricted to the particular type of pneumococcus from which has been produced the immune serum in the mixture of serum and sodium oleate. When the infecting pneumococcus was different in type from that represented by the immune serum, no therapeutic action resulted. When, therefore, a satisfactory polyvalent immune serum is forthcoming, the most promising method of treatment would seem to consist in the intrathecal injection of the antipneumococcal serum mixed with a solution of sodium oleate.

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AN INQUEST ON A LEG.

BY

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On April 6th, 1917, J. J., a master miller, disappeared from home. No trace of him was discovered until September 1st, when a fisherman found the remains of a leg in the river. In the hope that the rest of the body might be found the coroner ordered the river to be searched. This proving fruitless, the coroner decided to hold an inquest on the leg, and asked me to examine it and give evidence at the inquiry. The following notes of my examination may prove of interest.

On September 7th, five months and one day after the man disappeared, and six days after the leg was found, I made the examination. On the foot was a boot, which was identified by the village shoemaker as one he had made for the missing man. Under the boot was a stocking foot of blue homespun, joined to the leg portion behind the heel, the greater part of the front of the stocking being torn and missing. The missing man's wife identified the stocking, and also a bandage beneath it found round the ankle. It was clear, therefore, that the leg was that of the missing man.

The remains consisted of all the bones of the lower limb of the right side, more or less denuded of flesh. The femur was bare, except around the knee, from which the remains of the soft tissues, gradually tapering off, reached a point 4 in. above the middle of the patella. The head of the thigh bone, though denuded of cartilage, was undamaged; the neck was thick, strong, and sprang obliquely from the shaft; and all the bony prominences and depressions were strongly marked. The bone was a compact whole, without trace of epiphyses. There was no antero-posterior bowing of the shaft. It was the bone of a man in the prime of life.

The patella was in position, but bare, and, though the fibula was covered and the structures of the calf were present, the anterior surfaces of the tibia were bare, except close to the knee and the ankle. The foot was attached to the limb only by the tendo Achillis. There was no trace of the ankle ligaments, and the articular surfaces of the joint denuded of cartilage were exposed. The foot was shrunken and black, but, protected by the boot, the skin had not disappeared. Over the heel the papillary ridges were visible to the naked eye. Across the sole along the roots of the toes was a ragged cavity filled with soft soapy material, into which the structures had been converted.

The soft tissues of the calf and around the knee were dense and shrunken. An attempt was made to find the popliteal artery, to form an estimate of the man's age from the condition of its walls. But although the thick trunk of a nerve was isolated, the artery could not be found among the dense mass of homogeneous structure into which the soft tissues had been changed. Though the surface of the soft tissues was uniformly black, their substance was changed into dense white structures, and patches of white material studded their exterior.

There was no sign of old or recent injury, but on the upper third of the outer side of the femur the round shaft had been worn flat. The flat, slightly excavated surface was exquisitely smooth, and could have been caused only by long-continued friction, such as would occur if the limb had been caught and nipped, and swayed about by the current of the river. With the foot in its natural position the limb measured from the top

of the great trochanter to the sole of the foot 33½ in. The femur was 17½, the tibia 13½, and the fibula 13½ in. long. Since the inquiry I have learnt that the stature of the man was about 6 ft. 6 in.

When asked by the coroner if the man from whom the leg came was dead I had no hesitation in answering in the affirmative. A leg disarticulated at the hip-joint must have been separated from the body either by some one with anatomical or surgical knowledge, or by the maceration caused by long exposure to the elements. The possibility of its removal by deliberate surgical operation can be dismissed, for surgeons do not remove limbs with hob-nail boots, stockings, and dirty bandages upon them, nor, after the operation, throw them into the river. If the limb had been criminally disarticulated the man was certainly dead. All the factors of the case suggest that the separation of the limb from the body was due to the force of the current of the river, which the macerated tissues were unable to withstand. The smooth flattened surface at the upper third of the femur suggests that the thigh may have been caught with the body hanging free; when, owing to the weight and leverage of the trunk, separation of the trunk from the limb, rather than tearing of the limb from the trunk, took place.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

EMETINE DIARRHOEA.

IN a paper on the treatment of amoebic dysentery, published in the BRITISH MEDICAL JOURNAL of November 13th, 1915, I drew attention to the fact that emetine hydrochloride, given hypodermically, produced diarrhoea in many instances exactly in the same manner as ipecacuanha when used in large doses for the treatment of amoebic dysentery. Since that time such diarrhoea has been described by some as an evidence of emetine poisoning, an eventuality to be avoided. An annotation on diarrhoea due to emetine, published in the JOURNAL of October 6th, 1917, endorses this view, and quotes an observation—a somewhat late one—by Kilgore and Liu, published in the *Archives of Internal Medicine* (Chicago, 1917), calling attention to the importance of recognizing this condition. The same authors make the statement that the diarrhoeic stools due to emetine are almost indistinguishable to the eye from those of the amoebic dysentery for which the drug is given, and that when emetine diarrhoea occurs blood and mucus reappear.

In the old days the *rationale* of the ipecacuanha treatment was to press the remedy until a profuse diarrhoea was produced, the stools then becoming liquid and of a canary-yellow colour. After the cessation of the drug, solidity of the stools was quickly obtained, and to all intents and purposes many of the cases were cured clinically. Whether this was a real cure or not, it is not altogether easy to determine now, because in those days the cysts of the amoebae were unknown and prolonged microscopic examinations of the stools after treatment were not carried out. Some of the cases certainly did relapse clinically and others, in the light of our present knowledge, very likely became cyst carriers.

Since the oral administration of emetine, in the form of emetine bismuth iodide, has come into vogue, diarrhoea has become even more marked than when the drug was given by the needle. This, however, as I have just said, is exactly what one aimed at in giving ipecacuanha. In addition to the specific action of the drug, the bowel is thoroughly washed out, and this mechanical process is beneficial and not detrimental. (Compare the saline treatment of bacillary dysentery.) A few days after the termination of the course (twelve consecutive nightly doses of 3 grains of emetine bismuth iodide) the stools begin to become solid, and in a few days more, if cure has taken place, are formed and of a normal consistence. The liquid stools produced by the emetine, apart from the absence of amoebae and cysts in them, are, as a matter of fact, easily distinguishable from the true dysenteric stools, and there is no excuse for any one pushing the remedy to such an extent as to cause dangerous symptoms and even death. One

might in a similar manner produce equally dangerous symptoms, namely, weakness and collapse, by giving repeated excessive doses of ordinary magnesium sulphate. If the diarrhoea is excessive it can easily be controlled by tincture of opium.

Reappearance of blood during treatment is very rare; when it does occur it is often due to piles, and this source of fallacy must be excluded before it can be said that the blood is coming from the bowel ulceration. As regards other toxic symptoms of emetine, though not denying that peripheral neuritis may occur if the drug is given in excessive doses, I have not yet seen it in a long series of cases treated by ordinary courses.

It must be remembered that all drugs are poisonous if given in too large quantities and over too prolonged periods of time, and emetine is no exception to the rule.

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TREATMENT OF PAINFUL SHINS, FOLLOWING TRENCH FEVER, BY ELECTRO-THERAPEUTICAL METHODS.

EVERY physician connected with troops on active service knows the condition which is now officially diagnosed as "trench fever." He also knows that were it not for the "painful shins" which almost invariably follow, the vast majority of "trench fever" cases would be fit for duty in a very short space of time, whereas, in fact, thanks to these "painful shins," the convalescent stage of the disease is very long and disappointingly prone to exacerbation.

During the early part of last winter I tried many things electrical for the relief of this condition, watching the cases in their wards as well as in the electro-therapeutical department, and by the end of November I had come to the conclusion that the best remedy was ionization combined with faradism. My method is as follows:

Using liquor iodi fort., a patch 1½ in. wide and 3 in. long is painted, well outside and parallel with the anterior border of the tibia, in the middle third of the leg, and ionized for ten minutes, at the maximum of 10 milliamperes, the negative electrode being placed over the painted area, a thick pad well soaked with 2 per cent. sodium salicylate in 3 per cent. sodium chloride being placed between.

On the second day, ionization, with sodium chloride only, is applied over the original site, the negative electrode being placed as before. Ionization is now stopped, and for the next three, and subsequent days, the muscles of the calf and leg are exercised for ten minutes daily with faradism.

As a rule the men tell one at their second or third visit that they have experienced immediate relief from pain; that they have slept better and feel much better in themselves, and where they do not do so the fact soon becomes obvious from their general appearance. I watched the earlier cases for some weeks, keeping them to see if there was any tendency to recurrence, and having satisfied myself that there was not, I proceeded to carry out the above course as a routine.

Statistics of 100 Consecutive Cases received from the Wards for Treatment.

Days under Treatment.	No. of Cases.	Days under Treatment.	No. of Cases.
1	0	10	12
2	3	11	1
3	6	12	2
4	14	13	1
5	11	14	3
6	14	16	1
7	10	20	1
8	15	21	1
9	2	22	1
Sent to England as unlikely to be well in three weeks			2

100

Average stay under treatment=7.50 days.

It will be noted that 2 per cent. were sent to England after treatment had been begun, owing to slow recovery, and that 98 per cent. were sent to duty "A" or convalescent dépôt, the latter means of evacuation being only used where it was thought that the man's general condition required a little longer rest.

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