with general paresis, and perhaps subnormal temperature it might be worth while to try the effect of liquor epispaeticus painted over the whole scalp.

In simple and even in tuberculous meningitis I prescribe, almost as a routine treatment, internal antiseptics, and in such cases I prefer salicylic acid, salol, or benzo-naphthol. A favourite combination with me, especially when the temperature is above the normal, has been equal proportions of Dover's powder and salol; ten grains of each flavoured and suspended in almond mixture every three hours for an adult. The bowels should be kept open throughout the illness, and of all agents for this purpose I prefer calomel, and occasionally enemata. The vomiting is usually of cerebral origin, and any direct treatment to the stomach is generally of little avail; however a sinapism to the epigastrium, and the internal administration of bicarbonate of soda, sal volatile, and creosote frequently does good. The hiccup, which occurs at a late stage, is best relieved by hypodermic injections of morphine, or morphine and atropine. When there is much cardiac excitement with deficient vascular tone, a combination of opium, digitalis, and quinine will be found useful. When there are convulsions the inhalation of chloroform will prove efficacious. In basilar meningitis, when at a late stage there is a tendency to bulbar paralysis, atropine in small doses should be frequently given.

With the use of local or general blood-letting in this disease I have no experience, and in those cases where such a course might be deemed advisable I would rather try the effect of antimony. Depletion might be useful in the early stage if there were violent action of the heart and increased arterial pressure, but such conditions seldom or never occur.

As in other febrile affections, the nasal secretions become dry, inspissated, and irritating; this can be remedied by a spray of 1 or 2 percent. of menthol in paroline. An antiseptic mouth wash should be used, or it answers equally well for this purpose to paint the teeth and gums with a mixture of equal parts of glycerine and tincture of iodine. If some be swallowed the antiseptic action will be further extended.

To relieve cerebral excitement, sleeplessness, delirium, and general restlessness, I have gradually arrived at the conclusion that there is no drug equal to opium very freely administered. It is not a specific for meningitis or anything else, but to it more than to anything else I ascribe my marked success in the treatment of this disease. It puts the patient in the most favourable position for getting well, and renders his brain less susceptible or more resistant to the storm which is passing over it.

My views on this question have gradually undergone a process of development. At first I used Dover's powder and salicylic acid, opium and calomel; now I almost exclusively use hypodermic injections of morphine, and prescribe the antiseptic remedy separately, or even discard it. It is most difficult to poison a patient suffering from meningitis with opium. I would not advise you to try to poison him for fear you might succeed, but I wish to emphasise the difficulty of doing so, and I am convinced that there is more danger to the patient in using it sparingly rather than freely. In one of my most successful cases the patient, an adult, received each day for over a fortnight 6 grains of morphine hypodermically injected. As the patient began to improve the quantity was gradually reduced; but, with a too rapid diminution at first, there was a relapse, which was cured by a return to a larger dose. In one little patient, who only weighed 28 lbs., and who eventually died from tuberculous meningitis with tuberculous ulceration of the bowels, the quantity of morphine was gradually increased up to 3 grains a day. On one occasion I asked my house-physician, "How is it that this patient is not under the influence of morphine?" To which he replied, "Is there to be no limit?" And I answered that the only limit should be the quantity necessary to keep the patient constantly under the influence of the drug. I prefer a solution of morphine, as being more reliable and more uniform in strength than the hypodermic tablets.

I have often had a little difficulty with house-physicians in indoctrinating them into my views; they have generally been educated by therapeutists who are well up in the coal-tar series, and taught to avoid opium in this disease. I generally commence in children over 7 years of age with $\frac{1}{2}$ grain of mor-

phine hypodermically every four hours, and increase the quantity, and perhaps the frequency, as quickly as may be necessary. For children usually about 2 grains a day suffice, but for adults it may be necessary to give 3, 4, 5, or 6 grains daily. For children under 6 or 7 it is perhaps better to administer opium or morphine by the mouth, and to arrive at the requisite dose is a very simple matter. When there is much vomiting it is often an advantage to combine small doses of atropine with the morphine, but if there be much temperature the atropine had better be avoided. At a late stage, when there is evidence of ventricular effusion with a risk of respiratory paralysis, atropine should be given rather freely.

Treatment should be commenced early; when patients are sent into hospital actually dying we should not be expected to perform miracles. I feel confident that if the nervous system were kept absolutely at rest under a free administration of morphine from an early stage of the disease, the mortality would not be so high as it is at present. These views may seem heterodox to many, as the textbooks do not recommend morphine in meningitis, and the few, such as Sir J. Burdon-Sanderson and Professor Osler, who have employed it in cerebro-spinal fever have merely prescribed it to relieve pain.

Diet.—In all these cases there is impaired nutrition, hence the patients should be well fed with light articles of diet, such as peptonised bread and milk, various kinds of children's food, and other articles of farinaceous diet, vegetable juices, grapes, maltine, bread and butter, etc. I always see that the patient gets as great a variety as possible, and as much nutritious food as can be retained in the stomach.

NOTES ON A CASE IN WHICH ANTITYPHOID INOCULATIONS WERE PRACTISED.

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It is important to record at the present stage of this practice the results which are obtained from antityphoid inoculation, both to add to the stock of knowledge respecting it, and, if possible, to encourage its further adoption, in the hope of securing a sufficient degree of prophylaxis against the invasion of enteric fever.

PRIMARY INOCULATION.

A young man, aged 24, about to proceed on tropical service, submitted to a primary inoculation on October 23rd. Professor Wright, of Netley, very kindly supplied some doses of antityphoid vaccine in sealed glass capsules. The patient was confined to bed, and had a pad of lint soaked in mercuric perchloride solution applied overnight to the left flank. Dr. Garratt injected the first dose, about 1 c.cm., at 9.30 A.M., the temperature being below normal, 97.6°, and the pulse 80. The site of puncture was closed by sterilised plaster. Some pricking pain and throbbing ensued at the part, and some slight pain was also felt in the left thigh and round the left ilium. In two hours there was a copious flow of pale urine, and the temperature had risen to 99.4°. There was slight left temporal headache, the skin was generally injected and moist, and after short sleeps the patient awoke in profuse perspiration. At 4.30 P.M. the temperature was 100°, pulse 95. The pain continued in the left flank, was felt in the axilla, and down the left leg. At 6.30 P.M. a patch of vivid redness, 2 inches square, was apparent around the point of injection, with streaks proceeding from it in various directions, as of cellulitis, the sensibility of the patch being much heightened. Pulse 76. Appetite was impaired till the evening, and there was considerable thirst. At 9.45 P.M. the temperature was 99.8°, and the pulse 80. On scoring the red patch with the finger nail white streaks were readily produced.

October 24th. The patient had had a good night's rest. The redness of the patch was as before, and he had a bruised sensation in the flank. At 9 A.M. the temperature was normal. He had had one loose motion. Appetite was good. The urine was natural, though rather dark in appearance, and less in amount than usual, specific gravity 1026, alkaline reaction. About noon the temperature was 99.6°, but fell in the evening to 99.2° F.

On October 25th, he was feeling quite well. The temperature was 97.4°. The patient rose, had a bath, and went out in the forenoon. The bruised sensation in the side remained for four days subsequently.

SECOND INOCULATION.

This was carried out by Dr. Segundo as before, with the same amount of vaccine, also in the left flank, a little lower down, on November 2nd at 9 A.M. The temperature was 99°. There was less pain after the injection. In two hours' time a large amount of pale urine was discharged, and there was some sweating during the forenoon. At 12.15 P.M. the temperature was 100.8°, at 3 P.M. 99.2°, and at 7 P.M. 98.6°. The pulse during the day was 80, bounding, and of moderate tension. The patient felt very poorly for half an hour about 2 P.M. In the evening a fresh patch of redness appeared at the site of inoculation, less marked than on the first occasion. Appetite was diminished, but there was less thirst than after the first injection.

November 3rd. He had passed a good night. The redness persisted, and was spreading round towards the loin. An enlarged gland had appeared in the left groin, and was distinctly tender. A loose motion was passed. The urine was diminished in amount, and darker in colour than usual. Ehrlich's reaction was not obtained in it. The patient was feeling quite well, and went out in the afternoon.

On November 9th an examination of the finger blood was made for Widal's reaction by Dr. Andrewes in the pathological laboratory of St. Bartholomew's Hospital. The reaction was extremely vigorous and well marked even in a 200-fold dilution.

An inoculation was made in a second patient with another portion of the same vaccine. Very similar symptoms followed, and there was slight poorliness for three or four days; the pain in the flank, though not severe, giving rise to the most urgent of the slight inconveniences experienced.

A second inoculation, ten or twelve days after the first, is highly desirable to secure the full benefit of the vaccine.

The points requiring attention in this practice are to secure perfect asepsis and sterilisation of all instruments employed. The patient should remain in bed for two days, and resolve to keep quiet till all reaction has passed off. With these precautions in healthy subjects there appears to be no cause for anxiety as to a satisfactory result. The subject would do well to have his blood serum tested by Widal's process at intervals of three or six months, or, whenever possible, for some years to come.

Lastly, I will express my thanks to the Pathological Department of Netley Hospital for supplying me with the vaccine, and my high appreciation of Professor Wright's public services in promoting this practice of inoculation which appears to hold out promise of a boon not only to the military forces of this country, but to the whole community.

THE RELATION OF LARGE-CELLED INDURATIVE HYPERPLASIA OF THE LYMPHATIC GLANDS TO TUBERCULOSIS.

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PATHOLOGISTS who have made many *post-mortem* examinations on patients who have died of chronic pulmonary tuberculosis, and who have examined microscopically the lymphatic glands, especially in the cervical and bronchial regions, must be perfectly familiar with this condition. Large-celled indurative hyperplasia of the lymphatic glands is distinguished by the transformation of the normal gland tissue into large-celled tissue, having none of the characteristics of the original structure. This large-celled tissue consists partly of rounded and polygonal cells, and partly of spindle cells. If the proper lymphadenoid tissue has not altogether disappeared, the remaining portions of it form reticulated bands pervading the large-celled tissue.

Fig. 1 shows clearly the microscopical structure of a cervical lymphatic gland that has undergone this change. The normal lymphoid tissue stains more deeply than the large-

celled portion, thus coming out in sharp contrast under the microscope. The process of transformation begins probably with an accumulation of leucocytes in the gland tissue, followed by the development of epithelioid cells with large nuclei. Now what is the significance of this large-celled hyperplasia in a lymphatic gland? Is it a tuberculous change? Are we to look upon a lymphatic gland so changed as tuberculous, although there may be no definite evidence of tubercle, using that term in the usual histological sense? The actual frequency of tuberculosis of the lymphatic glands is not easily determined by mere anatomical inspection, and it is often difficult to say whether a given glandular affection is tuberculous or not.

Fig. 1.

Professor Ziegler¹ in his textbook of pathology separates the large-celled hyperplasias from the tuberculous affections of the lymphatic glands, but he goes on to say that it is not unlikely that tuberculosis may assume this type, and that some of the so-called scrofulous inflammations of the lymphatic glands in which no typical tubercles can be found are really due to the invasion of the tuberculous virus.

The following case is, I think, worthy of record as bearing on this question:

E. T., female, aged 7, died in the City of London Hospital for Diseases of the Chest of morbus cordis, mitral and aortic. The *post-mortem* examination was made by myself twenty-seven hours after death.

Fig. 2.

The body was well nourished, and *rigor mortis* present. The heart was hypertrophied and dilated, and gave evidence of old and recent endocarditis which was the cause of death.