from 50 c.c.m. of beer to which 0.0005 gram (= 0.0075 grain) of arsenious acid have been added. Thenarrow tubes are easier to use than the cone when the quantity of arsenic is less than $\frac{1}{16}$ milligram, but examination under a higher power of the microscope is more difficult. The cover-glass method allows of the use of an oil immersion lens for the detection of quantities under $\frac{1}{1000000}$. With a little practice it gives good results which are specially useful for quantitative estimations.

I have not entered into all the precautions to be observed in carrying out the test, because complete accounts will be found in Dr. Taylor's, Dr. Dixon Mann's, and Dr. Luff's excellent treatises. With regard to the carrying out of many of the experiments, I have to thank my friend Dr. Coutts, whose skill and enthusiasm have been of the greatest use to me.

Photographs of arsenious acid sublimates $\times 750$

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, December 1st, 1900. ² Watts's Dictionary of Chemistry, 1888, i, p. 302. ³ Wertheimer, in C. Richet's Dictionnaire de Physiologie, 1895, i, p. 674. ⁴ Clouet, Ann. d'Hygiène Publique, xlix, 1878; Wynter Blyth, Foods, etc., 1896, p. 542.

A NOTE ON THE VALUE OF INOCULATION AGAINST ENTERIC FEVER.

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THE question of the value of antityphoid inoculations in producing immunity against enteric fever has attracted much attention, and its importance, especially in the case of soldiers, can hardly be overestimated. The statistics of the army in South Africa will no doubt in due course be published, and must have great value, but, as everyone serving out there knows, the returns of patients treated in the hospital there are open to so many sources of error that any conclusions drawn from them will be very unreliable. On these points I will not now enter, but I think that the results of the inoculations of members of the staff and establishment of the Scottish National Red Cross Hospital serving in South Africa are of interest sufficient to warrant their publication.

The first section of the hospital, consisting of 61 persons—officers, nursing sisters, and establishment—left Southampton on April 21st, 1900, by steamer *Tanjore* for South Africa. During the voyage out all except 4 of the 61 *personnel* of the hospital were inoculated twice at an interval of about ten days. The inoculations were performed by the ship's surgeon, Dr. Wortabet, who performed the operation with the greatest care, and measured the dose of the virus for each case with exactness. The injections were all made in the flank, and were all followed in from two to eight or ten hours by marked symptoms, both local and constitutional, lasting from two to four or five days.

In many cases the symptoms were just as severe after the second as after the first inoculation. This would seem to show that it takes more than ten days before any immunity is established. Two of the 7 nurses were not inoculated because they had both suffered from enteric fever, and 2 of the orderlies were only inoculated once.

The material for inoculation I had received from Professor Wright at Netley a few days before we embarked, and it was quite fresh. I may add that, out of about 300 troops on board, chiefly volunteers and militia, nearly 100 were persuaded to be inoculated.

Immediately we reached the Cape the hospital was sent up to Kroonstadt, in the Orange River Colony, and remained then as a stationary hospital till the middle of October. During this period there were always many cases of enteric under treatment in the hospital. Further, some of the medical officers and student orderlies had charge of the Kroonstadt Hotel temporary hospital, which was crowded up with enteric cases, and the nursing sisters for three weeks did duty in the military hospitals at Bloemfontein in May and June, when enteric fever was at its worst. There was not a single case of enteric amongst the *personnel* of this first section of the hospital.

The second section of the hospital, medical officers, nurses, and establishment—82 in all—left Southampton in May, 1900. On board ship nearly all were inoculated, but many of them only once. The material for inoculation had been on board for some time, and was not so fresh as in

the first instance. Of this second section, one nurse had enteric at Kroonstadt. She was the only one, out of a total of 36 nurses, who suffered from enteric, and she was the only nurse who was not inoculated, excepting the 2 who were protected by a previous attack of enteric. A third section of the hospital, consisting of 4 medical officers and 16 nurses, went out in July; they were all inoculated, and none of them had enteric.

Of the second section 5 orderlies had enteric fever at Kroonstadt, of whom 2 died. Of these 5 there were 2 inoculated (once) and 3 non-inoculated. Of the 2 who died 1 had been once inoculated, the other had not been inoculated.

At the end of August Dr. Dodgson, who was deputed by the Director-General of the Army Medical Department to examine the results of the antityphoid inoculations, came to Kroonstadt, and was good enough to examine the blood of a number of the staff and establishment by Widal's test.

Of the first section who had been inoculated four months previously, he tested the blood of 23. Of these, 21 gave good reaction with dilutions ranging from 1 in 40 to 1 in 500; 2 gave only slight reaction—these were the two orderlies who had only been once inoculated.

Of the second section of the hospital who had been inoculated only three months previously, the blood of 22 was tested. Of these 11 gave no reaction, 9 gave very slight reaction, and only 2 gave good reaction.

It would appear from the above that the members of the first section were much more fully protected against enteric than those of the second section. None of the first section got enteric, though very much exposed to its influences, also the blood of all those examined showed good reaction to Widal's test. Among the second section there were 5 cases of enteric, of whom 3 had not been inoculated, and the other 2 had been only once inoculated; also the blood of 22 tested gave very slight or no reaction to Widal's test. It is not quite clear why the inoculations were so much more effective in the first than in the second section. Probably the freshness of the material had an influence; also I think that with the first section the dose for each individual was more exactly measured. As far as I could learn, the members of the first section suffered at the time more severely from both local and constitutional disturbances than those of the second.

The results above given are, I think, very strong evidence in favour of the protective power of the antityphoid inoculation, when the inoculations are very carefully performed, and they point to the necessity for two inoculations at a suitable interval.

During the period of five months that the hospital was stationed at Kroonstadt there were 92 admissions for enteric fever, and 11 deaths. Of the 92 cases, 15 said they had been inoculated, a few were doubtful, and about 70 had not been inoculated. Of the 11 deaths, 1 had been inoculated once, the others had not been inoculated.

From these figures I do not think that any conclusions or even reliable inferences can be drawn. One knows nothing as to the relative number of men inoculated or not in the different corps from which the patients came. Some of the men on admission were not in a condition to say whether they had been inoculated or otherwise. In not a few cases the patients did not know whether they had been vaccinated or inoculated against enteric, as on some of the ships the inoculations against enteric were performed on the arm. There are many other sources of error which I need not go into, but I fear that any statistics bearing on this question, derived from the hospitals in South Africa, will not be of any great value. At the same time, I feel convinced from the cases I saw in the hospital that the attacks of enteric were as a rule milder in the inoculated than in the non-inoculated, and the duration of the disease was much less.

CHILDREN'S HOSPITAL, NOTTINGHAM.—On December 17th, a new building was opened at Nottingham for the Children's Hospital. The building is an adaptation of a large country house, situated in $\frac{3}{4}$ acres of ground near the centre of the town, both being the gift of Mr. T. J. Birkin, J.P., who also contributed £3,000 towards the necessary alterations and additions. A new pavilion ward, with smaller wards and an operating theatre have been added with a detached outpatient department.