

are necessary to be effective. The first inoculation should consist of half a dose, i.e., 500 million dead bacilli, the second inoculation should be made ten days later and consist of 1 dose or 1,000 million dead bacilli.

#### EFFECTS OF VACCINATION.

Two or three hours after inoculation tenderness develops about the site of inoculation, reaches its maximum in about 12 hours, and vanishes, as a rule about 40 hours after inoculation. At the same time there is some rise of temperature accompanied by stiffness of the back and limbs, headache, loss of appetite and nausea, lasting 24 hours or so.

About the end of the first week considerable quantities of typhoid antibodies will have developed in the blood as a reaction to the vaccine. These newly-acquired properties rapidly increase and reach their maximum on the third day after the second inoculation. The vaccine is usually effective for two years or more.

The vaccine should not be administered to a person who is fatigued, and following the injection, the more strictly one rests for a day or so, the less discomfort will follow.

#### METHOD OF ADMINISTERING THE VACCINE.

The vaccine is injected, by means of a hypodermic syringe, into the subcutaneous tissue of the left arm near the insertion of the deltoid muscle, or into the fleshy part of the breast. The skin over the area of injection is first painted with a 10 per cent. tincture of iodine and after the needle is withdrawn it should be wiped with cotton soaked with alcohol and then flamed in a lamp.

When the first Canadian Expedition-

ary Force was in the concentration camp at Valcartier, 27,000 men submitted to antityphoid vaccination. This involved 54,000 injections, probably the largest number on record up to that time in one place at one time. The serum was prepared by the Ontario Board of Health, Toronto. No cases of severe constitutional reaction nor any infected arms, followed the injection.

#### PARATYPHOID FEVER.

In addition to the true typhoid fever which is caused by *Bacillus typhosus* there is a fever which very closely resembles it but is usually milder in type and shorter in duration, known as paratyphoid. Again there are two varieties of paratyphoid, known as paratyphoid A and paratyphoid B, each caused by a different variety of bacillus, known as *Bacillus paratyphosus* A and B respectively. The former is very common in India and the latter common in Germany. The vaccine prepared from *Bacillus typhosus* will not protect against paratyphoid A or B. Vaccines for these have to be prepared from the respective bacilli which cause the disease. Quite a number of cases of dysentery and apparently of typhoid fever developed amongst the troops at Gallipoli who had been vaccinated against typhoid. Investigation showed that the suspected typhoid cases were, however, mostly, if not altogether, paratyphoid A, which was likely introduced by the troops from India. Cases of paratyphoid B have also occurred among the men vaccinated against the true typhoid. To prevent such cases occurring a multiple vaccine is now prepared, using cultures of *Bacillus typhosus*, *Bacillus paratyphosus* A and *Bacillus paratyphosus* B.