

have gone on to well-developed suppuration, yield pus free from plague bacilli and as the only sure means of diagnosis in a doubtful case is the bacteriological, the study of a suppurating bubo is likely to yield no certain results. Examination must be made before suppuration develops and if this is not possible, recourse should be had to the agglutination test, for in the later stages of the disease the blood gains agglutinating properties. A drop of blood collected, as in Wyatt Johnston's method for typhoid fever, and sent to a bacteriological laboratory, may thus afford valuable information. In the earlier stage of the bubo, as already indicated, and in the surrounding sero-sanguinolent fluid abundant bacilli are present.

Passing from these cases of "Pestis minor," before indicating the main symptoms of the more virulent disease, a few words may be said with regard to the specific microbe and to the essential nature of the plague process.

THE PLAGUE BACILLUS.

The bacillus which was discovered by Kitasato during the epidemic in Hong Kong in 1894, has been abundantly proved to be the specific cause of the disease. It is present in large numbers in the buboes in the early stage of the disease and in the hæmorrhagic cedematous fluid surrounding them. It is from these that the bacilli can be obtained in the greatest abundance and diagnosis be made without difficulty. In well marked cases it is present also in the blood but here the individual bacteria are few and far between in any given specimen, and thus the failure to discover them in the blood is not by any means a positive indication that the individual is not suffering from the disease.

These bacilli are short and thick, with rounded ends and when grown outside the body frequently occur in short chains and from the deeper staining of the ends tend to appear like diplococci; they do not stain by Gram's method. They grow best at blood temperature upon all the ordinary media. The most characteristic growth is in slightly alkaline peptone broth, and more especially, as Hankin has pointed out, when a little butter fat has been added. The bacilli tend to grow round the fat droplets upon the surface and falling down form long festoons or stalactites, the old growths gradually accumulating at the bottom as a granular or grumous deposit, while the medium remains clear. Grown outside the body involution or degeneration forms show themselves with fair rapidity, and as Hankin points out, this tendency to involution may be made a means of rapidly identifying the microbe. If this be inoculated upon agar containing from 2.5 to 3.5 per cent. of common salt, involution forms will be found in an unmistakable way after a lapse of 24 hours. Hankin and Leumann have cultivated a large num-