

With two exceptions all the cases admitted during November had suffered from attacks of influenza. The large number of cases admitted that month was undoubtedly due to the great number of men in the temporary hospitals during the epidemic of influenza which occurred in the camp at that time. With every available building in use as a hospital a considerable degree of congestion of influenza cases was unavoidable, and no steps could be taken to identify and isolate meningococcus carriers.

It is not necessary to detail the symptoms of disease, but two distinct types of cases could be distinguished—the meningeal type and the septicæmic type. In the former the meningeal symptoms predominated, and loss of consciousness occurred early in the disease, generally within twelve hours of the onset of the symptoms. Of these cases 6 were unconscious on admission to the cerebro-spinal meningitis ward. Within twenty-four hours after the commencement of treatment consciousness had generally returned, and with the exception of one all recovered, so that rapid loss of consciousness is not necessarily an unfavourable symptom provided treatment is commenced early.

In the septicæmic cases the meningeal symptoms are not prominent. In 5 of the cases the meningococcus was found in the blood and was not at any time found in the C.S. fluid. The following case may be taken as typical of the milder form of this type of the disease. The onset was acute, and the most characteristic symptom was the occurrence within a few hours from the onset of the illness of a hæmorrhagic rash. This was most frequently seen on the arms and legs, especially on the extensor surfaces and in the gluteal region. In the severe form—the so-called fulminating cases—the hæmorrhagic spots increased rapidly until purple areas 2 in. or 3 in. in diameter were scattered over the legs and arms, and very numerous spots were present on the body. The most rapidly fatal were three cases of this type. The first two of these men died within eighteen hours of the first onset of the disease, while the other died after thirty hours' illness. In each of these cases the man was conscious till within an hour or even less of his death. One case (26) may be specially mentioned. Ten days before admission he had an attack of influenza. On the morning of admission he had a rise of temperature with hæmorrhagic rash. There was no headache, no vomiting, no rigidity of neck or Kernig's sign, or other symptom of meningitis. A specimen of his blood was found, after only twenty hours' incubation, to be swarming with meningococci. It was not until the evening of the third day after admission that vomiting and slight stiffness of the neck occurred. A lumbar puncture was done, and the C.S. fluid was found to be slightly turbid and to contain pus and meningococci. At this stage Kernig's sign was not present, though it developed later. He subsequently died. This case clearly shows an initial blood-infection which was followed by meningitis. The contrast between this case and those typical of the meningitic type of the disease is very marked.

DIAGNOSIS.

In 23 out of 36 military cases the meningococcus was found in the C.S. fluid. In 5 others, although no organisms could be detected in the C.S. fluid, the fluid contained an excess of polymorpho-nuclear leucocytes. In 2 cases no L.P. was done, while in 2 others the examination was negative. In 8 cases, therefore, the diagnosis was not definitely confirmed by the discovery of the meningococcus in either the blood or the C.S. fluid. Of these 6 occurred in November. It was very unfortunate that the staff of the bacteriological laboratory was much depleted during the influenza epidemic, and especially that Lieutenant Ross was ill during the whole of the time the cases were occurring. The great rush of the work during the epidemic and the depleted staff probably accounts for some of the negative results. The symptoms and signs in all the cases were so typical and so similar to those in which the meningococcus was found in either the blood or C.S. fluid that no other diagnosis could be arrived at.

PATHOLOGY.

Bacteriological examination of either C.S. fluid or the blood or both was made in all the cases. Blood cultures were made from 24 cases. The meningococcus was found in 13 of these, or 54 per cent. This is a much higher percentage than is usual. Muir and Ritchie state, "In a certain number of cases it [the meningococcus] was obtained from the blood during life, but cultures in most instances give negative results" (p. 242). Foster and Gaskell mention that "Elser and Huntoon were able to grow it in 11 out of 41 cases." The successful cultures made in camp were in all probability due to the early stage of the disease at which the blood was taken for examination. It was a routine practice that a blood culture was made as soon as possible after admission to the ward. The Medical Officers were on the lookout for these cases, and any man presenting suspicious symptoms was carefully watched. The result was that practically all the cases were under treatment within twelve hours of the onset of symptoms. I am strongly of opinion that these results would have been even better had the laboratory staff not been so depleted by the influenza epidemic. The fact that the ward was situated some distance from the laboratory may also have resulted in failure in one or two instances, and owing to the cooling of the culture medium in transit to the laboratory. In any case, with the best of arrangements, there will always be a large percentage of failures in blood culture, for it is not possible to procure more than a very minute percentage of the blood of a particular patient. A negative result in the blood culture is not nearly so significant as a negative result in the C.S. fluid, of which an amount may be withdrawn which is considerably in excess of the normal quantity of that fluid.

These results have an important bearing on the question of the route by which the meningococcus reaches the sub-arachnoid space. Two principal theories are held: (1) That the organism reaches the sub-arachnoid space by the communication which has been shown to exist between the