

of transference from one susceptible person to another is necessary to raise the pathogenicity of the organism to its full pitch. A simple and direct influence which the existence of coughs and colds in a community must exert is the increased scattering of organisms from the throat during the act of coughing, and doubtless this is no small factor in the spread of the meningococcus as a sequel to catarrh-producing diseases. It is possible then to reconcile the obvious influence exerted by measles and pneumonia on the meningococcal epidemic with the absence of co-ordination as regards prevalence of these diseases.

ASSOCIATION BETWEEN CEREBRO-SPINAL INFECTION AND PNEUMONIA.

In the report of the Public Health Committee it is pointed out that there was a very close relationship between the pneumonia which proved such a fatal complication of measles in both camps and the presence of cerebro-spinal meningitis. The two agree as to the distribution in the camps and show the same variations in incidence. At Trentham the cases of pneumonia which occurred in May and June prior to the appearance of meningitis were simple, and yielded a comparatively low mortality. With the appearance of meningitis the pneumonia became very virulent, with a high mortality for the rest of the year. At Featherston the cerebro-spinal meningitis appeared early in the year, and there was a corresponding incidence throughout of a very fatal pneumonic complication in the measles cases. There is a similarity between the two diseases as to age-incidence and as regards the influence of occupation. Both were most prevalent amongst newly arrived recruits. There is evidence also of personal association between individuals suffering from pneumonia and those affected by cerebro-spinal meningitis. Bacteriological confirmation of the supposition that this pneumonia was a manifestation of the meningococcus has been given by Major Hurley, who found the organism frequently in the sputum. This observation has also been confirmed in the Dunedin Laboratory by Professor Champtaloup, who detected it in the sputum of a man suffering from pneumonia, who was taken to the Dunedin Hospital while on leave from Trentham Camp.

In some cases the use of meningococcal vaccine in these pneumonias was followed by beneficial results.

Finally, we have clinical evidence that cerebro-spinal meningitis can result from contact with the pneumonia form of infection, and *vice versa*, in the following cases:—

(1.) Private M. entered hospital with measles in the middle of November. About the 1st December he developed acute pneumonia, and died on the 10th December. His mother, who was admitted to see him when his illness became acute, developed cerebro-spinal meningitis, and died on the 5th December, after two days' illness. It is worthy of mention that a child in the house in which Mrs. M. stayed shortly afterwards developed measles.

(2.) Private H., N.Z.M.C., was an orderly in charge of the ward at Featherston in which several severe cases of pneumonia were under treatment at the beginning of December. He was not in contact with the cerebro-spinal meningitis cases, which were treated at the racecourse buildings; yet on the 12th December he developed symptoms of meningitis, and died in six days.

There is, then, sufficient evidence of the identity of the infective agent in the two diseases to warrant their classification together under the general term "meningococcal infections."

DISTRIBUTION BY REINFORCEMENTS.

The infection was widely spread throughout the Reinforcements, although in only a few did the disease affect more than one or two individuals. The infection was present but did not spread, indicating that the conditions were for the greater part of the year adverse to the disease becoming epidemic, probably due both to the satisfactory sanitary condition of the camps and to the well-known infrequency of persons susceptible to meningococcal infection. Three units—the 10th, 13th, and 24th—escaped entirely. The latter unit, however, did not mobilize till January, so that it was only the officers and non-commissioned officers who so escaped. The non-commissioned officers mobilizing prior to the unit were not, however, wholly immune to infection, as 2 cases of meningitis and 1 of pneumonia were recorded amongst them. No instance of infection of an officer occurred.

One case was reported from the Engineering units at Trentham. In the Permanent Staffs 2 cases occurred in each camp. Infection appeared in six of the units whose whole training is carried out at Featherston—the Mounted Rifles and Artillery. That these units were affected is strong evidence against a somewhat widely held belief that the infection originates only in Trentham.

The units which suffered most were naturally those mobilizing in the wet, cold, winter months, when predisposing catarrhal diseases are prevalent and climatic conditions induce men to crowd together inside buildings.

At first there was little evidence of the infection being carried from one camp to the other. Thus the 17th Reinforcements had 10 cases of infection at Trentham and but 2 at Featherston. The 18th Reinforcement, which suffered most severely at Trentham with 18 cases, only yielded 1 case while at Featherston. With the 19th and 22nd Reinforcements, however, there seems some evidence of transference of infection from camp to camp. On examination of the details of movements of these cases it is often difficult to judge at which camp the infection was contracted. In a few cases it is evident that a man contracting the disease while at one camp developed it on arrival in the other. These, however, are the exception, and taking it all round the occurrence of disease in the one camp appears not to have affected the other to any extent.

Both types of infection were, roughly, 20 per cent. more prevalent in Trentham. However, in the case of the 20th Reinforcement, which mobilized in the middle of August at Featherston,