

demic through the Pacific it is certain that the Natives suffered far more severely than Europeans. Presumably this susceptibility is due to a lack of inherited and acquired resistance to invasion by catarrhal infective organisms—a resistance which comes to the town dweller in greater or less degree at the cost of an endless succession of those mixed infections popularly called “colds.”

Incubation Period.

So far as any evidence on the matter has been forthcoming during the outbreak of influenza in New Zealand, there is nothing to indicate an incubation period of more than forty-eight hours. In some cases it was under thirty-six hours and in other cases even less.

Period of Infectivity.

There was evidence that the cases were very infective in their earliest stages. Infection was known to be transmitted within twelve hours of the beginning of the attack—before the symptoms were such as to enable a diagnosis to be made. There is some evidence that infectivity ceases at an early stage. Certainly among the attendants in the temporary convalescent hospitals no case of infection has been recorded. The patients were sent to such hospitals about the seventh or eighth day in the average case, so that it seems probable that the infective period was over during the first week.

Channels of Infection.

As regards “carriers” we have little evidence. In one case investigated there was some reason to suspect that infection was introduced into an isolated house by a person who had recovered some three weeks before; but one cannot in such cases be sure that all other channels of infection were closed. In two cases reported there was some evidence of infection being carried by letter. One of these, reported by Dr MacNaughton, of Samoa, was a Native living in a group of islands in the Pacific who developed pneumonia shortly after receiving a long letter from a Native friend in hospital at Narrow Neck Camp. No other possible source of infection could be traced, and this was the only case on the island. Possibly the virus, although readily destroyed by drying, might survive for a short time if sufficiently imbedded in inspissated mucous and kept, as in a folded letter, away from light and air. The conditions would require to be unusual, and the evidence is at best inconclusive. The evidence generally is wholly in favour of direct conveyance of infection from person to person by means of minute air-borne droplets of saliva scattered in the act of speaking, coughing, &c.

Bacteriological Features.

Bacteriological observations during the second wave were, unfortunately, much limited owing to the depletion of staffs in hospitals and camps. The bacillus of Pfeiffer was detected in both the first and second waves, but during the second outbreak the report of the Professor of Bacteriology at Dunedin University indicates that it was less in evidence in the earlier cases of the acute infection, but became more prominent again as the epidemic waned. Dr. Pearson, at Christchurch, found it in the pneumonic cases during the epidemic.

Pneumococci and streptococci—the latter of which tended to take on a diplococcal form—were found by all observers, but were not confined to the secondary outbreak, since the Government Bacteriologist reported that he had found both organisms in cases occurring in the military camps and the Wellington Hospital prior to October.

The fact that a certain degree of immunity against the second wave of infection was produced by a recent attack of the primary-wave type of influenza establishes the bacteriological identity of the two outbreaks. It is of some interest to recollect that this diplococcal streptococcus was a feature in the pneumonic outbreak among troops in the New Zealand transports calling at American Atlantic ports in 1917. These pneumonic cases were preceded on that occasion by attacks of measles. Associated with influenza—which is a disease against which there is little acquired protection, and therefore enjoys a wide field of activity—this streptococcus has every opportunity to acquire, through rapid transference from case to case, a high degree of virulence, and doubtless this is what occurred. There was no reason to believe that we were dealing with any infective organism other than those usually associated with catarrhal outbreaks. In this case, however, conditions throughout the world had been favourable to these organisms attaining an abnormal infectivity.

Immunity conferred by Previous Attacks.

Evidence that infection a month or two earlier during the first wave did not confer complete immunity from infection of the second-wave type was abundant both in camps and elsewhere; but the Principal Medical Officers, both at Trentham and Featherston, found evidence that there was a certain degree of protection—at least, against the more severe complications—conferred by the primary attack. Instances were not uncommon in civil life in which the members of families who had been the sole sufferers during the first outbreak were alone free from infection in the second. Dr. Pearson, Bacteriologist at Christchurch, found in November evidence of partial immunity in persons infected as far back as September. Dr. C. S. Davis, Medical Officer to the Maoris at Waipapu County, in a very complete report on the epidemic as it affected the Waipiro Bay district, found that those who had recovered from the earlier epidemic of August and September suffered much more lightly in the November outbreak. Indeed, in his district the earlier wave was the more fatal of the two. Dr. Weeks, also reporting from Tolaga Bay, says the Maoris who suffered most in the first outbreak were little affected by the second. The evidence from the camps suggested that this immunity was evanescent and became very slight after eight weeks. The general experience seems to be that country dwellers suffer more than town dwellers in such pandemics, so doubtless there is a certain degree of permanent immunity derived from repeated invasions by catarrhal infections.