

to the south of the city certain independent urban populations (Otahuhu, Papatoetoe, Papakura) are functionally very closely connected with its life. The remainder of the district is semi-rural, although there are numerous small urban aggregations scattered here and there.

The course of the epidemic is shown on the graph (Fig. I, page 93), in which distinction has been drawn between the three main subdivisions of the district as described above. The initial peak occurred in December, 1947, and a similar flare up but with only half as many cases followed in January, 1949. Between times, in the middle of 1948, there was a moderate build up of cases affecting all areas. The similarity of the curves for the city area and for the semi-rural districts outside is interesting. Most of the early notifications were from Auckland itself, but Papakura, nineteen miles to the south, and the remote country district of Hunua, thirty miles to the south-east, produced cases at the very beginning.

IV. INCIDENCE IN DIFFERENT AREAS

The graph gives a misleading impression of the relative intensity with which these areas were affected. By the end of April, 1949, a total of 345 cases had occurred, equal to 9.8 per 10,000 population. They were distributed as follows:—

- (a) Auckland urban area: 218 cases, or 8.0 per 10,000.
- (b) Otahuhu, Papatoetoe, Papakura: 30 cases, or 21.5 per 10,000.
- (c) Remainder (semi-rural): 97 cases, or 15.4 per 10,000.

It will be seen that the incidence was almost twice as great in the semi-rural areas as in Auckland itself, but that the urban areas lying between city and country were affected more heavily still.

The next illustration (Fig. II, page 94) shows this in greater detail. It covers the period to the end of 1948 only. Cases are shown by age groups.* The incidence in Papakura was remarkable, 5 cases per 1,000. In form generally the figures for the different areas have little in common, but there is one consistent feature which is of considerable interest. Scrutiny will show that as the incidence increases from Auckland, through the semi-rural districts, through Otahuhu and Papatoetoe, to its climax in Papakura, so the length of the column for the 5- to 10-year olds in either sex grows too. In other words, there appears to be a positive relationship between the incidence as a whole in any area and the incidence in this particular age group. Children of this age are peculiarly situated in regard to infection and immunity. No child under the age of 10 in 1948 can have passed through the 1937 epidemic: above that age the majority must have had some opportunity of acquiring immunity at that time or in previous outbreaks. The pre-school child, however, has relatively few opportunities of becoming infected at any time. If, therefore, we find that the 5- to 10-year-old group produces few cases during the epidemic, the presumption is that it must have gained immunity during the preceding inter-epidemic interval. Study of Fig. II therefore suggests that a lighter general incidence in some areas than in others may be due to more effective circulation of the virus in these areas between epidemics, and that the converse is true of areas which suffer heavily.

* Figures for age and sex composition of these populations are not available. Cases in each age group have therefore been related to the total population in each area. In other words, the graphs have been constructed as if the populations concerned were equally distributed between the eight age/sex groups. The principal effect is to exaggerate the importance of cases amongst "over 15's."