immunity in vaccinia.^{*} Occasionally even during inter-epidemic times some one throws a pukka reaction and comes to notice as a "sporadic" case; various factors might account for this—abnormally low resistance, heavy dosage with the virus, some intercurrent condition which aids the virus, or its own temporarily exalted virulence. When an epidemic occurs, three types of reaction are seen in varying proportions. Those who have never been infected before react to the virulent organism by developing the disease in classical form—a "typical primary reaction." Those with limited immunity from a minor attack a long time before find themselves in hospital as "positive cases" with little or no paralysis or paresis (comparable with the accelerated reaction). Those with good immunity have a minor illness of limited duration, like the well-protected person who on being revaccinated develops a " reaction of immunity."

To take the analogy a little further, everybody knows that primary vaccination in later life is much more severe in its effects than vaccination in childhood. I think the same thing happens in poliomyelitis. For some reason the tissues of the adult react more violently to first contact with some viruses than do the tissues of a child. The average age at death of the fifteen fatal cases in the Auckland district was 22 years; two-thirds were aged 20 or older, although less than one-fifth of all cases came from this age group.

The cycle of poliomyelitis in the community may be regarded as a process of active immunization with a living but attenuated virus, interrupted every ten years or so by one of nature's experiments in which widespread and almost universal inoculation is carried out with a virulent organism. During the "experimental phase" the most closely settled areas came off best, because they have been the most effectively immunized. Distribution of the organisms is, apparently, mainly excremental, and I have suggested that dust spread may be important. It seems as if too great an anxiety to protect a child during the latent periods between epidemics from the ordinary contacts of every-day life may do more harm than good.

If my observations on the incidence in schools are published, some misguided person will no doubt suggest that it would be a good thing to close up half the sanitary blocks in schools and remove all the hand-basins. That would be putting the clock back with a vengeance; although it might, indeed, have some effect on the poliomyelitis incidence: poliomyelitis is unknown amidst the squalor of primitive Asiatic communities, although there is evidence that the organism itself is not lacking. Poliomyelitis seems to be one of the penalties we must pay for bettering our sanitary condition generally; it is a phase we must pass through. In course of time, humanity will adapt itself. It is certainly a lesser evil than the diseases we have abolished by improving our sanitary environment.

There is probably a considerable difference, in any case, between the effects of crowding and poor sanitation during an epidemic and in the intervals. Attention to personal hygiene may not give absolute protection during an outbreak, when spread appears to pass all barriers. But it is the only measure by which the individual can hope to reduce the dose of virus which he himself is likely to get. It may for aught we know make all the difference between a minor attack and life-long paralysis. It is probable that the usual and now familiar precautions taken during an epidemic have no effect whatsoever in reducing the total number of persons ultimately affected; but they may reduce

^{*} I am aware, of course, that the latter is now regarded as being merely a sensitivity reaction to the lymph which can have no real equivalent in policy policy. Nevertheless, a true reaction to the virus probably occurs also, even though it may not be the reaction which we see.