

Yet although the existence of these conditions was such as to make possible the exhalation of the virulence of the organism concerned in the primary epidemic to the pitch necessary for the production of the violent explosion of November, there are certain features in the history of the latter which make the problem a more complicated one. It is scarcely conceivable, for example, that the conditions in New Zealand were such as to exhalt the existing virus during September and October to the same extent as would be the case in Britain to which huge masses of troops were daily arriving from overseas. Nor could we compare the climatic conditions prevailing during these months in countries so widely different as Holland, Peru, and New Zealand.

Examining the conditions in the Dominion alone we find reason to doubt whether the second wave was the result merely of simple increase in virulence of the primary infective organisms.

It would be difficult, for example, to explain why the localized outbursts of high virulence which were recorded in August among the Natives did not spread and develop into the second wave. Nor would this theory account for the fact that, though there appears to have been a tendency to increase of virulence both at Auckland and Otago during September, it was from Auckland that the secondary wave spread. Some additional factor, then, was added during September or October to the forces which already were encouraging a recrudescence of the epidemic, and this factor was of such potency that it produced an epidemic of explosive type. We have already seen that in its earliest stages the secondary pandemic wave was associated with shipping activities, and we also have the evidence of the history of the epidemic in Australia, pointing to the fact that the additional factor required was carried from overseas during October. The stringent quarantine regulations adopted by the Commonwealth on the 17th October certainly delayed the development of the secondary wave of virulent influenza, though it was not able to prevent its appearance some three months later. The Australian experience suggests that, though the primary infection had all the potentialities for a violent recrudescence, the factor from overseas was able to accelerate the increase of virulence of the existing organisms so as to produce an outburst of explosive violence very much sooner.

Newsholme points out that the war conditions in Britain in 1918 resulted in successive accretions of infective of exhalted virulence being added to the already existing infection, and accounts thus for the outburst of October. In a degree proportional to our population we were receiving in New Zealand similar accretions of infection during the latter half of 1918, and doubtless this would account for the rising virulence in September and October. But this massing of infection would not be equally distributed in all countries visited by the November outburst, so it seems probable from a comparison of the pandemic in these countries that during these months there was being distributed over the world a more specific type of infection, and that this infection was not introduced in epidemic form, but as a more or less dormant virus, which required only admixture with the already existing active influenzal organism, under the favourable conditions which we have already questioned, to produce the explosive type of outburst of unusual intensity which characterizes the secondary wave the world over. It is not necessary to assume that this specific type of infection was other than one or more of the organisms usually associated with catarrhal epidemics. The features which would mark it as a specific type of infection require only that it should be of exhalted virulence, or have unusual potentialities for exhalation of virulence, given a suitable nidus. The nidus, we know, existed in all civilized countries in September and October.

It is not impossible that a strain of pneumococcus or streptococcus such as was found associated with measles in the American camps in 1917 should take on these peculiar characters, and that when living in symbiosis with influenzal bacilli, and with each other, should acquire potentialities for an outbreak such as that which visited New Zealand in November; nor is it impossible that such organism should be distributed by "carriers" who had themselves recovered from prior attacks of influenzal infection of pneumonic type.

We need only quote the now well-recognized example of the meningococcus to establish the existence of such possibilities as to carriage, and as to potentialities for evil when favourable symbiotic conditions are established.

Introduction of Specific Type of Infection to New Zealand.

Assuming, then, that this distribution was taking place, it remains only to inquire how the special virus may have been introduced into New Zealand. In making this inquiry it is necessary to remember that it is possible, and, indeed, probable, that these organisms of specific virulence might remain more or less dormant for a considerable time. They might not at first find the exact conditions necessary for their full development. Taking again the analogy of the meningococcus, we know that this organism requires not only aggregation of susceptible persons, but also it is necessary that acute catarrhal infections, such as measles or influenza, should be prevalent among these persons.

Probably the same laws govern the growth of these pneumonia-producing organisms, which thus might be widely spread before their potency was revealed. On this theory we could account for the absence of a definite world wave spreading from country to country which was a feature of the second pandemic. Naturally, successive additions of infection of increasing virulence would tend to produce a more severe outburst, as pointed out by Newsholme. As we have been able to trace the November outburst to Auckland in October, we must seek there for evidence of the introduction of these exhalted strains of infection.

Influence of the Arrival of the "Niagara."

Popular opinion attributes the whole outbreak to the arrival of the mail-steamer "Niagara" on the 12th October. This is not surprising, since this vessel had many cases of influenza on board, some of them of severe type, and she arrived just as matters were working up to the point of an explosion of infection. Without a careful study of the conditions prior to her arrival it is