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### The Influenza Problem.

THE widespread recrudescence of influenza in this country, although on a less fatal scale and of a less virulent type than in the experience of 1918-19, is an unpleasant reminder of our present helplessness in respect of this disease. Many volumes have been written about it. The old Local Government Board issued two reports by Dr. Franklin Parsons, which summarised all we then knew of the epidemic of 1890, and did much to expand our knowledge; and we have now before us an even more portly tome of nearly 600 pages upon the subject, issued by the new Ministry of Health. This report contains valuable historic material, an admirable clinical study of the disease, and suggestive speculations on the statistical aspects of the problem presented by it. These forcibly impress us with the imperfections of statistics dealing with altogether imperfect material. But we cannot be said to have greater knowledge of the disease, from the point of view of preventive medicine, than when Dr. Parsons's reports were issued. This is no reflection on the Ministry of Health; for in every civilised country investigators have similarly drawn a blank so far as guidance for the prevention of the disease is concerned.

We know certain elementary facts which, if they could be universally applied in practice, would prevent influenza from spreading; for the disease is infectious, and it is practicable to lessen the public opportunities of infection by avoiding unnecessary assemblies of people. But how can we avoid infection in social and business life, in view of the early

infectivity of the disease, the failure to recognise mild attacks, and the short incubation period, which multiplies centres of infection at a very rapid rate? We commonly fail to prevent the spread of ordinary catarrhs; and this is an index of our incapacity or inertia in relation to the more serious disease.

The mere enumeration of matters concerned with influenza on which we are still ignorant is an almost tedious task. Let us attempt it partially. We know that at uncertain intervals influenza marches, or rather flies, through the world, without any known reason. The epidemics in this country of 1803, 1833, 1837-8, and of 1889-92, are well known, but many occurred in previous centuries, and some have even asserted that the sweating sickness was a type of influenza. We know that when influenza becomes epidemic it tends to recur in secondary and tertiary waves, as in our recent experience. The present outbreak is the fourth since 1918. Dr. Brownlee has given interesting evidence pointing to an appearance of law in the intervals after which recurrences occur; and we may hope to hear more from him on this point, not only as regards this country but also for other countries, as to whether this law holds good internationally.

Knowledge of the natural history of these outbreaks may be expected eventually to give some clue to prevention, though this is not yet visible. But it is not known why influenza takes on a world-wide march at irregular intervals. We may assume that endemic influenzal infection of low virulence and infectivity, for some unknown reason, changes its biological characters, and that one or both of these characteristics may become enhanced; but why? Attempts to associate pandemics with special meteorological conditions have had little or no success; and we are little further advanced than when Sydenham appealed to the "epidemic constitution" of certain years.

As an alternative to the acquirement of enhanced biological properties by the contagion of influenza may be cited the evidence of importation of infection and the rapid spread of the disease from country to country; but this merely puts the practical difficulty further back. Why this exceptional spread from country to country, and why does not influenza prevail, like measles, every second year in a given urban community?

Further light would be more easily obtainable if we were certain that the Pfeiffer bacillus is the true causal agent of influenza; it is not dispossessed from this position, but the evidence of bacteriologists in recent outbreaks has not strengthened its position; and although bacteriologists have isolated the

bacillus from secretions of influenzal patients and grown it in separate culture, they have failed in the crucial test of inoculation in animals to reproduce influenza.

This brings us to our next difficulty. In the absence of a certain bacteriological test, a further obstacle is that there is no characteristic symptom in influenza, like the rash in scarlet fever, or the throat membrane in diphtheria. On the contrary, what is supposed to be influenza assumes several types. At present cases with gastric symptoms are common, with few or no respiratory complications in a proportion of cases. But are we certain that these two types are the same disease? There is much evidence that commonly there is mixed infection; and in the great epidemic of 1918-19, which destroyed more of mankind than the great war, much of the mortality was due to secondary (or primary) invasion of hæmolytic streptococci.

On such an apparently simple point as the immunity conferred by a single attack the evidence is discrepant. Although it did appear that many of those attacked in the summer epidemic of 1918 escaped attack in the terrible epidemic of the following winter, the evidence is not satisfactory. It appears clear that if immunity is conferred by an attack, the immunity is of short duration; and this brings out the further point that inoculation of a vaccine prepared from the Pfeiffer bacillus and the associated coccal organisms cannot be expected to do much good, except perhaps in diminishing the seriousness of pulmonary complications.

Nor have we any plausible explanation of the remarkable change in the age incidence of deaths from influenza. In the epidemic of 1889-92 some 60 to 70 per cent. of all the recorded deaths from influenza occurred among patients more than 55 years old; in the recent epidemic, fatal cases at these ages formed only some 12 per cent. of the total, while about 70 per cent. of the total deaths were of patients less than 35 years old. Does this imply that we have recently been concerned with a different infection, or what is the explanation?

It is noteworthy that coincidentally with epidemic influenza, certain other diseases, like cerebro-spinal meningitis and encephalitis lethargica, have prevailed to an exceptional extent. This has been explained by Dr. Hamer and others as implying that we are, in fact, in the grip of a single infection assuming multiform manifestations. But the association was not evident in the 1889-92 epidemic; and it is equally open to us to assume—and there are good grounds for maintaining—that all these diseases, each specific in character, are favoured by

the same "epidemic constitution"—or what is concealed under this designation—and that they are not identical diseases.

The preceding incomplete review of the chief of the unknown factors in influenza must necessarily be somewhat depressing. It is well, therefore, to look for a moment at other diseases which, like influenza, at irregular intervals and for unknown reasons, assume world-wide movements, invading mankind in many countries. Among these cholera, plague, and smallpox may be specially mentioned. Yet each of these is entirely controllable, and, so far as a large part of the world is concerned, has been controlled. Cholera is now kept within bounds and almost non-existent in every country with elementary sanitation. Plague is controllable to the extent to which infection by rats and their fleas is stopped: a practicable programme. In smallpox there is the important additional protection of vaccination, and against a population protected by this measure waves of smallpox infection break for ever impotently. The last-named illustration is significant from the point of view of influenza. Both infections are usually received by the respiratory tract. Against one vaccination affords protection, against the other results of inoculation have been more than dubious. The world is waiting for further light. How is influenza and how are respiratory infections in general to be prevented? This is the unconquered region of preventive medicine. It will doubtless be occupied eventually, but after how much delay and on what plan it would be rash to hazard a prophecy.

### An Elusive Group of Marine Organisms.

*The Free-living Unarmored Dinoflagellata.* By C. A. Kofoid and Olive Swezy. (Memoirs of the University of California, Vol. 5.) Pp. viii+562+12 plates. (Berkeley, California: University of California Press, 1921.)

THE University of California at Berkeley, Cal., supported no doubt by large revenues from the State, sets a noble example in publishing valuable contributions to knowledge. In addition to about thirty octavo series in zoology, physiology, and other sciences, the University Press issues large quarto Memoirs, of which the fifth volume is Kofoid and Swezy's "Dinoflagellata," a very notable work of 570 pages and twelve coloured plates. It is the result of observations made by Prof. Kofoid and his pupils over a series of years from 1901 onwards at the marine laboratories of the University of California and the more recently established Scripps Institution for Bio-