

terms in an era of financial stringency, when all new developments must be considered carefully in terms of relative priorities. Zellweger and Antonik have done a useful service, however, in confirming with their preliminary observations the reliability of the method and in reopening debate upon this difficult problem.

<sup>1</sup> Walton, J. N., and Gardner-Medwin, D., in *Disorders of Voluntary Muscle*, ed. J. N. Walton, 3rd edn. Edinburgh, Churchill Livingstone, 1974.

<sup>2</sup> Pennington, R. J. T., in *Disorders of Voluntary Muscle*, ed. J. N. Walton, 3rd edn. Edinburgh, Churchill Livingstone, 1974.

<sup>3</sup> Pearson, C. M., *New England Journal of Medicine*, 1957, 256, 1069.

<sup>4</sup> Pearce, J. M. S., Pennington, R. J. T., and Walton, J. N., *Journal of Neurology, Neurosurgery and Psychiatry*, 1964, 27, 96.

<sup>5</sup> Heyck, H., Laudahn, G., and Carsten, P. M., *Klinische Wochenschrift*, 1966, 44, 695.

<sup>6</sup> Griffiths, P. D., *Clinica Chimica Acta*, 1968, 20, 465.

<sup>7</sup> Larson, P. F., and Park, D. C., *Journal of the Neurological Sciences*, 1974, 23, 33.

<sup>8</sup> Zellweger, H., and Antonik, A., *Pediatrics*, 1975, 55, 30.

<sup>9</sup> Janeway, C. A., *New England Journal of Medicine*, 1971, 284, 787.

## Influenza Prospects

Influenza vaccines have been studied and widely used for over 30 years, but influenza remains probably the most important uncontrolled infectious disease in Britain. The sickness and death that result from the almost inevitable winter epidemics, the effects on industry and health services, and the recollection of the impact of past pandemics have stimulated research in most temperate countries towards the aim of prevention of influenza. Of the possible means of prophylaxis only vaccination at present offers hope of control, and progress in the development and application of influenza vaccines formed the subject of an international symposium held in London last month.

The vaccines at present licensed in Britain are inactivated preparations. Their manufacture is difficult, because the vaccines have to be changed periodically—recently almost every year—to accommodate the shifts and drifts in the antigens of the natural virus, and the manufacturers have an excellent record in both keeping their vaccines up to date and at the same time improving their quality. The virus, grown in fertile hens' eggs, is inactivated and purified by centrifugation and often by treatment with detergents, which can split the protective haemagglutinin and neuraminidase antigens from the virus. An injection of a modern killed influenza vaccine will usually protect 70–80% of those vaccinated at the expense of only minor side effects such as the occasional sore arm. Inactivated vaccines given by nasal spray are available, but a convincing field trial has yet to be reported, so that the protection they offer is still uncertain.

To whom should vaccine be given? An annual injection is justifiable for persons in whom an attack of 'flu might be especially hazardous—those with chest disease, for example, and elderly persons in institutions. Some speakers at the symposium advocated vaccination for infants and children both because the incidence of influenza is often high in children and because they may be responsible for much of the spread of infection, so that vaccination of children might benefit the whole community. It might be difficult, however, to convince many doctors, parents, or children of the justification for annual revaccination against a disease which in children is rarely serious.

Vaccination in industry was also considered. Studies from the Public Health Laboratory Service in collaboration with

industrial medical officers and general practitioners suggest that the effects of vaccination on sickness absence may be relatively small in the usual winter epidemics, probably because only about 30% of healthy people will usually accept an offer of vaccination and because the incidence of clinical influenza among adults in the moderate epidemics of recent years appears to have been only about 2%. Thus industrial vaccination programmes could probably not have prevented more than one illness per 100 employees during each of the last few winters; such an effect might go unnoticed against the background of other respiratory infections characteristic of the British winter. Until major outbreaks can be forecast reliably a more rational policy for industry may prove to be the vaccination of those key workers among whom even a small increase in absence may be critical.

Perhaps the greatest possibility of control lies in the use of live, attenuated vaccines given by nose-drops or spray. Live vaccines require only a small dose to stimulate serum antibodies, local immunity in the respiratory tract, and, possibly, cell-mediated immunity, which may also have some part to play in protection. As with inactivated vaccines it is necessary to prepare a new vaccine whenever the influenza virus undergoes a significant antigenic change. Attenuated strains with the protective antigens of a new virulent strain can be produced quickly in the laboratory nowadays by genetic recombination techniques, but the essential tests for safety and potency remain time-consuming; a major epidemic due to a new strain may be over before an appropriate live vaccine can be released. As experience with live vaccine is gained the time taken for safety and potency tests should become less.

One section of the symposium was given to discussion of plans for control of the next pandemic. The timing of the next pandemic can be forecast no more accurately than that of next winter's outbreak, and even short-term forecasting of influenza seems to be less reliable than forecasting the weather. But surveillance of influenza is improving in Britain and throughout the world, so that the emergence of new virus variants is likely to be spotted quickly; strains with obvious epidemic potential can then be adapted for vaccine production. We are fortunate in Britain that epidemics often affect the Far East or the Southern Hemisphere first, so that we can benefit from their experience. Once a new pandemic strain is recognized, with its complete shift in the structure of the virus haemagglutinin, we are bound to be seriously affected sooner or later. There is a real prospect of preventing the effects of such a pandemic if an acceptable and effective vaccine can be produced quickly enough and in sufficient quantity to be used on a very wide scale before the virus affects the country.

## Polyarthrititis and *Yersinia enterocolitica* Infection

Infection with *Yersinia (Pasteurella) enterocolitica*,<sup>1</sup> or pseudotuberculosis,<sup>2</sup> usually causes a mild gastrointestinal illness with abdominal pain, fever, and diarrhoea. It may also present like an acute appendicitis, owing to mesenteric adenitis, or like a terminal ileitis. The arthritis which may follow, usually within three weeks of onset, is sufficiently well known to have earned a page to itself in a recent textbook on the arthropathies.<sup>3</sup> It is generally considered to be a postinfective condition rather than a direct bacterial invasion of joint structures. This is a