NEWS AND VIEWS

Swine Vesicular Disease and Coxsackie Infection

THE appearance of swine vesicular disease in England in December 1972 caused much concern because of its similarity to foot-and-mouth disease in pigs. A differential diagnosis was achieved in a few days, largely owing to experience gained at the Animal Virus Research Institute, Pirbright, during a short-lived outbreak in Italy in 1966 and a later series of outbreaks in Hong Kong during 1971–72. In the earlier outbreaks, the virus was identified as an enterovirus which differed from other members of the group already found in pigs both serologically and in its ability to infect baby mice. Its relationship to enteroviruses of other species, including man, was not investigated at that time although it is realised that its properties were like those of the Coxsackie group.

Two communications in this issue of *Nature* (see pages 314 and 315) continue the story. Graves at the Plum Island laboratory has carried out exhaustive cross-neutralisation tests against Coxsackie antisera and has found a strong link between the swine virus and Coxsackie strain B5. At Pirbright, Brown *et al.* have found by immunodiffusion tests that the two viruses, although sharing a common antigen, possess also an antigen specific to each.

These findings point to an interesting relationship between Coxsackie infection in man and swine vesicular disease. Neither in the laboratory at Plum Island nor at Pirbright has overt disease been produced in pigs inoculated with Coxsackie B5 virus. At Pirbright and in at least one other laboratory, however, several research workers handling swine vesicular disease virus became ill with clinical signs like those of Coxsackie B5 infection. Using the tests described by Brown *et al.*, these infections have been confirmed as being caused by swine vesicular disease virus. It is interesting, however, that no cases were reported in the field among staff dealing with the outbreak of the disease in Britain.

This interrelationship between the two viruses prompts speculation that the origin of swine vesicular disease might lie in some such sequence of events as has been put forward to account for the appearance of new human strains of influenza which may have been derived from infection in swine. In the case of swine vesicular disease it seems possible that inapparent Coxsackie B5 infection may have taken place in swine and that suitable conditions have arisen for the development of a strain of virus which produces overt disease in swine but has a lower infectivity for man.

This relationship between Coxsackie B5 and swine vesicular disease seems to be yet another illustration of the interspecies transfer of a virus. Such findings should stimulate interest in the relationship between viruses within a single taxonomic group but which affect different species with a variety of clinical manifestations. A study of these interrelationships may lead to a better understanding of the whole question of virus/host interaction.

From a Correspondent

Intraplate Earthquakes—Thrusting Everywhere

THERE cannot be a reader of *Nature* who doesn't know by now that earthquakes mark boundaries between the rigid plates which cover the Earth's surface. Yet there are still a few earthquakes which do not lie on or near these boundaries ; for instance, in Eastern North America there have been large quakes in historical times, Australia and India have recently suffered extensive damaging quakes and even Britain every few years experiences a modest jolt. Instrumental recordings point to several quakes a year in the oceans away from plate boundaries. What can be learnt from these events?

Sykes and Sbar of Lamont-Doherty Geological Observatory, New York, report in this issue of *Nature* (see page 298) on a comprehensive study they have recently made of about eighty intraplate earthquakes globally distributed. Using techniques for determining focal mechanism which were highly successful in the late nineteen sixties in helping to establish plate tectonics, the authors have been able to determine the pattern of displacement of the rocks in the vicinity of the seismic source at the time of the earthquake. These patterns are quadrantal distributions of movement towards and away from the observer depending on the orientation of the fault plane and slip vector.

A global plot of these would yield pure confusion for the following reason. If a rod is subjected to extreme tension or compression fractures would appear by earthquake-type processes, but the orientation of the fault-plane would be controlled very strongly by preferred planes of yielding. The only thing that can be said with some certainty is that the normal to the fault surface will be roughly at 45° to the axis of maximum tension. Thus from a wide variety of focal mechanisms that the rod would display one should expect to see a consistency in the tension or compression axis—an axis which is easily deduced from the focal mechanism. Sykes and Sbar have deduced from their analysis that a large majority of the quakes that they consider have a horizontal compression axis. This is a very important result indeed and confirms work on separate earthquakes in the past year or two and also measurements of *in situ* stress that have been made by stress gauges in a few places. Furthermore the axes of the ambient compression for adjacent observations seem to be quite consistent, implying (in the absence of aliasing) that there are broad scale patterns of compressive stress over the Earth's surface.

It is tempting to try and go on from these observations to understand more about the forces driving plates. This is a problem for which no clear solution is yet in sight. Plate tectonics was conceived as a kinematic model of motion and a dynamical explanation which produces