pulses to a specimen to investigate the origins of optical response curves and dielectric constants were also dealt with, and there seems to be plenty of room for further research in this field.

One of the sessions covered imperfections, diffusion and colour centres, the last of which is a more topical subject than many will admit. Another session dealt with the theory of band structures and Fermi surfaces, the highlight of this being the paper by G. Yuval on the overlap determinant methods for Fermi surface singularities in X-ray spectra. This method, based on viewing the X-ray problem as a time-varying infrared catastrophe, met with enthusiastic support from the handful of people who understood what it was about.

There were also groups of papers on disordered systems, dislocations, superconductivity, semiconductors—including optical properties—and magnetism. The study of spin wave systems seems to be on the increase, and superconductivity is still insufficiently understood. An interesting paper by Professor P. Anderson attempted to tackle the exacting problem of defining the chemical bond in the language of solid state physics; this was an attempt to put chemical theory on a more rigorous footing, something which is unlikely to move the more pragmatic chemists.

On the development side, Mr. C. F. Drake outlined the alchemy involved in producing some of the devices discussed more theoretically by Professor Mott and others. He reported that the preparation of these devices is hindered by such factors as the difficulty of bulk production of the amorphous glass and the irregular voltage-current characteristics which seem to occur.

ECLIPSE

Pacific Annular Eclipse

from our Astronomy Correspondent

A PARTIAL solar eclipse will be visible from Australia on March 18, but astronomers are unlikely to find it worthwhile to travel to the remote islands of Indonesia to make observations. This is because the Moon will be near the apogee of the slight fluctuation in its separation from the Earth, so that its apparent diameter will not be enough completely to obscure the Sun. On this occasion, the angular diameter of the Moon will be $31' 30''$, sufficiently smaller than the solar diameter of $32' 08''$ for the ring of sunlight which will encircle the lunar disk to spoil the eclipse for most astronomical observations.

Only scientists concerned with the influence of the Sun on the ionosphere can derive any benefit from an annular eclipse. Ionospheric scientists use eclipses to find out what happens when the ionizing radiation from the Sun responsible for maintaining the ionosphere is suddenly cut off. H. Rishbeth has reviewed the contribution of eclipse measurements to ionospheric theory in *Space Science Reviews* (8, 543; 1968). Eclipses can provide data on rates of production and loss of ionization and on transport processes in the ionosphere. For example, E. V. Appleton and S. Chapman used eclipse data to show that the *E* and *F1* layers are produced by solar photons, from the discovery that conditions in the *E* and *F1* layers change at the same time as the eclipse. Estimates of the rate of production and loss of ionization are based on continuity equations for variations of

electron density. The technique has been applied to the *E* and *F1* layers, but with less success to the *F2* layer which is prone to extreme variability at all times. A feature of some solar eclipses has been what is called the "*F1 $\frac{1}{2}$* layer", an extra stratification of the *F1* layer which Ratcliffe has attributed to an upward decrease of the loss coefficient in the *F1* region.

Eclipse map from the *American Ephemeris and Nautical Almanac*.

The way in which the covering and uncovering of active areas on the Sun affects the ionosphere has been used to map activity over the Sun's disk. Anastassiadis and Boviatsos were able to use the ionosphere as a detector of solar radiation in this way during the eclipse of May 20, 1966 over Greece (*Nature*, 219, 1139; 1968). By measuring *D* and *E* layer absorption they succeeded in locating active areas of X-ray emission. The cut-off of ionizing radiation during an annular eclipse may not be complete enough for the extraction of the maximum amount of information, however. For one thing the active areas of intense emission tend to be concentrated toward the exposed limb of the Sun, and Rishbeth has pointed out that roughly ten per cent of the ionizing radiation comes from the chromosphere and corona and is not cut off even in total eclipses.

For these reasons and also because of the remoteness of the path, the March eclipse will not attract much attention. The central path starts in the Indian Ocean between Africa and Antarctica, follows a north-easterly path to the north of Australia and then turns east, passing south of Guam and the Mariana Islands and north of Eniwetok and Bikini in the Marshall Islands.

NEUROPHYSIOLOGY

Transmitter Release in Muscle

from our Neurophysiology Correspondent

ALTHOUGH the motor nerve terminals at the vertebrate neuromuscular junction are not myelinated, it is known that action potentials are propagated to their tips. Until recently there was no proof that this was necessary for neuromuscular transmission. Katz and Miledi (*J. Physiol.*, 199, 729; 1968) have now used tetrodotoxin (TTX) to block action potentials at the terminals, and investigated the effects on transmitter release. Using a curarized frog sartorius muscle TTX was applied, by diffusion from a micropipette, to a pre-terminal node of Ranvier and the end-plate