It is obvious that for real progress in the study of the Faraday effect, a satisfactory explanation of the magneto-optic anomaly referred to above is essential. We may regard the anomaly as a characteristic constant for the molecule, analogous to its optical anisotropy determined from studies on light scattering. A careful study of the figures given by Darwin and Watson shows that there is no direct or simple relationship between the magneto-optic anomaly and the optical anisotropy of a molecule. It is true that there are indications of such a connection, as for instance, in the fact that the constant is somewhat smaller for aromatic compounds than for aliphatic ones and is particularly small for substances such as carbon disulphide, nitrous oxide and nitrobenzene which show large depolarisations in light scattering. On the other hand, we have to consider the fact that the factor for carbon tetrachloride which is optically isotropic is 0·51, whereas for benzene which is highly anisotropic, it is 0·56. While, therefore, there is obviously no direct connection between the optical anisotropy and the magneto-optic anomaly of molelcules, the facts do not rule out a deeper connection in which the specific properties of the individual chemical bonds are involved. Long ago, in a remarkable series of investigations, W. H. Perkin showed that the magnetic rotatory power of organic compounds can be used as a powerful instrument for the study of their constitution. On the other hand, we also know that the optical anisotropy of a molecule is related both to its chemical constitution, and to its geometric configuration. The fuller elucidation of the relationship between these properties would obviously be a matter of great interest.

It is also now fairly certain that the Faraday effect can also be used with great success in the elucidation of the states of molecular aggregation. Here again, the problem centres round the explanation of the magneto-optic anomaly. Some progress has been made towards the solution of this problem in investigations undertaken recently at Bangalore. A fuller report of these investigations will appear in due course.

C. V. Raman.

SCIENTISTS' STUDY OF LAST SOLAR ECLIPSE

"Mass Attack" on Secrets of Radio-Wave Propagation

According to a plan made by the Committee under Sir Edward Appleton, the British physicists and radio engineers co-operated in a series of observations lasting for seven days and centred on the day of the eclipse to obtain the effects of the last solar eclipse upon the upper and lower ionospheres. This particular eclipse afforded an unique opportunity for examination of the solar effects upon the ionosphere, because it occurred near about noon in summer when the lower ionospheric layers were highly ionised and the upper ones were clearly defined and separated one from the other.

It is well known that the formation of the ionized layers, upon which all long distance radio transmission depends has to do with the energy radiated from the sun. It is however, not yet fully known whether the ultra-violet sunlight is solely responsible for this ionisation. It may be that swiftly moving particles of matter from the sun towards the earth also contribute to the effect in some degree. If the latter phenomenon also contributes to the ionisation, the effect of the particles being cut-off by the moon in their path should be observed at a different time from the eclipse itself. The effects of the "corpuscular eclipse" and "optical eclipse" were, therefore, observed.

The normal equipment for measurement of signal intensity, equivalent height of the ionised layer, critical frequency, and maximum equivalent ionic density was arranged to be operated as far north as possible so as to be near the track of totality. In ultra short-wave case, the "Radar" equipment of war-time was employed in the detection of the ionisation responsible for the "bursts" as well as other abnormal patches in the lower ionosphere. Observations on American radio stations operating on very long wave-lengths were carried out by several organisations so that variation in their signal strength could yield information about the lower ionosphere. Observations on long and medium-wave stations in Scandinavia were taken to obtain the variation of radio-wave absorption during the eclipse and give information about the 'E' and 'D' layers. The short-waves came in for two classes of observations as follows:—(1) Stations in U.S.A., Canada, U.S.S.R. and South Africa were closely observed as to the variation in their signal strength during the eclipse and further information about "F_2" layer could thereby be obtained. The transmission paths of American and Russian stations passed near the track of totality while those of African stations remote from this served as a check upon the eclipse variations. (2) Stations in Norway and Sweden which were at shorter distances from Britain were observed for the variation in their signal strength.

The ultra short-wave stations were also observed for the "bursts" (sudden returns of energy from the upper regions lasting for a few seconds) to find out whether these were subject to a certain degree of solar control. Some observations were also made by direction-finding apparatus on stations laying far to the West, the East and the South of Britain to find out whether the incoming radio signals were diverted from their true great circle course due to the effect of the eclipse.

It is expected that the obsrvations when analysed thoroughly will contribute greatly to the phenomenon of radio-wave propagation on all wave-lengths.

S. P. Chakravarti.