of stations as possible within or near the belt of the corpuscular eclipse.

We shall be glad if anyone who is able to make observations of either a simple or more ambitious character on this occasion will communicate with the first mentioned below. In this connexion we may add that, in the case of the 1927 eclipse, wireless observations of great value were obtained with apparatus of modest character, a simple galvanometric record of signal intensity being obtained.

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[1] *Monthly Notices*, R.A.S., vol. 92, March 1932, pp. 413-422.

Photodichroism Produced by α-Particles

A PHOTOGRAPHIC plate of specially prepared fine grain emulsion, exposed to plane polarised light, gives rise on development to a dichroic deposit of silver. This effect, discovered by Weigert,[1] appears to have a vital bearing upon theories of formation of the latent photographic image.

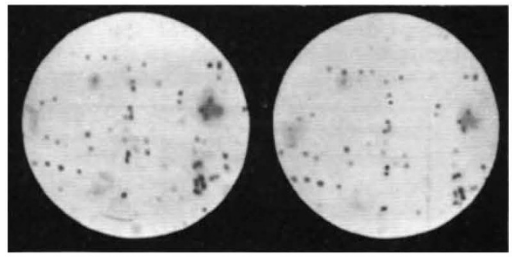
It would seem that a silver deposit might exhibit dichroism for one of two reasons: (*a*) the silver grains are scattered at random but are all oriented with their longest axis pointing in one direction, the direction of the electric vector of the original light which produced the dichroic image; or (*b*) the silver grains are oriented at random but are so distributed as to be arranged more densely in one direction than another, the direction of closest packing being that of the electric vector of the original light.

If it be held that the latent image is produced as a result of ejection of a photoelectron by the absorbed quantum of light, then the selective photoelectric effect, in which the emission is a maximum in the direction of the electric vector of the incident light, may be invoked to explain the Weigert effect, and the silver deposit will owe its dichroism to condition (*b*) above. Further, it might be expected that in the presence of a strong magnetic field parallel to the incident light, the production of dichroism might be diminished or destroyed. This effect was looked for by Cotton[2] without success, and accordingly he abandoned the explanation.

Although examination of the dichroic silver deposit with high magnification fails to show any evidence for either (*a*) or (*b*), as the grains are too small for complete resolution, yet it is possible to produce, artificially, a deposit of silver grains in which the distribution is linear and approximates to condition (*b*), by bombarding the photographic plate with α-particles at a small glancing angle. With very fine grain plates each α-particle produces a track[3] consisting of a number of silver grains depending upon the residual range on impact. The spacing of the grains in a single track varies, but on the average, for the particular photographic plate used, their centres are about 0·5 micron apart. They are in a medium (gelatine) of refractive index about 1·52, so that their separation is rather larger than a wave-length of yellow light, which is rather less than 0·4 micron in such a medium.

Seen under a microscope with a twelfth of an inch oil immersion objective and a magnification of 25, the individual grains in the α-particle tracks are well resolved when the electric vector of the light by which they are seen is perpendicular, and poorly resolved when it is parallel to the length of the track. This is well shown in the photomicrographs (magnification 1350 times) in Fig. 1. In other words, the light transmitted through the gaps between adjacent particles in the α-ray track is polarised with the electric vector perpendicular to the track.

To test this further, a fine grained photographic plate was exposed for equal periods to an intense polonium source of α-rays, so that on development two adjacent portions of the plate had silver deposits of equal density, one with the α-ray tracks in one direction, and the other with the tracks in the direction at right angles to the former. The two deposits were thus formed of silver grains of which the directions of closest packing were mutually at right angles. Under these conditions it was possible to observe a very minute but distinct dichroism of the silver deposit, the optical density of the deposit being greater



↕ Electric Vector. ↔

FIG. 1.

when the electric vector of the incident light coincided with the direction of the α-ray tracks, that is, with the direction of closest approach of the silver grains.

It is thus possible to produce dichroism with a known condition of arrangement of the silver grains, and it would seem that the second explanation of the photodichroism produced by excitation with plane polarised light is the correct one; this would lend support to the idea that the selective photoelectric effect plays a direct part in producing the photographic latent image. Further experiments are being conducted, and the results will be published in full later.

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March 3.

[1] Weigert, *Z. wiss. Phot.*, **30**, 95 and 177; 1931.
[2] Cotton, *C.R.*, **189**, 599; 1929.
[3] M. Blau, *Ber. Akad. Wiss. Wien*, **139**, 2A, 328; 1930.

Stark Effect for Argon

THE Stark effect on argon lines has earlier been investigated by E. Böttcher and F. Tuczek [1] and by W. Steubing.[2] These investigators have worked with relatively small electrical field strengths, 26 kv./cm. and 38 kv./cm. respectively, and could not observe any effect. Using higher field strengths ($E_{max.}$ about 170 kv./cm.), T. Takamine and N. Kokubu [3] succeeded in showing some very small displacements, towards the red of the violet lines, belonging to the so-called 'red spectrum' of argon, the structure of which was unknown at that time. The series analysis of this spectrum was given by K. W. Meissner [4] and F. A. Saunders.[5] From this we now notice that the affected lines observed by Takamine and Kokubu all belong to the principal series. It was to be expected that these lines would be very little displaced, whereas on the subordinate series lines a greater influence of the electrical field would be anticipated. Probably owing to deficient intensity, these lines have