Nature (*London*) **109** 175–176 (1922)

The radiant spectrum

Dr Hartridge's objections to my explanation of this phenomenon (*Nature* (*London*), September 1, p. 12, and December 8, 1921, p. 467) seem to be based on an imperfect appreciation of Brewster's observations on the subject. Brewster brings out two facts clearly in his paper: First, when a very small and intense source of white light is viewed directly by the eye it appears surrounded by a system of radiating streamers which appear to diverge directly from it; secondly, when a prism of small dispersive power is interposed in front of the eye the streamers are deviated and now appear to diverge from a point lying beyond the violet end of the spectrum into which the source itself is drawn out. It is clearly illogical to suggest, as Dr Hartridge does, that the prism is responsible for the radiant phenomenon in view of the fact that, in its essential features, the effect is observed even before the introduction of the prism.

Using a sufficiently intense source of light and a prism of small angle with optically good and clean faces, and making the observations in a dark room, it should be easy for anyone to satisfy himself by simple tests of the kind referred to by Dr Hartridge that he is in error, and that Brewster's phenomenon really arises from the scattering of light in the eye, the prism merely acting as a dispersive apparatus modifying the colour and disposition of the streamers in the halo surrounding the source. Judging from the statements made in his letter, Dr Hartridge would appear to have been particularly unfortunate in his choice of experimental conditions. Any noticeable imperfection in the optical surfaces of the prism would, of course, give rise to scattering, masking the true phenomenon due to the eye itself. This is indeed clearly suggested in Brewster's own paper.

A further and absolutely crucial test is also available. In my paper on the scattering of light in the refractive media of the eye (*Philos. Mag.*, November, 1919, p. 568), I have described the character of the diffraction-halo arising from this cause in considerable detail. With a source of white light the halo shows a radiating fibrous structure and clearly marked alternations of colour and intensity in its outer parts. A monochromatic source, on the other hand, exhibits a halo with a granular structure and a succession of bright and dark rings. These features are explained in my paper as due to the diffraction of light by corpuscles of more or less uniform size included within the structure of the eye. On this view we should expect one half of the first diffraction ring outside the central portion of the halo to be partially achromatised on the introduction of the prism and to appear as a detached semi-circular arc lying beyond the violet end of the spectrum and the displaced position of the achromatic centre. No mere

imperfections or irregularities in optical surfaces could, on the other hand, give rise to such a phenomenon. Actual trial confirms the expectation from theory and puts its correctness on an unassailable basis.

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4 January