

**Abstract of a Paper on the Diffraction Phenomena
observed in the Testing of Optical Surfaces,**

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THE author first gave an account of a recent investigation by Lord Rayleigh (published in the Philosophical Magazine for February 1917) which it was thought might be of interest to members of the Society. Lord Rayleigh's paper dealt with the effects observed when a reflecting surface or a lens is tested by the well-known method due to Foucault. This 'edge-test,' as it may be called, is no doubt familiar to readers of this Journal by the description given by Mr. H. G. Tomkins in his papers on 'The Construction of a Cheap Telescope.' Light from a point source is focussed by the reflecting surface and the cone of light converging to the focus is partly or wholly cut off by a sharp straight edge which is moulded into the focal plane. The appearance of the surface when studied by the aid of the reflected light thus partly or almost entirely cut off indicates the degree of optical perfection of the surface. It has been observed that when the surface is optically perfect and the edge cuts off the cone of rays converging to the focus, the reflecting surface appears dark as a whole, but the two edges of the surface on either side remain very bright. Lord Rayleigh shows that this residual luminosity of the edges of the surface is due to the diffraction of the light. The light reflected by the surface instead of converging to a single point forms a diffraction pattern at the focus. The edges introduced into the focal plane do not entirely cut off the diffraction-pattern, and the residual luminosity appears to come from the edges of the surface.

The author said he had studied the Rayleigh effect (as it may be called) and found that the luminosity of the two edges of the reflecting surface is equal only when the edge is placed exactly at the focal plane. Lord Rayleigh had discussed only this particular case. When the edge is put lightly in front of or behind the focal plane and placed so as to cut off the geometrical cone of rays, the residual luminosity of the two edges of the surface under test is markedly unequal. The difference is probably due to the fact that the diffraction-pattern at the focus is different from that formed in planes lying behind or in front of the focus. The mathematical theory of this asymmetrical case is being investigated and tested experimentally in the author's laboratory by Mr. Sudhansu Kumar Banerji, M.Sc.