

Investigation of the Solar Corona without an Eclipse.

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THE study of the solar corona has been, till recently, confined to short intervals during total solar eclipses, when the overpowering light of the sun is shielded from the earth by the moon's disc. In a paper read before the French Physical Society by M. Bernard Lyot of the Meudon Observatory near Paris an experimental technique worked out by him was described which provides a new method for investigating the light of the corona at all times when the sky is sufficiently clear and thus gathering more knowledge regarding this outer extensive tenuous envelope of the sun.

The most important obstacles to the observation of the comparatively feeble light of the corona under normal conditions are: firstly, the scattering of light by the solid and liquid particles suspended in the atmosphere and secondly, the scattering of light by imperfections in the optical system of the instrument used in the observation. The scattering by the gaseous constituents of the atmosphere are of comparatively little importance.

The only way of getting over the first difficulty is to make the observations from a high-level station which lies well above the low-lying dust layers and at times which are comparatively free from atmospheric disturbances. Mons. Lyot made his observations from Pic der Midi in S. France with an elevation of 2,800 meters above sea-level. Using a faultless telescopic objective

and stopping it down to about 4" diameter, he formed an image of the sun on a blackened disc whose diameter exceeded that of the sun's image by a few seconds. Another lens placed behind the disc produced an image of the first lens on a diaphragm whose centre was occupied by a small opaque screen. The edge of the diaphragm cut off the light diffracted by the edges of the first lens and the small screen stopped the light of the sun's image formed by internal reflection from the faces of the first lens. A well corrected objective placed behind the diaphragm and screen formed an image of the corona.

Examining the image with an eyepiece the prominences could be seen round the edge of the sun with a rosy red colour. When the atmospheric conditions are particularly good, the corona also could be photographed using a red filter.

Placing the slit of a spectrograph tangential to the image of the disc, the red and green rays of the corona (6375 Å and 5503 Å) could be photographed.

It is hoped that by installing one of these instruments in a selected high level station, it would be possible to follow day-to-day changes of solar corona and investigate its relationship to prominences and sunspots and perhaps also to related terrestrial phenomena such as magnetic storms and the reflection of electric waves from the upper atmosphere.