Hosfeld, R. Scintillation, stellar shadow bands and winds aloft.*

Rectangular diaphragms have been used over telescope objectives in studies of stellar scintillation by H. E. Butler in Ireland and Mikesell, Hoag and Hall at the Naval Observatory in Washington. Both investigations showed a change in scintillation with changing position angle of the aperture. A further photoelectric investigation of this effect is in progress at the McMillin Observatory of the Ohio State University. The conclusions arising from this study appear to be confirmed by motion pictures of the stellar shadow band patterns on the 69-inch mirror of the Perkins Observatory telescope.

The present results for stars near the zenith can be summarized as follows:

1) As a 1 inch by 12 inch objective aperture is rotated a critical position angle is reached where the amplitude of the intensity fluctuations, as recorded by a Brush oscillograph, rapidly approaches a maximum.

2) As the aperture is rotated through the position of maximum amplitude of intensity fluctuations, the number of fluctuations drops abruptly to a minimum.

3) The change in amplitude with change in position angle indicates an elongation of the bright elements in the stellar illumination pattern since a larger portion of the aperture can be covered by a bright element when the aperture lies parallel to the long axis of the elements.

4) Furthermore, if the pattern is in motion, the number of fluctuations should be a minimum when the length of the aperture is parallel to the direction of motion since this position will give the least projected width to the aperture resulting in the fewest encounters with the bright elements. As the minimum number of fluctuations is found in nearly the same position as the maximum amplitudes, the motion is approximately in the direction of the element elongation.

5) The bright patches in the pattern which cause the rises of intensity on the oscillograph trace should require more time to travel the length of the aperture than its width, resulting in broader peaks when the aperture is parallel to the motion. The broadest peaks occur in the position which gives the largest peaks (not an instrumental effect) again indicating motion in the direction of elongation.

6) On the basis of a limited number of observations, the direction of motion of the pattern as determined photoelectrically (i.e., the aperture

orientation which gives fewest fluctuations but the largest amplitudes of longest duration) has been found to have the same direction as the winds aloft over central Ohio as taken from the 700 millibar chart of the Weather Bureau.

7) If the interpretation of the photoelectric observations is correct, photographs of the pattern of starlight on the objective of a telescope should show elongated bright patches on some of the shortest exposures and, as the exposure times are increased, the elongation should appear to increase by virtue of the motion of the patches along their lengths. Photographs of the Perkins Observatory 69-inch telescope mirror with exposure times from 1/100 to 1/20 of a second show streaks whose lengths increase with increasing exposure time.

8) The direction of the streaks on the images of the objective are also the same as the winds aloft, as would be expected on the basis of the photoelectric observations.

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*Perkins Observatory,
Delaware, Ohio.*

Hosfeld, R. Photoelectric isophotes of Mars.

Thirty photoelectric drift curves were obtained across the disk of Mars on the night of 28-29 June 1954 with the 12½-inch refractor of the McMillin Observatory using a focal plane aperture 40μ in diameter, or 1'8.

A contour map constructed from approximately 100 intensity readings over the disk revealed some of the larger Martian features even though the focal plane image was only 1/50 inch in diameter.

Colors could not be measured because of the steep color curve of the visually corrected refractor, but the method appears promising enough to be applied to reflectors located at good observing sites.

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Huffer, C. M. and Kopal, Zdeněk. Studies of the darkening coefficient in three wave lengths.

Observations made with the 20-inch reflecting telescope and photoelectric equipment of the Lowell Observatory in October and November,

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