requires a test over a large but accurately known range of brightness. Since the equipment is often calibrated entirely by use of the meter, the first aspect is of primary importance, and the equipment in use at the Goethe Link Observatory at Indiana University provides a convenient and accurate method of testing. A light-tight enclosure is used to house five light sources, each of which can be adjusted to give the same deflection as the others when they are measured individually. Since the deflections are equal, lack of linearity of the equipment is of no consequence here. Next, a decrease in the amplifier sensitivity, or the removal of a neutral screen permits the addition across the indicator scale of accurately known intensities, and the discrepancy between correct and observed reading can be plotted as a function of observed reading.

Examples of the lack of linearity produced by altering the input circuit to the amplifier are as follows: in general, with equal time constants for the input grid resistors the maximum deviation from linearity is less than .004 mag. over most of the indicator scale, and better than .002 over the most used part of it. In one case, however, with an experimentally modified amplifier input circuit, linearity corrections reached .015 mag., far too large to be tolerated in a useful instrument.

The second aspect, that of testing over a large range in brightness, has involved application of the inverse square law, as by Stebbins, Whitford, and others. A more convenient method is the use of neutral filters or of apertures. This requires calibration originally by the inverse-square-law method since very small deflections cannot be relied upon for accuracy. A less fundamental test employs the photovisual magnitudes of North Polar Sequence stars. Results of our observations for calibration purposes confirm the corrections to the photographic magnitudes in the North Polar Sequence found by Stebbins and Whitford and later by others.

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Dodson, Helen W., Robert R. McMath, and E. Ruth Hedeman. Photometric studies of solar flares.

The development, at the McMath-Hulbert Observatory during 1950, of a new and improved densitometer for the measurement of intensities of features photographed on 35 mm motion picture film has permitted an extension of the

study of the "light curves" of solar flares. The intensity of the flare is expressed in terms of the intensity of the adjacent undisturbed disk as recorded on $H\alpha$ spectroheliograms taken with slits 0.4A wide. The study to date has included twenty-one flares photographed in 1949, eight of importance 1, nine of importance 2, and four of importance 3. The intensities at maximum range from 1.6 to 5 times the intensity of the undisturbed $H\alpha$ background. All flares in this study for which the intensity of the flare was greater than 3 times that of the background were accompanied by sudden ionospheric disturbances regardless of the location of the flare on the solar disk or the area of the disturbance.

Sudden ionospheric disturbances were not restricted to association with only the largest and most intense flares. On August 22, 1949 a flare of importance 1, 15° from the center of the sun, was accompanied by a sudden ionospheric disturbance even though it covered only 51 millionths of the solar hemisphere and reached an intensity of only 2.4 at maximum. This flare occurred directly over two spots.

Two flares that took place on November 1, 1949 in the same plage area, about 40° from the center of the sun, present an interesting anomaly. The first flare began at 1637 U.T., reached intensity 2.4 at maximum and extended over 130 millionths of the solar hemisphere. It was accompanied by a sudden ionospheric disturbance. The second flare broke out in the same plage area at 1954 U.T. This flare was more intense (2.75), larger (376 millionths) and lasted for a longer time (66 minutes) but there is no report of a sudden ionospheric disturbance for the period of its occurrence. Although both flares took place in the same plage area and between the same two large spots, the detailed regions involved in the two flares did not coincide or overlap in any way.

The light curves of the flares make possible not only a study of the role of the maximum intensity in flare effects, but they also permit an investigation of the time relationships between the first indications of flare activity on the sun, the attainment of maximum intensity, the onset of the sudden ionospheric disturbance, and the relative durations of the solar and ionospheric phenomena. Although the work to date includes only a portion of the flares recorded in 1949, it is hoped that the photometric measures can be extended to include much of the large body of observational material secured during the recent solar maximum.

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