

## NOTES

## THE GREAT POST-LIMB EVENT OF MARCH 2, 1966

At 0312 U.T. on March 2, 1966, a growing calcium plage, numbered 8174 by the McMath-Hulbert Observatory and first observed on February 21 at N.22° E.31°, was completely beyond the west limb of the Sun by several hours. At this time the region was apparently the site of a major flare for which the ionospheric effects were well established at least 20 min before any flare phenomena at H $\alpha$  were visible.

The region appeared to be still growing as it approached the west limb. The area and intensity of the calcium plage increased steadily through March 1. The associated spot group had grown continuously from February 21 to February 26, when it had 37 members. In subsequent days the group had 37, 32, and 17 spots. Since this decrease was slower than the cosine of the central angle of the center of the group, the spot group probably was still growing as it approached the west limb. The spot group was Zürich type E. The region had already produced a major flare on February 28 at 0352 U.T. Figure 1 (Plate 21) is a spectroheliogram, taken February 28 at 2336 U.T., with the bright plage showing at the west limb.

On March 2 at 0312, 0313, and 0314 U.T. all of Manila Observatory's indirect flare recorders showed marked disturbances. These events are tabulated in Table 1, together with radio events noted in Japan. Figure 2 is a tracing from a composite photograph of the more significant local chart recordings, namely, the S-SWF ("sudden short-wave fadeout"), the SPA ("sudden phase anomaly"), the SCNA ("sudden cosmic noise absorption"), and finally the magnetic crochet on the H ("horizontal") trace of the Davao magnetometer record. The foregoing ionospheric and radio frequency phenomena suggest that a major flare was in progress.

At the Manila Observatory all the recording equipment except the magnetometer recorders is located only a few feet from the visual observing position. Thus the disturbances on the indirect flare detectors were noticed shortly after they started. The remarkable part of this event is that nothing visible on the Sun gave any reason for the registering of the disturbances on the recorders, despite intensive scrutiny by three observers for the first 20 min. Nothing of flare intensity could be observed on the Sun, nor was any limb activity manifest. Finally, at 0335 U.T., 23 min after the start of the SPA, a brightening was observed on the west limb of the Sun at the same latitude as that of the plage which had passed over several hours before. At first three bright spikes extended from a bright substratum to about 15000 km and then filled in with a bulge of flare intensity. This bulge was photographed through the Lyot H $\alpha$  filter at 0344 U.T., well after the maxima of the sudden ionospheric disturbances. The filtergram was overexposed, but, with the help of a reticle photographed simultaneously onto the original negative, accurate area measurement was possible.

Spectroheliograms also were taken in the K $_3$  line at 0350, 0352, and 0354 U.T. and are shown in Figure 3 (Plate 22). The area of the flare was measured as 310 millionths of the disk. It is difficult to assign an ending time to the visible portion of the flare because of the succeeding bright prominence activity. An ending time of 0400 U.T. has been chosen, based on extrapolation of the area versus time curve, and on the visual estimate of the minimum intensity needed for a flare. There were loops and surges until 0450 U.T., some of them as bright as a faint flare. The "importance" of a flare at the limb is always uncertain. For the March 2 flare, Manila assigned importance 2n, but the *Quarterly Bulletin* in its summarizing report gives 1n. Since the greatest part of the flare probably was behind the limb, the "total flare" may have been a major solar event.