# NOTES FROM OBSERVATORIES

## A MECHANICAL IMPROVEMENT IN THE SPECTROHELIOSCOPE

By Edison Pettit

The Anderson prism arrangement as used in the Hale spectrohelioscope requires that the collimator and camera have the same focal length and that the two slits be nearly in line and nearly in the same plane. These restrictions can be removed if the prisms are mounted individually on small synchronous motors and the ratio of the thickness of the first prism to that of the second is made equal to the ratio of the focal length of the colimator to that of the camera.

The writer has constructed such a spectrohelioscope, with motors (Barber-Coleman YAJ 611-115V, 60-cycle, 32-watt, 3600 R.P.M.) operating on the commercial alternating circuit. These motors are of the shaded-pole, self-starting type having armatures with four slots.[1] The original armature shaft, which can be replaced easily by a longer one if necessary, extends beyond both bearings and carries a small cooling fan on one end. To reduce the heating of the pole-shading rings still further, the two motors were wired in a parallel circuit, operated in series with a 75-watt lamp which could be shunted by a suitable switch until the motors reached synchronous speed.

When first started the prisms may have a constant difference of phase, which causes the solar image to appear in two parts improperly framed, as sometimes happens in motion-picture projection. This difficulty can be overcome by rotating one prism on its motor shaft, or better by rotating the whole motor. If the motor is mounted on a fork with the motor bearings acting as trunnions, as shown in Plate XXII, it may be adjusted while in motion. The four-slot armature insures that the motors once adjusted thereafter operate in synchronism. If the number of slots is not a multiple of four it may be necessary to correct the phase relationship at each start.

[1] Ordinary shaded-pole induction motors are not synchronous.

If the "correspondence condition"[1] is not satisfied it is only necessary to move one of the prisms to the other end of the motor shaft, or to place the motor at the other end of the slit.

With this simple arrangement the image, though steady enough for visual observing, will occasionally vibrate, owing to the tendency of the motor to "hunt." This vibrating, which prevents the instrument from being used for photography, was overcome, however, by the simple expedient of mounting a loose flywheel on the motor shaft (Plate XXII). A washer with a hole slightly smaller than the shaft was first pressed on to it close to the motor-bearing. A well-balanced two-spoke flywheel, two inches in diameter weighing about 50 grams, with a hub bored to fit the shaft closely but still loose enough to permit the wheel to turn on it, was mounted between this washer and the fan. The prism was mounted on the other end of the armature shaft.

With this simple arrangement many solar spectroscopes or spectrographs attached to telescopes or operated with coelostats may be easily converted into spectrohelioscopes.

CARNEGIE INSTITUTION OF WASHINGTON
MOUNT WILSON OBSERVATORY
July 1940

---

## A Be STAR WITH BRIGHT *He* I

BY JOHN A. O'KEEFE

The star HD 165285, No. 281 of the Merrill and Burwell catalogue of Be and Ae stars,[2] has been photographed at the McDonald Observatory with the two-prism Cassegrain spectrograph, and the F/2 camera, giving a dispersion of 76 A/mm at Hγ. In addition to the bright hydrogen lines noted by Merrill,[3] Hδ and the $D_3$ line of *He* I appear in emission; the interstellar *Na* I and *Ca* II lines appear in absorption. The stellar absorption lines, though weak, suggest a slightly earlier type than B2, the type given in the Merrill and Burwell catalogue.

McDONALD OBSERVATORY
July 1940

---

[1] *Pub. A.S.P.*, **51**, 95, 1939.

[2] *Ap. J.*, **78**, 87, 1933.

[3] *Ap. J.*, **76**, 156, 1932.