out to at least 10 solar radii from the limb. They were long and straight, apparently unaffected by the curvature that solar rotation might induce. They also exhibited strong polarization.

Because the F-corona should be symmetrical around the limb, structureless and unpolarized, the character of these streamers and many other shorter rays indicates that they comprise the K-corona. Their polarization also supports this conclusion.

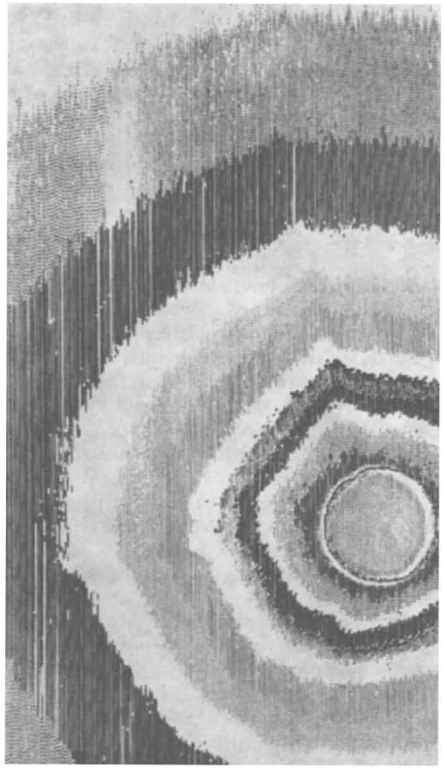

Fig. 2. Preliminary isophotes for the eclipse of March 7, 1970. Each change in the output of the isodensitracer—dashes to dots, dots to blank, and so on—corresponds to a change of 0·2 in photographic density.

Preliminary photometry of the records indicates that the streamers, however prominent they may seem to the eye, represent only slight increases of photographic density. Although the isophotes are not at all circular on Fig. 2 out to at least four radii, the streamers show up only as slight projections. This result indicates that they decrease in intensity away from the Sun at approximately the same rate as the overall coronal radiation. According to theory, the F-corona should decrease more slowly than the K-corona, so we conclude that inner zodiacal light does not contribute appreciably to the corona out to distances of at least 10 solar radii. As for ground-based observations of the Fraunhofer spectrum of the outer corona reported for previous eclipses, we suggest that it may well derive from cause (4): superposed skylight. To test this point, the slit of our spectrograph was long enough to cross the entire solar disk, so that any sky spectrum from the Moon's silhouette could be used for calibration.

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[1] Van de Hulst, H. C., in *The Sun* (edit. by Kuiper, G. P.), (Univ. Chicago Press, 1953).
[2] Blackwell, D. E., and Petford, A. D., *Mon. Not. Roy. Astron. Soc.*, **131**, 383 (1966).

Variations in Line Profiles from Photosphere to Chromosphere

WE observed from Miahuatlan (Oaxaca), Mexico, near the centre line of totality. A high-resolution Littrow-type grating spectrograph, fed by a coelostat and an objective lens (25 cm, 340 cm), was provided at second contact with a slit 12 μm wide, slanting through the last crescent of the solar photosphere and the chromosphere. The slit was removed before third contact.

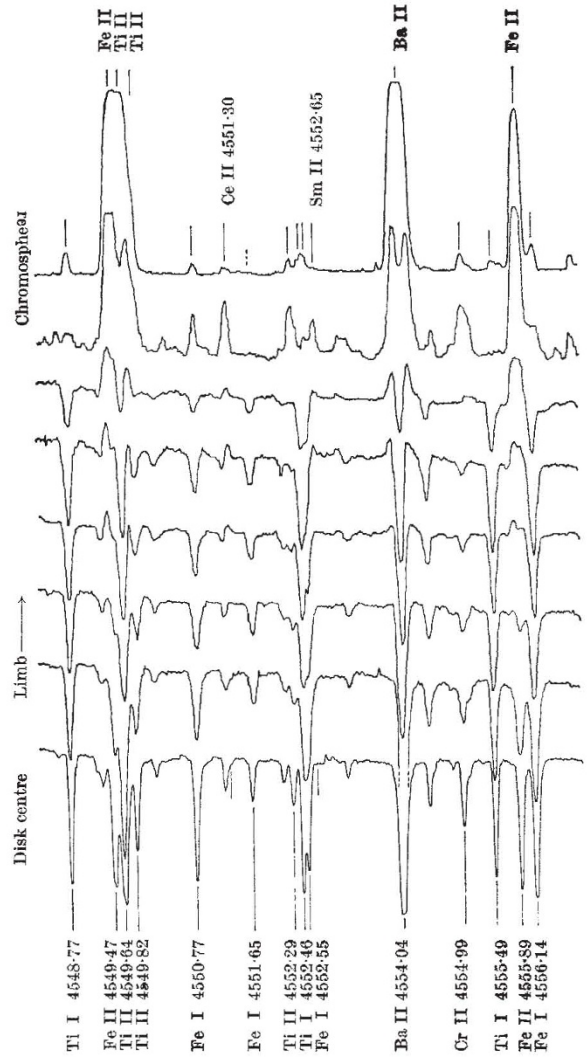

Fig. 1. Variation of spectral lines around 4550 Å from photospheric absorption lines to chromospheric emission lines.

We photographed the region from 4545 Å to 4579 Å simultaneously on two 70 mm films with respective intensities of 8 and 90 per cent, using a beam splitter, at a dispersion of 1·7 mm Å^{-1}. A shutter was guided photoelectrically in order to obtain the proper exposure times. Before and after the eclipse we took calibration spectra of the central part of the solar disk. In addition to this in the same spectrograph the region of the Mg b lines near 5200 Å was focused on a multiplex chopper and the coded spectrum was recorded on magnetic tape. This part of the experiment was developed by Th. de Graauw.

We made provisional microphotometric records in transmission of the photographic spectra at second contact. Because of differences in photographic densities and the adjustment of the photometer, the records show only qualitative differences in the appearance of spectral lines of different atomic and ionic origin in the transition from photosphere to chromosphere (see Fig. 1).

The extensive reduction of these spectra, using the laser-determined instrumental profile, the slit-jaw films and event-timing and time signal tapes, will take some time and the reduction of the multiplex tape has not yet started. Eventually we hope to obtain true line profiles of the outer limb and the transition region to the chromosphere.

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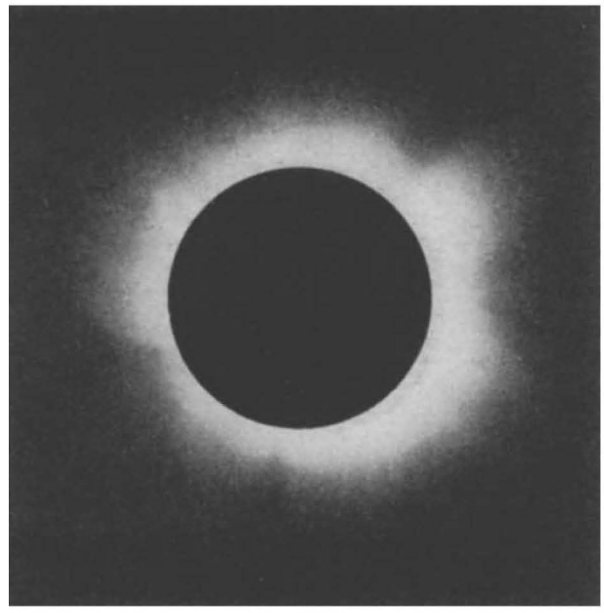

Fig. 1. This 20 s exposure beginning at 18 h 37 m 06 s UT was taken at f/30. Heliographic north is approximately at the top and east is to the right (see Fig. 2).

Association of Coronal Structures with Chromospheric Structure

Six direct photographs of the total phase of the solar eclipse of March 7, 1970, were made at Sandbridge, Virginia (longitude 75·9161° W, latitude 36·6759° N, mid-totality 1836 UT), using an achromatic doublet of focal length 7·62 m and Eastman Kodak Tri-X orthochromatic sheet film. This note describes the coronal structures and their apparent relationship to chromospheric features observed in Hα and CaII K at the McMath–Hulbert Observatory (Table 1). We use the terminology suggested by Newkirk[1]; position angles are measured (accuracy ±3°) eastward from the pole of rotation; McMath plage numbers designate active centres; longitudes of disk features are given relative to the central meridian of the Sun.

Fig. 1 shows one of the photographs, and a schematic sketch locating the more significant features is presented in Fig. 2. Table 1 lists those coronal features most prominent on our photographs and their probable association with activity in the chromosphere. The quoted position angles of streamers are the positions of intersection of their axes with the limb.

Especially noteworthy is the position angle of the cleft directly in the south and the decided difference in the appearance of coronal structure within about 30° (P.A.) of each pole. The western and northern parts of the corona, from P.A. 228° to P.A. 20° seem to be constituted predominantly of fine filamentary details (narrow rays) while the eastern and southern regions tend to be less filamentary and smoother in appearance. Streamers are without exception tilted poleward, towards the nearest pole, by varying amounts, contrary to the sense of tilt of streamers at minimum solar activity[2].

The maximum dimensions of the arches given in Table 1 are as estimated on our photographs. Such features have a subtle appearance in white light on low-contrast emulsions and are of somewhat uncertain extent. The arches at P.A. 30° and 190° are only partially visible on our photographs, and the quoted positions refer to the approximate centres of the arches as if they were complete.

An Hα filtroheliogram taken at 1631 UT is shown in Fig. 3 to aid in identification of structures on the visible

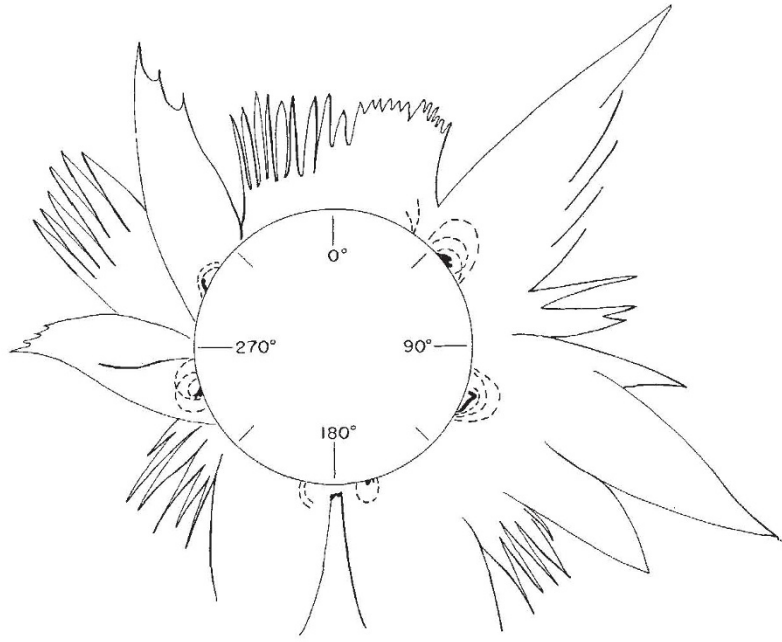

Fig. 2. The principal features shown on direct photographs are located in this sketch. Position angles are measured eastward from the north pole of rotation. Regions in which narrow rays were predominant are only schematic.