Spectrum of the Night Sky and of the Zodiacal Light

IN a recent paper[1], one of us has described the general nature of the spectrum of the night sky as observed in India, and pointed out that besides the green line 5577 A. originating in atomic oxygen, there are many other lines which have also to be considered as general characteristics of the spectrum of the night sky at *all* latitudes of the earth. As has been emphasised by Lord Rayleigh, this spectrum is quite distinct from that of the polar aurora; the second negative bands of nitrogen (N_2+) which are

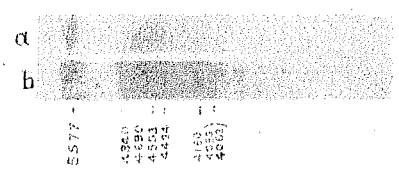

FIG. 1. Spectrum of (*a*) zodiacal light plus night sky; total exposure, 27 hours; (*b*) night sky; exposure, 75 hours.

a conspicuous feature of the spectrum of the polar aurora, are absent or only very faintly present in the night sky spectrum.

During the early part of this year, we succeeded in obtaining exceptionally well-exposed spectra both of the night sky and of the zodiacal light at Poona. Fig. 1, which was obtained with the spectrograph described in the paper referred to above, shows both the spectrum of the night sky (below) and that of the zodiacal light (above). The exposure for the night sky was towards the north at an angle of 20° above the horizon and lasted 75½ hours (April 12–29, 1933), while for the zodiacal light it was mostly towards the west sky at the same angle and of duration 21½ hours. (By an unfortunate oversight, the zodiacal light had superposed on it an additional 5¾ hours' exposure towards the north sky.) The night sky spectrum shows besides the 5577 line, more than thirty 'lines' between 5900 A. and 3700 A., two of which are on the red side of 5577 A. The

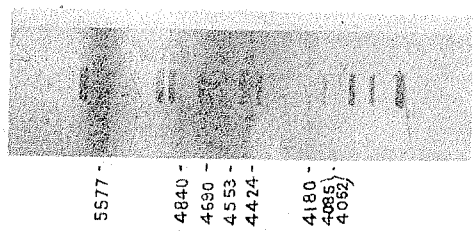

FIG. 2. Spectrum of night sky; exposure, 181 hours; comparison spectrum, helium.

strongest 'lines' occur at 4840, 4690, 4553, 4424, 4180 and 4085 A. and the photographically brightest region of the spectrum lies between 4830 and 4530 A. The spectrum of the zodiacal light also shows the emission lines or bands observed in the night sky. The plate used—Mimosa orthochromatic—was not sensitive to the red.

Fig. 2 shows a spectrum obtained with a spectrograph of higher dispersion (11·4 mm. between 5876 A. and 3900 A.). The exposure lasted 181 hours between March 7 and May 1, 1933. From a comparison with the spectrum of the night sky observed by Dufay[2] in France, it is seen that there is almost an identity between the spectra as observed in India and in France, both as regards the position of the lines and their relative intensities.

It is generally held that the spectrum of the night sky contains a background of continuous spectrum with Fraunhofer lines. In the spectra we have obtained, there is no positive evidence of the existence of Fraunhofer lines.

A fuller discussion of the spectra will be published elsewhere.

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[1] *Ind. J. Phys.*, 7, 405; 1932.
[2] *J. Phys.*, Ser. 7, 4, 221; 1932.

Nature, 132, 749, 1933.