yet been carried out using modern techniques. When improvements afforded by: (1) the use of detectors of increased accuracy and sensitivity extending farther into the ultra-violet to X-ray region and into the 2–8μ infrared; (2) satellite-based observing stations; (3) reliable absolute calibrations of detector responsivities; (4) interference filters which enable one to make Earth-bound observations only through atmospheric windows, the extinction law of which is properly evaluated, are incorporated in the final analysis, we must be prepared to accept revisions in *B.C.* which *may* reach tens of per cent for intermediate spectral types to nearly orders of magnitude for early *O* and late *M* stars.

Robert L. Wildey *

Mount Wilson and Palomar Observatories,
California Institute of Technology,
Carnegie Institution of Washington.

* Present address: Division of the Geological Sciences, California Institute of Technology.

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Concentration of Nightglow H_α-emission to the Ecliptic and the Radial Velocities of this Line

During the winter of 1962–63 I examined the distribution of H_α-intensity over the night sky. A Fabry-Pérot étalon was used with a spacing of 0·3 mm and reflexion coefficient 0·91 at H_α. An interference filter of 30 Å half-width was used as premonochromator. A contact image intensifier was used for registering the fringes. The whole system was installed on a small equatorial mounted in a tube in which temperature was controlled. The observations were made at the high-altitude station of the Sternberg Astronomical Institute ($\varphi = 44°$, $h = 3{,}000$ m) near Alma-Ata. One-hour exposure was sufficient to record H and OH fringes at any point of the sky, including the zenith.

The distribution of the night-glow H_α-emission shows a considerable concentration to the ecliptic and to the Sun. If the H_α intensity in the antisolar point is taken as 1, the intensity on the ecliptic at elongations 70°–90° from the Sun reaches 4–5 (Fig. 1). The distribution is markedly asymmetrical, the morning intensities being greater. The H_α intensity distribution across the ecliptic at the elongation of 90° (morning side) is shown in Fig. 2. The intensity of H_α in other point of the night sky at the same zenith distance, but far from the ecliptic, shows no enhancement. During the observations the regions close to the Sun were situated far from the Milky Way; its position is marked on Fig. 1. The H_α-intensity at 70°

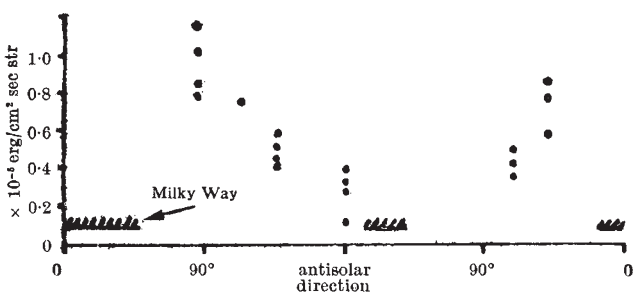

Fig. 1

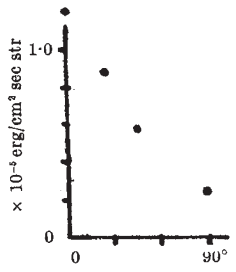

Fig. 2

elongation is greater than in a region of Milky Way without emission nebulæ.

An attempt was made to measure the radial velocities of H_α at 90° elongations. The dispersion of the monochromator used was 2 Å/mm for the fringe measured; the width of the H_α-line in the night-glow does not exceed 0·3 Å. A collimating lens of 2-m focal length sends into the apparatus the image of a white cross centred on the axis and illuminated by an H discharge tube. On the plate, points from the calibration cross were superimposed on the night sky fringes. The width of the line being 0·3 Å, a shift of 0·1 Å, corresponding to a radial velocity of 4·5 km/sec, could be easily detected. The measurements gave no certain evidence of relative shift of the two lines and the night-glow H_α radial velocity at 90° elongations must be less than the aforementioned value. In the antisolar direction a positive radial velocity was observed but not very certainly.

The small radial velocity and narrowness of the night-glow H_α line are strong arguments for its atmospheric origin. The observation can be fitted with the following model: neutral hydrogen forms a disk in the ecliptic plane 5,000 km thick and extended up to 3,000 km in the evening and to 10,000 km in the morning. During the night the hydrogen exosphere becomes denser as shown in a recent paper of Donahue (private communication). At sunrise intense dissipation begins, but the density remains high enough during several hours. It is a plausible explanation of the east–west asymmetry of the H_α night-glow. Such measurements can be used for determining the density of the exosphere, which depends strongly on the temperature of the thermopause. An interesting observational problem is the interaction of the Doppler-shifted Fraunhofer line in the zodiacal light and the H_α night-glow when observed with finite spectral resolving power. We have perhaps observed a darkening of the emission line at elongation near 90° due to such interaction.

P. V. Sheglov

Sternberg Astronomical Institute,
Moscow.

RADIOPHYSICS

21-cm Absorption of the Radiation from 3C273

The radio source 3*C*273 has been identified[1,2] with a star-like object of about thirteenth magnitude having a faint jet. However, the optical spectrum of the star contains a number of broad emission features which can be explained as hydrogen, magnesium and oxygen lines with a red-shift $\Delta\lambda/\lambda_0$ of 0·158 (refs. 2 and 3). Schmidt suggests that the stellar object is either a nearby ultra-dense star or, more probably, the abnormally luminous nuclear region of a galaxy at a distance of about 500 megaparsecs. The second possibility would make 3*C*273 the most luminous object known.

One method of deciding whether 3*C*273 is outside our Galaxy is to check whether its radio spectrum shows