

ABSTRACTS *

Adel, Arthur. Comparison of atmospheric methane content above Flagstaff, Arizona, and Columbus, Ohio.

A continuous, high resolution map of the infrared solar spectrum, 2 microns to 14 microns, was obtained by the author in 1940, at the Lowell Observatory. The experiment was performed with a grating with 2400 lines per inch in a Pfund type, automatically recording spectrometer of aperture F/5 and focal length of 30 inches. That portion of the map between 7 microns and 14 microns has been published, with a reference to the unpublished segment between 2 microns and 7 microns.¹

Early in 1948 M. Migeotte² identified absorption lines of the methane fundamentals ν_3 (3.3 microns) in solar spectra recorded at Columbus, Ohio, and ν_4 (7.7 microns) in the solar spectrum map recorded at Flagstaff.

The fundamental ν_3 (3.3 microns) is clearly resolved in the unpublished portion of the Flagstaff map and it serves importantly in drawing a comparison between the amounts of methane above Flagstaff and Columbus. For the purposes of such a comparison ν_3 is far superior to ν_4 , because of the much heavier absorption by water vapor at 7.7 microns and the far greater water vapor content of the atmosphere over Columbus relative to Flagstaff.

The slide shows ten lines in the P-branch of ν_3 of methane as observed in the solar spectrum at Flagstaff on the morning of October 28, 1940. The detailed agreement between this curve and the one obtained by Migeotte² is remarkable. The central intensities of the latter do not exceed those of the former by as much as one might have expected in view of the fact that the work at Columbus was done with a grating with 7200 lines per inch. It is significant that the fractional energy absorption is closely the same for the two spectra, thus indicating a widespread and uniform distribution of methane above the earth.

ATMOSPHERIC NITROUS OXIDE

Apropos of Cambridge University's recently published confirmation³ of the author's 1939-1941 discovery⁴ of atmospheric nitrous oxide it seems desirable to report at this time that observations of the absorption and *emission* of atmospheric nitrous oxide are being analyzed for the temperature of the gas, assuming it to be iso-

thermal.⁵ It may be of further interest to point out that in 1946 it was suggested that the nitrous oxide in escaping soil air might constitute a possible origin of the atmospheric nitrous oxide.⁶

1. A. Adel, *Ap. J.* **94**, 451, 1941.
2. *Phys. Rev.* **73**, 519, 1948; *Ap. J.* **107**, 400, 1948; *Phys. Rev.* **74**, 112, 1948.
3. G. B. B. M. Sutherland et al., *Phys. Rev.* **74**, 978, 1948.
4. *Ap. J.* **90**, 627, 1939; **93**, 509, 1941.
5. A. Adel, *Ap. J.* **105**, 406, 1947.
6. A. Adel, *Science*, **103**, 280, 1946.

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Bok, Bart J. and Margaret Olmsted. Photographic colors of faint Cepheids in Cygnus.

The 24-33 inch Jewett-Schmidt telescope at the Oak Ridge Station has been used for the study of blue and red magnitudes of four remote Cepheids, GL, QY, V343 and V336 Cygni all of them near galactic latitude $+3^\circ$. These four long-period Cepheids, which originally had been discovered by Baade, were found by Oort and Oosterhoff to show evidence for very small interstellar reddening, with the estimated total photographic absorptions not exceeding 1.5 mag. at distances in excess of 5000 parsecs.

The present investigation is based on thirty-seven pairs of blue (103a-O) and red (103a-E +25A Wratten filter) plates with ten minutes exposure time each and on a number of blue and red polar comparison plates, used for the establishment of the basic standard sequences. Normal color indices at maximum and minimum light were estimated for each star from the spectral data of Struve and Code and the normal colors of Heyden.

The derived color excesses, computed for minimum and maximum light for each of the four stars, indicate without exception average total photographic absorptions of 2.0 to 2.5 mags. The calculated distances for the four stars are 6000 parsecs for GL, 8300 parsecs for QY, 7600 parsecs for V343, and 15,800 parsecs for V336 Cygni. In all four cases the red range of apparent magnitude was found to be very much smaller than the photographic range, the average ratio being about 0.4.

A 60-minute Jewett plate (103a-O) gives no positive evidence for the presence of faint exter-

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