COMPARISONS WITH THE SECOND STAR.

In July and August, 1898  -  -  -  160.51°  228.42°
In November and December, 1898  -  -  160.51  228.28

The differences between the first and last sets in each case are no greater than would be expected in the measurement of such an object, and are contrary in sign to what would be required if the nebula were nearer than the stars.

If it can be assumed that the comparison stars are in reality far beyond the nebula in space, the results would indicate that the distance of the nebula from the Earth is much greater than that of the nearest fixed star. As the stars are apparently in the nebula, and may in reality lie within its boundaries, such an assumption is, perhaps, hardly justifiable. The same objection, however, is applicable to any star in this region accessible to a large telescope. The great focal length of the 40-inch refractor, which so materially increases the precision of measures made with it, necessarily limits the choice of comparison stars to those lying within the immediate neighborhood of the nucleus.

THE SPECTRUM OF SATURN'S RINGS.

The strong absorption band in the red region of the spectrum of Saturn, the wave-length of which is given by Vogel as 6183, was seen by this observer to be absent, or extremely faint, in the spectrum of the rings. In 1889 Professor Keeler could detect no trace of the band in the spectrum of the rings with the Lick telescope (A.N., 2927). An opportunity to test this point photographically presented itself last August, through the courtesy of the International Color-Photo Co., of Chicago. The "Erythro" plates made by this company for the Yerkes Observatory are so sensitive in the red that photographs of the spectra of fifth magnitude stars extending down to $H\alpha$ have been secured with their aid. An "Erythro" plate was used by Mr. Ellerman in making the accompanying photograph of the spectrum of Saturn with the 40-inch telescope on August 18, 1898. At that time the planet was so far south and west in the early evening that a long
exposure could not be given. For this reason it was necessary to use the dispersion of only one 60° prism of dense flint, on the spectrograph of 1 1/4 inches aperture. The collimator objective has a focal length of 19 inches, and the camera lens employed on this occasion a focal length of 10 1/2 inches. The slit, which was parallel to the planet's equator, was made rather wide (0.008 inch) in order to reduce the time of exposure. This accounts for the lack of sharpness in the photograph, which is enlarged seven and one-half diameters from the original negative.

Although the broad absorption band is clearly shown in the spectrum of the ball, no trace of it can be seen in the spectrum of the rings. The conclusion drawn from the visual observations, that the rings probably possess little or no atmosphere, is thus confirmed by the photograph.

The negative does not seem to show any of the bright lines mentioned by Lockyer (A.N., 2881).

A photograph of the same region in the spectrum of Jupiter has recently been obtained here by Mr. Ellerman with the three-prism spectrograph. The absorption band is well shown, but its intensity is less than in the spectrum of the ball of Saturn. It is hoped that this photograph, as well as others of Saturn which will be made here with a dispersion of three prisms, will permit the wave-length of lines in the band to be accurately measured. George E. Hale.

March 18, 1899.