ART. XXVI.—*Note on the Observations of Comet b, 1881, made at the United States Naval Observatory; by WM. HARKNESS.*

[Communicated by authority of Rear Admiral John Rodgers, U. S. N.,
Superintendent.]

ON the evening of June 28th, I examined the comet for polarization by means of a double image prism applied to the naked eye, and at first I fancied that when the two images were placed in the axis of the tail the one situated farthest forward was the fainter, but a careful examination by three different observers rendered this doubtful. Recourse was then had to a three-inch telescope armed with an eye-piece magnifying 34·5 diameters, and the image of the comet given by it was examined, first with the double image prism, and subsequently with a Savart polariscope, but neither of these instruments showed any polarization. Mr. Huggins thinks he has detected the

Fraunhofer lines in the continuous spectrum of the nucleus, and if this really is the case its light must be at least partly derived from the sun, and should show traces of polarization. As just stated, I failed to discern any with the double image prism: but that is not a very delicate test, although, owing to the small size of the nucleus, it is almost the only one practicable. Under the magnifying power used the coma filled the field of view with bright light, and yet exhibited not a trace of polarization when tried by that most delicate of all tests, the Savart polariscope; thus apparently confirming the testimony of the spectroscope that the coma is self-luminous.

On the evenings of June 28th, and July 1st and 2d, I examined the spectrum of the comet with a spectroscope having a single sixty-degree prism through which a beam of light 0.82 of an inch in diameter is passed. The wave-lengths of the bands in the comet's spectrum were determined by measuring the interval between them and the D line given by the flame of a spirit lamp with a salted wick held before the object glass of the telescope to which the spectroscope was attached; the measurement being effected by a micrometer which showed a bright point in the field of view. Owing to the unfavorable position of the comet, the only telescope upon which the spectroscope could be used was my three inch of 43.6 inches focus, which is mounted upon a portable tripod stand, but is destitute of clamp and tangent screws.

Notwithstanding the brightness of the comet, it gave a spectrum very ill-defined, and difficult to measure. The spectrum of the nucleus seemed to be continuous, and its approximate extent was from D to G. I did not detect any Fraunhofer lines in it, but possibly they may exist and yet have been obliterated by the rather wide opening of the slit, which was 0.0125 of an inch. With a narrower slit it was difficult to keep the comet in the field of the spectroscope. The coma gave a spectrum consisting of three bright bands, so ill-defined that no precise measures of the wave-lengths of their edges could be made, but the wave-lengths of their brightest parts were respectively, 549.3, 512.4 and 467.2. This seems to be the ordinary comet spectrum. The measurement of the wave-length of the middle band is tolerably accurate, but the measurements of the other two are liable to considerable uncertainty, owing to the faintness of the bands. I estimated their relative brightness to be 5, 30 and 1. On July 1st a slight haziness of the atmosphere sufficed to render the third band invisible. At a short distance from the head of the comet this band always faded out, and the spectrum of the tail seemed to consist of the first and second bands only—that is 549.3 and 512.4.

On June 28th the comet's nucleus was about as bright as a third-magnitude star, and its tail was plainly visible throughout an extent of at least twelve degrees. On July 1st the comet was perceptibly fainter, and its tail was only about eight degrees long, but perhaps this was partly owing to the moon, five and a half days old, being above the horizon. On July 2d the atmosphere was very clear and the seeing good, but the visibility of the comet was much diminished by the brightness of the moon, then near its first quarter. I estimated the length of the tail to be about the same as on the preceding evening, but Mr. Rock thought he could trace it for rather more than twenty degrees.

Since the 10th inst., Professor Hall has examined the comet with the twenty-six inch refractor, and Professor Eastman has examined it with the nine and six-tenth inch refractor, but neither of these gentlemen have been able to see any indications of a division of the nucleus.

The comet was observed at its lower culmination, with the transit circle, on June 26, 27, 28, 29 and July 1, 2, 3, 5, 6, 10, 11. For the convenience of those who may desire to compute the orbit, Professor Eastman has furnished from these observations, the following positions, which are uncorrected for parallax and aberration time:

Washington Date.	Right Ascension.	Declination.
June 26.5	5 ^h 48 ^m 38 ^s .04	+57° 40' 52".0
July 1.5	6 22 46.85	70 39 57.6
" 3.5	6 42 32.92	74 5 16.2
" 6.5	7 20 36.88	77 49 56.3
" 10.5	8 27 31.84	+80 48 56.1

From a Cambridge observation of June 23d, and the Washington observations of June 29th and July 5th, Professor Frisby has computed the following parabolic elements:

$$\begin{array}{lcl}
 \text{Perihelion Time, June } 16.3700 & & \\
 \left. \begin{array}{l} \pi = 265^\circ 31' 15''.4 \\ \Omega = 270^\circ 58' 27''.0 \\ i = 63^\circ 25' 55''.7 \end{array} \right\} \begin{array}{l} \text{Equinox} \\ 1881.0 \end{array} \\
 \log q = 9.866748
 \end{array}$$

The residuals, $U-O$, for the middle place are

$$\begin{array}{l}
 \delta\lambda \cos \beta = -13''.4 \\
 \delta\beta = +62.1
 \end{array}$$

It is a matter of interest to note that about June 20th the earth was in the immediate vicinity of the comet's tail, but I have not made sufficiently accurate computations to be able to state whether or not it actually passed through it.

U. S. Naval Observatory, Washington, July 13, 1881.