MNRAS..47

If the eccentricity of the orbit is not large enough to allow $\delta\mu_0$ to be made directly one of the unknown quantities, and it is preferred to treat ω' a', k', tan ν' directly as the elements, and to determine the coordinates by

$$15\cos\delta\,.\,(\alpha-\mathrm{A}) = x = a'k'\,.\,\rho\sin(v+\omega')$$
$$\delta-\mathrm{D} = y = a'\,.\,\rho\cos(v+\omega') + a'\,.\,\rho\sin(v+\omega')\,.\,\tan\nu'$$
$$= a'\sec\nu'\,.\,\rho\cos(v+\omega'-\nu'),$$

the equations of condition between the differences of the observed and computed coordinates and the corresponding variations of the elements become

$$\delta x = +[\cos(v+\omega')+e\cos\omega']\,.\,k'\,.\,\frac{a'\sec\phi}{57{\cdot}3}[\delta(\mu_0+\omega')+(t-t_0)\,\delta n]$$
$$-[\cos(v+\omega')(\cos\epsilon\,.\,\cos\phi+\tan\tfrac{1}{2}\phi)+\cos\omega']\,.\,k'\,.\,a'(\tan\phi+\delta e)\sin\delta\omega'$$
$$+[\cos(v+\omega')\sin\epsilon-\sin\omega'\cos\phi]\,.\,k'\,.\,a'[(\tan\phi+\delta\epsilon)\cos\delta\omega'-\tan\phi]$$
$$+\frac{x}{a'k'}\,.\,\delta(a'k')+15\cos\delta\,.\,\delta\mathrm{A}\ldots$$

$$\delta y = -[\sin(v+\omega'-\nu')+e\sin(\omega'-\nu')]\sec\nu'\,.\,\frac{a'\sec\phi}{57{\cdot}3}[\delta(\mu_0+\omega')+(t-t_0)\,\delta n]$$
$$+[\sin(v+\omega'-\nu')(\cos\epsilon\,.\,\cos\phi+\tan\tfrac{1}{2}\phi)+\sin(\omega'-\nu')]\,.\,\sec\nu'$$
$$.\,a'(\tan\phi+\delta e)\sin\delta\omega'$$
$$-[\sin(v+\omega'-\nu')\sin\epsilon+\cos(\omega'-\nu')\cos\phi]\,.\,\sec\nu'$$
$$.\,a'[(\tan\phi+\delta e)\cos\delta\omega'-\tan\phi]$$
$$+\rho\sin(v+\omega')\,.\,a'\,\delta(\tan\nu')$$
$$+\frac{y}{a'}\,.\,\delta a'+\delta\mathrm{D}\ldots$$

from which the most probable values of the corrections are to be deduced. The elements ω, i, $\ldots$ are then found by the formulæ previously given.

Observations of Nova Cygni, of some of the Planets, and of Comet Barnard, made at Mr. Wigglesworth's Observatory with the 15·5-inch Cooke Equatorial. By J. G. Lohse.

Nova Cygni.

1885, Sept. 1.—*Nova Cygni* is of the same brightness as the small star of the 15th magnitude north preceding of it. No change in the brightness of the other stars, which were all seen, could be made out.

Oct. 3.—*Nova Cygni* was examined with a magnifying power of 260. It has become a little brighter, and is only 0·3 mag.

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MNRAS..47

fainter than the stars Nos. 68 * and 73. The star No. 68 is a little brighter than No. 73, but the difference is scarcely 0·1 mag. *Nova Cygni* is not so well defined as the comparison stars, and is certainly surrounded by nebulosity. Attempts were made to see *Nova Cygni* with a McClean prism held in front of the eyepiece, but no trace of light could be recognised. The spectrum of the other three stars, forming with *Nova* a trapezium, could be seen without much difficulty, especially that of the 11th magnitude star No. 60.

Oct. 7.—*Nova Cygni* is of a bluish colour and surrounded by nebulosity. It is more than double as bright as the star No 50, and about of the same brightness with Nos. 68 and 73 No. 68 is a little brighter than No. 73.

Oct. 26.—*Nova Cygni* was examined with magnifying powers of 330 and 130. It is decidedly surrounded by nebulosity, and about 0·3 mag. fainter than the stars Nos. 68 and 73. No. 73 is nearly 0·1 mag. brighter than No. 68. No. 50 was very well seen, but it has not half the light of *Nova Cygni*.

Dec. 1.—*Nova Cygni* is 0·3 magnitude smaller than stars Nos. 68 and 73. Definition poor.

1886, May 1.—*Nova Cygni* is of the 14·5 magnitude. No change amongst the neighbouring stars was noticed.

July 5.—*Nova Cygni* is of the 14th magnitude, and nebulous in appearance.

July 22.—*Nova Cygni* is equal in brightness to star No. 73, and 0·2 mag. fainter than No. 68. *Nova* appears nebulous. The 15th mag. companion of *Nova* was also seen.

Aug. 2.—*Nova Cygni* is equal in brightness to stars Nos. 68 and 73. The 15th mag. star near it was very well seen.

The estimations indicate a small increase in the brightness of *Nova* during October, and it seems that one of the comparison stars is variable to a very small extent.

Venus.

On January 2 and February 3, 1886, the dark part of *Venus* was distinctly seen by Mr. Wigglesworth and Mr. Lohse; it is of a gray colour, except near the terminator, where the secondary spectrum causes it to appear blue, and compared with the bright part of *Venus* it looks very much smaller. On January 2, from $5^h\ 15^m$ to $5^h\ 35^m$ G.M.T., when the definition was very good, the upper or south horn appeared rounded while the lower one was quite sharp. In prolongation of the lower horn, but perfectly separated from it, was a bright narrow line of light about $\frac{1}{20}$ of the diameter of *Venus* in length. A similar phenomenon is often presented by the mountains of the Moon near the south horn, which appear along the edge as a detached irregular line of light as long as the summits only are illuminated.

* *Copernicus*, vol. ii. p. 118.

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