" For the calculation of the angle of position (θ) and distance (ϱ) we have,

$$E - [3{\cdot}39698] \sin E = [1{\cdot}46706] (1826{\cdot}48 - t)$$
$$\tan \tfrac{1}{2} v = [0{\cdot}39928] \tan \tfrac{1}{2} E$$
$$\tan (\theta - 21^\circ\ 3') = [9{\cdot}95494] \cdot \tan (v + 69^\circ\ 24')$$
$$\varrho = [0{\cdot}55319] \cdot \frac{\sin E}{\sin v} \cdot \frac{\cos (v + 69^\circ\ 24')}{\cos (\theta - 21^\circ\ 3')}$$

" I have made an unsuccessful attempt to determine the elements of τ *Ophiuchi*. I think the period will prove to be about 120 years; but this must remain for verification. " J. R. HIND.

" *Mr. Bishop's Observatory, Regent's Park,*
" *December* 12, 1845."

IX. Extract of a Letter from Sir John Herschel to the President, dated Collingwood, November 29, 1845.

" Being on the subject of the satellites of *Saturn*, I will mention here a singularity which, though obvious enough, has not (so far as I am aware) been noticed before, viz. that the periodic time of the first satellite (first in order of the ring) is *precisely* half that of the third, and the periodic time of the second *precisely* half that of the fourth. This is far too remarkable and close a coincidence to be merely casual, and (the second satellite being a certainty) the extension of the law to the first (a law so out of the way and unlikely) would of itself be evidence of its real existence, even had it not been (as it now certainly has been) re-observed. If such atoms perturb one another's motions, there must be some very odd secular equations arising from this singularity. It is not worth while to make a formal communication of such a thing to the Astronomical Society; but if you think it worth your verbal mention at the meeting, it may be interesting to those (if any) who are busy about satellitary perturbations."

X. On a new Double-image Micrometer, communicated in a Letter to the President, by Professor Powell.

" My dear Sir, — The following suggestion for a very simple double-image micrometer occurred to me a few years ago; but not having much practical acquaintance with these matters, I should hardly have supposed it to possess novelty or prospect of utility enough to render it worthy the notice of the Astronomical Society, had you not encouraged me to communicate it.

" The optical principle is merely that of a ray of light, refracted obliquely through a plate of glass with parallel surfaces, and emerging parallel to, but not coincident with, its original direction.

" If, then, such a plate intercept half the cone of rays going from the object-glass of a telescope to its focus, there will be formed, at the focus, besides the direct, a deviated image; and the angular deviation will be dependent on the inclination, the thickness, and the refractive power of the glass, involving a constant factor

to be found by observation for the particular instrument, agreeably to the following formula, which may be easily tabulated for all inclinations.

"If φ and φ^1 be the angles of incidence and refraction, and t the thickness of the plate, a moment's consideration will shew that the oblique path of the ray within the plate $= t \,.\, \sec \varphi^1$; and, for the angular space θ between the direct and the deviated ray, c being the constant for the instrument, we have

$$\theta = c \,.\, t \,.\, \sec \varphi^1 \sin (\sin \varphi - \varphi^1).$$

"If such a plate be placed within the tube of a telescope between the object-glass and its focus, so that a variable inclination can be given to it, and a graduated circle be read off outside; then, when the plate is perpendicular to the axis there will be no deviation; but, when it is inclined, the deviation, found as above, will give the measurement of a small angular space, as in other double-image micrometers.

"The less the thickness of the glass, the greater will be the range of the scale for a very small deviation.

"The idea has as yet been put to trial only in a very rough manner; and I offer it without at all being able to say whether serious practical difficulties may not arise, which can only be decided on a more accurate construction; or should no such objection occur, it still remains to be seen whether this suggestion may afford any useful addition to the micrometrical resources already in the hands of the observer, so as at least to be available in some cases: but these are points on which the practical astronomer alone can judge; and it is mainly in the hope that it may receive such examination that I submit this idea to the Astronomical Society.— I remain, &c.

"BADEN POWELL,
"Savilian Professor of Geometry.

"*Oxford, December 7th*, 1845."

After the reading of this paper, Professor Powell proceeded to illustrate his views by the aid of a large diagram, which was suspended in the meeting-room. He also exhibited to the members present a rough application of the proposed micrometer to a telescope which he had brought with him for that purpose.

Several copies of the Ephemeris of Gambart's (Biela's) Comet, for its present apparition, computed by Mr. Stratford, have been left by him at the Apartments of the Society for distribution to such Fellows of the Society as are desirous of observing the Comet.

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