

was very slightly surpassed by no. 3 ($\cdot 904$). Has a further change occurred since August last? or is the difference due to the employment of a high power by Prof. Pickering? The spot being usually a hazy indefinite object may become inconspicuous under a high power owing to want of contrast.

The following notes on some of the other spots may be of interest. No. 0 was seen distinctly on June 5 and 7. The great brightness of no. 2, according to Prof. Pickering, is very remarkable, since in 1869–71 it was one of the faintest spots—visibility only $\cdot 039$. In 1879–82 this latter was only $\cdot 022$, and in 1882–84 the spot was not seen at all. The present remarkable brightness is confirmed by M. Quénisset, who recorded it as the most brilliant spot visible on Aug. 5 last. No. 15 was seen quite distinctly on June 5. I have found this spot very variable. On June 7 it was only suspected. No. 22 was not seen by Prof. Pickering. It is probably, however, identical with the projection from the wall shown in his diagram. The drawings reproduced in the B.A. Report for 1872 show beyond doubt, I think, that Prof. Pickering's crater no. 40 is identical with the spot 25 of Birt. His no. 47 was first seen by the writer as an elevated object, but not as a crater, on May 7, 1881. It has often been seen since as a spot. Spot 6 is very variously placed in the drawings in the B.A. Report, and two or three different spots seem to have been identified with this object. Prof. Pickering's spot 41 is identical with no. 43 of the Map in the 'Observatory' for Oct. 1887, p. 347, and his no. 54 with the spot there numbered 6.

Yours faithfully,

Brighton, 1892, Dec. 17.

A. STANLEY WILLIAMS.

Herapath's Comet.

GENTLEMEN,—

I wrote to you a short time ago about the discovery of a comet (Gregory's at Langar) being the sole achievement of an observatory. Perhaps you will allow me space for a few words on the discovery of another comet as the sole observing achievement of an individual. It is a remarkable instance of the length of time taken sixty years ago in the diffusion of scientific (and other) news as compared with the same now, that the discovery of the comet in question (1830 II.) was claimed by Biela on January 14, 1831, though it had been noticed by Herapath a week before, and observed both at Kensington (by Sir James South) and at the Royal Observatory, Greenwich, several days before being seen by Biela, the well-known discoverer in 1826 of the periodical comet (which has since become celebrated in so many ways) called after his name.

Herapath's account of his discovery of the comet to which I am alluding is given in the second volume of the 'Monthly Notices' of the R. A. S. The comet was visible to the naked eye, and was noticed by Herapath (who then resided at Cranford) whilst on

Jan. 1893.]

Correspondence.

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Hounslow Heath about 6 o'clock in the morning on January 7, 1831. "The tail," he says, "was then nearly perpendicular to the horizon, inclining towards the south, and of a white colour, apparently between 1° and 2° long. The head was of the same colour as the tail, but in proportion far more splendid. To me it appeared to equal, in light, stars of the second magnitude, whilst it exceeded them in size." He afterwards determined its approximate place with a sextant by taking distances from Arcturus and α Lyræ. Being in Ophiuchus, with a declination of more than 12° south, it could not long have risen at the time of the observation. The comet's orbit was calculated by Wölfers, who showed that it had passed its perihelion on the 28th of December, 1830, at the distance from the Sun of only 0.126, less than half that of Mercury.

Probably few are now even acquainted with Herapath's claims to great discoveries in natural philosophy and the cause of gravitation, in which he professed to be following in the steps of Newton. On the rejection of his first paper on the subject by the Royal Society in 1820, he had it and others printed in the 'Annals of Philosophy,' a publication since superseded by the 'Philosophical Magazine,' which led to a somewhat heated controversy on the accuracy of his views and the arguments by which he supported them. Into this I have no wish to enter. Herapath published a complete account of his theory in 1847 in two volumes (intended to be supplemented by a third, which never appeared) under the somewhat pretentious title 'Mathematical Physics, or the Mathematical Principles of Natural Philosophy.' Perhaps I may be allowed a remark upon one point in this. His principles require that the densities of the planets should decrease as their distance from the Sun increases. He is therefore disturbed at the fact that the density of Uranus is greater than that of Saturn, and suggests that a mistake may have been made in determining the mass of Uranus by its observed perturbations upon Jupiter and Saturn. The then quite recent discovery of Neptune led him to think that effects produced upon the interior planets by Uranus and Neptune working together might have been attributed to Uranus only, and produced an erroneously large estimate of the amount of its mass. But surely he might have taken the trouble to ascertain that the mass of Uranus had been deduced in quite a different manner, *i. e.* from the periods and distances of its satellites, or rather of those now known to be the two outermost, Titania and Oberon. Herapath died at Catford in 1862.

Blackheath, 1892, Nov. 26.

Yours faithfully,

W. T. LYNN.

The Relative Brightness of Comets.

GENTLEMEN,—

Tables of *planetary* elements enable one to compare the relative sizes of the several planets, generally by stating their