XXVIII. On the satellites and belts of Jupiter

Mr. John Snart

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directly under this aperture, draw several concentric semi-circles, and fix the meridian line according to the preceding directions. The gnomon should have several other holes made through it in a line perpendicular to the horizon, that the sun's rays at noon, flowing through some of them, may fall near the north end of the stone at all seasons of the year; for if only one hole be used, the sun's image will fall near the centre of the gnomon in the summer, and in the winter it will be thrown far beyond the north end of the stone.

I am, sir, your humble servant,

EZ. WALKER.

XXVIII. *On the Satellites and Belts of Jupiter.* By
Mr. JOHN SNART.

To Mr. Tilloch.

London,
July 18, 1806.

SIR,
THE salutary effects of the most tempestuous weather are so obvious that most persons have observed them, and whatever disagreeable effects we may encounter while these august operations are going on, we are fully compensated for in the issue.

Friday last (11th instant) was a very tempestuous day: however, about ten o'clock P. M., after our atmosphere was pretty much attenuated by the discharge of vast quantities of rain, much thunder, lightning, &c.; and Jupiter being retrograde in longitude $9^{\circ} 1^{\circ} 21'$, *i. e.* in $1^{\circ} 21'$ of Capricorn, right ascension 272° , and consequently in that part of the heavens which is about south-south-east of London, my attention was called, by an acquaintance of mine, to a sight which afforded me a great deal of pleasure, viz. "a view of the third and fourth satellite of Jupiter by the naked eye." But though professor Beauchamp, I think, was so remarkable for the singular acuteness of his vision, that he could discern these auxiliaries by his natural optics, I was apprehensive that I might be deluded by some stars of the 7th or 8th degree of magnitude. Therefore, to prove the identity of these secondary planets, I took a good night telescope to examine the primary and its satellites, as well as
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to observe if there were any small stars in its vicinity; knowing that there are many nebulæ belonging to that part of the galaxy, or milky way, which runs through the preceding constellation Sagittarius, and by the precession of the equinox border upon the sign of φ ; but could not discern any: for the two satellites I had observed were in the places I saw them by my naked eye, as well as the two other lesser ones; that is to say, one of the outer ones was on the eastern and the other three were on the western side of their primary, thus:

I did not take particular notice of the belts at this time, because I was too much interested with the novelty of the satellites: but an idea has often occurred to me respecting the *rationale* of their mutations (*i. e.* of the belts) which I think may (at least analogically speaking) elucidate the phenomena of their fluctuation. For instance: when the sun is about to pass from either hemisphere into the other, the rarefaction of vapours consequent upon his presence causes so great a commotion in the atmosphere as to produce a continual current of wind, and to carry the clouds in one direction throughout most part of the torrid zone of our earth (called a monsoon, or general trade wind, &c.). Now, if we were to be elevated to a great height above our atmosphere, it is plain, I think, that this current must give the clouds a lineal direction, by which they would assume the appearance of one or more belts or girdles passing across the equatorial parts of the earth, and which belts would change their form and dimensions to an aerial observer in six months in a similar manner to those of Jupiter in $5\frac{1}{2}$ years (equal to half a year in that planet): I therefore think it but fair reasoning to suppose that Jovian trade winds, or something equivalent thereto, carrying his clouds in an equatorial direction, produce these mutations on the face of that planet which we call belts, and for which phenomena I have never seen any colourable conjecture. If these ideas meet your approbation, and you think them worthy of insertion, they are much at your service.—From yours respectfully,

Southwark Philosophical Society,
215, Tooley-street.

JOHN SNART.

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