

receive from them no observation beyond the mere fact of their existence, nor has any explanation of them been offered.

Many phenomena are to be observed in the motion of the satellites. They move about the planet from west to east in nearly circular orbits, and, when one passes between the sun and the planet, it casts a black shadow on its disk, as in a solar eclipse the shadow of the moon is thrown on the earth. If on the other hand the satellite passes into Jupiter's shadow, it is itself eclipsed. If, again, we see it more across the face of the planet between it and the earth, a transit of the satellite occurs, and if it passes on the other side, it is occulted by the planet. By certain variations in the appearance of the satellites, especially the fourth, noticed by Galileo, and subsequent observers, it is thought that, like our moon, they rotate in their axis once in their revolution and the planet.

Some writers have supposed the light which Jupiter lacks on account of his great distance from the sun, to be compensated by the number of his moons, and have indulged in glowing descriptions of the splendour of the scene presented by them, which would tend very much to dim the beauty of the sidereal heavens in the eyes of the Jovicolae, if any such creatures exist. But though we might at first sight suppose this to be the case, as it is certain that our one moon robs the star-groups much of their magnificence, when we consider that these moons receive but $\frac{1}{4}$ as much light as ours, and therefore, covering as they do, a space about half as large again would, even if they were all full together—which as a matter of fact, never occurs, for at that part of their orbit where they would otherwise be full, they are generally all eclipsed—shed upon the Jovials only about $\frac{1}{16}$ part of the light sent to us by the full moon.

Laplace has discovered a curious relation, which governs the movements of the first three satellites, namely, that the mean motion of the third is equal to three times that of the second, while a similar relation holds for their longitudes. In the ephemeris a complete list of their times of eclipse, transit occultation, etc., is given for a certain meridian, so that by comparing these times with the times of the occurrence of these phenomena at any particular place,

the longitude of that place may be determined, a method sometimes used, but one which does not admit of very great accuracy on account of the difficulty of observing the exact time of the occurrence of these phenomena. It is worthy of note that, by observing the occultation of Jupiter's satellites, Roemer, a Danish astronomer, first discovered the velocity of light, whose transmission was, previous to this time, thought to be instantaneous.

Many imaginative writers have gone into calculations concerning the probable magnitude and character of the inhabitants of Jupiter, some proving them to be as large as Og, King of Bashan, while others by another line of reasoning, show them to be pigmies two and one-half feet in height; some, also, imagine them bat-winged, others think them inveterate dancers, while Sir Humphrey Davy fancies their bodies to consist of "numerous convolutions of tubes, more analogous to the trunk of the elephant than anything else." But, before looking into their nature, let us consider the possibility of their existence. If the planet depend entirely upon the sun for its heat and light, creatures like those on earth can scarcely exist there, unless, as some writers suggest, the layer of cloud surrounding it can collect the heat from the sun, while preventing radiation from the planet, and thus, though the amount of heat received be small, rendering the temperature sufficient for the existence of life. If, on the other hand, the planet be liquid, and in a semi-incandescent state, life is certainly impossible on its surface. But Proctor suggests that, even if the planet lack inhabitants, there is no reason why the satellites, which are as large as the four planets next the sun, and receive their heat and light from Jupiter as a sun, should not possess a race of creatures as perfect as those on the earth. This, certainly, might be; but, by the disturbance they cause in each other's motions, their mass has been calculated, and thus it is found that their density is about the same as his, and so cannot more than he, admit of the existence of life. If creatures did exist on either planet or satellite, the sights presented to their gaze in the heavenly arena would be certainly magnificent. From Jupiter would be seen the sun, together with all the groups of stars, sweeping