

the third satellite of Jupiter. The densest of this group of satellites, the second, is even *denser* than Jupiter himself, while the third and largest appears to be of *equal* density with the primary. The masses also do not increase in at all the same ratio as the distances. If the planets have been formed from revolving rings, then the greater or less dense aggregation round a nucleus must have been caused by peculiar causes, which may, perhaps, always remain unknown to us.

The orbits of the secondary planets which belong to the same group have very different degrees of eccentricity. In the Jovial system, the orbits of the first and second satellites are nearly circular, while the eccentricities of those of the third and fourth satellites amount to 0·0013 and 0·0072. In the Saturnian system, the orbit of the satellite nearest to the primary (Mimas) is considerably more eccentric than the orbits of Enceladus and Titan, the largest and first discovered, whose orbit was so accurately determined by Bessel. The eccentricity of the orbit of the sixth satellite of Saturn is only 0·02922. According to all these data, which are among those that may be relied upon, Mimas only is more eccentric than the Earth's Moon (0·05484); the latter possesses the peculiarity that its orbit round the Earth has a greater eccentricity, in comparison with that of its primary, than any other satellite. Mimas revolves round Saturn in an orbit whose eccentricity is 0·068, while that of the orbit of its primary is 0·056; but the orbit of our Moon has an eccentricity of 0·054, while the eccentricity of that of the Earth is only 0·016. With regard to the distances of the satellites from their primaries, compare *Cosmos*, vol. i., p. 94–98. The distance of the satellite nearest to Saturn (Mimas) is now no longer taken as 80,088 geographical miles, but as 102,400; whence its distance from the ring, this being calculated as 24,188 miles broad, and at a distance of 18,376 miles from the surface of the planet, will be 28,000 miles.* Remarkable anomalies, together with a certain correspondence, are also presented in the position of the orbits of the satellites in the Jovial system, in which very nearly all the satellites move in the plane of the equator of their primary. In the group of Saturnian satellites, seven of them revolve almost in the plane of the ring, while the outermost (the eighth, Japetus) is inclined toward their plane $12^{\circ} 14'$.

* In the earlier data (*Cosmos*, vol. i., p. 97) the equatorial diameter was taken as a basis.