a common center of gravity. In our solar system, which is constituted of very heterogeneous elements, dark cosmical bodies revolve round a self-luminous one, or much rather again round a common center of gravity, which at different times is situated within and without the central body The individual members of the solar system are of dissimilar nature—more dissimilar than for many centuries astronomers were justified in supposing. They are principal and secondary planets; among the principal planets a group whose orbits intersect each other; an innumerable host of comets; the ring of the zodiacal light; and, with much probability, the periodic meteor-asteroids.

It still remains to state here fully, as actual relations, the three great laws of planetary motion, discovered by Kepler. *First law:* each orbit of a planetary body is an ellipse, in one of whose foci the Sun is situated. *Second law:* each planetary body describes in equal times equal sectors round the Sun. *Third law:* the squares of the times of revolution of two planets are as the cubes of their mean distances. The second law is sometimes called the first, because it was discovered earlier. (Kepler, *Astronomia Nova, seu Physica Cœlestis, tradita Commentariis de Motibus stellæ Martis, ex observ. Tychonis Brahi elaborata*, 1602; compare cap. xl. with cap. lix.) The first two laws would be applicable if there were only a single planetary body; the third and most important, which was discovered *nineteen* years afterward, fixes the motions of two planets to one law. (The manuscript of the *Harmonice Mundi*, which appeared in 1619, was already completed on the 27th of May, 1618.)

While the laws of planetary motions were empirically discovered at the commencement of the seventeenth century; while Newton first discovered the force, of whose action Kepler's laws were to be considered as necessary consequences; so the end of the eighteenth century has had the merit of demonstrating the *stability of the planetary system* by the new path which the perfected calculation of infinitesimals opened to the investigation of astronomical truths. The principal elements of this stability are, the invariability of the major axes of the planetary orbits, proved by Laplace (1773 and 1784), Lagrange, and Poisson; the long periodic change (comprised within narrow limits) of the eccentricity of two larger planets more distant from the sun, Jupiter and Saturn, themselves only $\frac{1}{1048}$ of the mass of the all-governing central body; finally, the arrangement that, according to the eternal