

gation of the theory of gravitation, have immortalized the name of Kepler.* Cosmical considerations, even when based merely on feeble analogies and not on actual observations, riveted the attention more powerfully then, as they still frequently do, than the most important results of *calculating astronomy*.

After having described the important discoveries which in so small a cycle of years extended the knowledge of the regions of space, it still remains for me to revert to the advances in physical astronomy which characterize the latter half of this great century. The improvement in the construction of telescopes led to the discovery of Saturn's satellites. Huygens, on the 25th of March, 1655, forty-five years after the discovery of Jupiter's satellites, discovered the sixth of these bodies through an object-glass which he had himself polished. Owing to a prejudice, which he shared with other astronomers of his time, that the number of the secondary planetary bodies could not exceed that of the primary planets,† he did not seek to discover other satellites of Saturn. Dominicus Cassini discovered four of these bodies, the Sidera Lodiacea, viz., the seventh and outermost in 1671, which exhibits great alternation of light, the fifth in 1672, and the fourth and third in 1684, through Campani's object-glass, having a focal length of 100–136 feet; the two innermost, the first and second, were discovered more than a century later (1788 and 1789) by William Herschel, through his colossal telescope. The last-named of these satellites presents the remarkable phenomenon of accomplishing its revolution round the primary planet in less than one day.

Soon after Huygens's discovery of a satellite of Saturn, Childrey first observed the zodiacal light, between the years 1658 and 1661, although its relations in space were not determined until 1683 by Dominicus Cassini. The latter did not regard it as a portion of the sun's atmosphere, but believed, with Schubert, Laplace, and Poisson, that it was a detached revolving nebulous ring‡. Next to the recognition of the existence of secondary planets, and of the free and concentrically divided rings of Saturn, the conjecture of the probable existence of the nebulous zodiacal light belongs incontestably to the grandest enlargement of our views regarding the planetary system, which had previously appeared so sim-

* Delambre, *Hist. de l'Astronomie Moderne*, t. i., p. 360.

† Arago, in the *Annuaire* for 1842, p. 560–564; also *Cosmos*, vol. i. p. 97.

‡ Compare *Cosmos*, vol. i., p. 137–144.