

of the insuperable difficulties presented to its practical application on the unstable element. He wished to go himself, or to send his son Vicenzio, to Spain, with a hundred telescopes, which he would prepare. He required as a recompense "una croce di San Jago," and an annual payment of 4000 scudi, a small sum, he says, considering that hopes had been given to him, in the house of Cardinal Borgia, of receiving 6000 ducats annually.

The discovery of the secondary planets of Jupiter was soon followed by the observations of the so-called triple form of Saturn as a *planeta tergeminus*. As early as November, 1610, Galileo informed Kepler that "Saturn consisted of three stars, which were in mutual contact with one another." In this observation lay the germ of the discovery of Saturn's ring. Hevelius, in 1656, described the variations in its form, the unequal opening of the handles (*ansæ*), and their occasional total disappearance. The merit of having given a scientific explanation of all the phenomena of Saturn's ring belongs, however, to the acute observer Huygens, who, in 1655, in accordance with the suspicious custom of the age, and like Galileo, concealed his discovery in an anagram of eighty-eight letters. Dominicus Cassini was the first who observed the black stripe on the ring, and in 1684 he recognized that it is divided into at least two concentric rings. I have here collected together what has been learned during a century regarding the most wonderful and least anticipated of all the forms occurring in the heavenly regions—a form which has led to ingenious conjectures regarding the original mode of formation of the secondary and primary planets.

embassador in 1636, but without leading to the desired object. The telescopes were to magnify from forty to fifty times. In order more easily to find the satellites when the ship is in motion, and (as he believed) to keep them in the field, he invented, in 1617 (Nelli, vol. ii., p. 663), the binocular telescope, which has generally been ascribed to the Capucine monk Schyrleus de Rheita, who had much experience in optical matters, and who endeavored to construct telescopes magnifying four thousand times. Galileo made experiments with his binocular (which he also called a *celatone* or *testiera*) in the harbor of Leghorn, while the ship was violently moved by a strong wind. He also caused a contrivance to be prepared in the arsenal at Pisa, by which the observer of the satellites might be protected from all motion, by seating himself in a kind of boat, floating in another boat filled with water or with oil (*Lettera al Picchena de' 22 Marzo, 1617*; Nelli, *Vita*, vol. i., p. 281; Galilei, *Opere*, t. ii., p. 473; *Lettera a Lorenzo Realio del 5 Giugno, 1637*). The proof which Galileo (*Opere*, t. ii., p. 454) brought forward of the advantage to the naval service of his method over Morin's method of lunar distances is very striking.