terference of polarized light were discovered in 1816 by Arago and Fresnel. The theory of undulations advanced by Huygens and Hooke, and defended by Leonhard Euler, was at length established on a firm and secure basis.

Although the latter half of the seventeenth century acquired distinction from the attainment of a successful insight into the nature of double refraction, by which optical science was so much enlarged, its greatest splendor was derived from Newton's experimental researches, and Olaus Römer's discovery, in 1675, of the measurable *velocity of light*. Half a century afterward, in 1728, this discovery enabled Bradley to regard the variation he had observed in the apparent place of the stars as a conjoined consequence of the movement of the earth in its orbit, and of the propagation of light. Newton's splendid work on *Optics* did not appear in English till 1704, having been deferred, from personal considerations, till two years after Hooke's death; but it would seem a well-attested fact that, even before the years 1666 and 1667,* he was in possession of the principal points of his optical researches, his theory of gravitation and differential calculus (method of fluxions).

In order not to sever the links which hold together the general primitive phenomena of matter in one common bond, I would here immediately, after my succinct notice of the optical discoveries of Huygens, Grimaldi, and Newton, pass to

* Brewster, *The Life of Sir Isaac Newton*, p. 17. The date of the year 1665 has been adopted for that of the invention of the method of fluxions, which, according to the official explanations of the Committee of the Royal Society of London, April 24, 1712, is "one and the same with the differential method, excepting the name and mode of notation." With reference to the whole unhappy contest on the subject of priority with Leibnitz, in which, strange to say, accusations against Newton's orthodoxy were even advanced, see Brewster, p. 189–218. The fact that all colors are contained in white light was already maintained by De la Chambre, in his work entitled "*La Lumière*" (Paris, 1657), and by Isaac Vossius (who was afterward a canon at Windsor), in a remarkable memoir entitled "*De Lucis Natura et Proprietate*" (Amstelod., 1662), for the knowledge of which I was indebted, two years ago, to M. Arago, at Paris. Brandis treats of this memoir in the new edition of Gehler's *Physikalische Wörterbuch*, bd. iv. (1827), s. 43, and Wilke notices it very fully in his *Gesch. der Optik*, th. i. (1838), s. 223, 228, and 317. Isaac Vossius, however, considered the fundamental substance of all colors (cap. 25, p. 60) to be sulphur, which forms, according to him, a component part of all bodies. In *Vossii Responsum ad Objecta, Joh. de Bruyn, Professoris Trajectini, et Petri Petiti*, 1663, it is said, p. 69, Nec lumen ullum est absque calore, nec calor ullus absque lumine. Lux sonus, anima (!) odor, vis magnetica, quamvis incorporea, sunt tamen aliquid. (De Lucis Nat., cap. 13, p. 29.)