

property of the substances, but dissected by the minuteness of their parts. On this account, these phenomena give very important indications of the real structure of light; and at an early period, suggested views which are, in a great measure, just.

Hooke appears to be the first person who made any progress in discovering the laws of the colors of thin plates. In his *Micrographia*, printed by the Royal Society in 1664, he describes, in a detailed and systematic manner, several phenomena of this kind, which he calls "fantastical colors." He examined them in *Muscovy glass* or mica, a transparent mineral which is capable of being split into the exceedingly thin films which are requisite for such colors; he noticed them also in the fissures of the same substance, in bubbles blown of water, rosin, gum, glass; in the films on the surface of tempered steel; between two plane pieces of glass; and in other cases. He perceived also,¹ that the production of each color required a plate of determinate thickness, and he employed this circumstance as one of the grounds of his theory of light.

Newton took up the subject where Hooke had left it; and followed it out with his accustomed skill and clearness, in his *Discourse on Light and Colors*, communicated to the Royal Society in 1675. He determined, what Hooke had not ascertained, the thickness of the film which was requisite for the production of each color; and in this way explained, in a complete and admirable manner, the colored rings which occur when two lenses are pressed together, and the *scale of color* which the rings follow; a step of the more consequence, as the same scale occurs in many other optical phenomena.

It is not our business here to state the hypothesis with regard to the properties of light which Newton founded on these facts;—the "fits of easy transmission and reflection." We shall see hereafter that his attempted induction was imperfect; and his endeavor to account, by means of the laws of thin plates, for the colors of natural bodies, is altogether unsatisfactory. But notwithstanding these failures in the speculations on this subject, he did make in it some very important steps; for he clearly ascertained that when the thickness of the plate was about 1-178000th of an inch, or three times, five times, seven times that magnitude, there was a bright color produced; but blackness, when the thickness was exactly intermediate between those magnitudes. He found, also, that the thicknesses which gave red and vio-

¹ *Micrographia*, p. 53.