

Circular Motion alone to be naturally uniform, and retains the distinction between Natural and Violent Motion. In the *Dialogues on Mechanics*, however, published in 1638, but written apparently at an earlier period, in treating of Projectiles,² he asserts the true Law. "Mobile super planum horizontale projectum mente concipio omni secluso impedimento; jam constat ex his quæ fusius alibi dicta sunt, illius motum equabilem et perpetuum super ipso plano futurum esse, si planum in infinitum extendatur." "Conceive a movable body upon a horizontal plane, and suppose all obstacles to motion to be removed; it is then manifest, from what has been said more at large in another place, that the body's motion will be uniform and perpetual upon the plane, if the plane be indefinitely extended." His pupil Borelli, in 1667 (in the treatise *De Vi Percussionis*), states the proposition generally, that "Velocity is, by its nature, uniform and perpetual;" and this opinion appears to have been, at that time, generally diffused, as we find evidence in Wallis and others. It is commonly said that Descartes was the first to state this generally. His *Principia* were published in 1644; but his proofs of this First Law of Motion are rather of a theological than of a mechanical kind. His reason for this Law is,³ "the immutability and simplicity of the operation by which God preserves motion in matter. For he only preserves it precisely as it is in that moment in which he preserves it, taking no account of that which may have been previously." Reasoning of this abstract and *à priori* kind, though it may be urged in favor of true opinions after they have been inductively established, is almost equally capable of being called in on the side of error, as we have seen in the case of Aristotle's philosophy. We ought not, however, to forget that the reference to these abstract and *à priori* principles is an indication of the absolute universality and necessity which we look for in complete Sciences, and a result of those faculties by which such Science is rendered possible, and suitable to man's intellectual nature.

The induction by which the First Law of Motion is established, consists, as induction consists in all cases, in conceiving clearly the Law, and in perceiving the subordination of Facts to it. But the Law speaks of bodies not acted upon by any external force,—a case which never occurs in fact; and the difficulty of the step consisted in bringing all the common cases in which motion is gradually extinguished, under the notion of the action of a retarding force. In order to do this,

² Dial. i. p. 40.

³ *Princip.* p. 84.