

arising from the combined action of many forces. Starting, then, with the laws of motion (which, in the first instance, may be regarded as an enunciation of certain material phenomena ascertained by direct experiment), his next grand generalization led him to extend these laws to all the bodies of the solar system: and, combining this assumption with the first proposition of Kepler (above quoted), he at once demonstrated that the planetary bodies are retained in their orbits by a force tending to the centre of the sun. Combining then this demonstrated truth with the second proposition of Kepler (above quoted), he then went on to prove, by a new and most refined geometry, that the force, emanating from the sun, must vary inversely as the square of the distance from its centre; or, in other words, must diminish in the exact proportion in which the square of the distance increases. Having once established this great truth, he then proved that the third proposition of Kepler was a necessary consequence of the demonstrated law of central force. Nothing can be conceived more perfect than this induction; which, starting with laws ascertained by observation, ascended by successive demonstrations, and proved that the most striking phenomena of the solar system were necessary truths involved in the operation of one single mechanical law.

By a similar train of demonstrative reasoning, Newton proved that the planets act on the several satellites revolving round them according to the same law by which the sun acts on them; and that the moon is retained in her orbit by the same power which, on the earth's surface, brings a heavy body to the ground. Generalizing the truths at which he had so far arrived by demonstrative reasoning, and