

stated as follows: "A physical speculation, in which it is demonstrated that the vehicle of that Virtue which urges the planets, circulates through the spaces of the universe after the manner of a river or whirlpool (*vortex*), moving quicker than the planets." I think it will be found, by any one who reads Kepler's phrases concerning the *moving force*,—*the magnetic nature*,—*the immaterial virtue* of the sun, that they convey no distinct conception, except so far as they are interpreted by the expressions just quoted. A vortex of fluid constantly whirling round the sun, kept in this whirling motion by the rotation of the sun himself, and carrying the planets round the sun by its revolution, as a whirlpool carries straws, could be readily understood; and though it appears to have been held by Kepler that this current and vortex was immaterial, he ascribes to it the power of overcoming the inertia of bodies, and of putting them and keeping them in motion, the only material properties with which he had any thing to do. Kepler's physical reasonings, therefore, amount, in fact, to the doctrine of Vortices round the central bodies, and are occasionally so stated by himself; though by asserting these vortices to be "an immaterial species," and by the fickleness and variety of his phraseology on the subject, he leaves this theory in some confusion;—a proceeding, indeed, which both his want of sound mechanical conceptions, and his busy and inventive fancy, might have led us to expect. Nor, we may venture to say, was it easy for any one at Kepler's time to devise a more plausible theory than the theory of vortices might have been made. It was only with the formation and progress of the science of Mechanics that this theory became untenable.

(*Descartes.*) But if Kepler might be excused, or indeed admired, for propounding the theory of Vortices at his time, the case was different when the laws of motion had been fully developed, and when those who knew the state of mechanical science ought to have learned to consider the motions of the stars as a mechanical problem, subject to the same conditions as other mechanical problems, and capable of the same exactness of solution. And there was an especial inconsistency in the circumstance of the Theory of Vortices being put forwards by Descartes, who pretended, or was asserted by his admirers, to have been one of the discoverers of the true Laws of Motion. It certainly shows both great conceit and great shallowness, that he should have proclaimed with much pomp this crude invention of the ante-mechanical period, at the time when the best mathematicians of Europe, as Borelli in Italy, Hooke and Wallis in England, Huyghens in Holland,