

the human race may there present. The reader might suppose he were perusing Kepler's *Somnium Astronomicum*, or Kircher's *Iter Extaticus*. As Huygens, like the astronomers of our own day, denied the presence of air and water in the moon,* he is much more embarrassed regarding the existence of inhabitants in the moon than of those in the remoter planets, which he assumes to be "surrounded with vapors and clouds."

The immortal author of the *Philosophiæ Naturalis Principia Mathematica* (Newton) succeeded in embracing the whole uranological portion of the *Cosmos* in the causal connection of its phenomena, by the assumption of one all-controlling fundamental moving force. He first applied physical astronomy to solve a great problem in mechanics, and elevated it to the rank of a mathematical science. The quantity of matter in every celestial body gives the amount of its attracting force; a force which acts in an inverse ratio to the square of the distance, and determines the amount of the disturbances, which not only the planets, but all the bodies in celestial space, exercise on each other. But the Newtonian theory of gravitation, so worthy of our admiration from its simplicity and generality, is not limited in its cosmical application to the uranological sphere, but comprises also telluric phenomena, in directions not yet fully investigated; it affords the clew to the periodic movements in the ocean and the atmosphere,† and solves the problems of capillarity, of endosmosis, and of many chemical, elec-

* "Lunam aquis carere et aëre: Marium similitudinem in Luna nullam reperio. Nam regiones planas quæ montosis multo obscuriores sunt, quasque vulgo pro maribus haberi video et oceanorum nominibus insigniri, in his ipsis, longiore telescopio inspectis, cavitates exiguas inesse comperio rotundas, umbris intus cadentibus; quod maris superficiem convenire nequit; tum ipsi campi illi latiores non prorsus æquabilem superficiem præferunt, cum diligentius eas intuemur. Quod circa maria esse non possunt, sed materia constare debent minus candicante, quam quæ est partibus asperioribus in quibus rursus quædam viridiori lumine cæteras præcellunt."—*Hugenii Cosmotheoros*, ed. alt. 1699, lib. xi., p. 114. Huygens conjectures, however, that Jupiter is agitated by much wind and rain, for "ventorum flatus ex illa nubium Jovialium mutabili facie cognoscitur" (lib. i., p. 69). These dreams of Huygens regarding the inhabitants of remote planets, so unworthy of a man versed in exact mathematics, have, unfortunately, been revived by Emanuel Kant, in his admirable work *Allgemeine Naturgeschichte und Theorie des Himmels*, 1755 (s. 173-192).

† See Laplace (*des Oscillations de l'Atmosphère, du flux Solaire et Lunaire*) in the *Mécanique Céleste*, livre iv., and in the *Exposition du Syst. du Monde*, 1824, p. 291-296.