Gilbert, as early as 1600, regarded magnetism as a force inherent in all matter. So undetermined was even Newton, the profound and experienced thinker, regarding the "ultimate mechanical cause" of all motion.

It is indeed a brilliant effort, worthy of the human mind, to comprise, in one organic whole, the entire science of nature from the laws of gravity to the formative impulse (nisus formativus) in animated bodies; but the present imperfect state of many branches of physical science offers innumerable difficulties to the solution of such a problem. The imperfectibility of all empirical science, and the boundlessness of the sphere of observation, render the task of explaining the forces of matter by that which is variable in matter, an impracticable one. What has been already perceived by no means exhausts that which is perceptible. If, simply referring to the progress of science in modern times, we compare the imperfect physical knowledge of Gilbert, Robert Boyle, and Hales, with that of the present day, and remember that every few years are characterized by an increasing rapidity of advance, we shall be better able to imagine the periodical and endless changes which all physical sciences are destined to undergo. New substances and new forces will be discovered.

Although many physical processes, as those of light, heat, and electro-magnetism, have been rendered accessible to a mathematical investigation by being reduced to motion or vibrations, we are still without a solution to those often mooted and perhaps insolvable problems: the cause of chemical differences of matter; the apparently irregular distribution of the planets in reference to their size, density, the inclination of their axes, the eccentricity of their orbits, and the num-

fore reduced by him, as previously by Goodwin Knight (*Philos. Transact.* 1748, p. 264), to the conflict of two elementary forces. In the atomic theories, which were diametrically opposed to Kant's dynamic views, the force of attraction was referred, in accordance with a view specially promulgated by Lavoisier, to the discrete solid elementary molecules of which all bodies are supposed to consist; while the force of repulsion was attributed to the *atmospheres of heat* surrounding all elementary corpuscles. This hypothesis, which regards the so-called *caloric* as a constantly expanded matter, assumes the existence of two elementary substances, as in the mythical idea of two kinds of æther. (Newton, *Optics*, query 28, p. 339.) Here the question arises, What causes this caloric matter to expand? Considerations on the density of molecules in comparison with that of their aggregates (the entire body) lead, according to atomic hypotheses, to the result, that the distance between elementary corpuscles is far greater than their diameters.