branches out into distinct subdivisions, according as we consider the equilibrium or motion of matter in the three distinct states in which it is presented to us in nature, the solid, liquid, and aëriform state, to which, perhaps, ought to be added the *viscous*, as a state intermediate between that of solidity and fluidity, the consideration of which, though very obscure and difficult, offers a high degree of interest on a variety of accounts.

(236.) The principles both of the statical and dynamical divisions of mechanics have been definitively fixed by Newton, on a basis of sound induction; and as they are perfectly general, and apply to every case, they are competent, as we have already before observed, to the solution of every problem that can occur in the deductive processes, by which phenomena are to be explained, or effects calculated. Hence they include every question that can arise respecting the motions and rest of the smallest particles of matter, as well as of the largest masses. But the mode of reasoning from these general principles differs materially, whether we consider them as applied to masses of matter of a sensible size, or to those excessively minute, and perhaps indivisible, molecules of which such masses are composed. The investigations which relate to the latter subject are extremely intricate, as they necessarily involve the consideration of the hypotheses we may form respecting the intimate constitution of the several sorts of bodies above enumerated.

(237.) On the other hand, those which respect the equilibrium and motions of sensible masses of matter are happily capable of being so managed as to render unnecessary the adoption of any particular hypothesis of structure. Thus, in reasoning respecting the application of forces to a solid mass, we suppose its parts indissolubly and unalterably connected; it matters not by what tie, provided this condition be satisfied, that one point of it cannot be moved without setting all the rest in motion, so that the relative situation of the parts one among another be not changed. This is the abstract notion of a solid which the mechanician employs in his reasonings.