

The reason of this peculiarity in the science of Hydrodynamics appears to be, that its general principles were not discovered with reference to the science itself, but by extension from the sister science of the Mechanics of Solids; they were not obtained by ascending gradually from particulars to truths more and more general, respecting the motions of fluids; but were caught at once, by a perception that the parts of fluids are included in that range of generality which we are entitled to give to the supreme laws of motions of solids. Thus, Solid Dynamics and Fluid Dynamics resemble two edifices which have their highest apartment in common, and though we can explore every part of the former building, we have not yet succeeded in traversing the staircase of the latter, either from the top or from the bottom. If we had lived in a world in which there were no solid bodies, we should probably not have yet discovered the laws of motion; if we had lived in a world in which there were no fluids, we should have no idea how insufficient a complete possession of the general laws of motion may be, to give us a true knowledge of particular results.

14. *Various General Mechanical Principles.*—The generalized laws of motion, the points to which I have endeavored to conduct my history, include in them all other laws by which the motions of bodies can be regulated; and among such, several laws which had been discovered before the highest point of generalization was reached, and which thus served as stepping-stones to the ultimate principles. Such were, as we have seen, the Principles of the Conservation of *vis viva*, the Principle of the Conservation of the Motion of the Centre of Gravity, and the like. These principles may, of course, be deduced from our elementary laws, and were finally established by mathematicians on that footing. There are other principles which may be similarly demonstrated; among the rest, I may mention the Principle of the *Conservation of areas*, which extends to any number of bodies a law analogous to that which Kepler had observed, and Newton demonstrated, respecting the areas described by each planet round the sun. I may mention also, the Principle of the *Immobility of the plane of maximum areas*, a plane which is not disturbed by any mutual action of the parts of any system. The former of these principles was published about the same time by Euler, D. Bernoulli, and Darcy, under different forms, in 1746 and 1747; the latter by Laplace.

To these may be added a law, very celebrated in its time, and the occasion of an angry controversy, the *Principle of least action*. Mau-