

assumed to represent the first. Now this arbitrary and capricious evasion of the question we consider as opposed to the introduction of the distinct and proper idea of Pressure, by means of which the true principles of this subject can be apprehended.

We have already seen that Aristotle was in the number of those who thus evaded the difficulties of the problem of the lever, and consequently lost the reward of success. He failed, as has before been stated, in consequence of his seeking his principles in notions, either vague and loose, as the distinction of natural and unnatural motions, or else inappropriate, as the circle which the weight *would* describe, the velocity which it *would* have if it moved; circumstances which are not part of the fact under consideration. The influence of such modes of speculation was the main hindrance to the prosecution of the true Archimedean form of the science of Mechanics.

The mechanical doctrine of Equilibrium, is *Statics*. It is to be distinguished from the mechanical doctrine of Motion, which is termed *Dynamics*, and which was not successfully treated till the time of Galileo.

### *Sect. 2.—Hydrostatics.*

ARCHIMEDES not only laid the foundations of the Statics of solid bodies, but also solved the principal problem of *Hydrostatics*, or the Statics of Fluids; namely, the conditions of the floating of bodies. This is the more remarkable, since not only did the principles which Archimedes established on this subject remain unpursued till the revival of science in modern times, but, when they were again put forward, the main proposition was so far from obvious that it was termed, and is to this day called, the *hydrostatic paradox*. The true doctrine of Hydrostatics, however, assuming the Idea of Pressure, which it involves, in common with the Mechanics of solid bodies, requires also a distinct Idea of a Fluid, as a body of which the parts are perfectly movable among each other by the slightest partial pressure, and in which all pressure exerted on one part is transferred to all other parts. From this idea of Fluidity, necessarily follows that multiplication of pressure which constitutes the hydrostatic paradox; and the notion being seen to be verified in nature, the consequences were also realized as facts. This notion of Fluidity is expressed in the postulate which stands at the head of Archimedes' "Treatise on Floating Bodies." And from this principle are deduced the solutions, not only of the simple problems of the science, but of some problems of considerable complexity.