CHAPTER I.

Earliest Stages of Mechanics and Hydrostatics.

Sect. 1.—*Mechanics.*

ASTRONOMY is a science so ancient that we can hardly ascend to a period when it did not exist; Mechanics, on the other hand, is a science which did not begin to be till after the time of Aristotle; for Archimedes must be looked upon as the author of the first sound knowledge on this subject. What is still more curious, and shows remarkably how little the continued progress of science follows inevitably from the nature of man, this department of knowledge, after the right road had been fairly entered upon, remained absolutely stationary for nearly two thousand years; no single step was made, in addition to the propositions established by Archimedes, till the time of Galileo and Stevinus. This extraordinary halt will be a subject of attention hereafter; at present we must consider the original advance.

The great step made by Archimedes in Mechanics was the establishing, upon true grounds, the general proposition concerning a straight lever, loaded with two heavy bodies, and resting upon a fulcrum. The proposition is, that two bodies so circumstanced will balance each other, when the distance of the smaller body from the fulcrum is greater than the distance of the other, in exactly the same proportion in which the weight of the body is less.

This proposition is proved by Archimedes in a work which is still extant, and the proof holds its place in our treatises to this day, as the simplest which can be given. The demonstration is made to rest on assumptions which amount in effect to such Definitions and Axioms as these: That those bodies are of equal weight which balance each other at equal arms of a straight lever; and that in every heavy body there is a definite point called a *Centre of Gravity*, in which point we may suppose the weight of the body collected.

The principle, which is really the foundation of the validity of the demonstration thus given, and which is the condition of all experimental knowledge on the subject, is this: that when two equal weights are supported on a lever, they act on the fulcrum of the lever with the