to be in equilibrium; and the investigation of the relations among them in such case, or the conditions of equilibrium, constitutes the science of *Statics*.

Force, how measured.

5. Some convenient force being assumed as a standard or *unit*, the magnitude of any force is measured numerically with reference to the unit by the number of such units (acting simultaneously at a point and opposite to the force), which it will counter-balance. Thus, if the force will counter-balance n unit forces, its magnitude is said to be n.

This supposes n to be a whole number, and we can always take a unit-force of such magnitude that it shall be so; then, when any other force is taken as the unit, the magnitude of our original force will be expressed by the ratio (whether a whole number or a fraction) which its magnitude bears to that of the force assumed as unit.

In general, the term *Pressure* may be used for a Force thus statically considered and measured.

Weight.

6. It is found that on all bodies on the Earth a pressure is exerted downwards, in a vertical direction: that is, in a direction perpendicular to the surface of still water at the place; and this pressure (which, for any particular body, is called the *weight* of that body) is invariable at the same place for the same body at all times, whatever form, size or position the body be made to take. Hence the *weight* of some particular body may conveniently be assumed as a unit to which other pressures may be referred for measurement.

Unit of Force.

In the English system the weight of a certain piece of brass carefully preserved as a standard, is called one pound Troy, and all other weights are referred to this. If lost, it might be restored from the knowledge that this *pound* being divided into 5760 *grains*, "a cubic inch of distilled water, of the temperature of 62° Fahrenheit, when the barometer is at 30 inches, weighs 252.724 grains"

Rigidity.

7. When a system of particles, or a body, is such that the relative distances of the particles undergo no change by the action of the forces applied to them in any manner, the system is said to be *rigidly* connected, and the body is called a *rigid* body, relatively to the forces concerned.