CHAPTER I.

DEFINITIONS AND PRINCIPLES.

Material particle.

1. A *material particle* is a portion of matter occupying an indefinitely small space; or, a geometrical point endowed with the properties of matter.

All bodies may be geometrically conceived as made up of particles.

Force.

2. When the distance between two particles remains unchanged during any period of time, they are relatively at rest, and we conceive that they will continue so unless one or both be acted on by some cause to which we give the name of *Force*.

The state of rest or motion of a particle can only be conceived of in relation to others, but it is convenient to speak of it *absolutely* as being at rest or in motion, reference being understood to ourselves (or some particles in a known relation to ourselves), and changes of rest or motion are to be considered as produced by forces acting on the particle alone.

Direction and magnitude of a Force.

3. When a particle at rest is set in motion by a force, it will begin to move in a particular line, which we may define to be the *direction* or *line of action* of the force. The motion might be just prevented and the particle kept at rest, by a suitable force applied in an opposite direction. In this case the two forces are said to balance or counter-balance each other; and the magnitudes of two forces are said to be equal when each would separately counter-balance the same force.

Equal Forces.

Statics, general problem of.

4. Generally, when forces acting on any system of particles keep them at rest, the forces are said to counter-balance, or