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CHAPTER I.

THE PARALLELOGRAM OF FORCES.

1. THE science of Mechanics treats of the action of forces on bodies. Under the influence of these forces the bodies may either be in motion or remain at rest. That part of mechanics which treats of the motion of bodies is called Dynamics. That part of mechanics in which the bodies are at rest is called Statics.

If the determination of the motion of bodies under given forces could be completely and easily solved, there would be no obvious advantage in this division of the subject into two parts. It is clear that statics is only that particular case of dynamics in which the motions of the bodies are equated to zero. But the particular case in which the motion is zero presents itself as a much easier problem than the general one. At the same time this particular case is one of great importance. It is important not merely for the intrinsic value of its own results but because these are found to assist in the solution of the general case by the help of a theorem due to D'Alembert. It has therefore been generally found convenient to lead up to the general problem of dynamics by considering first the particular case of statics.

2. Since statics is a particular case of dynamics we may begin by discussing the first principles of the more general science. We should consider how the mass of a body is measured, how the velocity and acceleration of any particle are affected by the action of forces. The general principles having been obtained we may then descend to the particular case by putting these velocities equal to zero. In this way the relationship of the two great branches of mechanics is clearly seen and their results are founded on a common basis.