

first, which might be done. But the facts which form exceptions and apparent contradictions to the first law of which we have been treating, and which are very numerous, offer, we conceive, an additional exemplification of the same argument; and this we shall endeavour to illustrate.

The rule that a body naturally moves for ever with an undiminished speed, is so far from being obviously true, that it appears on a first examination to be manifestly false. The hoop of the school boy, left to itself, runs on a short distance, and then stops; his top spins a little while, but finally flags and falls; all motion on the earth appears to decay by its own nature; all matter which we move appears to have a perpetual tendency to divest itself of the velocity which we communicate to it. How is this reconcilable with the first law of motion on which we have been insisting?

It is reconciled principally by considering the effect of *Friction*. Among terrestrial objects friction exerts an agency almost as universal and constant as the laws of motion themselves; an agency which completely changes and disguises the results of those laws. We shall consider some of these effects.

It is probably not necessary to explain at any length the nature and operation of friction. When a body cannot move without causing two surfaces to rub together, this rubbing has a tendency to diminish the body's motion or to prevent it entirely. If the body of a carriage be placed on the earth without the wheels, a considerable force will be requisite in order to move it at all: it is here the friction against the ground which obstructs the motion. If the carriage be placed on its wheels, a much less force will move it, but if moved it will soon stop: it is the friction at the ground and at the axles which stops it: placed on a level rail road, with well made and well oiled wheels, and once put in motion, it might run a considerable distance alone, for the friction is here