

PART II—MECHANICS OF SOLIDS—BODIES AT REST AND IN MOTION

CHAPTER II

VELOCITY, ACCELERATION

17. Rest and Motion. When we get out in the open air and look about for a few minutes we see numerous examples of rest and motion. The houses, the fences and the trees are at rest; while the carriages and motor-cars on the road, the railway-train in the distance, or the birds flying across the field, we declare to be in motion.

We agree at once that we can arrange bodies into the two classes, namely, those at rest and those in motion; but a brief consideration will show that this arrangement is not so simple after all,—that, indeed, a body considered from one point of view may be at rest while from another it may be in motion.

Two persons sit together in a railway-train. Each is at rest with respect to the other, but both are in motion with respect to a third person on the ground outside. It is impossible to think of a single object as at rest, which, when looked at in another way, would not be considered to be in motion. Thus motion is quite as natural a state as rest.

18. Velocity or Speed. A body is in motion when it is changing its position; and there is another idea which we usually associate with this change of position, namely, the time taken to do it. This brings in the notion of *speed* or *velocity*. The latter term is often used to include also the *direction* of the motion, while the former refers only to the *rate* at which the body moves. But in this work this distinction will not be insisted on.

Suppose you wish to go from Toronto to Montreal, a distance of 330 miles. You find that one train requires 10