

hours, while another one would take 48 hours. You do not hesitate long to choose the one you will use. The rate of motion is of great importance to us.

In the first case the average speed is $330 \div 10 = 33$ miles per hour; in the second case, $330 \div 48 = 6\frac{5}{8}$ miles per hour.

$$\text{Thus we see, } \text{Speed} = \frac{\text{Space}}{\text{Time}}.$$

Usually the speeds we have to deal with are not constant, the body moves faster at some times than at others. This is well illustrated in the motion of a railway-train. On a long level track the speed is approximately uniform, but on climbing a hill or approaching a station the speed changes.

PROBLEMS

1. A train leaves Winnipeg at 10.40 p.m. and reaches Regina next morning at 9.40 as shown by the same time-piece. The distance is 357 miles. Find the average speed.
- 2. A train leaves Montreal at 9.45 p.m. Monday and reaches Vancouver on Saturday at 9.10 a.m., Pacific time, which is 3 hours slow of Montreal or Eastern time. The average speed, including stops, was $26\frac{1}{2}$ miles per hour. Find the distance.
- 3. A train travels at the rate of 60 miles per hour; find the speed in feet per second.
- 4. An eagle flies at the rate of 30 metres per second; find the speed in kilometres per hour.
5. A sledge party in the arctic regions travels northward, for ten successive days, 10, 12, 9, 16, 4, 15, 8, 16, 13, 7 miles, respectively. Find the average velocity.
6. If at the same time the ice is drifting southward at the rate of 10 yards per minute, find the average velocity northward.

19. Acceleration. We have all enjoyed the sport of coasting down hill on a sleigh or a toboggan. We start off very gently but with every second the speed increases, until at the bottom it is very great. The sleigh then runs up the opposing hill, rapidly loses its speed and finally comes to rest.

When the velocity is not uniform we say the motion is *accelerated*. If there is an increase in the velocity, the