

in the year, and this orbit that it seems to follow must be just the same apparent size as seen from the earth as the real orbit of the earth would be as seen from Arcturus. As, however, the star has a real forward motion of its own, of which we shall speak in a moment, the actual effect of the change of the earth's place on the apparent motion of the star is not, as would be the case if the star were really at rest, to make it seem to revolve in an orbit, so much as to make it appear to follow a winding rather than a straight course. One half of the year it is a little on one side of the straight line giving the general direction of its course, and the other six months a little on the other side.

The distance of Arcturus would be marvel enough if that fact stood alone. It would speak of a universe of all but infinite vastness, a universe too great for our feeble thought ever really to fathom. But two other facts stand out which set the marvel higher. The one is that to which we have just alluded—viz., the exceeding swiftness with which Arcturus is seen to move; the other the brightness with which it shines. For taking its annual motion at the figures Dr. Elkin has adopted, we find that the distance the star travels in the year, as seen from our standpoint, is 127 times as great as the distance between the earth and the sun as seen from the standpoint of Arcturus; 127 times ninety-three millions of miles; or nearly twenty-four thousands of millions of miles in the year; 374 miles in every second of time.

How can we get any idea of a speed like this? No terrestrial experience gives us the faintest idea of it. We may perhaps have stood in some country station when an express train dashed past, the "Flying Dutchman" or "Flying Scotchman." What an impression it gives of speed and power, as it seems to "devour

the way" before it! How the very ground trembles as it rocks and sways in the vehemence of its forward rush! The speed with which the tiny black smoke-crowned speck on the horizon swells up into the gigantic machine at hand, the headlong haste, the roar and rattle, the tornado which follows it, the clouds of dust and fragments swept into its train, the rapidity of its passage past the spectator, and its quick disappearance beyond, mark it as a wonder of human ingenuity, of human intellect and courage, of human skill. Yet its speed was probably but fifty or at best sixty miles an hour. The snail that takes an hour to labour across the garden path is far swifter as compared with the express train than that train as compared with Arcturus. "The Flying Dutchman" must increase its speed nearly five and twenty thousand times before it can race with this flying star. It must be ready to belt the entire earth, not in an hour, but in very little over a minute of time to give it a chance of success.

But even if we leave the works of man, and compare the speed of Arcturus with the velocities we recognize in the solar system, it still appears remarkable. Let us take the earth's rotation on its axis for an example. Suppose we could rise up from the surface of the earth to a convenient height, and detaching ourselves from the attraction of the earth so that we were no longer carried round by its rotation, yet at the same time travelling by its side with an equal pace, as it journeyed round the sun, what should we see? If we rose from London we should see streets, churches and houses hurrying past us with more than ten times the speed of the fastest express. If we soared above the East India Docks, which are on the exact meridian of Greenwich Observatory at the even minute, the vast city would come rushing towards and in seven