

the sun can be mapped out many years in advance, and that the planets follow the predictions of the astronomer so closely that, if you could see the predicted planet as a separate object, it would look, even in a good telescope, as if it exactly fitted over the real planet, one thinks that here at least is a branch of astronomy which is simply perfect. And yet the worlds themselves show slight deviations in their movements which the astronomer cannot always explain, and which may be due to some hidden cause that, when brought to light, shall lead to conclusions of the greatest importance to our race.

One of these deviations is in the rotation of the earth. Sometimes, for several years at a time, it seems to revolve a little faster, and then again a little slower. The changes are very slight; they can be detected only by the most laborious and refined methods; yet they must have a cause, and we should like to know what that cause is.

The moon shows a similar irregularity of motion. For half a century, perhaps through a whole century, she will go around the earth a little ahead of her regular rate, and then for another half century or more she will fall behind. The changes are very small: they would never have been seen with the naked eye, yet they exist. What is their cause? Mathematicians have vainly spent years of study in trying to answer this question.

The orbit of Mercury is found by observations to have a slight motion which mathematicians have vainly tried to explain. For some time it was supposed to be caused by the attraction of an unknown planet between Mercury and the sun, and some were so sure of the existence of this planet that they gave it a name, calling it Vulcan. But of late years it has become reasonably certain that no planet large enough to produce the effect observed can be there. So thoroughly has every possible explanation been sifted out and found wanting, that some astronomers are now inquiring whether the law of gravitation itself may not be a little different from what has always been supposed. A very slight deviation indeed would account for the facts, but cautious astronomers want other proofs to regard the change as established.

Many readers have doubtless wondered how, after devoting so much work to the study of the heavens, anything can remain for astronomers to find out. It is a curious fact that, although they were never learning so fast as at the present day, yet there seems to be more to learn now than there ever was before. Great and numerous as are the unsolved problems of our science, knowledge is now advancing into regions which, a few years ago, seemed inaccessible. Where it will stop none can say.

Here are a few figures that might be not inaptly termed the romance of the railway. The London and North-Western Company own over 2,300 engines, operating upon 2,900 miles — an engine for every mile. These engines' work is equal to a journey round the world every three hours; their performance is equal to a trip to the moon in twenty-nine hours. A journey to the sun would

be longer, the estimate being "about" fifteen months. There are 78,000 persons employed by the company; 79,000 special trains are run every year on this one system, and 82,000,000 passengers are carried; 60 tons of tickets are issued annually. If placed end-to-end for ten years, the tickets would make a $1\frac{1}{4}$ -inch belt round the world.