when given to the world they were found to exhibit serious discordances from those of other observers; but although the suspicions of his dishonesty were prety general at the time, it was not until 1834 that positive proof was forthcoming. In that year Professor Littröw, of the Vienna Observatory, discovered among Hell's manuscripts a note-book which, there is every reason to suppose, was the identical one used at Wardhus. It then became apparent that the principle figures had been erased so as to be for the most part illegible; but from a careful examination of such as remained it was thought that one observation of the ingress and one of the egress might be depended upon; this was Littröw's opiniou, and Encke, accepting his reasons, discussed the whole anew, and found the solar parallax to be 8".57, or, for the earth's distance from the sun, 95,365,000 miles.

Although for the reason stated some suspicion has attached to the value of the solar parallax obtained from the transit of 1769, the first serious doubts as to its accuracy may perhaps be dated from the publication of Professor Hansen's elements of the moon's orbit in 1854. Several years previous Mr. Airy had brought to a conclusion one of the most valuable and laborious works ever undertaken in astronomy-the reduction on a uniform system and comparison with theory of the immense mass of lunar meridional observations taken at the Royal Observatory, Greenwich, between the years 1750 and 1830, the results of which were printed in 1847. These calculations furnished the means of improving the tables of the moon so far as depends upon observations in the meridian, but such observations are impracticable when she is near to the sun, and consequently several of the inequalities of her motion are not completely exhibited by them. It was for this reason, and to secure a hold upon her entire orbit, or very nearly so, that the Astronomer Royal some years since devised and erected at Greenwich an instrument specially intended for determining the place of the moon in any part of her diurnal path. The results moon in any part of her diurnal path. The results given by this instrument, which is known as the altazimuth, have proved of great value, affording a check upon the amount of several irregularities indicated by theory, and particularly upon one technically called the parallactic equation, which is directly connected with the solar parallax; or in other words, with the earth's distance from the sun. If the amount of this inequality, as given by observation, does not agree with that computed with an assumed value for the sun's distance, we know that the latter requires corection, and it is easy to ascertain to what amount. Professor Hansen found that the Greenwich meridian observations required a material diminution in the sun's distance, and were confirmed by a long series taken at Dorpat, in Russia: while the same conclusion was drawn by Mr. Airy from the observations with the altazimuth instrument in other parts of the moon's orbit. The solar parallax finally given by Hansen is 8".97, about four-tenths of a second greater than was inferred from the transits of Venus and corresponding to a diminuation of more than 4,000,000 miles in the earth's distance from the sun

Within the last few years M. Le Verrier has completed a most rigorous application of the theory of attraction to the motions of the Earth, Venus

and Mars, as defined by a long course of observation at Greenwich and other astronomical estab. lishments. Nothing can excel in completeness the three investigations of this eminent mathematician. The theory of the earth was published in 1858 in the Annales of the Observatory of Paris, and contains one striking result bearing upon the subject of my communication. The inequality, technically called the lunar equation, was found to require an increase of one-twelfth part, which would render necessary an augmentation of Encke's solar parallax of nearly four-tenths of a second, and therefore a diminution of the assumed distance of the earth from the sun very nearly to the same amount assigned by Hansen's researches connected with the moon. M. Le Verrier adopts 8" 95 for the parallax in his solar tables, but does not, in this place, insist upon its substitution for the number given by the transits of Venus. The earth's mass as referred to the sun's would from the same cause require increasing to the extent of nearly a tenth part of the whole.

In the theory of the planet Venus it is found impossible to account for the motion of the line of nodes (the points where her orbit intersects the ecliptic) with the received values of the planetary masses; but, if a correction be applied to the mass of the earth of about the same magnitude as indicated by M. Le Verrier's previous researches, the calculated motion of the nodes would agree with that resulting from observations as far back as they can be depended upon. In this case, however, it would be necessary to diminish the adopted measure of the earth's distance from the sun by a thirtieth part-affording another and quite inde-pendent corroboration of the error with which it is affected. In 1861 the investigation of the orbit of Mars was completed, and forms, with the tables of the planet, a part of the last volume of the Paris Annales. M. Le Verrier announces, as the fail capital to which his discussion had led him, the absolute impossibility of representing the observations without a motion of the perihelion (or nearest point of the orbit to the sun) greater than is consistent with the planetary masses employed, and the equal impossibility of providing for the increase of disturbing force, except by the addition of at least a tenth part to the assumed mass of the earth, with the corresponding diminution in her distance from the sun.

Notwithstanding these very remarkable and confirmatory results M. Le Verrier appears to have been at this time very strongly impressed with the exactness of Encke's parallax, and terms the unavoidable increase of the received value "a grave objection" to the augmented mass of the earth derived from his theories. He had previously detected a motion of the perihelion of the planet Mercury, due to some unknown cause, and proposed to account for this and the other anomalous motions I have alluded to by the following assumptions:—

1. There exists, besides the planets Mercury, Venus, the Earth, and Mars, a ring of asteroids between the Sun and Mercury, the aggregate mass of which is comparable to that of Mercury.

2. At the distance of the earth from the sun there is a second ring of asteroids, the mass of which is at most equal to a tenth of the earth's.

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