whether Newton's reasoning was sufficient to establish this part of his theory; namely, that her actual motions arise from her gravitation to the sun. And to this we may reply, that it was sufficient for that purpose,—since it showed that, from Newton's hypothesis, inequalities must result, following the laws which the moon's inequalities were known to follow;—since the amount of the inequalities given by the theory agreed nearly with the rules which astronomers had collected from observation;—and since, by the very intricacy of the calculation, it was rendered probable, that the first results might be somewhat inaccurate, and thus might give rise to the still remaining differences between the calculations and the facts. A *Progression of the Apogee ;* a *Regression of the Nodes ;* and, besides the Elliptical, or first Inequality, an inequality, following the law of the *Evection,* or second inequality discovered by Ptolemy; another, following the law of the *Variation* discovered by Tycho;—were pointed out in the first edition of the *Principia,* as the consequences of the theory. Moreover, the quantities of these inequalities were calculated and compared with observation with the utmost confidence, and the agreement in most instances was striking. The Variation agreed with Halley's recent observations within a minute of a degree.[10] The Mean Motion of the Nodes in a year agreed within less than one-hundredth of the whole.[11] The Equation of the Motion of the Nodes also agreed well.[12] The Inclination of the Plane of the Orbit to the ecliptic, and its changes, according to the different situations of the nodes, likewise agreed.[13] The Evection has been already noticed as encumbered with peculiar difficulties: here the accordance was less close. The Difference of the daily progress of the Apogee in syzygy, and its daily Regress in Quadratures, is, Newton says, "$4\frac{1}{4}$ minutes by the Tables, $6\frac{2}{3}$ by our calculation." He boldly adds, "I suspect this difference to be due to the fault of the Tables." In the second edition (1711) he added the calculation of several other inequalities, as the *Annual Equation,* also discovered by Tycho; and he compared them with more recent observations made by Flamsteed at Greenwich; but even in what has already been stated, it must be allowed that there is a wonderful accordance of theory with phenomena, both being very complex in the rules which they educe.

The same theory which gave these Inequalities in the motion of the Moon produced by the disturbing force of the sun, gave also corres-

[10] B. iii. Prop. 29. [11] Prop. 82. [12] Prop. 88. [13] Prop. 85.