

discovery; namely, that very Nutation which he had formerly rejected. This may appear strange, but it is easily explained. The aberration is an annual change, and is detected by observing a star at different seasons of the year: the Nutation is a change of which the cycle is eighteen years; and which, therefore, though it does not much change the place of a star in one year, is discoverable in the alterations of several successive years. A very few years' observations showed Bradley the effect of this change;<sup>9</sup> and long before the half cycle of nine years had elapsed, he had connected it in his mind with the true cause, the motion of the moon's nodes. Machin was then Secretary to the Royal Society,<sup>10</sup> and was "employed in considering the theory of gravity, and its consequences with regard to the celestial motions:" to him Bradley communicated his conjectures; from him he soon received a Table containing the results of his calculations; and the law was found to be the same in the Table and in observation, though the quantities were somewhat different. It appeared by both, that the earth's pole, besides the motion which the precession of the equinoxes gives it, moves, in eighteen years, through a small circle;—or rather, as was afterwards found by Bradley, an ellipse, of which the axes are nineteen and fourteen seconds.<sup>11</sup>

For the rigorous establishment of the mechanical theory of that effect of the moon's attraction from which the phenomena of Nutation flow, Bradley rightly and prudently invited the assistance of the great mathematicians of his time. D'Alembert, Thomas Simpson, Euler, and others, answered this call, and the result was, as we have already said in the last chapter (Sect. 7), that this investigation added another to the recondite and profound evidences of the doctrine of universal gravitation.

It has been said<sup>12</sup> that Bradley's discoveries "assure him the most distinguished place among astronomers after Hipparchus and Kepler." If his discoveries had been made before Newton's, there could have been no hesitation as to placing him on a level with those great men. The existence of such suggestions as the Newtonian theory offered on all astronomical subjects, may perhaps dim, in our eyes, the brilliance of Bradley's achievements; but this circumstance cannot place any other person above the author of such discoveries, and therefore we may consider Delambre's adjudication of precedence as well warranted, and deserving to be permanent.

<sup>9</sup> Rigaud, lxiv.

<sup>10</sup> Ib. 25.

<sup>11</sup> Ib. lxxvi.

<sup>12</sup> Delambre, *Ast. du 18 Sièc.* p. 420. Rigaud, xxxvii.