

has reduced to a regularity as complete as that of the sun;—upon *Comets*. No part of the Newtonian discoveries excited a more intense interest than this. These anomalous visitants were anciently gazed at with wonder and alarm; and might still, as in former times, be accused of “perplexing nations,” though with very different fears and questionings. The conjecture that they, too, obeyed the law of universal gravitation, was to be verified by showing that they described a curve such as that force would produce. Hevelius, who was a most diligent observer of these objects, had, without reference to gravitation, satisfied himself that they moved in parabolas.³⁴ To determine the elements of the parabola from observations, even Newton called³⁵ “*problema longe difficillimum*.” Newton determined the orbit of the comet of 1680 by certain graphical methods. His methods supposed the orbit to be a parabola, and satisfactorily represented the motion in the visible part of the comet’s path. But this method did not apply to the possible return of the wandering star. Halley has the glory of having first detected a periodical comet, in the case of that which has since borne his name. But this great discovery was not made without labor. In 1705, Halley³⁶ explained how the parabolic orbit of a planet may be determined from three observations; and, joining example to precept, himself calculated the positions and orbits of twenty-four comets. He found, as the reward of this industry, that the comets of 1607 and of 1531 had the same orbit as that of 1682. And here the intervals are also nearly the same, namely, about seventy-five years. Are the three comets then identical? In looking back into the history of such appearances, he found comets recorded in 1456, in 1380, and in 1305; the intervals are still the same, seventy-five or seventy-six years. It was impossible now to doubt that they were the periods of a revolving body; that the comet was a planet; its orbit a long ellipse, not a parabola.³⁷

But if this were so, the Comet must reappear in 1758 or 1759. Halley predicted that it would do so; and the fulfilment of this prediction was naturally looked forwards to, as an additional stamp of the truths of the theory of gravitation.

³⁴ Bailly, ii. 246.

³⁵ *Principia*, ed. 1. p. 494.

³⁶ Bailly, ii. 646.

³⁷ The importance of Halley’s labors on Comets has always been acknowledged. In speaking of Halley’s *Synopsis Astronomicæ Cometicæ*, Delambre says (*Ast.* xviii. *Siccle*, p. 180), “Voilà bien, depuis Kepler, ce qu’on a fait de plus grand, de plus beau, de plus neuf en astronomie.” Halley, in predicting the comet of 1758, says, if it returns, “*Hoc primum ab homine Anglo inventum fuisse non inficiabitur æqua posteritas.*”