

# THE DISCOVERY OF NEPTUNE

by

A. Pannekoek\*

## I

Of all the astronomic discoveries of the nineteenth century the discovery of the planet Neptune may not be the most important, but it is certainly the best known, having caused the greatest sensation by its dramatic developments. The course of events leading up to the discovery has often been described and its general outlines are well known. William Herschel discovered Uranus in 1781 and in the succeeding years its orbit was calculated. These calculations showed that Uranus had been observed as a fixed star on several previous occasions in the eighteenth century (by Flamsteed in 1690, 1712 and 1715; by Bradley in 1753; by Mayer in 1756; by Le Monnier in 1750, 1764, 1768, 1769 and 1771). A painstaking investigation of its motion, taking into account the perturbations caused by other planets, especially those due to Jupiter and Saturn, was given in the tables of Alex. Bouvard in 1821 and showed that the early observations did not harmonize with those made after the discovery. Moreover, in the following years Uranus appeared to deviate more and more from the orbit calculated from the later observations; in 1835 the deviation was already 30'' and in 1841 as much as 70''. Airy, the director of Greenwich Observatory, found from observations in 1833-35 that, in addition, the radius vector (i. e. the distance from planet to the sun) did not fit the calculated orbit. In the eighteen-thirties astronomers gradually became convinced that these discrepancies were caused by the attraction of an unknown disturbing body, that of a more remote planet. Out of this supposition rose the problem: was it possible from a knowledge of the perturbations in the motion of Uranus to derive the position and orbit of the unknown body? In 1836 Mary Sommerville expressed it thus: "The discrepancies

\* Em. Professor of Astronomy at the University of Amsterdam.