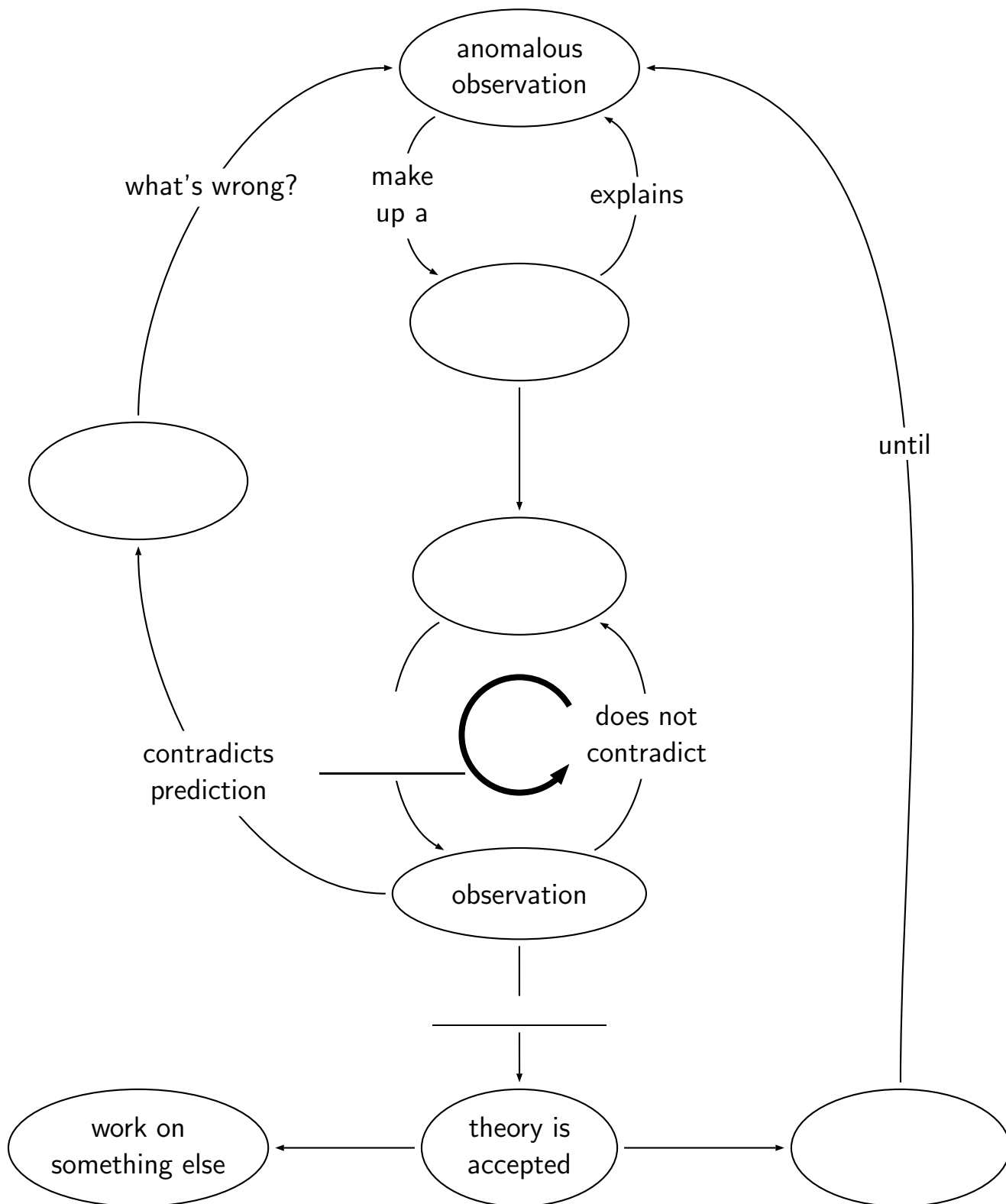


# ASTR 310 Tutorial : The Nature of Science

Part 1: Scientific Inquiry With your discussion leader, complete this concept map about scientific inquiry.



## Part 2: Case Studies

### Case 1: The orbit of Uranus

Anomalous observation:

Brainstorm (at least 2 ideas):

Successful theory:

Theory's prediction:

Observation that confirmed theory:

### Case 2: The orbit of Mercury

Anomalous observation:

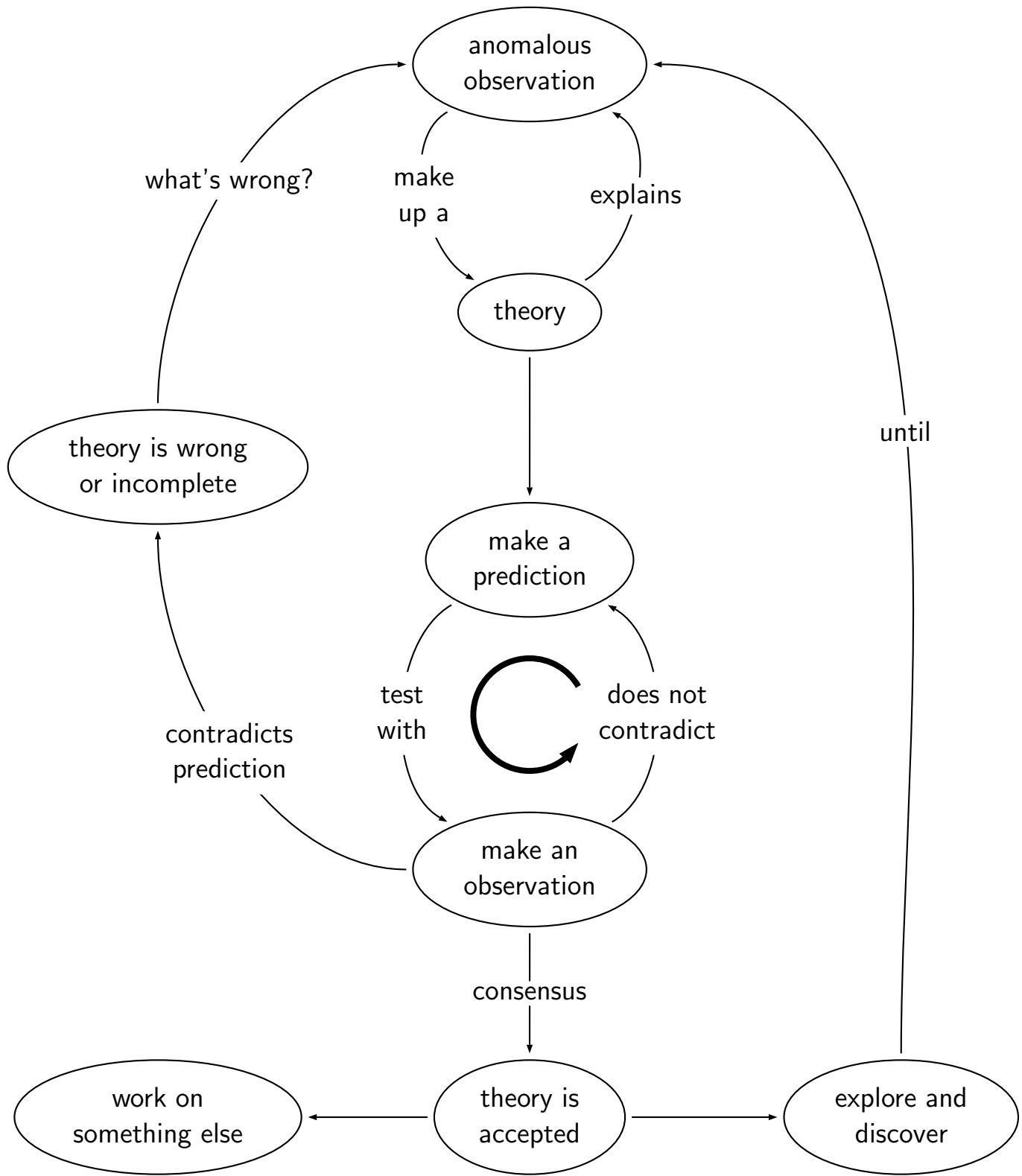
Brainstorm (at least 2 ideas):

Successful theory:

Theory's prediction:

Observation that confirmed theory:

### Case 3: Global Warming, Summarize your understanding of global warming in a few sentences:



consensus

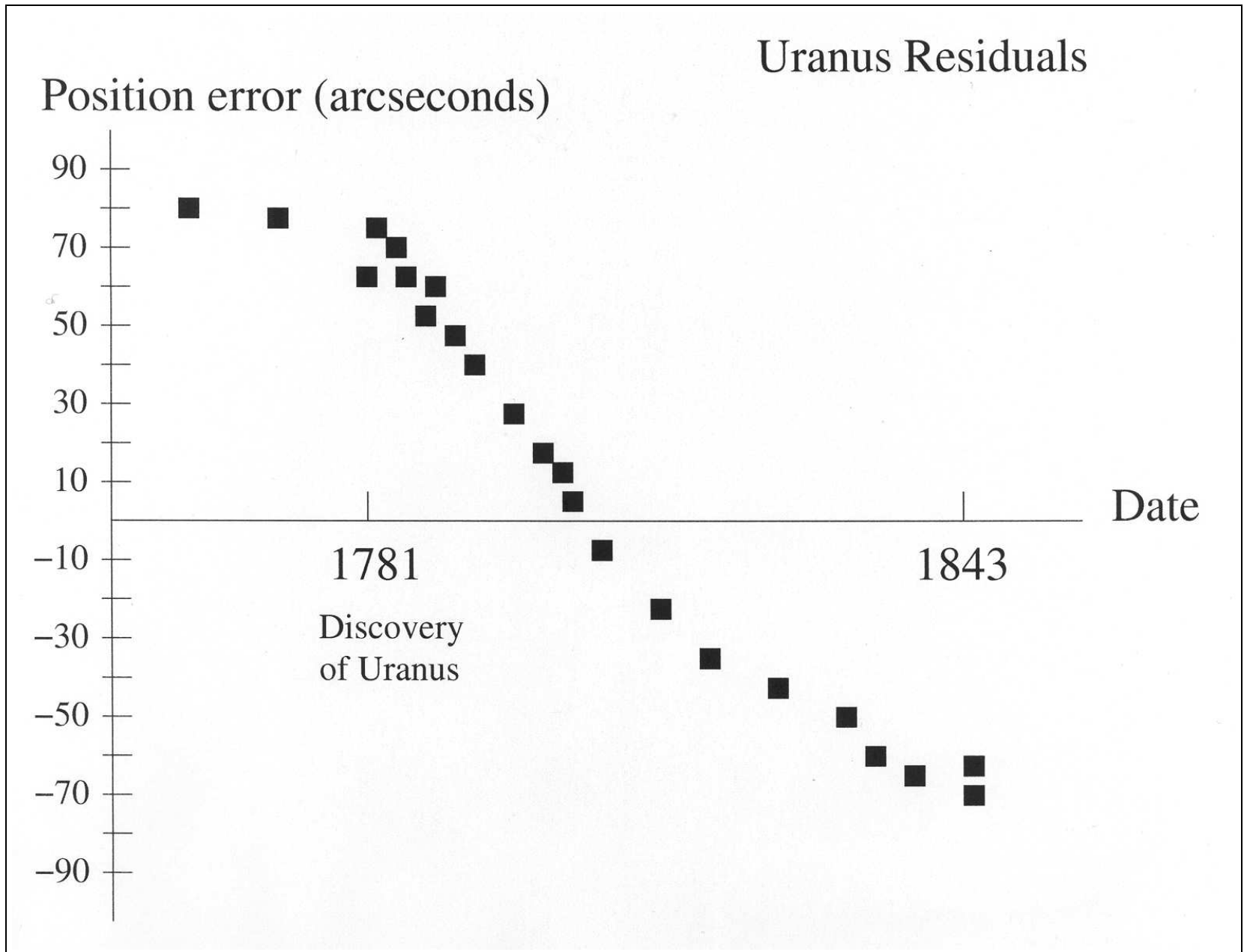
theory

theory is wrong  
or incomplete

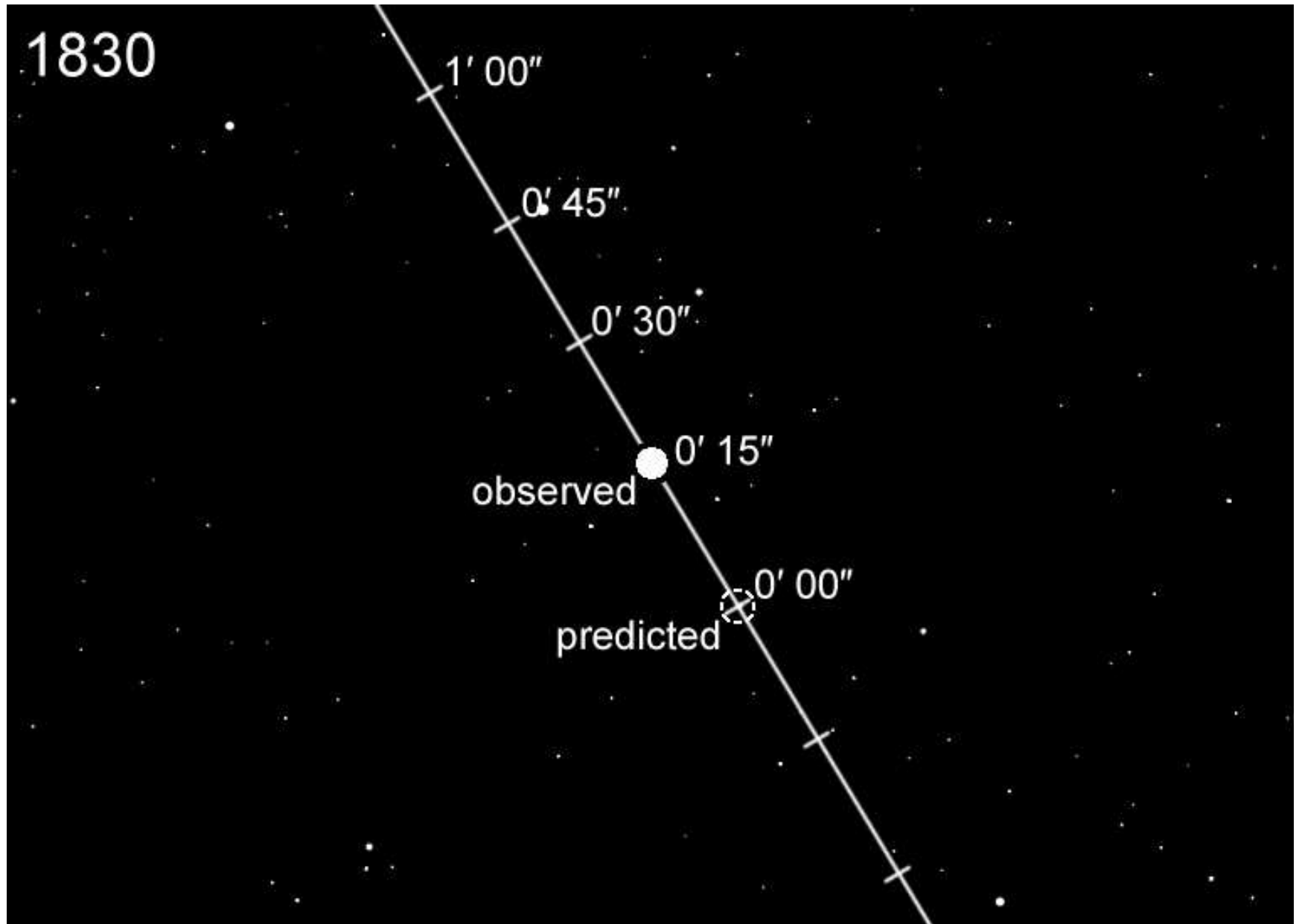
make a  
prediction

explore and  
discover

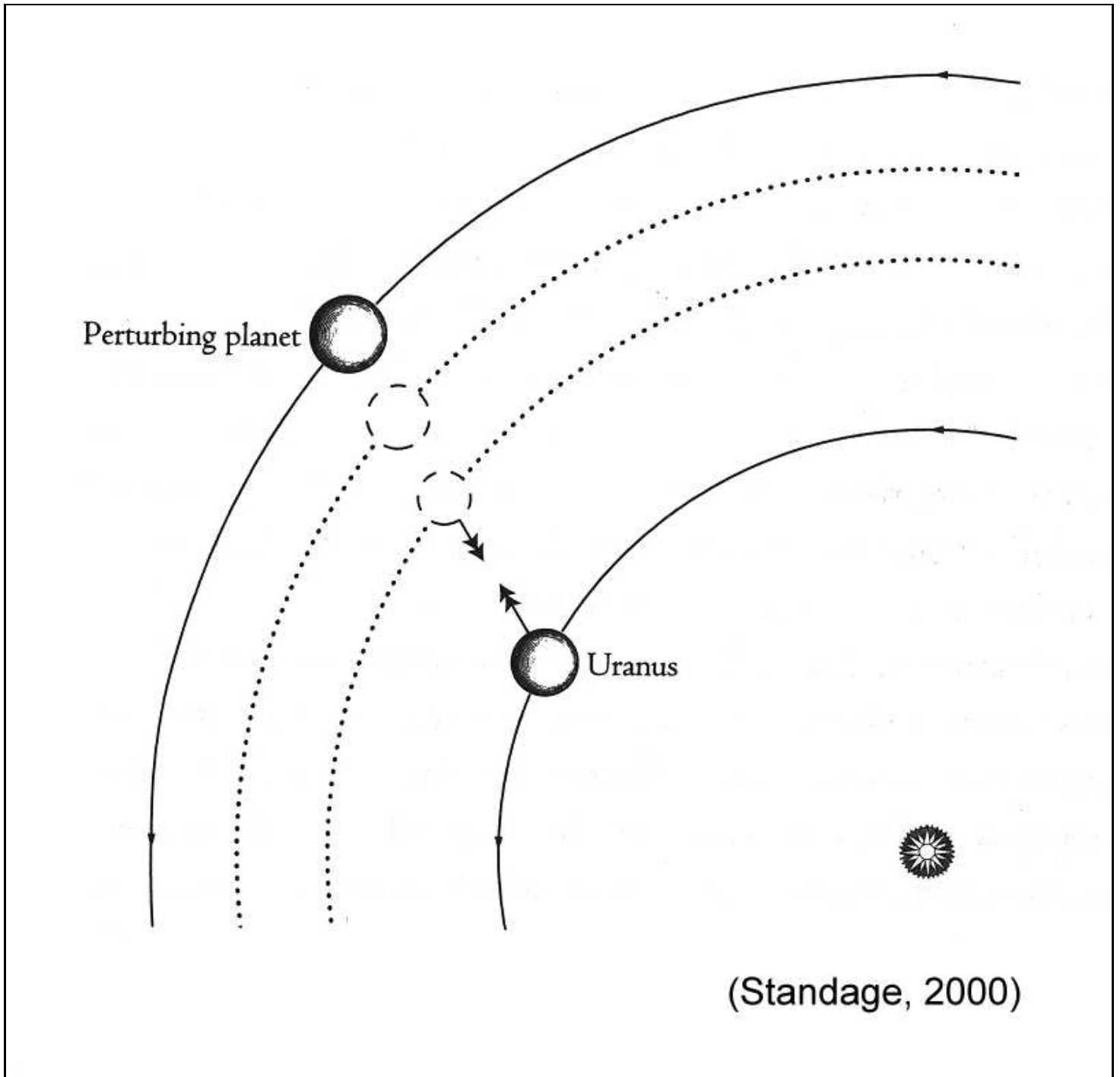
test  
with



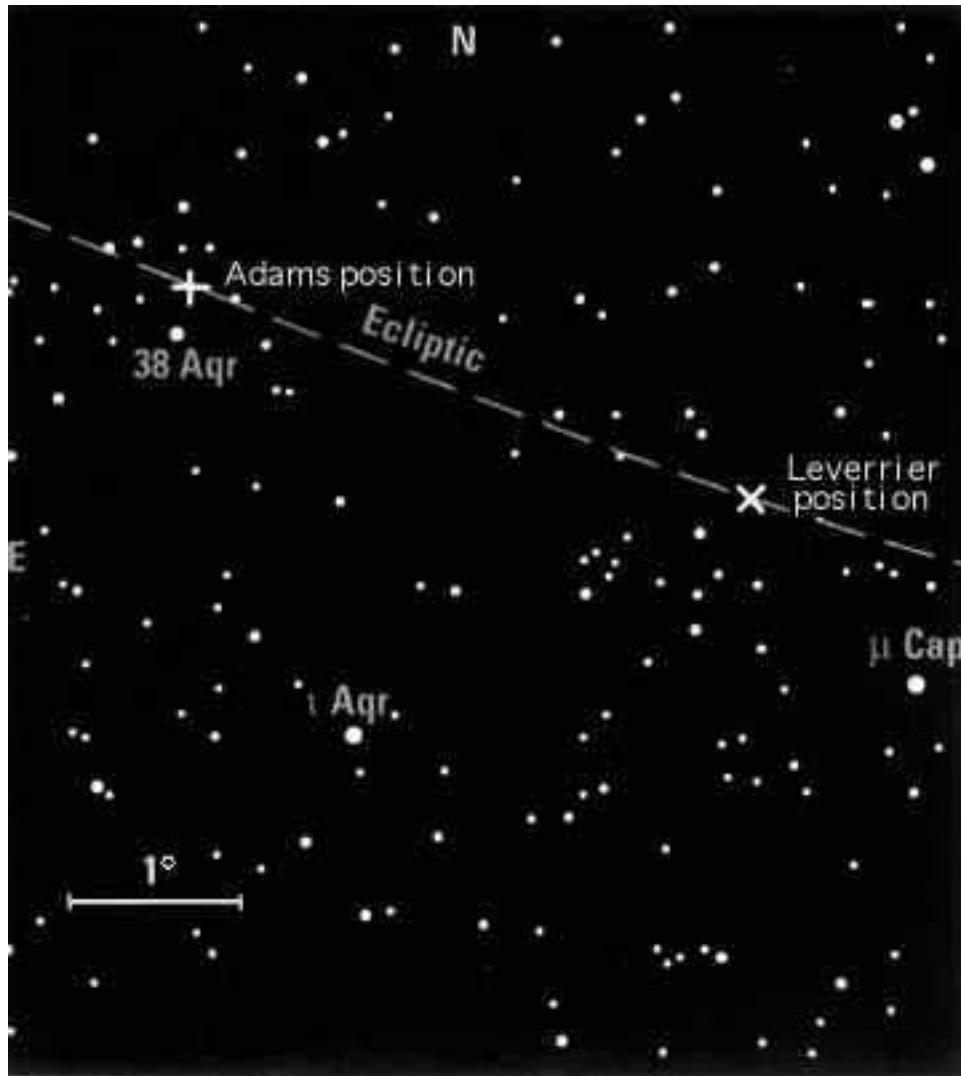
**Exhibit 1-1** Differences between predicted and observed positions of Uranus



**Exhibit 1–2** Predicted and observed positions of Uranus in 1830

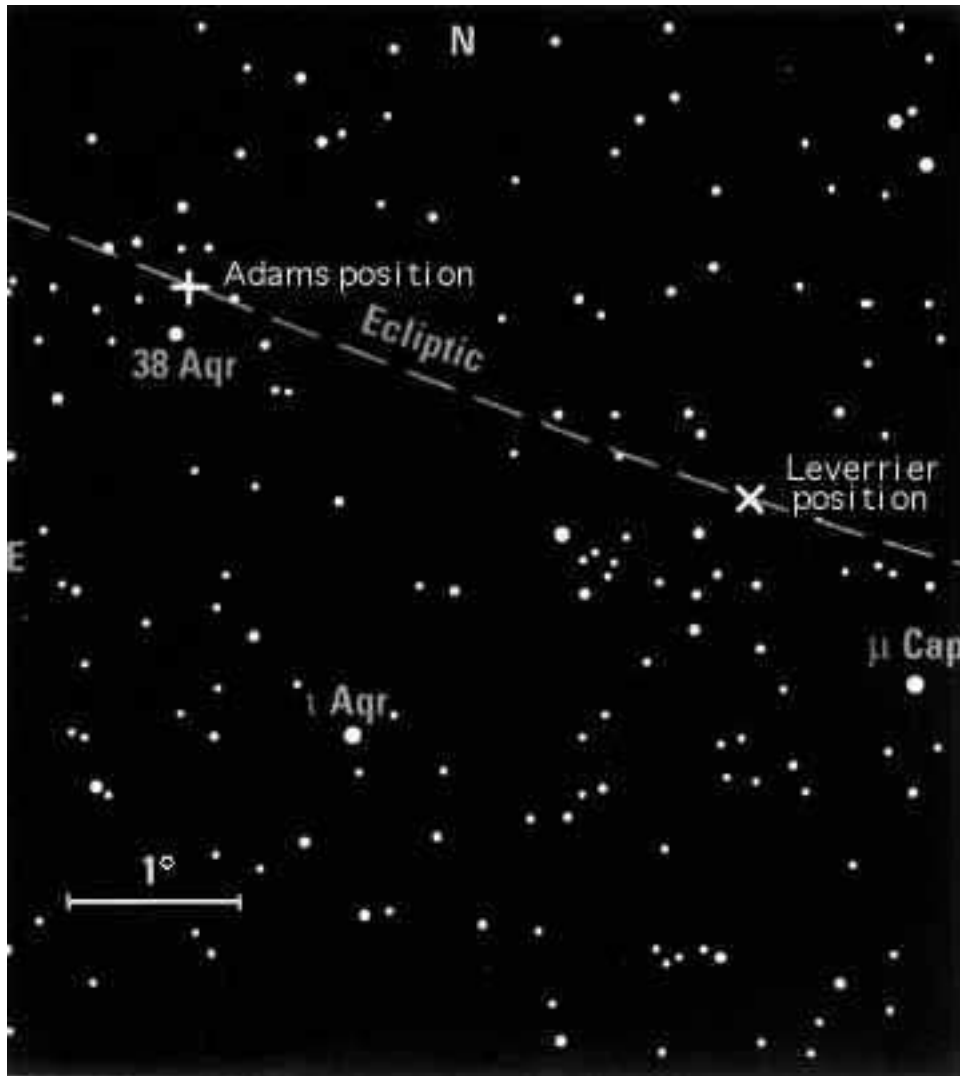


**Exhibit 1–3** One planet can perturb another planet's orbit.

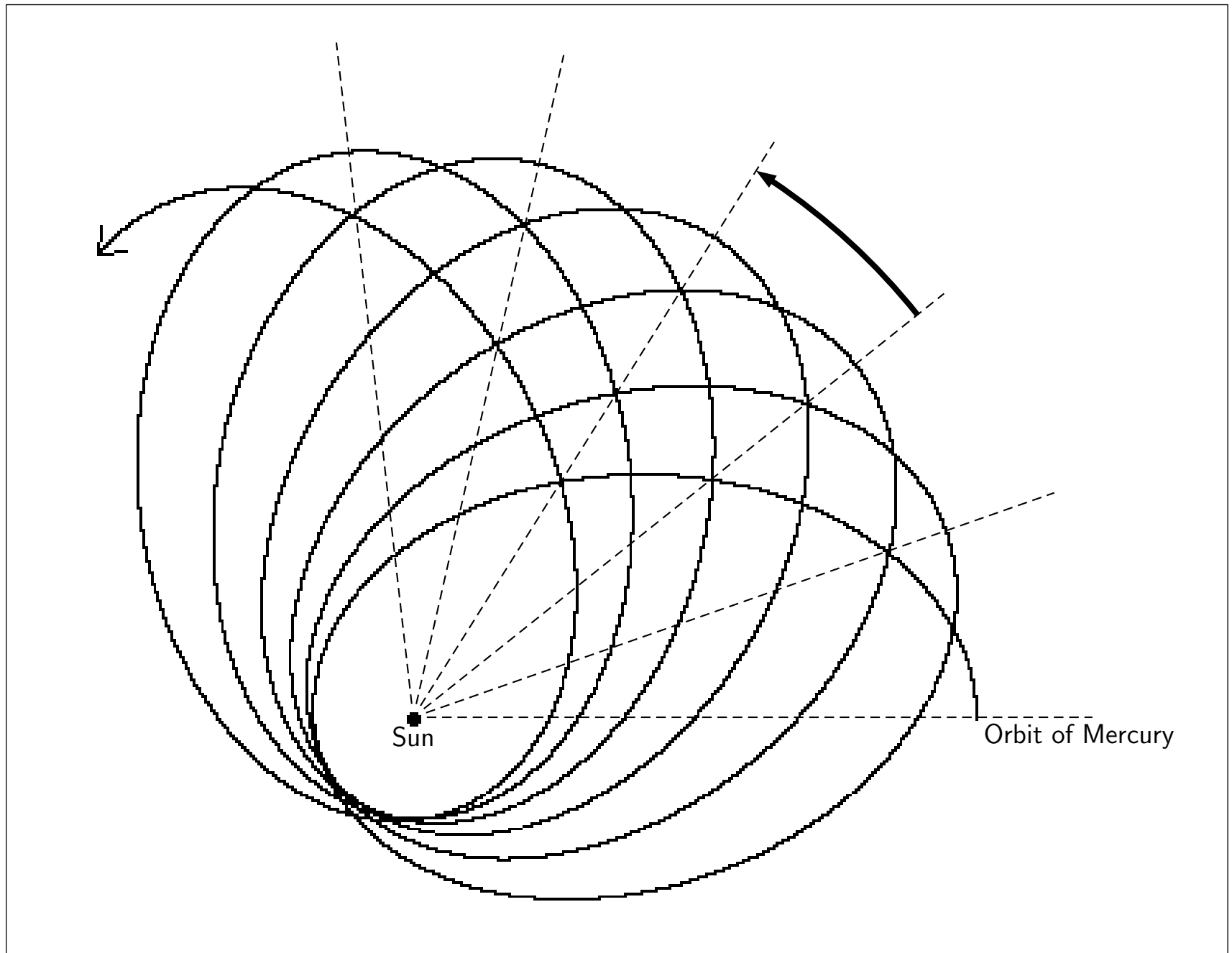


**Exhibit 1-4** Position of Neptune predicted by Adams and Leverrier

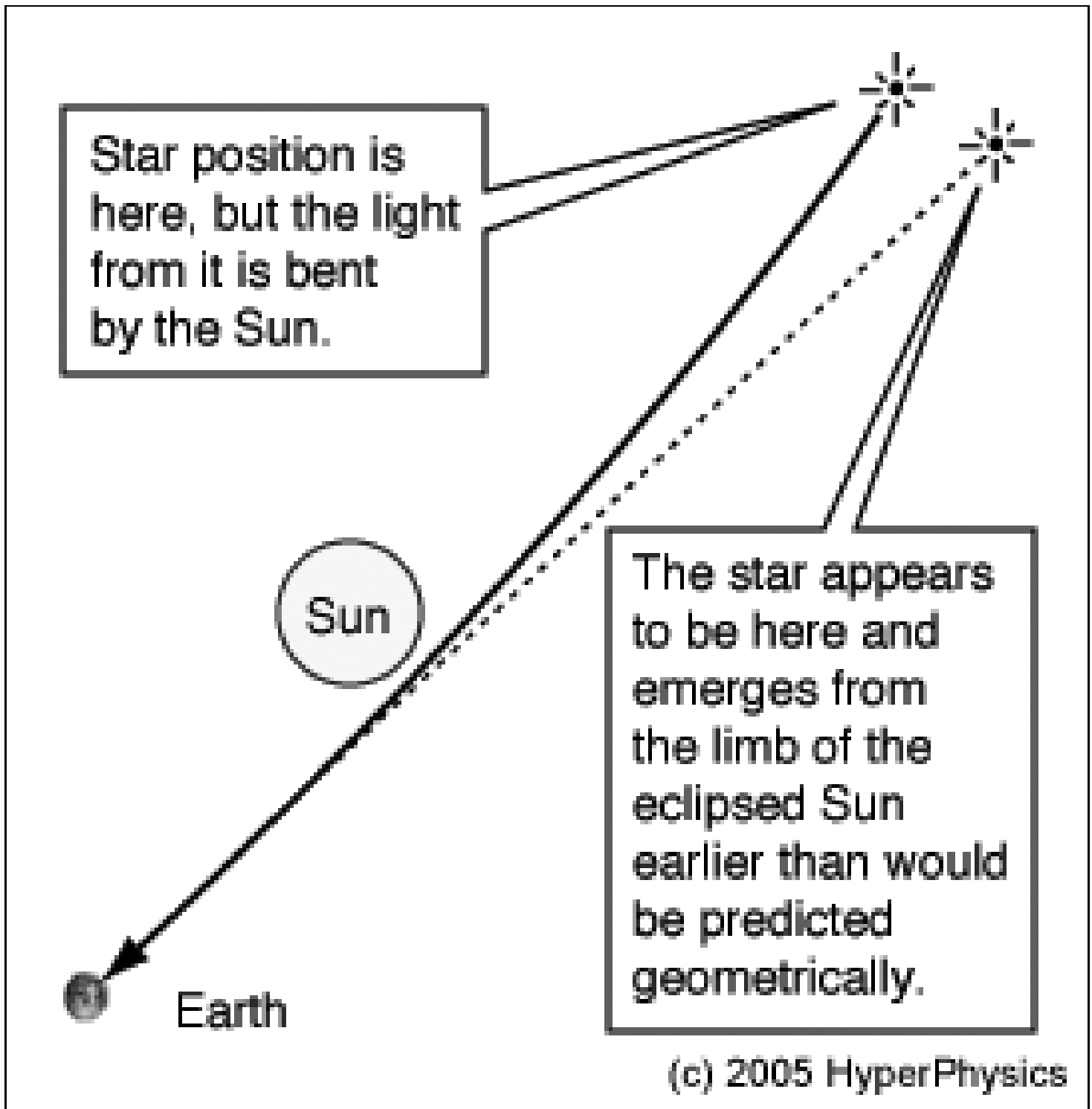




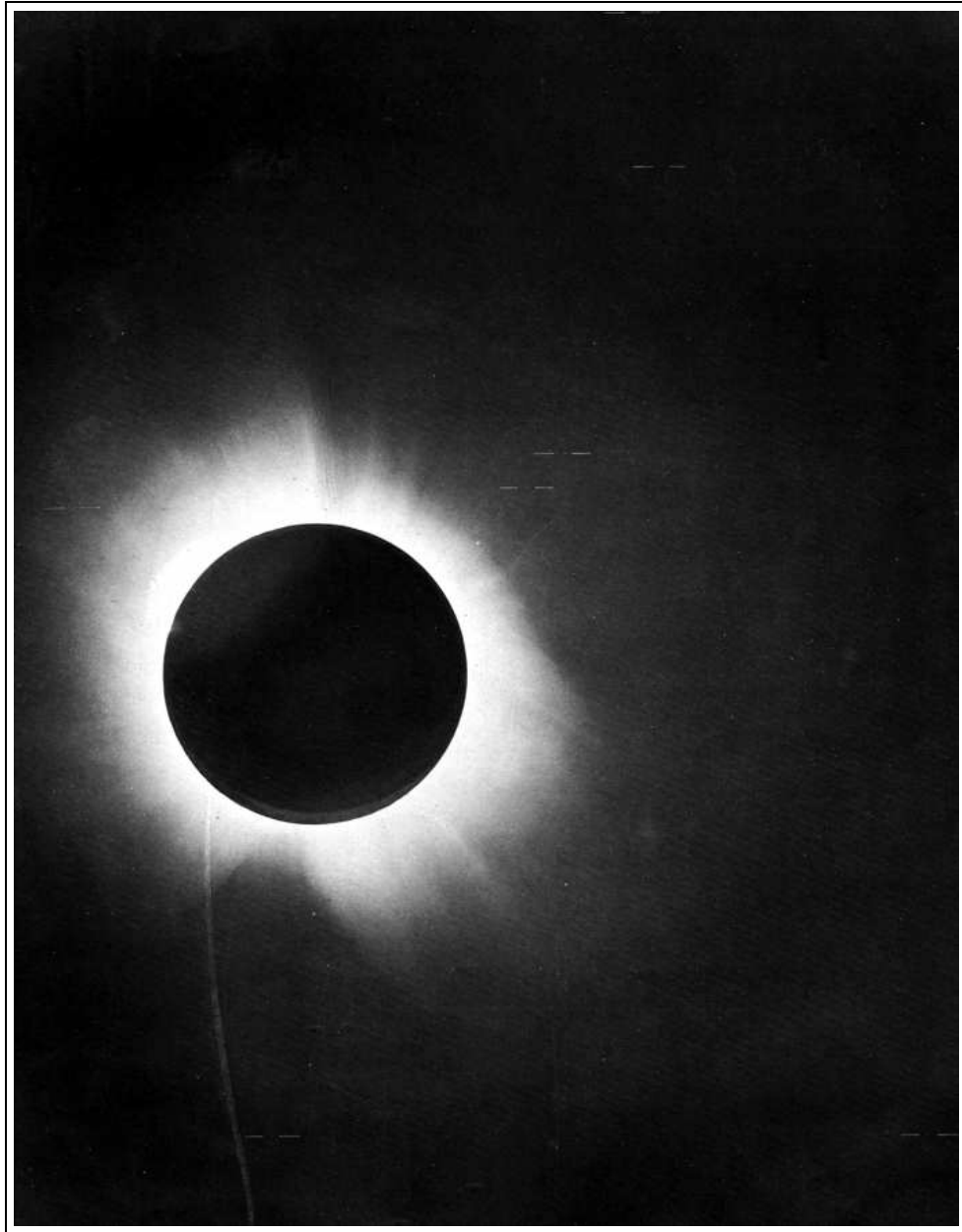
**Exhibit 1–5** Galle's observations on September 23, 1846



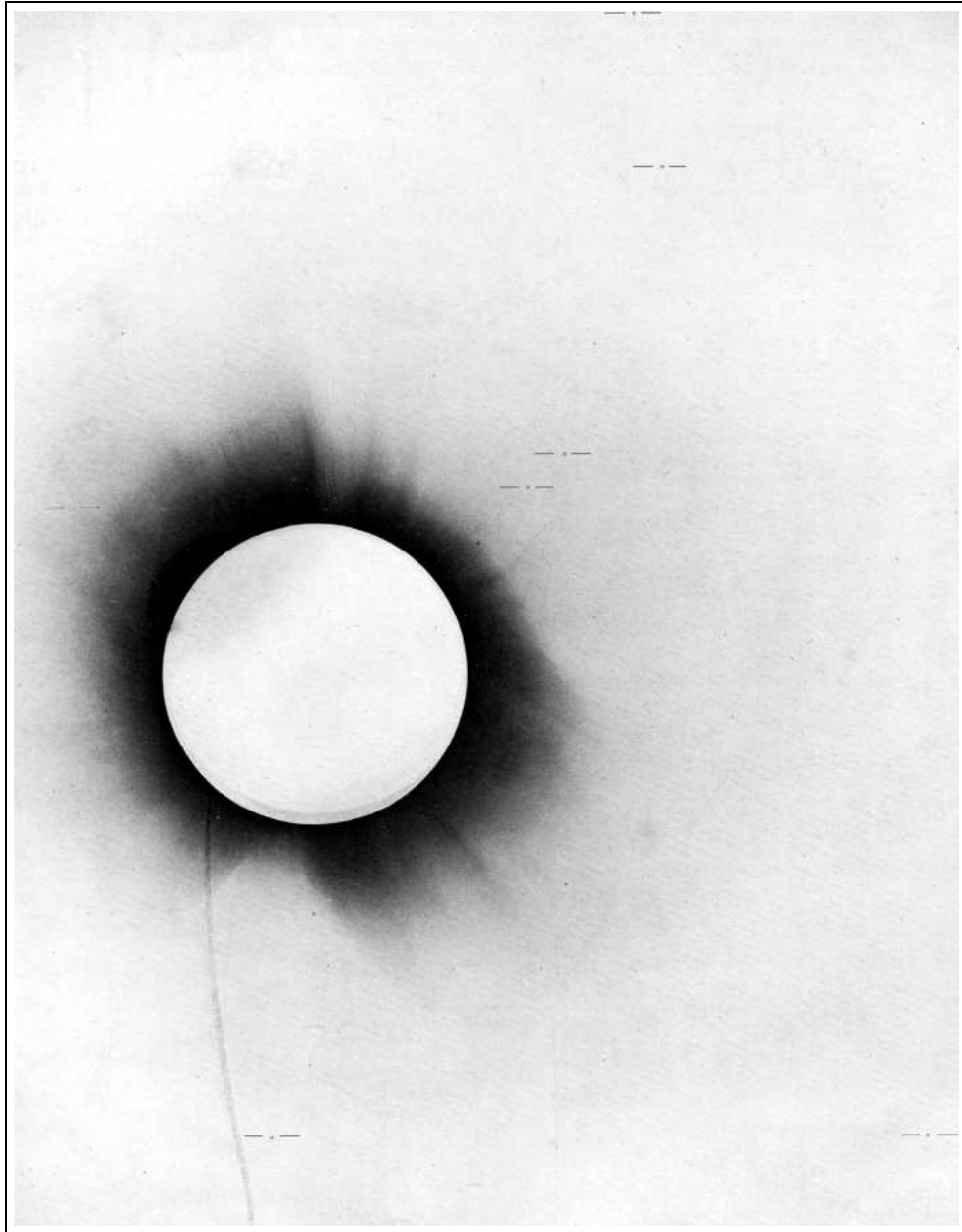
**Exhibit 2-1** Precession of Mercury's orbit (exaggerated)



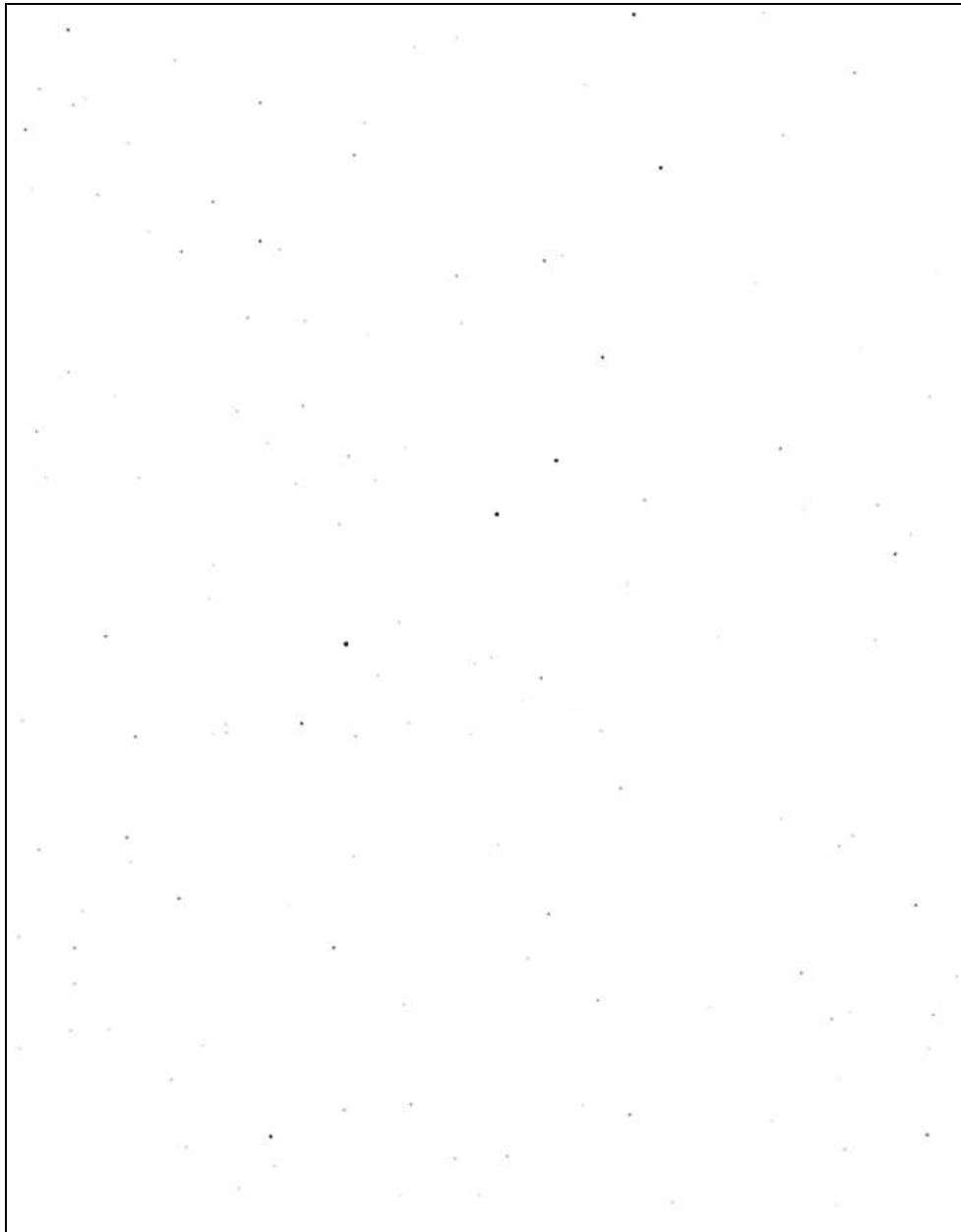
**Exhibit 2–2** Gravitational lensing by the Sun shifts the positions of background stars.



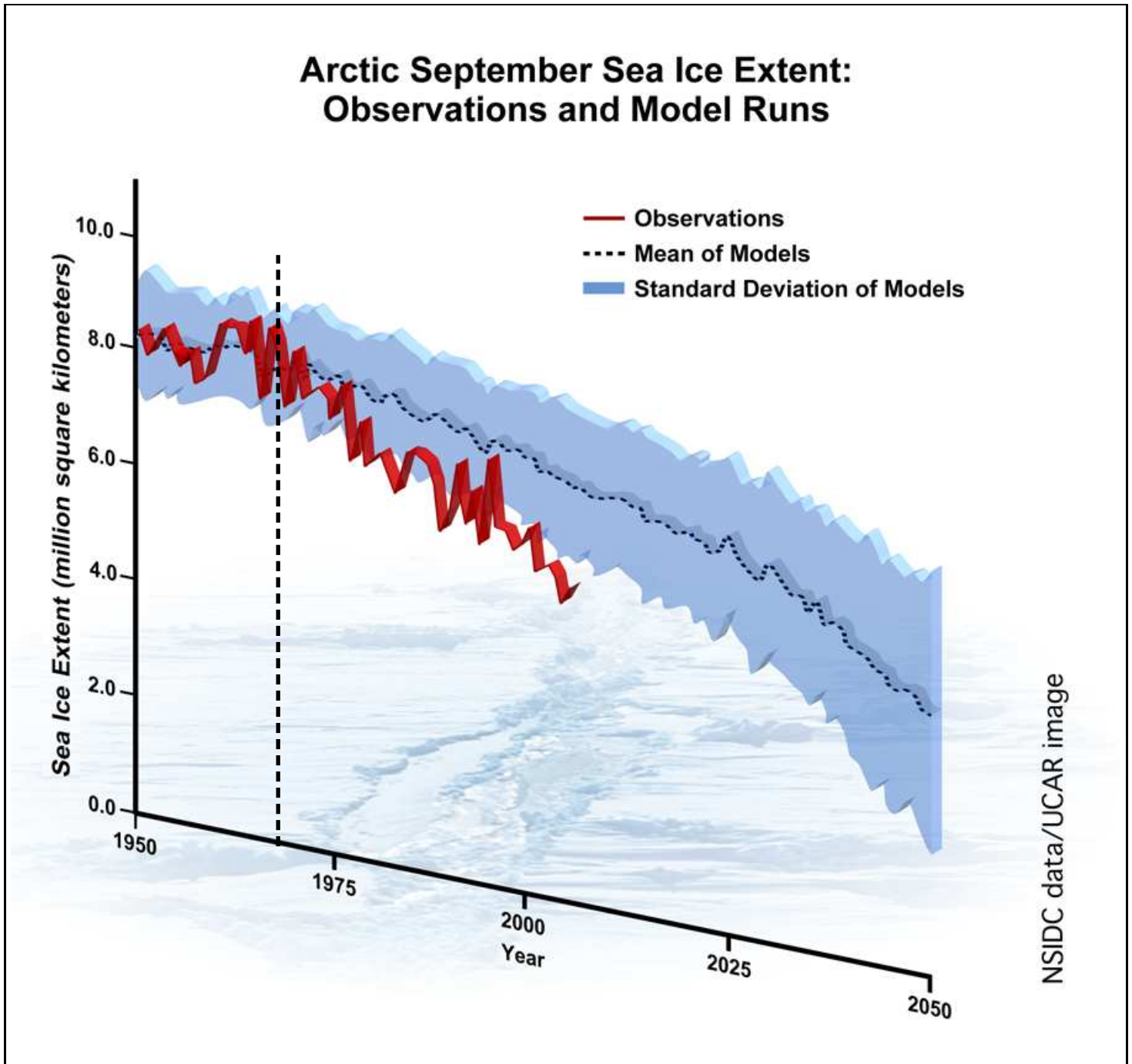
**Exhibit 2–3** Eddington's observations of 1919 eclipse. Stars whose positions are measured are highlighted.



**Exhibit 2-4** Eddington's observations (negative) of 1919 eclipse. Stars whose positions are measured are highlighted.



**Exhibit 2–5** Reference stars (negative) behind 1919 solar eclipse



**Exhibit 3-1** (National Snow and Ice Data Center, 30 April 2008)

