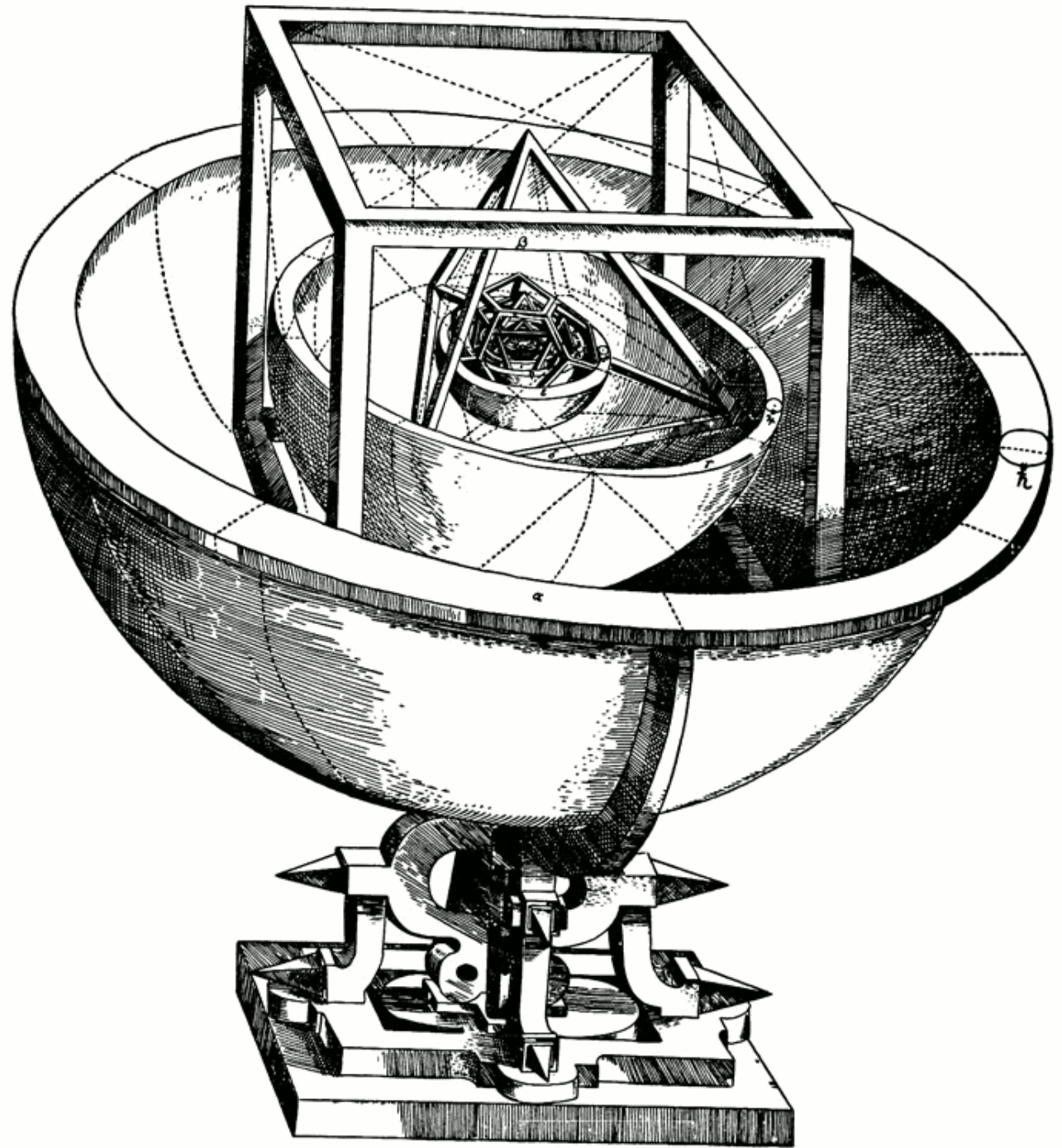


Kepler's Laws



Johannes Kepler

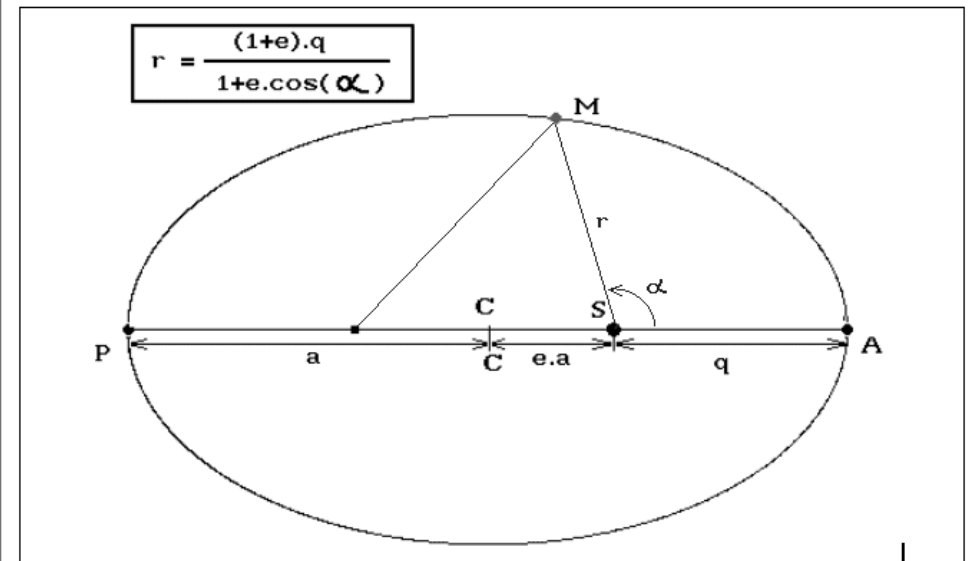
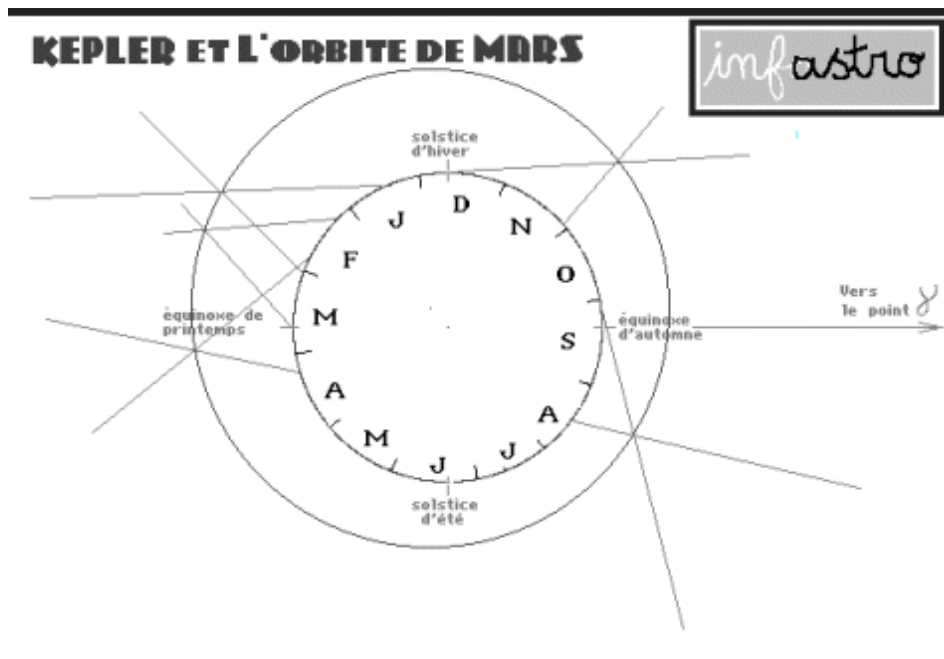
(1571-1630)

- The first astrophysicist?
- A mathematician hired by Tycho to solve the orbit of Mars
- It took over 20 years
- He realized that the orbits of the planets were ellipses, not circles
- Also a mystic and an astrologer



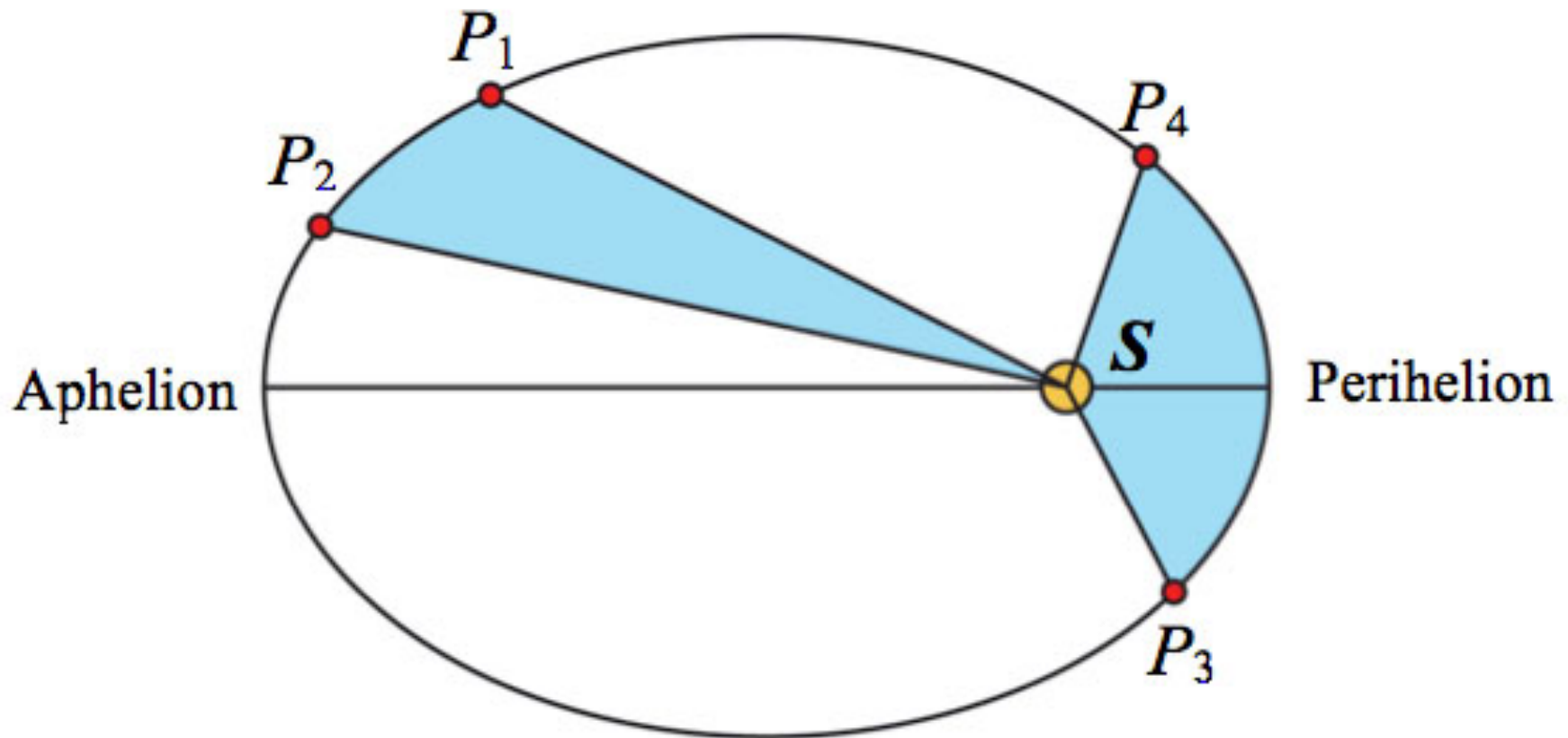
Kepler's Laws

- I. The orbits of the planets are ellipses, with the Sun at one focus.



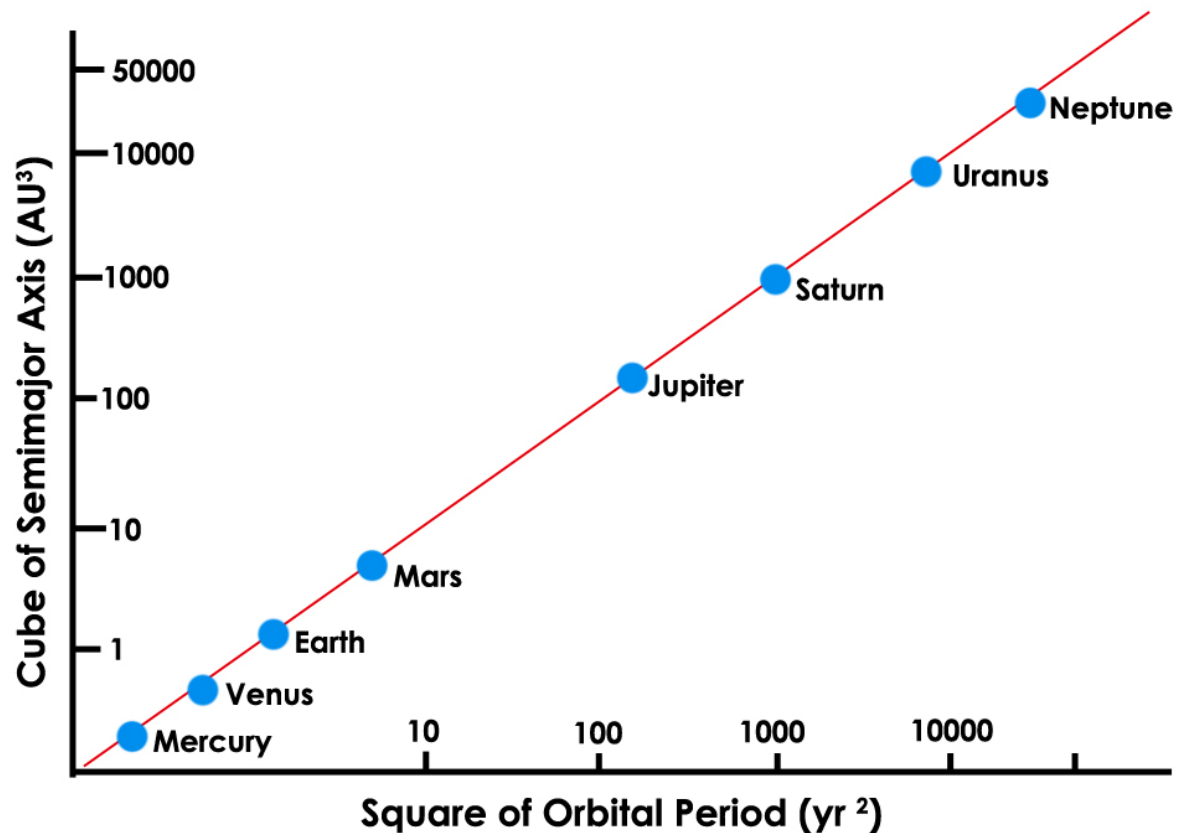
Kepler's Laws

II. The line between the Sun and a planet sweeps out equal areas in equal times



Kepler's Laws

III. There is a relation between the orbital period and the mean distance to the Sun, $p^2 = a^3$



Kepler's Laws

- I. The orbits of the planets are ellipses, with the Sun at one focus.
- II. The line between the Sun and a planet sweeps out equal areas in equal times
- III. There is a relation between the orbital period and the mean distance to the Sun, $p^2 = a^3$

Kepler's Laws

These are empirical laws.

They have been verified:

throughout the Solar System, and
elsewhere in the universe

There is no theory here.