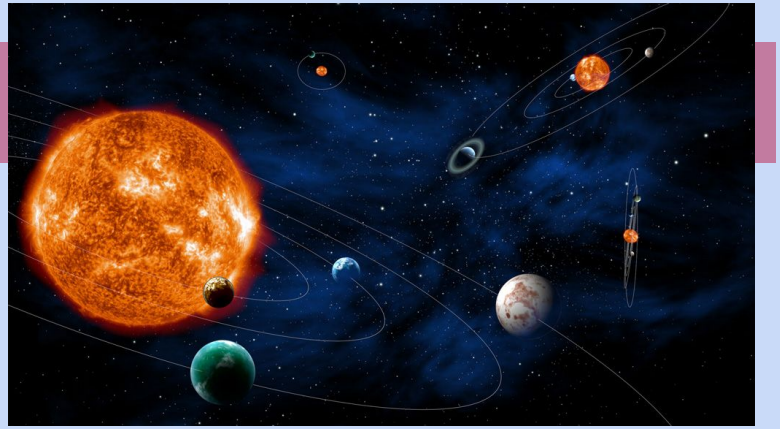
Origin of Modern Astronomy

Chapter 22

Chapter 22.1: Early Astronomy



Astronomy: the study of the universe, the properties of objects in space, and the laws under which the universe operates.

Aristotle

- Greek philosopher
- concluded the Earth was round

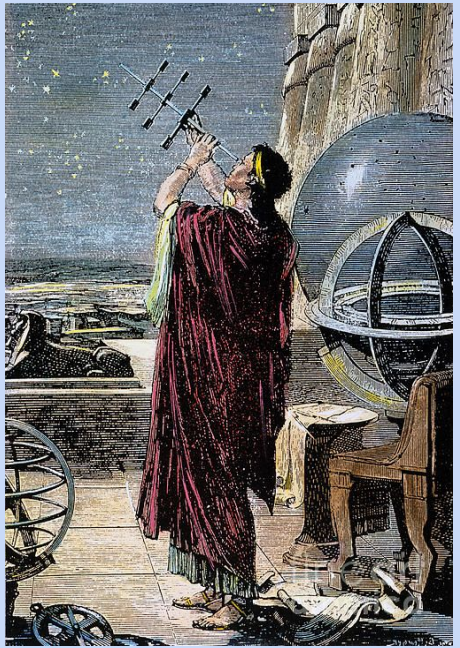
Eratosthenes

- Accurately estimated the circumference of the Earth

How he mathed it

Hipparchus

- Determined the location of 850 stars
- Developed the first measurement of a “year”
- Developed a method for predicting lunar eclipses

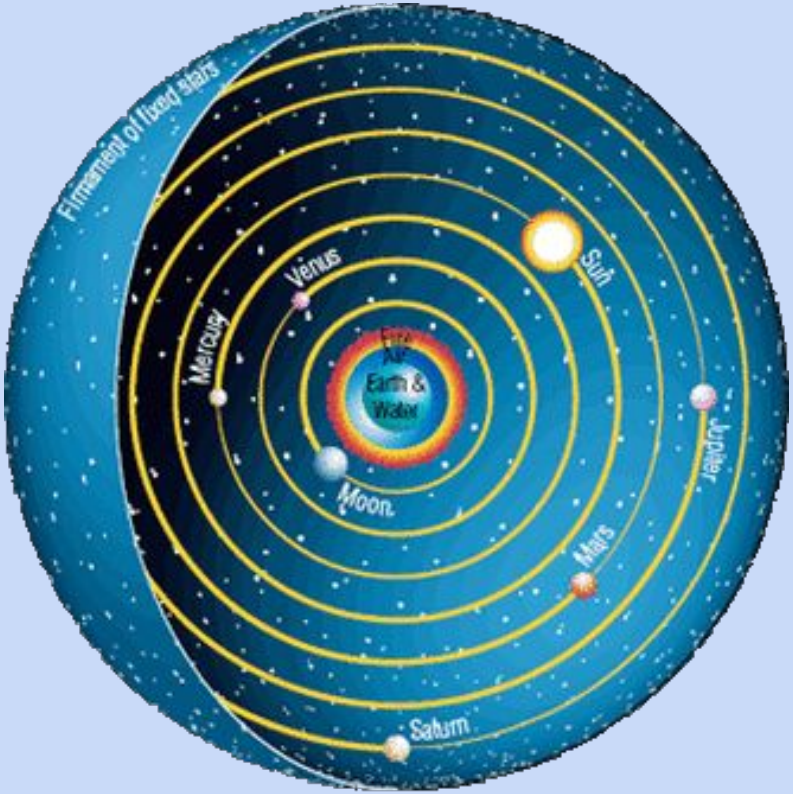


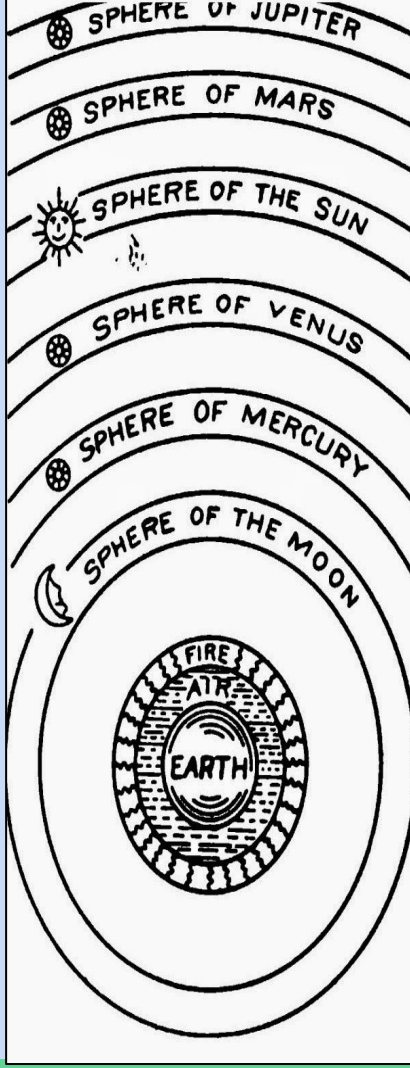
Geocentric model:

the moon, sun and the other planets orbit the Earth

Celestial sphere:

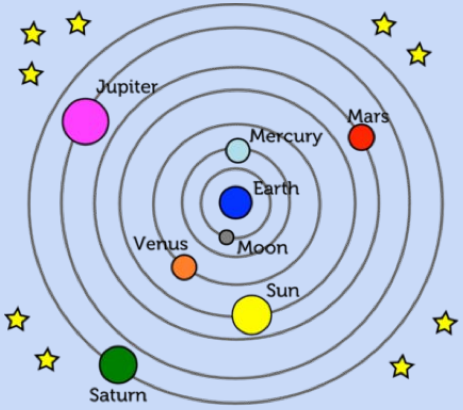
the outermost universe in which all stars were contained



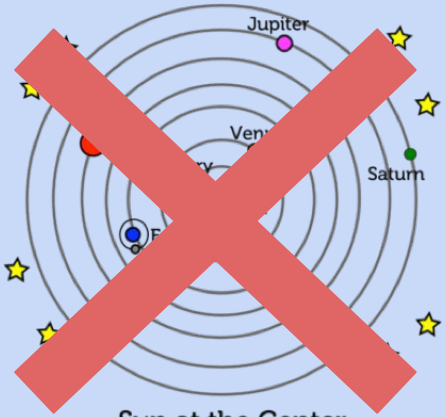


Aristarchus

- proposed the first heliocentric (sun-centered) model of the solar system.



Earth at the Center



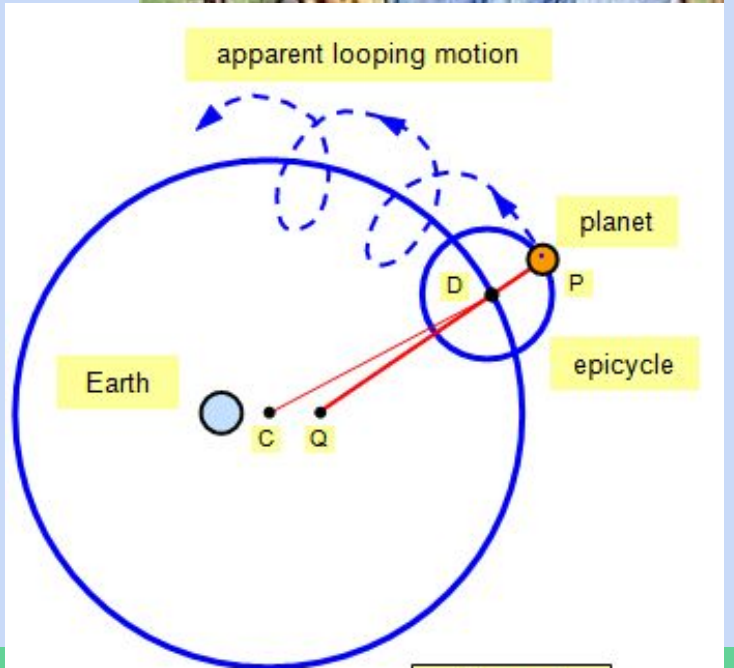
Sun at the Center

Claudius Ptolemy

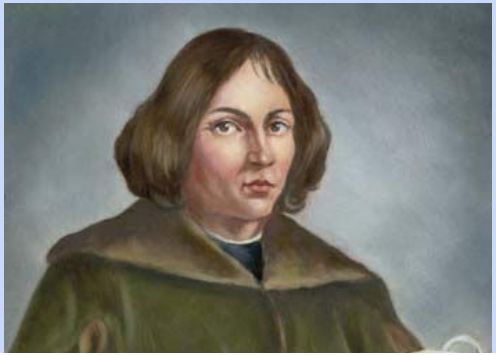
- Created the Ptolemaic system accounting for planetary movement

Retrograde motion: apparent westward shift in motion in relation to the stars.

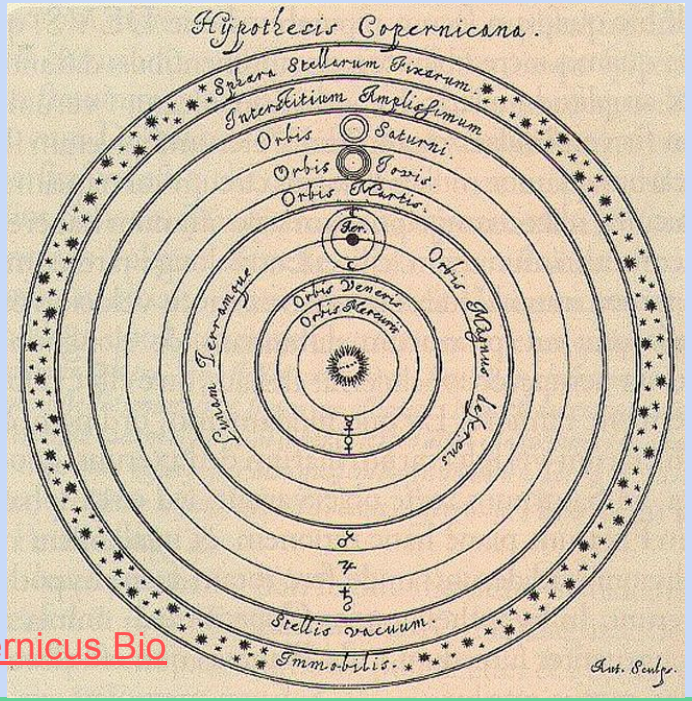
Mercury in retrograde??



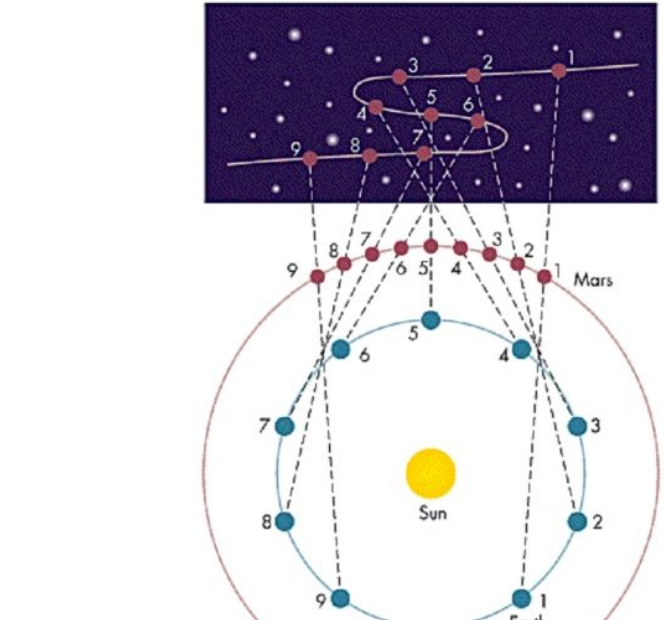
Nicolaus Copernicus (1473- 1543)



- concluded that Earth was a planet and that the sun was the center of the solar system.



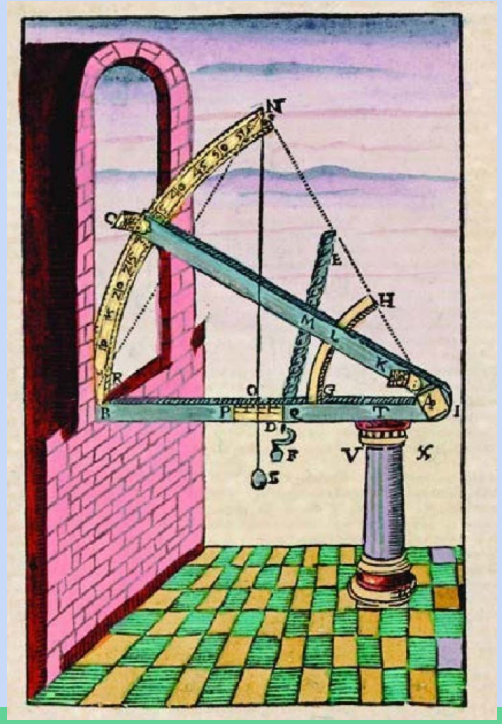
Copernicus Bio



Tycho Brahe (1546-1601)

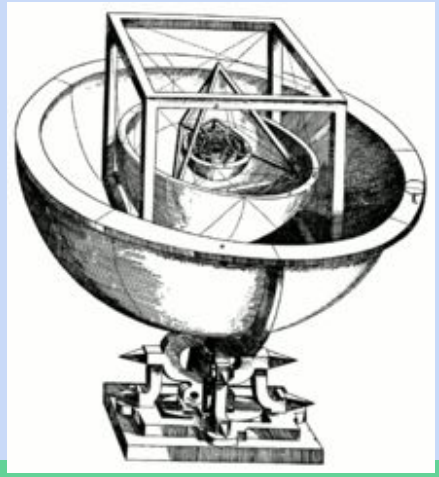
Planetary Laws of Motion

- designed and built instruments to measure locations of planetary bodies



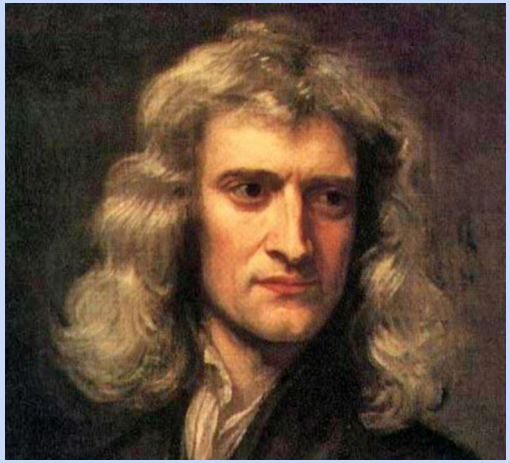
Johannes Kepler (1571- 1630)

- Assistant to Brahe
- formulated the three laws of planetary motion



Sir Isaac Newton:

- English mathematician, astronomer, & physicist
- Formulated the laws of motion and universal gravitation



Newton's Laws of Motion

1. (*The Law of Inertia*) A body at rest remains at rest and a body in motion remains in motion with a constant speed and in a straight line, unless acted upon by an outside force.
2. The acceleration of an object is proportional to the force acting upon it and is directed in the direction of the force. That is, $F=ma$.
3. To every action there is an equal and opposite reaction.