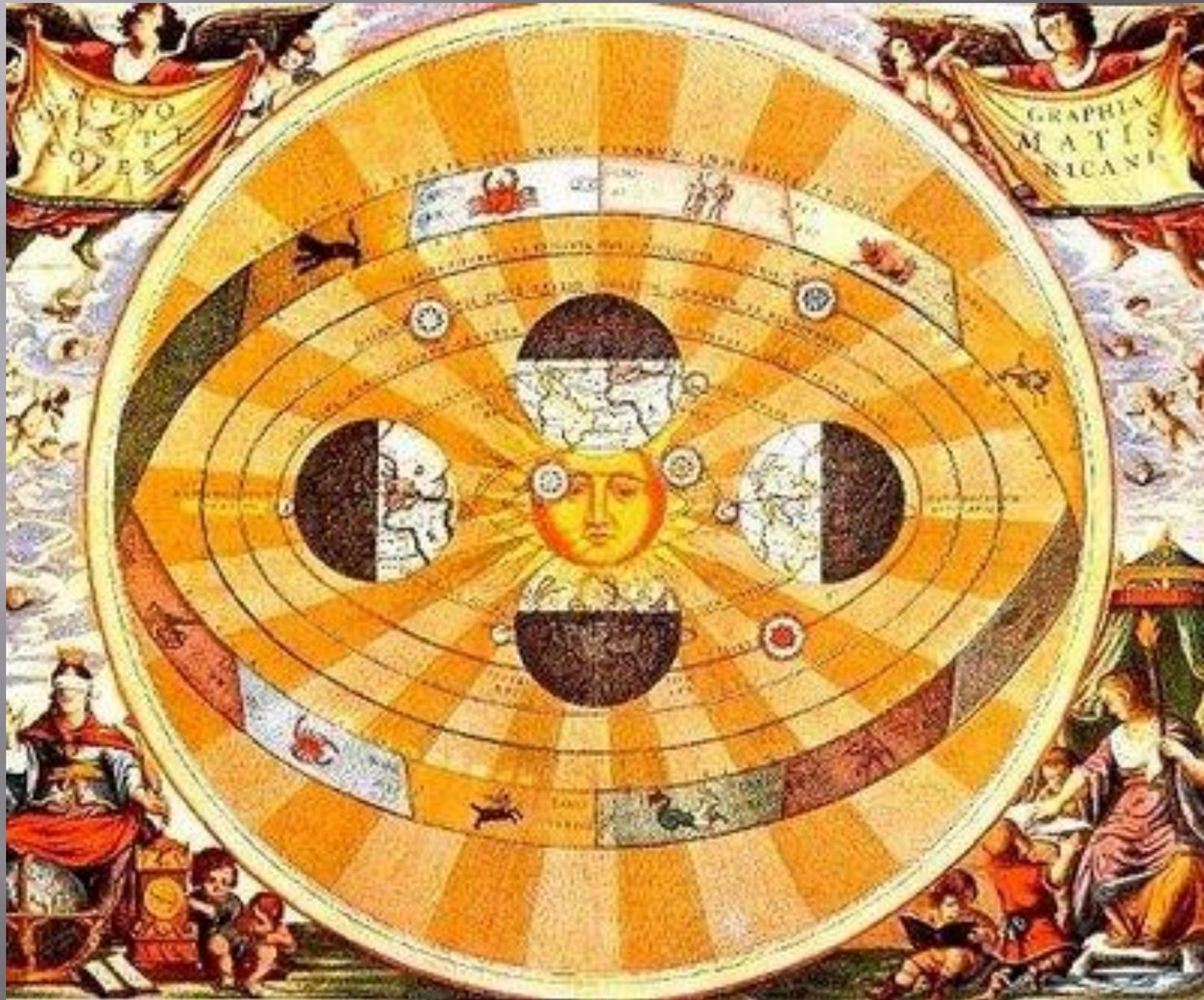
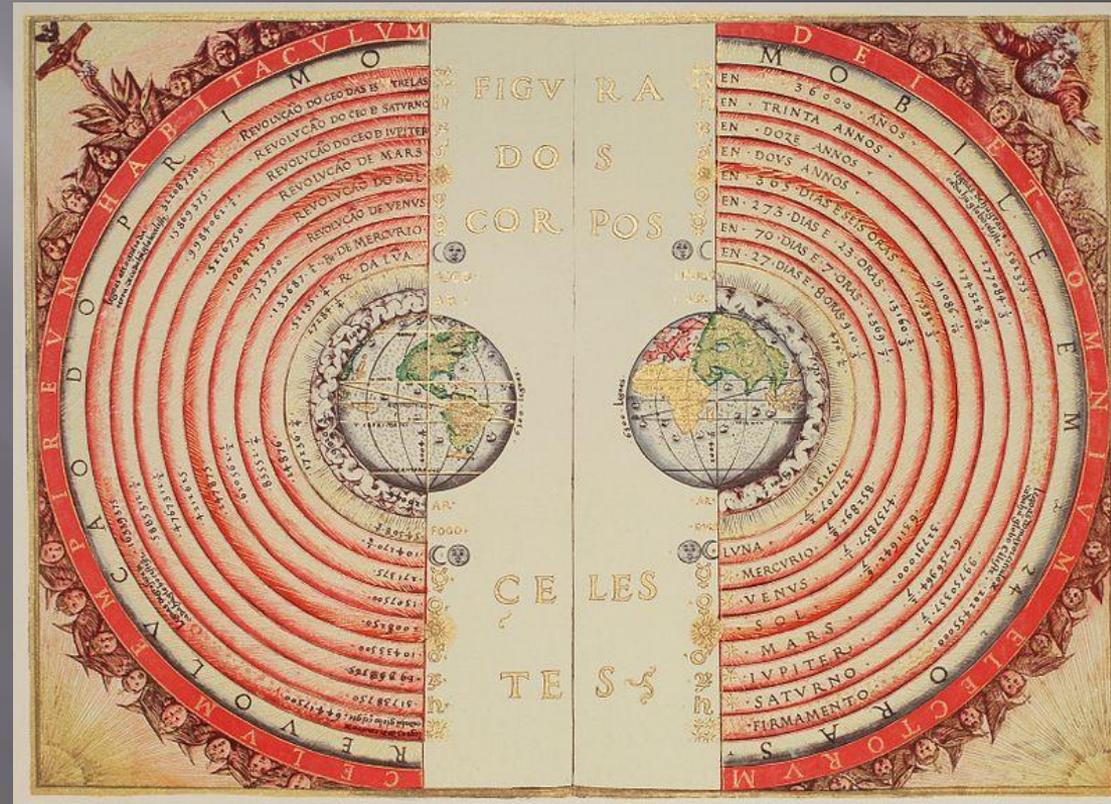


The Scientific Revolution



Medieval Aristotelian Philosophy

- ▣ Natural philosophy
 - Nature of the universe
- ▣ Geocentric theory
 - Celestial Spheres
 - Earth
 - ▣ Light elements
 - ▣ Heavy elements
- ▣ Aristotle's ideas made sense and were compatible with a Christ-centered universe



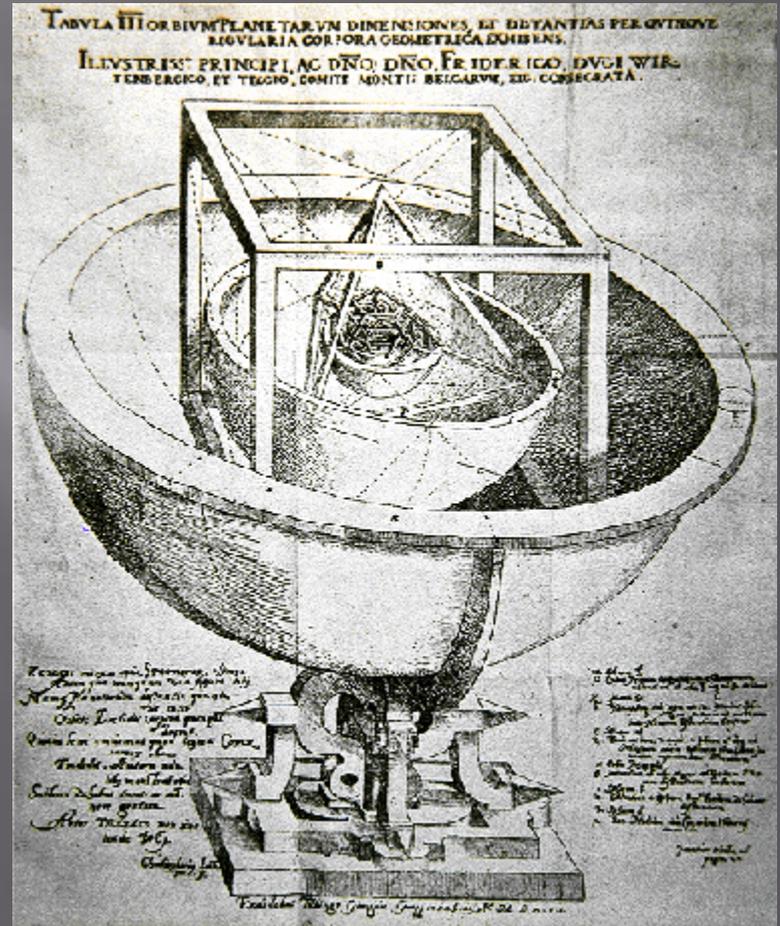
What is the Scientific Revolution?

- ▣ A new way of thinking that provided the foundation of the modern world!
- ▣ Medieval View
 - Knowledge is derived from the ancient authors or the Bible
- ▣ Modern View
 - Knowledge is derived from careful observation and questioning accepted beliefs



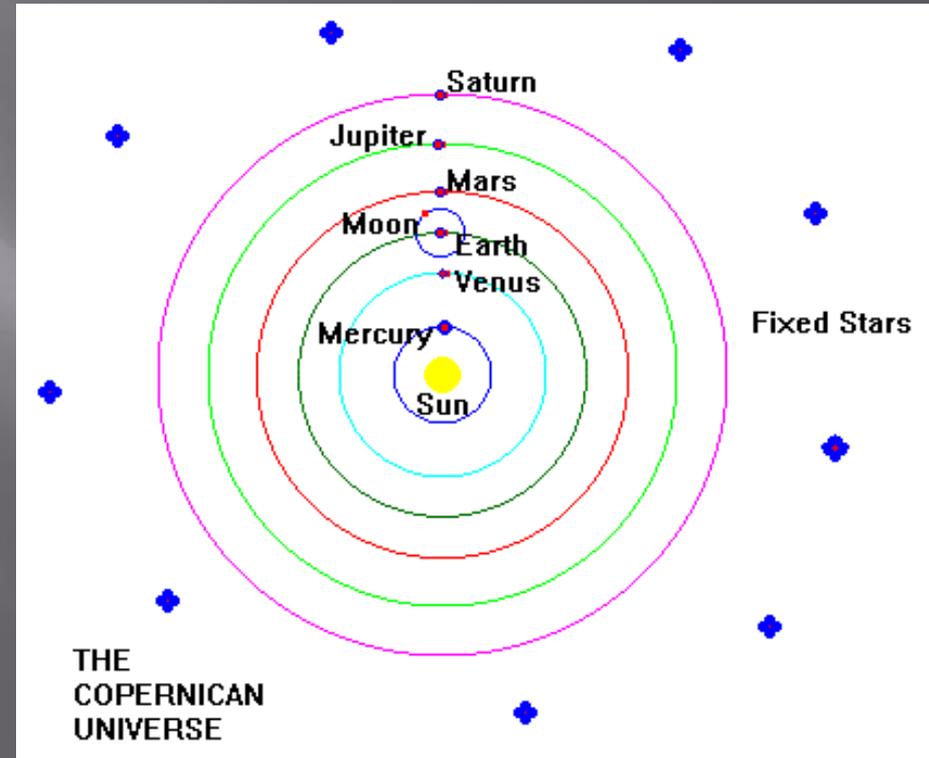
Causes of the Scientific Revolution

- Medieval University
 - Departments of Philosophy formed
- Renaissance
 - Rediscovery of classics with Arab commentaries
- Printing press
 - Speed of communication
- Age of Discovery
 - Need for new scientific instruments
- Hermeticism
 - Use of astrology and magic



The Copernican Hypothesis

- 1543 – Copernicus asserted that the sun was at the center of the universe
 - Believed that Ptolemy's theory distracted from the glory of God
- Catholics ignored it, but denounced by Protestants
 - Size of the universe and placement of earth questioned very teachings of Scripture



Proving Copernicus Right!

- ▣ Tycho Brahe
 - Gathered data to prove this assertion
- ▣ Johannes Kepler
 - Used Brahe's data to prove laws of planetary motion
 - Successfully combined natural philosophy with mathematics



Galileo's Contribution

- ▣ Used the experimental method to discover the law of inertia
 - Proved Aristotle wrong!
- ▣ Invented his own telescope
 - Used it to discover Jupiter's moons and the nature of our moon
- ▣ 1633 – Roman Inquisition forced him to recant his statements
 - 1992 – Church finally admitted that he was correct!



Scientific Method

- ▣ Francis Bacon
 - Experimental method
 - Used experiments or inductive reasoning to find truth
 - From specific to general!
- ▣ Rene Descartes
 - Rationalism
 - Used logic and deductive reasoning to find truth
 - World is mechanistic... ipso facto, it can be comprehended!
 - Doubt everything until it is proven to be true
 - "I think, therefore I am"
 - Cartesian Dualism
 - Mind and body are different!



Newtonian Synthesis

- Bacon's Empiricism and Descartes' Rationalism will be combined by Newton to create the "Scientific Method"
- 1687 – Newton publishes *Principia*, which includes his law of universal gravitation
 - The universe is like a clock governed by natural laws!
 - Everything works perfectly with everything else
 - It was all created and set in to motion by GOD!



Medicine and Chemistry

▣ Medieval Medicine

- Galen proposed that disease was caused by imbalance of 4 humors
- Led to bloodletting!

▣ Scientific Revolution Medicine

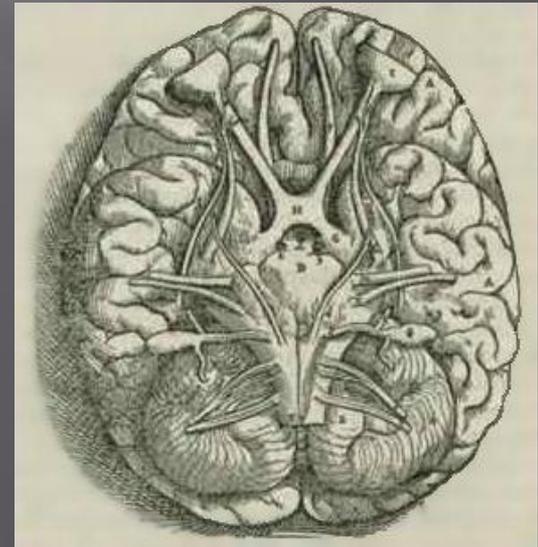
- Paracelsus introduced use of chemicals/drugs to cure diseases
- Vesalius studied cadavers to better understand and correct Galen's anatomy
- William Harvey improved Vesalius' study and correctly described the human circulatory system

▣ Robert Boyle introduced the modern study of chemistry

- Boyle's Law – inverse relationship between pressure and volume
- Matter is composed of atoms

▣ Antoine Lavoisier

- Devised the modern method for naming elements



Spread of Scientific Knowledge

- ▣ Scientific Societies
 - English Royal Society
 - French Royal Academy
- ▣ Sponsored by the state
 - Devoted to the improvement of the state
- ▣ Competitive practice through the publishing of journals



How did science come to be accepted?

- ▣ Science was an aspect of Europe's wealthy elite
 - This class moved further and further away from the culture of the masses
- ▣ Science was viewed as beneficial and useful to mercantile class and ruling class
 - It can be used to improve the human condition!



Women and Science

- ▣ Elite, privileged women received humanist learning → learning of new science
- ▣ Debate about nature of women (*querelles des femmes*):
 - Old view: Women were weak and not fit for education
 - New view: Women had rational minds and could learn through education
- ▣ Result: Old view prevailed, and most scientists used their findings to argue that women were naturally inferior!



Religion and Science

- ▣ Up until 1616, Italy served as the home of European science
 - Roman Inquisition pushed this movement back to Protestant countries
- ▣ These Protestant countries lacked a strong religious authority to repress science
 - Protestantism helped spread modern science
- ▣ Galileo didn't believe that religion and science conflicted
 - The Church did though!
- ▣ Effect: As science triumphed, religion declined!
 - Secularization of European intellectual life

Spinoza and Pascal

- ▣ Benedict de Spinoza
 - Belief in pantheism
 - God is the universe!
- ▣ Blaise Pascal
 - Pascal's wager!
 - ▣ Christianity does not contradict reason!
 - Human reason cannot comprehend the infinite...only faith can!

