

CHANGES IN THOUGHT

The Scientific Revolution, the Age of Reason,
& the Enlightenment

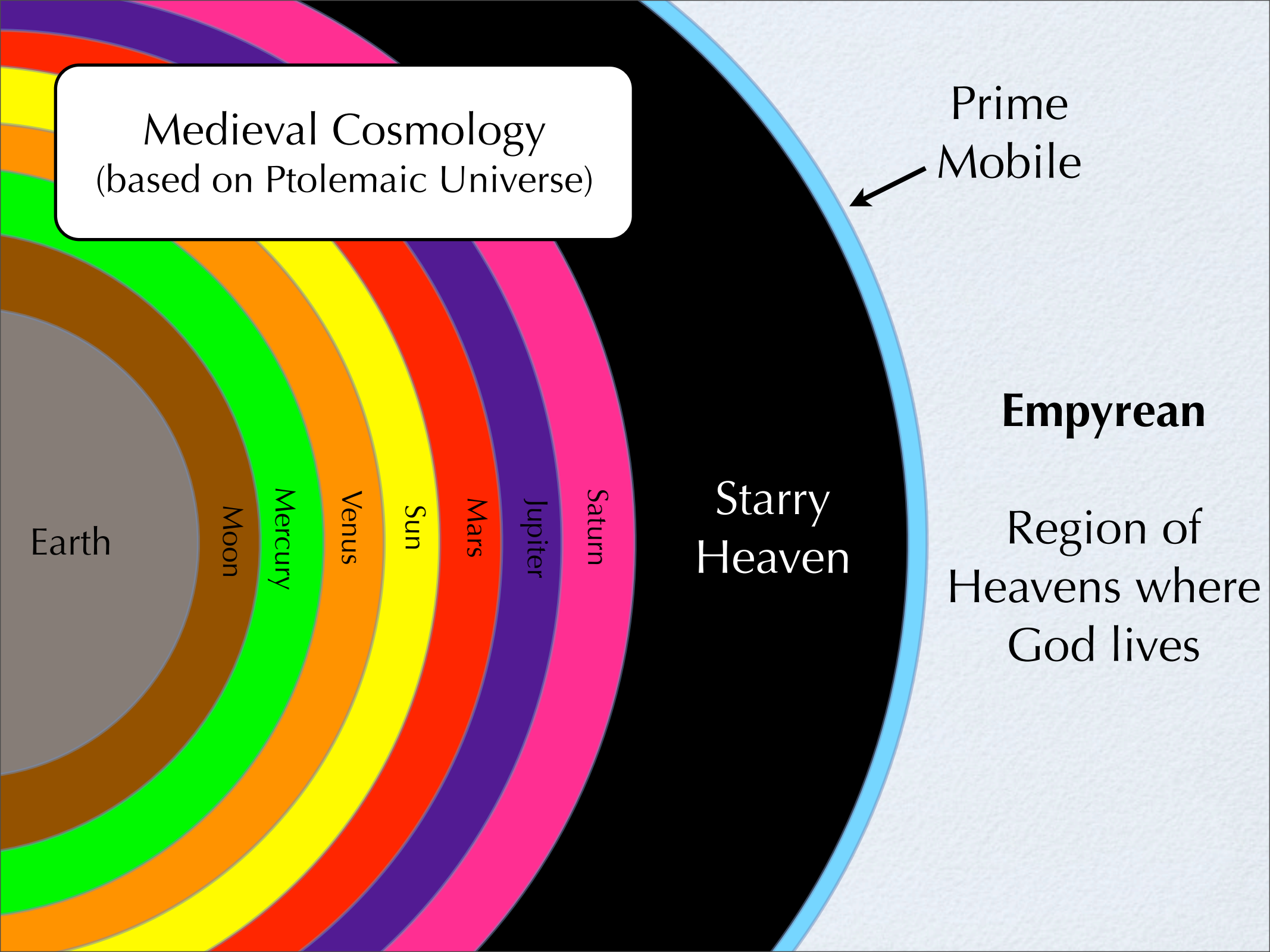
SCIENTIFIC REVOLUTION

- Before 1500, scholars decided what was true or false by quoting a Greek or Roman author.
 - What they said was considered true unless it contradicted the Bible.
- Mid-1500s: Scholars began to challenge the ideas of ancient thinkers.
 - This led to the Scientific Revolution.

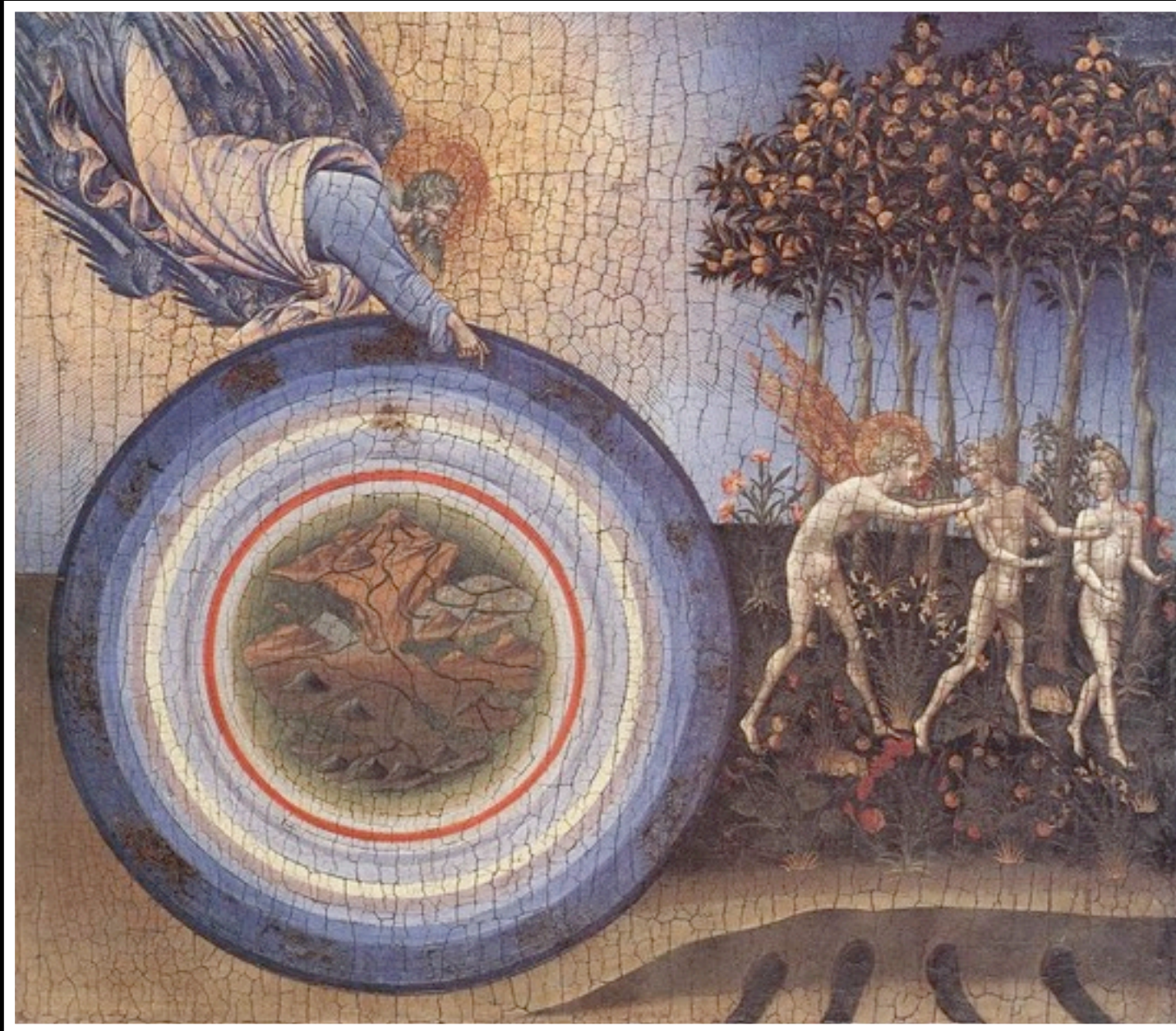
GEOCENTRIC UNIVERSE

Ancient scholars (Aristotle & Ptolemy) believed that the earth was the center of the universe.

Medieval Cosmology
(based on Ptolemaic Universe)



THIS IS MY FATHER'S WORLD,
AND TO MY LISTENING EARS
ALL NATURE SINGS,
AND ROUND ME RINGS
THE MUSIC OF THE SPHERES.
THIS IS MY FATHER'S WORLD:
I REST ME IN THE THOUGHT
OF ROCKS AND TREES,
AND SKIES AND SEAS;
HIS HANDS THE WONDERS WROUGHT.



The Creation of the World and the Expulsion from Paradise
Giovanni di Paolo (circa 1445)



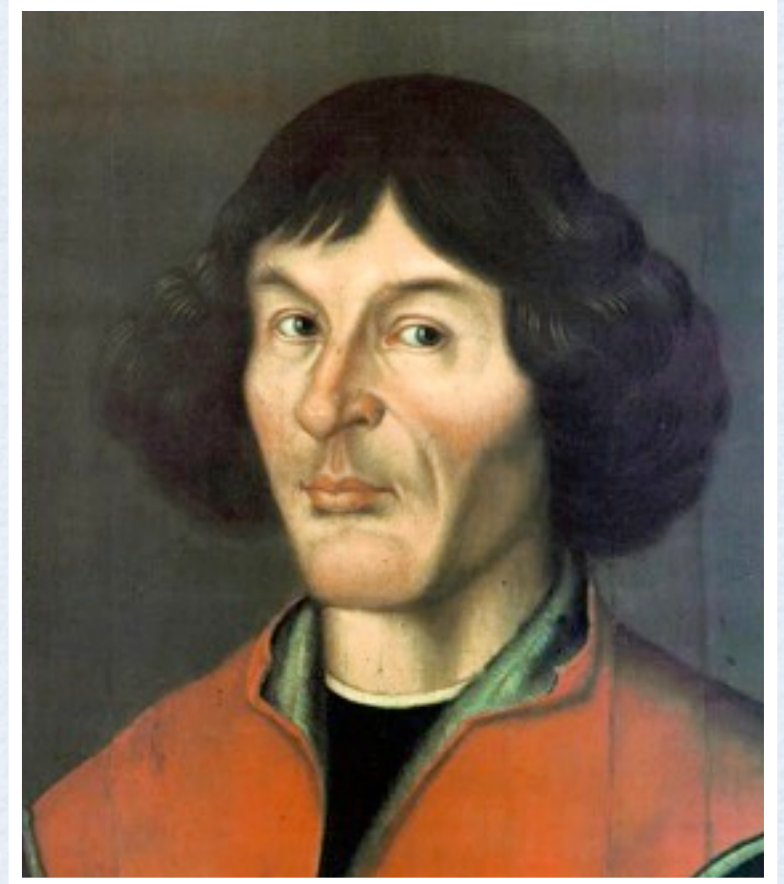
Creation of the World from the
Nuremberg Chronicles.

The Fourth Day.
God sets the Spheres moving.

in Hartmann Schedel,
Das Buch der Croniken,
Nuremberg, Anton Koburger,
1493.

HELIOCENTRIC THEORY

- Nicolaus Copernicus
 - 1473-1543
 - Polish churchman & astronomer
 - *On the Revolutions of Heavenly Bodies* was published just before his death.



HELIOCENTRIC THEORY

- Tycho Brahe
 - 1546 - 1601
 - Danish astronomer
 - Copernicus' ideas were based on theory; Brahe recorded the movement of each planet and many stars.



HELIOCENTRIC THEORY

- Johannes Kepler
 - 1571 - 1630
 - Brahe's assistant
 - Kepler's Laws of Planetary Motion



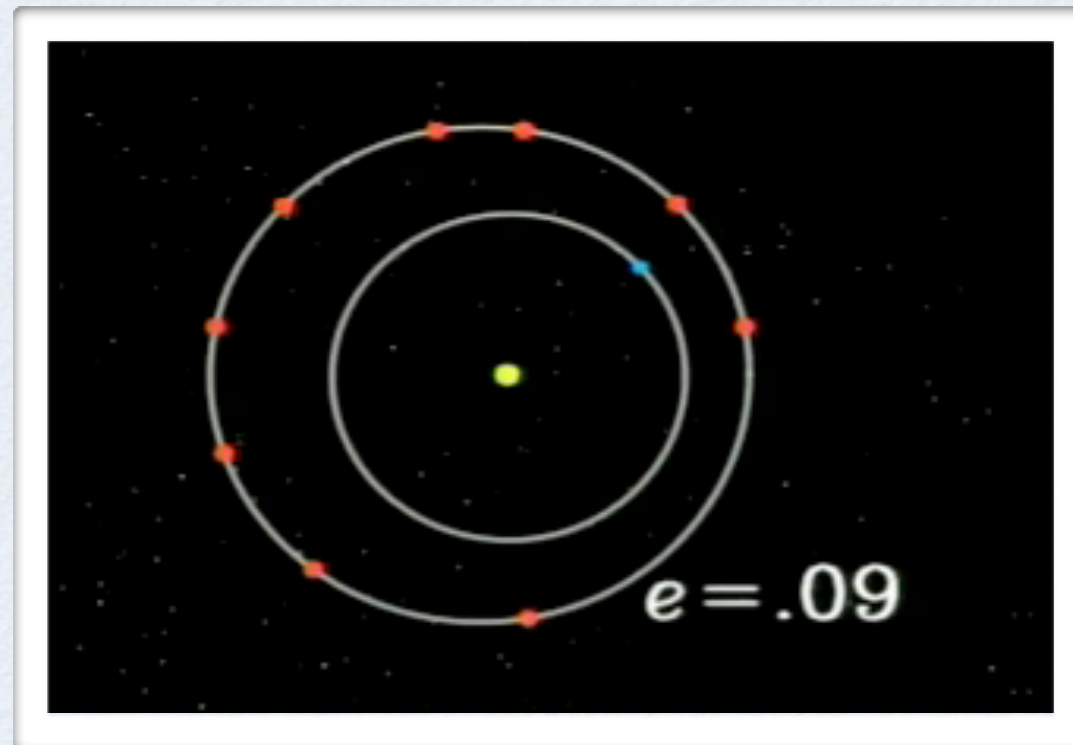
HELIOCENTRIC THEORY

- **Kepler's Laws of Planetary Motion**

1. Planets revolve around the sun in elliptical orbits.

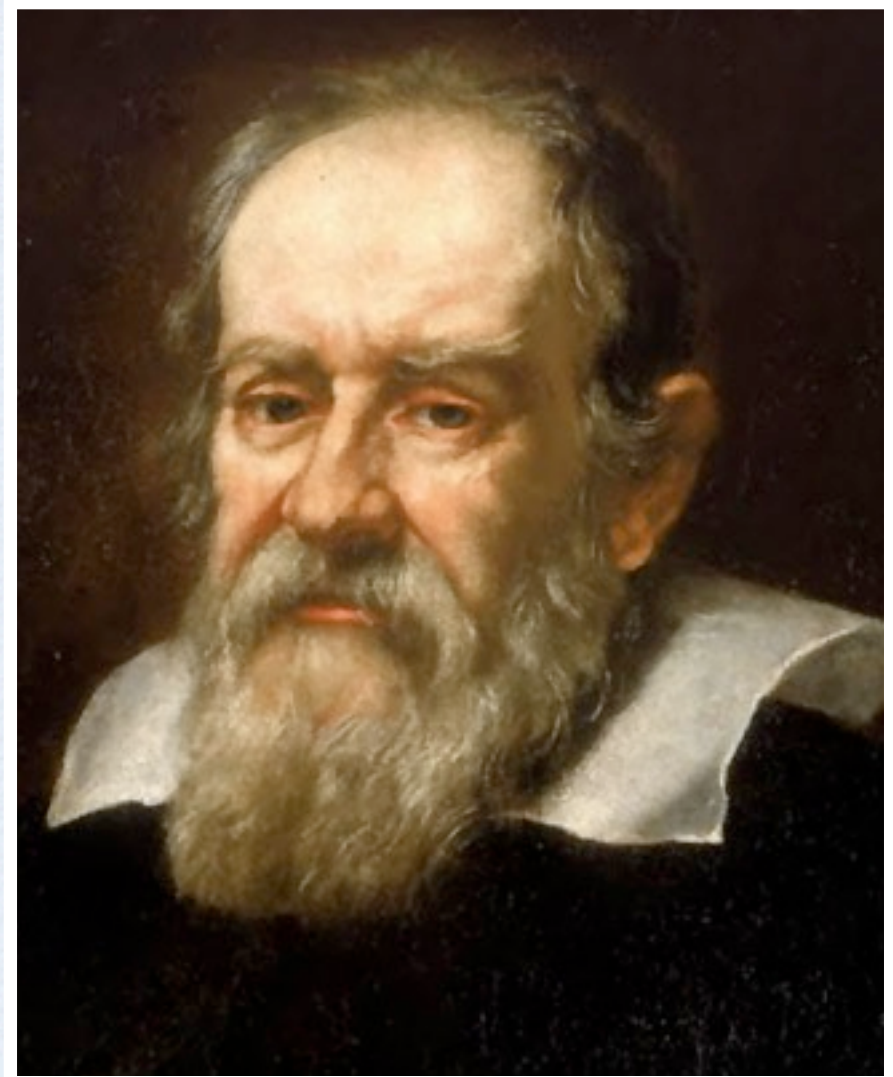
2. Planets move more rapidly in their orbits as they approach the sun.

3. The time taken by planets to orbit the sun varies proportionately with their distance from the sun.



GALILEO GALILEI

- 1564 - 1642
- made improvements to the telescope.
- defended Copernicus' idea of heliocentric universe.
- forced to recant his ideas by the Inquisition.



**I THROW MY TELESCOPE
IN THE AIR SOMETIMES**

**SINGING AYYYYYYYYYYO
I'M GALILEO**

THESE SCIENTIFIC CHALLENGES TO
THE CHURCH OCCURRED AT THE
SAME TIME THAT PROTESTANTS
WERE CHALLENGING THE THEOLOGY
OF THE CHURCH.

SCIENTIFIC METHOD

- State the problem.
- Gather information on the problem.
- Form a hypothesis
- Test the hypothesis.
- Record and analyze data.
- State a conclusion.
- Repeat to verify findings.

MEDICINE

- In the Middle Ages, physicians accepted the ideas of the ancient Greek physician, **Galen**.
- Galen had never dissected a human, only sheep, goats, pigs, and apes.



MEDICINE

- **Andreas Vesalius**
 - 1514 - 1564
 - Flemish doctor
 - *On the Fabric of the Human Body* (1543)
 - included drawings illustrating human muscles, bones, and organs in great detail.



MEDICINE

- **William Harvey**
 - 1578 - 1657
 - English doctor
 - proved the heart circulates blood through the body. (Galen believed that blood came out of the liver.)



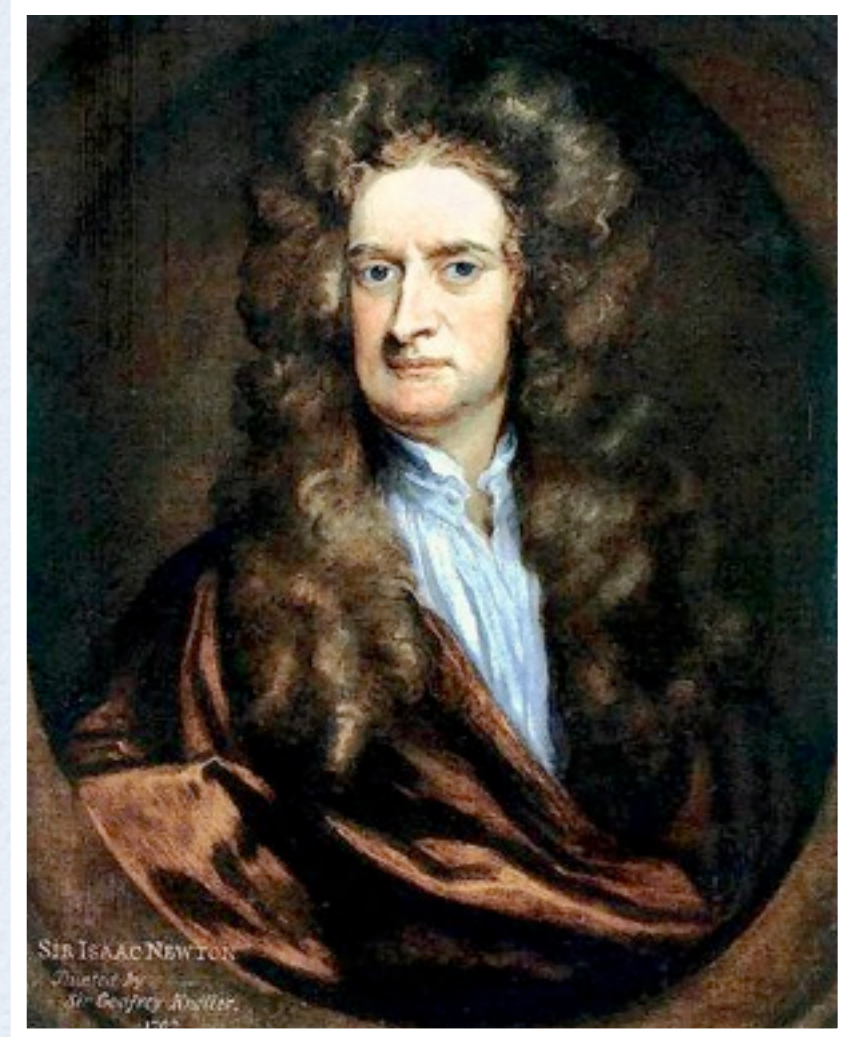
MEDICINE

- **Anton von Leevenhoek**
 - 1632 - 1724
 - perfected the microscope.
 - first to see cells and microorganisms.



PHYSICS

- Isaac Newton
 - 1643 - 1727
 - *Mathematical Principles of Natural Philosophy*
 - idea of universal gravitation



Every particle of the universe attracts every other particle with a force varying inversely as the square of the distance between them and directly proportional to the square of their masses.

Isaac Newton

THE ENLIGHTENMENT

Period in the 1700s that was characterized by the use of reason and scientific methods.

ENLIGHTENMENT IDEAS

- Universe is rational and can be understood through reason alone.
- Truth can be arrived at by empirical observation, the use of reason, and doubt.
- Human experience not religious authority is the basis for understanding truth.
- Human life can be understood in the same way we can understand the natural world.
- Humans can be improved through education and the development of rational thought.
- Religious doctrines have no place in the understanding of the physical and human worlds.
- Human history is a history of progress.

PHILOSOPHES

Thinkers in the early 1700s who believed in reason, liberty, natural law, progress, and human happiness.

SALONS

Social gatherings in homes in which people would discuss literature, philosophy, and other intellectual topics.

The History of Fashion



ENLIGHTENMENT THINKERS

Thinker	Works and Ideas
Thomas Hobbes	<ul style="list-style-type: none">•wrote <i>Leviathan</i>•Powerful government ensures orderly society
John Locke	<ul style="list-style-type: none">•wrote <i>Two Treatises of Government</i>•Government has obligation to protect natural rights of citizens
Baron de Montesquieu	<ul style="list-style-type: none">•wrote <i>The Spirit of the Laws</i>•Separation of powers
Voltaire	<ul style="list-style-type: none">•wrote the novella, <i>Candide</i>•Defended freedom of thought
Denis Diderot	<ul style="list-style-type: none">•compiled <i>Encyclopedia</i>•Denounced slavery, advocated education for all, and freedom of expression

ENLIGHTENMENT THINKERS

Thinker	Works and Ideas
Jean Jacques Rousseau	<ul style="list-style-type: none">•wrote The Social Contract•Minimal controls on a person's behavior, but individual interests were to submit to the good of the community
Mary Wollstonecraft	<ul style="list-style-type: none">•wrote <i>A Vindication of the Rights of Woman</i>•Equal education for girls and boys
Adam Smith	<ul style="list-style-type: none">•wrote <i>The Wealth of Nations</i>•<i>Laissez faire</i> economics, but government has a duty to protect society
Thomas Jefferson	<ul style="list-style-type: none">•wrote <i>Declaration of Independence</i>•Separation of Church and State

DEISM

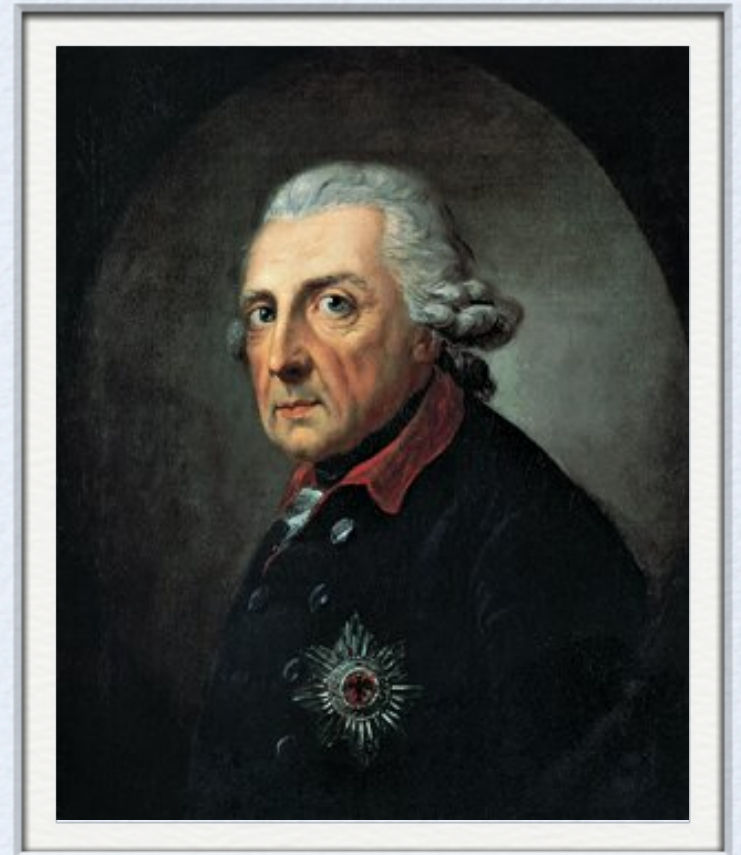
Religious movement in the 1700s which did not believe that the Creator interfered in the natural laws of the universe
(clockwork idea)

ENLIGHTENED DESPOTS

Absolute monarchs in the 18th Century (1700s) who ruled according to the principles of the Enlightenment

FREDERICK THE GREAT

- Frederick II, King of Prussia (1740-1786)
- said ruler was “first servant of the state”
- Reforms:
 - religious freedom
 - education in schools and universities
 - codified laws
 - promoted industry and agriculture



CATHERINE THE GREAT

- Catherine II, Empress (Czarina) of Russia (1762-1796)
- least enlightened of Enlightened Despots
- Reforms:
 - tried to Westernize Russia (architecture, sculpture, music)
 - supported the philosophes
 - reduced torture
 - some limited religious tolerance
 - some improvements in education
 - increased local control



MARIA THERESA & JOSEPH II

- rulers of Austria & HRE (mother & brother of Marie Antoinette)
- Reforms
 - ended serfdom in 1781
 - freedom of press & religion
 - made German the official language to assimilate minorities
 - more equitable (fair) justice system
 - expanded state schools





ENLIGHTENMENT ART



ROCOCO ART

ROCOCO

- **Rococo:** term for a shell or rock decoration
- Reaction to the dark drama of Baroque art
- Period between Baroque and Neoclassical art
- Characteristics:
 - light
 - superficial
 - airy
 - decorative

ROCO CO ARTISTS

- Watteau
- Fragonard
- Boucher
- Gainsborough
- Reynolds



WATTEAU

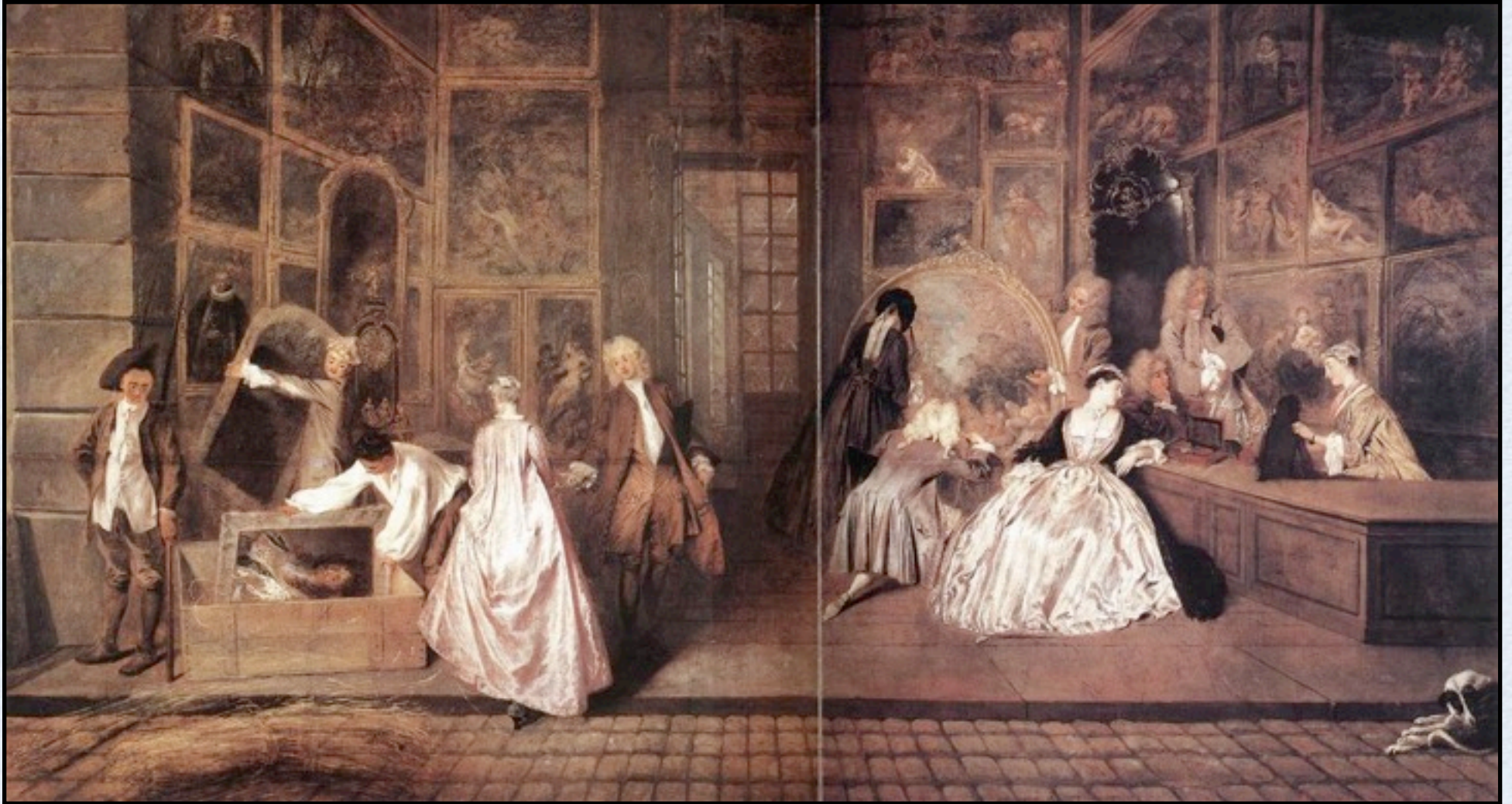


Gilles



L'Embarkation de Cythéra

WATTEAU



L'Enseigne de Gersaint

FRAGONARD



The Swing

FRAGONARD



The Love Letter

BOUCHER



The Breakfast

BOUCHER



The Toilet of Venus

BOUCHER



Birth of Venus

BOUCHER



The Autumn Pastoral

GAINSBOROUGH



Blue Boy

GAINSBOROUGH



Portrait of a Lady in Blue

REYNOLDS



Lady Sunderlin

ROCOCO ARCHITECTURE



ROCOCO INTERIORS



ROCOCO INTERIORS



ROCOCO INTERIORS



NEOCLASSICAL ART

NEO-CLASSICAL ART

- Archeological discoveries led to an increased interest in Ancient Greece or Rome.
- Neo-Classical art imitated the art of Greece & Rome.
 - Art: emphasized symmetry, simplicity, and order
 - Architecture: columns and domes
- Neo-Classical art was a sharp contrast to the dramatic Baroque and superficial Rococo movements.
- Artist:
 - Jacques Louis David
 - Giovanni Pannini
- Architect:
 - Thomas Jefferson

JACQUES-LOUIS DAVID



Oath of the Horatii

JACQUES-LOUIS DAVID



Love of Paris and Helen

JACQUES-LOUIS DAVID



Madame Raymond de Verniac

JACQUES-LOUIS DAVID



*Portrait of Antoine-Laurent and
Marie-Anne Lavoisier*

GIOVANNI PANNINI



Roma Antica

GIOVANNI PANNINI



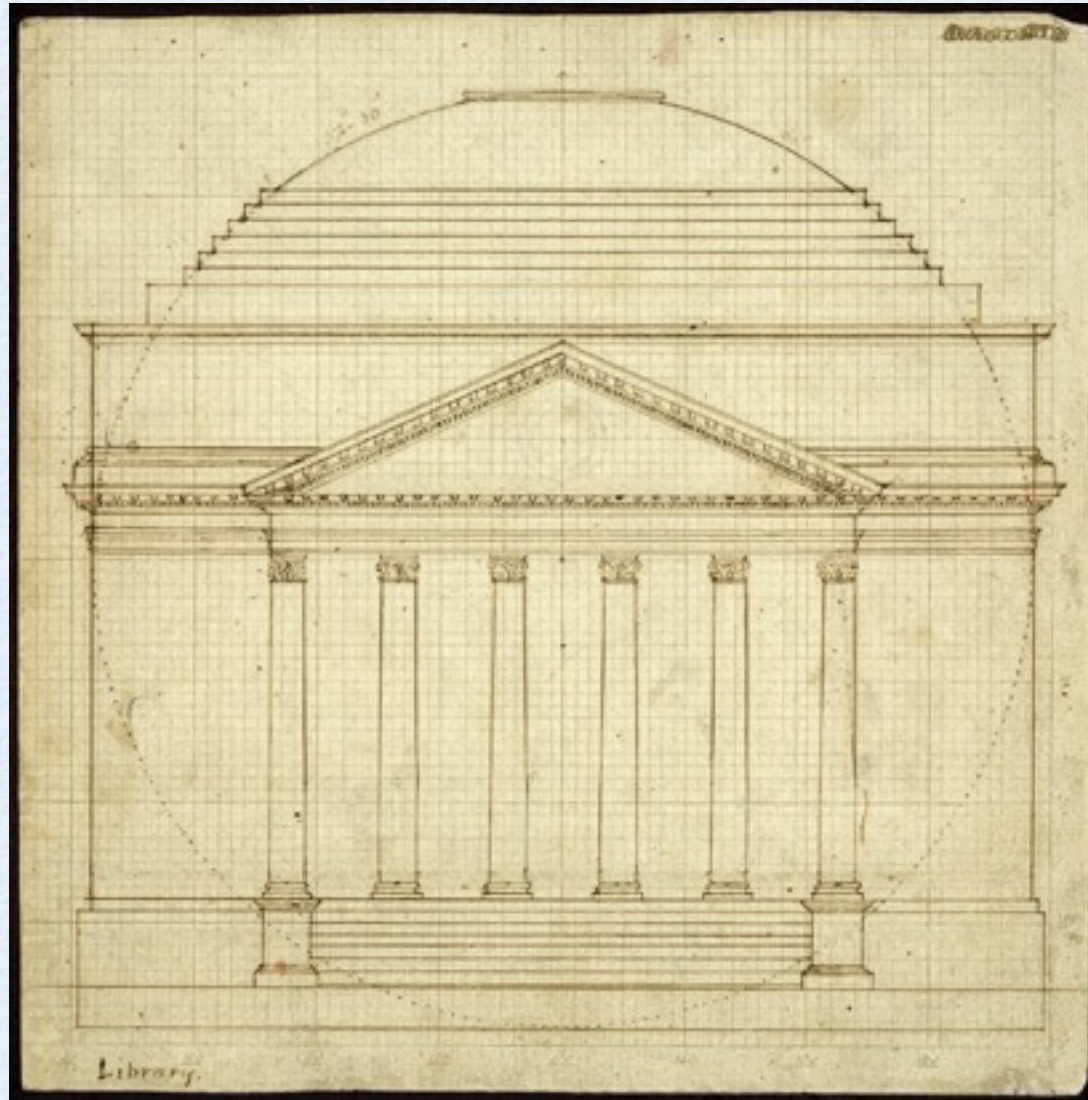
Picture Gallery with a View of Modern Rome

THOMAS JEFFERSON



Monticello

THOMAS JEFFERSON



University of Virginia Library

THOMAS JEFFERSON



University of Virginia

CLASSICAL MUSIC

- Little of music from classical antiquity survived.
- Classical Period in music is not the same as the general term, Classical Music.

CHARACTERISTICS OF CLASSICAL MUSIC

- Secular music becomes more important than sacred.
- Beginning of modern orchestra
- homophony became more popular than polyphony
- chamber music is popular
- Movement developed by court musicians in Vienna, Paris, and Berlin.
- Symphony began
- Classical Composers
 - Wolfgang Amadeus Mozart
 - Joseph Haydn
 - Ludwig van Beethoven (early works)

CLASSICAL COMPOSERS

Piano Sonata No. 8 in C Minor, Op. 13; "Pathetique"

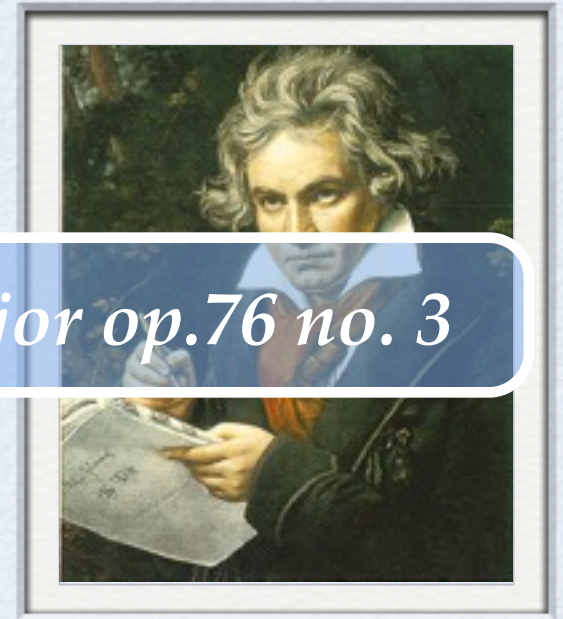


*Piano Sonata No. 14 in C Sharp Minor,
Op. 27; "Moonlight Sonata"*



Franz Josef Haydn

*Wolfgang Amadeus
Mozart*



*Ludwig van Beethoven
(early works)*

MOZART OPERAS



Don Giovanni
=
Don Juan

- *Don Giovanni*



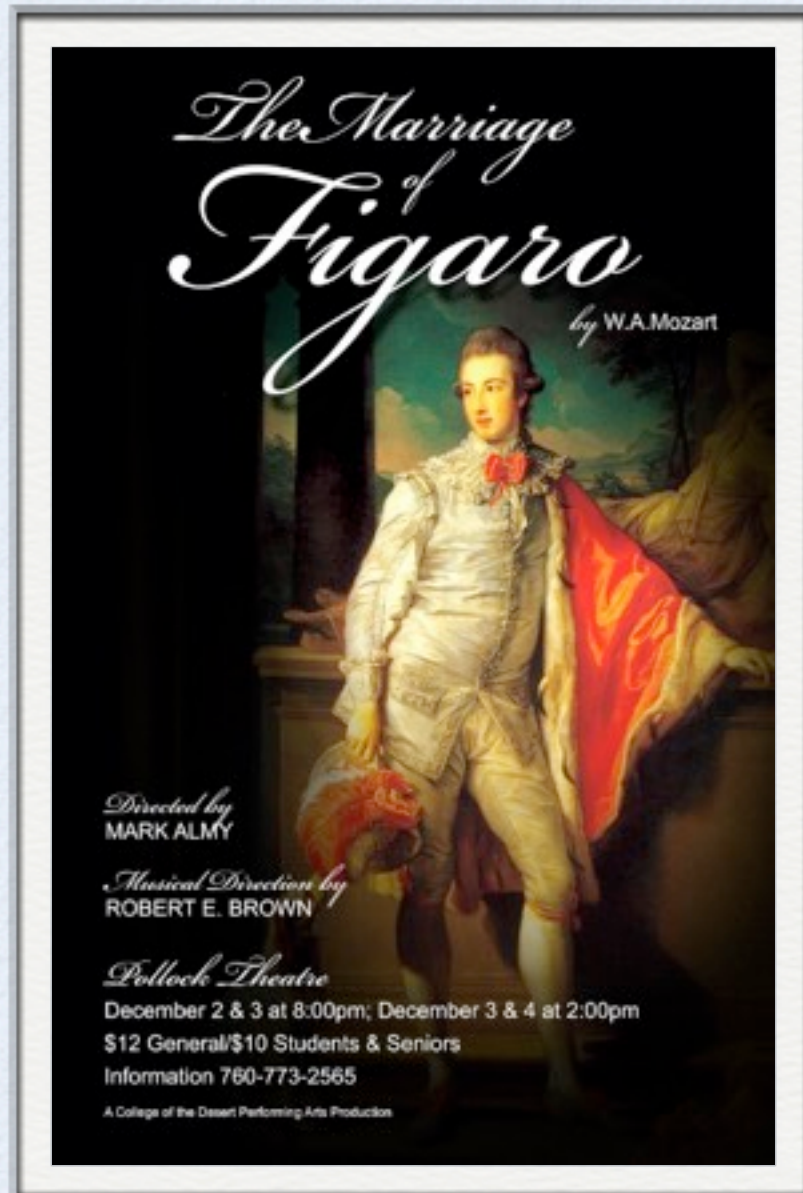
MOZART OPERAS



Full of Masonic Symbols

- *Magic Flute*

MOZART OPERAS



- *Marriage of Figaro*

OTHER MOZART WORKS

- *Mass in C Minor, K 427*
- *Piano Sonata in A Major, K 331*
- *Requiem K 626 (Lacrimosa)*
- *Serenade No. 10 in B Flat for 13 winds, K 361
(adagio)*