The Renaissance World

Transition to a Whole New World

The 14th *through the* 16th centuries

THE RENAISSANCE WORLD

TRANSITION TO A WHOLE NEW WORLDVIEW FOR HUMANITY

CHRONOLOGY: ⇦ 14th c. – 16th c. ⇨ Don't be confused! This 'Transition Period' *overlaps*, but *these* centuries are crucial.
[The Scientific Revolution will be our 17th century lead-in to the Enlightenment Era.]

GEOGRAPHY: Our story is still 'Euro-centric,' but the "New World" is being explored and exploited.

This explosive era is fascinating and deserves an entire course, but for the purposes of our historical overview and worldview critique, even a *summary* should provide impetus for further study. Today we still contend with the shift from **Modern** to **Postmodern**. …so we might benefit from an appreciation of the dramatic shift from **Medieval** to **Modern**!

Admittedly, these historical sketches **'go in one era and out the other'**! And yes, *every* age is *transitional*, but here we have a chance to learn of a stupendous cultural *shift* that involves everything we're discussing this semester! (This era looked back *and* forward!)
We'll see startling discoveries, advancements in learning, intellectual dislocation, bitter religious conflict, violent societal upheavals and awe-inspiring artistic achievements… the genius of human giftedness *and* the stain of sinfulness. We'll see institutionalized authorities challenged and bold prophets declaring new paths for human destiny. Such challenges shatter foundational assumptions and stretch worldview horizons. (Now how can that not be fascinating? Doesn't it make you want to live in the library for a while?!)

The Renaissance Era had intellectual antecedents in the **Late Medieval** Period. That Church-dominated civilization actually stirred dissent and carried the seeds of its own demise. Currents were *already* flowing that were:
Decidedly *anti*-clerical, *anti*-metaphysical, and *anti*-Scholastic. (Talk about contesting seemingly infallible authorities!)

The controversial careers of two brilliant Franciscans, **Roger Bacon** (13th c.) and **William of Ockham** (14th c.) are great examples of the turning tide. William surely had faith in God's revelation (revealed knowledge) but with his "Razor" as a tool for 'economy of explanation' he began to unravel the Scholastic's over-blown inter-dependent Faith and Reason nexus.
That this would eventually lead to secular empiricism was *not* his intention, but it brings up a key issue for us. **Authority**.
To what "authority" do we turn when worldview questions arise? More on that later! But William's contributions were a precursor to the renaissance. His followers even called their work the *Via Moderna* as opposed to the *Via Antiqua*.

The **Scholastics** had produced a brilliant **synthesis** of philosophy/reason and theology/faith…but *their* 'authorities' were not omniscient! Church dogma was *not* truly Biblical, as it was built upon faulty worldview assumptions colored by Neo-Platonism and Aristotelianism. So we can be thankful that things began to 'open up' even though negative results eventually followed.
Unfortunately, when faith and reason are severed from each other…**Reason** will try to become a self-sufficient end-all, and **Faith** will become 'fideism' divorced from validation. Neither stance is genuinely Biblical!
A study of our intellectual history should teach us that we need a worldview large enough to hold faith and reason in a healthy, creative balance…and dynamic enough to prevent faith and reason from distorting or dismissing each other! Perhaps if we could learn enough from *this* history, we could contribute to recent efforts to integrate science and faith. Avoiding the errors of either syncretism or reductionism, an authentically Biblical Worldview would contain the interpretive tools adequate for theology *and* science.
Hebraic Holism has to be better than either Platonism or Aristotelianism…and better than *any other* man-made "ism" as an appropriate interpretive model for God's **word** *and* God's **world**!
We'll let that count as our "CONNECTION TO WORLDVIEW STUDIES" for now, and return to an overview of the transition era:

It was not only radical intellectuals who began to pull the threads out of the Medieval Tapestry…many inter-related factors contributed to its unraveling. The descriptive term that historians use to discuss this tumultuous transition is the—

"Dissolution of the Medieval Christian Synthesis"

Below is a list of factors that helped **tear the old WV apart** and necessarily set humankind on a **new worldview quest**!
Think how these factors might challenge old ways and engender uncertainty and unrest…but also growth and a sense of progress!

1. **Church Corruption**. Scandals, abuses, hypocrisy, wealth, excesses; and an unbiblical self-conception! (Power corrupts!)
2. **Bubonic Plague**. (1347-50) One third of Europe's population died. [From 1450 to 1600 Europe's population *increased* by one third.]
3. **Global Exploration**. Increase in trade, influx of wealth. New peoples & species found (of which medievals had not known.)
4. **Economic Change**. From an agrarian-feudal to a 'capitalist' (money-based) economy. Rise of a merchant class.
5. **Rise of Nations**. With monarchies opposed to Roman imperialism and resentful of Papal domination and taxation.
6. **The Printing Press**. (*c*. 1450) This was the earliest 'mass media' and information explosion!! Literacy greatly increased, and anti-clerical ideas could be widely disseminated. The discipline of Textual Criticism arose, which was not only crucial for Bible scholars, it was used to expose self-justifying forgeries that the Medieval Church had deemed authentic! Printing and literacy helped *humanists* and *reformers* spread their message! By 1500, printers operated in over 200 cities, and there were about 9 million books around (compared to less than 100,000 hand-made manuscripts 50 years before!) Developments in the art of printing comprise one of the Renaissance Era's most enduring contributions to human culture.

Along with these changes in society, and from the same context, there emerged three profoundly influential movements that shattered the remnants of Medieval cohesion and heralded the Modern world.
An easy way to remember them is by calling them…

"The Three *R*s"

RENAISSANCE: (The Humanist Renaissance)

The word "renaissance" is French for "**re-birth**" but what exactly was being reborn? Not humans, but an *ideal* for humanity. The 'ideal' emulated would be that of the classical ('Greco-Roman') world. Here humanists found the "golden age" they wanted to 'revive.' And they purposely wished to revive it *so as to* 'revitalize' their own age and culture! Renaissance artists and writers rediscovered and imitated pagan works. And now as the pagans had, they extolled the dignity, physical beauty, creativity, *and* the destiny-shaping potential of the human *qua* human.
People could now see themselves as unique admirable beings and *not* as mere 'pawns on God's cosmic chessboard' or mere 'actors in God's grand morality play'! If you think 'individualism' sounds more modern than medieval, then you have gotten the point about this transition movement!

Applying the term R to describe a distinct era in history may have come later. (See historians Michelet and Burkhardt, c.1850-1860) But terms such as *renovation* and *rinascimento* (Italian for rebirth) were self-consciously employed at this time. (Vasari, 1550.) Indeed, it was Renaissance thinkers who first dubbed the previous era— *medium aevum* ("The Middle Ages") as if that millennium had been a stagnant "interlude" bracketed between classical glory and their own era of rediscovery!

(Their calling medieval art & architecture "**Gothic**" belies the same negative attitude. The "Goths" (Visigoths & Ostrogoths) were the barbarians whose invasions had brought about the Fall of Rome, ending the classical era and setting up the Medieval Christian era!)

The Humanist Renaissance was mainly a movement in literature and art. "Humanist" here does not refer to *secular humanism* (as in today's atheism.) Rather, think of renaissance **humanism** as: a keen interest in the "**humanities.**" Most Renaissance humanists were not against Christianity, and many of them saw individuality as a way to be free to imitate Christ. Here's a generalization for you: **'The Medieval Era tried to Christianize humanity…the Renaissance Era tried to humanize Christianity!'** Humanist scholars provided both the ideals and the critical tools necessary for a vast increase in learning. Christian Humanists dedicated to Textual Criticism, Bible Translation, and to education for the people, helped spark the next "R." The Reformation has even been called "The Religious Renaissance."

REFORMATION: (The Protestant Reformation)

There had been *many* voices calling for 'reform' in the Church…Peter Waldo, Girolamo Savonarola, John Wycliffe and Jan Hus. They had been dealt with most harshly. There had also been Conciliar ('by council') attempts to solve some of the scandals, and these had failed. The Roman Catholic Church was in dire need of a thorough house-cleaning. What happened instead was a violent **schism** that scourged Europe and Britain with over a century of war and bloodshed.

By the time **Martin Luther** was excommunicated in 1521, his movement could no longer be suppressed. The Reformation exploded *when* it did because of all the factors mentioned in this all too brief summary, including the peasant revolts, the new individualism, and the Dissolution of the M.C.S. The real needs of real people, the changing political landscape, and the intellectual ferment of the times were all very ripe for the success of the Protestant movement.

As for the religious facets, the thrust of the reformation was much more than criticizing authorities and crying out: *"The clergy should practice what they preach!"* The thrust of the reformation was daring to question *where* true authority resides, and daring to change *what* was being preached! That's radical!
Generally speaking, reformers **rejected:** papal authority; extra-Biblical doctrines such as purgatory and transubstantiation; sacramentalism; clerical celibacy; and Church 'fund-raising' practices like the sale of 'indulgences.' They **affirmed:** 'salvation by faith, the priesthood of all believers, and the precedence of Scripture over tradition.

However, leading reformers bitterly **disagreed with each other** on a variety of issues**:** the 'real presence' of Christ in Communion, baptism, the church's relationship to the civic government, church polity, *etc*. And, often their behavior was anything but Christ-like. We should not pedestalize the reformers nor should we idealize the reformation. It may have been courageous and right to break away from a powerful and unbiblical Church, for there hadn't been true unity *before* the Protestant schism, but soon the reformation movement itself needed reform! In theory, it's great to proclaim: *Sola Scriptura* and 'Back to Pure Sources,' but the reformers still brought their philosophical presuppositions to scripture and soon devised their own doctrinal-theological systems in a rather 'scholastic' fashion.
The point for this summary is that the rancorous disagreements over interpretation (dueling dogmatisms!) eventually caused a revival of Skepticism. And all the bloodshed and fanaticism caused an impassioned anti-religious backlash. We will discuss that more as we look at the worldview connections for the Enlightenment Era.

REVOLUTION IN NATURAL PHILOSOPHY (The Scientific Revolution)

If Humanists and Protestants hadn't done enough to dismantle the Medieval World and bring us into Modern Times…this "R" was the 'knock-out punch.' Remember that one running theme of this summary is that of "authority." If explorations and textual criticism had shown Medieval authorities to be wrong…and increased literacy made more and more people aware of that unsettling fact…where would humans look for certainty? How would they satisfy the inherent need for a sense of order? In the previous era, most of our philosophers were clergymen. In the next era, many of them will be mathematicians. Does this "R" have something to do with that? [First R: New way to think of ourselves as Humans. Second R: New way to think of ourselves as Christians. Third R: New way to think of ourselves as Knowers.]

Never-mind that later academics have questioned the concept of "*revolution*" in science. The 16th & 17th century Nature Philosophers believed themselves to be doing something quite new, breaking the shackles of ignorance and establishing superior ways of knowing about the world, thus setting a bold new course for all mankind.
Was this era a turning point for mankind?
Consider that the entire shape and scope of the universe changed during this time. Consider the amazing number and types of discoveries that were made. And consider too, that it was much more than a deluge of newfound facts…it was the deliberate endeavor to wield correct methodology. It was a repudiation of old authorities and setting out toward unlimited possibilities. We *can* call that a revolutionary movement and a genuine paradigm shift!
Famous historian Herbert Butterfield declares that our '*Third R*' surpasses even the first two:

> Since the **Scientific Revolution** overturned the authority in science not only of the middle ages but of the ancient world—since it ended in not only the eclipse of scholastic philosophy but in the destruction of Aristotelian physics *and Ptolemaic astronomy*—it outshines everything since the rise of Christianity and reduces the **Renaissance** and the **Reformation** to the rank of mere episodes within the system of Late Medieval Christendom.

During the 16th & 17th centuries, **astounding advances** were made in our knowledge of**:** algebra & calculus; anatomy, medicine & the nature of disease; map-making & navigation; clock-making & calendar revision; metallurgy & mining; chemistry & gases; optics & the nature of light; zoology…*etc*.
Of course, the most thrilling and 'far-reaching' advances were in **astronomy and physics.**

[The story of the shift from: 'geo-centric model' to the 'Newtonian universe' is summarized in **A New Cosmology**.]

Many **scientific instruments** were invented or improved**:** the air-pump/vacuum, barometer, calculator, thermometer, and especially—the **microscope and telescope**! (Think about how that increased our world-VIEWing!)

Foundations arose that could foster experimentation and disseminate scientific knowledge. Scientific academies enabled science to flourish unimpeded by traditional institutions, and to gain social acceptance.
The Royal Society's *Philosophical Transactions* was the first professional scientific journal.

[A special chronology listing some key findings and publications is given in **Revolution in Natural Philosophy**.]

Given that Science was moving forward by boundless leaps while Christians were still fighting and killing each other, you might see where this is going as to our **Worldview Connections**! Why argue over 'speculations' about the **Supernatural** when we have new 'spectacles' through which to know **Nature**?
Why waste time on sectarian theological disputation which does not yield truth and does not help anyone at all, when there is a vast cosmos to explore and to master for our own betterment? No wonder *Voltaire* said:

> "Every sect is a rallying point for doubt and error. Scotist *versus* Thomist, Realist *versus* Nominalist, Papist *versus* Protestant...they are all only pseudonyms. There are no sects in Geometry."

What a world! More infinitesimally complex and infinitely larger than anything the Medieval Mind could have imagined. From this point onward (for science always looks forward instead of harkening back to some 'Golden Age') SCIENCE would become a prestigious, authoritative enterprise and a definitive feature of modern western civilization.

List of Special Sections: (Required Readings)

RENAISSANCE HALL OF FAME

Roger Bacon (1212–1292) Franciscan who studied Aristotle, (whose works had just been 'rediscovered') did work in math, and maybe invented spectacles!

William of **Ockham** (1280–1349) Brilliant theologian, a nominalist and logician, helped drive wedge between faith and reason. Criticized the papacy.

John Buridan (1300–1358) Student of Ockham's, rector of the U. of Paris, more logician than theologian, contributed to the science of his age.

Nicolas of Oresme (1320–1382) Student of Buridan's, tutor to Charles V, he opposed astrology and pseudo-science. More remarkably, at a time when Aristotle's authority in natural philosophy was accepted without question, *he* questioned it! And far ahead of his time, his scholarly work anticipated Copernicus, Galileo and Descartes!

Dante Alighieri (1265–1321) Politician, philosopher and poet. His worldview was still Medieval (he believed in universal Christendom) but his talent so impressed the 14th century humanists that he can be considered *transitional* to the Renaissance era. Read his *"Divine Comedy."*

Francesco **Petrarca** (1304–1374) Poet whose espousal of ancient classics for both scholarly *and* religious reasons inspired the Humanist Renaissance.

Johannes Gutenberg (1400–1468) Regarded as inventor (at least developer) of the **Printing Press**, which launched a 'literacy and knowledge' explosion!

Nicholas of Cusa (1401–1464) Bishop & scholar, one of the first to deny geo-centricity, but as a Neo-Platonic mystic, denied the Law of Non-Contradiction!

Marcilio Ficino (1433–1499) Priest & Greek scholar, he translated the complete works of Plato and Plotinus. He founded a *Platonic Academy* in Florence which greatly influenced the Humanist Renaissance. Our notion of "Platonic Love" (intimate but 'spiritual' friendship) comes from Ficino.

Giovanni **Pico** della Mirandola (1463–1494) Publicly argued 900 theses in Rome & was condemned by the Pope. He championed human liberty & dignity. His influential work *Oratio* extols the humanistic ideal of man attaining perfection through philosophical contemplation. Pico was associated w/ Ficino's Academy.

Lorenzo Valla (1405–1457) A worldly Papal secretary, greatly enhanced Biblical scholarship by comparing the Latin Vulgate to Greek texts; criticized scholasticism.

Johann Reuchlin (1455–1522) Foremost Hebrew scholar of his time, he advanced language study amongst Xns, though he didn't join the Reformation.

Desiderius **Erasmus** (1466–1536) "Prince of Humanists." He promoted both a return to nascent Christianity and the use of new text-critical scholarship to reform the Church morally *and* intellectually, thus he helped sparked the Reformation, but then he tried to remain a voice of moderation and reason as the wars exploded. He was the first 'best-selling author' in the history of print, and M. Luther used his Greek translation of the New Testament.

Niccolo Machiavelli (1469–1527) Florence statesman and political philosopher; author of *"The Prince"* — a cynical and 'amoral' handbook for rulers.

Thomas More (1478–1535) English humanist, author and statesman; a lifelong friend of Erasmus (who called More's home a "*Platonic Academy*"!) He wanted reform in the Church but remained a Papist and was executed for treason by Henry VIII—thus he was one of the first 'martyrs' of the bloody and tumultuous English Reformation. [He was 'canonized' by Pope Pius XI in 1935!]

Michel de **Montaigne** (1533–1592) He criticized the intolerance of his times, but carried the humanist tradition into **Skepticism**. His essays introduced a new literary genre. He influenced such luminaries as Pascal, F. Bacon, Kant, and perhaps Shakespeare. He was really an early *Enlightenment* thinker!

John **Wycliffe** (1330–1384) Writing in English instead of the traditional Latin, this Oxford philosopher attacked the papacy and many church doctrines. A great pre-Reformation figure, he translated the Bible into English and he organized clergymen to go out and preach to the people from the scriptures!

Jan Hus (1374–1415) Influenced by Wycliffe's writings, he became the most important forerunner of the Ref. in Europe. He was burned at the stake.

Girolamo Savonarola (1452–1498) An anti-papist monk who fervently tried to preach moral reform in Florence and was tortured and hanged.

John Colet (1467–1519) This great professor was one of the first to help change Christianity by using the new linguistic scholarship. His lecture series on Paul's epistles were a pre-Luther milestone.

Martin Luther (1483–1546) Augustinian monk who agonized over his own sinfulness. As Bible professor (U. of Wittenberg) his preaching on '*salvation by faith*' and his attacks on the Papacy and Church wrongdoings sparked the **Reformation**…which he then led with his scholarship and service.

Philip Melancthon (1497–1560) Greek prof at U. of Witt., worked with Luther and succeeded him as Protestant leader. Wrote the first great work on Protestant dogmatics. **Other** great Reform Leaders**:** Ulrich Zwingli (d. 1531) Jean Calvin (d. 1564) Thomas Cranmer (d. 1556) John Knox (d. 1572).

Nicolai Copernicus (1473–1543) *You know*, he's the one who told us that *the world doesn't revolve around us!!* Follow the story of the resistance to the Copernican (helio-centric) Theory and its gradual 'clinching' by tracing the careers of **:** Tycho Brahe (d. 1601) Johannes Kepler (d. 1630)… ***and***…

Galileo Galilei (1564–1642.) **Other** revolutionary scientific discoveries were made by: William Gilbert (d. 1603) William Harvey (d. 1657)

Giordano Bruno (1548–1600) Supported the Copernican theory, but his WV was a heretical mixture of science and spiritualism, magic and astrology.

Christopher **Columbus** (1451–1506) Trying to reach India by sailing west, his several voyages explored Cuba, Haiti, and discovered the South American mainland.

Ferdinand Magellan (1480–1521) His sailing expedition was the *first* to circumnavigate the globe. (He died en route, as did all but 20 of the 270 men!)

Other famous explorers were: Amerigo Vespucci (d. 1512) Vasco da Gama (d. 1525) First westerner to sail around African Cape to Asia. Hernando Cortez (d. 1547) A 'Machiavellian' conquistador!

Giotto (1266–1337) His frescos show true innovation from the old flat, unreal Byzantine style; he's been called the Father of Renaissance painting.

Donato Bramante (1444–1514) Painter and architect whose work shows classical influence. His most important job was rebuilding St. Peter's Basilica.

Leonardo *da Vinci* (1452–1519) Add 'inventor, engineer, anatomist, scientist' to a resume that includes 'painter of the world's most famous paintings' and you will hail L. as **the universal genius** of this era. One who inspires and fascinates us still! See- *Last Supper, Virgin of the Rocks, Mona Lisa…*

Michelangelo (1475–1564) Full-orbed artist, nobleman and poet, an influential personality of the era. His tempestuous creativity was marveled at as 'of super-human origin'! He is "*the Platonic Form*" of a Renaissance man and still our very idea of "an artist." See- *Statue of David, Pieta, The Last Judgment*

Raphael (1483–1520) In his versatility (painter, architect, engraver, tapestry designer, sculptor, *etc.*) he established norms of grace and beauty. Favorite artist of Julius II (same Pope who commissioned Michelangelo to do that famous ceiling had R. do the frescoes.) Died too young to finish so many projects but is still one of the most beloved artists of all times. See- *The Transfiguration, The Sistine Madonna, Disputa, School of Athens, Triumph of Galatea…*

Albrecht Durer (1471–1528) Remained Catholic but was warm toward the reformers; he was an engraver and painter who traveled to Italy and spread the Renaissance ideals to northern Europe. Durer is still considered the greatest German artist of all time.

See many more great **artists** of this exciting era**:** Brunelleschi (d. 1446) Donatello (d. 1466) Botticelli (d. 1510) VASARI (d. 1574) Caravaggio (d. 1610)…and…

Look into some **writers** who expressed the humanity of these times**:** Rabelais (d. 1553) Marlowe (d. 1593) Cervantes (d. 1616) and Shakespeare (d. 1616)

Francis Bacon (1561–1626) In the **350 years** from **Roger** Bacon to **Francis** the world had changed so much that humans would have to have **a whole new view** of it.

Some Philosophy textbooks don't *have* a 'Renaissance' chapter, for this era hasn't been about devising *new* philosophical systems, as much as trying to reconcile the prevailing ones with the rapidly changing culture and amazing new discoveries. But the era certainly didn't lack for magnificent minds!!

The *movers and shapers* of this era were**:** architects, astronomers, Bible translators, cartographers, explorers, fiery preachers of moral and ecclesiastical reforms, inventors, linguists, navigators, painters, playwrights, poets, political theorists, printers, sculptors, and even a few wild-eyed mystics and syncretists!

Don't forget the infamous popes, ambitious kings, bankers and powerful "patronage" families, and of course, the brilliant, beautiful women who inspired them *all*!

They did look to the classical ***past*** for inspiration, but their vision was for man's ***future***. Why shouldn't we use our creative genius to *extol* the human ideal and to *improve* human society? Why shouldn't we use our reason to liberate ourselves from the oppression and tyranny of the so-called "Dark Ages"?

REVOLUTION IN 'NATURAL PHILOSOPHY'

Special Chronology with Important Scientific Publications

1493—1541 Life of Phillipus Aureolus Theophrastus von Hohenheim, aka **PARACELSUS** ("Beyond Celsus") (Celsus was a Roman physician in the first century.) Well-traveled researcher, chemist & physician, developed better lab techniques and revolutionized the way disease was studied, though his theories still contained 'magic' elements. Gave public lectures & burned the works of Galen. One of the most fascinating personalities in the history of science & medicine! Died under mysterious circumstances.

1536 Paracelsus published ***The Great Book of Surgery***

1473—1543 Life of **Nicolas Copernicus**, mathematical theorist, physician, churchman, philosophy student—*a Renaissance Man!*

1543 Copernicus published ***On the Revolution of the Celestial Spheres*** which 'got the ball rolling' as to new theories in astronomy.

1514—1564 Life of **Andreas Vesalius**, physician to Charles V and Philip II. He was the "Father of Modern Anatomy."

1543 Vesalius published ***On the Fabric of the Human Body***

1546—1601 Life of **Tycho Brahe**, astronomer who kept the most accurate data yet acquired by the naked eye.

1544—1603 Life of **William Gilbert**, physician to Elizabeth I and a diligent experimenter. The first to distinguish between electricity and the force of magnetism. He theorized that the earth itself is a great magnet.

1600 Gilbert published ***On the Magnet***

1561—1626 Life of **Francis Bacon**, lawyer-statesman, essayist…and the "Father of Modern Science" (Experimental-Inductive Method)

1605 Bacon published ***Advancement of Learning*** **1620—*Novum Organum*** ("New Instrument or Logic"--for interpreting nature)

1571—1630 Life of **Johannes Kepler**, astronomer.

1609 Kepler published ***The New Astronomy*** **1609 --1629** ***Laws of Planetary Motion***

1564—1642 Life of **Galileo Galilei**, astronomer and physicist.

1610 ***The Starry Messenger*** **1632** ***Dialogue Concerning the Two Chief World Systems*** **1638** ***Two New Sciences***

1633 The Roman Catholic Church condemned Galileo (but don't worry, he was exonerated in 1992!)

1578—1657 Life of **William Harvey**, physician to James VI. Discovered the workings of the circulatory system (circulation of blood.)

1628 Harvey published ***Anatomical Exercises on the Motion of the Heart and Blood in Animals***

1596—1650 Life of **Rene Descartes**, mathematician, scientist, and the "Founding Father of Modern Philosophy"!

1637 ***Discourse on Method*** **1641** ***Meditations on First Philosophy*** **1644** ***Principles of Philosophy***

1592—1655 Life of **Pierre Gassendi**, mathematician, philosopher and skeptic. Although educated as a priest, he based his worldview on Atomism (like Democritus and Epicurus) and moved scientific enquiry in a materialistic direction.

1644 Gassendi published ***Disquisitio Metaphysica*** which attacked Descartes' belief in 'clear, distinct ideas.'

1623—1662 Life of **Blaise Pascal**, math prodigy, theologian, theorist on Probability, inventor of the first workable calculating machine in 1642. He tried to reconcile Faith with the new science, opposing both religious dogmatism and rationalistic skepticism. He warned about the false optimism of the rising scientific worldview! Some think he divorced faith from reason and was thus like an early Kierkegaard! Discuss: **"PASCAL'S WAGER"**

1670 Pascal's ***Pensees*** (his unsystematic ruminations) were published posthumously and have become a **classic** in devotional literature.

1660 ~ Founding of the *Royal Society of London* **1666 ~ *Founding of the French Academy of Sciences***

1623—1673 Life of **Margaret Cavendish**, Duchess. The only woman admitted to a Royal Society meeting.

1666 Cavendish published ***Observations on Experimental Philosophy*** **1668** ***Grounds of Natural Philosophy***

1627—1691 Life of **Robert Boyle**, chemist, physicist and philosopher. He helped this era reject Aristotelian physics, saying that all the properties of matter can be explained by particle motion (not by the "Four Causes.") His division of primary & secondary qualities influenced Locke.

1661 Boyle published ***The Skeptical Chemist*** **1692** ***General History of the Air***

1632—1723 Life of **Anton van Leeuwenhoek**, lens-grinder and microscopist. Discovered protozoa, bacteria, blood corpuscles, *etc*.

1642—1727 Life of **Isaac Newton**, mathematician and physicist…solver of the mystery left unsolved by Copernicus *through* Galileo. Newton's famous **Law of Gravitation** provided a mega-principle to explain all motion, from a speck of dust to the planets and stars. This gave mankind a worldview infused with consistent and measurable physical laws. It provided a basis for all scientific enquiry for the next (more than) two hundred years. It provided a profound sense of order in a world that had lost its coherence (the coherence enforced in the Medieval Christian Synthesis.) And, it provided the capstone of the 'scientific revolution' which began to establish science as *the* most trustworthy way to know reality. As we will see in the next section, all philosophers will have to take the mechanistic-mathematical Newtonian worldview into account in their work.

1687 Publication of ***Principia Mathematica*** (*Mathematical Principles of Natural Philosophy*) Possibly the single greatest scientific work ever written (until Einstein!?)

A NEW COSMOLOGY

The OLD Geocentric Model: A Description of the "Aristotelian – Ptolemaic" Cosmos
The Copernican Heliocentric Theory
Kepler's Beliefs Galileo's Discoveries
The Newtonian Synthesis and a New Worldview

What did the universe as conceived of by Aristotle and Ptolemy "look like"? Why was this "picture" so satisfying and virtually unquestioned for so long? Why did Christians see it as being Biblical? Upon what assumptions and observations was it based? Why would anyone ever want to challenge it and imagine another model?

THE GEOCENTRIC MODEL

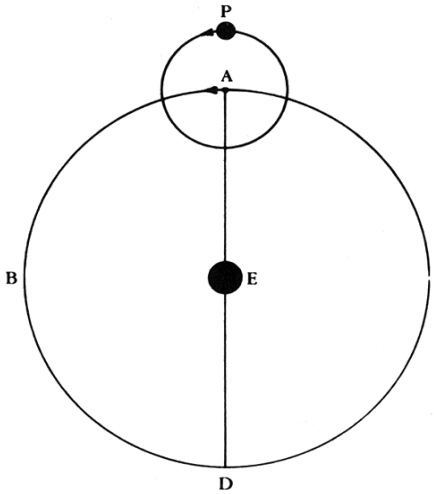
As you recall, our philosophers *from Thales on* all dealt with the "problem" of appearances ***vs***. ultimate reality. (Between 'reality' as it **appears** to our senses and our 'reasoned' concept of: reality-as-it-**really-is**.) The 'real world' must ultimately be perfect—that is a 'reasonable' assumption…and senses can deceive us—that is obvious. This dilemma is 'magnified' when it comes to conceptualizing the Cosmos! What does it really "look like"? From what vantage point would you have to stand to get a true picture of it? What do we see when we stand beneath the starry skies?
The ancients had observed the movements of the heavenly bodies and had kept precise records. They realized that we live in an orderly, even somewhat predictable, Cosmos. Shouldn't we be able to draw *models* that account for what we *see* **and** that reflect the way we *intuit* that things really are? Can **mathematical** calculations ever offer a depiction of **physical** reality? The history of the worldview shift from geocentric to heliocentric is as philosophically intriguing as it is scientifically intricate.
As early as 1900 BCE, sky-gazers had noticed some strange movements of the visible planets. Planets ("wanderers") loop backward on their overall course across the sky. This phenomenon is called "**retrograde motion**".
PLATO, at his great Academy where mathematics was an entrance requirement, assigned a tough 'homework problem'**:** create a geometric pattern that *accounts for and accurately predicts* the observed motion of the sun, moon, and planets. If you think that would be easy—try it sometime, for there are some rather eccentric things going on up there! Now, if it is assumed that there MUST be a hidden perfection behind the irregularities we can see with our eyes, then our Reason should be able to discover it.

[See: Daniel Kolak's book ***Lovers of Wisdom***, 2nd ed., Chapter 9 for a lengthy and baffling discussion of all this!]

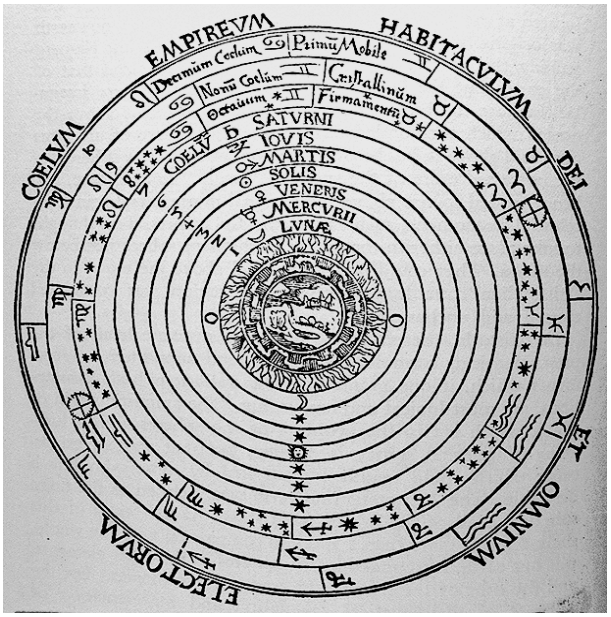
Remember who entered the Academy as a teenager and was so brilliant Plato dubbed him 'the Brain"? **ARISTOTLE**.
Aristotle 'drew' upon the cosmology of **Eudoxus**, who had envisioned a series of, or layer after layer of, **concentric spheres** that 'carry' the celestial bodies around the earth. (Picture a celestial onion whose ethereal layers are in motion around a stationary kernel!) Aristotle added some 'buffer spheres' to keep the layers running smoothly and all was well. This model worked well enough, and it was "under-girded" by powerful assumptions in Metaphysics and Physics (what things are and how they move!) In the 3rd c. BCE, when **Aristarchus** proposed a sun-centered cosmos with a moving earth, it simply wasn't deemed believable!
Since **assumptions** are of more interest to this course than *'doing the math'*, let's note some of them that persisted until the Scientific Revolution. You can easily see how they were 'baptized' by Scholastic philosophers (recall the "Medieval Christian Synthesis"!) and deemed theologically necessary.

The Cosmos has a center-point and is finite…[created by God for man.] Celestial bodies move uniformly…[they are changeless, incorruptible, perfect, 'heavenly'!]
The Circle is the perfect shape, as it has no beginning and no end… The Earth is of different stuff than the heavens…[fallen, corruptible, imperfect…]

Aristotle's model was 'improved' by Claudius **Ptolemy** (85—165 CE) a mathematician-philosopher from Alexandria, Egypt. Ptolemy used the concept of extra-orbital "**epicycles**" to explain why planets seem to loop back. Look at the following diagram…it is terribly over-simplified but you'll see the effect. **E** is the earth. **P** is a planet. The big circle is the main orbit, but the small circle whose 'center' is **A** is the 'epicycle.' The **P** going around its circle-upon-a-circle will appear from the viewpoint on **E** to move *backward* against the celestial sphere. (A loopy model, but it worked!)



The Aristotelian—Ptolemaic model of the Cosmos reigned supreme for centuries. It has it all! Circularity, order, a sense of our place (albeit a cluttered place!) in the world, predictive capability, and a theoretical accounting for what we actually do, in fact, observe. It satisfies our inner needs, our reasoning *and* our senses. Add Catholic theology to the model and you have a picture that will be hard to challenge. (There are still 'Bible believing' Christians today who embrace Geocentricity rather dogmatically.)



In this medieval illustration, you can detect ideas from Ptolemy, Aristotle, Empedocles and even Pythagoras! (*Ten* spheres.)
Note of course, the spherical Earth in the center…composed of four elements: **Earth, Water, Fire and Air**.
In this geo-centric, geo-static cosmology, the earth does *not* revolve around anything else or rotate around its own axis. And what about the celestial bodies above us? The earth is surrounded by concentric spheres made of a perfectly transparent substance known as "quintessence" (fifth essence, also called *Aether*.) These surrounding spheres would have to be transparent or we wouldn't see the stars! These spheres revolve around the earth, 'carrying' the other celestial bodies along their equator. (Picture a sphere, not a flat circle.)
As you can see, first is the sphere "of the **Moon**" ("Lunae"), next is **Mercury** ("Mercurii"), next is **Venus** ("Veneris"), next is the **Sun** ("Solis"), next is **Mars** ("Martis"), next is **Jupiter** ("Iovis"), next is **Saturn** ("Saturni"). The symbols by the names of the planets are the traditional astrological symbols for them. Next is the sphere of the **fixed stars**— the **Firmament**. (The stars do not move relative to each other.) The next sphere is crystalline, and the tenth sphere says: **Primu Mobile** (Prime Mover) which provides the energy to move all the other spheres. The **Prime Mover** was often *Christianized* into the Biblical **God**, or as seen here, God's realm can be depicted as **outside** the tenth sphere. Interestingly, in the 8th,9th,& 10th spheres you'll notice the symbols for the twelve astrological constellations! Beyond the outermost sphere it says in Latin: **"The Kingdom of Heaven, the Habitation of God and of All the Elect."**
Below you see another illustration of this beautifully spherical, harmonious, and earth-centered world.

THE COPERNICAN HELIOCENTRIC THEORY

Mikolaj Kopernik (1473–1543) a name we have Latinized ["Nicolai Copernicus"] and lauded as the founder of modern astronomy…truly was a *Renaissance Man!* He studied Pythagorean philosophy, mathematics, medicine, and had a doctorate in Church canon law. When he was almost 'on his deathbed' he finally published his lifelong work: "***Concerning the Revolution of the Celestial Spheres***," which he knew was controversial. Though he dedicated it to the Pope, it remained on the Church's *Index of Forbidden Books* until 1835! This 'forbidden work' dared suggest that the earth revolved around the sun. As we have seen, heliocentric views had been suggested earlier, but Copernicus offered the first well-developed mathematical theory in centuries. He intended to *refine, not refute* the Ptolemaic system. Yet his model wasn't aesthetically superior to Ptolemy's, nor was it better at charting predictions, …and it still required lots of epicycles! Alas, Copernicus had retained the assumption of circular orbits. [*By the way*, the U.S. Coast Guard prefers to utilize Ptolemaic calculations to Copernican because they are simpler and more precise. They work! *There's* an interesting discussion point for "appearance *vs*. reality" and the relationship between math-model and physical reality!]

The Copernican Theory was slow to gain adherents. It was entirely mathematical, and without offering a new understanding of the mechanics of motion, it violated Aristotelian physics and common sense. How absurd! How could the earth spin and sail? We do not feel it moving. If we throw something straight up it will fall back down to us, not plop down some distance back!
Notice: the Heliocentric model is, simply speaking, not empirical! It was accepted on 'faith' while Geocentricity was adhered to by 'reason.'
The French intellectual, philosopher & lawyer Jean Bodin (1530–1596) declared:

> "No one in his senses with the slightest knowledge of physics will ever think that the earth, weighty and unwieldy from its own mass, staggers around its own center and that of the sun; for at the slightest jar of the earth, we would see cities, fortresses and mountains toppled down."
> (Would he believe that we are 'staggering' around the sun at nearly 67,000 miles per hour?)

But the shift we are reviewing also raised religious objections: How could the earth be just another planet if it is "center-stage" for God's redemption story? How could all humans have descended from Adam if there are people on other planets? How can the heavens be the 'habitation of God' if they aren't perfect? If the cosmos itself is infinite…where IS God? Both Catholics and Protestants generally rejected the idea of a moving earth. But again, note that they did so because they deemed it *unscientific as well as unscriptural!!*
[For a list of alleged Geocentric Biblical 'proof-texts' – consult extra material in the Philosophy Notebook.]
How *did* the Heliocentric model come to be so commonly accepted? Because although some historians refer to this entire shift as—
THE COPERNICAN REVOLUTION, the theory proposed by the Polish clergyman did not cause an immediate worldview revision. We will have to briefly trace the story from Brahe through Galileo and end with Newton. But first, tuck *this* away for when we'll study Immanuel Kant!

> The expression "Copernican Revolution" will be used *as an analogy* for an **Epistemological** alteration:
> As Copernicus theorized that the **observed motions** of the celestial bodies can be explained by the **actual motions** of the observer (*i.e.*- observing from a revolving earth) …so new epistemologies can claim that the perceived structure (spatial-temporal-causal) of the world can be explained by the structure of the perceiver's own mind!!

Tycho Brahe (1546–1601) a Danish astronomer, tried to refute the Copernican view. He thought that the moon and sun revolved around the earth while the other planets revolved around the sun. From his own private observatory on his own island, he painstakingly collected the most accurate data ever yet acquired. When he died, his meticulous astronomical tables were inherited by a convinced Copernican!

KEPLER'S BELIEFS

Johannes Kepler (1571–1630) a German mathematician and mystic, worked for years with Brahe's data to test the Copernican model. Kepler formulated *principles of planetary motion* still accepted today, that matched Brahe's data and supported Copernicus: The planets orbit the sun in *elliptical* patterns, and at varying but mathematically harmonious velocities…(*that* explained away the retrograde effect!)
With Kepler astronomy advanced but mysteries remained to be solved. Without Aristotelian—Ptolemaic assumptions, no one could explain why planets 'stayed their course' in orbits of any shape. (Why don't they hurl out into the darkness?) Don't worry, new assumptions are on their way.

GALILEO'S DISCOVERIES

Galileo Galilei (1564–1642) a pioneer physicist, patron saint to astronomers, and the very icon of the conflict between religion and science. Picture him dropping weights off the Tower of Pisa, being the very first to peer into the heavens through a new telescope, and being forced by the Inquisition to 'abjure' his heliocentric heresies. His biography is one of the most interesting, and telling, in all of history. But here we are restricted to a mere mention of his place in the worldview shift.

What *did* Galileo observe through his telescope? Mountains and craters on the moon, the phases of Venus, spots on the sun, moons around Jupiter, rings around Saturn…and way more stars than anyone ever imagined! Look back at your medieval illustration and watch it dissolve.
These celestial observations not only support Copernicus rather than Ptolemy, but Galileo also corrected some terrestrial concepts like Aristotle's understanding of motion. Things don't fall because they are finding their natural place *at rest*…matter is naturally *in motion*!

Galileo also contributed to the changes in epistemology and methodology. He believed, as Copernicus and Kepler had, that the 'language' of nature is mathematics. He thought that all physical descriptions of the Cosmos would necessarily be mathematical. But can math resolve the age-old **"appearance *vs.* reality"** dilemma and describe what *really* is? Even Ptolemy hadn't thought that his model was a *real* physical picture! Galileo believed that a physical description of reality should be coterminous with the mathematical, and this confidence is a significant part of the shift. However, the 'shift' from Quality to Quantity *as to the essence of things* will result in an ongoing problem in epistemology…for where does that leave the "qualities" we experience? We will revisit this problem, as Locke uses Galileo's distinction between Primary and Secondary Qualities.

But getting back to this overview…what about Galileo as a 'martyr for scientific truth against the ignorance of Christian belief'?!
Galileo himself saw no conflict between 'how to go to heaven, and how the heavens go.' He believed that both general revelation and special revelation proceeded from the same Revealer, and that God gave us our reason and senses to know the Cosmos. He believed that Holy Scripture "could never speak untruth…when its true meaning is understood." And although he had a troubled life, he never seems to have lost his love for God and his awe over God's creation. To Galileo, the works of God and of nature are miraculous. Even described mathematically, this universe is a marvelous display of God's power and glory!
With the stellar career of Galileo, the 17th century had a closer look at a Cosmos far more vast than ever before conceived. It only remained for some colossal genius to arrive and devise mathematics that could really handle so much motion…and finally enlighten us as to: 'what makes the world go 'round?' The year Galileo died, the greatest natural philosopher of them all was born.

THE NEWTONIAN SYNTHESIS

Sir Isaac Newton (1642–1727) the solitary genius, provides the capstone of the Scientific Revolution and its new cosmology. With his brilliant use of observation, reason, insight and intuition…Newton brought physics, astronomy, mathematics, *and* metaphysics together in an elegant synthesis. He was the admired (though not beloved!) leader of the scientific community, the great hero to the Enlightenment intellectuals, and he is still hailed as the greatest scientist of all times. He studied the nature of light, invented the reflecting telescope, and he "co-discovered" **differential calculus**. (Newton and Leibniz discovered it *independently* of each other and argued over 'who should get credit.')

Newton's grand achievement, published in the famous ***Principia*** (Mathematical Principles of Natural Philosophy) was his Theory of Gravitation and the Laws of Motion. The force of gravity between two bodies, say the earth and sun, is *directly proportional* to the product of the masses of the bodies and *inversely proportional* to the square of the distance between them. What *is* Gravity? He doesn't say. But he tells us how it works and demonstrates that it is how things orbit like they do! Mystery solved!
In the Laws of Motion (the 'mechanics of dynamics'!) he defined the relations between: rest and motion; force, mass and speed; action and reaction.

1. Every body preserves its state of rest or uniform motion until a force acts on it….. [*Inertia*]
2. The rate of change of linear momentum is proportional to the force applied….. (An applied **force** is directly proportional to the **acceleration** it induces…the constant of proportionality being the body's **mass**.) **F=ma**
3. For every action force which one body exerts on another, there is an equal and opposite reaction force…..

Ah! Here you have all the 'coherence and harmony' anyone could ask for when old 'certainties' have been undone. The old synthesis of Aristotelian-Ptolemaic cosmology and Scholastic theology has suffered dissolution, but here is a powerful paradigm to take its place.

Away with the **Medieval Christian Synthesis**…Now we have what we may call the **Modern Newtonian Synthesis** – "an explication of the system of the world…mathematically demonstrated..." But now we will have to ask…where is **God** in this new system?

A NEW WORLDVIEW

Newton's mathematical principles of Nature so impacted the way people saw the world that his vision has been called "the received view" and Enlightenment cosmology/philosophy has often been called **"Newtonian."** We 'received' from Newton a universe with discernible order and measurable relations…discerned by human reason, measured by scientific scrutiny and explicated in equations. Galileo's dream came true—the great book of Nature *is* written in mathematical language. (No wonder the next era's philosophers are mathematicians!)

Now all motion, *whether an apple falling from a tree in a Lincolnshire garden, the tides of the seas, or the revolutions of the heavenly spheres,* can be explained in terms of universal laws and natural forces. Such a world would have been unthinkable to even the most radical medieval mind, because in the Newtonian cosmos, the heavens aren't 'heavenly' ('otherworldly') they are of the same matter as earth and obey the same rational laws.

Ponder the enormity of the new worldview and the profundity of its implications for humanity. Talk about a paradigm shift! To wit:
We've gone from mysterious to mechanistic, finite to infinite, centered to center-less; from knowing 'WHY' (teleology and theology) to showing 'HOW'; from an intimate sense of 'PLACE' to the immensity of 'SPACE'; from believing in the essential- inherent 'QUALITIES' of things to demonstrating 'QUANTITIES'. What happens to religious belief through all of this?

Copernicus, Kepler, Galileo and Newton all believed in "God." Newton, *although he was anti-Trinitarian*, owned thirty Bibles and wrote more about spiritual questions than scientific matters. The reason he dabbled in esoterica is because he saw this intricate world as a divine cryptogram!
There is simply no such thing as: *The Birth of Science = The End of Faith*. The 'Transition from Medieval to Modern' was more multi-faceted and complex than *that* caricature (which atheists find so comforting!) However, it is true that many Enlightenment intellectuals *did* let their understanding of the implications of the new science to 'reform' their attitudes toward religion. This makes sense in the context of the Reformation's bloody aftermath. Here's a **Newtonian** application for you: The Cosmos is rational, the God who created it must be rational, ergo, any religion that presumes to acknowledge God must also be rational. That should keep the religious *zealots* (fanatics and dogmatics) quiet!
Newton would **not** have approved of using **'Newtonian'** to describe a clockwork cosmos with merely a clockmaker god, but that is what we got.

In the next era, God is relegated to being a philosophically necessary 'First Cause.' Distant Creator not Active Redeemer.
You've heard the expression: "God of the Gaps." That means to ascribe to divine action only what can not yet be explained by science. The more science can explain, the less we "need" a God! That is how many 18th century philosophers construe things. And by the 19th century even a clockmaker god is deemed unnecessary.

All areas of human interest were impacted by the new 'scientific' worldview: religion, politics, ethics, economics, and of course- **PHILOSOPHY**.
The next era is obsessed with **Epistemology**. Upon what firm foundation can we build an edifice to house the torrent of new knowledge?

Waxing Eloquent About the Heavens

☼ The essence of the sun…
"is nothing else but purest Light. [The Sun is that] than which there is no greater star; which singly is producer and warmer of all things; a fountain of light…most fair…the source of vision, portrayer of all colours though himself empty of colour…called king of planets for his motion, heart of the world for his power, eye of the world for his beauty, and which alone we should judge worthy of the Most High God, should he be pleased with a material domicile in which to dwell with the blessed angels."

~ Johannes Kepler, Astronomer, Mathematician *and* Neo-Platonist!

"The heavens themselves, the planets, and this centre.
Observe degree, priority and place,
Insisture, course, proportion, season, form,
Office and custom, all in line of order…
But when the planets
In evil mixture to disorder wander,
What plagues and what portents, what mutiny,
What raging of the sea, shaking of earth,
What consternation of minds!
Take but degree away, untune that string,
And hark! What **discord follows**! Each thing melts
In mere oppugnancy." ~ Ulysses in Troilus and Cressida
William Shakespeare

"Doubt that the stars are fire;
Doubt that the sun doth move;
Doubt truth to be a liar;
But never doubt I love…"
~ Hamlet
William Shakespeare

"And <u>new Philosophy calls all in doubt</u>,
The element of fire is quite put out;
The sun is lost, th' earth, and no man's wit
Can well direct him where to look for it.
And freely men confess that this world's spent,
When in the Planets and the Firmament
They seek so many new; they see that this
Is crumbled out again to Atomis.

'*<u>Tis all in pieces, **all coherence gone**</u>;*
All just supply, and all relation:
Prince, subject, father, son, are things forgot,
For every man alone thinks he hath got
To be a phoenix, and that then can be
None of that kind, of which he is but he.
This is the world's condition now."
~ John Donne, 1611

"Philosophy is written in this grand book, the Universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in mathematics and its characters are geometric figures." ~ Galileo

"The eternal silence of these infinite spaces [the heavens] terrifies me." ~ Blaise Pascal

QUIZ ON "THE THREE Rs"

[Use: 'The Renaissance World' Summary, and Palmer pp. 143 – 152]

Multiple Choice:

1. Which does **NOT** describe the Late Medieval Scholastic Synthesis of Faith and Reason?
   A. Roman Catholic Ecclesiastical and Neo-Platonic Hierarchical…
   B. A "*Dante-esque*" geo-static, geo-centric picture of the Cosmos…
   C. Endowing the human with unique dignity and individual worth as chooser of own destiny…
   D. Aristotelian teleology linked with Christian theology… (Prime Mover as God, *etc.*)

2. Pick the statement **NOT** true about the brilliant William of Ockham:
   A. He was considered heretical by some religious figures because he denied the miracles in Scripture.
   B. His methodological principle of simplicity was later called 'Ockham's Razor' and was used as a guiding rule for empirical scientists.
   C. He rejected as 'sophistry' Augustine's attempt to solve the paradox of 'human freedom *vs*. divine foreknowledge.'
   D. In the 'Universals *vs*. Particulars' debate, William was a Nominalist. (Only particulars are real and universality is merely a feature of language not of reality.)

3. Many fields we now recognize in the sciences were still called _____ _____, and only began to emerge as specialties toward the end of (and after) this era. Actually, this term was used until the 19th century!:
   A. Metaphysical Physics B. Natural Theology C. '*Studia Synthetica*' D. Natural Philosophy

4. In a Renaissance context, the term 'Humanism' means:
   A. Revival of the Sophist claim that humans are the sole arbiters of reality…so Humanism = Atheism.
   B. Shift of interest from theology to *'Studia Humanitatis'* (literature, poetry, history, art, languages, *etc.*)
   C. A focus on the Human *qua* Human (for his own sake) extolling human creativity and beauty.
   D. B and C but **not A**, for *most* Renaissance Humanists were still Theists, some were even devout Christians.

5. Humanist pursuits that most significantly helped the Reformation:
   A. Debating which system best under-girds Christian theology, Plato's or Aristotle's.
   B. Textual Criticism, philology, and translation of the Scriptures into vernacular languages.
   C. Rejection of the dry scholastic style and imitation of 'Ciceronean eloquence.'
   D. Satirizing the pomposity and wealth of the clergy, especially the Papacy.

True or False:

6. Protestant theologians were able to shed philosophical presuppositions and interpret Scripture without prejudice.

7. A terribly crucial issue at stake throughout all the upheavals & advances of this era was 'Authority.'

8. The Scientific Revolution overlaps with the Enlightenment ONLY because new discoveries kept being made, NOT because thinkers dealt with the moral, social, political and philosophical implications.

9. The prodigious mathematician and devout theologian, Blaise Pascal warned about the false optimism of the rising scientific worldview.

10. The change from 'geocentric to heliocentric' happened in one generation, was accepted by academics for empirical reasons while rejected by clergymen for fideistic reasons, thus causing an immediate and irreconcilable rift between Science and Faith.

11. During the Scientific Revolution most of the great scientists became atheists when they realized that Nature itself was infinite and could operate perfectly well on its own.

12. An authentically interpreted Biblical worldview would be able to handle any new data discovered by the sciences, but should not 'wed itself' dogmatically to any one particular scientific paradigm.