Lecture 16: The Beginnings of Modern Science and Philosophy

I. INTRODUCTION

A. Introduction

- The Renaissance
  - From French meaning "rebirth"
  - It was a cultural movement that spanned roughly the 14th to the 17th century.
  - It began in Italy in the late Middle Ages and later spread to the rest of Europe.
  - The term is used loosely to refer to this historic era and the cultural movement.
  - Traditionally, the Renaissance is viewed as a bridge between the Middle Ages and the Modern era.

As a cultural movement, it encompassed:

- Learning based on classical sources,
- The development of linear perspective in painting,
- Gradual but widespread educational reform.
  - The influence of the cultural movement affected literature, philosophy, art, politics, science, religion, and other aspects of intellectual enquiry.
- For us, the Renaissance indicates an interest in human beings, their activities, abilities, and capabilities.

- We will explore Renaissance Art, Humanism, and Science and then spend some time with Rene Descartes.

B. Renaissance Art

- Renaissance Art evolved realistic linear perspective.
  - Part of a wider trend towards realism which also involved studying light, shadow, and, famously human anatomy.
- There was renewed desire to depict the aesthetics of nature.
  - Seen in works by DaVinci, Michelangelo, and Raphael.
II. RENAISSANCE HUMANISM

A. Introduction

- Renaissance Humanism
  - Humanism was not a philosophy per se, but rather a method of learning.
    - Humanism is the movement to recover, interpret, and assimilate the language, literature, learning and values of ancient Greece and Rome.
    - Above all, humanists asserted the genius of man and the unique and extraordinary ability of the human mind.

- Renaissance Humanism v. Medieval Scholasticism
  - Medieval scholastics focused on resolving contradictions between authors of ancient texts, but humanists would appraise them through a combination of reasoning and empirical evidence.

- Humanist scholars shaped the intellectual landscape throughout the early modern period.
  - Moved from more God-centered interests to more human centered interests
    - Political philosophers such as Niccolò Machiavelli and Thomas More revived the ideas of Greek and Roman thinkers, and applied them in critiques of contemporary government.
    - Theologians, notably Erasmus and Martin Luther, challenged the Aristotelian status quo, introducing radical new ideas of justification and faith.

- In terms ideas relevant to psychology, humans assumed to have reliable sensory systems, reasoning powers, and ability to enjoy...
II. RENAISSANCE HUMANISM

B. Francesco Petrarch

Francesco Petrarch (1304 - 1374)

- Many historians argue that his writings mark the beginning of the Renaissance.
- Petrarch wanted a freeing of the human spirit from the medieval traditions.
- Principally attacked Scholasticism
- Believed the classics should be studied directly as works of humans and not interpreted or embellished by other humans.

Petrarch desired a more personal religion based on the Bible, personal faith, and feelings.
- Taught that God wanted humans to use their capabilities to actualize potential, and thus make the world better.
- Skepticism toward all dogma paved the way for the development of modern science.

C. Giovanni Pico

Giovanni Pico (1463 - 1494)

- He is famed for events of 1486.
- At age of 23, he proposed to defend 900 theses on religion, philosophy, natural philosophy and magic against all comers.
- This was basis for *Oration on the Dignity of Man* which has been called the "Manifesto of the Renaissance"
- It is a key text of Renaissance humanism.

Giovanni Pico proposed that humans only have capacity for change

- Can choose instinctual, sensual lives and become brutish
- Or exercise rationality and intelligence and become more angelic and Godlike.

- Argued that all philosophical views were reconcilable
- Ultimately in agreement and all should be studied and assimilated into the Christian worldview.
II. RENAISSANCE HUMANISM

D. Desiderius Erasmus

- Desiderius Erasmus (1466 - 1536)
  - Opposed fanatic belief in anything.
  - Criticized the classics, claiming that anything created by humans was inherently imperfect.
  - Attacked all forms of superstitions
  - Desired people to take lessons from simple life of Jesus instead of the pomp and circumstance of the Church.

Desiderius Erasmus was generally critical of excesses of all kinds, both within the Catholic Church and the Protestant religions.

He wrote The Praise of Folly.

He attacked the church, philosophers, and nobility.

His criticisms may have led to Martin Luther’s actions.

E. Martin Luther

- (1483-1546)
  - Insisted on an intensely personal religion (each person is answerable only to God)
  - Deemphasized ritual and church hierarchy.
  - Initiated the Reformation in 1517 by nailing Ninety-Five Theses to the door of the church in Wittenberg.
  - Had progressive ideas about sex and marriage.

Martin Luther insisted on accepting the existence of God on faith alone; to understand Him through reason was foolish.
II. RENAISSANCE HUMANISM
F. Michel de Montaigne

- Michel de Montaigne (1533-1593)
  - Famous for his ability to merge serious intellectual speculation with casual anecdotes
  - His autobiography and his volume *Essais* contains some of the most widely influential essays ever written.
  - Montaigne had a direct influence on writers including Descartes, Emerson, Nietzsche, Rousseau, Asimov, and perhaps Shakespeare.

- Also proposed an extreme form of skepticism
  - Human rationality caused most of human problems
    - Animals lack rational powers, therefore are superior to humans.
  - Rejected science as a means to attain reliable knowledge because scientific “truth” is in constant flux
    - Sensations are illusory
  - Didn’t share optimism expressed by other Renaissance humanists.

III. RENAISSANCE SCIENCE
A. Challenges to the Church

- Renaissance Humanism challenged church orthodoxy, as did the emergence of science.
- Upheavals in arts and humanities were mirrored in the sciences.
- Renaissance saw significant changes in the way the universe was viewed and the methods with which philosophers sought to explain natural phenomena.¹
- The most significant development was a *process* for discovery, the scientific method.

- Once questioning of “truths” began, escalated rapidly
  - Church scholars attempted to show that contradictions were only apparent.
  - Attempted to censor the challenges, but could not curb the tide of inquiry and challenge
  - The scientific method focused on empirical evidence and the importance of mathematics
    - The new scientific method led to great contributions in the fields of astronomy, physics, biology, and anatomy.
III. RENAISSANCE SCIENCE
A. Challenges to the Church

- Decline in Church’s Authority
  - Directly related to rise in spirit of inquiry and empirical observation.
  - Church dogma replaced by that which it opposed the most: the direct observation of nature without theological consideration.

III. RENAISSANCE SCIENCE
B. Reawakening of Objective Inquiry

- Several factors contributed to the reawakening of the spirit of objective inquiry
  - Acceptance of reason and the examination of nature as a means of knowing God.
  - Work of the humanists recaptured the spirit of inquiry reflected in the classics, and in the human potential to act upon the world and change it for the better.
  - Other events contributed to the decline of Church authority and acceptance of objective study of nature.

III. RENAISSANCE SCIENCE
C. Ptolemy

- Claudius Ptolemaeus, known as Ptolemy, 90 - 168
  - was a Roman mathematician, astronomer, geographer and astrologer.
  - Proposed a Geocentric system of the universe
    - Earth is the center of all heavenly bodies
    - Became part of Church dogma put man as center of the universe and creation.
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D. Aristarchus of Samos

- Aristarchus of Samos (310 BC – 230 BC)
- Greek astronomer and mathematician, born on the island of Samos, in Greece.
  - He was the first Greek to present an explicit argument for a heliocentric model of the solar system
  - Placed the Sun, not the Earth, at the center of the universe.

E. Nicolaus Copernicus

- Nicolaus Copernicus (1473 - 1543)
- He was the first astronomer to formulate a scientifically-based heliocentric cosmology that displaced the Earth from the center of the universe.
  - On the Revolutions of the Celestial Spheres is regarded as the starting point of modern astronomy and the beginning of the Scientific Revolution.

F. Giordano Bruno

- Giordano Bruno (1548 - 1600)
- Italian philosopher and proponent of heliocentrism and the infinity of the universe.
  - Considered an early martyr for modern scientific ideas because he was burned at the stake as a heretic by the Roman Inquisition
  - His actual heresy was his religious not scientific beliefs.
III. RENAISSANCE SCIENCE

F. Johann Kepler

- Johann Kepler (1571 – 1630)
  - Accepted heliocentric position
    - It explained the universe in a simple mathematical harmony.
  - Proved many of the mathematical details of the Copernican system
  - Anticipated Newton’s concept of gravity
  - Insisted that all mathematical deductions be verified by empirical observation.

III. RENAISSANCE SCIENCE

G. Galileo Galilei

- Galileo Galilei (1564 -1642)
  - Italian physicist, astronomer, mathematician, & philosopher
  - Achievements: Improvements to the telescope and resulting astronomical observations, and support for Copernicus’ heliocentric cosmology
  - Father of Modern Science
    - Explored kinematics: The motion of uniformly accelerated objects, taught in all physics classes.

III. RENAISSANCE SCIENCE

G. Galileo Galilei

- Mathematical studies allowed for distinction of objective and subjective reality.
  - Objective reality
    - Exists independent of an individual’s perception
      - Includes what later would be called primary qualities, quantity, shape, size, position, and motion of objects.
III. RENAISSANCE SCIENCE

H. Isaac Newton

- Isaac Newton (1643 – 1727)
  - English physicist, mathematician, astronomer, natural philosopher, alchemist, and theologian.
  - Widely considered one of the most influential men in human history.
  - His 1687 *Principia Mathematica*, is considered the most influential book in the history of science.
  - Lays the groundwork for classical mechanics.

- Science and Religion
  - Newton wrote more on religion than he did on science.
  - Saw the universe as a complex, lawful machine created by God who set in motion, after which He ceased involvement (Deism).
  - He believed in a rationally immanent world but saw evidence of design.
  - He refused to take holy orders, and sacrament on his death bed.

III. RENAISSANCE SCIENCE

I. Bacon

- Francis Bacon (1561 –1626)
  - Science based on induction.
  - Argued that science should only include facts of observation
  - Maintained that science should not include theories, hypotheses, mathematics, or deductive methods.
  - Proposed methods of agreement, difference, and concomitant variation.
  - Radical empiricism was later called positivism.

- Baconian Science
  - Generalizations made from many observations, noting their similarities and differences, and used to describe event classes
  - Science should:
    - Provide useful information and improve the world for mankind
    - Skinner and behavior analysis adopted the Baconian inductive method and the view that the main goal of science is to improve the human condition.
III. RENAISSANCE SCIENCE

I. Bacon

- Baconian Science
  - Four sources of error that could hinder scientific investigation:
    - Idols of the cave
      - Personal biases
    - Idols of the tribe
      - Human nature biases
    - Idols of the marketplace
      - Too much influence of meaning assigned to words (verbal labels)
    - Idols of the theater
      - Blind allegiance to any viewpoint

III. RENAISSANCE SCIENCE

J. Rene Descartes

- Rene Descartes (1596-1650)
  - He was a French philosopher, mathematician and scientist.
  - Was the father of modern Philosophy.
    - His *Meditations on First Philosophy* is a standard text in philosophy departments.
  - Descartes was also influential in math.
    - He is accredited as the father of analytical geometry.

III. RENAISSANCE SCIENCE

J. Rene Descartes

- Meditations
  - Sought to devise a system of explanation that could not be questioned
  - Deductive Method
    - Determine that which was certain and then deduce other certainties
    - Through self analysis, determined that some ideas are innate (natural components of the mind).
    - Innate ideas were unity, infinity, perfection, axioms of geometry, and God.

III. RENAISSANCE SCIENCE

J. Rene Descartes

- Philosophy
  - By virtue of the validity of rational processes, knowledge gained through the senses could be accepted because God, being perfect, would not and could not deceive us.
  - Sensory information had to be analyzed rationally to determine its validity.
  - Was a rationalist, a nativist (innate ideas), and a phenomenologist (introspectively study the nature of intact, conscious experience).
III. RENAISSANCE SCIENCE
J. Rene Descartes

- Mind - Body
  - Descartes suggested that the body works like a machine.
    - It has the material properties and follows the laws of physics.
  - The mind was described as a nonmaterial entity.
    - Lacks material processes and does not follow the laws of physics.
  - Descartes argued that only humans have minds.

- Contributions to Psychology
  - The mechanistic explanations of behavior and many bodily functions
    - Could be said to have led to stimulus-response explanations and behaviorism.
  - The focus on the brain as an important mediator of behavior.
  - Description of the mind-body relationship provided others the opportunity to support or refute it.
  - Studied the bodies of animals as a means to understand the functioning of human bodies.
    - Led to physiological and comparative psychology.
  - He paved the way for the scientific study of consciousness.