

Notes on the Scientific Revolution and the Enlightenment

*“Nature and Nature’s law lay hid in night
God said, ‘Let Newton be,’ and all was light.
Alexander Pope, Essay on Man 1734*

I. Scientific Revolution

- A. Nicolas Copernicus 1473-1543
- B. Tycho Brahe 1546-1601
- C. Johannes Kepler 1571-1630
- D. **Galileo Galilei** 1564-1642
- E. **Sir Isaac Newton** 1642-1727
- F. **Francis Bacon** 1561-1626
 - 1. *Advancement of Learning* 1605
 - 2. *Novum Organum* 1620
- G. **René Descartes** 1596-1650
 - 1. *Discourse on Method* 1637
 - 2. *Cogito, ergo sum*
- H. Andreas Vesalius 1514-1564
 - 1. *Anatomy The Structure of the Human Body* 1543
- I. William Harvey 1578-1657
- J. Robert Boyle 1627-1691
 - 1. Father of modern chemistry
- K. Joseph Priestley 1733-1804 and Antoine Lavoisier 1743-1794
 - 1. Water is hydrogen and oxygen
- L. Carolus Linnaeus 1707-1778
 - 1. Classification of animals
- M. Georges-Louis Buffon 1707-1788
 - 1. Zoology
- N. Benjamin Franklin 1706-1790 and Alessandro Volta 1745-1827
- O. William Gilbert and James Hutton
 - 1. Geology
 - 2. Hutton’s *The Theory of the Earth* 1795

II. Enlightenment

- A. **Immanuel Kant** “What Is Enlightenment?” 1784 – the liberation of the individual from the direction of others.
 - 1. Motto is *Sapere aude!* “Dare to Know!”
- B. Characteristics of the philosophes
 - 1. Skepticism—questioning all authority and assumptions
 - 2. Belief in existence of Natural Laws
 - 3. Confidence in Human Reason
 - 4. Optimism that application of reason to discover natural laws will lead to Progress

- C. Philosophes—reason could reveal natural laws; reform human institutions to conform with natural laws
1. **“The republic of letters”**
 2. Marquis de **Condorcet** 1743-1794 (a mathematician) *Progress of the Human Mind* 1795 belief in progress with the tenth era of human history ending in peace, justice, and virtue.
 3. Bernard de **Fontenelle** 1657-1757
 - a. *Conversation on the Plurality of Worlds* 1686 : idea of progress, sceptical about absolute truth and the claims of organized religion, anti-clerical
 4. Pierre **Bayle** 1647-1706
 - a. *Historical and Critical Dictionary* 1697 sceptic, nothing can be known beyond all doubt; attacks deference to all traditions, including religion. preaches tolerance
 5. **Voltaire** 1694-1778
 - a. François-Marie Arouet
 - b. Essays, plays, letters, plays, histories
 - c. ***Candide*** 1759 attacks superstition, persecution, war and uncritical optimism
 - (1) Following the Lisbon earthquake, how can God be all good? Leibnitz “Best of All Possible Worlds” shaken
 - d. Supported enlightened despotism, corresponded with Frederick the Great and Catherine the Great; did not believe in social and economic equality, and pessimistic that men could govern themselves
 - e. Deist
 - f. *Letters on the English* 1733
 - g. *Treatise on Tolerance* 1763 attacked execution of Jean Calas, a Huguenot merchant accused of murdering his son to prevent his conversion to Catholicism
 - (1) “*Écrasez l’infâme!*”
 6. Jean-Jacques **Rousseau** 1712-1778
 - a. Man is basically good; society makes us bad
 - b. Attacked rationalism and civilization as stifling the individual; extolled emotions and feeling
 - c. *Discourse on the Origin of Inequality* 1755 called for a complete reorganization of society to eliminate inequalities based on factors such as rank or race. Attacked private property as a source of evil society.
 - d. *Discourse on the Arts and Sciences* 1762 Civilization had corrupted the natural goodness of man.
 - e. ***Emile*** 1762 Helps discover childhood; education via direct

- experience rather than books, severe discipline avoided.
- f. ***Social Contract*** 1762 “**All men are born free but everywhere they are in chains.**”
 - (1) The **General Will** is always right; obedience is an act of freedom
 - (2) All individual right derive from the General Will, including property right
 - (3) Rousseau is much more statist than Locke
 - 7. Charles-Louis Baron de **Montesquieu** 1689-1755
 - a. *Persian Letters* 1721 criticized European customs in the guise of letters written by a Persian traveler
 - (1) First critical examination of slavery by a philosophes
 - b. ***The Spirit of Laws*** 1748
 - (1) Large: Despotism
 - (2) Middling: Monarchy
 - (3) Small: Republic
 - (4) Historical evolution of laws, nations, and institutions
 - (5) Separation of powers and checks and balances
 - (6) Sovereignty comes from the people, not from God
 - 8. Denis **Diderot** 1713-1784 and Jean le Rond **d’Alembert** 1717-1783 (a mathematician)
 - a. *Encyclopedia* 1751-1772
 - (1) placed on the Catholic Index of Forbidden Books
 - b. D’Alembert: enlightened public vs noisy blind multitude
 - c. Diderot to Voltaire: “*No quarter for superstitions!*”
 - d. Diderot: “*Let us strangle the last king with the guts of the last priest!*”
 - 9. François **Quesnay** 1694-1774 and Anne-Robert **Turgot** 1727-1781
 - a. The **Physiocrats**
 - (1) Wealth come only from agriculture
 - (2) One tax, derived from land
 - (3) Improve and modernize agriculture
 - (4) Eliminate all other taxes and economic restrictions
 - (5) ***laissez-faire***
 - 10. Baron Paul **d’Holbach**
 - a. *System of Nature* 1770 human beings were machines completely determined by outside forces
 - 11. La Mettrie
 - a. *Man a Machine*
 - D. **John Locke** 1632-1704
 - 1. ***Essay Concerning Human Understanding***
 - a. ***Tabula rasa*** Ideas are derived from experience
 - b. Human personality molded by environment: education and social

- institutions
2. ***Second Treatise of Government***
 - a. **Social Contract:** governments created by mutual consent, natural rights are life, liberty, and property; right of rebellion
- E. **Adam Smith** 1723-1790
1. ***The Wealth of Nations*** 1776 Attacks mercantilism; people should be free to pursue economic self interest; specialization; very limited government
 2. The ***“invisible hand”*** of the unfettered economy would over time causes the forces of supply and demand to meet, determining the price of a good
- F. **Mary Wollstonecraft**
1. Daughter of an alcoholic and abusive father
 2. Supported herself
 3. Lived with William Godwin and bore a daughter, Mary, out of wedlock (died of puerperal fever)
 4. ***Vindication of the Rights of Women*** 1792 is one of the works that mark the beginning of feminism
 - a. Blatantly influenced by John David Hume and other philosophers considered women to be inferior to men; Diderot, Montesquieu, and Voltaire all opposed equal rights for women
- G. Gottfried von **Leibnitz** – mathematician and philosopher
1. Invented differential and integral calculus simultaneously and independently of Newton
 2. ***Théodicée*** believed God had created the **“Best of all possible worlds.”**
 - a. This concept shaken by Lisbon Earthquake 1755 and attacked by Voltaire in *Candide*
- H. Gotthold Ephraim **Lessing**
1. ***Nathan the Wise*** 1779 an eloquent plea for religious toleration
- I. **Moses Mendelssohn**
1. ***Jerusalem*** 1783 plea for freedom of conscience, toleration of minorities, and separation of church and state
- J. **Immanuel Kant** 1724-1804
1. “The basic tenet of German idealism is that we perceive and understand the world through the medium of our ideas and not through direct application of our senses.
 2. ***Critique of Pure Reason*** 1781
 - a. Affirms that reason can lead to knowledge
 - b. Argues that each person understands the world through concepts that cannot be separated from his or her unique experience
 - c. This undermines faith in rational objectivity and universalism
 - d. Leads to subjectivity and relativism of the Romantic era
 3. ***Critique of Practical Reason*** 1790
 4. Actually points out the limitations of Reason and helps lead to Romanticism

5. Reason can neither prove nor disprove the existence of God; faith and intuition can lead one to understanding of spiritual truths
- K. **Johann Süßmilch**
1. *The Divine Order* 1741: invented statistics, and developed demographic information of such accuracy that he was used for over a century until mortality rates changed.
- L. **Cesare Beccaria** 1738-1794
1. *Essay on Crime and Punishments* 1764
 - a. Abolish torture
 - b. Assumption that one is innocent until proven guilty
 - c. Standard procedures for trials, so everyone had an equal chance.
 - d. Objected to capital punishment
 - e. **“It is better to prevent crimes than punish them”**