Development of Thought continued

The dispute between rationalism and empiricism concerns the extent to which we are dependent upon sense experience in our effort to gain knowledge. Rationalists claim that there are significant ways in which our concepts and knowledge are gained independently of sense experience. Empiricists claim that sense experience is the ultimate source of all our concepts and knowledge. The dispute between rationalism and empiricism takes place within epistemology, the branch of philosophy devoted to studying the nature, sources and limits of knowledge. The defining questions of epistemology include the following. What is knowledge? Or how do we know that a particular proposition about the world is true? What is the source of this knowledge? Does it come from experience? What are the limits of knowledge? Or what can we know, and what can't we.

Descartes said that the mind has innate ideas, which it is born with, The British Empiricist philosopher John Locke did not agree with this. Locke was one of the founders of the school of empiricism which states that knowledge comes only or primarily from sensory experience. Locke's theory of mind is often cited as the origin of modern conceptions of identity and the self. Locke was the first to define the self through a continuity of consciousness. He postulated that, at birth, the mind was a blank slate or tabula rasa. Contrary to Cartesian philosophy based on pre-existing concepts, he maintained that we are born without innate ideas, and that knowledge is instead determined only by experience derived from sense perception

The Age of Enlightenment and scientific revolution was a cultural movement of intellectuals beginning in late 16th-century Europe emphasizing reason and individualism rather than tradition. Its purpose was to reform society using reason, to challenge ideas grounded in tradition and faith, and to advance knowledge through the scientific method. During this period developments in mathematics, physics, astronomy, biology (including human anatomy) and chemistry transformed views of society and nature. It promoted scientific thought, skepticism, and intellectual interchange. The Enlightenment was a revolution in human thought. This new way of thinking was that rational thought begins with clearly stated principles, uses correct logic to arrive at conclusions, tests the conclusions against evidence, and then revises the principles in the light of the evidence. No longer were the absolute answers of the dogmatic scholastic thinkers accepted.

One of the first things that bought this revolution in thinking about was the publication of Nicolaus Copernicus' book, *De revolutionibus orbium coelestium* (*On the Revolutions of the Celestial Spheres*). Copernicus was a Renaissance mathematician and astronomer, whose book formulated a heliocentric model of the universe which placed the Sun, rather than the Earth, at the center. It had been believed that the Earth was the center of the Universe for centuries in Western Culture, This radical idea was not popular with the traditionalist and religious thinkers, and helped pave the way for the scientific revolution to follow.

Galileo Galilei (15 February 1564 - 8 January 1642), often known mononymously as Galileo, was an Italian physicist, mathematician, engineer, astronomer, and philosopher who also played a major role in the scientific

revolution. His contributions to observational astronomy include the telescopic confirmation of the phases of Venus, the discovery of the four largest satellites of Jupiter (named the Galilean moons in his honor), and the observation and analysis of sunspots. Galileo's observations provided proof for Copernicus's heliocentric model.

Galileo's championing of heliocentrism was controversial within his lifetime, when most subscribed to geocentrism (the idea that Earth is at the center). He met with opposition from astronomers, other scientists and religious figures. [1] The matter was investigated by the Roman Inquisition in 1615, which concluded that heliocentrism was false and contrary to scripture, placing works advocating the Copernican system on the index of banned books and forbidding Galileo from advocating heliocentrism.

Johannes Kepler (December 27, 1571 – November 15, 1630) was a German mathematician, astronomer, and astrologer; and another key figure in the 17th century scientific revolution, he is best known for his laws of planetary motion, which showed that planets orbit in ellipses and not circles, as was previously thought. This again was a direct contradiction to traditional Aristotelian thinking, which posited that the planets revolve or orbit one another in perfect circles or spheres.

Sir Isaac Newton (25 December 1642 – 20 March 1727) was an English physicist and mathematician (described in his own day as a "natural philosopher") who is widely recognized as one of the most influential scientists of all time and as a

key figure in the scientific revolution. His book *Philosophiæ Naturalis Principia Mathematica* ("Mathematical Principles of Natural Philosophy"), first published in 1687, laid the foundations for classical mechanics. Newton also made seminal contributions to optics and shares credit with Gottfried Leibniz for the invention of calculus.

Newton's *Principia* formulated the laws of motion and universal gravitation, which dominated scientists' view of the physical universe for the next three centuries. By deriving Kepler's laws of planetary motion from his mathematical description of gravity, and then using the same principles to account for the trajectories of comets, the tides, the precession of the equinoxes, and other phenomena, Newton removed the last doubts about the validity of the heliocentric model of the cosmos. The Sun was definitely at the center of our galaxy.

Newton also built the first practical reflecting telescope and developed a theory of color based on the observation that a prism decomposes white light into the many colors of the visible spectrum. He formulated an empirical law of cooling, studied the speed of sound, and introduced the notion of a Newtonian fluid.

Some other influential scientists of the revolution include Blaise Pascal, who invented the first mechanical calculator in 1642. Gottfried Wilhelm von Leibniz was a German mathematician and philosopher who did much work including refining the binary number system, which is the basis for all modern computer architectures. Thomas Newcomen(1664–1729) perfected a practical steam engine for pumping water, the Newcomen steam engine. In 1672 Otto von Guericke (1602–1686), was

the first human on record to knowingly generate electricity using a machine, and in 1729 Stephen Gray (1666–1736) demonstrated that electricity could be "transmitted" through metal filaments. In 1749 Benjamin Franklin (1706–1790) demonstrated that lightning was electricity.

The late 16th, 17th, and 18th centuries were a period of revolutionary scientific changes. It is claimed that not only were there revolutionary theoretical and experimental developments, but that even more importantly, the way in which scientists worked was radically changed. All of this would lead up to Edmund Husserl and his crisis in philosophy.

Edmund Husserl was alarmed by the unscientific nature of philosophy up to that point. Husserl wished to develop a science about the ego which would become the ultimate foundation of philosophy, on which all the other sciences were dependent. "It (phenomenology) may further be defined as the systematic development of *the universal logos of all conceivable being.* In other words, a systematically and fully developed transcendental phenomenology is *ipso facto the true and genuine universal ontology."*

Husserl believed that whatever we know about the world, all objective truth, begins with and is based in consciousness. He wanted to make the study of consioussness a science.