

THE SCIENTIFIC REVOLUTION:
THE DIRECT AND INDIRECT IMPACT STILL FELT TODAY

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World History Seminar – HIST510 A001 Spr 13
American Military University
June 2, 2013

Human history is replete with achievements, inventions, and innovations that have allowed people to live more comfortably, understand the world more deeply, and live longer. Inventions such as the plow, the water pump, and electricity have had a direct and profound impact on the lives of the majority of people around the world. Other achievements, such as the caravel ship and space travel, have likewise had a profound impact on the lives of most of the world's people; however, the impact has been more indirect. Most people will never venture into outer space, yet many people will benefit from the technological advancements that accompany space travel. The many achievements and innovations arising from the Scientific Revolution had both direct and indirect impact on the world, and that impact is still reverberating today. From the day-to-day usefulness of Galileo Galilei's improved telescope to the enigmatic computations of Sir Isaac Newton, the Scientific Revolution has had far-reaching and lasting impact on humanity, in both a direct and an indirect way.

The new spirit of thought embodied in the Scientific Revolution emerged out of the Renaissance, which incorporated knowledge from the ancient past with increasingly sophisticated methods of inquiry, observation, and analysis. Perhaps the greatest impetus to the Scientific Revolution was Johann Gutenberg's printing press. According to historian J. M. Roberts, the printing press "was to prove of huge importance in circulating new ideas – especially scientific ones – among the small numbers of the specially interested."¹ Gutenberg's Bible, Erasmus' Greek edition of the New Testament, and the works of prominent theologians were accessible to a growing number of people. Later, a number of other writings were published in a variety of languages, making information available to even more people. As pamphlets, advertisements, and newspapers became ubiquitous throughout Europe, common people had

¹ J. M. Roberts, *A Short History of the World* (New York: Oxford University Press, 1993), 307.

access to information that was previously available only to the elite. In this case, the innovation that most directly led to the Scientific Revolution, the printing press, had a direct impact on people throughout Europe and around the world by providing access to information.

Simultaneously, however, the printing press led to substantial indirect consequences as well. As Roberts continued to point out, “printing had...helped to create an international public of learned men.”² These “learned men” and their ideas about the nature of the world and of the universe created a monumental shift in the way many humans viewed nature and religion.

Perhaps the most direct impact of the Scientific Revolution on humanity was the “scientific method” of observation, hypothesis, prediction, testing, and analysis. Roberts referred to this as “intellectual enquiry by systematic experiment.”³ In ancient times, primitive people accepted the world around them as the product of mystical, spiritual, and supernatural forces. If a person from medieval France were to ask how rainbows appear, a likely response would have been, “Because God makes them.” One could postulate that a similarly worded exchange of question and answer could have taken place among Mesolithic hunters following herds of animals, or in ancient Sumer, or in Han China. After the Scientific Revolution took root, however, such a question would likely not have been asked in 18th century in England without obtaining a more lengthy and detailed response having to do with sunlight and raindrops.

The Scientific Revolution, born out of the Renaissance spirit of curiosity that Leonardo Da Vinci typified, caused humans to question their surroundings with increasing scrutiny. Da Vinci broke with convention by writing his notes in Italian, rather than Latin, and writing

² Ibid.

³ Ibid., 308.

backwards to protect his intellectual property⁴ from those who would take his ideas and possibly for fear of Church reprisals. This perhaps allowed him a modicum of freedom to investigate taboo subjects such as human reproduction. Like Da Vinci, Nicholas Copernicus and Galileo Galilei also feared that their work would bring the ire of the Church upon them. Copernicus and Galileo, the latter of whom was accused of heresy by the Inquisition for his ideas, represent both a direct and an indirect impact of the Scientific Revolution. Directly, their ideas about heliocentrism shook to its core humanity's understanding of the Earth's place in the universe. Galileo's telescope corroborated what Copernicus believed, and a fundamental change of thought occurred within the scientific community that slowly reverberated out to the common people. A consequence of this change of thought was an increase in questioning of dogma. The skepticism of Catholic Church practices that led to the Reformation provided an avenue through which people could question the established Church authority, and the Copernican-Galilean revolution facilitated this substantial paradigm shift.

It is somewhat ironic that the first book Gutenberg printed on his printing press was a Bible, yet the printing press facilitated a shift of mindset from acceptance of traditional beliefs to skepticism of established traditions. This indirect and unforeseen consequence of the printing press opened the door to more extensive scientific observation and inquiry. Isaac Newton provides a clear example of the blend between religion and science as part of the shift from dutiful acceptance of established belief to logical scientific inquiry. Newton was a religious man, yet he was also scientist. Michael Ben-Chaim addressed this paradox by stating, “[Newton's] endeavour to explore...followed his practical reflections on human beings as agents who

⁴ Lawrence Biemiller, "Viewing the Genius of Leonardo Da Vinci through His Notebook," *The Chronicle of Higher Education* 43, no. 18 (Jan 10, 1997): B2, <http://search.proquest.com/docview/214742439?accountid=8289> (accessed May 29, 2013).

belonged to God's dominion and were created to serve its divine ends.”⁵ While Newton and most people at the time were still very religious, Newton’s scientific findings combined with the findings of Copernicus and Galileo to create an atmosphere in which the existence of God was questioned. This, of course, was a significant step beyond questioning of Church authority. Atheism, according to Roberts, became a respectable belief to a very small group of people.⁶ While initially a small group, there are now many in the scientific community today, such as Carl Sagan,⁷ who describe the physical workings of the universe without reference to a deity of any kind. It is therefore evident, at least indirectly, that a consequence of the Scientific Revolution is an erosion of religious belief.

There is little question that the effects of the Scientific Revolution are still felt today. The effects, however, extend beyond the study of physical science into the social sciences. Patrick Manning, addressing what he referred to as the “Scientific-Cultural Path,” analyzed the social science contributions of Thomas Malthus, Charles Darwin, Alfred Wegener, and Karl Marx.⁸ The inquisitive spirit of the Scientific Revolution lives on through them in the fields of history, sociology, economics, politics, archaeology, philosophy, and geography. An example of the Scientific Revolution’s impact on the study of history, for example, is the effort of some historians to explain biblical events through natural occurrences. A small group of historians and scientists postulate that the effects of volcanic eruptions and earthquakes caused the Ten Plagues of Egypt and the parting of the Red Sea during the Exodus. It is quite uncertain that historians

⁵ Michael Ben-Chaim, "The Discovery of Natural Goods: Newton's Vocation as an 'Experimental Philosopher'," *British Journal for the History of Science* 34, no. 123 (2001): 397, <http://search.proquest.com/docview/215750458?accountid=8289> (accessed May 31, 2013).

⁶ Roberts, 310.

⁷ Keay Davidson, “The Universe and Carl Sagan,” *The Skeptical Inquirer*, 23, no. 6 (Nov/Dec 1999): 25. <http://search.proquest.com/docview/219318345?accountid=8289> (accessed May 31, 2013).

⁸ Patrick Manning, *Navigating World History: Historians Create a Global Past* (New York: Palgrave Macmillan, 2003), 10-11.

today would attempt to explain biblical events scientifically had it not been for the pioneering efforts of Copernicus, Galileo, Newton, and others during the Scientific Revolution. It is evident that the Scientific Revolution changed the world. Its direct impact shapes modern scholarship, while its indirect impact influences the lives of common people around the world.

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