

Free science milestones and their impact on society research paper example

[Environment](#), [Electricity](#)



On the Origin of Species

Evolution, defined as the change in the characteristics of a population that occurs over the course of generations (Belk & Maier, 2013 p. 222), had been considered by various scientists since the beginning of the 19th century. Several evolution theories were put forward attempting to explain the origins of life and the changes witnessed among different generations of organisms. The widely accepted theory then was the special creation story as described in Genesis, the first book of the Bible. In the 1859, Charles Darwin published a book called “ On the Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life” (Paul, 2008). This book put forward a version of the evolution theory that has gained acceptance among scientists. The ideas contained in the book came to be referred to as Darwinism. The two main ideas were that all living things share a common ancestor and that evolution happens through a process called natural selection. Natural selection occurs when organisms possessing favorable traits survive to generate offspring for the next generation. Darwin’s idea of common descent generated a lot of controversy especially among creationists who wondered how possibly humans can share a common ancestor with plants (Belk & Maier, 2013). This controversy has continued to this day with a group of scientists contending that natural selection and random mutation are insufficient to explain the complexity of life ([www. dissentfromdarwin. org](http://www.dissentfromdarwin.org)).

The ideas in On the Origin of Species were readily accepted because of the completeness of evidence presented by Darwin. This evidence was gathered by Darwin during his voyage through the South America seas. The book

revolutionized biology by presenting a theory so comprehensive that most scientists began to regard as a fact.

Darwinism is still valid even today. More evidence, in form of fossil records and the universality of DNA, has emerged to provide further support for Darwinism. Results of DNA sequencing indicate that “organisms as different as pine trees, mold, ladybugs, and humans contain cells with nearly all of the same components and biochemistry” (Blake & Maier, 2013 p. 245). On the Origin of Species has helped scientists understand phenomena such as why tuberculosis becomes resistant to drugs. The theory of natural selection is useful in the field of genetic engineering where drought resistant seed varieties are harnessed to enhance food security.

Social Darwinism – Herbert Spencer

Herbert Spencer applied Darwin’s principles of natural selection to society. His ideas came to be known as social Darwinism. It means that humans, just like plants and animals, can compete and those who are fit, survive. This notion of “survival of the fittest” was used to discourage governments interfering within the economy and to justify riches accumulated by few people. Spencer believed that “human social order was the result of evolution—those on top of the heap deserved to be there” (Grigg, n. d.). This idea was seized by both individuals and governments to justify their actions. Andre Carnegie said social Darwinism freed him to pursue personal riches (“Herbet Spencer”, n. d.). Hitler, perhaps believing that humans should be selectively bred just like plants, instigated the genocide of Jews in Germany. Social Darwinism may also explain colonialism.

Social Darwinism continues to make an impact today, especially in economics, where its principles are used to justify capitalism and to advocate for a laissez faire stance by the government.

Electricity

Early concepts of electricity involved the sparks produced when certain clothing materials were rubbed. The first major invention of electricity occurred in 1799 when Alessandro Volta developed the first battery that could supply electricity continuously (Ede and Cormack, 2012). Hans Orsted used Volta's battery to study electricity which culminated in his discovery of the connection between magnetism and electricity (" Origin of Electrical Power", n. d.). Michael Faraday modified Oersted's idea to invent a version of modern day generator that is used in hydroelectric power generation facilities. Electricity changed 20th century by enabling the use of telegram for communication, the lighting of homes with electric bulbs and brought about the industrial revolution when cheap power was used to power machines and factories.

Thermodynamics

Thermodynamics refers to the response of a system to energy (Onkar, 2009). Thermodynamic was developed in the 19th century after heat had been accepted as form of energy. The first scientist to use principles of thermodynamics to theoretically study engine efficiency was Sadi Carnot in 1824. In 1847, Helmholtz came up with the first law of thermodynamics which states that energy cannot be created or destroyed but can be transformed and some loss may occur during such transformation. Other

scientists who contributed to development of thermodynamics include Rudolf Clausius, Kelvin, Ludwig Boltzmann and Willard Gibbs. The development of thermodynamics increased understanding of the various ways of harnessing energy such as using solar panels. It also aided understanding of the efficiency of systems.

Role of politics in science – 19th and 20th centuries

Science was influenced by politics in various ways. Governments got involved in science by funding research. The funding increased sharply after world war (Nebeker, 1995). Moreover, politics played an important role in the acceptance of theories developed by scientist. Those theories that were considered to be against political beliefs received great objection, condemnation and rejection.

Ethical considerations by 20th century chemists

Major developments took place in chemistry in the 20th century, for example development of the atomic bomb. As with any potentially dangerous technology in the wrong hands, the atomic bomb raised ethical dilemmas. The chemists responsible were grappling with the possibility of such destructive technology being deployed to wipe out the human race (Malloy, 2008).

The Gentleman scientist

The “ gentleman scientist” is that scientist with the freedom to pursue research as a hobby. They may not be affiliated with any institution. The gains made by emergence of the gentleman scientist included better

research since the scientist was devoted to the topic and was not constrained by budgets, deadlines, and teaching schedules. Stephen Hawking attributes his success to the fact that he is not required to teach and so can devote more time to research.

Certainty and uncertainty in the scientific community of 20th century

Uncertainty may refer to unpredictability or lack of knowledge (Palmer, n. d.). The optimism and confidence in the scientific theories of the 19th century died away when new theories such as the relativity theory demonstrated the incompleteness of scientific knowledge thus far (Peat, 2002). Uncertainty is necessary in driving science forward. Uncertainty motivates further research and discussion to make knowledge more complete.

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