

Spanning the Gap

A Biography of Charles S. Peirce



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Charles Peirce, one of America's greatest intellects, was born in Cambridge, Massachusetts, on September 10, 1839. His father, Benjamin Peirce, was one of America's foremost mathematicians and a professor of mathematics and natural philosophy at Harvard University. Charles Peirce (pronounced "purse") became, in his own time, a mathematician, logician, chemist, astronomer, geodesist, cartographer, spectroscopist, engineer, surveyor, metrologist, economist, historian of science, psychologist, inventor, philosopher, lexicographer, dramatist, actor, semiotician, and short story writer. The versatility of Charles Peirce's mind is uncontested to this day.

Peirce had a long life which spanned from the American Civil War to the eve of the First World War. Yet his death in 1914 marked the real beginning of his influence; many of his ideas weren't even discussed, let alone read, by many people until after World War II. Present day philosophers often refer to him as having been ahead of his times.

Growing up in Cambridge, Peirce's early childhood was filled with numerous math problems, endless nights of double dummy and other mind games with his father. Peirce insisted that his father influenced his education so much that "if I do anything, it will be his work."

Benjamin Peirce wanted his son to be a scientist, and Charles acceded to his father and attended

NOTES

1. Stanley, W.A., *An American Philosopher* NOAA Reprint, vol. 8, April 1978, p. 1
2. Bernstein, R.J., *Perspectives on Peirce*. New Haven: Yale University Press, 1965, p.9.
3. *Peirce, Charles Sanders*, Dictionary of American Biography, Vol. 14, NY: Charles Scribner's Sons, p. 402.
4. Ransdell, J.
["Who is Charles Peirce?"](#)
5. Denison, D.C., *Who is Charles Peirce?* The Boston Globe Magazine, 10 March 1985, p.46.
6. *Peirce, Charles Sanders*, Dictionary of American Biography, Vol. 14, NY: Charles Scribner's Sons, P. 402.
7. Ransdell, J.

Harvard at the age of sixteen. He began work at the U.S. Coast and Geodetic Survey as a summer employee in 1858. At Harvard he received an undergraduate degree in 1859 at the age of 20. While he was attending the Lawrence Scientific School, the Civil War began. Peirce earned a Master's degree at Harvard in 1862, and in 1863 he earned a Bachelor of Science at the Lawrence Scientific School, *summa cum laude*.

Peirce had been exempted from military service in the Civil War by virtue of being appointed a regular aide for the *U.S. Coast and Geodetic Survey*. From there he embarked upon a career that occupied him for the next thirty years, which would take him from chemistry into astronomy, *geodesy* (the mathematical measurement of the shape of or the location of exact points upon the earth's surface), *metrology* (the science of weights and measures), *spectroscopy* (the study of the spectrum by use of a spectroscope), and other sciences.

When he felt that he needed more experience in methods of scientific investigation, he studied the techniques of classifications under Louis Agassiz -- training which served him well in his logic -- by classifying fossils at the Museum of Comparative Zoology.

Although a graduate of science he pursued his interest in philosophy, logic, and methodology throughout his education. At Harvard he studied Kant and with his philosophical background he sought life Darwinian style. He saw science as a living and growing body of truth. He searched for universal principles that could unite all sciences and wanted to answer the great question of the origin of the universe. Along this challenging route he discovered and contributed to a range of academic studies.

During his adult life Peirce held a variety of careers ranging from university lecturer on philosophy and logic at Harvard from 1864 to 1866 and logic at Johns Hopkins from 1879 to 1884, though he was

["Why Is This Place Called Arisbe?"](#)

8. Young, STB, F.H., *Charles Sanders Peirce* 15 October 1945, section II.

9. Houser, N. and C. Kloesel, *The Essential Peirce- Selected Philosophical Writings* Vol. 1. Indianapolis: Indiana University Press, 1982, introduction.

10. Denison, p. 46

11. Brent, C., *Charles Sanders Peirce: A Life*. Indianapolis: Indiana University Press, 1982, p. 322.

never granted a full professorship at either institution. Some believed the reason he never gained a full-time position at either institution was due to his personal life, specifically his two marriages. In 1862, Peirce married Harriet Melusina "Zina" Fay, an educated woman from a prominent Cambridge family. Zina joined him on his early scientific work and was also a writer and organizer within the feminist movement of the late nineteenth century.

Unfortunately, clashing personalities and other difficulties cost them their marriage. Zina left him, contributing to a nervous breakdown he experienced in 1875. Though they were separated, they didn't divorce until 1883, two days before his marriage to his second wife, Juliette Annette Froissy Pourtalai of Nancy, France, whom he met in 1876. This love affair, which he was having with Juliette while still married to Zina, was believed by some to have damaged his academic standing and led to the estrangement of his friends and relatives.

Others believed that Peirce wasn't the professor type, even though he was considered a vital formative factor in the lives of some of his more progressive students. Often balancing on the fine line between genius and insanity, Peirce had a difficult time making himself clear to large groups of people. His friend and fellow colleague, William James, saw his lectures as "flashes of brilliant light relieved against Cimmerian darkness."² Many found him quick-tempered, describing him as "highly emotional, easily duped, and forgetful of his appointments and personal appearance." Others described him as spoiled, obnoxious and conceited. Among the latter was a future president of Harvard, Charles William Eliot, who could never be persuaded to appoint Peirce to a professorship.

Peirce turned, then, to other pursuits. He worked for the Harvard Observatory from 1867-1875 and from research accomplished at the observatory, Peirce published his only work, *Photometric Researches in*

1878.

Peirce was assigned superintendent of a survey within the *U.S. Coast and Geodetic Survey (USC&GS)* in 1867. (The USC&GS survives to this day as part of the *National Oceanographic and Atmospheric Administration*, or NOAA.). By 1872 he was in charge of the pendulum and gravity operations within the USC&GS. IN 1876 while with the USC&GS he created the quincuncial map projection, which creates an accurate projection of the earth's surface on a flat map surface. Evolving through the decades, this basic cartographic tool is still used today as an international air route chart. With the USC&GS he traveled throughout the United States and Europe and gained world recognition for his originality and accuracy in pendulum work. Peirce also determined the length of a meter from a wavelength of light in 1879 and in 1884 he was assigned special assistant to gravity research with the USC&GS. He resigned from the agency in 1891 after Congress discontinued funding for the pendulum studies. He received no government pension. From then on he focused mainly on writing.

Peirce believed that every educated man should study mathematics because it develops the mind's power of imagination, abstraction, and generalization. Unlike his father, he wasn't a great contributor to the field of mathematics. Yet, many believe that Peirce could have made great contributions to the field of mathematics, even though he published very few papers on the subject. What he did contribute was the copula of *inclusion* (the most important symbol in the logic of classes.) Peirce also developed two new logical algebras, two new systems of logical graphs, some contributions to probability theory, and a series of "existential graphs" that represented logical relationships. The significance of these existential graphs, however, wasn't recognized until the development of a computer-based representation of graphical inference. A version of his graphs is currently being used by computer scientists around the world as a knowledge representation schema for artificial

intelligence applications.⁴

To many his philosophy was considered revolutionary. To others he appeared to be a receding horizon. "There are depths within depths. The closer you get to him, the farther he moves away from you."⁵ Charles Peirce saw philosophy not as a set of doctrines or a collection of wise sayings, but more as an attempt to settle theoretical questions by working from science. Compared to Ralph Waldo Emerson, Peirce was a new brand of philosopher for the 19th century who used precise methods and logic to deal with philosophical problems at the foundations of mathematics and scientific method. His writing style was complex. He often tried to create new terms in his attempt to articulate new ideas, trying to cover vast fields in limited space. He was so talented that he was capable of writing a question in one hand while answering it with the other.

In 1887 Peirce moved to Pike County, Pennsylvania, "the wildest county in the northern states."⁶ Peirce was a prolific writer and composed a majority of his writings after leaving the Coast and Geodetic Survey. On his country estate in Milford, which he purchased with his second wife, Juliette, Peirce composed thousands of words a day. He called his home Arisbe after the Greek town south of Hellepont, a colony of Miletus, home of the first philosophers of ancient Greece. It was an old farmhouse, which he and Juliette renovated and expanded many times with an eye for something vast. Ultimately his house became a living metaphor for his intellectual life. In the twenty-seven years he spent there he sought to answer questions about the origins of the universe and many spheres of knowledge. On the search for solutions he created some of his best work and ideas.

When the house was first purchased it consisted of a fifty-acre farm and an adjacent tract of eighty acres known as the "Quick Saw Mill" property, and another tract of 1,850 acres. Charles and Juliette hoped to turn the house into a summer resort for intellectual

elites. Peirce wanted to create an "institution for the pursuit of pure science and philosophy which shall be self supporting."⁷ He wanted Arisbe to be a place where research and education would be of equal importance. With high ambitions and little means, Juliette sold the land piece by piece in order to construct various additions onto the house, believing that personal success would come from such expansion. Peirce, himself, engineered most of the additions using complicated mathematical equations to work out floor joist deflections and such. However their only income at the time came from Peirce writing definitions for the Century Dictionary and an occasional review for magazines such as The Nation. In the end the house became too big and began to deplete what little funds they had.

To the philosophical world Charles Peirce is considered the father of pragmatism, a method of sorting out conceptual confusions by relating meaning to consequences. While still in Cambridge, he met with the Metaphysical Club whose members included famous philosophers such as Oliver Wendell Holmes, Chauncey Wright and William James. With these men Peirce fabricated the theory of pragmatism that would later develop into a school. The idea of pragmatism is considered by some philosophers to be a uniquely American style of philosophy. Some equate it to being the philosophy of a businessman in a business-oriented nation.⁸ However, he received no credit for the formulation of pragmatism until much later when William James first used the theory in a public presentation in 1898.

What is most intriguing about Peirce is that because his writing habits were so fruitful, even present day scholars of philosophy can witness the evolution of his thinking style, theories and ideas. Besides pragmatism, other theories that he is recognized for are fallibilism, tychism, agapism and synechism. *Fallibilism* is the thesis that "no inquirer can ever claim with full assurance to have reached the truth, for as time advances, new evidence and information may arise that may discredit one's previous theories and system of belief." *Tychism* is the belief that

"chance is really operative in the universe." *Agapism* is the thesis that "love, or sympathy has real influence in the world and in fact is an evolutionary agent."⁹ *Synechism* is the theory that "continuity prevails and that the presumptions of community are of enormous methodological importance for philosophy." Peirce considered *Synechism* to be his real contribution to philosophy.

One of his better known theories is *semiosis*, a general theory of information, representation, communication and interpretation. *Semiosis* is a form of logic with application beyond the traditional domain to which logic is restricted. In essence Peirce rationalized that "all ideas could be seen as signs and then proceeded to come up with categories of signification, detailing the way a sign related both to the object it signifies and to the mind that is attempting to interpret it."¹⁰ According to Peirce, "if there were no signs there is no relation between a mind and the rest of the world." Thinking consists of never-ending sign interpretation. *Semiosis* is primarily oriented toward communication rather than language and is different from *semiotics*, which was developed by extrapolations from the linguistics of Ferdinand de Saussure.

By the early twentieth century Peirce was living in poverty with only occasional monetary contributions by his friend William James and various appreciative students. Because of James' help, Peirce adopted the middle name Santiago (*St. James* in Spanish). By 1909 Peirce was ill with cancer and was taking a grain of morphine a day to fight the pain. Still, despite the pain, he continued to write into the night. Some claimed he had the "persistence of a wasp in a bottle."¹¹

On April 19, 1914, Peirce died of cancer, surrounded by piles of unpublished works. Peirce was never fully appreciated until decades after his death. Harvard University purchased many of his papers from Juliette. They arrived in sixty-one unorganized boxes. Whatever papers remained in their Milford residence, including household objects,

were burned in a bonfire on the front lawn following Juliette's death and the resale of the property. People made futile attempts at organizing his writings, which were unpaginated, disordered and lacked dates and numbers. Eventually, two American philosophers, Charles Hawthorne and Paul Weiss, believed they found a connection and then began to publish his writings in 1931.

Charles Peirce was considered a philosopher's philosopher. His work is now entering the mainstream in intellectual circles and universities. A handful of universities throughout the world have established research projects in his honor, such as the Peirce Edition Project at Purdue University of Indiana. A man ahead of his time, he is studied more for his unparalleled anticipation of emerging themes in the world today, rather than for his historical influence.

In 1962 the U.S. Coast and Geodetic Survey commissioned a ship named in his honor, *GSS Peirce*. Under the auspices of various organizations such as the National Park Service, the Peirce Edition Project, and the Peirce Society, his ideas are being preserved, studied and promoted for future application.

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