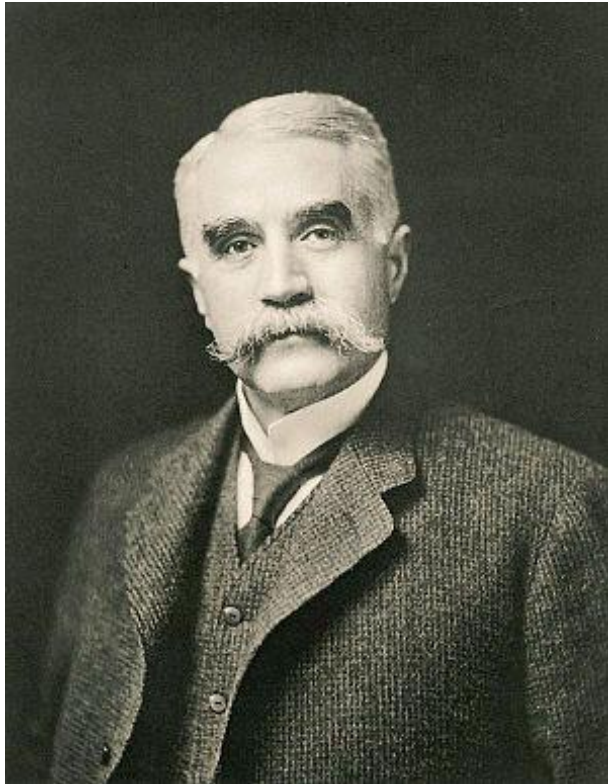


Brush, Charles Francis, 1849-1929

Dates:

birth 1849-03-17
death 1929-06-15

Biographical notes:



Charles F. Brush, Sr., (1849-1929) prominent Cleveland, Ohio inventor, scientist, entrepreneur and philanthropist best known as the inventor of the arc lamp.

Graduated from the University of Michigan in 1869 and returned to Cleveland as a mining engineer.

Worked as an analytical chemist (1870-1873) and then began to experiment with electricity. By 1877 he devoted all his time to the study of electricity and developed the Brush electric dynamo and the Brush Electric Arc Light.

In 1880, he founded the Brush Electric company. He was active in philanthropy and endowed the controversial "Brush Foundation" for the study of Eugenics, when, within a week, he lost both his granddaughter and his son to blood poisoning. He won many awards including the French Legion of Honor, the Rumford medal, Edison medal, Franklin Metal, and three honorary doctorates.

Charles F. Brush, Sr., was born on March 17, 1849, in Euclid, Ohio, a suburb of Cleveland. The second youngest child of Isaac and Delia Phillips, Brush had six sisters and two brothers. As a child, Brush was fascinated with science, especially electricity. By the age of twelve, he had built static electric machines, batteries, electro-magnets, induction coils and small motors. Brush continued his work with electricity at Cleveland's Central High School, where he began to experiment with the arc light. Finishing high school in 1867, Brush continued his education at the University of Michigan. Since there was no course in electricity or electrical engineering, he studied mining engineering, one of two science degrees offered at Michigan at the time. Despite this lack of formal studies in electricity, his college education gave him the solid foundation required for his later research in the field.

In 1869, Brush graduated from Michigan, completing the four-year course in two years. He returned to Cleveland, becoming an analytical and consulting chemist. His considerable success in a business venture marketing Lake Superior iron and iron ore now enabled Brush to spend greater amounts of time in his electrical research.

Fascinated by Brush's dream of an affordable electrical lighting system, childhood friend George Stockley, head of the Cleveland Telegraph and Supply Company, provided further funding for Brush's electricity experiments.

Brush saw three components to his electrical lighting system: the dynamo, providing the power; the arc light, providing the light; and the storage battery, providing supplementary power. Brush tackled the dynamo first, which he considered the key to his electrical lighting system. In 1878, his dynamo received an endorsement from the Franklin Institute, based on a series of performance tests of similar machines on the market.

The tremendous increase in sales of the Brush dynamo resulting from this endorsement allowed Brush to tackle the arc light and storage battery stages of his research. His inventions proved successful and in April 1879, Brush contracted with the city of Cleveland to light Monumental Square using his arc lamps and dynamos. This display was also noteworthy for his idea to power the lights from a central location. In December 1880, Brush repeated his success when he lit portions of New York City's famed Broadway Avenue.

By 1880, the Cleveland Telegraph and Supply Company had changed its name to the Brush Electric Company. Brush gave the company exclusive rights to manufacture and sell his inventions. The royalties he earned made him very wealthy, but as the decade progressed other competitors, most notably the Thomson-Houston Electric Company, began to cut into his profits.

Business continued to decline and Brush decided to sell his shares of the Brush Electric Company to The Thomson-Houston Electric Company in 1889. With substantially more wealth because of this sale, and freed from business concerns, Brush effectively retired from the field of electrical research. He was marginally involved in the field, as patent disputes regarding his storage battery designs continued into the next decade. In 1892, The Thomson-Houston Electric Company merged with the Edison General Electric Company to form General Electric.

Brush was an astute business man and turned his attention to other ventures, most notably as a financial backer to Linde Air Products Company. In addition, he, along with his son, Charles, Jr., and family friend Charles Baldwin Sawyer, established the Brush Laboratories Company in 1921. The company specialized in the commercialization of beryllium and the acoustic use of Rochelle salt crystals.

For the most part, however, Brush turned his attention to scientific research in his personal laboratory constructed in the basement of his Euclid Avenue home. In particular, he labored over his experiments regarding the kinetic theory of gravitation and attempts to prove the existence of ether.

At the time, ether was thought to be a gas which occupied space. Brush first experimented with gases, believing that if ether did exist, its ability to transmit heat was checked by gases at high pressure. In another attempt to prove the existence of ether, Brush surmised that gravity could be explained by action of ether, formulating a kinetic theory of gravitation. Brush believed he found scientific evidence to support his theories through his experiments, but his critics were skeptical. Brush hired the U.S. Bureau of Standards and General Electric to corroborate his finding, but they were unsuccessful.

Brush was actively involved in giving his time and money to many educational and charitable organizations in and around Cleveland, Ohio. He was a trustee of The Case School of Applied Science, Western Reserve University, University School, The Cleveland School of Art, and Lakeview Cemetery. He gave financial support to such organizations as the Cleveland Museum of Art, Trinity Cathedral, and the Cleveland Orchestra, and was a philanthropist in his own right.

In 1928, Brush established the Brush Foundation in memory of his son, Charles F. Brush, Jr. With his gift of \$500,000, Brush directed the Foundation to fund research in the field of eugenics and to study the problems of human overpopulation.

Brush married the former Mary Morris (1854-1902) on October 5, 1875. They had three children: Edna (1880-1930), Helene (1884-1935), and Charles, Jr. (1893-1927). In 1880, he began construction of a mansion at 3725 Euclid Avenue for his growing family. Completed in 1884, the home on "Millionaire's Row" reflected the stature of a man with his wealth. A year after his death in 1929, the home was demolished according to his wishes.

Over the course of his eighty years, Brush received many awards and honors. These included honorary degrees from Western Reserve University (1880), Kenyon College (1903), The University of Michigan (1912) and The Case School of Applied Science (1928). He was awarded the French Legion of Honor (1881), the Rumford Medal of the American Academy of Arts and Sciences (1889), the Edison Medal of the American Institute of Electrical Engineers (1913), and the Franklin Medal of the Franklin Institute (1928). In 1928, a high school in Lyndhurst, Ohio, a suburb of Cleveland, was named in honor of Charles Brush. Its school mascot was, and still is, "the Arcs".

Information for this biography was taken from Harry Eisenman's 1967 dissertation, "Charles F. Brush: Pioneer Innovator in Electrical Technology."