

Biographical Encyclopedia of Astronomers

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Cannon, Annie Jump

Born Dover, Delaware, USA, December 11, 1863

Died Cambridge, Massachusetts, USA, April 13, 1941

Annie Jump Cannon, the "Dean of Women Astronomers," American astronomical computer, classified spectra of a quarter of a million stars on a system partially of her own design.

Cannon's father, Wilson Lee Cannon, was a shipbuilder and lieutenant governor of the state of Delaware. Her mother, Mary (Jump) Cannon, was interested in astronomy and had taken a course in

astronomy at the Friends' School. Annie recollected a childhood marked by many hours with her mother studying the constellations. She attended Wellesley College from 1880 to 1884 and distinguished herself in physics and astronomy. Professor Sarah Whiting, a pioneering woman in science, encouraged Cannon to pursue spectroscopy.

It is believed that Cannon's deafness resulted from exposure to the harsh winter cold during her first year at Wellesley. She learned to use a hearing aid and to speechread to deal with her progressive loss of hearing. Her deafness became very severe by middle age. At astronomical conventions, she preferred one-to-one conversations. Fellow scientists noted that she was almost completely deaf without the aid, and some ventured that this fostered her great power of concentration

In 1894, one year after her mother died, Cannon returned to Wellesley to assist with X-ray experimentation. Following the advice of Edward Pickering, the director of the Harvard College Observatory, she then pursued studies at Radcliffe, and he appointed her to the observatory staff in 1896. She would spend her entire career there

During her early years at the observatory, Cannon sharpened her skills in studying variable stars. In 1911, she became curator of astronomical photographs. One of the most extensive efforts to classify the stars was Pickering's Henry Draper Catalog, which provides the positions, magnitudes, and spectra of 225,300 stars. That invaluable reference for astronomers covers the heavens from pole to pole for all stars brighter than the eighth magnitude, as well as many fainter stars, and provides data on distances, distributions, and motions. Scientists investigating the colors, temperatures, sizes, and compositions of stars frequently refer to the Henry Draper Catalog for its spectral information. Developing the catalog was a colossal challenge; nearly a quarter of a million stars had to be classified.

After the equipment was readied in both hemispheres, Pickering himself chose Cannon as the principal investigator for the project

In this capacity, she not only identified, recorded, and indexed the data on the stars but also supervised the publication of all nine volumes. Cannon personally examined every single one of these spectra.

When Cannon began her classification of the stars, she revised the symbols used for the spectral types. Originally, Williamina Fleming had used letters of the alphabet, and Antonia Maury employed Roman numerals. Cannon reordered the classes in more specific and subtle terms of decreasing surface temperature. The Draper classification scheme she devised was introduced

in her *Catalogue of the Spectra of 1122 Stars*, and it was adopted internationally. Only slight modifications have been made to the system since

Cannon was the first woman to receive the Henry Draper Medal for "notable investigations in astronomical physics." Her contributions in the field of spectroscopy were unsurpassed in quantity. Probably no other single observer in the history of science gathered so great a mass of data on a single system. Cannon believed patience, not genius, was responsible for her success. Her pioneering work has been validated for its thoroughness in the Henry Draper Catalog.

Cannon examined photographs of the stars near the South Celestial Pole for years, discovering many variable stars and novae. Throughout her career, she classified one-third of a million stars and discovered more than 300 variable stars, 5 novae, and many stars with peculiar spectra

Cannon won many honors for her work. William Campbell (1941) called her the "world's most notable woman astronomer." In 1925, she received an honorary Doctor of Science degree from Oxford University, the first woman recipient in its 600-year history. Other honorary degrees were conferred upon her from the University of Groningen in the Netherlands, the University of Delaware, Oglethorpe University, and Mount Holyoke College. Wellesley presented her with the degree of Doctor of Laws in 1925. Cannon was an honorary member of the Royal Astronomical Society in England, one of only six people ever to receive such status since the Society's establishment in 1820. In 1938, she was appointed William Cranch Bond Astronomer for her distinguished service at the Harvard College Observatory

The Ellen Richards Research Prize was awarded to Cannon in 1932. She used the money to endow the Annie J. Cannon Prize of the American Astronomical Society (AAS) (administered by the American Association of University Women for several years, but since 2004 again administered by the AAS). It is to be given every other year (annually, 1988–2004) to an outstanding woman astronomer. The first recipient was Cecilia Payne-Gaposchkin

As is too often the case, the honors received by Cannon came primarily from outside the Harvard College Observatory. Although she encountered the same discrimination that challenged other women of her time, Cannon was also a deaf woman during America's brief flirtation with Social Darwinism. Thus, she faced additional barriers to her advancement and professional recognition. Her status as a "defective," openly discussed in the correspondence of several leading eugenicists in the early 1920s, seems to have prevented her from being nominated as a member of the National Academy of Sciences. Pickering himself did everything in his power to gain her recognition. In addition to crediting her work in his reports, he wrote to President Lowell in 1911, encouraging him to appoint her Curator of Astronomical Photographs (replacing Fleming) and to

give her a corporation appointment. Lowell did not give Cannon the appointment. Harlow Shapley, Pickering's successor at the observatory, also felt strongly that Cannon deserved greater recognition at Harvard. To grant her further visibility, Shapley encouraged other universities to award Cannon honorary degrees.

It was not until 1938, 3 years before her death, that Cannon received the William Cranch Bond Astronomer Award and a corporation appointment from Harvard. A moon crater is named in her honor. Cannon was, according to Dorrit Hoffleit, the happiest person she ever met.

Harry G. Lang

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