Cannon, Annie Jump

Complete Dictionary of Scientific Biography

(*b*. Dover, Delaware, 11 December 1863; *d*. Cambridge, Massachusetts, 13 April 1941),

astronomy.

Miss Cannon's father, Wilson Lee Cannon, was a man of wide influence who became state senator in Delaware; her mother was Mary Elizabeth Jump Cannon. When Miss Cannon entered Wellesley College in the class of 1884, she became one of the first girls of her native state to go away to college. In 1894 she returned to Wellesley for graduate study in mathematics, physics, and astronomy. The following year she enrolled as a special student in astronomy at Radcliffe College, probably at the suggestion of Edward C. Pickering, who had already employed several talented women astronomers at Harvard College Observatory. Miss Cannon joined the staff at Harvard in 1896 and worked there for the rest of her life.

Miss Cannon quickly recognized the immense opportunity offered by the study of astronomical photographs, an endeavor in which Harvard Observatory had taken a foremost position under Pickering's aggressive leadership. Much of her early work dealt with variable stars, but her greatest contributions were in the field of stellar spectral classification. On the photographic plates she discovered more than 300 variable stars, and a large number of these were detected from their spectral characteristics.

In the early work at Harvard, the spectra of stars had been sorted into various groups designated by the letters A, B, C, and so on. Miss Cannon developed the definitive Harvard system of spectral classification by rearranging these groups, omitting some letters, adding a few, and further subdividing the others. Her work proved that the vast majority of stars are representatives of but a few species; and she also demonstrated that these few spectral types, with rather rare exceptions, could be arranged in a continuous series.

In 1901, after five years of research, Miss Cannon published a description of the spectra of 1,122 of the brighter stars, a volume that proved to be the cornerstone on which her larger catalogs were based. *The Henry Draper Catalogue*, published as volumes **91–99** of the *Annals of Harvard College Observatory*, is Miss Cannon's outstanding contribution to astronomy; it contains spectral classifications of virtually all stars brighter than ninth or tenth magnitude—a colossal enterprise embracing 225,300 stars.

Although Miss Cannon began classifying spectra in her first year at the observatory, the classifications for *The Henry Draper Catalogue* were made in the relatively brief interval from 1911 to 1915; but because checking and arranging the material for publication required several additional years, the final volume was not issued until 1924. Unsated, she continued her work, publishing about 47,000 additional classifications in the *Henry Draper Extension* (*Annals*, **100** [1925–1936]) and several thousand more in the *Yale Zone Catalogue* and *Cape Zone Catalogue;* another 86,000 were published posthumously in the *Annals* (**112** [1949]).

Miss Cannon's ability to classify stellar spectra from low-dispersion objective prism plates was quite phenomenal: her rate of more than three stars a minute and her ability to duplicate the classifications later also attest to her unusual skill and determination. While she came to recognize at a glance the characteristics that placed a star in the general sequence, she rarely failed to note the peculiarities in the spectrum. Cecilia Payne-Gaposchkin has remarked that "Miss Cannon was not given to theorizing; it is probable that she never published a controversial word or a speculative thought. That was the strength of her scientific work—her classification was dispassionate and unbiased."

From 1911 Miss Cannon was curator of astronomical photographs in charge of the ever-growing collection of Harvard plates. In 1938 she became the William Cranch Bond Astronomer, one of the first women to receive an appointment from the Harvard Corporation. Her personal charm and cheerful excitement conveyed a spirit of enthusiasm and evoked the admiration of all who knew her, and she became universally recognized as the dean of women astronomers. Throughout her career she was almost completely deaf unless assisted by a hearing aid, a handicap that must have contributed to her immense powers of concentration.

Among her numerous honorary degrees was the first honorary doctorate awarded to a woman by Oxford University. She was for a while the only woman member of the Royal Astronomical Society—an honorary member, because women were not then admitted to regular membership. She was one of the few women ever elected to the American Philosophical Society. In 1931 the National Academy of Sciences awarded her the Draper Gold Medal, and in 1932 she received the Ellen Richards Research Prize, which—with characteristic generosit—she turned over to the American Astronomical Society to establish the Annie Jump Cannon Prize for women astronomers.

BIBLIOGRAPHY

For the most part Miss Cannon's publications appeared in the *Annals of Harvard College Observatory* (note references in text). Her daily work is recorded in 201 record books preserved at Harvard College Observatory.

On Miss Cannon or her work, see Leon Campbell, "Annie Jump Cannon," in *Popular Astronomy*, **49** (1941) 345–347; Owen Gingerich, "Laboratory Exercises in Astronomy—Spectral Classification," in *Sky and Telescope***28** (1964), 80–82; and Cecilia H. Payne-Gaposchkin, "Miss Cannon and Stellar Spectroscopy," in *The Telescope*, **8** (1941), 62–63.

Owen Gingerich