

Biographical Encyclopedia of Astronomers

© 2007 Springer

Mitchell, Maria

Born Nantucket, Massachusetts, USA, August 1, 1818

Died Lynn, Massachusetts, USA, June 28, 1889

Maria Mitchell, the first woman astronomer in the United States, paved the way for women in science. She trained an entire generation of women astronomers who followed her into research as well as teaching. Mitchell played a vital role in the 19th century's more enlightened attitudes about the role of women in American society and science

One of ten children born to William and Lydia (*née* Coleman) Mitchell, Mitchell was raised in a favorable environment with the intellectual lives of her parents. As members of the Nantucket Quaker Meeting, they encouraged each of their children to read extensively and engage in thoughtful dialogue about what they were learning. At an early age, Mitchell began to help her father with his astronomical observation and computing. Her father was well-known as an astronomer who could be trusted to rate chronometers for the whaling vessels and merchant ships calling at Nantucket. Using a platform on top of their home, and later a similar structure on top of the Pacific Bank where William served as a teller, their observing was not limited to timekeeping work but included various objects in the Solar System and sweeping for comets

Mitchell's formal education was limited to a few years in a school run by her father, followed by a few years at the Reverend Cyrus Peirce's school. She showed a special aptitude for mathematics from an early age and learned under Peirce's guidance to the extent of his ability. For several years, Mitchell assisted Peirce in the operation of his school before starting her own career as a teacher in a school she organized in 1835. The following year, she accepted an additional role as librarian of the new Nantucket Athenaeum.

Mitchell experienced more frequent contact with women in the community as a librarian but also enjoyed more time for her own studies. She taught herself to read French and German and then mastered the mathematical works of Pierre de Laplace, Joseph Lagrange, and Carl Gauss while continuing astronomical observations with her father when weather permitted. While sweeping the skies on the night of October 1/2, 1847, she discovered a comet near Polaris, now known as C/1847 T1 (Mitchell). This was her fourth independent discovery, but the first for which the priority was properly hers. Her father immediately reported it to William Bond, director of the Harvard College Observatory. Other independent discoveries of the same comet were made within days, including by the director's son, George Bond, who conceded he had narrowly missed making the discovery himself that same evening. However, William's immediate action in posting the letter to Bond ensured that the comet was credited to his daughter. The discovery by the young American woman brought her substantial notoriety in Europe as well as America. Mitchell was awarded a gold medal by King Frederick of Denmark.

The fame gave Mitchell the opportunity to increase acquaintances among leading American scientists like Alexander Bache, director of the United States Coast Survey (USCS), and

Charles Davis, newly appointed superintendent of the United States Navy's Nautical Almanac office in Boston. Within two years, Davis offered her additional employment as a computer for the new *American Ephemeris and Nautical Almanac*. Mitchell computed ephemeris data for the planet Venus from her home in Nantucket. Bache invited Mitchell to spend one summer in Maine working with USCS observers. She continued in that dual employment as librarian and astronomical computer from 1849 until 1865. With her additional income, Mitchell traveled in the United States, learning firsthand how privileged her special position on Nantucket was compared to women in other parts of the country. Female self-development and self-reliance was encouraged at the peak of whaling and maritime activity in Nantucket, like nowhere else in the United States at the time.

Mitchell had more travel opportunities when she was asked to travel as a tutor and chaperone for a Chicago banker's daughter in 1857. Mitchell accompanied the young woman to England where she was welcomed as a visitor to the Greenwich and Cambridge observatories. When the banker's daughter was forced to return to Chicago due to her father's financial crisis during the financial panic of 1857, Mitchell stayed in Europe and visited many notable astronomers, including Angelo Secchi, Caroline Herschel, and Mary Somerville

On her return to America, Mitchell received a 5-inch Clark refractor equipped with a micrometer as a gift "from the women of America" in recognition of her achievements as a woman astronomer. This fine instrument intensified Mitchell's desire to continue in her chosen career as an astronomer. After her mother died, Mitchell and her father moved to Lynn, Massachusetts. She was soon interviewed by a trustee for Matthew Vassar's endowment to establish the first women's college in the United States. As one of the best-known women in America, Mitchell was a natural choice for the Vassar College faculty in New York, even though she lacked any formal educational credentials. Mitchell quickly accepted the position and moved with her father to the campus near Poughkeepsie, New York, in 1865

The Vassar College Observatory was equipped with a 12-inch Fitz refractor, one of the largest telescopes in the United States. Mitchell was eager to use the new instrument and valued the opportunity to influence the higher education of women. Her astronomy classes, though rigorous, were popular and well-attended. Her astronomy classes and night observing sessions with the telescope created educational opportunities unlike those available to women at any other institution. With the help of her students, Mitchell conducted visual observations of double stars and planets. Thus, Mitchell's later career in astronomy was primarily as a teacher who empowered women in astronomy and the sciences rather than as a researcher

Several of Mitchell's students were employed in the field of astronomy. The most noteworthy of these include Antonia Maury, Caroline Furness, Margareta Palmer, and Mitchell's successor at Vassar College, Mary Whitney (1847–1921). More importantly, her students who chose to pursue careers in astronomy were important assets for the expansion of American astronomy through the first few decades of the 20th century. Working for Edward Pickering as "computers" at Harvard College Observatory, and later at Lick and Mount Wilson Observatories, they contributed greatly through their interpretation, classification, and measurement of spectra, as well as the more routine computations necessary for observational-data reduction

Mitchell took a second tour in Europe in 1873, but while she visited noteworthy astronomers, she was more interested in the status and education of women. The trip had a marked influence on her subsequent life decisions, and she became more involved in improving the status and opportunities for women in the United States. She helped organize and served as president of the American Association of Women, assumed leadership roles in organizations such as the Social Sciences Association, and was the first woman accepted as a member of the American Association for the Advancement of Science.

After she resigned in 1888 from Vassar College, Mitchell returned to her home, where she died. During her lifetime, Mitchell was honored by her election to the American Academy of Arts and Sciences and to the American Philosophical Society.

Thomas R. Williams

Selected References

Belserene, Emilia Pisani (1986). "Maria Mitchell: Nineteenth Century Astronomer." *Astronomy Quarterly* 5, no. 19: 133-150

Hoffleit, Dorrit (1983). *Maria Mitchell's Famous Students*. Cambridge, Massachusetts: American Association of Variable Star Observers. (In celebration of the 75th anniversary of the Maria Mitchell Observatory.)

—— (1994). *The Education of American Women Astronomers before 1960*. Cambridge, Massachusetts: American Association of Variable Star Observers.

Keller, Dorothy J. (1974). "Maria Mitchell, an Early Woman Academician." Ph.D. diss., University of Rochester.

Kendall, Phebe Mitchell (comp. and ed.) (1896). *Maria Mitchell, Life, Letters, and Journals*. Boston: Lee and Shepard Publishers.

Kohlstedt, Sally Gregory (1978). "Maria Mitchell: The Advancement of Women in Science." *New England Quarterly* 51, no. 1: 39-63

Lankford, John (1997). *American Astronomy: Community, Careers, and Power, 1859–1940*. Chicago: University of Chicago Press, pp. 288–308.

Merriam, Eve (ed.) (1971). "Maria Mitchell. 1818–1889." In *Growing up Female in America*, pp. 75–90. Garden City, New York: Doubleday.

Wright, Helen. (1949). *Sweeper in the Sky: The Life of Maria Mitchell*. New York: Macmillan.