

Biographical Encyclopedia of Astronomers

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Somerville, Mary Fairfax Greig

Born Jedburgh, Scotland, 26 December 1780

Died Naples, Italy, 29 November 1872

Mary Somerville was the first woman scientist to win an international reputation entirely in her own right rather than by working in association with a father, husband, or brother. Self-educated in mathematics and astronomy, she wrote many textbooks dealing with celestial mechanics, geography, and the sciences in general. She was the author of the first paper by a woman ever published in the *Proceedings of the Royal Society* (London).

Mary Somerville was born Mary Fairfax, the daughter of lieutenant, later vice admiral, Sir William George Fairfax. Having seen her husband off on a voyage, her mother, Margaret (née Charters) Fairfax, gave birth to Mary while traveling from London back to the family home in Fife, Scotland. Given no systematic formal education, Mary was educated by some of her more liberal family members and by her own efforts.

At age 13, Mary was taught painting in Edinburgh by Alexander Nasmyth, father of the engineer, astronomer, and telescope maker, James Nasmyth. A chance remark by Alexander Nasmyth that geometry was the basis for understanding perspective as well as the foundation of astronomy set her to the study of mathematics. She studied geometry from Euclid's *Elements*, with the aid of her younger brother's tutor. Her interests broadened to algebra as a result of finding mysterious symbols in the puzzles of a women's magazine, and her brother's tutor provided algebra texts. Her father worried that the strain of abstract thought would injure the tender female frame.

In 1804, when 24 years old, Mary married her distant cousin, Captain Samuel Greig. His father was a nephew of Mary's maternal grandfather. A member of the Russian navy, Greig took a post in London in order to marry Mary. Within two years the couple had two sons, but he died in 1807. According to Mary, her husband "had a very low opinion of the capacity of my sex, and had neither knowledge of, nor interest in, science of any kind."

With the death of her husband, Mary returned to Scotland as a widow with independent means. She took up mathematics, astronomy, and dynamics, encouraged by the circle of friends she had chosen. These included John Playfair (1748–1819), then professor of natural philosophy at Edinburgh, and William Wallace (1768–1843), then professor of mathematics at the Royal Military College. They guided her studies much as a doctoral student would be guided by a professor today.

In 1812, Mary married her second husband, William Somerville, also a distant cousin with naval connections. He was the son of her aunt Martha and her uncle Thomas Somerville. A doctor, William was interested in science and supportive of his wife's interests. Mary and William Somerville moved to London when he was appointed Inspector to the Army Medical

Board in 1816. He was later a physician at the Royal Hospital in Chelsea. When William was elected to the Royal Society, Mary Somerville gained access to a wide circle of prominent scientific acquaintances, including George Airy, Humphry Davy (1778–1829), John Herschel, William Herschel, Henry Kater, George Peacock (1791–1858), Thomas Young (1773–1829), and Charles Babbage (1792–1871). She frequently visited Babbage while he was designing his calculating machines. During a visit to Paris in 1817, Somerville met Jean Biot, Dominique Arago, Pierre de Laplace, Simon Poisson, Louis Poinsot (1777–1859), Emile Mathieu (1835–1890), and others.

Somerville began experiments on magnetism in 1825. She published her first paper, "The Magnetic Properties of the Violet Rays of the Solar Spectrum," in the *Proceedings of the Royal Society* in 1826. Aside from Caroline Herschel's astronomical observations, this was the first paper by a woman to be read at a meeting of and published by the Royal Society. She also wrote about the action of short-wavelength radiation on vegetable juices and about comets.

Somerville began translating Laplace's *Mécanique céleste* in 1827. When the book was published in 1831 under the title *The Mechanism of the Heavens*, it was more than a translation, containing a commentary on the mathematics used and filling in the gaps in mathematical development. According to Nathaniel Bowditch, in a remark echoed by many a student about many a textbook, "I never come across one of Laplace's 'Thus it plainly appears,' without feeling sure that I have got hours of hard study before me, to fill up the chasm and show how it plainly appears." When Somerville dined with Laplace in Paris in the early 1830s, he paid her a compliment during the conversation. Confused by her name from her earlier marriage, Laplace observed that only two women had ever read the *Mécanique céleste*; both being Scottish women—"Mrs. Greig and yourself."

During her visit to Paris, Somerville wrote her second book, *The Connection of the Physical Sciences*, published in 1834, which treated celestial mechanics and other sciences. The book was published in several editions. In the 1836 edition, she discussed the problematic accuracy of the orbits of the outer planets, suggesting, "...[T]he discrepancies may reveal the existence, nay, even the mass and orbit, of a body placed forever beyond the sphere of vision." This passage led John Adams, by his own admission, to begin calculations in 1843 that led to the discovery of Neptune.

Mary Somerville was elected an honorary member of the Royal Astronomical Society at the same time as Caroline Herschel, the first two women members in 1835. She was elected to honorary membership of and offered medals by many societies, and awarded a significant civil pension. In 1838, William Somerville's health deteriorated, and the family went to the warmer climate of Italy. There she wrote *Physical Geography*, which was published in 1848 and remained in print for 50 years. Another mark of distinction for that work was that it was admonished from the pulpit in York Cathedral. She published *Molecular and Microscopic Science*, an account of chemistry and physics, in 1869 at the age of 89. William died in 1860. Her daughter Martha published Mary's autobiography in 1873.

Mary Somerville served as an inspired teacher and as a role model for aspiring women scientists. She supported women's education and women's suffrage; her signature was the first

on John Stuart Mill's 1867 petition to parliament for the right of women to vote. Somerville College in Oxford was named in her honor.

Paul Murdin

Selected References

Chapman, Allan (2001). *Mary Somerville and the World of Science*. London: Canopus.

Patterson, Elizabeth Chambers (1969). "Mary Somerville." *British Journal for the History of Science* 4: 311-339.

—— (1974). "The Case of Mary Somerville: An Aspect of Nineteenth-century Science." *Proceedings of the American Philosophical Society* 118: 269-275

—— (1979). *Mary Somerville, 1780–1872*. Oxford: Oxford University Press for Somerville College.

Somerville, Mary (2004). *Collected Works of Mary Somerville*, edited by James A. Secord. 9 vols. Bristol: Thoemmes.

Somerville, Mary and Martha Somerville (1873). *Personal Recollections from Early Life to Old Age, with Selections from Her Correspondence*. London: Murray