

# Somerville, Mary Fairfax Greig | Encyclopedia.com

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(*b.* Jedburgh, Roxburghshire, Scotland, 26 December 1780; *d.* Naples, Italy, 29 November 1872)

*scientific and mathematical exposition, experimentation on the effects of solar radiation.*

One of the foremost women of science of the nineteenth century. Mrs. Somerville was through her writings and example influential in gaining wider acceptance among a literate public for various nineteenth-century scientific ideas and practices and in opening new opportunities to women. Her notable career, spanning more than half a century, brought her in contact with many of the foremost scientific, literary, and political personages of Europe and America. Public recognition accorded her had profound and beneficial effects in advancing the cause of science and of Women's education and emancipation.

Through her father, Vice-Admiral Sir William George Fairfax, R.N., a hero of the Battle of Camperdown, she was connected with the distinguished Fairfax family of England that produced the great Cromwellian general Sir Thomas Fairfax, and the Fairfaxes of the Virginia Colony. Through her mother, Margaret Charters, his second wife, daughter of Samuel Charters, solicitor of customs for Scotland, she was related to several ancient Scottish houses, among them the Murrays of Philiphaugh, the Douglasses of Friarshaw, the Douglasses of Springwood Park, the Charterises of Wemyss, and [John Knox](#).

Fifth of their seven children (only three of whom survived to majority), Mary Fairfax was born in the manse at Jedburgh, the home of an aunt, Martha Charters Somerville, who later became her mother-in-law. Her childhood was spent in Burntisland, a small seaport on the Firth of Forth opposite Edinburgh. In a house sold to the Fairfaxes by Samuel Charters and still standing, her easygoing, indulgent mother thriftily reared four children—the eldest surviving son Samuel, Mary, and two younger ones, Margaret and Henry—on slim navy pay. Customarily in the Charters, as in many well-connected Scottish families, sons received excellent educations, attending university and entering the kirk, the legal profession, or service in the East India Company. For daughters, mastery of social and domestic arts and a minimum of formal book learning was considered sufficient. Mary's father, returning from a long period of sea duty, "shocked was to find... [his daughter] such a savage" hardly able to read, unable to write, and with no knowledge of language or numbers. He dispatched her, at the age of ten, to a fashionable, expensive boarding school at Musselburgh—a drastic step for a man of such strong Tory convictions. There for twelve months she had the only full-time instruction of her long life, emerging from the experience, she recounts in her autobiography, "like a wild animal escaped out of a cage" but with a taste for reading, home notion of simple arithmetic, a smattering of grammar and French, poor handwriting, and abominable spelling.

Over the next years she had occasional lessons in ballroom dancing, pianoforte playing, fine cookery, drawing and painting (under Alexander Nasmyth), penmanship, needlework, and the use of the globes. A lively and persistent mind, immense curiosity and eagerness to learn, supported by a robust constitution and quiet, unswerving determination, enabled her to take advantage of every opportunity for enlightenment. At Burntisland she had freedom to roam the Scottish countryside and seashore, observing nature at first hand. She read through the small family library, teaching herself enough Latin for Caesar's *Commentaries*. In Edinburgh during the winter months, family position brought her in contact with intellectual and professional circles and the rich artistic life of the Scottish capital. A charmingly shy, petite, and beautiful young woman—Edinburgh society dubbed her the "Rose of Jedburgh"—she delighted in the parties, visits, balls, theaters, concerts, and innocent flirtations that, with domestic and daughterly duties, filled the days of popular Edinburgh belles at the turn of the century.

Another and less conventional interest absorbed her during these years. Between the ages of thirteen and fifteen, the chance glimpse in a ladies's fashion magazine of some strange symbols, said to be "algebra," aroused her curiosity. None of her close relatives or acquaintances could have told her anything of the subject, even had she the courage to ask. Mrs. Somerville, in contrast to other scientific women of the nineteenth century, had no family incentive to investigate science or mathematics and no household exposure to these subjects. Her unguided efforts to learn something of this mysterious but strangely attractive "algebra" were fruitless until, overhearing a casual remark by Nasmyth, she was led to persuade her younger brother's tutor to buy for her copies of Bonnycastle's *Algebra* and Euclid's *Elements*, which she then began to study on her own. Discovering her reading mathematics, her father instantly forbade it, fearing that the strain of abstract thought would injure the tender female frame. This view was widely and long held and shared to a degree by Mrs. Somerville herself: she believed her injudicious encouragement of her oldest daughter's intellectual precocity had been a factor in the child's death at age ten. In the late 1790's Captain Fairfax's strictures against arduous mental effort binned with outspoken criticism of "unwomanly behavior"

by aunts and female cousins, Mary Fairfax to secret, intermittent applicat mathematics but sharpened her resolve to learn the subject.

In May 1804 she married a cousin, Samuel Greig, commissioner of the Russian navy Russian consul general in [Great Britain](#). Greig's father, Admiral Sir Samuel Greig, a nephew of her grandfather Charters, had been one of five young British naval officers who, at the request of empress [Catherine II](#), went to Russia in 1763 to reorganize her navy and had been chiefly responsible for the success of that undertaking. He and his English wife reared their children in Russia: their sons made careers in Russian service, and their daughters married into Russian families, but with Britain were never broken. Young Samuel, Greig, a captain in the Russian navy, traubed aboard Admiral Fairfax's ship and, on his marriage to the admiral's daughter, was given an appointment in London, where he and his bride lived his death in September 1807. at the age of twentynine. For Mary Greig, this period in London—away for the first time from family and Scotland—was a difficult one. She was much alone, and although she could read and study more freely; than ever before, her husband had. in her words, “a low opinion of the capacity of ... [the female] sex and had neither knowledge of nor interest in science of any kind.” After his death she returned; with their two young sons to her parents' home in Scotland.

With the newly acquired independence of widowhood and a modestly comfortable fortune she out openly to educate herself in mathatics, ignoring the ridicule of relations and acquaintances. The greater part of each day was occupied with her children, and her evenings with social and filial obligations: yet she read Newton's *Principia* and began the study of higher mathematic physical astronomy. Moreover, she found and encouragement among Edinburgh intellectuals [John Playfair](#) gave her useful hints on study A group of young Whigs in her social circle, them Henry Brougham. Francis Jeffrey, theHor ner brothers, and [Sydney Smith](#)—who had years earlier launched the successful *Edinburgh Review* and who urged, as social reforms, widned educational opportunities—became and rermained her champions, finding in this pretty, quid, and liberal-minded young widow the capacity and zest for learning that they asserted for her sex. Mrs. Somerville's most helpful mentor in these days was William Wallace, later professor of mathematics at Edinburgh. Wallace advised her by correspondence and rewarded her efforts with a silver medal for solving, in his *Mathematical Repository*, a prize problem, the first of many awards she would receive over the next sixty years.

In May 1812 Mary Greig married, as his second wife, her first cousin, William Somerviile son of the historian and minister at Jedburgh. Thomas Somerville. A cosmopolitan army doctor who had served in Canada, Sicily, and [South Africa](#), and an affable, generous, and intelligent man of liberal convictions, William Somerville, from the first, staunchly supported his wife' aspirations. Throughout their half century of marriage, until his death in 1860 in his ninetieth year, he was her invaluable aide, taking great pride and satisfaction in her fame. Soon after their marriage she began, at age thirty-three, to continue on her own a rigorous course of readings (laid out by Wallace) in French higher mathematics and astronomical science. At her husband's urging she also devoted an hour each morning to Greek and, when the young naturalist George Finlayson became tutor to her son woronzow Greig, she commenced the systematic study of botany. Together she and Somerville interested themselves in geology and mineralogy under the casual tutelage of their friends John playfiar. [Robert Jameson](#), and [James Hall](#). Among the causal tutelage of theirfriends John playfiar, Robert Jamson and [James Hall](#). Among their other Edinburgh intimates were [Sir James Mackintosh](#), [Sir Walter Scott](#), [John Leslie](#), James Gregory, and [David Brewster](#).

When in 1816 William Somerville was named to the Army Medical Board, the family moved from Edinburgh to London, their chief residence for the next twenty years. Through Scottish friends and connections they were immediately introduced into the best intellectual society of the British capital, where they were soon popular figures. Dr. Somerville became a Fellow of the [Royal Society](#). Mrs. Somerville's mathematical and scientific puruits made her a minor lioness. In 1817 on their first tour abroad, Biot and Arago, who had been charmed by her in London, introduced them to Laplace, Gay-Lussac, Bouvard, Poisson, Cuvier, Hauuml ü, and other French savants, who received them both as colleagues, entertained them during their stay in Paris, and afterward maintained friendly correspondences with the couple. In Switzerland the Somervilles were welcomed by Candolle, de La Rive, Prevost, and Sismondi; and in Italy by the English colony and various celebrated Italians. Many of Mrs. Somerville's friendships with scientific, literary, and political personages date from this time.

In London their familiar circle included the Henry Katers, the Thomas Youngs, the Alexander Marcets (Mary Somerville and Jane Marcet always held each other in affectionate esteem), Sir Humphry and Lady Davy (whom Mrs. Somerville had known in Edinburgh as Mrs. Apreece). the poets [Thomas Campbell](#), Samuel Rogers, and [Thomas Moore](#), [Maria Edgeworth](#). John Allen, the Misses Berry, [Harriet Martineau](#), Joanna Baillie and her family. Francis Chantrey, John Saunders Sebright, Henry Warburton, and, above all, [William Hyde Wollaston](#). From such natural philosophers she learned science directly, as they discussed their latest findings, described and demonstrated their newest apparatus, and shared their enthusiasms and ideas with fellow guests at the small, convivial gatherings typical of the day. In an age of gentleman amateurs, Mrs. Somerville's informal apprenticeship to these scientific masters was in many respects identical with the nurture of male scientists.

Her first paper, a report in *Philosophical Transactions* of some experiments she designed and carried out on magnetizing effects of sunlight, appeared in 1826; it was communicated to the [Royal Society](#) by her husband. This work, widely praised and accepted for some years, although its conclusions were later disputed and disproved, had a vitalizing effect on investigations of the alleged phenomenon. Ten years later Arago presented to the Acadéquacutemie des Sciences an extract from one of her letters as a paper entitled “Experiments on the Transmission of Chemical Rays of the Solar Spectrum Across Different Media.” which appeared in the *Comptes rendus*. Her third and final experimental paper, “On the Action of Rays of the Spectrum on Vegetable Juices” (1845), came out in *Abstracts of the Philosophical Transactions*. All her experimental work is characterized by rationality in approach, delicacy and simplicity in execution, and clarity in presentation. Her only essay for

a popular journal was a long one on comets in the December 1835 issue of *Quarterly Review*, soon after Halley's comet had been seen.

Research, writing, and study were always unobtrusively carried on in the midst of a full social life and numerous maternal and domestic responsibilities. In 1824 William Somerville was appointed physician to the Royal Hospital, Chelsea; and, with three children, they moved to Chelsea College, on the outskirts of London. Margaret, their oldest daughter, had died the previous year. In 1814 they had lost two children: the younger Greig boy at the age of nine, and their own only son, an infant, Of Mrs. Somerville's remaining offspring, her son Woronzow Greig, a successful and esteemed barrister, graduate of Trinity College, Cambridge, died in 1865 at the age of sixty, while her two daughters, Martha and Mary Somerville, both unmarried, survived their mother. She herself supervised the education of the girls, determined that they should not lack, as she did, for systematic learning. At the behest of Lady Byron, widow of the poet. Mrs. Somerville directed also the early mathematical studies of Ada Byron, later Lady Lovelace; the Byron and Somerville families were, from the mid-1820's onward, intimate friends.

In 1827 Henry Brougham wrote William Somerville to ask him to persuade his wife to put Laplace's *Mécanique céleste*, which she had studied in Edinburgh, into English for the Library of Brougham's Society for the Diffusion of Useful Knowledge. Unsure of her ability, she finally gave in to their urgings, provided the manuscript, if unsatisfactory, would be destroyed. A rendition rather than mere translation—since full mathematical explanations and diagrams were added to make Laplace's work comprehensible to most of its English readers—her treatise when completed in 1830 was too long for the Library series, Somerville, however, submitted it to their great friend J. F. W. Herschel, who urged the publisher [John Murray](#) to bring it out. Dubious of the success of a book on such a subject, Murray printed 750 copies in 1831, To his and Mrs. Somerville's amazement, *The Mechanism of the Heavens* sold well and won praise for her. It was put to use in advanced courses at Cambridge. Its preface—the necessary mathematical background—was reprinted in 1832 as *A Preliminary Dissertation on the Mechanism of the Heavens*; both it and the previous volume were immediately pirated in the [United States](#) and were used in Britain as textbooks for almost a century. The Royal Society hailed the work by voting to place a portrait bust of Mrs. Somerville in their Great Hall. Acclaim came also from the younger generation of British scientists, including Babbage, Brewster. Buckland, Faraday, Herschel. Lyell Murchison. Sedgwick, and Whewell. who gave her the same unstinting admiration, respect, and assistance their elders had bestowed, regarding her as the spokeswoman for science and offering her honors and opportunities unique for a woman.

Thus at age fifty-one Mary Somerville embarked on a professional career as a scientific expositor. Her gift for clear and cogent explanation, a quick and lively mind, access to the best scientific thought of the times, patience and perseverance, together with a sweet simplicity and charm of manner and a “womanliness,” which demonstrated that learning and comfortable domesticity could successfully combined, sustained this career for the next four decades. Mrs. Somerville was fortunate too in her times: industrialization had popularized notion of self-help, expanding opportunities, changes new freedoms. *Her second book. On the Cm km of the Physical Sciences*, a synthetical consideration of the mutual dependence of the physical sciences, came out in 1834 to even greater acclaim. The Royal Astronomical Society (1835) elected her and Caroline Herschel their first female honorary members. [Sir Robert Peel](#) her a awarded civil pension of £200 annually (later increased to £300 by Lord Melbourne) in recognition of work. The Royal Academy of Dublin (1834), the Société de Physique et d'Histoire Naturelle (Geneva, 1834). and the Bristol Philosophical institution (1835?) voted her honorary memberships la the ten editions of this work Mrs. Somervill put forward the newest, most penetrating, and auithori tative ideas and practices, avoiding fads and gim crackery. Clerk Maxwell, forty years afterward, classed the work as one important in advancing scientific thought through its insistence on viewing physical science as a whole. J. C. Adams attributed his first notions about the existence of Neptune to a passage he read in its sixth edition.

In the late 1830's her husband's health failed and the family migrated to Italy, where Mrs. Somerville spent the remaining thirty-six years of her life, a valued guest and brilliant part of the Italian scene during the Risorgimento. Not only was offered access to Italian libraries and scientific facillties. but she was given membership in six of the leading Italian scientific societies (1840–1845). Although, as the years passed, it became more and more difficult to stay abreast of British sci she managed through letters, visits, journals and books to keep in touch with major developments. In 1848, at age sixty-eight, she published her third and most successful book. *Physical Geography*, a subject which had always interested her deeply. Its seven editions brought her numerous honors: Victoria Gold Medal of the Royal Geographical society (1870); election lo the American Geographical and Statistical Society (1857), to the Indian Geographical Society (1870). and to five addi provincial Italian societies (1853–1857); several medals; and praise from Humbokldt. In this book, as in the *Connexion of the Physical Sciences*, Mrs. Somerville strongly endorsed the new geology of Lyell, Murchison, Buckland, and their school—a stand that brought her some public criticism.

Twenty-one years later, when she was eightynine, her final work. *On Molecular and Microscopic Science*, appeared in two volumes. It deals with the constitution of matter and the structure of microscopic plants. At this date its science was considered old-fashioned, but young [John Murray](#) published it out of loyalty to and affection for its author, on the recommendation of Sir [John Herschel](#), who had also been instrumental in persuading Mrs. Somerville to bring out her *Physical Geography*. The public received it with kindly interest and deference to its venerable creator. In the same year she was made a member of the [American Philosophical Society](#) (she had warm regard for Americans) and completed her autobiography—a vivid and spritely account of her life in Scotland, England, and Italy; of her visits to Switzerland, France, and Germany; and of the many interesting personages she had known. After her death her elder surviving daughter, Martha, published parts of this manuscript as *Personal Recollections From Early Life to Old Age of Mary Somerville* (1873).

In her later years Mrs. Somerville gave powerful but always temperate support to the cause of the education and emancipation of women. Hers was the first signature on [John Stuart Mill](#)'s great petition to Parliament for women's suffrage, solicited by Mill himself. An early advocate of higher education for women, many of her books were given after her death to the new Ladies College at Hitchin (now Girton College, Cambridge). Somerville College (1879), one of the first two colleges for women at Oxford, is named after her. Although frail and deaf in her last years, Mary Somerville's spirit and intelligence, her interest in friends, in the cause of women, and in science never faltered. At the time of her death, at ninety-two, she was revising a paper on quaternions.

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Elizabeth C. Patterson