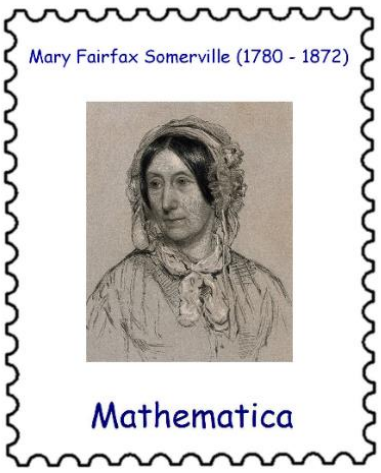
MARY FAIRFAX SOMERVILLE (December 26, 1780 – November 29, 1872)

by HEINZ KLAUS STRICK, Germany



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MARY grew up in Burntisland, a small town on the Firth of Forth, as the fifth of seven children of the Scottish naval officer (and later vice-admiral) WILLIAM GEORGE FAIRFAX and his wife MARGARET. Three of her siblings died at a young age.

As was common at that time, only the sons of the family received a comprehensive education that prepared them for university or a military career. The father was often absent for months and therefore hardly cared for his children. The mother believed that special school education for her daughters was unnecessary.

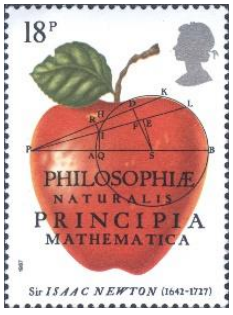
When the father came home again after a long absence, he discovered that his now 10-year-old daughter MARY could hardly read, write or do the maths. He was so shocked that he sent MARY to an expensive, poorly run boarding school for a year – it was the only full-time education of her life.

Glad that this time was finally over, she decided to read all the books that came into her hands in the home library. She taught herself Latin with the help of an annotated edition of *Caesar*.

In the following years she was prepared for her future role as a wife in her social class. In addition to the obligatory handicrafts and cooking lessons, this also included ballroom dancing, playing the piano, as well as drawing and painting.

One day she noticed strange symbols in an article in a women's magazine. She learned from her drawing teacher that this involved algebra. She obtained an algebra book and the *Elements* of EUCLID and worked through them with the support of her younger brother (who had received extensive instruction from a private teacher). When her father found out, he forbade her to do this because he was worried that *the strain of abstract thinking would hurt the delicate female physique*. Her mother and other female relatives also considered her interest in mathematics to be unfeminine behavior. Undeterred by this criticism, she secretly continued her self-study.

At the age of 24, MARY was married to SAMUEL GREIG, a distant relative who had previously served in the Russian Navy. When GREIG found a job in London, the couple moved to the British capital. The husband showed no understanding for his wife's scientific curiosity – but since he was often absent, she was able to continue her studies. When GREIG died after three years, MARY returned to Scotland with her two sons.



As a widow with a small fortune, she was now able to focus on the scientific topics that interested her whenever she had time. Encouraged by JOHN PLAYFAIR, Professor of Natural Philosophy at the University of Edinburgh, and with the support of WILLIAM WALLACE, later Professor of Mathematics at the University, she studied, among other things, NEWTON's *Principia* and the *Mécanique Céleste* by PIERRE-SIMON LAPLACE. She won a silver medal in a mathematical journal competition.

In 1812 MARY married her cousin, the well-travelled military doctor WILLIAM SOMERVILLE. Four more children were born in this marriage. Unlike her first husband, SOMERVILLE supported his wife's scientific interests and encouraged her to learn ancient Greek. PLAYFAIR sparked the couple's interest in geology and mineralogy and MARY began studying botany.

In 1816 WILLIAM SOMERVILLE moved to a senior position in London, where he was accepted as a member of the *Royal Society*. In these social circles, MARY was now able to take advantage of every opportunity for scientific discussions. During a trip that took the couple to Paris, Switzerland and Italy, they made numerous contacts with members of the scientific academies. Encouraged by this, MARY had now come to believe ... *that women are capable of occupying a higher place in creation than that assigned to them in my early days, which was very low.*

In 1826 her first article appeared in the *Philosophical Transactions* – on the magnetic properties of violet light rays in sunlight. Their approaches – not all of which ultimately turned out to be correct – provided suggestions for further investigations, among other things, through FRANÇOIS ARAGO, with whom she was in friendly contact.

After this first publication, she was asked if she would be willing to write a popular summary of LAPLACE's *Mécanique Céleste* for the philanthropic *Society for the Diffusion of Useful Knowledge*. However, MARY SOMERVILLE did not just leave an essay on LAPLACE's work; rather, she translated the entire book into English and provided it with detailed comments, including on the mathematical basics.

Since this version was too extensive for the magazine, the astronomer friend JOHN HERSCHEL (son of WILLIAM HERSCHEL) arranged for a publisher to have the book printed. It was published in 1830 under the title *The Mechanism of the Heavens* – and was a great financial success. It was published in ten editions (including as a pirated copy in the United States). The comments she added were even translated into German and Italian.

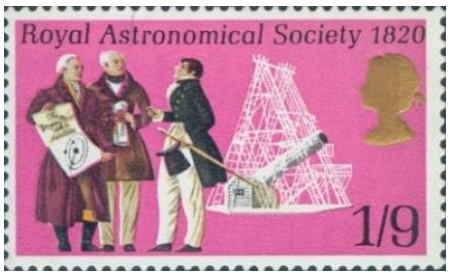
As an introduction to the book, she wrote an independent treatise (*A Preliminary Dissertation*), in which she clearly described the structure of our solar system and explained how the planetary system is controlled by gravity.

However, she was not allowed to present her book at the *Royal Society* herself – her husband had to do that for her. (The first woman to lecture at the *Royal Society* was the mathematician and electrical engineer HERTHA AYRTON in 1904; and despite the legal requirement of the *Sex Disqualification Removal Act* of 1919, the *Royal Society* did not admit women as members until 1945.)

The SOMERVILLES' circle of friends included, among others: the widow of Lord BYRON. MARY SOMERVILLE developed a special relationship with her daughter ADA, who later became AUGUSTA ADA KING COUNTESS OF LOVELACE. She not only invited the 18-year-old ADA to attend concerts together, but also gave her a variety of scientific suggestions. MARY SOMERVILLE became a role model for ADA to emulate.

Next, in 1834, MARY SOMERVILLE published a book that had never before existed in this form: *On the Connexion of the Physical Sciences* – a survey of the state of research in chemistry, astronomy and physics as well as the principles and methods underlying these subjects. For the polymath WILLIAM WHEWELL, the book was an occasion for the creation of a word: in a favorable review of the work, he was the first to use the term *scientist* (instead of the previously common terms *men of science* or *natural philosopher*).

In 1835, MARY SOMERVILLE – together with CAROLINE HERSCHEL, WILLIAM HERSCHEL's sister – was accepted as an honorary member of the *Royal Astronomical Society*. The two were the first women to receive this honour. In recognition of her services, the British government granted her an annual pension of £200, which was later increased to £300.



After her husband became ill, from 1838 onwards she lived mainly in the more climate-friendly Italy, where she wrote further books with great perseverance (*... if I'm not successful in solving a problem today, then I'll tackle it again tomorrow ...*) including the first book on *Physical geography, Molecular and Microscopic Science*. The 91-year-old was ultimately no longer able to complete a work on quaternions.

Despite a large number of awards, most recently in Italy, at the end of her life she drew a rather pessimistic conclusion for her gender: *I am aware that I never made a discovery myself, I had no originality. I have persistence and intelligence, but not a genius. This spark from heaven is not granted to* [*my*] *sex ...*

The *Royal Bank of Scotland* honored MARY SOMERVILLE in 2017 by printing her portrait on a £10 note.

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https://www.spektrum.de/wissen/mary-fairfax-somerville-das-vorbild-von-ada-lovelace/2184357

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