

Mary Somerville, Scientist, Writer and a Woman of her Time

It is a great privilege for me to take part in this session: first and foremost because we are so honoured to have Lesley Manville with us, both as a most distinguished actress and as the personification of Mary Somerville on screen. It is also a real treat to have the chance to take a look at Mary Somerville, the iconic figure whose name this college bears, and whose attainments and values are still relevant to the life of Somerville College today.

Born in 1780 in Jedburgh on the lowland coast of Scotland, not too far away from Edinburgh, the young Mary Fairfax had little expectation of anything more than a genteel life with little education beyond the feminine accomplishments of sewing, music and painting, in a limited family circle. Her father was a naval officer who ultimately became an admiral and was knighted, but never earned more than modest financial rewards from his service in the American War of Independence and subsequently in British overseas service. He was a sometimes heroic participant in the wars that saw Britain lose its first empire in America and go on to build another in the East Indies. His elder son, Mary's beloved brother Sam, embarked on a promising career in India, only to die of fever at the age of twenty-one. The Fairfax men embodied a British imperial experience that was quite typical of their generations.

"Genteel poverty" is the phrase that has been used to describe Mary Fairfax's circumstances. She ran wild in the coastal countryside of her home in Burntisland, and inheriting her father's fascination with natural history (in his case, plants and especially tulips), she studied the sea shells and birds and flowers that she found around her. At the age of eight she still had not been taught to write, and the next few years of her education did not advance her very far. But, in a book mainly consisting of fashion plates she discovered an article about algebra, and was captivated immediately and for life. From that point on she took every opportunity she could to find books on mathematics.

Her first clear talent however, was for painting. A grand relative of her mother's admired the young girl's pictures and observed how fortunate it was that she would be able to earn her living by painting, "for everyone knows she will not have a sixpence". Mary Somerville's own observation in later life was "had it been my lot to win my bread by painting, I fear I should have fared badly, but I never should have been ashamed of it; on the contrary, I should have been very proud had I been successful. I must say the idea of making money had never entered my head... but I was intensely ambitious to excel in something, for I felt in my own breast that women were capable of taking a higher place in creation than that assigned to them in my early days, which was very low." Few women of her generation excelled as notably as she did, few were to do more to advance the reputation of women's capacities; and beyond that, few women or men did more to advance public enlightenment in their own time.

Little though she would have known it during her childhood, Mary Fairfax was born into the era of the Scottish Enlightenment. When she went to stay in Edinburgh as a young debutante, and began to ask the friends of her brother and father for tuition in Latin, algebra, geology and natural history and the other subjects she longed to study, she moved among the heirs of Adam Smith and David Hume, and the founders of the most brilliant intellectual journal of its day, the *Edinburgh Review*. She married as her

first husband, Samuel Greig, who held the post of Russian consul in London, but he had no sympathy for her intellectual pursuits, and it must have been a release, of sorts, when he died after just three years of marriage, leaving her to return to her family in Scotland, an impoverished widow with two infant sons. Still nursing the younger one (who died only a few years later) she would rise early in the morning to study trigonometry and astronomy and grapple with understanding Newton's "Principia". She made contact in Edinburgh with the leading mathematicians William and John Wallace, and got them to recommend to her the scientific books, all in French, that she needed to pursue her studies. She got to know Henry Brougham, then a rising politician who later became Lord Chancellor and the founder of the University of London; and among her scientific studies she began to make original observations of her own.

Marriage to her older cousin Dr William Somerville in 1812 and the birth of four more children curtailed her studies for a time; but this was a lucky second marriage, for Mary Somerville, then aged thirty-two, had met in this navy physician a rare helpmeet. William Somerville paid no attention at all to the friends and family members who highly disapproved of Mary Fairfax Greig's intellectual pursuits and stigmatised her as eccentric and foolish. He may have fallen in love with her first for her famous delicate beauty, but he encouraged his new wife's scientific research and later her career as a writer and took immense pride in her for the rest of his life. A Liberal in politics, like his wife, and extremely sociable, he became himself a Fellow of the Royal Society (a status his wife could only be granted in an honorary capacity, since women were not allowed). Mary's paper *On the Magnetizing Power of the More Refrangible Solar Rays* was published in the *Philosophical Transactions of the Royal Society* under William's name.

William and Mary Somerville, moving to London, provided excellent company with an unending stock of discoveries making for fascinating conversation, and an interest in the most advanced literature. They soon shared a rich social life among the leading writers and thinkers of their time. Mrs Somerville attracted admiration from the worlds of literature and science alike. Maria Edgeworth wrote in 1822, "La Place says [she] is the only woman in England who understands his works". Lady Byron, estranged from the poet, became a good friend and asked Mrs Somerville to tutor her daughter, who became Ada Lovelace, renowned now as one of the founders of computer science. JMW Turner, as we shall see shortly, got to know her in the circles of the great country houses where he was invited to paint, and included an image of Mary Somerville the accomplished pianist in one of his best-known interior scenes.

Britain in the eighteen-teens, twenties and thirties had emerged from the Napoleonic Wars as pretty much the undisputed great power of the nineteenth century. It was also, as one economic historian has it, "the first industrial nation". London at the hub of the industrial revolution and the centre of empire seethed with social distress and unrest, abysmal filth and terrifying sickness and epidemics. The Somervilles lived in relative comfort with servants, but they had their share of illness, for both their sons died in infancy and their much loved eldest daughter Margaret at the age of nine; and both parents themselves endured long and dangerous illnesses at different times in their lives.

At the same time, the political class of which the Somervilles were a marginal part was moving towards the first reform of Parliament in the modern era. The Great Reform Act of 1832 and the movement for

Roman Catholic emancipation, followed in the mid 1830s by the rise of Chartism, with its mass public demonstrations, were worrying at the time to the settled middle classes, even though they may be seen in retrospect as pale echoes of the upheavals going on in contemporary Europe. It was also a time of intellectual ferment, and the idealism of the Romantic era was giving way to new forms of experimentation: in the arts, in science and engineering and in forms of government. Sir Robert Peel as Home Secretary introduced the forerunners of the Metropolitan Police force. Lord Liverpool's Conservative government swept away the penalty of capital punishment for all crimes bar murder, treason and arson. The workhouse, mass schools for the poor, gas lighting, the railways and a little later a metropolitan sewage system, all came about during Mary Somerville's adult life, and all to the Victorian mind betokened Progress. In her memoirs she commented on the extraordinary speed of travel and communication that had become possible in "the steam age".

Most of all, for the Somervilles it was what the writer Richard Holmes has called *The Age of Wonder*. The subtitle of his brilliant book of that title is "How the Romantic Generation Discovered the Beauty and Terror of Science". For Mary Somerville, without question the beauty far outweighed any possible terror. She was undaunted in her pursuit of scientific knowledge, and even while modestly disclaiming her own intellectual powers, she could not resist a challenge. In 1827 her friend Henry Brougham was in the process of founding his Society for Diffusing Useful Knowledge. He wrote to William Somerville asking him to persuade his wife to produce an account of Laplace's seminal work *Mecanique Celeste*. "No one without trying it" he wrote, "can conceive how far we may carry ignorant readers into an understanding of the depths of science." And only Mary Somerville could do this. "This letter surprised me beyond expression" wrote Mrs Somerville in her memoirs, "I thought Lord Brougham must have been mistaken with regard to my acquirements, and naturally concluded that my self-acquired knowledge was so far inferior to that of the men who had been educated in our universities, that it would be the height of presumption to attempt to write on such a subject or indeed on any other." Brougham would not take no for an answer, and travelled to Chelsea to persuade Mrs Somerville in person. She agreed to undertake the task on condition that if the work was not good enough, it should be burned; and then, she writes, "Thus suddenly and unexpectedly the whole character and course of my future life was changed."

Among the couple's dearest friends were the renowned astronomer Sir John Herschel and his wife. After he had read *The Mechanism of the Heavens*, which was to become a great best seller surpassed only by her next book, Mrs Somerville received a letter from Herschel expressing his "highest admiration" for her achievement. "Go on thus, he wrote, and you will leave a memorial of no common kind to posterity." The book was a path-breaking exposition of the state of modern science. Too lengthy for Brougham's series of popular educational tracts, for which it had been intended, it was published by John Murray in 1831 and became an instant success. Three years later, Mrs Somerville published her second major scientific work, *On the Connexion of the Physical Sciences*. An admiring retrospective review of this work by Richard Holmes in *Nature* only last autumn, describes it as the publisher Murray's best-selling scientific work until he published Darwin's *Origin of Species* nearly a quarter of a century later. What Mary Somerville achieved in these first two books, both published when she was in her fifties, was a clear exposition of scientific discoveries up to that date, making the links between them

comprehensible for a general audience, and posing questions about scientific enquiry that could still seem relevant today. She spent many months in conversation with leading scientists in Britain and France, ranging from astronomers and physicists to geologists geographers and chemists, and explored subjects ranging from terrestrial magnetism to giant seaweed. Basing one passage on her own research into infrared and ultraviolet rays she produced one of the earliest descriptions of these phenomena. (This research is the subject of the scene from *Mr Turner* in which she tries to demonstrate to the artist how the rays from the sun could create a magnetic field: a captivating moment of meeting between the great artist of light and colour and the great exponent of the power of modern science.)

One of Mary Somerville's great qualities as a scientific writer was an openness to new possibilities. She entranced her readers not only by reporting on the extraordinary new discoveries of her own time, but by opening the door to wondrous possibilities in the future. New planets not yet observed, the mechanism by which climate might change, the causes of earthquakes ... these were only some of the questions she opened up to the excitement of future research. Holmes writes that it was Mary Somerville's work that "prompted the creation of a new professional concept and new umbrella term to define it, coined by Whewell in his review of 1834: 'scientist'".

A third book, *Physical Geography*, which was published in 1848 and introduced an innovative regional approach to Geography, was much cited as a primary source, and used on university reading lists including at Oxford, for decades. It led eventually to the award of the Victoria Gold Medal of the Royal Geographical Society, one of many accolades accorded to Mary Somerville in her long life, beginning with honorary membership of the Royal Society.

It would take too long here to enumerate all the awards and medals, mentions in Parliament, and admiring accolades that Mary Somerville received from the leading men of science of her era: in France, Switzerland, Germany and Italy as well as her own country. She received a government pension for life, which came in very handy when her husband lost all his money in an unwise investment. The couple and their two unmarried daughters, Martha and Mary Charlotte, spent most of their latter years in Italy, travelling incessantly, with Mary Somerville making scientific observations and buttonholing scientists and writers to discuss their most recent works wherever she went.

Her life was rich not only in success as an acclaimed scientist and writer, but in several other ways that mark her as the model *par excellence* of nineteenth-century woman. When Turner first met her, he portrayed her at the piano, which by all accounts she played beautifully. Music was always important to her, and on her travels in Italy she especially adored opera. From her early years she was an accomplished painter, as the landscapes in oils and watercolours that we have in the college now illustrate. Most significantly, Mary Somerville stood for what women could accomplish. She was invited to become the lead signatory on John Stuart Mill's petition for votes for women, which he presented to Parliament over fifty years before the Representation of the People Act of 1918 finally granted a limited suffrage to women. She also became a member of the General Committee for Women's Suffrage in London.

As she wrote in her memoirs, then in her eighty-ninth year, “Age has not abated my zeal for the emancipation of my sex from the unreasonable prejudice too prevalent in Great Britain against a literary and scientific education for women”, and she drove home the point by praising the French and even the Russians for granting degrees to women. At a time when some so-called scientists could proclaim that education made women both physically and morally unfit for motherhood, Mary Somerville the wife and mother -and devout Christian - was honoured by the leading scientific societies of Europe. She was famous not only for her extraordinary intellect and her hugely influential writings, but also for her personal beauty and modesty, and for accomplishments in the arts of painting and music that most women would have envied without all the rest.

In old age, Mary Somerville was thankful to find her intellect unimpaired. Her interest in future discoveries and her hopes for future progress were undimmed. “Though far advanced in years, I take as lively an interest as ever in passing events. I regret that I shall not live to know the results of the expedition to determine the currents of the ocean, the distance of the earth from the sun determined by the transits of Venus, and the source of the most renowned of rivers, the discovery of which will immortalise the name of Dr Livingstone...” She spent her declining days studying calculus and keeping up with public events through the newspapers. Following a day spent working on quaternions, she died in her sleep on 29 November 1872, less than a month before her ninety-second birthday. Seven years later, a group of progressive-minded men and women who shared Mary Somerville’s passion for the education and advancement of women, named their new college after her. We have a lot to live up to.

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