Chapter 2
Early Life, Career and Friends: The Social World of Georgian Science

Mary Somerville had many blessings. In addition to her obvious intellectual gifts, she had 92 years of active life, an elegance of form which she retained into old age, and a beauty of disposition and a sympathy that gave her the gift of friendship. She was also practical and tough-minded, with no time for woolliness or pretence: a hard-headed individual in a romantic age.

Indeed, she was succinctly described by her fellow scientific authoress Maria Edgeworth, who in January 1822 wrote: 'Mrs. Somerville is the lady who La Place says, is the only woman in England who understands his works. She draws beautifully; and while her head is among the stars, her feet are firm upon the Earth. Mrs. Somerville [is] slightly made, fair hair, pink colour, small grey round, intelligent smiling eyes; very pleasing countenance; remarkably soft voice, strong but well-bred Scotch accent…'.[1]

As her *Dictionary of National Biography* recorder, Ellen Mary Clerke, expressed it more than 60 years later, her 'soubriquet of the Rose of Jedburgh formed a piquant contrast to her masculine breadth of intellect'. An interesting observation indeed, made by one late Victorian intellectual woman on a predecessor of an earlier generation. Yet one of the sources of Mary Somerville's success, like that of Caroline Herschel, was her instinctive sense of how to succeed in a man's world: a socially flexible and reputationalist world, yet one in which men still undoubtedly made the rules as far as the recognition of intellectual excellence was concerned.

Mary Somerville was born in The Manse, Jedburgh, on the Scottish borders, on 26 December 1780. Her father was Sir William George Fairfax, an honoured, distinguished, yet rather impoverished admiral in the Royal Navy. The Fairfaxes

[1] Maria Edgeworth to Miss Ruxton, 17 January 1822. Copy of letter in Somerville Papers, Bodleian MS. Dep.c. 370. MSB. 3–34, Collection 'E'. This same letter is also printed in Mary Somerville, *Personal Recollections* (London, 1873), 156, though it is headed 'Maria Edgeworth to Miss…', without any reference to Miss Ruxton. The reason for the omission of Miss Ruxton's name in the printed text is uncertain, as it is clearly spelt on the above-mentioned Bodleian Library document. As this document, Dep. c. 370, seems to be an early nineteenth-century copy of the original letter, however, the omission may possibly be due to an error of transcription.

A. Chapman, *Mary Somerville and the World of Science*,
SpringerBriefs in History of Science and Technology,
DOI 10.1007/978-3-319-09399-4_2

were of Yorkshire origin, and claimed descent from Lord Thomas Fairfax, the Parliamentary General in the Civil War. Yet Sir William's victories had not been especially profitable, and whatever prize money he may have won had long since been depleted, and the family seems to have lived on his modest pension. During his service in the American station during the Wars of Independence, however, Sir William had struck up a correspondence friendship with George Washington, with whom he was related, and he always regretted that the exigencies of war had never allowed him to accept Washington's cordial invitation to visit him socially.[2]

Mary's mother was formerly Miss Margaret Charters, the daughter of a Scottish solicitor. Mary's background, apart from the naval and legal professions of her parents, consisted of Scottish clergy, academics, and minor gentry. And though Jedburgh-born, she always regarded Burntisland, a small fishing village on the Fifeshire coast, to be her real home.

When she was born in December 1780, in fact, Mary's mother had only just returned from waving her husband off to sea on a series of adventures which would not permit him to return until Mary was a girl of eight or nine—by which time she had been allowed to run wild and had received no regular education, though her freedom to explore the area around Burntisland where she spent her childhood gave her a healthy constitution and stimulated her intellectual curiosity in the natural world.[3] At this stage in her life she also showed signs of that robustness of mind and spirit that she would carry (in a more circumspectly expressed form) for the rest of her days. 'About this time I was with my mother on a visit to her father in Edinburgh when my uncle Thomas Charters an officer in the Indian army then on leave, amused himself by teaching me to swear. One day walking with my maid in the High Street a lady asked my name and I answered, 'What's your business you damned B****'. The lady said, 'You're a bonny bairn but weel awat ye hae an ill tongue'. It says something for the octogenarian Mary's sense of humour that she included this incident in her autobiographical draft, although her daughter Martha removed it from her *Personal Recollections* published in 1873.[4]

Following her father's return home from sea, however, Mary began to receive the usual education of a young lady of her age and social station at a private school in Musselborough, though from an early age she 'resented the injustice of the world in denying all those privileges of education to my sex which were so lavishly bestowed upon men'. She subsequently recorded, however, that her interest in

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[2] Mary Somerville, *Personal Recollections* [n.1], 227.

[3] Elizabeth C. Patterson, *Mary Somerville and the Cultivation of Science,* 1815–1840 (Martinus Nijhoff, Kluwer, Boston, The Hague, Lancaster, 1983), 1. Elizabeth C. Patterson, *Mary Somerville* (Oxford, 1979), 7–9. Mary Somerville, *Personal Recollections* [n.1], 20.

[4] This passage about childhood swearing appears under Mary Somerville's own hand in the First Autobiographical draft: Bodleian Library, Somerville Papers Dep. c. 355 MSAU-3, p. 5, but a later editor (probably Martha Somerville) has cut the entire passage out of the page with scissors, leaving a 5 × 4-inch hole in the sheet. The offending passage was restored by Dorothy McMillan (ed.), *Queen of Science. The Personal Recollections of Mary Somerville* (Canongate Classics 102, Edinburgh, 2001), 9.

mathematics was first aroused when, as a young girl, she was looking at a monthly fashion magazine with an older friend, Miss Ogilvie of Burntisland. The magazine contained a puzzle which Miss Ogilvie described as 'a Kind of Arithmetic: they call it Algebra; but I can tell you nothing about it'.[5] On one level, this story begs a whole host of questions: was there a sufficiently large number of young Scottish women who, in spite of Miss Ogilvie's personal ignorance, enjoyed tackling algebraic puzzles as part of their fashion reading? If not, how did such puzzles find their way into ladies' magazines in the first place? On the other hand, such puzzle articles in women's magazines must not have been uncommon, for it was in response to one of them—dealing, in this instance, with the mathematical vibrations of a musical string under tension—set in *The Ladies' Diary* for 1780, that resulted in Sir William Herschel's first publication.[6] But in any case, the puzzle article discovered in the fashion magazine led Mary Somerville to start searching for information about algebra. She obtained a copy of Robertson's *Navigation,* but lacked the background to understand it, especially as her arithmetic at this stage was so poor that she could never produce the same answer twice when she added up a simple column of figures. Yet the puzzle seems to have launched her into what would become a lifelong odyssey of largely self-taught scientific investigation.

Mary's next strategy was to persuade her Edinburgh student brother Henry to purchase books for her. She obtained a copy of Euclid's *Elements of Geometry,* and Bonnycastle's *Algebra,* in addition to which she set about learning Greek so that she could read Xenophon and Herodotus in their original language. In Edinburgh she had lessons in the more acceptable ladylike skills of art and drawing. Her tutor was Alexander Nasmyth, the founder of the Scottish landscape school, and he later remarked that 'the cleverest young lady [he] ever taught was Miss Mary Fairfax'. Nasmyth's teaching inspired Mary with a fascination with perspective and the mathematical structures within art, and, as Maria Edgeworth mentioned, she herself became an accomplished lifelong painter and draughtswoman. Alexander Nasmyth had another important connection with Mary Somerville, for in addition to being a successful artist he moved on equal terms amongst the scientists and medical men of the Scottish Enlightenment.[7] Sir David Brewster—the eminent optical physicist, and the discoverer of polarisation—was one of his circle, while Alexander's son James Nasmyth was to become one of the leading lights of the English Grand Amateur astronomical community from the 1840s to 1880s.[8]

Yet Mary's intellectual precocity alarmed her elderly father, who feared for his beloved daughter's health and sanity if she persisted in these demanding pursuits. Indeed, he said to his wife, Mary's mother: 'Peg, we must put a stop to this, or we shall have Mary in a strait jacket one of these days. There was X, who went raving

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[5] Mary Somerville, *Personal Recollections* [n.1], 47.

[6] See [1].

[7] See [2, 3].

[8] *The Home Life of Sir David Brewster, by his daughter Mrs. Gordon* (Edinburgh, 1869). Also *James Nasmyth* [n.7], 63–95.

mad about the longitude'.[9] Mary then started studying her mathematical books in secret, late at night, after being put to bed. But the servant noticed that her night candles were mysteriously wasting away, as a result of which the candle was taken away once she was put to bed, leaving her with no source of light to read by. Not to be deprived of her beloved mathematical and linguistic studies, however, Mary decided to use the time for memory training, so she began to recall in detail all that she had been allowed to read during the day. Early on in life, Mary had become '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 [which] in my early days was very low'.[10]

Being a woman of her age, and strongly respectful to her parents, who were now struggling to make ends meet on Sir William's miserly Royal Navy pension of £75 per annum, and also because she was strikingly attractive—and, as her daughter Martha later recorded, in no way a 'blue stocking'—Mary took the natural step of getting married at the age of 24. Her husband was the above-mentioned Captain Samuel Greig, and the marriage gave her a surviving son, Woronzow, and left her a widow after 3 years.[11]

In widowhood Mary returned to mathematics—in particular, Ferguson's *Astronomy* and Newton's *Principia.* She soon became aware, however, that while Newton had created a gravitational mechanics and new methods of computing the orbits of 'three bodies'—the Sun, Moon and Earth—and their mutual effects upon each other, this had been done 120 years earlier. A growing reverence for Newton had, unfortunately, placed something of a dead hand upon English mathematics in the interim, and superior calculating techniques such as the calculus (devised by Newton's German arch-rival Gottfried Leibniz) were virtually ignored in England —and perhaps nowhere more so than in Newton's own university of Cambridge.

It was in continental Europe, and especially in Paris, that most of the mathematical innovations of the previous 40 years had taken place. None of Newton's work was challenged or in any way undermined in this process, for French mathematicians such as Lagrange, La Croix and Laplace all agreed that Newton's genius still provided the bedrock on which all subsequent mathematical physics had been built. Yet the French mathematicians recognised that further developments had to take place, and new insights had to be obtained. One could not simply draw a reverential line under Newton's *Principia* and say 'enough'.

Mary Somerville belonged to the first generation of British mathematical scientists to recognise the need to shake off this torpor. Her subsequent friends Sir John Herschel, Charles Babbage, Augustus de Morgan, William Whewell and George Peacock—at that time still undergraduates or else young dons at Cambridge —set about the revival of Cambridge mathematics: brilliant junior members of the

[9] Mary Somerville, *Personal Recollections* [n.1], 54.

[10] Mary Somerville, *Personal Recollections* [n.1], 60.

[11] E. Patterson, *Mary Somerville* [n.3], 11–12. E. Patterson, *Mary Somerville and the Cultivation of Science* [n.3], 5.

University trying to arouse and inspire their own superiors. In 1812, indeed, they founded the Analytical Society, with the avowed intention, in spite of the war that was raging between the two countries, of opening up Cambridge to the creative mathematical work going on in France. Between them, these men were laying the foundation for Cambridge's excellence in the physical sciences during the Victorian age—a laurel indeed previously held by Oxford, when between 1695 and 1795 David Gregory, Edmond Halley, James Bradley, Nathaniel Bliss, Thomas Hornsby and others had pioneered both Newtonian physics and observational astronomy in Oxford University.[12]

Edinburgh University was also sensitive to the work of contemporary French mathematical scientists, and when Mary Somerville won an inscribed prize medal for solving a mathematical puzzle set by Dr. William Wallace (who in 1819 would become Edinburgh University's Professor of Mathematics), she made her first formal acquaintance with the world of academic science. She so impressed Professor Wallace, moreover, that he offered her further instruction, and a detailed reading list —most of the volumes upon which were in French. She purchased 'an excellent little library', encapsulating the most advanced mathematical thought of the day. And by this stage, it had become impossible to conceal her intellectual passions, though 'I was considered eccentric and foolish, and my conduct was highly disapproved of by many, especially by some members of my own family'.[13] Even so, it seems that she had her second husband Dr. William Somerville's fullest support.

At Wallace's suggestion, Mary Somerville embarked on the study of Pierre-Simon Laplace's *Mécanique Céleste,* not all of the five volumes of which were yet published. She was reading Laplace with William Wallace's mathematical brother, John, and rapidly found that she understood it as well as he did, which added to her confidence and spurred her on.

In 1815, *Mécanique Céleste* (1799–1825) was the most advanced statement on one of the most complex branches of mathematics ever to have been written. Building upon Newton's *Principia* (1687), and that mathematical and conceptual language which made it possible to express the exact and ever-changing gravitational interactions between the masses of the Sun and the planets as they moved in space, Laplace addressed the most complicated problems in contemporary cosmology. Why, for instance, did the orbits of Jupiter and Saturn seem to be changing over the centuries? Would Jupiter one day crash into the Sun, or would Saturn break free and spin out of the Solar System in millions of years to come? How far did the drag effect of the tides on the Earth affect our planet's, and the Moon's, long-term orbital relations? Would the Moon eventually break free from the Earth's gravitational pull? Indeed, how dynamically stable was the Solar System? Did the distant binary stars,

[12] For the mathematical innovations, see Ivor Gratton-Guinness, 'The young mathematician', in *John Herschel, 1792–1871: A Bicentennial Commemoration,* ed. D.G. King-Hele, F.R.S. (Royal Society, London, 1992), 17–28. For Oxford's astronomical excellence, see A. Chapman, 'Oxford's Newtonian School', in *Oxford Figures. 800 Years of Mathematics,* ed. John Fauvel, Raymond Flood and Robin Wilson (Oxford University Press, 2000 [ed. 2]?), 137–149.

[13] Mary Somerville, *Personal Recollections* [n.1], 80.

Fig. 2.1 Baron Pierre Simon Laplace (1749–1827), the great French cosmologist and mathematician whose researches inspired Mary Somerville to write *Mechanism of the Heavens* (R.S. Ball, *Great Astronomers*.)

which William Herschel discovered between 1782 and 1802, and more of which other astronomers later discovered, operate under the same gravitational laws as those which governed the Sun and planets? Could the co-planarity, and the same orbital direction, of all the planets around the Sun be used to prove that the planets had once been part of the Sun, from which they had been ejected only to condense as spinning spheres; and had the Sun once rotated faster than it does today? Laplace, indeed, had taken up some of the issues pertaining to the origin of the Solar System, and as early as 1796 had proposed his famous nebular hypothesis—or condensation theory—for the formation of the planets around the Sun, when he published his highly influential *Exposition du Système du Monde* (Fig. 2.1).

By the 1820s Mary was winning attention due to her obvious genius for higher mathematics. In addition to William and John Wallace, she was also encouraged by Professor John Playfair of Edinburgh, Dr. Thomas Young and Sir John Herschel in London, and the influential Henry, later Lord Henry, Brougham.

Brougham was an Edinburgh lawyer whose talent was rivalled only by his eccentricity and ambition. In the highest traditions of the Scottish Enlightenment, he was interested in all branches of humane learning, and was one of the leading reform politicians of the day. His reformist principles had made him too hot for conservative Edinburgh, however, and by 1808 he had moved south, been admitted to the London Bar, and entered Parliament 2 years later. Closely associated with the radical Whigs in Parliament, and sensitive to the more positive currents which had emerged out of revolutionary Europe, in 1830 he received a peerage and the Lord Chancellorship, whereupon he threw all of his exotic brilliance behind the passing of the great Reform Act of 1832. Brougham was, in addition, a firm believer in science as an engine of fundamental reform, and had already played a leading role in the establishment of the Mechanics' Institutions movement, which aimed to teach the principles of science to the working classes. He had also been greatly impressed by Mary Somerville, with whom he had probably become acquainted via Mary's friendship with Brougham's sister. And while not a particularly political person herself, one can see how Mary's own progressive views were in keeping with those of some of the radical Whigs, on issues such as Parliamentary reform, the education of the working classes (and later, the education of women), and the final abolition of slavery, which came in 1834. In these respects, she also shared common ground with the Edinburgh Professor's daughter Margaret Brodie Stewart, who in March 1829 married John Herschel.[14]

In short, Mary Somerville was a product of that remarkable and brilliant era called the Scottish Enlightenment, when Edinburgh became perhaps the most intellectually illustrious city in Europe. Though many of its leading figures held chairs in the university, the Scottish Enlightenment was an extraordinarily open movement in which talent, rather than birth or academic office, opened the doors. Even many of the men who held professorships had risen from poor backgrounds to international reputations. And its drawing-room, or club, culture gave full expression to those who were not post-holding academics, embracing people as diverse as the poet Robert Burns, Dr. Robert Knox the anatomist (who ran a distinguished private medical school, quite separate from the University, and bought cadavers from the notorious body-snatchers Burke and Hare), and Thomas Henderson, the one-time lawyer's scrivener who became Director of Edinburgh's Royal Observatory. Although this was a predominantly male culture, its openness made it possible for a woman of extraordinary talent to find both encouragement and creative expression, even when that woman had no starry illusions about the barriers which still existed in the Edinburgh world, and was all too aware of the conservatism and petty snobbery that still bedevilled the 'Athens of the North'.

Mary Somerville's intellectual connections within metropolitan science can be traced from the time of her move from Edinburgh to London after 1816, and her

[14] Lady Margaret Brodie Stewart Herschel makes many references in her correspondence to the abuses to which newly-freed slaves were subjected at the Cape of Good Hope in 1834: *Lady Herschel's Letters from the Cape,* 1834–1838, ed. Brian Warner (Friends of the South African Library, Cape Town, 1991), 43, 50, etc.

preserved correspondence and related documents read like a *Who's Who* of late Georgian science. On the other hand, a review of these names clearly reveals where her predominant scientific interests lay, for they were on the whole the names of physical rather than natural history scientists. In spite of William Somerville's profession, there are not many medical men, botanists or zoologists, and those who are to be found—such as Dr. Thomas Young and Dr. William Wollaston—are usually there because of their separate interests in physics or astronomy. The only natural history scientists whose names are prominent—such as Sir Charles Lyell, Sir Roderick Murchison, Adam Sedgwick, and the Revd Dr. William Buckland—are included because they are geologists. Many of these men, moreover, were married to intellectually gifted wives, with whom Mary formed lifelong friendships.

Mary was fascinated by the new and continuing discoveries which suggested that the Earth was immensely old rather than having been created only around 4004 BC, though in many ways what really interested her was the idea of the Earth as a planet whirling through space and condensing from its primordial Laplacian nebulosity, rather than the successive *genera* of living creatures which later came to populate it. Her books can be examined in vain for anything beyond passing references to organic fossils, in spite of their central significance to contemporary geologists; while her last book, *Microscopic and Molecular Science* (1869), is more concerned with the structural forces that might underlie living creatures than with the matters of habitat or ecology which would have interested a naturalist. (More will be said of these interests in Chap. 4.)

Even so, Mary moved easily amongst the leading fossil geologists of the day, and in February 1829 she and Dr Somerville spent an enjoyable week at Christ Church, Oxford, along with Sir Roderick and Lady Murchison, as guests of Mary and William Buckland. Buckland and Murchison were two of the leading geologists of the day, yet while Buckland held the Regius Chair in geology at Oxford in conjunction with a Christ Church Canonry, and Murchison was to become Director General of the Geological Survey, both men had risen to scientific prominence through the self-taught Grand Amateur tradition, the former being a clergyman, the latter a retired army officer. Buckland, moreover, was one of the foremost scientific celebrities of the time—a spell-binding speaker, a much sought-after dinner-party guest, and sometimes an outrageous eccentric, although none of these traits prevented his translation to the Deanery of Westminster in 1845. His Christ Church Canon's residence—a large free-standing house just off the Cathedral cloister—contained one of the world's finest private geological collections and a menagerie of exotic living creatures, so that it is impossible to imagine that natural history did not figure prominently in that week's conversation.[15] Charlotte Murchison and Mary Buckland, moreover, were intellectual women in their own right, and the three couples cemented friendships that would endure for the rest of their lives.

[15] Mary Somerville, *Personal Recollections* [n.1], p.30, for Oxford visit, though she does not give a date. February 1829 is given in E. Patterson, *Mary Somerville and the Cultivation of Science* [n.3], 53.

It is clear, however, that Mary was also much admired by Buckland's Cambridge counterpart, the Revd Dr. Adam Sedgwick, who was Woodwardian Professor of Geology in the University, as well as a Prebend of Norwich Cathedral, for the Somervilles stayed with him in Trinity College in April 1832. Sedgwick, who was a bachelor and lived for most of the year in College, except when off geologising or else fulfilling his residence at Norwich Cathedral, was also something of a larger-than-life figure and a social lion. Following the conventions of the day, he wrote to Dr. Somerville rather than to Mary prior to their visit to Cambridge, pointing out how the stern severities of a bachelor college were being softened somewhat in preparation for the couple's visit: A four-posted bed (a thing utterly out of our regular monastic system) will rear its head for you and Madame' in the set of rooms in which they would be staying. And almost as a way of reassuring the Somervilles that Trinity College's bachelor dons were capable of making a visiting lady comfortable, Sedgwick informed Dr. Somerville that a similar arrangement had worked excellently when Sir Roderick and Lady Charlotte Murchison had visited Trinity College. Sedgwick further asked whether on Mary's arrival in Cambridge she was likely to be exhausted from travel; although, as her husband pointed out, travel 'rather recruits Mrs. Somerville', and she was willing to go along with whatever had been arranged.[16]

In spite of Sedgwick's corresponding with William Somerville, it is clear that Mary was the real celebrity, for on 5 April Sedgwick unveiled the busy social schedule proposed for the visit, with receptions for people to meet Mary, and a succession of dinners hosted by the mathematicians William Whewell, George Peacock, George Airy, and the anatomist Dr. Peacock, on successive evenings. At the end of the week in Cambridge, Sedgwick and Whewell accompanied the Somervilles for several more days to Audley End. After their return to London, Mary wrote to Sedgwick to thank him for the splendid visit, emphasising her awareness of the recognition awarded for her scientific work by 'such men as adorn your University'.[17]

Indeed, the extremely social character of the scientific world of Mary Somerville's day is clearly evident from her letters and reminiscences. This was an age when transport was relatively slow—she was in her mid-sixties by the time that railways had begun to shrink distances across England—and the age of the academic conference as a shop window for state-of-the-art research was still some decades away. And while it is true that the annual week-long jamborees of the British Association for the Advancement of Science—with their dinners, balls, and sociable field trips—moved

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[16] Dr. William Somerville to the Revd Prof. Adam Sedgwick, April 1832, in *The Life and Letters of the Reverend Adam Sedgwick LL.D. D.C.L., F.R.S.,* vol. 1 (Cambridge University Press, 1890), 388.

[17] Mary Somerville to Sedgwick, Chelsea, 25 April 1832: *Life and Letters of... Sedgwick* [n.16], 389. For Kater's work on the physics of vibrating pendulums and their experimental applications, see Henry Kater, 'An Account of Experiments for Determining the Length of the Pendulum vibrating Seconds in the Latitude of London', *Philosophical Transactions of the Royal Society,* 108 (1818), 33–102.

around the British Isles with great success after 1831, one of the most important instruments of scientific association remained—as it had been since the founding of the Royal Society in 1660—a meeting of friends—and rivals! For male scientists, these meetings could take place at the Royal Society or other metropolitan learned societies, although the soirees of the Royal Institution and the Surrey Institution, both of which admitted ladies to their gatherings, widened the scope for more formal contacts within London. Even so, as one quickly learns from Mary Somerville's private writings, social gatherings at private houses were an enormously important agent of scientific exchange, especially if ideas were aired across congenial dinner-tables or drawing-rooms.

One such incident—undated but probably occurring in the early 1820s—is recorded in the *Personal Recollections.* Mary and William Somerville had spent an evening with Captain Henry Kater and his wife Mary Frances. (Kater was the ex-army physicist who in 1818 had conducted pioneering researches into the behaviour of free-swinging pendulums, and invented in the 'Kater free pendulum' an instrument which would revolutionise geophysics by making it possible to measure and map slight variations in the Earth's gravitational field.)[18] After a musical interlude in which Captain and Mrs. Kater sang 'very prettily', and after much scientific discussion and the trial of several experiments, the party adjourned to the garden with at least one astronomical telescope. It was a clear night, and they proceeded to test the telescopes to determine their resolving power in the separation of double stars. This went on 'till about two in the morning', when the group noticed a light still burning at the window of Dr. Thomas Young's house nearby. Dr. Somerville rang the doorbell, and when Young, wearing his dressing gown, answered it, he invited the party in, and proceeded to show them a piece of Egyptian papyrus which seemed to have a Ptolemaic horoscope drawn upon it, and in which he was in the process of translating.

In addition to his work as the physicist who established the key experimental proofs for the wave theory of light, and serving as Professor of Natural Philosophy at the Royal Institution, Thomas Young made significant contributions to the decipherment of the ancient Egyptian hieroglyphic language. Indeed, Mary Somerville recorded that Jean-François Champollion, who finally deciphered the language in 1828, was 'ungenerous' insofar as he failed to acknowledge Young's contributions.[19]

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[18] No date for the evening with the Katers is given in Mary Somerville, *Personal Recollections* [n.1], 130; nor is there any reference to the occasion in George Peacock's *Life of Thomas Young M.D., F.R.S., & C.* (London, 1855). It probably took place some time just before or after 1820, however, when Young was doing his work on the ancient Egyptian language and script. At that time (*c.*1801–1826) he was living at 48 Welbeck Street, London: *Life,* 468 and 253. Unfortunately Peacock's *Life* contains neither an index nor an itemised contents page, so that searching for a reference to a particular event is not easy. I have, nonetheless, looked through the most seemingly relevant chapters: VI, VIII, X, XII, XIV, and XV.

[19] Mary Somerville, *Personal Recollections* [n.1], 131. For Young's work on Egyptian hieroglyphs after 1814, see George Peacock, *Life of Thomas Young* [n.18], 258–344.

Before 1826, when the Royal Society published, in its *Philosophical Transactions*, her paper on the ability of the violet rays of the solar spectrum to induce magnetism in iron, Mary Somerville had no published works to her name. It is interesting to consider, therefore, how she had already acquired an established reputation as a scientist by that date. I believe that her early reputation came about because of the sociable character of this Grand Amateur community. The remarkable openness of the Edinburgh and London intellectual worlds, their lack of emphasis upon formal qualifications, and the prominence of the soirée, conversazione, dinner-party, and other informal sociable gatherings, made them places where talent could rise to prominence. It is true that this was also a very narrow world, restricted to no more than a few hundred people who, in addition to intelligence, enjoyed relatively comfortable economic circumstances—be they a modest £300 a year private income, or the revenues drawn from ancestral broad acres.[20] There was very little chance, therefore, of working people rising into it—not just because of their poverty, but also, sadly, because of the lack of opportunity available to them to acquire the essential education and leisure to pursue extensive and often abstract intellectual enquiries.

This Grand Amateur intellectual world, moreover, was not exclusively scientific. Its members would not have considered themselves to be 'scientists' in the modern sense, so much as 'literary and philosophical' people, their soirées including as they did lawyers, reforming politicians, poets, philosophers, economists and essayists. Jane and Thomas Carlyle, Sir Robert Peel, Lord Henry Brougham, Michael Faraday, Sir Charles Lyell and Lord Thomas Macaulay were all part of it. On one occasion, when Peel chanced to call in upon Faraday at the Royal Institution, he was shown, in the laboratory, Faraday's *experimentum crucis* whereby circular motion was generated from electromagnetic induction to produce the dynamo. The politician, who was especially interested in practical inventions, asked the physicist what possible use it could have. Faraday replied 'I know not, but I wager that one day your government will tax it'.[21] Faraday's apparatus, in fact, was the first electric motor!

In this world, therefore, it is perhaps easier to understand the fame of an unpublished scientist than it would be today. Quite simply, Mary Somerville became famous via her letters, her conversation, and by the fact that everybody in intellectual London knew of the extraordinary woman who had mastered the most abstruse mathematics of the age, and had acquired from her studies a sophisticated grasp of how physical science worked (Fig. 2.2).

It was mentioned above that in July 1817 the Somervilles crossed the Channel on their first continental visit together. We must also remember that at this time there was a whole generation of British people who had never been abroad, for between 1792 and 1815 the once familiar route of the Grand Tour had been blocked due to the French Revolutionary and Napoleonic Wars, except for a few months

[20] A. Chapman, *The Victorian Amateur Astronomer. Independent Astronomical Research in Britain 1820–1920* (Praxis-Wiley, Chichester and New York, 1998), 3–11. For Mary Somerville's £300 Civil List Pension, see Elizabeth Patterson, *Mary Somerville and the Cultivation of Science* [n.3], 153–155.

[21] L. Pearce Williams, *Michael Faraday* (Chapman and Hall, London, 1956), 196.

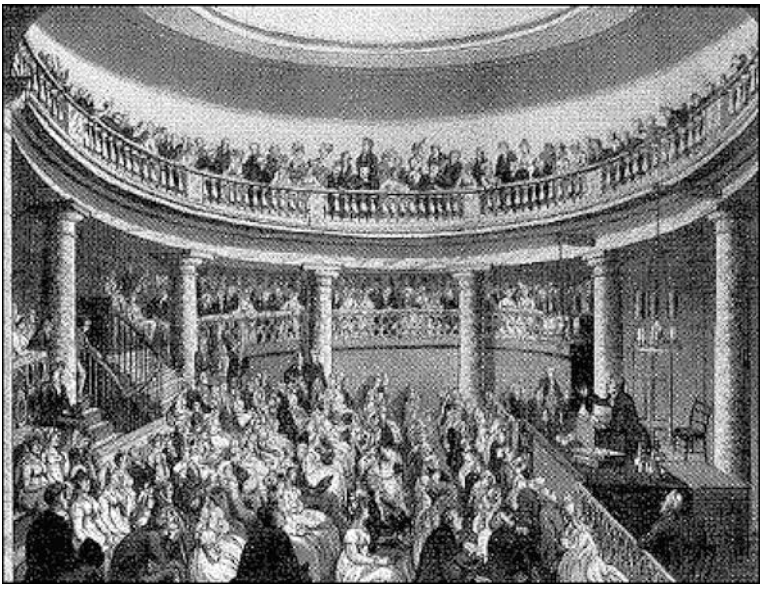

Fig. 2.2 A lecture on chemistry being delivered at the Surrey Institution, London, 1814. Note the large number of ladies in the audience. In its day, the Surrey Institution (which no longer survives) was a rival to the Royal Institution, which drew a similar proportion of ladies. Astronomy and chemistry were very popular subjects (Author's collection.)

during the fragile peace of the Treaty of Amiens. Only a tiny handful of British intellectuals—such as Sir Humphrey and Lady Jane Davy, accompanied as they had been by the young Michael Faraday in 1813—had been permitted to travel abroad. After Waterloo in June 1815, however, the English upper classes flooded onto the continent once again, and 2 years later the Somervilles joined the throng. Yet it was plain that even by this early date, some 8 years before she published anything, Mary Somerville arrived in Paris not as a tourist, but as a woman of note.[22]

Her reputation had clearly spread to Paris by letter and by word of mouth. Very significantly, however, she had met in London the French physicist Jean Baptiste Biot, who was in England working on a geophysical survey, and it was his wife in Paris who became the principal introducer of the Somervilles to the French *savants.* Madame Françoise Gabrielle Brisson Biot was an educated woman who had translated a German scientific text into French, though it was, as Mary Somerville recorded, 'published under the name of her husband'.[23] In Paris she also was

[22] Mary Somerville, *Personal Recollections* [n.1], 108–121. The original Journal of her 1817–1818 continental travels is in a small green notebook commencing '17th July. With a fair wind we embarked at Dover 10 min before 12 in the King George Packet…': Bodleian Library, Somerville Papers, Dep. c. 355 MSAU-1 Book No. 2.

[23] Mary Somerville, *Personal Recollections* [n.1], 110.

entertained by Dominique Arago and his wife at the Paris Observatory, and was shown 'all the instruments in the minutest detail, which was highly interesting at the time, and proved more useful to me than I was aware of'. We must remember in this respect that up to this point Mary's astronomical knowledge had been derived almost entirely from books. Though she knew in theory how astronomical observations were made, it is probable that before 1817 she had never been inside a major observatory, with the exception of her short visit to that of Sir William Herschel at Slough the year before. No doubt this is why Dominique Arago's tour of the Paris Observatory, and his detailed description of how to use the instruments, later 'proved more useful' than she was aware of at the time. Such a knowledge of practical scientific procedures would have been essential in framing in her own mind the background to her subsequent *On the Mechanism of the Heavens* and *On the Connexion of the Physical Sciences.*

Through Arago, Mary Somerville was introduced to Laplace, the most illustrious of all the French men of science, and the two developed an enduring intellectual friendship which would lead to her producing a great synopsis of and developing commentary on his work in *On the Mechanism of the Heavens.* Alexis Bouvard, Louis Poinsot and the palaeontologist Baron Georges Cuvier also entertained her.

Although England and France had fought bitterly over 22 years, the *savants* of both countries recognised and esteemed each other. English astronomers and mathematicians admired Laplace, Lagrange, Bouvard, and others, while English geologists like William Buckland and Sir Roderick Murchison (who had fought in the British army during the Peninsula campaign against Bonaparte) admired Cuvier. The French, in their turn, admired the quality of the observational data being produced by the Greenwich Observatory, and in particular held the late Revd Dr. James Bradley, Sir Isaac Newton, and the chemists John Dalton and Sir Humphry Davy, in the profoundest respect.

French science, however, was organised very differently from that of Britain, for both under the *ancien regime* and under Bonaparte a highly centralised, state-funded and patronised, and almost entirely Paris-based system of working prevailed, that was the antithesis of the diverse culture of the British Grand Amateurs. Indeed, so Paris-centred was French intellectual life that Cuvier informed Mary that when he had been sent to inspect the schools of Bordeaux and Marseilles, 'he found very few scholars who could perform simple calculation in arithmetic',[24] while many were ignorant of 'science, history… literature', and even the writings of the French philosophers. Indeed, 'Cuvier said such a circumstance constituted one of the striking differences between France and England; for in France science [was] highly cultivated but confined to the capital'.

From Paris, the Somervilles travelled to Geneva, to where Mary found that her reputation had also spread, and where she met Jane Marcet and her husband Alexander John Gaspard Marcet. It had been Jane Marcet's popular books on chemistry which had first stimulated Michael Faraday's interest in science around

[24] Mary Somerville, *Personal Recollections* [n.1], 112–113.

1809.[25] From Switzerland, they travelled into Italy—a country with which she was to fall in love, to which she would return, and in which, 54 years later, she would die. And here again, she was to find that her reputation had gone before her. She was, in spite of being an unambiguous Scotch Protestant, graciously received by His Holiness Pope Pius VII, 'a handsome, gentlemanly, and amiable old man' who blessed her[26]; after which, Mary and William travelled to Naples, where they would make a dramatic and dangerous ascent of the cone of Mount Vesuvius.

The Somerville's continental progress came to an end when William returned home to take up his newly-Gazetted plum post as Physician to Chelsea Hospital in 1819. Mary's reputation continued to grow in France, Germany, Switzerland, and Italy, of course, and on their next visit in 1832, in the wake of the publication of her Laplacian *On the Mechanism of the Heavens,* the Parisian newspapers hailed her coming as that of an intellectual celebrity. By 1832, with two major publications to her credit, and with clearly more to come, Mary Somerville's former verbal reputation had been transformed into that of a major published *savant.*

By the time of her visit to Paris in 1832, Laplace was dead, Alexis Bouvard was Director of the Observatory, and the fiercely Republican Dominique Arago was involved in politics after the Revolution of 1830.[27] Even so, Mary was now feted by everyone, and while she very clearly enjoyed the company in which she moved, she nonetheless took a particular dislike to the physiologist François Magendie, finding him coarse and uncouth. One suspects that she had, in any case, a prior aversion to Magendie because of the notorious cruelty of his vivisection experiments, contrasting him with Sir Charles Bell of Edinburgh who 'made one of the greatest physiological discoveries of the age without torturing animals'.[28] Both Bell and Magendie had discovered the ways in which nerve fibres are grouped and transmit signals, though Bell's work slightly preceded that of the Frenchman.

Indeed, Mary's social round in Paris in 1832 was remarkable in its range, as not only scientists but public figures like General Marie Joseph Lafayette and the visiting American novelist James Fennimore Cooper and his wife were keen to enjoy her company. And by the time that Mary and William Somerville returned to England, her international reputation as a woman of science was assured.

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[25] *Jane Marcet, Conversations on Chemistry, in which the Elements of that Science are familiarly explained and illustrated by Experiments,* 2 vols. (1806). L. Pearce Williams, *Michael Faraday* [n.21], 19, 20.

[26] Mary Somerville, *Personal Recollections* [n.1], 121–122.

[27] Mary Somerville, *Personal Recollections* [n.1], 185–186. *Elizabeth Patterson, Mary Somerville and the Cultivation of Science* [n.3], 100–108.

[28] Mary Somerville, *Personal Recollections* [n.1], 192–193.

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