

Chapter 2

The Two Marriages

Unfortunately, even the little time Mary Somerville was allowed to devote to her books didn't meet with her parents' approval. To their eyes there was only one solution against the danger of becoming insane by studying too much, and that was marriage.

The family decided that Mr. Samuel Greig, her cousin, would be the right man. He was the son of an officer in the British navy and arrived in the Firth of Forth aboard a Russian frigate. The Fairfaxes received him warmly as a relative and so he met Mary and made a marriage proposal. She was at that time twenty-four years old, quite attractive and charming, but her family was poor and the only thing she possessed was a rather modest trousseau containing the main personal and household linen [PR 73].

But although the Fairfax family could rely only on Sir William Fairfax's pay as admiral, both parents could boast that they were of "good birth": Margaret Charters was the daughter of a man of some intellectual pretension and learning, while her father descended from the same Yorkshire family as George Washington. The pretty young lady had little choice. Her family was opposed to any other solution, so in 1804 she married Samuel Greig.

This was a terrible mistake. Even though the man was certainly well known to Mary's parents and gave all the possible guarantees of a respectable husband, he had one of the worst possible defects. That is, he had a very low opinion of the capabilities of the female brain. Moreover, he had neither knowledge of nor interest in science of any kind.

The proverb "marry in haste, repent at leisure" was never so true as in the union of these two totally different souls. She also had to move to London, where her husband had obtained the Russian consulship. Under different conditions, this would have been a great relief, if her husband hadn't provided her with his bachelor's apartment, which was small and stuffy. The only amusements were solitary walks, making her suffer acute nostalgia for the merry promenades in the center of Edinburgh.

She had left Scotland with a gift of twenty pounds from her family which would just have been enough to buy a shawl to protect her from the cold. She saved herself

from pneumonia with some furs that her husband's brother brought her from Russia. The only friends they had the chance to make in London were a rich Russian merchant, Mr. Thomson Bonar, and his wife, whose company represented an enormous consolation for Mary.

Luckily, fate was to work on her side, however. After three years of unhappy marriage and two children, of which only one, Woronzow, survived, Mr. Greig died at the age of only 29, and to her great relief the young widow returned to her childhood home in 1807. We can only imagine the happiness in her eyes when she saw once again her beloved village of Burntisland.

Her husband's premature death entitled her to some money, and this granted Mary the financial and psychological independence needed to go back to her studies. At the time, these were concentrated on plane and spherical trigonometry, conic sections, and astronomy. Her enthusiasm for freedom and independence was so great that she even began to tackle Newton's *Principia*, early one morning when the house was quiet, but she confessed that the content of the book was totally obscure to her at that stage.

Newton, who was rightly considered one of the most important scientists in British history, had opposed the teaching of *calculus*, which had enabled foreign mathematicians to make considerable progress in astronomical and mechanical science. Only later, in 1816, had John Herschel, Charles Babbage, and George Peacock collaborated on the translation of La Croix's *Treatise on the Differential and Integral Calculus*.

In her new guise as Mrs. Greig, Mary Somerville decided to look around for people with whom she could exchange scientific ideas. She thus made the acquaintance of Professor William Wallace, who taught mathematics at the University of Edinburgh, and asked him to give her a list of books which would enable her to learn mathematical and astronomical science.

Professor Wallace took Mary Somerville's request very seriously and made a long list, including Poisson's *Treatise on Mechanics*, Lagrange's *Theory of Analytical Functions*, Euler's *Algebra*, Monge's *Application of Analysis to Geometry*, and Laplace's *Mécanique Céleste* (Fig. 2.1). She was not discouraged at all and promptly bought all of them. As these books were nearly all in French, she had to teach herself to read in that language in order to understand their contents [PR 79].

For her, this library represented a real treasure and a new world began to open up before her eyes: she was thirty-two years old, free, economically independent, and willing to learn as much as she could. During that period she regularly read the *Edinburgh Review* and managed to become acquainted with some of the authors of the penetrating articles printed in it. Wallace even awarded her a silver medal for solving a prize mathematical problem on diophantine equations.

In one of her social *rendez-vous*, she met for the first time Henry Brougham, who would come to have an enormous influence in her life a few years later. This interesting gentleman had helped to found the *Edinburgh Review* as a young lawyer in 1802. He went to London in 1810, where he was called to the English bar, and then entered the House of Commons as Whig Lord High Chancellor. He won

Fig. 2.1 French mathematician Pierre-Simon Laplace (1749–1827), author of ‘*Mécanique Céleste*’, which inspired Mary Somerville to write her first book ‘*On the Mechanism of the Heavens*’ (Engraving by H. Rousseau published in the ‘*Album du Centenaire*’, 1889, Paris, Jauvet and Cie éditeurs)



popular repute as chief attorney to Queen Caroline and proposer of educational reforms in Parliament that pioneered several innovations, most of which were concerned with making scientific education more readily available to the working classes. Moreover he was one of the founders of University College in London, and in 1825, of the Society for the Diffusion of Useful Knowledge, which would become Mary’s lifetime employer.

Another useful friendship was with Professor John Playfair, a mathematician at the University of Edinburgh. He knew that Mary was trying to read and understand the *Mécanique Céleste*, and hearing that she was finding the book quite difficult, gave her a fundamental piece of advice: she should read on for a few pages and then return to it again; afterwards things would look much better. From that moment on she followed his suggestion and found that it never failed here. Indeed, she succeeded in reading and understanding Laplace’s five volumes, a monumental effort that completely changed her life.

But despite her ability to establish useful relations with educated people, she was still a woman, and her family, seeing once again that she was concentrated on books, was worried for her mental health. They considered such activity to be at best eccentric.

This may well have been true. Mathematicians are often eccentrics. But why do people worry so much when they observe them with their eyes wide open, staring into empty space as if the formulas they are thinking of are fascinating new specimens never sought before, new breaths of life for their thirsty souls? The problem was that Mary Somerville’s family didn’t understand her joy in learning science, and the solution once again seemed to be to find a new husband for her. This time it was another Somerville, a cousin, in fact William Somerville, the eldest

son of the minister of Jedburgh. Their marriage took place in 1812, when Mary was thirty-two years old.

This time fate was favorable. This time the selected husband was the right choice, extremely handsome, intelligent, with a nice nature and refined manners, and he was a surgeon, emancipated from Scotch prejudices. He had entered the army in 1795 as a hospital assistant and received his M.D. at Aberdeen in 1800. Moreover he had spent most of his life away from Britain, as he had made at least two trips into the interior of South Africa, where he distinguished himself for his negotiations with tribes who were attacking Dutch farmers. Another interesting part of his personal history was that, when he married Mary Somerville at the age of forty-one, he had already been married, and was widowed.

Mary also admired her mother-in-law and aunt Martha Charters and she couldn't forget that her father-in-law had been the first person to encourage her studies.

After a honeymoon in the Cumberland lake district in the company of another Somerville cousin and his wife, the couple moved to London, where Mary began to enjoy her role as a respectable lady, not reluctantly but with enthusiasm, as William was a lovable person and thoroughly approved her choice of studies, encouraging her to devote herself to her ambitious goals.

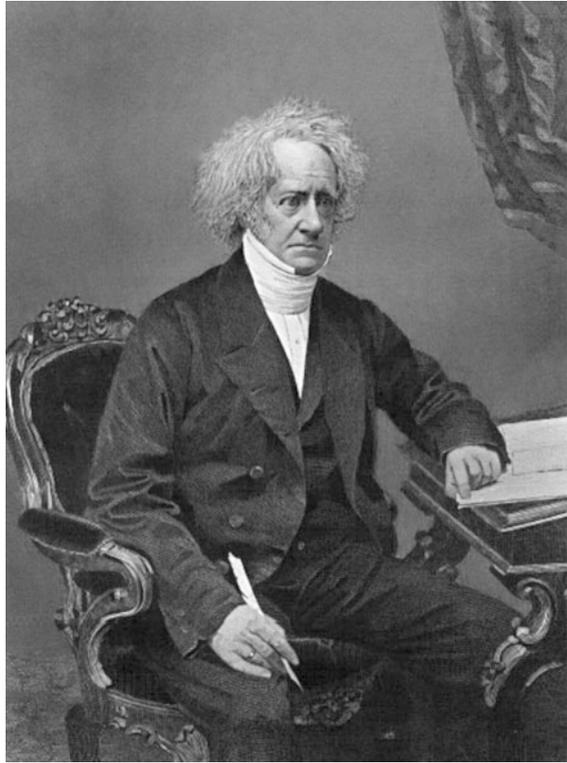
He reached the point where he would even spend his free time searching the libraries for the books she required and copying her manuscripts, to save her time. Even more effectively, he exchanged ideas and opinions with her, as he had a good classical culture and a strong interest in natural history and the sciences in general. His behaviour was in accord with his liberal principles. For Mary, who disapproved of prejudice, this was one of his best qualities.

Moreover, he had a fine knowledge of the English language, and was good at reading and criticising her writings. Maybe her talent in understanding science would have flourished just the same without William, but certainly he represented for her a perfect mentor. For instance, he was interested in geology and mineralogy, and they studied them together, a most helpful exercise.

The couple didn't stay long in London, as William Somerville became head of the Army Medical Department in Scotland, whereupon they moved up to Edinburgh. Here Mary studied Greek, reading Homer an hour every morning before breakfast. Then, in late 1815, her husband was appointed Principal Inspector General for England, so the couple went back to London, where they settled in a house in the fashionable Hanover Square in Mayfair, and Mary became acquainted with a new set of learned friends.

One of the first of these, in 1816, was Sir William Herschel, who was living with his wife and son John (Fig. 2.2) in Slough, twenty miles from London. Even though John was twelve years younger than Mary, he soon became one of her closest friends, and a wonderful ally for her as he was one of the leading scientists of his day. They corresponded extensively on scientific matters during their lives and this meant that Mary was well informed about any new discoveries. Much of the information she collected from John Herschel's letters and conversations was eventually transferred into her books. Moreover, he acted as an honest critic of her

Fig. 2.2 British astronomer and mathematician Sir John Herschel (1792–1871). His lifelong friendship with Mary Somerville allowed fruitful scientific conversations which she often reported in her books (*Author unknown, published in Duyckinck, Evert “A portrait gallery of Eminent men and Women in Europe and America”, 1873, New York, Johnson, Wilson & Company*)



work and she relied strongly on his opinions. She felt such deep affection for him that in her *Personal Recollections* she wrote:

His view of everything is philosophic, and at the same time highly poetical, in short, he combines every quality that is admirable and excellent with the most charming modesty [PR 271].

When Mary Somerville visited the Herschels at Slough, she saw the large telescope built by the famous astronomer and used for nine years to carry out sky surveys and investigate double stars. Moreover, it was through the Herschels' twenty-foot telescope that she later observed the “glorious appearance of Jupiter” for the first time [PR 135].

She would also have liked to have met William's sister, Caroline, a mathematician and astronomer herself, but she was travelling at that time. Mary was disappointed, as she knew that she had been the first woman to discover a comet, and would have loved to talk with her.

After a while, the Somervilles began to become known by important luminaries, not only in England, but also in Paris. They made their first visit to France in 1817, where Madame Françoise Gabrielle Brisson Biot, a well educated Parisian socialite who had translated a German scientific text into French, threw a famous party with

the aim of introducing them to the French intellectual *élite*. Among the guests, Mary Somerville also met the Marquis de Laplace, the great mathematician.

He was puzzled by the fact that Mary Somerville had read his *Mécanique Céleste*. The two later engaged in a long discussions about astronomy and calculus, and in the end Laplace gave her a signed copy of his *Système du monde*, a gesture which Mary appreciated enormously. She also felt a sincerely liking for Laplace, who was elegant and had distinguished manners. She liked him even more when some time later he stated that she was the only woman who understood his work.

The general elegance of the French ladies convinced her that she had to do something about her wardrobe, so she equipped herself with proper dresses. Up to then she had usually made her clothes herself, but French society was quite demanding from that point of view and there were plenty of *couturiers* ready to create whatever *mise* was needed [PR 113]. One of the pleasant consequences of this interlude was that the Prince de Condé received them at his castle in Chantilly, where they had a fascinating display of French *grandeur*, and where uniforms and liveries were worn by all the men in the palace [PR 107].

Europe became for Mary Somerville a kind of remarkable parlor, where all the leading personalities of the day could be met in beautiful places. One such place was Venice, where the Countess Isabella Teotochi Albrizzi, a writer and salonist, used to entertain her guests in her wonderful *palazzo*. At one of these receptions, Mary Somerville met Lord Byron, who had a famously profound love for Italy. This was a feeling she would one day share, for she would eventually spend the rest of her life there [PR 118].

She even learned the Italian language, although she always wrote in English, sometimes fighting against some Scottish idioms. Her long first journey to Italy took her to meet the Pope Pius VII himself in Rome, and in passing through Bologna, she met the cardinal Gasparo Mezzofanti, a hyperpolyglot, who knew fifty-two languages. Naples was on the list, too, and her visit came just after an eruption of Vesuvius.

Mary and her husband couldn't resist the temptation, and even though the air was full of smoke, they ascended the volcano and walked around the crater, holding a handkerchief to their nose. Somerville brought back a number of crystals for his collection of volcanic minerals when they finally returned home to Hanover Square.

By that time Mary had had four children by William, of which only the two girls Martha and Mary Charlotte survived. She still had her son Woronzow from her first marriage, so she had a family to take care of, and maybe because she had suffered from the rather limited education received from her mother, she paid great attention to rearing her children, always making an effort to devote a few hours to them every day.

All families have their eccentric side. The Somervilles had an important collection of minerals and fossils which they had collected during their travels, and friends some times added new items to their cabinet. It once happened that Mary recognized a fossil plant in Edinburgh Museum that she had noticed on the sands of Burntisland, and she must have felt that her long wanderings as a child along Firthshore were beginning to prove themselves a useful scientific exercise. Among

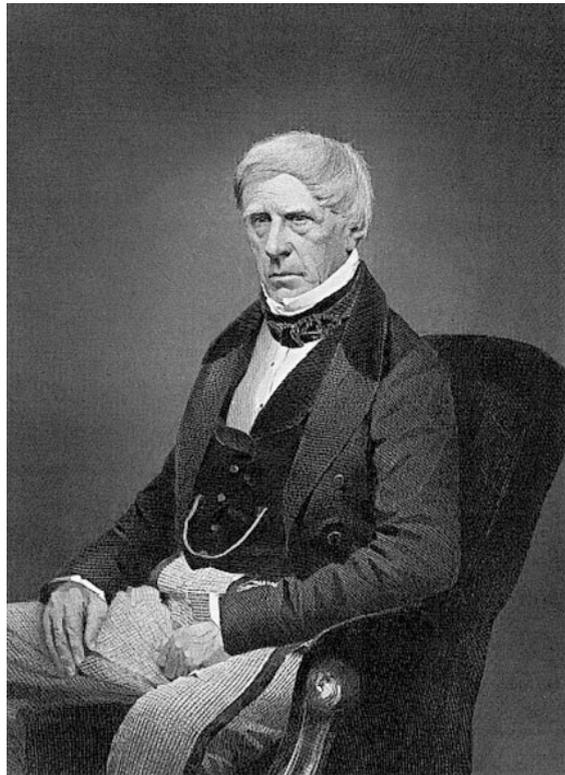
the peculiar recollections from that period of investigations, the following was one of the most vivid. One evening William had made Mary faint, poisoning her with the fumes of arsenic contained in a mineral. She recovered, but after that the couple switched from mineralogy to geology.

Mary Somerville could easily recognize real talent among her many contemporaries, and in any field. She read Jane Austen's *Pride and Prejudice* and found it excellent. And she very much liked the philanthropist Elizabeth Fry, and could listen to her for hours, as her voice was so fine.

Up to now Mary Somerville had just interacted with the world without producing anything of her own. She was mainly interested in absorbing knowledge, without ever considering that she might be a prominent figure herself. The real baptism of her literary career in science was solicited by Lord Brougham (Fig. 2.3), who, as already mentioned, was acting on behalf of the Society for the Diffusion of Useful Knowledge.

He began to flatter Mary Somerville, telling her that she could write an account of the *Mécanique Céleste* which she understood so well, and the *Principia* of Isaac Newton. But Mary didn't pay much attention to the offer, as it arrived after a series of dramatic events which would put an end to her serene life in Hanover Square for

Fig. 2.3 Sir Henry Brougham (1778–1868), Lord of the House of Commons, founder of the Edinburgh Review and the Society for the Diffusion of Useful Knowledge. He commissioned Mary Somerville to write her scientific books



a certain time. The first was the illness and death of her ten year old daughter Margaret. She was a brilliant little girl, and maybe her family had expected too much from her. Her mother's demands for her to obtain a high level of education may have proved too great for her. In addition, the second son she had had from her first marriage, William George Craig, died at the age of only nine, and the first child of her second marriage, a boy, died in infancy.

At the same time, in 1819, William Somerville was appointed physician to Chelsea Hospital, so the family had to move from Hanover Square to a government house in Chelsea. In those days, Chelsea was a much less desirable area, certainly not the present elegant residential quarter whose reputation attracts celebrities from all over the world. It was indeed a popular location for artists and writers, but Chelsea remained rural. In fact, in the 19th century a development boom caused its final absorption into London. This meant that, when the Somervilles moved there, in order to see friends and reach places, they had a long way to go. And Mary was not a walker.

What was more, William and Mary didn't have much talent for managing their money, and they almost lost everything due to the incompetence of a cousin whose debts had been guaranteed by William. Indeed, William was a famously good-hearted and trusting man. Mary was only informed of this financial loss after the event and the family went through a serious financial crisis [PEC 170–172].

In this unpleasant situation, Mary found relief in a new friendship with Lady Noel Byron and her daughter Ada (Fig. 2.4). The latter, after marrying Lord Lovelace, transformed herself from the daughter of Lord Byron, abandoned by her father at the age of two, into a smart scientist. She was indeed the only person who understood the importance of Charles Babbage's early mechanical computer, the so-called "analytical engine", and for this reason she is regarded as the first computer programmer. Mary Somerville and Ada Lovelace had a wonderful common interest that would often serve them in conversation: mathematics. When Ada encountered difficulties in some calculation, she would walk to Mary Somerville's house and they would straighten the matter up over a cup of tea.

Despite their financial ups and downs, travelling was a favourite activity for the Somervilles during their Chelsea years, assisted by William Somerville's invaluable ability to speak foreign languages. And they could leave their girls at home thanks to their reliable German governess, Miss Becker, who was more like a friend than a home help. Their freedom to travel depended totally on her conscientiousness.

One of the tours across Europe took them through Holland and Germany in the company of Sir James Mackintosh, a Scottish jurist who was also a journalist, judge, philosopher, and politician, and hence a perfect travelling companion. During that trip, Mary had one of her outbursts of disapproval over gender inequality. In one of the houses she visited while going up the Rhine, she was astonished to see that "the lady of the house was going about with a great bunch of keys dangling at her side, assisting in serving up the dinner, and doing all the duty of carving, her husband taking no part whatever in it" [PR 159].

They always employed the same method for enjoying their trips to the European capitals in the best possible way: they first made contacts by letter and then paid



Fig. 2.4 Ada Lovelace (1815–1852), mathematician, considered the first computer programmer. She was an admirer of Mary Somerville and the only daughter of Lord Byron (*Portrait by Margaret Sarah Carpenter, 1836, Government Art Collection, 10 Downing Street*)

visits to the people they wanted to meet, usually celebrated intellectuals who could offer them enlightening conversation. But it should be said that their friendly relationships with others were not based solely on Mary Somerville's curiosity and

outgoing nature, but also on William's love of talking to people and generally observing and studying humankind. In Holland, for instance, Mary was amused by the fact that her husband spoke the Dutch language fluently, having learnt it during a voyage to the Cape of Good Hope.

In the 19th century, getting together and exchanging ideas was how so-called *Grand Amateurs* broadened their culture, and it was not a bad way indeed, if one considers the quality of research in all the fields pursued.

It was during the Chelsea period that a crucial letter arrived from Lord Brougham, dated 27 March 1827. In the letter, which was addressed to William Somerville and not to Mary, the founder of the Society for the Diffusion of Useful Knowledge said explicitly that Mary in his opinion was the only person who could explain the depths of science to ignorant readers. He was worried by the fact that in England not more than twenty people knew the contents of Newton's *Principia* and Laplace's *Mécanique Céleste*, and not more than a hundred knew them even by name. It was his firm belief that "Mrs. Somerville could add two cyphers to each of those figures" [PR 162].

Mary's reaction was very simple. She felt that her self-taught education wouldn't equip her to cope with such an endeavour. But a few days after the arrival of the letter, Lord Brougham went to the Somerville's home in person, and together with William, succeeded in convincing Mary at least to try. Her reluctance was perfectly justified: in order to explain the content of such books properly, it would have been necessary not only to know differential and integral calculus, but also to include diagrams or figures, something totally missing from Laplace's work. In the end she agreed to try, upon condition of secrecy, so that if she failed, the manuscript could be put on the fire [PR 163].

When she decided to start her work, she organized the household in a new and efficient way, designed so that she could write in peace, or at least without too many interruptions. This was not difficult, because she was a very well organized woman, and a real expert on such things as the work-life balance. Luckily, she had a great capacity to completely ignore external circumstances when she was focusing on some specific line of thought.

One is moved by the fact that she actually hid her papers when someone came to visit her, as if she was doing something inappropriate. A scientist and a writer, trying desperately to combine her love for knowledge and her duties as a mother and wife. What a shame!

One should add that it is difficult to understand the kind of *trance state* that captures the mind of a mathematician at work: nothing else is important, daily matters no longer exist, the only real thing is the content of what one is trying to understand, and the mind is too preoccupied for anything other than its main pursuit. But this is a pleasant state. The world is shut out, the formulas are there to nourish one's mind, to enter deep in one's soul, with their often astonishing beauty. Mary knew all this very well, so Lord Brougham's offer was certainly difficult to satisfy, but what a wonderful opportunity to master her talent!

When the book was finished, after three years of hard work, and handed in for examination, a letter arrived from her truest and best friend John Herschel. He was enthusiastic about her manuscript and said that it was a pity that Laplace was no longer alive, since he would have enjoyed the way Mary had illustrated his mathematics.

Mary was fifty-one years old when this happened, an age which in those days represented for the majority of women the start of a quiet period in their lives, after taking care of their households and rearing their children. But for Mary Somerville the best had yet to come.

The success of the book, which was entitled *On the Mechanism of the Heavens*, was astonishing. It was published by John Murray, one of the most prominent publishers in Britain, who had also published Jane Austen, Sir Arthur Conan Doyle, Lord Byron, and Herman Melville, to mention but a few. The 750 copies were quickly sold, mainly in Cambridge, in an effort to modernize teaching in mathematics. The preface, about seventy pages which she called *Preliminary Dissertation*, was the only part which could be read by the uninitiated, so she had some copies of it printed separately to give away. Maybe the best comment about this preface was the one made by Maria Edgeworth, the Irish novelist and writer of moral tales for children, who wrote in a letter to Mary:

I was long in the same state of a boa constrictor after a full meal...my mind was so distended by the magnitude, the immensity of what you put into it!

So what did she write in her first literary endeavour, when she became the only woman around to publish on science? In fact, she had not only translated, but also interpreted Laplace's work, turning her attention to the most awkward parts of celestial mechanics and reworking all the calculations of the author in such a way that they could be properly understood. This meant that she included original demonstrations of her own and added diagrams which would make the reader more aware of the contents, but which also represented a clever attempt to communicate the aesthetic sides of science. As she had taught herself differential and integral calculus, she had a thorough grasp of the arguments presented by the illustrious French mathematician, and this was the main reason for the sensation the book created. She mastered the theory of gravitation in such a way that it would be wrong to describe her as a popularizer of science: she was a real scientist, who had to devise her own calculations and explain them in order to transfer Laplace's method to paper. Her own philosophical point of view in the presentation was inspired by the intellectual unity of physical science, with mathematics as the glue.

Her work became renowned all over the country and in Europe, and brought her the honour of the "Victoria Medal", besides many other distinctions from every kind of college and academy, both at home and abroad. In particular, in 1835 she was elected Honorary Fellow of the Royal Astronomical Society together with Caroline Herschel, an honour never previously obtained by a woman. Moreover, it was unanimously voted by the Royal Society of London that a bust should be placed in their great Hall, and Sir Francis Legatt Chantrey, the leading portrait sculptor of Regency Britain, was commissioned for the task.

In a more peculiar vein, a well known shipbuilder in Liverpool asked for permission to name his new vessel, intended for trade with China and India, the “Mary Somerville”, with a copy of her bust as figurehead!

In 1835, another most welcome letter arrived from the British statesman Sir Robert Peel, who advised the Crown to grant a civil pension of 200 lb a year for Mary Somerville in recognition of her eminence in science and literature, hoping that this gesture would encourage others to follow her brilliant example. Of course, everyone in the family rejoiced over this news, even more so because the Prime Minister, Lord John Russell, added 100 lb a year to the pension, thereby coming to the rescue of the brilliant scientist’s battered personal fortune, almost completely lost through mismanagement.

Together with this recognition for her scientific achievements, an invitation arrived in 1832 from Adam Sedgwick, one of the founders of modern geology, who was Woodwardian Professor of Geology at Trinity College, Cambridge, for a special week in the company of Sir George Biddell Airy, professor of astronomy and mathematics at Cambridge and Director of the Greenwich Observatory. Airy wielded great influence within the British science community and had become quite well known, not only for reorganizing the Greenwich Observatory, but also because he opposed government support for pure science, arguing that original research was best left to private individuals and institutions.

William Somerville received this formal invitation from Sidgwick, which was quite lively and detailed. It had been decided as a matter of fact to lodge the distinguished guests in Trinity College itself, a most unusual favour, so far as a lady was concerned. “A four-poster bed” he wrote, “a thing utterly out of our monastic system, will rear its head for you and Madame in a chamber immediately below my own, and your maid may safely rest her bones in a smaller inner chamber” [PR 180]. Then followed a list of arrangements and engagements which would appear to have detailed every hour of every day of the proposed visit.

We can only imagine how Mary reacted to this invitation, not only for the great honour she received, but also because it was so unusual for a woman. Even though the letter was sent to William and not to herself, according to the rules of society in those days, she went with her husband to Cambridge with the firm intention of enjoying every minute of the visit.

As a consequence of this recognition, her social life became even more brilliant than ever, and full of interest. Even the sad events which had taken place within her family, with the loss of three of her children, didn’t diminish her eager and intelligent curiosity about the world. And the deep faith that had always given her strength was an invaluable help in enduring these many sorrows.



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