

“All women who have published mathematics hitherto have shown knowledge, and power of getting it, but no one, except perhaps (I speak doubtfully) Maria Agnesi, has wrestled with difficulties and shown a man’s strength in getting over them. The reason is obvious: the very great tension of mind which they require is beyond the strength of a woman’s physical power of application.” from a 1843 letter by Augustus de Morgan, mathematician

The reason why practically no woman had wrestled with difficulties and shown a man’s strength in getting over them was obvious to de Morgan, who attended Trinity College and held a position as math professor in London University. No woman could have been his classmate at Trinity College or his colleague at London University since women were not allowed, regardless of their strength in getting over the difficulties that math may present.

Maria Gaetana Agnesi, (1718-1799) the Italian mathematician mentioned doubtfully by de Morgan, shined with a bright light since her early years in Milan, where she started by being the hostess of intellectual gatherings at her family house, and making her father burst with pride by showing how she could speak various languages by the age of nine. The wealth and unusual open mindedness of her family allowed her to have excellent tutors with whom she maintained stimulating discussions.

As years went by, Agnesi become more interested in mathematics and religion, and less fond of her social obligations. Her desire of retiring to a convent was met with the opposition of her father, who in exchange accepted a more convent-like way of life for her.

She devoted the third decade of her life to write Foundations of Analysis (Istituzioni analitiche). In these thousand pages she combined her knowledge of math and different languages to give a clear, precise and illuminating discussion of most of the ideas about differential and integral calculus known at the time,

including the complementary concepts of the calculus arch-rivals Leibniz and Newton.

Her father died a few years after the publication of her work. Since then, Agnesi submerged herself in religion and charitable work, taking care of the poor and even living among them until end of her life.

Sophie Germain (1776-1831) grew up in the turbulent Paris of the end of the eighteenth century, not far, in space and time from Agnesi. Germain fell in love with math in an unusual way and never faltered. Her family was far from supportive of this math love story. They tried every method in reach to stop Sophie in her pursuit of understanding but her tenacity was stronger.

She was not allowed to attend to the school of her desire. Thus she studied from notes. She could not submit work in her own name. She submitted work under the name of a former student, M. LeBlanc. The recipient of this work was the renown mathematician Joseph-Louis Lagrange who became eager to know M. Leblanc after noticing how interesting “his” work was. When he discovered that the admiration should be addressed to a woman, he did not step back. On the contrary, he went to her home to express his admiration and support.

Germain, once more under the pseudonym of M.LeBlanc, maintained extensive correspondence in number theory with **Gauss**. Like Lagrange, Gauss did not step back when a novelesque incident revealed to him the gender of M. LeBlanc.

Never lacking of self-confidence, Germain submitted an entry for a contest of the French Academy of Sciences. It was an essay about the mathematical theory of elastic surfaces. The rejection of her work did not stop her and two years later she submitted a second entry. This time, she earned the prize.

Alicia Boole (1860-1940) . During long centuries women had no access to mathematics. A few excellent fathers, like Agnesi's, did their best to remedy this injustice to their daughters. Everything indicates that the mathematician George Boole would have joined these group of fathers. But death took him before any of his five daughter could benefit from his instruction. He left them however with a remarkable mother: Mary Everest Boole, who raised this all-female family with no money but with an infinitude of interesting ideas. One of **these** daughters, Alicia Boole (1860-1940) discovered as a teenager the attraction of geometry when a friend of the family showed her a puzzle designed to visualize the tesseract, or cube in four dimensions. From that moment on, she was hooked and spent many hours trying to understand the equivalent to the platonic solids in four dimensions. She married an actuary and had two children. It was her husband who found in a mathematics magazine a picture very similar to the distinctive figures that she was constantly drawing. She wrote to the author of the paper, the Dutch professor Pieter Schoute establishing a collaboration that would last until his death in 1913. Nothing is known about her math activity until 1930 when she met the young geometer Harold Coxeter. Since then, worked with him until her last days.