

Ada Byron, Lady Lovelace

In planning his Analytical Engine, Charles Babbage had an unusually, the mathematically gifted and talented **Ada Byron, Lady Lovelace** (December 10, 1815 – November 27, 1852), the only legitimate child of renowned English poet George Gordon, Lord Byron.

From an early age, Byron's daughter showed great intelligence and perhaps not too surprising, a rebellious nature. She engaged in a life-



long correspondence with Babbage about the Analytical Engine. In 1843 she wrote an article in which she gave descriptive, analytical, contextual, and metaphysical information about the engine. She explained a process that developed into computer programming, and did so with great clarity and insight, demonstrating that she had inherited some of her father's gift for words.

Augusta Ada Byron was born at Piccadilly in Middlesex, now a part of London. Five weeks after her birth, and after only a year of marriage, her parents separated and her mother Annabella Millbanke was awarded sole custody of their daughter. Lord Byron was a temperamental, passionate, unstable and infamous cad, moving from one scandal to another, while Annabella was calm and composed.

Annabella was provided with some power over her husband when one of his bitter former lovers, Lady Caroline Lamb, shared the news that Byron had an incestuous relationship with his half-sister Augusta Leigh and had corrupted several young boys with unnatural crimes. The truth of these charges has never been established. Lord Byron left for Italy, never to return to England while alive. He died when Ada was eight years old at Missolonghi, Greece, where he had gone to fight for Greek independence from Turkey. Although he never saw his daughter again, he greatly regretted it. In *Childe Harold*, he wrote:

“Is thy face like thy mother’s my fair child,
And sole daughter of my house and heart?”

He also wrote: “I see thee not. I hear thee not. But none can be so rapt in thee.” Among his last words were, “Oh my poor dear child! My dear Ada! My God, could I but have seen her!”

Fearing that Ada might become a poet like her father, Annabella, whom Lord Byron nicknamed the “Princess of Parallelograms” because of her love of geometry, encouraged her daughter’s interest in mathematics and the sciences. Ada was educated at home by governesses and tutors who taught her basic science and mathematics. She was an active, energetic child who loved gymnastics, dancing and horseback riding. She became an accomplished musician, learning to play the piano, the violin and the harp. She was especially fascinated by mechanical things, and was very intrigued with how machines worked. At age 14, she had a bout with the measles that left her an invalid. She slowly recovered and was well enough to be presented at court in 1833. Sometime in early 1834 she tried to run off with a young male tutor.

At age 17 Ada Byron met Mary Somerville, the remarkable mathematician who translated Laplace’s works into English. It was at the home of Mrs. Somerville that Byron first met her future husband William King and learned of Babbage’s new calculating engine. They began a voluminous eighteen-year correspondence on the topics of mathematics, logic, and ultimately all subjects. Their letters were often playful and even slightly flirtatious. Her first letter to Babbage was January 18, 1836, in which she describes her eagerness to continue her mathematical studies and how she needs a mentor to guide her. Later, logician Augustus De Morgan gave Ada Byron lessons in arithmetic, algebra, trigonometry and calculus. At age 19, Byron married King, 11 years her senior, who soon after became the Earl of

Lovelace. The marriage was comfortable, and although she was his intellectual superior, he took pride in his wife's talents and accomplishments. The couple had two sons and a daughter. Byron left them to her mother, nannies and servants to raise.

In 1842 Italian mathematician and ambassador to France, Louis Menebrea published a memoir describing the function and theory of Babbage's Analytical Engine. Countess Lovelace spent nine months translating the paper from French to English so that more could read the work.

Lovelace appended a set of her *Notes* that, at three times the length of Menebrea's work, became the source of her fame. In them she showed how to compute Bernoulli numbers, earning her the reputation of being the first computer programmer. However, Babbage and others had previously written "programs" for the never-completed Analytical Engine. Lovelace, who called herself "an Analyst and Metaphysician," demonstrated that she understood Babbage's plans for the machine, and was superior to him in articulating its promise. She perceived that his machine had greater potential than even he realized.

Babbage intended the analytical engine to print astronomical, mathematical and actuarial tables.

Lovelace anticipated future developments, including computer-generated music. She was convinced that if symbols ("unknowns") were substituted for the numbers crunched by Babbage's machine, it could be used to perform almost any task. She wrote: "The Analytical Engine weaves algebraic patterns, just as the Jacquard loom weaves flowers and leaves." Since it was not considered proper for well-bred women to write papers, when her paper was published in *Taylor's Scientific Memoirs*, she signed it "A.A.L."

Lovelace's passion for horses proved disastrous when with Babbage, she became involved in testing mathematical theories of probability in horse racing. She was forced to pawn the family jewels to pay

her creditors. Her husband stood beside her in a mounting scandal brought on by her addictions to alcohol and drugs. This led to serious personality disorders. She died of cervical cancer at 36, the same age Lord Byron was at his death. At her request she was buried next to the father she never knew in Hucknail Torkard church in Nottinghamshire. After her death, Lovelace's work was lost and forgotten until B.V. Bowden discovered it in 1935. Those who rediscovered her results knew nothing of her achievements. The precision and correctness of her working instructions and programming analysis led the United States Department of Defense to name its new standardized computer language ADA in her honor in 1979.

Quotation of the Day: “No one knows what almost awful energy and power lies yet undeveloped in that wiry little system of mine. I say awful, because you [Babbage] may imagine what it might be under different circumstances.”— Ada Lovelace