

# This Month in the not so distant past



Looking back at historical moments that happened in September, **John Davis** highlights **Charles Babbage** and **Ada Lovelace**.

**W**ho could predict that a chance meeting over drinks and canapes one summer evening would later have such a significant effect on the development of technology that we all take so much for granted these days.

The meeting, in 1833, was between the Cambridge academic Charles Babbage and the young impressionable Ada Byron who had been invited to Babbage's soiree by her tutor Mary Somerville the scholar who has an Oxford college named after her.

Babbage could certainly be considered as a polymath of the Victorian age as he was not only a mathematician but also a philosopher, inventor and mechanical engineer. Born in 1791, he was educated at Peterhouse College, Cambridge and later taught mathematics at Trinity College in the same university.

After early work on mathematical formula and astronomy, the 1820s saw Babbage begin work on his Difference Engine, basically a machine that could perform mathematical calculations. He was to produce several prototypes of this machine before graduating to design the Analytical Engine, a much more complex device that, using punched cards, was intended not only to perform mathematical calculations but deliver instructions and store information in a memory.

The seventeen-year-old young lady that Babbage was introduced to and who seemed so fascinated by his work was the estranged daughter of the romantic poet Lord Byron. The poet, described by the press as 'mad, bad and dangerous to know', left England four months after Ada was born and there is no record to suggest they ever met. He was to die in Greece from a fever while fighting in the Greek War of Independence in 1824. He was thirty-six.

Perhaps, not surprisingly, Ada's mother, Annabella Milbanke, was quick to steer her daughter away from literature and the arts, and focussed her offspring's education around a core of mathematics and science. Young Ada proved to be a prodigious talent, working on difficult calculations and number patterns while drawing up plans and designs for a flying machine. Once, when asked why she loved mathematics so much she replied, 'Because it has answers. Every time

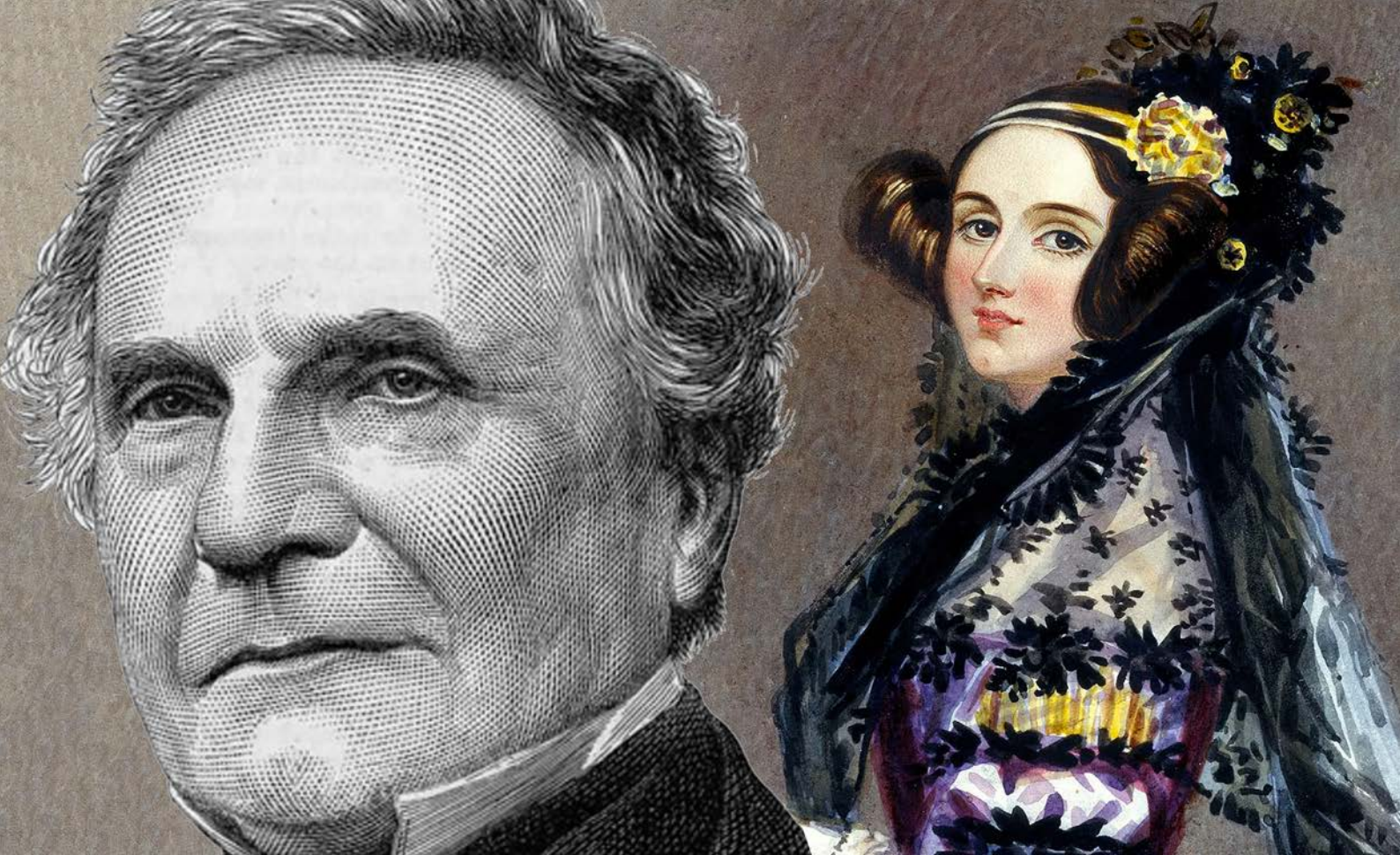
I solve a maths problem, it makes a lovely shape in my head.'

At the evening gathering Ada was mesmerised by Babbage's work on his Difference Engine even though it was only partially constructed. He also discussed with her other inventions he was making in his large house in Dorset Street and outlined plans for his next project, an Analytical Engine.

*'Every time I solve a maths problem, it makes a lovely shape in my head.'*

Shortly afterwards, progress on the Difference Engine would slow and, as financial backers lost interest, work eventually stopped. Undeterred, Babbage still pressed ahead with his new device and in desperation began to search for monetary help abroad. This put him into contact with the Italian mathematician Louis Menabrea who published details about the Analytical Engine in French. Being no linguist, Babbage asked Ada to translate the report for him. For nine months during 1842-43 she worked feverishly on the report not only translating the information but also adding her own notes and observations. It was for this piece of work that she established her reputation as one of the most famous mathematicians of the Victorian age.

Ada's translation proved that not only did she understand the plans for the machine as well as Babbage but that she was much better at predicting how successful it could be in the future. Ada saw the machine's potential as a general-purpose computer that could be adapted to perform specific tasks like composing music, drawing graphics and being put to practical scientific use. When she suggested giving the machine a set of instructions for calculating number patterns she produced, in effect, the first computer program and became the world's first computer programmer. The name Ada is still used today for a computer programming language, used in such things as aircraft navigation systems.



*Charles Babbage and Ada Lovelace*

Babbage who died in October 1871 aged seventy-nine worked in many other fields of science and mathematics before his death. Parts of his incomplete mechanisms can be seen in the Science Museum in London. In the 1990s, a functioning Difference Engine was constructed from Babbage's original plans. Built to tolerances achievable in the nineteenth century, the success of the finished engine indicated that the machine would have worked successfully. The same is probably true of the Analytical Engine because its design contained the principles of modern computers. Its sheer complexity and scale, however, requiring steam power, would have made it impossible to build with the precision and materials available in the nineteenth century.

While still heavily engaged in her scientific and mathematical work, Ada married William King in 1835 and when he later succeeded to the family title, she became Countess Lovelace. Despite spells of ill health throughout her life the couple brought up three children Byron, Annabella and Ralph. Ada, the only legitimate child of Lord Byron, 'flirted with scandals' to quote one biographer and with her quick eye for spotting good odds, became an avid gambler, losing large sums of money on several occasions when she was unable to repay the other members of her syndicate. She became seriously ill during 1852

and died in November of that year. She was only thirty-six years old. At her request, she was buried at Hucknall in Nottinghamshire beside Lord Byron—the father she never knew.

It was the pioneering work carried out by Charles Babbage and Ada Lovelace that later mathematicians, especially Alan Turing, were able to develop into other computing machines. Turing used some of the principles established by Babbage and Lovelace to construct his 'bombe'. It was a device that could be used to discover some of the daily settings of the Enigma Machines used by German military networks and greatly assisted the code-breakers working at Bletchley Park during World War Two.

Turing was to go on to contribute towards building early electronic computers including the Automatic Computing Engine (ACE) and the Manchester Mark I. He is also considered to be the father of artificial intelligence

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