Charles Babbage was born into a wealthy family in 1791. Despite a comfortable upbringing, he proved to be a mathematical genius and because he grew frustrated at amending the many mistakes he found in logarithm tables, he turned his mind to building a machine that could take the drudgery out of calculations.

In 1822 he showed the Royal Astronomical Society his first model of a 'difference' engine, a machine that could make the calculations needed for constructing logarithm tables. The name derives from an abstract mathematical technique known as the method of differences. The society encouraged him to go onto further and better machines.

Together with Ada Lovelace, the daughter of Lord Byron, he set out on a more ambitious project to build an 'analytical engine'. This machine was designed to calculate values of mathematical functions that were far more complicated than the logarithmic functions.

This machine was fraught with problems from the very start. It just wouldn't work. The drawings that have survived show us that the construction was huge, filling the large workshop Babbage had built on his estate. The hundreds of cogs, rods and wheels had to be specially turned on lathes and current metal technology simply wasn't good enough. When he had built his little model, the minor inaccuracies it produced could be shrugged off, but once he tried to get the full-sized machine going, the minor inaccuracies became greatly magnified.

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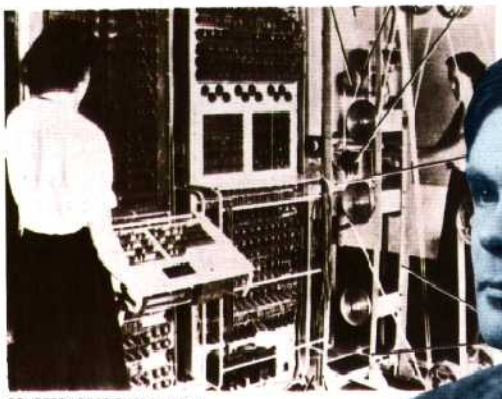
The First Programmer
Countess Ada Lovelace, Charles Babbage's companion and Lord Byron's only legitimate daughter, is one of the few women to figure in computing history. A gifted mathematician, she understood Babbage's Analytical Engine and wrote some of the best accounts of how it worked. She even devised programs for it, making her the world's first computer programmer

Babbage was on the right track, and had he been able to get parts machined sufficiently well, it is probable that his analytical machine would have worked. Much of the logical architecture and design structure of today's computers can be traced back to Charles Babbage and he is remembered as one of the founding fathers of modern computing.

One important hunch that occurred to Babbage during his years of work was the idea that his engine could be 'programmed' or 'taught' to do any mathematical task. Had he been able to prove this, or had he been able to build a machine that could do it, the Victorians would have been running their Empire by steam computer.

It wasn't until 1936 that proof was provided for Babbage's hunch. It appeared in an obscure paper called *On Computable Numbers*, published by a young Cambridge mathematician, Alan Turing. Turing's name may be almost unknown to the general public, but his contribution is fundamental to the development of the ideas that had to be generated before the computer could become a reality. Scientists had for a long time reasoned that mathematics was not a mysterious art but a science totally controlled by logical rules and that if you gave a machine these rules and a problem, it should be able to solve it. However, all the efforts of the most able mathematicians had failed to develop such a machine. Turing decided to



COURTESY OF SCIENCE MUSEUM

Alan Turing And Colossus
Alan Turing proved that a set of simple instructions could solve any complex problem. He and his team developed Colossus, one of the world's first computers, seen operating here during World War II. This enormous machine contained 1,500 valves, one of which burnt out every few minutes. Colossus was capable of processing 5,000 characters a second and was responsible for cracking the German code 'Enigma'