Charles Babbage

Though never fully implemented, Charles Babbage's machines were the forefathers of the modern computer

'I wish to God these calculations had been executed by steam!' Charles Babbage exclaimed as he laboured over the tables of the Nautical Almanac. The 19th century had developed steam power but accurate navigation at sea was still a problem. A ship's position was found by observing the moon and then using mathematical tables that were often inaccurate.

It was in 1812 that Babbage first had the idea of building a machine, which he called the Difference Engine, that could perform the laborious calculations needed for the nautical tables. By 1823 he had completed a small model and approached the government for a grant to build a working machine. The Chancellor of the Exchequer gave him £1,500 and he set about building an engine that would eliminate errors by automatically printing the results of its own computations.

Babbage's life's work was thereby determined. The project consumed vast sums of money, for he was working at the frontiers of the engineering skills available at that time. He obtained the money through the assistance of the Prime Minister, his friend the Duke of Wellington. Despite Babbage's confidence that 'whatever the engine did it would do truly', the government eventually withdrew, having sunk £17,000 into the venture. Babbage's engineer, Joseph Clement, resigned shortly afterwards, following an argument, and took with him all the tools that had been specially machined for the engine.

Babbage moved quickly onto a more ambitious project, the Analytical Engine, which was intended to accomplish all that the Difference Engine had been designed for and much more besides. Its design in many ways resembled that of the modern computer. It contained a memory store and an arithmetic 'mill' (equivalent to the CPU), provided printed output, and could even be programmed, using conditional branching.

At first the instructions were controlled by spikes as in a barrel organ; later the punched card system that Joseph Jacquard had introduced into the weaving industry was adopted. Babbage also experimented with different number bases but as all his machines were mechanical, there was no advantage to be gained from using the binary system.

He was joined in his project by his companion Countess Ada Lovelace, who was a gifted mathematician. They were dogged by problems, not least money. She lost much of her wealth gambling on an 'infallible' horse-racing betting system. After her death at the age of 36, Babbage continued alone.

A man of prodigious energy, he also invented the doctor's ophthalmoscope for looking into the eye, choreographed a ballet, devised a system of stage lighting and invented a technique for signalling at sea.

In his last years he grew irascible. Expecting a peerage, he turned down the baronetcy offered as recognition for his work.

Babbage's work anticipated the structure of the modern electronic computer but he failed to realise his vision fully. His Analytical Engine remained unfinished, its completion thwarted by the technical limitations of 19th-century engineering science.

1792
Born in Totnes, Devon, on 26 December

1810
Goes to Trinity College, Cambridge, to study mathematics

1814
Marries Georgina Whitemore

1822
Publishes a paper entitled 'Observations on the Applications of Machinery to the Computation of Mathematical Tables'. Receives the first Gold Medal of the Astronomical Society, which he helped to found

1827
Cambridge appoints him Lucasian Professor, the chair once held by Newton, at £80 a year, though he never lectures or takes up residence

1833
Parliamentary candidate at Finsbury

1834
Work on Difference Engine suspended after the engineer Joseph Clement resigns

1862
Partially complete Difference Engine exhibited at South Kensington, London

1871
Dies on 18 October