Charles Babbage: The Father of the Computer [B2]

Matematico autodidatta e dal carattere irascibile, fu una delle menti più brillanti del XIX secolo. Ideò il primo computer digitale programmabile, ma le sue idee furono ignorate per decenni.

One of the most important and innovative thinkers of the 19th century, Charles Babbage is considered to be the father of the computer. Almost two hundred years ago, this brilliant mathematician, inventor and mechanical engineer originated the concept of the digital programmable computer. Born on 26 December 1791, the son of a banker, Babbage was often **unwell** as a child and was educated at home. Largely **self-taught** in mathematics, he entered Cambridge University in 1810, where he discovered that he knew more than his tutors!

THE DIFFERENCE ENGINE

After leaving university, Babbage started to consider one of the major scientific problems of his time: printed mathematical tables, which were central to navigation, science, engineering and maths, were calculated by hand; mistakes were common and these could have disastrous consequences, especially for ships at sea. In 1812, Babbage had the idea of computing all tabular functions using machinery. Babbage began work on an advanced calculator intended to produce logarithm tables used in navigation. The Difference Engine would perform computations to 20 decimals. The value of numbers was represented by the positions of **toothed wheels** marked with decimals. The 'thinking machine' automatically printed answers into tables. It had **storage**, a place where data could be held for later processing. Babbage received government **funding** in 1823, but ten years later **fell out** with the machine builder. The engine — to be composed of twenty-five thousand parts, **weighing** fifteen tons, 2.4 metres tall, with six wheels — was never built.

THE ANALYTICAL ENGINE

Babbage was no 19th-century **geek**. A great **raconteur**, he was an important figure on London's social scene. He held scientific **soirées** inspired by the salons of the French **Enlightenment**, making his home a regular meeting place for scientists, authors and other intellectual elites. By the mid-1830s, Babbage was working on another invention, the even more complex Analytical Engine, which would prove to be the **forerunner** of the modern digital computer. The **steam-driven** machine would be capable of performing any arithmetical calculation using **punched cards** that would give the answers. It would also have a memory unit to store numbers, sequential control, and most of the rest of the basic elements of the modern computer. The memory unit would hold a thousand fifty-digit numbers, more than the **storage** capacity of any computer before 1960. The machine even had the world's first-ever computer program, courtesy of brilliant mathematician Ada Lovelace, a guest at Babbage's **soirées**. A lack of government **funding**, however, meant that, sadly, it would never be built.

UNFINISHED DREAMS

Several factors prevented the building of Babbage's machines. Government **funding** was never sufficient, and Babbage's irascible character meant that there were constant **clashes** of personality with potential collaborators and investors. His brilliant ideas were also, quite simply, ahead of their time. The Analytical Engine, if built, would have forty thousand parts, making it more complex than a modern **jet engine**! The power of computers — his invention — was only finally recognised with the work of the British scientist Alan Turing, who founded modern computing in the 1930s.

SAD AND FRUSTRATED

Charles Babbage died on 18 October 1871, a sad and frustrated man, with his machines unfinished and his designs forgotten for decades. Although he never managed to turn his visionary dreams into reality, his incredible work did **lay the foundations** for today's Alan Turing-inspired world of modern

computing. In an act of homage to the great inventor, British scientists built his Difference Engine, to Babbage's specifications, in London's Science Museum in 1991. Nine years later, they built his printer. More than a century after his death, the cultural icon's **groundbreaking** conceptions finally took physical form.

A PROLIFIC INVENTOR

Babbage's mind was never still. The range of his interests was extraordinary. He was instrumental in the success of the Industrial Revolution through the development of more efficient machines and promoting the automation of workers. He also helped to start the career of Isambard Kingdom Brunel, Britain's most famous engineer. A **shortlist** of his activities includes the following: he pioneered **lighthouse** signalling, invented the opthalmoscope, advocated decimal **currency**, proposed the use of **tidal power**, proposed speaking tubes to connect London and Liverpool, built an automaton to play **noughts and crosses**, **broke a cypher** in the Crimean War which remained secret for a hundred years, and invented a seismic detector and a '**cow-catcher**' — a device on the front of locomotives **to deflect** obstacles on the **track**. He even made the first comments about possible **greenhouse** effects in the world! Babbage was not always entirely ahead of his time. In his book On the Economy of Manufactures and Machinery (1832), he came up with what was later **coined** as 'the Babbage Principle' aimed at **boosting** productivity in manufacturing. The labour process, Babbage said, **drawing on** the ideas of economist Adam Smith, should work on the principle of specialisation with tasks divided among several workers: labour costs could be reduced by assigning only high-skill tasks to well-paid men, and by limiting low-skill tasks to poorly-paid women. The dangerous tasks should be given to children.

AN IRASCIBLE GENIUS

In the words of one biographer, Charles Babbage was "**touchy** and proud to the point of self-destruction on **matters of principle**." He would often explode into "diatribes of incontinent **savagery**," often against the scientific

establishment. He offended many people who could have helped him in his work. Famous across Europe for his eccentricity, he was fascinated by the supernatural world. He had formed ghost-hunting organisations at university. He thought God was the ultimate programmer. He actually had a very romantic view of life and the world, once saying, “The air itself is one vast library, on whose pages are forever written all that man has forever said or women **whispered**.” He was obsessed by noise in the street, especially street music. He organised a campaign against London’s street musicians, who made money by playing for hours outside people’s houses until the desperate occupants paid them to go away. Claiming that noise reduced his **output** by 25 per cent, he went to court many times. He once listed the “instruments of torture permitted by the government to be in daily and nightly use in the streets of London,” including organs, **brass bands**, **fiddles**, drums and **bagpipes**. Some neighbours who were against Babbage actually hired musicians to play outside his windows. A brass band once played non-stop for five hours! Babbage’s campaign was finally victorious, with the introduction of strict limits on the activities of street musicians. They had their revenge, however. As Babbage lay on his deathbed, an **organ grinder** outside his house tormented his final moments of life.

Glossary

- **to deflect** = evitare
- **unwell** = malato
- **lay the foundations** = porre le basi
- **groundbreaking** = rivoluzionario
- **greenhouse** = serra
- **self-taught** = autodidatta
- **clashes** = conflitti, scontri
- **currency** = moneta
- **brass bands** = bande di ottoni
- **bagpipes** = cornamuse
- **soirées** = serate
- **steam-driven** = a vapore
- **whispered** = sussurrare
- **noughts and crosses** = tris
- **broke a cypher** = decifrare un codice
- **boosting** = stimolare
- **organ grinder** = suonatore di organetto
- **funding** = finanziamento
- **punched cards** = schede perforate
- **lighthouse** = faro
- **track** = pista
- **coined** = coniare
- **drawing on** = attingere a
- **fell out** = litigare
- **weighing** = pesare
- **jet engine** = motore a reazione
- **output** = produzione
- **geek** = fanatico della tecnologia
- **Enlightenment** = Illuminismo
- **tidal power** = energia delle maree
- **touchy** = permaloso
- **matters of principle** = questioni di principio
- **savagery** = brutalità

- **fiddles** = violini
- **toothed wheels** = ruote dentate
- **raconteur** = aneddotista, buon raccontatore
- **forerunner** = precursore
- **storage** = immagazzinamento
- **shortlist** = lista ristretta
- **cow-catcher** = deviare le vacche