

June 2022



Dear Club Members,

On the 14th June 1822, at a meeting of the Royal Astronomical Society Charles Babbage proposed his plan for a difference engine.

Born December 1791 Babbage was an English polymath. During his lifetime he worked on ideas connected to mathematics, philosophy and mechanical engineering. We know him as the inventor of the first programmable digital computer, and he often known by the title "father of the computer".

The name difference engine describes the way in which the machine was designed to function. Complex mathematical functions, used in mathematics, science, engineering, and navigation can be worked out by using a process called divided differences... if you're not mathematically minded it's all a bit brain twisting, but basically working out these figures by machine was both quicker and less prone to error. So important was this work that the British Government gave Babbage £1700 to turn that initial idea in to a working machine.

Unfortunately that £1700 was woefully short of the amount needed. By 1842 work had been abandoned on the machine, and Babbage had spent over £17,000. Parts of that incomplete machine were put on display in the Science Museum in London. In 1991 the museum used Babbage's plans to create a fully functioning difference engine. Using the same manufacturing tolerances that would have been possible in the 19th century, this working version proved that Babbage's plans were viable.

The main aim of the machine was to produce of tables of numbers relating to various mathematical functions. Where we would now reach for a calculator to work out the logarithm of a number, historically these had to be looked up in a printed table. Babbage even created a printer that would create a paper copy of the numbers calculated by the machine, and typeset a master copy so further tables could be printed with no reliance on human error. Again, in the year 2000 the Science Museum created a working replica using those plans.

Babbage's engine worked by a rotating series of brass gears and number wheels. A hand crank turns the machine, and the linked components rotate to produce the solution to the problem. Lady Byron, wife of Lord Byron, and mother of Ada Lovelace, took her daughter to see a small working model of the Difference Engine in 1833. She wrote this about the experience- "We both went to see the thinking machine (or so it seems) last Monday. It raised several Nos. to the 2nd and 3rd powers, and extracted the root of a Quadratic equation."

Lady Byron went back to live with her parents whilst Ada was still an infant. Fearing her daughter would develop her fathers scandalous behaviour she encouraged Ada to develop her skills as a mathematician and scientist. Mary Sommerville tutored Ada, and introduced the Byrons to Babbage. Sommerville, alongside Caroline Herschel, was the first woman to be a member of the Royal Astronomical Society.

When work on the Difference Engine stalled Babbage went on to develop a more complex machine called the Analytical Engine. This differed in that it was designed to be programmed used punched cards. This is the exact same process that Jacquard looms use to create complex

patterns, the punch cards telling the loom which shafts to raise and lower with each weft pick. Lovelace collaborated with Babbage on this project, and is now credited as being the first Computer Programmer after writing an algorithm tailored to the Analytical Engine. Her notes could be considered as the first piece of software designed to be installed on one of the first computers.

Babbage died in 1871, aged 79. Lovelace predeceased him, she died of uterine cancer in 1852, aged just 36. Your fibre is inspired by the difference engine itself. A scientific sculpture of gleaming brass, iron and steel that is utterly beautiful to watch working.

Happy Spinning

Katie

Fibre Content- In case your parcel is missing the label

75% Shetland Wool

20% South American Wool

5% Viscose Tweed Nepps

Further Reading-

Charles Babbage-

<https://www.computerhistory.org/babbage/charlesbabbage/>

<https://www.youtube.com/watch?v=KBuJqUfO4-w>

How does the difference engine work?

https://www.youtube.com/watch?v=PFMBU17eo_4&list=PLSOxgHhh6-o8ZuhRpL9ds8wM4doxauru-

The Jacquard Loom-

<https://www.scienceandindustrymuseum.org.uk/objects-and-stories/jacquard-loom>

<https://www.youtube.com/watch?v=Ollns3fPtE>

Ada Lovelace

<https://www.computerhistory.org/babbage/adalovelace/>

<https://www.newyorker.com/tech/annals-of-technology/ada-lovelace-the-first-tech-visionary>

The Difference Engine

<https://www.smithsonianmag.com/history/what-a-difference-the-difference-engine-made-from-charles-babbages-calculator-emerged-todays-computer-109389254/>

Computing before computers-

<https://www.sciencemuseum.org.uk/objects-and-stories/lovelace-turing-and-invention-computers>

One of the Difference Engines made from Babbage's plans (a second engine is at the Computer History Museum in California USA)

<https://www.youtube.com/watch?v=BlbQsKpa3Ak>