

The Life and Contributions of Charles Babbage

The history of computing can be traced back many years. Digital Computing is rooted in the art of counting and solving problems. From the early forms of counting and doing arithmetic using an abacus or Napier's Bones, computing has always been the objective. As the years went by, the way people completed these tasks became easier and more dependent on machines. By moving to machines, humans were able to complete tougher tasks dealing with numbers and calculations and also they could do more in a given period of time. This is evident in the example of the problem the US had when trying to count the country's population. The early censuses were done by hand, but as the population grew larger, it was more difficult to complete that task in a reasonable period of time. Therefore some people began to think about making a machine that could aid in the process. It was successful and completing the census was not as hard as it could have been.

Throughout the history of computing we see situations as this, where there is a problem with trying to complete a calculation or task and someone comes up with an idea to solve the problem. These inventors are the pioneers that drove the evolution of computing to new heights. One such man that took part in this evolution was Charles

Babbage. His story “is a tale of squabbles over money, personal tragedy, a vendetta, a beautiful countess, a confrontation with the Prime Minister, political instability and public protests” (Bortz). The following is a biography of the life that he led and the contributions he made to advance computing to what we know it as today.

Before Charles Babbage would become known as the “Father of Computing” he was born December 26, 1791 in London, England, United Kingdom. Information about his early years is sketchy but more is known now than previous years. It was even first believed that he was born in 1792 in Devon, but that became false. Babbage’s father was a wealthy banker, providing enough for his family so they could live comfortably in that time period. Babbage inherited a good amount of money from his father, which enabled him to devote his life to research and science. This allowed him some freedom in what he did with his life and gave him the time needed to work on his projects. Not only did he work on his inventions, but also he was interested in math. He also was “one of the leading members of the Royal Astronomical Society, a founder of the Royal Statistical society, and published occasional research papers in the fields of optics, atmospheric observations, electricity, and magnetism, the operation of life insurance companies, cryptology, geology, metal working, taxation systems, the operation of lighthouses, and the design of diving bells” (Williams 154). All of this is evidence that Charles Babbage was a man of many talents and interests and that he strived to be the best in what he could do. He published books as well and is known as someone who worked very hard at Operations Research. His willing to learn and become an inventor is evident in his early years from the following passage:

“My invariable question on receiving any new toy, was ‘Mamma, what is inside of it?’ Until this information was obtained those around me had no repose, and the toy itself, I have been told, was generally broken open if the answer did not satisfy my own little ideas of the ‘fitness of things’” (Williams 155).

Even at this early age, one could see what would develop.

Babbage went to a boarding school for his elementary years and then he went to Cambridge University. While attending the school, he spent his time studying mathematics, a subject he clearly favored. He would even hold meetings with other interested students including John Herschel, who would later become an important astronomer, and George Peacock. These three young men decided they would translate a French Calculus book, which became a standard in mathematics. He even had a pretty good social life while at Cambridge. He would later become a professor of mathematics at Cambridge from the years 1828 to 1839 (Williams).

Besides teaching math, he concentrated on two major projects, both of which were designed to make counting easier. Two counting machines, the difference engine and the analytical engine, were designed to aid in the calculation of logarithms and other computations. These two projects would set him apart from other inventors of the time and give him credit for pioneering the modern computer.

The Difference Engine that Babbage would create came from his desire for accuracy in numbers. At that time it was very hard to produce accurate numeration by hand because of human error. Because of his passion for Math, Babbage noticed many errors in math tables throughout his lifetime and decided to do something about it.

Michael R. Williams explains in [A History of Computing Technology](#) how Babbage came about the idea for his Difference Engine:

“One evening I was sitting in the rooms of the Analytical Society, at Cambridge, my head leaning forward on the table in a kind of dreamy mood, with a table of logarithms laying open before me. Another member, coming into the room, and seeing me half asleep, called out, ‘Well Babbage, what are you dreaming about?’ to which I replied, ‘I am thinking that all these tables (pointing to the logarithms) might be calculated by machinery’” (Williams 163).

This is an amazing quote from 1812 or 1813 because at that moment, Charles Babbage knew what he wanted to create and what it would do. By 1822, Babbage had enough information and an idea of his vision that he was ready to show his colleagues a working model of a Difference Engine. He even was able to construct a machine, which could handle six-figure numbers and had a difference mechanism in place. What happened next was what Babbage really needed. The government decided to advance him 1500 pounds for him to complete the project. Now, not only was he doing something he set out to do, but also the government was subsidizing him. While production of his Difference Engine continued with help from Samuel Clement, he ran into personal and monetary problems. His wife, daughter, and father all died close to each other four years after beginning production. He then realized he was running out of money fast so he petitioned for the government to give more. After a while, they decided to do so and he was back in business. However, there were times when there was no work being done on the project but may not have been so bad. It was then Babbage conceived his idea for an analytical engine. This idea called for a much more sophisticated machine than the one he was working on at the time. This did not go over well with the government because he wanted to change the designs so they ended his funding. The government gave all of his drawings and materials to the Museum of King’s College in London because of a dispute with Clement. One of the more amazing facts about the Analytical Engine

(which was never built by Babbage) was that the program would have ran it would have been stored on punch cards. What makes this so amazing is that in the mid 1800s, this man was conceiving ways of computing that would become reality 80-90 years later with the IBM revolution.

Babbage's life and work were very important to the technology field. In 1985, nearly 160 years after Babbage began his work on the Difference Engine, Doron Swade wondered why no one had attempted to complete the work of Babbage. Swade worked at the Science Museum of London at the time and was doing research on Babbage's work. That is when Australian computer science professor Allen Bromley arrived to take on Swade's question. So Bromley studied Babbage's notes and decided to build a Difference Engine in time for Babbage's 200th birthday. They succeeded in their project and the museum now has a working Difference Engine built only with materials that would have been available to Babbage (Bortz). Another view into the impact that Charles Babbage had on the technology field is evident from an article in The San Diego Union-Tribune from last month. "Babbage is often referred to as the father of the modern computer. Perhaps "grandfather" would be a more apt paternalistic connection. Yet there is little doubt that his contributions to mechanical engineering and tabulation helped lead the way for other subsequent and more successful efforts that did result in what we now consider modern computing" (Choney). The article continues to highlight the earlier years of Babbage and what his motivation was in designing the Difference Engine. She explains his purpose and idea as; "What Babbage employed was a simplifying principle, 'the method of finite differences' to develop a machine that would use only arithmetical addition and remove the need for multiplication and division in calculating values. And,

‘while the manually operated desktop calculators of the time boasted six or perhaps eight digits, Babbage's engines were designed to handle numbers with 20, 30 and even 50 digits’” (Choney). This illustrates another look at Babbage’s ideas at the time of conceiving the Difference Engine.

Maurice V. Wilkes describes the Difference Engine in “Charles Babbage—The Great Uncle of Computing” as not a very good idea. “[Babbage] claimed [the Difference Engine] would enable mathematical tables to be computed mechanically by steam, as he once put it. The only thing a difference engine can actually do, however, is to compute and tabulate polynomials” (Wilkes). He continues to talk about how important the grant Babbage received from the government was at that time. It was pretty much unheard of during the early 1800s, to receive money from a government to do a project. Wilkes makes the point that the Analytical Engine was what put Babbage on the map due to its ingenious design: “instead, he moved on to the ‘Analytical Engine’ which, had it been built, would have been a true general-purpose computer (not a stored program computer in the modern sense, but more like the Harvard Mark I). Here Babbage showed vision and insight verging on genius” (Wilkes). This is a true complement and well deserved to Charles Babbage.

Charles Babbage was a true inventor and pioneer and does need to be considered if not the father, then the grandfather of computing. His ideas and visions would inspire men and women to do the same long after his drawings were made and his machines half built. Charles Babbage had a successful, yet tough life. His wife died after thirteen years of marriage, and only three out of eight children survived into adulthood...all of which

were sons (Wilkes). With all of his hardships and his inability to realize his dream, Charles Babbage remains a very significant person in the evolution of computing.

Works Cited – Bibliography

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