

Herman Hollerith

1860

Born in Buffalo, New York State

1879

Graduates from Columbia University and becomes an assistant at the US National Census Office

1882

Enrols at Massachusetts Institute of Technology to do further research

1883

Works in Washington for the Patent Office

1884

Applies for his first patents for representing information on continuous punched paper tape

1887

His system is adopted for processing mortality statistics in Baltimore, Maryland

1889

System installed in Surgeon General's office for organising army medical statistics. Files a patent for the concept of the individual punched card

1890

Wins competition for supplying equipment to process the 1890 census. Gains a PhD from Columbia University for work on information processing

1900

Introduces a new generation of improved equipment

1901

New equipment used in the census of agriculture

1905

First patents start to expire and competition begins against his monopoly

1911

He forms a holding company, the Tabulating Recording Company

1914

The famous business administrator Thomas J Watson takes over the running of the company

1924

Company changes its name to International Business Machines (IBM)

1929

Dies in Washington DC



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The inventor who put America's population figures on punched cards and went on to found the world's largest computer company

Hollerith was born in America in 1860. After graduating from Columbia University he became an assistant at the US National Census Office, helping to compile statistics from the census of 1880. The work was all done by hand and was painstakingly slow — so slow, in fact, that when the time came for the next census, 10 years later, the Office was still tabulating the results. Hollerith knew his strength lay in invention; in order to train himself as an inventor and develop his creative skills he left the National Census Office and joined the Patent Office in Washington.

Hollerith's first idea was to code information onto paper tape. The paper tape was marked with ink into 'fields'. Each field represented different categories — say male or female, or black or white. The presence of a hole in the male/female field meant that the subject was male, while its absence denoted a female, and so on. These holes could later be 'read' by machine. His first patents came out in 1884, and over the next few years he improved his system. He began by processing information on health statistics for the fast developing American cities and the army administration.

Five years later in 1889 he improved on the idea of punched paper tape by using separate cards for each individual. The cards were the size of a dollar

bill — partly, it is said, because the only equipment that could be adapted had been built for handling money. The holes were originally round and made with a bus conductor's punch, but later special punches were built to cut a 6mm ($\frac{1}{4}$ in) square hole. In this way a great deal of information could be included on a single card.

The advantage of individual cards over continuous tape is that information can be sorted as well as totalled. For example, you might want to find out the number of white women aged 80 living in New York City. All the cards would be sorted through and any with holes punched in these three fields could be mechanically separated from the rest. These early machines could produce only a running total but later on, in order to improve the efficiency of his machines, Hollerith introduced addition and other simple arithmetic operations, proving that machines could replace the human hand.

Commercial success came in 1889 when the Bureau of Censuses announced a competition to supply a system of equipment to process the coming year's census. Systems were tested by retabulating data from the previous census. Hollerith's equipment won. His machines were by then all protected by patent and he took advantage of his monopoly by charging the Government 65 cents to process every thousand cards. Though there was an individual card for every person in America, Hollerith took only two years to finish. He announced that the population stood at 56 million, and invoiced the Government accordingly.

By the time of the 1900 census he had developed far more efficient machinery but he refused to lower his charge. When his patents ran out the Government looked to other companies but Hollerith overcame the competition by forming his own company, which later became International Business Machines. Today IBM is the world's largest computer manufacturer with an annual turnover of 20 billion dollars.

Card Games

Hollerith's original method of representing information is still in use today, a century later, though the format of the cards has changed. Modern punched cards have 12 rows of 80 columns. Tabulating machines used the decimal

system, and so each card could store 80 numbers. Alphabetic characters were created by 'multi-punching' — making more than one hole in a column. Computers can also accept cards that are punched in the binary system

