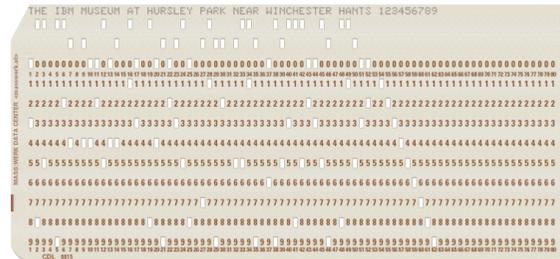**IBM's Punch Card**

The importance of the punch card for IBM cannot be overstated. Between 1930 and 1950 the manufacturing and production of pre-printed punch cards alone were estimated to be around 25% of IBM's profits. Aside from processing raw data and computer programming, the punch card was the forerunner of modern data storage media which, today is estimated at upwards of 1450 exabytes (1EB = 1 billion gigabytes).

The early designs of punch cards varied widely depending on the application and manufacturer of the reader, punch or tabulator. Hollerith's company alone designed several forms of punch card for different purposes.

In 1928 Thomas J Watson announced an internal IBM engineering competition to design a new format punch card. The objective was to increase the data capacity of a punch card and maintain a small form factor. The winner of the competition was Clair D Lake who invented a 12 row punch card which could hold one character of data in each of its 80 columns.

Ultimately the 80 column card became known as the **IBM Card**.

Frequently in data processing applications fewer than 80 data columns were used with the remaining columns holding control information about the card itself.

The size of the IBM Card is precisely 187.325mm x 82.55mm and only 177.8 µm thick ($7^{3/8}$ x $3^{1/4}$ and 0.007 inches thick). Quality control was so strict that an IBM Card could be used by IBM's Customer Engineers as an ad-hoc 'feeler gauge'.

The physical legacy of the punch card lives on today in the form of airline boarding cards, car rental forms, theatre tickets, bank cheques and numerous other applications.

The wider storage legacy of punch cards may be seen also in our daily lives: in our smartphones, personal computers and even our digital watches.

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IBM Museum @ Hursley Park

In the 1990s a small museum at Hursley Park was set up to support a Laboratory Open Day and has developed organically since. It now occupies much of the basement area of Hursley House.
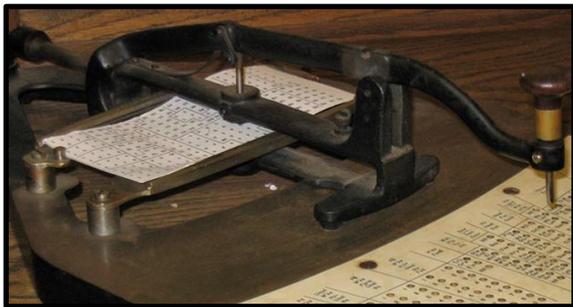

The museum showcases early IBM hardware and software with a special emphasis on products that have been invented and developed by the Hursley Laboratory teams.

A section of the museum has been set aside to focus on equipment and media from the earliest

days of IBM and its predecessors, primarily the Tabulating Machine Company, International Time Recorders (ITR) and the Computing Scale Company (CSC). These companies were brought together to form the Computing, Tabulating and Recording Company (CTR). Each of these had their own distinct product lines although it would be the products of the Tabulating Machine Company which would form the basis of the IBM company we know today.

Herman Hollerith's Punch Cards

Hollerith was a mechanical engineer who lectured at the Massachusetts Institute of technology (MIT). He had a special interest in the use of punched cards as a means of automating mechanical tasks along the lines of the cardboard punched cards used to guide steam-driven looms and pianolas (a self-playing piano).
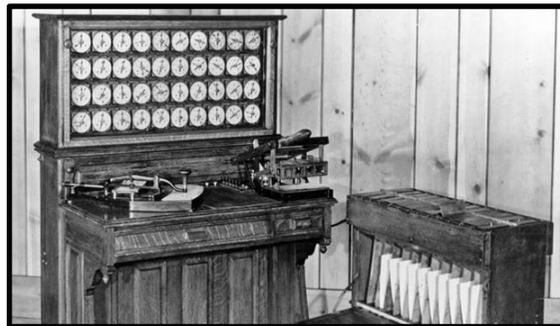

Hollerith Card Punch at the Hursley Museum

Hollerith's PhD thesis described the use of perforated or punched cards to count or 'tally' statistics as seen on a census form: male / female, married / single and so on which would be determined a hole or no hole.

Wires would make electrical contacts through holes in the cards (on / off) which in turn would be counted to produce the output of the tabulating machine or Tabulator.
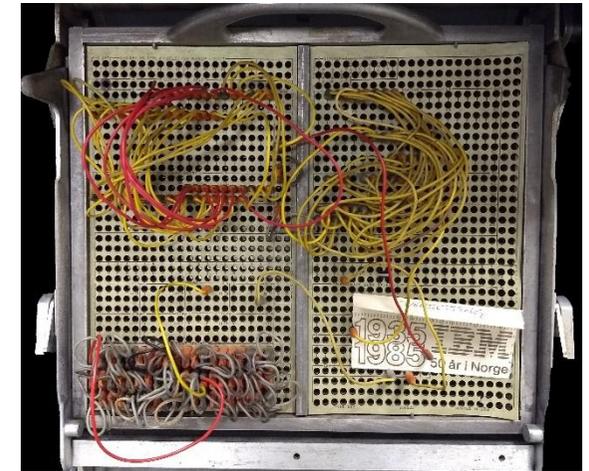
Having patented his designs Hollerith built and sold his punch cards and tabulators to the US Census Office which used them for the 1890 census. At the time the 10 year census would take around 8 years to compile; with Hollerith's tabulators the amount of time for the work was reduced to around three!

The success of the tabulator in calculating census returns was quickly followed by a widening recognition of how punched cards, tabulators and sorting machines could be applied throughout industry, particularly in the railway, retail, education and government sectors.

Core Products

Punch cards, punch machines, tabulators, card sorters and card printers became core products of the fledgling company and were developed further as technology progressed to provide faster processing and greater functionality. In due course programmable 'plug boards' were designed to perform different tasks which could be removed and swapped to provide a greater degree of flexibility for different jobs; the first truly programmable 'computers'.

Card readers, printers and punches continued to be used to create and run small computer programs and provide data input for mainframe computers into the 1990s when they were eventually phased out.