1401 Restoration Tour – Part 1
Visible Storage: Unit Record Processing in the Late 1950s and Early 1960s

Note: This portion of the tour is intended to set the stage for what data processing was like at the time of the 1401's announcement and delivery. It covers the labor intensive and time consuming aspects of what life was like in the "tab[ulation] departments of that time.

Thank you for visiting the Computer History Museum and signing up for the 1401 Restoration tour to see what data processing was like in the late 1950s and early 1960s. I hope that you have allowed enough time for your visit to permit you to take the full tour of the artifacts that are on display in Visible Storage. While we are in Visible Storage, we ask that you not touch any of the artifacts. You'll get a chance later. Hang on, at the end we will have some special handouts to help you remember today's tour. Please do not hesitate to ask questions while we're on the tour.

American business has been doing automated data processing for more than 100 years. It was called unit record processing then because it was focused on a single card containing information needed by the business application. Hang onto your hats! We're going to take a whirlwind tour of the first sixty years of data processing in about ten minutes.

The Jacquard loom was first used in the early 1800s and was one of the earliest uses of "punched cards". These cards were used to control a weaving loom – telling it when to lift the appropriate threads and pass the right colored thread across the loom.

Things really got going during the end of the 19th century when the U.S. Census Bureau was processing the 1880 census and planning for the 1890 census. The processing of the 1880 census took the better part of eight years and the Bureau realized that they would exceed that cycle with the processing of the additional data being added to the 1890 information. They put out a bid requesting ideas on how the process could be improved and Herman Hollerith came up with a winning proposal. Before us we see a replica of Hollerith's solution. He had noticed train conductors had been using *punch photographs* to describe the characteristics of ticket holders by punching around the edge of tickets. Hollerith's solution was to take the information from the census sheets that had been collected, punch it into cards, and then tabulate the results. As a result, the population count of roughly 62 million people was completed in just six weeks and the data fully published in 1892. (Some sources say it took at least three months to complete the initial tally.) Hollerith formed the Tabulating Machine Company in 1896.

This time clock was manufactured by the International Time Recording Company founded in 1889 to improve the collection and monitoring of hours worked by employees. Every day, employees would clock in their timecard as they started work in the morning, clock out for lunch, clock in again for the afternoon and then clock out as they left work. In this manner, the payroll department knew the hours each person worked during a day and week so that the paycheck could be prepared for distribution to the employee the following week. *I used a time clock like this while working summers at a manufacturing plant in Providence, RI.*

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The hours worked were punched into the timecard. Each card was gathered into a deck and sorted into sequence by employee number using a card sorter like the IBM 083 Sorter that we see here. If we had a six-digit employee number, it would have required six passes through the sorter – one for each digit – starting with the unit's position. I find it useful to relate the employee number to a cell in an Excel spreadsheet. The card would then be one row, and the deck of cards would be all the rows and columns.

The cards were then matched against another deck of cards which were the employee master payroll information. The latter contained information about the employee's hourly pay rate, amount paid to date during the year, tax class, and deductions. The two decks were merged using a collator like the IBM 077 Collator. The collator uses a control panel to tell it which columns to match. Each wire in the panel controls what data is to be matched, the stacker to select for the card, and how to treat exceptions.

The merged card deck was then taken to another machine to calculate the paycheck and punch it into another card which represented the new master card which included the new year-to-date information. A calculating punch was used to perform this because tabulating equipment could not perform multiplication and division. We see here an IBM 604 Electronic Calculating Punch (actually, the punch unit is not here) and some of the control panels used to wire the circuitry of the 604. To change the calculations, the wiring of the existing panel was re-plugged. Each application and each machine required a separate control panel.

The final step for our payroll example would be for the employee payroll cards to be taken to a tabulating machine to print the payroll checks and other forms that the company needed to produce for their payroll department and for the government. Unfortunately, we do not have room enough to display one here in Visible Storage.

Well, we've taken a look at how things were before there were computers to handle business applications. As you have seen, things were very sequential and labor intensive. The large computers of the time used magnetic tape for storage and there was no way to process the data on tape in a random fashion either.

This was the state of the bank I worked for in 1961 when I joined their data processing department as a programmer in preparation for the installation of their IBM 1401 that summer. Some companies had floors filled with tabulating equipment. Businesses like PG&E, Transamerica Insurance, etc. had several rooms filled with keypunches, sorters, collators and other tabulating equipment. Men usually operated the unit record equipment while most of the keypunch operators were women.

Let's now visit the 1401 restoration room and see how things changed in data processing with the announcement of the IBM 1401 Data Processing System on October 5, 1959.

Please follow me…

Possible comments while walking to the Restoration Room include:

- Back in this time period, men generally wore suits or sports jackets with a white shirt <u>and</u> tie.
- Hollerith's punched cards were the size of the dollar bills of the 1880s – 3.125×7.4218 inches compared to today's dollar which is 2.61×6.14 inches. *Holding up a punched card and a $1.00 dollar bill.* I guess we can see how the value of a dollar has shrunk during the past 100 years.
- For genealogists, the 1890 census has a sad note. In 1921, the census records were destroyed by a fire in the basement of the Commerce Department. Around 6000 records and fragments survived.
- I forgot to mention that Hollerith's Tabulating Machine Company, the International Time Recording Company, and the Computing Scale Corporation merged into the Computing Tabulating Recording Company in 1911. In 1914, having been fired from the National Cash Register Corporation, Thomas J Watson, Sr. became general manager of CTR. In 1924, the name of the company was changed to International Business Machines (IBM) – which had been the name given to the Canadian subsidiary in 1917.
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