Computer History Museum

Volunteer Information Exchange

Sharing what we know with those we know

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Contribute To The VIE

Sad news. We are losing the Babbage Machine. After more than seven years of having this wonderful piece of art, mechanics and history on loan, the owner, Nathan Myhrvold has asked for its return. The exact schedule for return has not yet been set. We echo the thanks of John Hollar to Tim Robinson and all the dedicated Babbage team. (Page 4.)

On the other hand, Adafest, a celebration of Ada Lovelace, triggered by her birthday on Dec 10 was a great day for the CHM. Thanks to Kate McGregor for reporting. (Page 2)

Our friends at the CT&I (Center for Technology and Innovation) in Endicott, NY are currently restoring an IBM 1440 from 1962. And now they have two important new restoration projects on their plate. (Page 3)

Bill Selmeier recalls a story about WISC, Gene Amdahl's first computer. (Page 4)

You probably know how IBM solved its “card is too small” problem, but how did Rem Rand solve the same problem. (Page 5.)

Jim Strickland jlstrick@aol.com

CHM Blog

Recent CHM Blog Entries

Kirsten Tashev keeps us up-to-date on new CHM blog entries.

- The Analytical Engine, the machine that Lovelace and Babbage collaborated on, written by our great volunteer and resident Babbage expert, Tim Robinson.

Links You Might Enjoy

- Project to restore Edsac is underway
- Paul Laughton sends this link to a 1956 IBM film about SAGE, Its good and shows rare footage of an IBM 720, an early dot matrix high speed printer.
- Computer scientists (today's crop, mostly from Europe and the UK) remember their first computers.
- A video made by 1401 team member Marc Verdiell showing hardware debugging on the 1401.

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To All CHM volunteers, staff and other readers!



In the spirit of the New Year, let me suggest a resolution. Here it is: ” I, __*your name here* ____, resolve to write at least one article, story, blurb, book review or other contribution for the VIE in 2016 to share with my fellow volunteers.

All of us have those stories, it is mostly a matter of writing them down – a matter of minutes. So for 2016, please take a few minutes to share your knowledge and experiences with all of us.

Adafest

KATE MCGREGOR

Over 800 visitors joined us at the Computer History Museum on Sunday, December 13 to investigate the life of Ada Lovelace and celebrate her 200th birthday… and what a party it was! Lovelace was an English mathematician and remarkable thinker. Her work with Charles Babbage on his Analytical Engine illustrated her ability to envision the creative possibilities of computers at a time when they were seen purely as calculation tools. This intersection of creativity and computing is at the core of Lovelace's enduring legacy. She predicted many of the ways in which we use technology today and is definitely an inspiring woman to learn about!



Special activities took place throughout the day, encouraging children and adults of all ages to engage and participate in fun and interesting ways. The CHM program was designed to be intergenerational and accessible to visitors with varied degrees of previous knowledge about Ada Lovelace and computer history. Families and friends explored together and had lots of fun in the process! Our volunteer team helped visitors to orient themselves to the Museum and to interpret and understand the many stories and of people, technology and innovation that the Museum highlights. Visitors loved connecting with CHM volunteers throughout the day as they shared stories and interesting discussions!

Members were welcomed to a special reception during the morning, to view our new exhibit about Ada Lovelace that will be on display in the lobby for the upcoming year, and our Museum Store celebrated our wonderful members by offering a 25% discount on all purchases throughout the day. Hundreds of additional Museum visitors joined us as well, many of whom were visiting for the first time!



Adafest took place from 10:00 AM – 7:00 PM and in addition to our the new exhibit, our celebration of her life and contributions included tours focused on Women in Computing, live demos of Charles Babbage's Difference Engine #2, IBM 1401 demos related to Ada's work and ideas, a Steampunk marketplace with local vendors selling their crafts and wares, Hour of Code workshops and lobby stations with our partners at Embark Labs, a screening of *Calculating Ada, The Countess of Computing*, lobby stations where visitors examined primary source documents and wrote postcards of their own to Ada, a reading of *Ada Byron Lovelace and the Thinking Machine* with illustrator April Chu, "Drawing Ada" workshops with illustrator April Chu, Steampunk crafts with the Mountain View Library, demonstrations of a model of Charles Babbage's Difference Engine #1 with Lisa Robinson, an Exploration Station with historic artifacts that was facilitated by our High School Interns, Steampunk face painting, a photo booth and more!



One of the highlights of the event was the afternoon awards ceremony for young women who wrote letters for our *Letters to Lovelace* competition (http://www.computerhistory.org/education/adalovelace/). Each of the selected entrants were thrilled to be recognized as part of the celebrations, while their families, friends and other CHM visitors enjoyed hearing the letters being read aloud by the students and cheering for their accomplishments as they took the stage! A video of the contest finalists reading their own letters aloud also played in the lobby throughout the day.

The event ended with a Steampunk costume contest and cocktail party celebration, and a good time was had by all!

A huge thank you to all of our CHM volunteers who participated and contributed throughout the day, our entire CHM staff team for the collaborative work to make this a Museum-wide success, and our CHM Education team for the amazing creativity and hard work to design and facilitate this event.

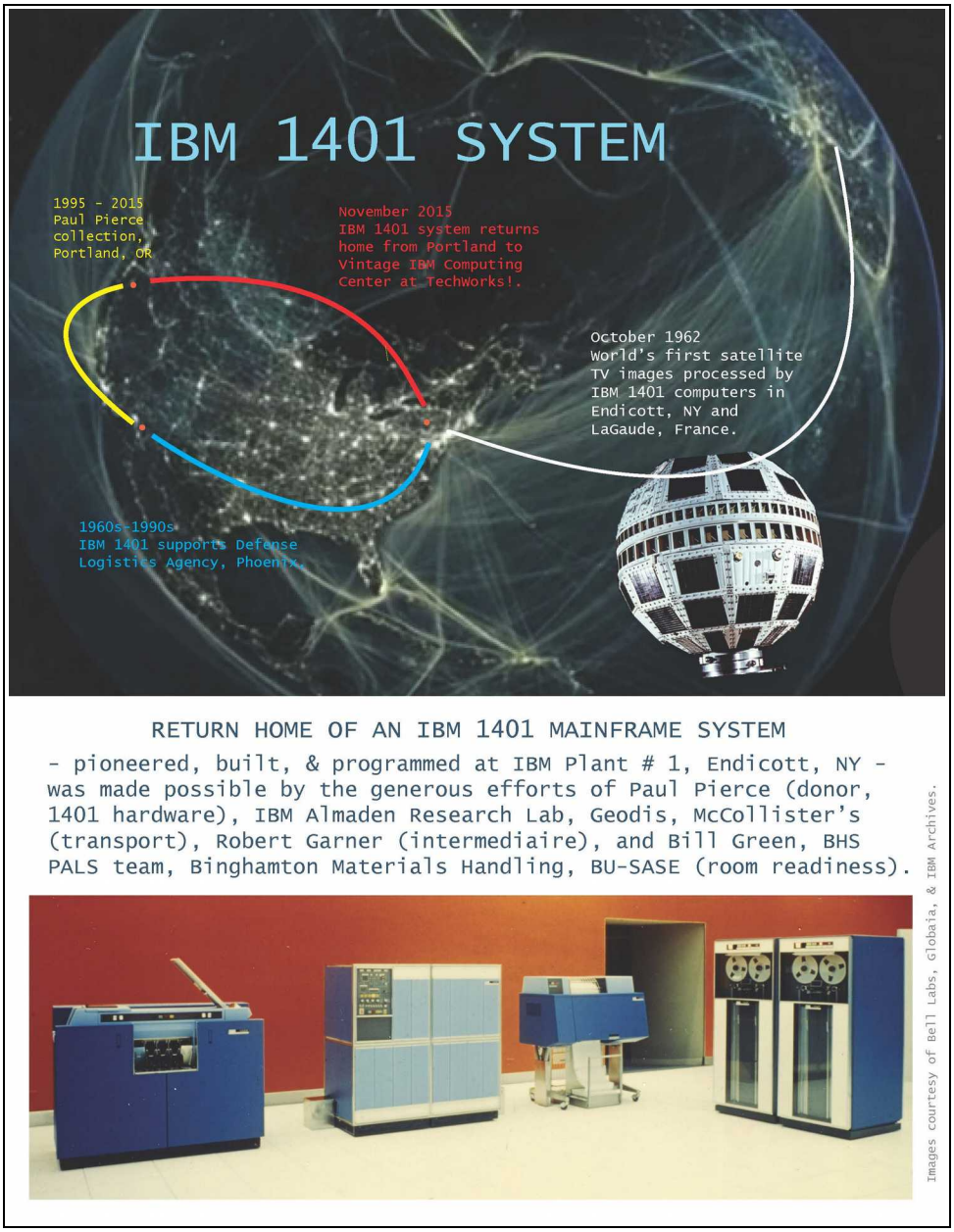
Be sure to search social media for photos from the event tagged with @ComputerHistory #AdaThinkingBig, and check out our "Adafest" photo album on the Computer History Museum's Facebook page!

1401 Returns Home

There is a team in Binghampton, NY, near IBM's former stronghold, Endicott, NY, that is restoring an IBM 1440. The organization is called TechWorks!. We have reported their progress in VIE 5.09.

Team member, Bill Green, reported recently that progress is good, they are closing in on successful card reading. In addition:

- Recently, through the good offices of Robert Garner, Paul Pierce donated a 1401 to them which they expect to restore also. See announcement at right.
- With regard to the new acquisition, Bill writes the following.



> While looking around some of the insides of the Paul Pierce 1401, I came across some tags on internal cables that gave the part number and EC [engineering change] number with an August 1961 date. They also said Kupfrian Manufacturing, Binghamton, NY.
>
> While doing my monthly volunteer work at the county library today, I took a few minutes and looked up Kupfrian Manufacturing in the 1962 Binghamton City Directory. I found the firm listed with president Wilbur J. Kupfrian at 1 Henry Street, just a couple of blocks from TechWorks!
>
> For the heck of it, I looked up Water Street to see what was listed at the TechWorks! 321 Water Street address. I found Sealtest Foods listed at 319. And I spotted a second location for Kupfrian Manufacturing at 320 Water Street, right across the street from us!
>
> It appears that 1 Henry Street was the office and manufacturing was done right across the street from where the 1401 now sits!



Talk about a journey home. What a story!

A second story from that group is told in the following press release:

> The Center for Technology & Innovation is pleased to announce a loan agreement with the Smithsonian's National Air and Space Museum to provide components of an Apollo mission simulator to Binghamton for restoration and display at TechWorks!. The components were designed and manufactured by Link at the Binghamton airport and were accessioned into the Museum's collection after being used by NASA.
>
> Items returning to Binghamton include the mechanically driven star display for the telescope of the Lunar Excursion Module (LEM). A team of veteran Link engineers, including members of the original Apollo team, have been recruited to restore the equipment to operating condition. The team's goal is to complete their work by

Spring 2016.

When the star field generating equipment is operational, it will be able to demonstrate for TechWorks! visitors the unique 1960s technology that produced the superb resolution necessary to train Apollo astronauts in mission-critical navigation tasks. One of the most important of these tasks was to precisely synchronize lunar lift-off between the LEM and the Command Module to assure rendezvous and docking for the return trip to Earth. For additional information, contact Susan Sherwood Executive Director, Center for Technology and Innovation 607-723-2376 director@ctandi.org

Babbage: End of an Era

A long and very successful era will be coming to an end. Here is John Hollar's email on the topic.

Hello everyone.

I'm writing to let you know that Nathan Myhrvold has made the decision to end his loan of the Babbage Engine to the Museum. This news is less than 24 hours old [as of December 18] and I wanted to let you know immediately-- and personally-- along with our current thinking about what comes next.

We are in discussions with his office about the timing of the transition. Most likely we will be shipping the Engine back to Nathan in Bellevue, Washington, in early 2016. We naturally want to be responsive to his request while also giving our staff, volunteers and visitors time to adjust to the news and to the change.

The Babbage Engine has had a wonderful home at the Museum. Tim Robinson and the Babbage team have been brilliant stewards of the device ever since its arrival at CHM in 2008. They have nursed it back to health, kept it in tremendous working order and even upgraded its mechanism when needed. Our Babbage demonstration teams have amazed more than 300,000 visitors with its operation. And the worldwide media coverage of the Engine operating at CHM in the heart of Silicon Valley has done us a world of good.

I know this will be a disappointment to many of you. Each year at this time we have had a conversation with Nathan's office. Each year he has been happy to extend the loan, until now. He put us on notice from the outset that he would want the display back in Bellevue for his own purposes one day, and now that day has arrived.

We will do our best to minimize the disruption to CHM and to our visitors' experiences in the short run. In the long run, we will re-purpose the gallery for other stories. We're working on a vast canvas of history, and there's always more to do.

Thank you to Tim, the growing Babbage team and to all of you for the care and imagination you've shown over the years while we've been the custodians. It's been a tremendous chapter in our history.

Kind regards, John

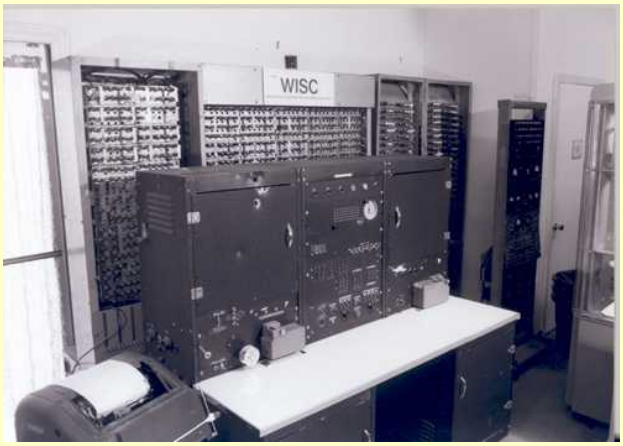
Amdahl's WISC

Noting the passing of Gene Amdahl, friend and former docent Bill Selmeier sends us this story told to him by Gene when Bill was giving him a VIP tour.

> When Gene was attending the University of Wisconsin in 1949, he was enrolled in a physics class. The professor assigned a math-heavy project to a team of students including Gene: determine which of a list of elements was most capable of sustaining a chain reaction.
>
> Instead of doing the math, the team encouraged Gene to finish building his computer to do the math for them. And that's how WISC came to be.

Actually, we should note that Mr. Amdahl's 1983 lecture tells it slightly differently.

> After completing the [physics] project with two other graduate students, with only the aid of a 10-digit desktop calculator and a slide rule, Amdahl deemed that there had to be a better method to make these types of calculations. After a trip to the US Army's Aberdeen Proving Grounds and getting glimpses of ENIAC and EDVAC computers, he describes returning to Wisconsin in the fall of 1950 and changing his thesis to one proposing a design for an electronic computer, which became known as WISC—the Wisconsin Integrally Synchronized Computer.



Ahh history! Note that WISC is one of the CHM's treasured artifacts.

“Too Small” Punched Cards – Two Solutions

JIM STRICKLAND

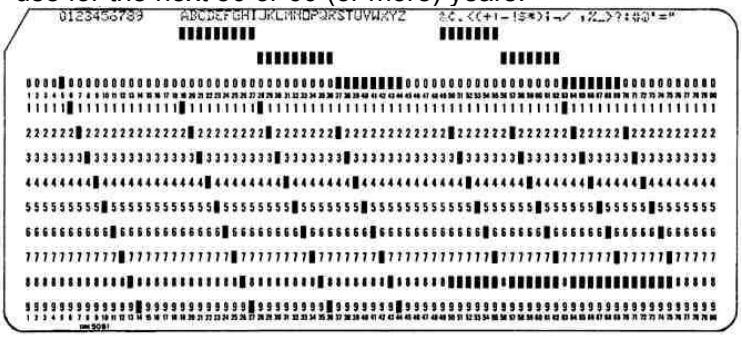
In the late 1920's, the two competing tabulating machine companies, IBM and Powers Accounting Machines, had a problem. The card that was used by both companies was too small. “Too small” meaning that customers wanted more data than could be held in 45 columns.

The card that came to be known as “the IBM card” started out in the 1890 census with round holes. In describing the card we sometime say it had 24 columns of 12 holes, and that is physically accurate but the data was punched in fields that bore no relation to columns. That card morphed several times so that in 1927, the card was 45 columns of 12 holes, data was columnar and all data was numeric. The most commonly used Powers card was just like the IBM card, so that customers could have both IBM and Powers equipment.

In 1927, IBM had an internal “contest” to find a new format that would allow for more data and, secondarily, for alphabetic as well as numeric data. The two competing teams kept their work secret from the public and secret from the each other.

The winner, the 80 column, 12 row, rectangular hole card, and the concomitant coding scheme was patented and announced in 1928.

Alphabetic data was introduced in 1931, with alphabetic characters requiring two punches and some special characters requiring 3 punches. That card remained in use for the next 50 or 60 (or more) years.

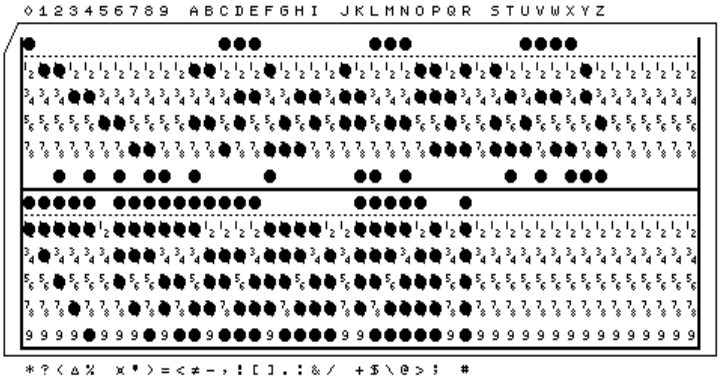


The introduction of EBCDIC (Extended Binary Coded Decimal Interchange Code) in 1964, allowed 256 characters and since punched cards were very much in place, they had to be accommodated. The solution was to use as many as six punches in a column.

But Powers also had the “too small” problem. How did they handle it?

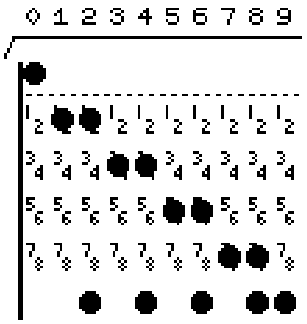
Actually, in 1928, it was Remington Rand that had the problem. Powers Accounting Machine Company had been founded in 1911 by James Powers who had developed his equipment while employed by the Census Bureau. Remington Rand was formed in 1927 with the merger of Remington Typewriter and Rand Kardex. Shortly after that merger, it acquired Powers.

In 1930, Remington Rand introduced its solution, the double decker card with two sets of 45 row columns—one set on the top half of the card (called columns 1-45) and one set on the bottom half (columns 46-90). This card continued to serve Rem Rand for many years to come.



Its 90 columns were a competitive advantage over IBM's 80 columns and the Rem Rand key punch had the ability to create either 45 or 90 column cards which was an advantage for customers converting from one format to the other. (The IBM keypunch punched one column at a time; the Rem Rand keypunch punched all columns at the same time.)

But Rem Rand's coding scheme was not an advantage.



Numeric characters required either 1 or 2 holes. The top row (of six) represented 0 and the bottom row represented 9. The second row represented either a 1 or 2, the next row, either 3 or 4, the next 5 or 6, the next 7 or 8. If there was a punch in the second, third, fourth or fifth row and in the sixth, the number was even. If there was a punch in the second, third, fourth or fifth row and not in the sixth, the number was odd. If only the sixth row was punched, the number was a 9.

In 1938, Rem Rand introduced alphabetic data—alphabetic characters required either two or three punches. Special characters, required 3, 4, 5 or 6 punches in a column.

We should note that in the computer era, the 80 column IBM format dominated even in Remington Rand/Sperry Rand installations.

A legacy of the 80 column punched card format is that a display of 80 characters per row was a common choice in the design of character-based terminals.

Punched Card Addendum

In 1951 (or perhaps 1950) Remington Rand became the first company in the US to sell computers in quantity.

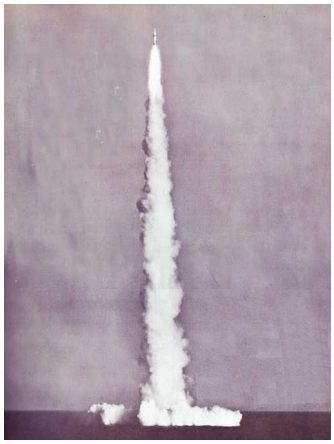
But IBM joined the race in 1953 and by 1962 IBM's revenues from electronic stored-program computer systems exceeded, for the first time, those from punched card systems.

Because IBM's worldwide revenue from both of these systems was more than two times larger than that of all other companies combined, 1962 is a good estimate for the crossover date for the entire industry.

Despite this rapid rate of installation of computer systems, punched card equipment continued to be used for many more years. It was needed to satisfy the requirements of small organizations and for special purposes, and it also served as information input-output equipment for many computer systems.



Panel session on Lockheed: A Silicon Valley strategic defense startup (with missiles)



The IEEE Silicon Valley History Committee will hold a panel session on January 14, 2016 on Lockheed: a Silicon Valley strategic defense startup with missiles!

In 1956 Lockheed moved its new division, Lockheed Missile Systems Division to a 275 acre site next to Moffett field in Sunnyvale; Lockheed had been selected as the systems manager for the Navy's Polaris Fleet Ballistic Missile and the developer of the missile itself. Join three former Lockheed senior leaders from then to get a retrospective on Defense Valley of the 1950s and 1960s and the Polaris/Poseidon program that led to today's Tridents than make up the most secure leg of the strategic Triad.

***For details see**: http://sites.ieee.org/sv-techhist/?p=489*
***Register at**: https://svhistory20160114.eventbrite.com/*

Volunteers!
Please volunteer to share your stories, your interesting facts (and factoids) and your knowledge
Send them to Jim Strickland (Jlstrick@aol.com)

Coming Events (Click for details)			
Date	**Day**	**Time**	**Event**
Jan. 14	Thur.	7:00 PM 8:30 End	An Evening with the U.S. Digital Service Team Speakers from the U.S. Digital Services Team which is part of the Office of Management and Budget, in conversation with John Hollar.
Jan. 19	Tues.	6:00 Members only reception 7:00 Program begins	Thinking Big—Ada Lovelace: Mathematician and Visionary In-depth discussion of mathematician and visionary Ada Lovelace. University of Oxford Professor of Mathematics and Computer Science Ursula Martin, Ada Lovelace biographer Dr. Betty Toole, and retired engineer and Charles Babbage expert Tim Robinson will critically explore the complexities of Ada Lovelace.
Feb. 23	Tues.	7:00 Programming 8:30 Book signing	Originals Author Adam Grant in Conversation with Facebook's Sheryl Sandberg