CHM Computer History Museum

A Career with the Right Place at the Right Time

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I graduated from college at the right time to get in on the ground floor of the development of computer programming. I was lucky to be in the right place at the right time to actually be part of the groundbreaking development.

I graduated from Carleton College in Minnesota with a degree in economics. The college acquired an IBM 1620 computer my senior year. A student who had spent a summer working for IBM taught an informal class in programming, but it was only open to math majors. I never dreamed that I would be using such a machine very soon.

My first job out of college was at the Federal Reserve Bank of Minneapolis in the economics research department. This department consisted of 5 men with PhDs in economics, 2 of us women with BAs in economics to support them, and a room full of women with calculators. Our task was to develop the figures for Personal Income and GNP (Gross National Product) for the 9th Federal Reserve District. These figures were combined with figures from the other 11 districts to make the national statistics. The women had a job of calling contacts in the district to collect the raw material for economists to come up with numbers. This was all done manually. By the time that the national statistics were announced, the data was about 6 months old.

Soon after I arrived, the bank acquired an IBM 1620 with all of 20K in memory. The two of us research assistants were sent to classes at IBM to learn to use it. There was not a lot to learn since everything was written at the machine code level. There was no high level language and no operating system. We got the thin "Principles of Operation" manual and went to work.

The programs and data were punched onto 80 column cards. Data had to be heavily encoded to fit on one 80 column card. Because there was so little memory, first the cards were sorted on a sorting machine. Categories were calculated and then punched on to more cards. Groups of cards were collated in another machine and then fed into the computer for the next step. Final numbers were printed and also punched onto cards that went to Washington. Even printing was an issue because the printer had a carriage return, and the program had to include waits for the carriage return to complete.

One of the economists decided that we should write a program to look for leading indicators. I was tasked with writing the program. The idea was to look for correlations between past final numbers for Personal Income or GNP and current data that was collected. I remember that the best indicator of Personal Income in the 9th District turned out the be the number of pigs born. The big problem that I faced was that the correlations required large matrices and I had to deal with it on a 20K computer. My solution was to write a program that could be overwritten with the matrix as it processed. All of the setup code was in the space that was later used for the matrix. This program was later shared with other Fed banks.

After two years working for the Fed, my husband was accepted at Stanford for the MBA program. I was very sad to leave my job, but with my "extensive" two years of experience, I landed a job with IBM in Palo Alto and later San Jose. IBM was about to release a new computer, the IBM 360. It had two operating systems, DOS and OS. My first job was to write "channel programs" which are now called "device drivers". When a program issued a command such as "seek", the channel program had to locate the track containing the data. For most devices, this required a calculation on where to move the read head. I was also involved with a device that never was released. It had a bunch of hanging tapes that could be lifted and wrapped around a cylinder which would be directed to the read head. Trying to instruct the

device to select the correct piece of tape and then to get it wrapped up was an exercise in futility.

My second assignment was to participate in writing the first word processor. Previously, all data and programs were punched into cards. IBM wanted to release a typewriter with capability to enter data to be input directly into digital form as a record in the 360. Three women worked on one room on the DOS version, and three men worked in the next room on the OS version. We had a friendly rivalry. The first version of the program had to be punched into cards. Once we got it minimally working, we were able to use the program to continue development online. Both teams finished at about the same time, but the "girl's" version was MUCH faster than the "boy's" version. They had to look at our code to improve their code! As I look back on it, I wonder why the more advanced operating system, OS, had a male team while DOS had a female team. However, at that time, there were many women programmers and I never felt discrimination.

My husband graduated in June and took a job in Los Angeles. I checked for jobs at IBM in Los Angeles, but little development was done here. I found a job at Planning Research Corporation (PRC) in Westwood. It was one of two companies spun off from Rand in Santa Monica to do government computer systems. The other was System Development Corporation (SDC) where I later worked for 16 years.

I spent 5 years at PRC working on several contracts. The most interesting one was to develop a novel data management system (DBMS) for the IBM 360. Previously, data was limited to what would fit on an 80 column card or set of cards. Linking data elements through keys required programming. Members of the computer science department at UCLA worked on a design for a DBMS that could hold trees of data with a root file containing keys for subfiles which in turn could have other subfiles. For example, and employee could have a subfile for each project worked on, past employment, abilities, health, or any other data where there might be more than one record.

PRC collaborated with UCLA to develop the design into a DBMS product. We coded the program and then used it on the PRC corporate MIS (Management Information System). This was a high stakes test environment since we were running the corporate payroll on a Beta version of the program. All output was carefully checked. Generally it worked and we were able to locate and fix bugs that turned up. However, occasionally there were problems with the payroll which was run on Saturday. One Saturday, the computer operator called me for help. I bundled up my 10 month old baby and went in to work. My son, Chris, enjoyed his time in the computer room because it had a ramp with a low railing from the hall up to the raised floor of the computer room. Chris practiced walking up and down using the railing. He succeeded and took his first walk across the computer room; he joyfully walked while I fixed the program.

The 1972 earthquake almost brought disaster to the MIS system. All programs were on cards stored in a file cabinet. The drawers swung open which tipped the cabinet and dumped all of the cards on the floor. Fortunately, it was standard practice to draw a diagonal line across program decks just in case they got dropped. We spent some frantic days reassembling desks of cards and testing the result.

PRC moved to Washington D.C. in 1973. I left PRC and joined SDC in Santa Monica. Thanks to my DBMS experience at PRC, I was hired into the R&D (Research and Development) Division to work on a data retrieval program for the LA police department. The goal was to be able to retrieve records of cars and trucks based on partial information. The main key was the license plate number. However, witnesses to accidents or infractions may remember only part of the number and maybe the make or color of the car. Our system could attempt to retrieve records based on any combination of information.

When this project was completed, I moved on to a project that attempted to retrieve data from multiple structured databases using written English. We used a new computer, the PDP-11 using the Unix operating system. The project ran into many difficulties. Number one was that the computer was too slow and didn't have the memory to parse English, not to mention the difficulty of designing the dictionary to map from terms used in English to database fields.

The group split apart into one that worked on the understanding of English and the other on the problem of accessing multiple structured databases through a single SQL interface. I managed the second project and spent the next 15 years working on it. Originally the project was called "Mermaid" since the original programmers were Margie, Eric, Robin, Mark, Alex, Iris, and Dave. It started with IRAD (Internal R&D) funds and then was awarded a contract to integrate databases from NSA, DIA, and CIA. However, the security issues were impossible to overcome. Each agency wanted to see the data from the other agencies, but they wanted to protect their own data. We were able to contract with other government agencies to refine and extend the program.

SDC started as a division of Rand in 1957. In 1969 it was spun off to become an independent company that, like Rand, performed work for government agencies. Part of the spinoff agreement was that after a fixed period it should either go public or be sold, with some of the gain to be invested in nonprofit research. It was purchased by Burroughs in 1980. This was not a marriage made in heaven. Burroughs made big mainframe computers for business use. SDC did much of their programming on IBM or Sun computers which were designed to be networked. All of the SDC clients were government agencies. The first sign of a problem was when a group of Burroughs managers came to SDC for a visit. We had a dinner for technical management attended by a group of white men from Burroughs and our SDC group including white, black, and Asian women. The next day we demonstrated retrieval of data from a terminal in Santa Monica to a computer in Camarillo over an early version of the internet. The comment was, "This will never work".

We continued work on Mermaid, but the Santa Monica office was shut down in 1989 and most of SDC was dismantled. Unisys (a merger of Burroughs and Sperry-Univac) had no interest in Mermaid since it ran on Sun computers and accessed databases on Sun, IBM, and Dec computers. I was granted a license to the Mermaid software but not the trademark "Mermaid". For the next 10 years, several of us from SDC developed and marketed the system now called "InterViso" with our company Data Integration Inc. (DII).

In the R&D Division at SDC, we were encouraged to write papers and attend conferences. As a government contractor, we had an "open source" mentality. This is the main way that we marketed our work since it was all highly technical. We did not have "off the shelf" products. I continued this activity with DII which was how we reached new customers. We branched out from government agencies. Our first two big clients were US West, a telephone company located in Colorado, and British Telecom.

After about 8 years, it became apparent that we had to have outside funding to grow. In the words of the book "Crossing the Chasm", we had to leap from small to large quickly. We lost the British Telecom contract because we were too small. We ran into several cases where a company wanted the software but would not deal with a small company for mission critical software. We found David Clements, recently retired from Teradata (a maker of database machines), to be president. David and I made the rounds of the venture firms in Silicon Valley. We were told more than once that we had an interesting product, but they did not fund companies outside of Silicon Valley. Moving the company was not an option. So, we decided to sell in 1998.

This was a case of the wrong company at the wrong time. What it had going for it was that it was in San Francisco and had venture funding. I thought that they had a complementary product, but it had been sold. DII sold a product that ran and had customers. After 4 years under the new company, the product barely ran, lost functionality, and had no customers. The final blow was when 3 key people were killed in the World Trade Center where they were attending a 1 day trade show. The company was shut down by the venture firm and I retired in 2002. However, Mermaid lives on. I receive frequent emails from Academia.edu about references to Mermaid from academics all over the world. Hopefully, people are still able to learn from our papers.

As I look back on my 40 year career, I know that I had ups and downs. I had to make career moves when I moved or the company moved. What would have happened if I had just stayed in Minneapolis and the Federal Reserve Bank? Being comfortable is not always best. I also ran into bigots who had trouble dealing with a woman. My attitude is that it was their problem, not mine. In fact, sometimes I think that people remembered me because I was a woman.