

B. The Computer Center

When universities got their own computers, the computer centers were likely to be extradepartmental, organized by whatever persons happened to have relevant knowledge, experience, and interest. The computer was usually paid for by government funds, though not necessarily military funds. Organized training in computer usage grew up around the computer center, simply as a necessary outgrowth of the computer's own functioning. As the computer got more complicated over time, so did the training.

The extreme government financed "contract research" style of MIT was not replicated at most universities. It was more typical to spend a lot less money, and to focus more on the university's internal needs, rather than seeking to become primarily a government contractor. By 1960, clear differences of style had developed, according to the priority placed on obtaining military funding.

The computer center at Stanford University, set up in 1952-53, was funded by the engineering school, under Frederick Terman, and the Applied Mathematics and Statistics Laboratory. Each organization committed \$25,000 per year, more or less as an overhead on their research programs. Most of their research programs, of course, would have been grant-funded, and the computer center was therefore indirectly paid for by military funding. The computer center started off with a Card Programmable Calculator, and got an IBM 650 in 1957. Training was more or less ad hoc at this stage. The computer center was rather more concerned with educating professors than with educating students. John Herriot, the computer center director, observed: "Of course, as you might expect, the students took to the computers much faster than the faculty." (BAB OH 21, John Herriot, p. 7) In other words, he did not have to do anything special to get in as many students as his equipment could support. They simply arrived automatically. (ibid, pp.4-8)

In 1955 (?), very shortly after the MIDAC machine at the University of Michigan started up, Prof. John Carr of the Mathematics department organized a course in elementary programming and numerical analysis. Because the MIDAC machine was classified, Carr had to take student programs to the machine and run them himself. A newly arrived, newly minted, Ph. D. named Bernard Galler sat in on Carr's course. Carr apparently did not want to teach beginning programming over the long term, because he immediately set about grooming Galler as a programming teacher and researcher. Galler took over the programming course the following term. The MIDAC console had to be declassified so that Galler could go and work on it. The next year, the university got an IBM 650, nonclassified, and, unlike the MIDAC, located on campus instead of out at Willow Run. When Galler began pushing the limits of the IBM 650's performance, Carr introduced Galler to General Motors, where they had an IBM 701. (BAB OH 236, Bernard A. Galler, pp.4-6,7, 13)

The development of a distinctive style of "land-grant computing" is illustrated by the experience of the University of Minnesota. Funding was treated firmly as a means rather than an end. The emphasis was on getting computers widely used, rather

than on doing contract research for the military. The university tended to worry about ethical considerations, rather than becoming captivated by the academic equivalent of business success.

The beginnings of computing at the University of Minnesota were striking in the extent to which the university chose a politics of its own, rather than simply having one imposed on it by apparent financial necessity. Minnesota drew on an incredible range of financial sources _other_ than the military funding favored by an institution such as MIT. Minnesota was consciously egalitarian, trying to spread knowledge of computing among the largest number of people. The university was being very consciously true to its land-grant origins.

Marvin Stein arrived at Minnesota in 1955, the same year that Bernard Galler arrived at Michigan. Stein was already an experienced computer programmer, and Engineering Research Associates (Univac) had effectively recruited him because ERA was making a substantial gift of computer time to the university, and someone was needed to see that it was used properly. The university's part of the bargain was to give Stein a tenure-track appointment in the Mathematics department of its Institute of Technology, and he was given tenure after a year. (BAB OH 90, Marvin Stein, pp. 17, 24)

Stein launched a yearlong graduate level introductory course in programming. The demand was such that he had to teach two sections of fifty students each. Stein ran the class in "semi-seminar" mode. As he described it:

I would suggest some type of exercise that would illustrate the ideas that I was discussing. Then we would have one student who would volunteer to illustrate that, and actually carry out the exercise on the computer. That student would write a report. All the other students would receive a copy of that report and their assignment was to do a critique of it. (ibid, p. 19)

At the same time, another faculty member, Bill Munro, taught another sequence in numerical analysis. Both courses involved regular laboratory work, apart from preparing problems for reports. There was some kind of screening requirement for the programming course, simply to keep the numbers of students within manageable limits. Stein could not recall the details by the time he was interviewed, but the requirement was apparently sufficiently porous that anyone out of the ordinary who had a decent reason for wanting to learn about computers could get in. That included undergraduates, and liberal arts graduate students. (ibid, pp.17, 31-32)

Stein also made it known that he was available to help anyone with a research problem which might be amenable to the use of computers. However, he stipulated that the customers had to learn to do their own programming, albeit with the help of Stein and his staff. The result was that once a user did one project, he would be disposed to come back for others. These computations mounted up to a point beyond what ERA's initial gift would cover.

So, in the more advanced phases of the projects, the researchers would go out to Convair in San Diego, where Stein and the university had a connection. (ibid, pp. 17-19, 21)

This was not a long-term solution, of course, so the university obtained a NSF grant for \$100,000, and found other monies from various sources, to a total of \$250,000. They looked around, to see what they could get. There was a machine at Los Alamos which they were offered, but it turned out to be a fundamentally unreliable prototype. There was an offer from the newly independent Control Data, but that was still a paper company with a paper machine (this must have been approximately 1957-58 or thereabouts). In the end, Univac agreed to sell the university an 1103 machine for exactly the sum of money they had raised, rather than what it would actually cost. About 1960, the university got another computer, a Control Data 1604, with half a million dollars from the National Science Foundation, and a quarter of a million from the state legislature. In 1963, the university got a Control Data 6600. The nominal price was three millions, but Control Data discounted it to a million and a half, and the National Science Foundation kicked in \$900,000. The state regents borrowed the remainder. (ibid, pp. 21-22, 27, 29)

Stein took the computer center on a consciously anti-commercial path. He stated his policy:

One of our restraints was that we didn't care to be in competition with various manufacturers with whom we had to do business in other ways, and who were operating service bureaus. We allowed outside use if there was clearly some justification for it: if we had some type of unique program, or if it was one of our students who had received his or her degree and had gone to work for an outside organization, and wanted to come back to do something on the equipment that he or she had written the program for and was familiar with... I remember turning down offers from Honeywell to buy thousands of hours, primarily because it seemed that we ought not to be in competition in that way. Also, our faculty and students were making good use of the time. We were pretty heavily loaded. We didn't want to get into a position where we essentially said, "Too bad for you, but we need the money." Our system was blind as to whether the user was paying for the usage or not. It might have been naive of us, but that is the way we operated. Students had as good access as research projects that paid. And I was a little worried that these outside users who were putting down large sums of money would demand priorities that at that time I didn't want to concede to them. Maybe if we needed the money, or if I knew more about money in those days, we would have done it; but we didn't. (ibid, pp. 27-28)

Make some reasonable substitutions, eg. high school for university, auto repair for computing, etc., and this speech could have been made by one of Garrison Keillor's Lake Wobegon characters. The mere expensiveness of the machine was no reason

to run it according to corporate principles.

The nature of a technology is not defined by the circumstances of its first invention, but rather by the circumstances of its gradual adoption and modification. Academic computing was run by people who wanted to be part of the university, and who implemented that desire in hardware, when and as they could.