There was no compelling need for the universities to become involved in computing. There was no compelling social or economic pressure for universities to develop computer expertise parallelling that of great corporations. There was no compelling pressure growing out of personal needs of individual faculty members. Nor was there a truly enduring need arising out of the utilitarian aspects of academic disciplines.

In the first place, there was no public need for academic reseach and education. The numbers of computer scientists and computer engineers were still very small-- some fraction of the 13,000 computer specialists as late as 1960. Those of the high level experts who
were not employed in academia all worked in a handful of laboratories, for a handful of big organizations, most of which were computer manufacturers ("IBM and the seven dwarves"). Such firms could reasonably train their own long-term employees, and would have an advantage in being able to disclose proprietary information (make note of that chap who had an article in the October 2001 T&C about SHARE). By analogy, the design of telephone systems was not considered a appropriate academic engineering field-- such expertise was concentrated at Bell Labs and Western Electric.

IBM was much the same kind of firm. Apart from doing its own research, it not only trained its own employees, but trained its customers' employees, and provided former IBM'ers for jobs which required more extended training and experience. In short, the company behaved very much like a national public utility of computing-- or an extension of the federal civil service.

Such monopolistic or semimonopolistic firms were willing to sponsor almost any reasonable type of research, without much worry about immediate results. The same applied for government laboratories. Braun and McDonald (Revolution in Miniature), point out that this was not a carte blanche. However, that applied when large sums of money were at issue. Bell Labs had no difficult in employing theorists such as Claude Shannon and the mathematician R. W. Hamming.

Computer manufacturers had their internal pure research programs at an early date. These were not funded on the same scale as industrial research, of course, but they were sufficiently well funded as to compare favorably with all but a handful of academic situations.

Artificial intelligence is something like a litmus test of willingness to conduct pure research. It is notoriously expensive, on account of the sheer power of the computers required. At the same time, results from artificial intelligence are notoriously problematic.

IBM was doing actual reseach with artificial intellgence at a very early date. In 1952 or thereabouts, Nathaniel Rochester, Gene Amdahl's boss at IBM, was supporting work which was thirty or forty years ahead of its time in terms of commercial prospects. This meant things like neural nets and character recognition.

They wrote a program to simulate a neural net, of a size feasible for the then-computers. This meant only 1000 neurons on an IBM 701 (presumably neurons with an unrealistically low number

of connections). The performance was uninspiring. Interestingly, this surfaced what must be a very early example of the hard AI/soft AI dispute. Gene Amdahl wanted to try altering the software around, but Rochester took the view that the network was simply much too small. (BAB OH 107, p. 40)

Similarly, Rochester and his associates did character recognition, using theoretically sophisticated methods, but the results were not remotely good enough to be commercially viable. (ibid p. 41).

However, this sort of pure research was the spare-time diversion of a group whose main business was to design computers.

Similarly, IBM supported Arthur Samuel's checker-playing program. Samuel had moved to IBM when he found that a university did not offer sufficient scope to his interest in computers (Pamela McCorduck, Machines Who Think, check page).

Of course IBM did not fund these projects on the scale that the military would have. As John McCarthy commented: "They tended to be two or three people projects, and without dedicated computers."(BAB OH 156, P. 10) While artificial intelligence per se at IBM came to a halt in 1959, after adverse publicity (ibid), IBM went on to do other kinds of impractically exotic research. In 1968-70, IBM Research was doing an early form of personal computer graphics with a machine costing $700,000 which could only serve one terminal (An IBM 1130 computer with an IBM 2250 graphics terminal attached). This was only about twenty years in advance of its time. (Belady BAB OH 352, p. 13-15)

All of these pieces of research had very little in the way of rational expectation of profit. However, IBM dominated its market sufficiently that it could behave more or less like AT&T, and fund research over the long term.

Universities were not under an obligation to get involved in computing as a matter of meeting social or economic needs. If they had felt like doing so, they could perfectly well have left the whole business to IBM and the federal government.

Individual professors might have personal needs leading to involvement in computing. This, too, does not constitute an adequate explanation. Someone like Arthur Samuel, who wanted to do expensive research, could always switch to a corporation. Personal, ideosyncratic interests did not translate into introducing the computer on campus. There were a number of well established mechanisms for coping with odd personal interests, eg. summer vacations, sabbaticals, permitted industrial consulting, salary buyout grants. Computers only needed to be brought on campus if they were to be integrated into one or more recognised academic disciplines.

Even then, it was not self-evident that a whole discipline should grow up to deal with computers. Applied mathematicians displayed an early interest in computers-- as tools, not subjects. However, on the basis of this limited interest, the role of computers on campus ought to have been self-limiting, as computers got better, and required less special attention. The presence of a music school on campus does not imply the need to develop an expertise in musical instrument design and manufacturing. Similarly, there were not departments of "typewriter-ology," at least, not at the senior college or

graduate school level.

The precondition for a growing and expanding collective collegiate interest in computers was that computer must either be a purpose in their own right, or an integral part of a larger purpose. Now, as we have seen, the original computer scientists were disinclined to go in for computer engineering for its own sake. If that was what they had wanted to do, they could have done it even better in a corporation or a government laboratory. Computer science was only going to come into existence if it engaged, or was thought to engage, important questions in the social sciences or humanities.

Amaral-- RCA funding AI well into the sixties OH 176

There was the rationale of testing.

Griswold, OH 256, p. 9