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COMPUTERS, PROGRAMMERS, AND THE POLITICS OF TECHNICAL EXPERTISE

THE COMPUTER BOYS TAKE OVER

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The Cosa Nostra of the Data Processing Industry

We are at once the most unmanageable and the most poorly managed specialism in our society. Actors and artists pale by comparison. Only pure mathematicians are as cantankerous, and it's a calamity that so many of them get recruited by simplistic personnel men.

—Herbert Grosch, "Programmers: The Industry's Cosa Nostra," 1966

Unsettling the Desk Set

The 1957 film *Desk Set* is best known to movie buffs as a lightweight but enjoyable romantic comedy, the eighth of nine pictures in which Spencer Tracy and Katherine Hepburn acted together, and the first to be filmed in color. The film is generally considered frivolous yet enjoyable, not one of the famous pair's best, though still popular and durable. The plot is fairly straightforward: Tracy, as Richard Sumner, is an efficiency expert charged with introducing computer technology into the reference library at the fictional Federal Broadcasting Network. There he encounters Bunny Watson, the Hepburn character, and her spirited troop of female reference librarians. Watson and her fellow librarians, who spend their days researching the answers to such profound questions as "What kind of car does the king of the Watusis drive?" and "How much damage is caused annually to American forests by the spruce budworm?" immediately suspect Sumner of trying to put them all out of a job. After the usual course of conventional romantic comedy fare—mutual mistrust, false assumptions, sublimated sexual tension, and humorous misunderstandings—Watson comes to see Sumner as he truly is: a stand-up guy who was only seeking to make her work as a librarian easier and more enjoyable.

What is less widely remembered about *Desk Set* is that it was sponsored in part by the IBM Corporation. The film opens with a wide-angle

view of an IBM showroom, which then closes to a tight shot of a single machine bearing the IBM logo. The equipment on the set was provided by IBM, and the credits at the end of the film—in which an acknowledgment of IBM's involvement and assistance features prominently—appear as if printed on an IBM machine. IBM also supplied equipment operators and training.

The IBM Corporation's involvement with *Desk Set* was more than an early example of opportunistic product placement. Underneath the trappings of a lighthearted comedy, *Desk Set* was the first film of its era to deal seriously with the organizational and professional implications of the electronic computer. In the midst of the general enthusiasm that characterized popular coverage of the computer in this period crept hints of unease about the possibility of electronic brains displacing humans in domains previously thought to have been free from the threat of mechanization. In 1949 the computer consultant Edmund Berkeley, in the first popular book devoted to the electronic computer, had dubbed them "Giant Brains; or, Machines That Think." The giant brain metaphor suggested a potential conflict between human and machine—a conflict that was picked up by the popular press. "Can Man Build a Superman?" *Time* magazine asked in a cover story in 1950 on the Harvard Mark III computer.[1] More pressingly, asked *Colliers* magazine a few years later, "Can a Mechanical Brain Replace You?"[2] Probably it could, concluded *Fortune* magazine, at least if you worked in an office, where "office robots" were poised to "eliminate the human element."[3] IBM's participation in production of *Desk Set* can only be understood in terms of its ongoing efforts, which started in the early 1950s, to reassure the public that despite rumors to the contrary, computers were not poised "to take over the world's affairs from the human inhabitants."[4]

Seen as a maneuver in this larger public relations campaign, *Desk Set* was an unalloyed triumph for IBM.[5] The film is unambiguously positive about the electronic computer. The idea that human beings might ever be replaced by machines is represented as amusingly naive. Sumner's Electronic-Magnetic Memory and Research Arithmetic Calculator (EMERAC) is clearly no threat to Watson's commanding personality and efficiency. In fact, "Emmy" turns out to be charmingly simpleminded. When a technician mistakenly asks the computer for information on the Island "Curfew" (as opposed to Corfu), Emmy goes amusingly haywire. Fortunately, she could easily be put right using only a bobby pin, judiciously applied. The reassuring message was that computers were useful but dimwitted servants, and unlikely masters. As one reviewer described

the situation, "It simply does not seem very ominous when they threaten to put a mechanical brain in a broadcasting company's reference library, over which the efficient Miss Hepburn has sway. . . . The prospect of automation is plainly no menace to Kate."[6]

But if the computer held no dangers for Hepburn, it did for many of the real-life office workers watching the film. Like Watson and her librarians, most would have greeted the arrival of a computer-toting efficiency expert with fear and trepidation. Although Tracy imbued the character of Sumner with his trademark gruff-but-likable persona, such experts were generally seen as the harbingers of reorganization, mechanization, and what the economist Thorstein Veblen described as the "degradation of labor."[7] And as Thomas Haigh has suggested, it was no coincidence that Sumner was both an efficiency expert and a computer designer; many of the "systems men" of the early electronic computer era were efficiency experts turned computer consultants. In any case, the specter of computer-driven unemployment looms large over *Desk Set*, if only as the source of initial conflict between Sumner and Watson. But even the most casual viewers of *Desk Set* might have suspected that absent the feisty Hepburn, the librarians at the Federal Broadcasting Network might not have gotten off so easily. Although the film alluded to a second EMERAC that had been installed in the payroll department, no mention was made of the payroll workers having a Watson of their own. Even if the skilled reference librarians and accountants were immune from computerization, though, what about other, less specialized workers? Did anyone really expect the two Emmies to remain confined to the library and payroll departments? It seemed inevitable that at least some Federal Broadcasting Network employees would be reduced to the status of mere machine operators, or perhaps replaced altogether.

Insofar as the *Desk Set* has been interpreted critically, it is in the context of these larger concerns about the replacement of human beings with computers. The struggle of human versus machine (or more precise, woman versus machine) depicted in the film is often seen as a metaphor for worker resistance to computerization. Although the possibility that computers might supersede humans was much discussed in the popular press during the 1950s and early 1960s, with the exception of a small number of occupational categories the adoption of computer technology generally *did not* involve large-scale worker displacement. For the most part, what resistance to corporate computerization efforts did emerge came not from ordinary workers but rather from their managers. It was these managers who frequently saw their work most directly affected by

the applications developed by computer programmers and systems analysts. Over the course of the 1950s corporations had discovered that the electronic computer was more than just an improved version of the mechanical calculator or Hollerith machine. What was originally envisioned as a "chromium-plated tabulator," as Haigh has portrayed it, was increasingly seen as a tool for managerial control and communication.[8] As the electronic computer was gradually reinterpreted in larger organizational terms, first as an "electronic data processing" device and then again as a "management information system," it was increasingly seen as a source of institutional and professional power.

Computers Can't Solve Everything

The 1960s were something of a golden age for the computer industry. The industry grew at an average annual rate of 27 percent during this period.[9] At the beginning of the decade there were roughly fifty-four hundred computers installed in the United States; by 1970 this number had grown to more than seventy-four thousand.[10] In 1969 alone U.S. firms purchased $7 billion worth of electronic computers and related equipment. An additional $14 billion was spent on computer personnel and materials. The corporate world's total investment in computing that year represented 10 percent of the nation's total annual expenditure on capital equipment.[11] These corporate investors were also getting increasingly more for their money. In the first half of the decade, innovations in transistor and integrated circuit technology had increased the memory size and processor speed of computers by a factor of ten, providing an effective performance improvement of almost a hundred. By the end of the decade, the inexorable march toward smaller, faster, and cheaper computing predicted by Gordon Moore in 1965 was clearly in evidence.[12]

It was during this period that the IBM Corporation rose to worldwide dominance, establishing in the process a series of institutional structures and technological standards that shaped developments in the industry for the next several decades. Under IBM's substantial umbrella a broad and diverse set of subsidiary industries flourished, including not just manufacturers of complementary (or even competing) hardware products but also programming services companies, time-sharing "computer utilities," and independent data processing service providers. When we consider such subsidiary industries, our estimate of the total size of the computer industry almost doubles.[13]

And yet by the late 1960s there were signs of trouble in paradise. Foreshadowing the "productivity paradox" debate of later decades, hints began to appear in the literature that a growing number of corporations were questioning the value of their investment in computing. As an article in 1969 in *Fortune* magazine entitled "Computers Can't Solve Everything" described the situation, "After buying or leasing some 60,000 computers during the past fifteen years, businessmen are less and less able to state with assurance that it's all worth it." The article recited a litany of overambitious and ultimately unsuccessful attempts to computerize planning and management processes at such firms as Pillsbury, Westinghouse, and the International Minerals and Chemical Corporation. The success that many companies experienced in computerizing their clerical operations in the 1950s, argued industry reporter Thomas Alexander, had generated unrealistic expectations about their ability to apply computing power to more sophisticated applications, such as controlling manufacturing operations, optimizing inventory and transportation flows, and improving the quality of managerial decision making. But perhaps one in ten businesses was "showing expertise in the management of the computer" to higher-order activities. The rest were slowly and uncomfortably "waking up to the fact that they were oversold" on computer technology—not just by self-interested manufacturers and computer consultants, but by their own data processing personnel.[14]

Fortune was not alone in its assessment of the apparent unprofitability of many corporate computerization efforts. Beginning in the mid-1960s, the noted Harvard Business School professor John Dearden published a series of articles in the *Harvard Business Review* dismissing as "myths" and "mirages" the alleged benefits of computerized corporate information systems.[15] Prominent industry analyst John Diebold complained, also in the pages of the *Harvard Business Review*, about the "naive standards" that many businesses used to evaluate the costs and benefits of computer technology. "Nowhere is this lack of [business] sophistication more apparent than in the way in which computers are applied in American industry today."[16] Management consultant David Hertz argued that computers were "oversold and underemployed."[17] A survey in 1968 by the Research Institute for America had determined that only half of all corporate computer users were convinced that their investment in computing had paid off. The inability of computerization projects to justify their own existence signaled "the fizzle in the 'computer revolution,'" suggested the accounting firm Touche Ross and Company.[18]

Perhaps the most devastating critique of corporate computing came from the venerable consulting firm McKinsey and Company. In 1968 McKinsey released a report titled "Unlocking the Computer's Profit Potential," in which it claimed that "computer efforts, in all but a few exceptional companies, are in real, if often unacknowledged, trouble." Despite years of investment in "sophisticated hardware," "larger and increasingly costly computer staffs," and "complex and ingenious applications," most of these companies were nowhere near realizing their anticipated returns on the investment in electronic computing. Instead, they were increasingly characterized by rising costs, lost opportunities, and diminishing returns. Although the computer had transformed the administrative and accounting operations of many U.S. businesses, "the computer has had little impact on most companies' key operating and management problems."[19]

The McKinsey report was widely cited within the business and technical literature. The editors of *Datamation* endorsed it almost immediately, declaring that it "lays waste to the cherished dream that computers create profits."[20] *Computers and Automation* reprinted it in its entirety several months later. References to the report appear in a diverse range of journals for at least two decades after its initial publication.[21]

The dissatisfaction with corporate computerization efforts expressed in the McKinsey report and elsewhere must be interpreted within the context of a larger critique of software that was percolating in this period. As mentioned earlier, the "gap in programming support" that emerged in 1950s had worsened to "software turmoil" in the early 1960s, and by the end of the decade was being referred to as a full-blown "software crisis."[22] And in 1968, the first NATO Conference on Software Engineering firmly established the language of the software crisis in the vernacular of the computer community. Large software development projects had acquired a reputation for being behind schedule, over budget, and bug ridden. Software had become "a scare item for management . . . an unprofitable morass, costly and unending."[23]

It is important to note that the use of the word software in this period was somewhat inconsistent. As Thomas Haigh has suggested, the meaning of the word software was changing rapidly during the 1960s, and could refer alternatively to something specific—the systems software and utilities that today we would describe as an operating system—or more generally to the applications, personnel, and processes associated with computing. He argues that the software crisis as it was understood by the NATO conference organizers referred only to the former definition.[24]