

“As Foolproof as the Telephone”: Automation and Gendered Labor

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Abstract

This essay examines the development of Machine-Readable Cataloging in the late 1950s and early 1960s, relating it to a popular filmic speculation about feminized labor and the automation of information retrieval, in order to ultimately discuss the paradoxical ways in which MARC transformed the feminized labor of information. It will show that cataloging, like other forms of women’s labor transformed by technology in the latter part of the twentieth century, has a complicated relationship to market labor and industrialization that is the result of social processes over which librarians can be said to have no control at all, or certainly very little control, particularly industrialization, the Cold War, and the shift in the national economy’s focus from production to service, from manufacturing to communication.

In 1941, the U.S. government established an Office of Scientific Research and Development to accelerate the war effort. Its director, Vannevar Bush, supervised roughly 6,000 scientists, many of whom worried about managing and organizing the rapidly expanding body of scientific and technical information to which they were both contributing and citing. Bush anticipated that the scientific energy generated by wartime

efforts would shift to new uses in postwar America. At the end of the war, Bush famously urged scientists to turn to the massive task of making more accessible the “bewildering store of knowledge” (Bush 1945, 101). He recognized that newer technologies promised to improve the control of this increasingly large body of literature. His foresight proved accurate. In 1950, the United States Government authorized the establishment of a clearinghouse of scientific and technical information (Wiegand 1999, 15). After the Soviet Union launched Sputnik in 1957, the President’s Science Advisory Committee published a report on the availability of scientific and technical information in the United States that left little doubt about why it thought the nation was losing the Space Race. The primary recommendation of the report was to better integrate planning and communication of the federal programs in science and technology (President’s Science Advisory Committee 1958, 28).

By the early 1960s, pilot projects at the National Library of Medicine (MEDLARS), the Library of Congress (MARC), and the Massachusetts Institute of Technology (INTREX) were in the works to automate scientific information retrieval, computerize traditional library catalogs, and create a ubiquitous computer-mediated information environment. These early information retrieval systems, which, as a result of the Space Race, were largely commissioned by the U.S. Air Force as part of a defense-subsidized electronics industry, not only echoed Vannevar Bush’s well known “Memex” ideas from 20 years earlier, but also reflected the Cold War military-academic-industrial complex, which Bush helped to inaugurate. Computers were first designed during World War II to automate calculation, then to control weapons and guide aircraft, and later to analyze problems of command through simulation, with the ultimate goal being the automation of command.

Women played a crucial role in the early development of computers during World War II (Light 1999). So perhaps it should come as no surprise that women played a crucial role in the development of the first automated information retrieval systems, such as MEDLARS, MARC, and INTREX, roughly 20 years later. Machine Readable Cataloging (MARC), in particular, serves as one of many examples of the ways in which postwar technological change and information are tied to women's labor and women's bodies. From 1964-69, the Library of Congress developed the format for a standardized machine-readable catalog record, now widely used in libraries throughout the world. MARC served as an early example of an expert or "thinking" system at a time before the development of early Database Management Systems, which began with the release in 1968 of IBM's Information Management System (IMS), originally designed for NASA's Apollo program. In complicated ways, MARC participates in a technological history that traces the industrialized market labor of women. This essay will examine MARC within that history, briefly providing the context in which MARC developed, a popular speculation about feminized labor and the automation of information retrieval, and, finally, the paradoxical ways in which MARC transformed the feminized labor of information. In addition, it will show that cataloging, like other forms of women's labor transformed by technology in the latter part of the twentieth century, has a complicated relationship to market labor and industrialization that is the result of social processes over which librarians can be said to have no control at all, or certainly very little control, particularly industrialization, the Cold War, and the shift in the national economy's focus from production to service, from manufacturing to communication.

These social processes created new jobs for which women were considered to be appropriate candidates, including librarians, typists, clerks, administrative assistants, nurses, and computer programmers, jobs we might say provide a significant amount of "information labor." To various women, at various times, those jobs and the salaries they provided, proved to be attractions too great to resist as the war drew to a close and men returned from war to resume their work in the labor force. Some women "continued to work" in the postwar years because they were reluctant to give up the life and the income to which they had become accustomed during the war. Some women found that the growing pressure of inflation was so seriously eroding the purchasing power of their husband's income that they had to go back to work. Other women, as a result of divorce, desertion, or the decision to remain single, in increasing numbers, had no husband's income to fall back upon. Others went home and had babies and did not re-enter the labor force until their children were grown and out of the house. The result was an increase in the number of women in the workforce (Cowan 1983, 202).

One of these women, Henriette Avram, joined the National Security Agency in 1952, after taking a Master's degree in mathematics. Working with the IBM 701, she became one of the National Security Agency's first computer programmers. After a brief stint in the private sector, Avram joined the Library of Congress in 1965 as a systems analyst in the Office of Information Systems. Assigned to analyze cataloging data and to assess their manipulability by computers, she quickly devised a standard vehicle for the communication of data, culminating in the MARC Pilot Project later that year. The Pilot Project yielded a format structure that became the basis of MARC formats worldwide, an extended character set capable of accommodating various diacritics and symbols that

became the standard for the Roman alphabet, codes for language and country, and the MARC Distribution Service, a prototype for similar services around the world. Remarkably, after establishing the Pilot Project in early 1966, Avram and her team made it operational by November of that year. The design of procedures and computer programs took place over a mere eight months. By March 1969, the Library of Congress had created a subscription service to make MARC available to organizations throughout the country.

From its inception, MARC was built to transform labor; and it's probably reasonable to say that MARC was built to transform labor largely done by women, given the number of women entering librarianship at this time. MARC and early information retrieval systems like it were, therefore, likely built on the assumption that women would be operating them. A corporate report outlining the goals of developing MARC states that the most "immediate objective" of these new "machine techniques" is "to lessen the human workload" involved in input processes and to increase the volume of units which those processes can handle (Sparks 1962, p. 1). That same year, the U.S. Air Force commissioned LIBRARY-21, a UNIVAC vision of the 'library of tomorrow,' designed by Cold War defense consultants working for the Central Intelligence Agency and private industry, which was showcased at the 1962 World's Fair. In anticipation of its debut, *The New York Times* described LIBRARY-21 as "an electronic brain capable of dispensing thousands of passages of literature at the touch of a few reference buttons" (New York Times, December 15th, 1961). Its designers imagined automated features that were geographically extensive, where "remote inquiry and automatic catalog search" would "make it possible to answer questions from remote stations – homes, offices, schools, or regional information centers" (Bowles 2000). These remote stations were to be "operable by anyone," designed to be "as foolproof as the

telephone" so no specially trained labor would be needed (Downey, 2007 p. 40). IBM built the IBM 1401 Data Processing System and IBM 870 Document Writing System, which were used for coding catalog data into a worksheet, which was then punched into data processing cards ("punch cards") for input into a computer. Its report cites an "influx of printed matter," an increase in personnel costs, and the amount of time librarians spend doing "repetitive operations that could be handled by data processing equipment" as reasons for a systems approach to the production of library card data (IBM 1964, p. 1). While these reports ostensibly identify the rationale for developing automated information retrieval systems, they also reflect popular representations of feminized labor in the postwar era.

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