

### 3

#### **The Automated Library**

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PROBLEMS OF THE AUTOMATED LIBRARY

We use *Automated Library* to denote a library in which the collections of library materials are primarily on paper but in which the library's *procedures* have been computerized. Libraries are very record-intensive: Not only is each title different but, for many purposes, the records needed for library operations must necessarily be very concerned with *individual copies* of each title. A circulation system must know precisely *which* copy of *which* volume of *which* edition of *which* title was borrowed by precisely *which* borrower and *when* it is due back. Attributing the loan to some other borrower will not do; nor will substituting the return of some other document, even by the same borrower, be acceptable as a discharge of the loan. Acquisition records need to show precisely how many copies of a given work were ordered from which bookseller and which, if any, have so far been received. A library not knowing which titles it already has (and in how many copies) could not function efficiently. Serials records contain minute details of copies of issues, indexes, binding, and invoices in order to assure that each set is complete and properly acquired, bound, and paid for. Library records, then, must be specific to individual copies.

In general it is desirable that library record-keeping be automated for three reasons:

1. Much of the work involves the accurate updating of records in files. The tasks involved are generally tedious, repetitive, mechanical in nature, and lend themselves to computerization, even though the records may be complex and arranged in complicated ways.

2. Automation is likely to improve cost-effective performance by increasing accuracy, by reducing the rate of increase in costs in labor-intensive activities, and by increased effectiveness. It should become possible to do some tasks more thoroughly than levels of staffing usually permit with manual procedures, such as the regular claiming of unsupplied issues of periodicals, or by doing things that cannot in practice be done in paper files, notably searching for combinations of characteristics.

3. Automation permits decentralized access to records. A librarian in a branch library can verify the status of an order without maintaining duplicate files, travelling to the order department, or asking other staff to interrupt their work in order to find out. A user can check to see whether a book is out on loan without travelling to the library to see whether it is on the shelf.

Considerations of service, of cost, and of the humane use of staff all argue for the use of computers to ease the burden and to increase the effectiveness of handling library records.

## STANDARDS

Bringing order to chaos and achieving collaboration both depend on shared understanding: on standards. Library service has long depended on shared standards, of which the adoption of standardized cataloging codes and standardized subject classification schemes are two very important examples. These two examples and most library standards may facilitate automation and make computerized procedures more cost-effective, but they have little to do with computers directly.

Two standards have enormous strategic importance for the Automated Library:

1. The MACHine Readable Cataloging (MARC) communications formats for catalog records define how catalog records (and potentially other bibliographic records) can be communicated from one computer system to another. This national (NISO Z39:2) and international standard (ISO 2709) is now more than twenty years old. Although rather complicated and cumbersome, it provides a necessary basis for the economies through standardization that is essential for the development of the Automated Library.

2. More recent, much less well-known, but of comparable strategic importance, is the "Search and Retrieve" standard, sometimes called the "Linked Systems Protocol," (ISO 10162/10163; US NISO Z39:50). (Endnote 1). In the first twenty years of the Automated Library one would use *one* online catalog or *one* online bibliography at a time. After finishing the use of one system, one could then consult another—one at a time and separately. But as the number of different systems increased, each using commands that were more or less different from the others, and requiring telecommunications to more or less remote sites, the advantages and the inconvenience of using not only one's local system but also other, different, remote systems became increasingly clear.

The sensible alternative, for anyone interested in using computers, was to try keep the advantages and to delegate the inconvenience. Instead of withdrawing from one's local on-line catalog in order to use another, one would prefer to command the local on-line catalog to extend the search to other on-line catalogs elsewhere on one's behalf and to retrieve and to present the results. In principle, this removes from the user the need to bother with the telecommunications and possibly unfamiliar commands needed for the other online catalogs. (See figure 3.1.)

[BEST PLACE FOR FIG 3.1]

In theory any remote on-line catalog can become an extension of one's local catalog with the differences in commands made largely transparent. Getting one computer to "Search and Retrieve" from another can, in principle, be extended to a variety of bibliographic files (circulation, acquisitions, bibliographies, and so on). This is a new development. By 1991 the national and international standards were being revised to achieve compatibility, software developers had formed a "Z39:50 implementors group," and early versions were becoming available.

The MARC standard enables computer-based bibliographic data to be shared and the "Search and Retrieve" standard enables retrieval systems to be shared. The long term consequences of both are enormous.

## **TECHNOLOGICAL TRENDS**

Those who predict technological trends are unanimous on certain points. If, for lack of any grounds for doing otherwise, we accept their projections and extrapolate them forwards for a few years, we reach some simple planning assumptions concerning the new information technology:

1. Improved performance by computers, if continued, will result in computing power becoming extremely inexpensive, with a trend toward a computer on every desk.
2. Telecommunications will become ubiquitous, convenient, and very low cost per character transmitted.
3. Data storage costs become trivial.

Everything else, including labor costs, we should assume to be unchanged or getting worse. Library service is very labor intensive. About two-thirds of a library's budget usually goes for labor. Since machines can be made more cost-effective in a way that human beings can not, it appears inexorable that the cost of labor will tend to increase relative to other costs. (See Fig. 3.2).  
[BEST PLACE FOR FIG 3.2]

Because of the steadily shifting relationship between machines and humans, we can expect the amount of machine use to increase steadily, relative to the use of labor for any and all activities for which machines can be used. The effect may simply be empowerment—more machine power to increase what a person can do. The effect will also be one of substitution—what can be delegated to machines will increasingly be delegated as it becomes technically and economically feasible.

## **“DRIFT DOWN” PRINCIPLES**

The following “drift-down” principles have been proposed by Michael Gorman:

1. Nothing should be done by a professional that can be done by a technician.
2. Nothing should be done by a technician that can be done by a clerk.
3. Nothing should be done by a human being that can be done by a machine. (Endnote 2).

These principles do not necessarily apply in all circumstances but they do seem reasonable guidelines for improving the cost-effectiveness of library services in North America.

## **EXPERIENCE WITH LIBRARY AUTOMATION**

Paper Libraries of any size now either are or are becoming Automated Libraries. We have some familiarity with what is involved. In brief, the change from the nineteenth century design of the Paper Library to the Automated Library has been characterized by:

standardization of data,  
remote access to files,  
the linking and combining of files,  
access to numerous different files from the same terminal,  
increased cooperative use of shared files,  
discontinuation of numerous, more-or-less duplicative local files,  
greater capability for doing things to and with the (computer-based) files, and  
increased vulnerability to technological failure.

### **PROBLEMS OF THE AUTOMATED LIBRARY**

The Automated Library perpetuates some of the problems of the Paper Library noted in the previous chapter. Because the collections of documents are still on paper, a localized medium, the need for local collections, the space needed for paper documents, the inflexibility of paper documents, the separation of documents from the users, opening hours for the collections (though no longer for the catalog), and competition for use of copies of documents all remain as much a problem as in the Automated Library as in the Paper Library. The catalog may be used in a number of places. In particular, with remote access to the on-line catalog, the user is no longer separated from the catalog and the separation of catalog and documents is somewhat diminished since, online, a catalog can at long last be used in the bookstacks.

The Automated Library represents a significant improvement but for only some of the problems and, aside for the online catalog, benefits directly those who are *providing* the service rather than those who are *using* the service.

*Notes on Chapter 3: The Automated Library.*

1. Michael K. Buckland and Clifford A. Lynch, "The Linked Systems Protocol and the Future of Bibliographic Networks and Systems," *Information Technology and Libraries* 6 (June 1987):83-88; Michael K. Buckland and Clifford A. Lynch, "National and International Implications of the Linked Systems Protocol for Online Bibliographic Systems," *Cataloging & Classification Quarterly* 8 (1988):15-33.

2. Michael Gorman, "The Organization of Academic Libraries in the Light of Automation," *Advances in Library Automation and Networking* 1 (1987): 152.