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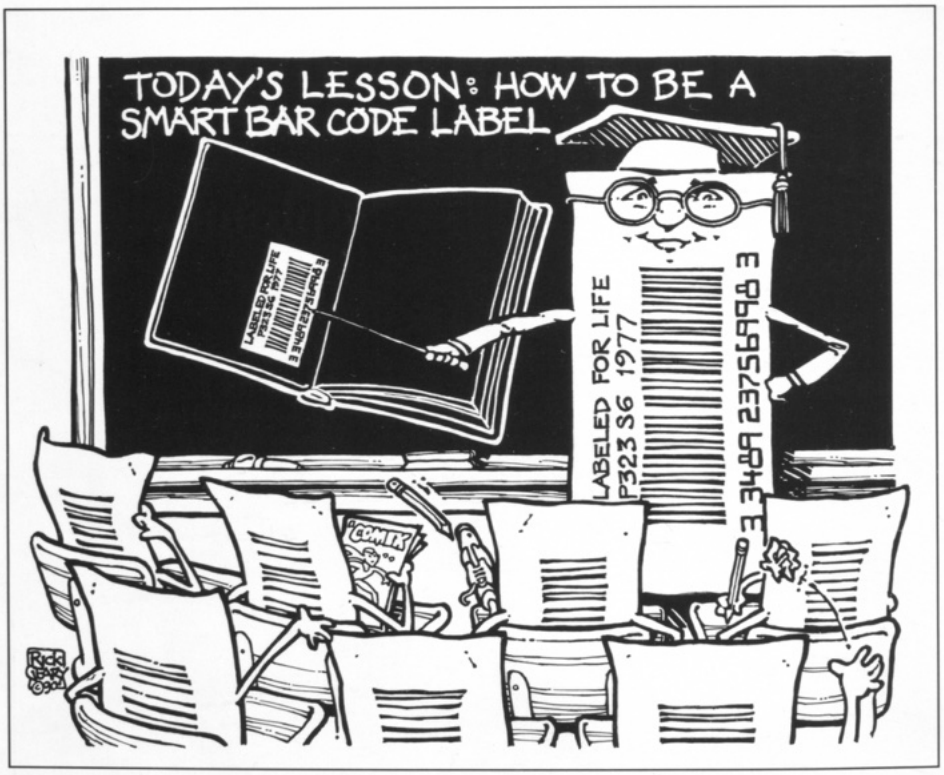


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# Information Technology and Libraries



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# Editorial

Readers, and authors, too, must sometimes wonder what editors do and how we decide what gets published and when. Unlike with magicians, there is no sleight of hand involved and no professional ban on revealing our secrets. They are not really secrets, but these questions are seldom if ever asked. Rather than wait, we thought that the *ITAL* readership would like to know a bit more about the journal—but not too much, so that if there is a little magic about the process, it remains.

The editor is responsible for the overall quality and tone of a journal, scholarly or not. The editor has to have a vision that can be translated into a product that people will buy, either through subscriptions or through a readership one hopes exists in libraries. There really is no point in publishing a journal if no one wants to read it.

The editorial board of *ITAL* is responsible for the quality of the journal in ways equally important to the leadership role of the editor. The editorial board of *ITAL* serves two primary functions. It helps formulate editorial policy, and it passes judgment on the manuscripts submitted for publication consideration. Occasionally members of the board help beat the bushes for manuscripts, but by and large they are at the mercy of those who take the time and the risk to be writers.

This is a good group of referees. They are considerate of the efforts authors have made, but they are not afraid to say that something is not of the quality or scope needed for the journal. On the other hand, when they see merit in a paper and can offer constructive criticism, they do, often spending hours on one paper. The payoff occurs when the author sets ego aside and listens carefully. Almost every issue of *ITAL* contains papers that have been revised in one way or another. That the journal has maintained a consistently high quality is a tribute to the LITA members who have been willing to contribute their time and expertise.

The referees are also good at meeting the deadlines we set. Papers are usually read and refereed within two months after manuscript has been received. Even when revisions are necessary, the average time from the date the manuscript is first received and the date it appears in print is less than a year. There are times when an author sees his work in print just six months after submission. This is an extraordinarily quick turnaround time of which *ITAL* is justifiably proud.

We would like to see more manuscripts and urge you readers who are also writers or who want to be writers to send us your papers if they are on any aspect of library information technology. When in doubt, send us the manuscript or call or query. A look at recent issues should tell you that we are not just a bits and bytes journal, if we ever were. There is room for the practical in our "Communications" section if the scholarly approach does not fit. And note that "scholarly" does not mean dry and unreadable. Finally, we urge you to write letters to the editor. You can let us know how we are doing and what you like and do not like about the journal in general terms, but we also encourage critical responses to the papers we publish. Scholarly dialogue is necessary in any discipline or profession if it is to grow and if we are to learn from one another. We need to take a page out of the scientist's handbook and challenge one another whenever we think that a point was missed or misinterpreted

or when we can offer corroboration. We are far too silent in our dealings with each other and especially with those who risk their ideas in a public forum. Let those brave souls know that they have an audience. Join in.

TOM LEONHARDT

# Selection Advisor: An Expert System for Collection Development

**Mark Johnston and John Weckert**

*Given financial constraints and the vast amount of materials available, it is extremely important for librarians to select wisely. An expert system is being developed to help in the selection of materials for academic libraries. The selection criteria on which the system is based fall into six categories: subject, intellectual content, potential use, relation to collection, bibliographical considerations, and language. Answers to each question are in the range of -5 to +5. Conceptually the structure of the knowledge base is that of a state transition diagram. In addition to describing the system, the paper also considers it in the context of expert systems in general. In particular, model-based approaches and machine learning are considered.*

With the explosion in the amount of information available in various forms, it has become extremely important to select materials wisely. This is particularly true when these information sources must be purchased within stringent financial guidelines. However, financial considerations are not the only ones. Time is another. Much time can be wasted reading, viewing, or listening to irrelevant material, or material that, while relevant, is not as good or as useful as some alternative. We have a project under way to develop an expert system to give assistance with the selection of materials for academic libraries. It is hoped that this system will help libraries to acquire the best and most relevant materials for their readers.

This is not the most popular area for the development of expert systems for libraries, but it is an interesting one and, we believe, one with potential. Descriptions of two systems in this field have appeared recently. The prototype described by Sowell appears to be similar to ours.[1] We, however, are building ours in Prolog rather than using an existing shell, which gives us increased flexibility. There are also similarities with the system described by Rada.[2] That system, however, is specifically for journals. The one we are developing will be suitable for both books and journals. There is also mention of the additional systems in this field in a report by Vickery et al.[3]

## SELECTION CRITERIA

Gorman and Howes write:

> For the librarian who is absolutely up-to-date with the latest authors, intellectual trends and user demands in a field, selection may indeed count as a minor activity in terms of mental energy; but such librarians are almost non-existent. For most professionals selection will be a demanding task requiring the skillful balancing of funds, collection strengths and weaknesses, user needs and demands, and other available materials.[4]

In order to assist the professional in this task, a number of sets of criteria have been proposed. One set, proposed by Spiller, has eight categories: date, author, structure and research method, level, physical presentation,

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readability, index, and bibliography.[5] Another, more comprehensive one detailed by Whittaker has seven categories and fifty subcategories. The main categories are: people, plan, contents, organization, design, production, and placing.[6]

Gorman and Howes argue that it may be more useful to consider a much smaller set, divided into just two broad categories: content and its presentation, and form. These are then broken down into six subcatcatories: authority of creators, scope, treatment and level, arrangement, format, and special considerations or special features.[7]

Our knowledge base, which captures the expertise of the collection development experts, is based on the criteria presented by Rutledge and Swindler and is modified by Gorman and Howes' work and through consultation with Gorman.

Rutledge and Swindler divide selection criteria into six categories. In order of declining importance, these are: subject, intellectual content, potential use, relation to collection, bibliographic considerations, and language.[8] Each of these categories is then divided into three blocks of issues of first, second, and third priority. Figure 1 shows the first two columns of Rutledge and Swindler's table.[9]

Points are allocated in each category and totaled. The points total indicates whether the library must get the item, should get it, or could get it. In the two categories shown in figure 1, the points allocated are in the ranges shown in figure 2.

The three ranges in each are for the decreasing priorities. We chose this model initially because it is already in a form that is relatively easy to computerize.

| | Subject | Intellectual Content |
|---|---|---|
| First Priority | Directly supports programs or institutional emphases | Key work in field<br>Key author<br>Major critical study<br>Substantial new contribution to learning |
| Second Priority | Ancillary to programs<br>Specialized topic<br>Minor field of scholarship or inquiry | General essay<br>Narrowly focused work<br>Narrow intellectual perspective<br>Popular treatment |
| Third Priority | Tangential to programs<br>Marginal area of scholarship or inquiry | Raw or unedited material<br>Marginal or polemical work<br>Trivial literature<br>Propaganda |

*Figure 1. Two Columns of Rutledge and Swindler's Table.*

| | |
|---|---|
| Subject | 21–30 |
| | 11–20 |
| | 1–10 |
| Intellectual Content | 17–25 |
| | 9–16 |
| | 0–8 |

*Figure 2. Two Categories' Allocated Points.*

## COMPUTERIZATION

We now turn to the issue of computerizing this model. The easiest way would be to associate one question with each item in the table and calculate the points appropriately. Questions then might be "Does it directly support programs or institutional emphases?" and "Is it a major field of scholarship?" If the answers to these questions are negative, then we would move down and ask, "Is it ancillary to programs?" and "Is it a minor field of scholarship?" If the answers were negative again, we would move down to third-priority issues. If the answers to each of the sets of questions asked were positive, the next questions asked would concern the intellectual content criterion.

There are several related problems with this approach. First, if we limit user responses to yes or no, often no response will appear to be satisfactory. The user may feel that some work does not directly support programs, but that it is more than ancillary. In other cases yes/no answers appear to be even less satisfactory. The criterion "Intellectual Content" has one issue: "key author." Forcing the user to answer either yes or no to the question "Is the author a key one in the field?" is clearly unsatisfactory. The status of the author does not occur anywhere else in that criterion.

One solution is to allow more responses,

such as yes/maybe/no. There are, however, always going to be cases where even this is too restrictive. In addition, the more options we allow, the greater the redundancy. For example, what is the difference between a very weak positive response to "Does the work directly support programs?" and a strong positive one to "Is it ancillary to programs?"

Our solution has been to provide numeric responses to each question, on a scale of -5 to +5, and to delete all questions that appear redundant. (This allows easy identification of uncertainty, which is important given the nature of the selection enterprise, where the selector is certain that a work should be accepted or rejected to a greater or lesser degree. We discuss uncertainty in more detail shortly.) We also reworded the questions so that a scaled answer is most natural. In this way, we have been able to reduce the number of questions about support for programs and about the importance of the field of scholarship from six to two. The first question now is "To what extent does the work support programs and institutional emphases?" and the second, "How major is the field of scholarship or inquiry?" These two questions seem to capture all the content of six of the points under the subject criterion adequately. An answer towards +5 indicates strong support, while one towards -5 shows weak or no support. We have been able to reduce the number of questions to about three-fifths of the original number.

It was not all quite as simple as this, of course. Even in the criterion "Subject," which was the easiest to modify, there was one problem. The second entry in the second priority is "Specialized topic,"something that arises in neither of the other priorities. It is, however, closely related to entries in "Intellectual Content" and "Potential Use," both in their second priorities. It was therefore decided to cover that issue under the heading "Intellectual Content." Also, it is not always clear whether being a specialized topic is good or bad. It depends at least on what the library wants, so a question to this effect was included, even though it is not raised in the original set of criteria. If the library does want such works, then a score towards +5 adds to the score the work will receive; otherwise it will subtract from it. In the second criterion, "Intellectual Content," a question is asked about each of the issues in the first priority but not about the rest. For example, it was felt that a question like "Is the work a major critical study?" adequately covers issues such as whether or not it is a general essay or trivial literature.

Even in this modified version, not all questions are asked in any one consultation. The "Potential Use" criterion, for instance, is divided into two blocks. The first has two questions concerning the strength of research or teaching interest and that of user interest. The second block concerns general interest, and readability or accessibility. If the score in the first block is low, the second block questions are asked. From here the user is led to the "Relation to Collection" questions. If the first block score is high, however, the second block is bypassed, and the user is led directly to the relation to collection questions.

So far we have only discussed the expertise of the collection developer and have not considered knowledge specific to particular areas. This knowledge should also be built into the system. For example, if the system knows about the authors, the publishers, and their relative status in some field, then certain questions will not need to be asked. Scores for those questions will be obtainable directly from the knowledge base.

## UNCERTAINTY

The representation of uncertainty in computer systems has attracted considerable interest in recent years. Various approaches have been used regarding probability, certainty factors and measures of belief, and fuzzy logic. When using probability, the range of values is strictly 0–1, though other scales can be used and then mapped into this range. Currently research is under way to investigate the extent to which Bayesian probability methods (as used in the PROSPECTOR system[10]) can be used in place of the arbitrary Rutledge and Swindler approach.

The certainty factor (CF) approach was first used in the MYCIN project and currently is available in numerous expert system shells such as VP-Expert.[11,12] Typically the user enters a value in the range 0–100 to indicate the certainty of a particular variable. The CF method differs from classical probability in the manner in which the values are combined. For example, in a logical conjunction (e.g.,

first coin head AND second coin head) in probability theory, the values would be multiplied (e.g. 0.5 * 0.5 = 0.25), whereas in the CF method the minimum of the two values would be taken.

In classical Boolean logic there are only two values: true and false. In fuzzy logic we have a value in the range 0–1 representing the degree or extent of membership of some set, e.g., strong support for institutional programs could be represented by mSuppInstProg = 0.9.[13] Again, it is in the combination of factors where the method differs from Boolean logic and classical probability. The conventional set notion of union (normally disjunction, i.e., OR) is defined as MAX of the two set membership values. The notion of intersection (normally conjunction, i.e., AND) is defined as MIN of the two set membership values. Other set operations such as "subsets" and "complement" are also defined.

The three above approaches all have their adherents, although of the three, probability has perhaps the longest and soundest tradition. We are pursuing this direction in our system at present but plan to allow several alternatives, field testing them to assess their usability.

## THE KNOWLEDGE BASE

We now look at the structure of the knowledge base.[14] The basic structure is as follows:

```
question("intellectuallc," "Is this a major critical study?")
question("intellectual1d," "Is it a substantial new contribution?")
question("intellectual2," "Is it a popular treatment?")
question("intellectual3a," "Is it raw or unedited material?")
question("intellectual3b," "Is it likely to be of research interest?")
question("intellectual4a," "How strong is your preference for specialist works?")

option("intellectual1c," -1,-1,[["intellectual1d"]])
option("intellectual1d," 25,17,[["intellectual2"], ["intellectual4a"]])
option("intellectual2," 16,9,[["intellectual3a"],["intellectual4a"]])
option("intellectual3a,"-1,-1, [["intellectual3b"]])
option("intellectual3b,"8,1, [["intellectual4a"]])
option("intellectual4a,"'-1,-1, [["intellectual4b"]]).
```

This fragment of the knowledge base deals with the criterion "Intellectual Content." Each question clause contains an identifying label, for example, "intellectual1c," and an associated question. Each option clause also has a label, followed by several parameters and a list of zero or more options. (In the examples above, all lists contain just one or two members.) The system works like this: when the question for intellectual1c is asked and answered, the answer is stored and the question for intellectual1d is asked. The answer to this is stored, and then the score for the block intellectual1 is calculated. If this score is above a certain number, the system moves on to intellectual4a, otherwise to intellectual2. The question for this identifier is asked, and depending on the answer, identifier intellectual3a or intellectual4a is sought. This process continues until the list in the option is empty, at which point the final calculation is made, and a recommendation given.

This knowledge base can be interpreted as a set of rules, but such an interpretation is a little tortuous. It is best described as a table-driven approach. Conceptually what we have is a state transition diagram (this is also a way of looking at the table in the Rutledge and Swindler paper). The program then implements that via a state action table; that is, given a particular state (criterion) and a particular response to a question, there is an action to move to another state.

## WEAKNESSES OF CURRENT EXPERT SYSTEMS

A criticism often leveled at current expert systems is that of brittleness; they perform badly outside their narrow domain of expertise. This is hardly surprising, since many systems are simply collections of rules perceived to be relevant to a particular problem or issue. In first-generation expert systems, there was no attempt to set them in a wider context or equip them with any "commonsense" knowledge. Many studies have shown that experts' knowledge is schema driven. They have causal models of the domain from which they reason. Second-generation expert systems are characterized by a level of knowledge deeper

than a simple surface rule base. This is often expressed as a causal or qualitative model. An example of such an approach is Bratko's work in the KARDIO project.[15] The process of acquisition lends itself to simple modeling, where the user lists the criteria, aspects of those criteria, and weightings.

In this model-based approach, there is facility to extend the model to incorporate links to other relevant concepts in library work. Thus the system has a model of its context to fall back on should there be no rules available to bring to bear on certain input data. The incorporation of such models should greatly facilitate communication between systems, seemingly a highly desirable outcome given the plethora of software systems available, which have limited, if any, ability to communicate. Expert systems used for cataloging, online searching, or acquisition could share a knowledge of relevant issues and communicate when necessary, or at least be "aware" of one another's domain of expertise.

In such an advisory system, there are three broad approaches to the establishment of criteria for selection. One method is to adopt accepted criteria derived from "experts," published research, and so on. This approach is the one we have taken so far and is illustrated in the preceding discussion. An alternative approach is for users to define their own criteria. Thus users set up their own model tailored to the idiosyncrasies of that particular library or institution. A third approach is to make use of "machine learning" techniques. If there is a suitable body of data concerning materials accepted versus those rejected, a set of rules classifying materials in a similar manner can be induced or learned by a computer program. The resultant rules can then be incorporated into an expert system.

## USER-DEFINED CRITERIA

Typically a user would need to: (a) enumerate the criteria used, (b) list the subissues within each criterion, (c) specify the range of values to be entered in order to indicate the degree of certainty associated with that issue, and (d) specify how the criteria are to be combined (a weighting).

We are in the process of constructing a graphic display that groups issues and their criteria. The manner in which they are combined is indicated by the user drawing links between objects. Links can be created, destroyed, or recreated. The user can incrementally develop and revise the model until satisfied. This process need only be carried out once, though further revisions can take place. From the model, the computer produces a set of rules that are incorporated into the expert system for routine use.

## MACHINE LEARNING OF RULES

Selection of materials can be based on statistical measures if suitable data exist for both accepted and rejected items. Losee suggested one such method based on a decision theoretic model.[16] An alternative approach is to analyze the data with a computer and to build a decision tree or a set of rules based on those variables seen to be most discriminatory.

In Australia, few libraries if any have the time and resources to log the materials rejected for acquisition as well as those accepted. Machine-readable records such as MARC are only available for materials that are in catalogs. Induction of rules by statistical means from a body of data requires ideally 1,000–2,000 samples of positive and negative cases. As these data are not currently available, it is planned to employ an acquisitions librarian to classify materials. The classification will be recorded by a computer and will generate the records in a suitable format for subsequent induction. Once a body of data has been generated, induction algorithms will be used to produce the rules.

One of the best known of these algorithms is ID3 (Interactive Dichotomiser 3) developed by Quinlan.[17] This algorithm expects data in feature-vector form (e.g., v1, v2, v3, v4, . . . Accept/Reject), where v*n* are values or measures of the various variables such as "Supports programs," or "Relation to collection." The algorithm begins by looking for the most discriminatory variable. It does this by constructing frequency tables for each variable. Once a value for a variable is found that partitions the data into two sets, it is established as the root of the decision tree. The process then continues until all cases have been classified. ID3 is used in a number of commercial expert system shells such as RuleMaster. The algorithm has since been further developed by Quinlan into the C4 algorithm,

which generates actual rules rather than a decision tree.[18]

Use of this algorithm will provide an interesting opportunity to compare the machine-generated rules with the intentions of the user, which may not have been clearly articulated. It is a feature of work in the area of expertise and knowledge engineering that experts often "don't know what they know" or, more accurately, have difficulty articulating rules to describe their thought processes. Users who do not wish to spend the time creating models of the decision-making process may instead prefer to lease a computer and/or software over a sufficient period to build up a bank of data from which a system can be extracted. The system can then be tested, and if satisfactory, put into routine use.

## SUMMARY

The system described here will not solve all selection problems, but perhaps it will add some consistency to the activity and, by forcing those using it to think carefully about the selection process, aid in wise decision making. There are two other positive attributes that have been noted by librarians. One is its use in training librarians in this field of their discipline, and the other is the ease of storing information on all previous decisions made, both for works accepted and for those rejected. The reasons for the initial subscription to a journal, for example, may be forgotten ten years later, when that journal's subscription is being questioned. With this system, however, the evaluation session can be stored and examined at any time, and the subscription reevaluated in the light of the reasons given when the subscription was initiated. The system allows a clear separation of underlying model from implementation, a feature not common in rule-based systems. The system additionally allows construction of user-defined models and various representations of uncertainty and combination of criteria. This relieves librarians of the need to be software experts and enables easy modification of the system. Benefits of the model-based approach in terms of extensibility and potential to link with other systems are suggested. Directions for further research in the realm of machine learning of criteria are also given.

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# Management, Cost, and Behavioral Issues with Locally Mounted Databases

**Richard W. Meyer**

*Clemson University Library has extended the online public access catalog by mounting several commercial databases and locally generated files. Experience with the system since 1987 has produced numerous observations related to management, cost, and behavioral issues. As a major goal, Clemson has attempted to provide comprehensive access to information at the lowest possible cost to users. The DORIS system at Clemson provides access to databases online over the computer network extended throughout the state. This access provides users with comprehensive search capabilities from their offices. Design of the system focuses on common interfaces for various citation databases with screen-displayed commands and full availability of help screens. In terms of cost, analysis suggests that the greater expenditure for online versus print access is more than offset by retrieval of citations, which are increased by an order of magnitude. Interface design and screen displays accommodate user psychology and enhance ease of use. Results to date suggest that citation database selection should focus on undergraduate instruction across all disciplines and research where databases are low cost and user activity is very high.*

Information services and access to information at Clemson have expanded dramatically in the past decade and increasingly have become a joint effort of the university computing services and the library. Because division of responsibility remains distinct, few redundancies in access to information have occurred. A cooperative attitude coupled with a common desire to provide efficient access have resulted in a rich environment of information sources for the campus. One of the major programs developed since 1987 is online access to citation and nonbibliographic data using the BRS Search software, which is called the Document Online Retrieval Information Service (DORIS) at Clemson. The environment and strategy that led to Clemson's aggressive program of information services have been documented in an earlier paper.[1] The intent of this article is to explore those managerial, cost, and behavioral issues that surfaced during the process of developing online access to information through DORIS.

## BACKGROUND

Clemson University is a state land-grant institution founded in 1889. With programs oriented toward science and technology, the university offers degrees in sixty-four undergraduate and ninety-seven graduate programs in the colleges of agricultural sciences, architecture, commerce and industry, education, engineering, forest and recreation resources, liberal arts, nursing, and sciences. Present enrollment is about 15,200 students, of whom 2,100 are graduate students. With more than 1,000 faculty on the main campus and five agricultural experiment stations, the university maintains the state's primary programs

Richard W. Meyer is Associate Director of Libraries, Clemson University, Clemson, South Carolina. The author wishes to acknowledge with gratitude the exemplary efforts of Ches Martin, the programmer analyst responsible for implementing the DORIS project.

for instruction and research in agriculture, architecture, city and regional planning, building construction and management, textiles, forestry, ceramic engineering, and environmental engineering. Because of the technical orientation of Clemson's mission, computing has played a fundamental role at the university since the early 1960s and is widely dispersed in the many academic programs. However, a computer network that provides access to a large mainframe and mid-range processors is the mainstay of academic and administrative computing.

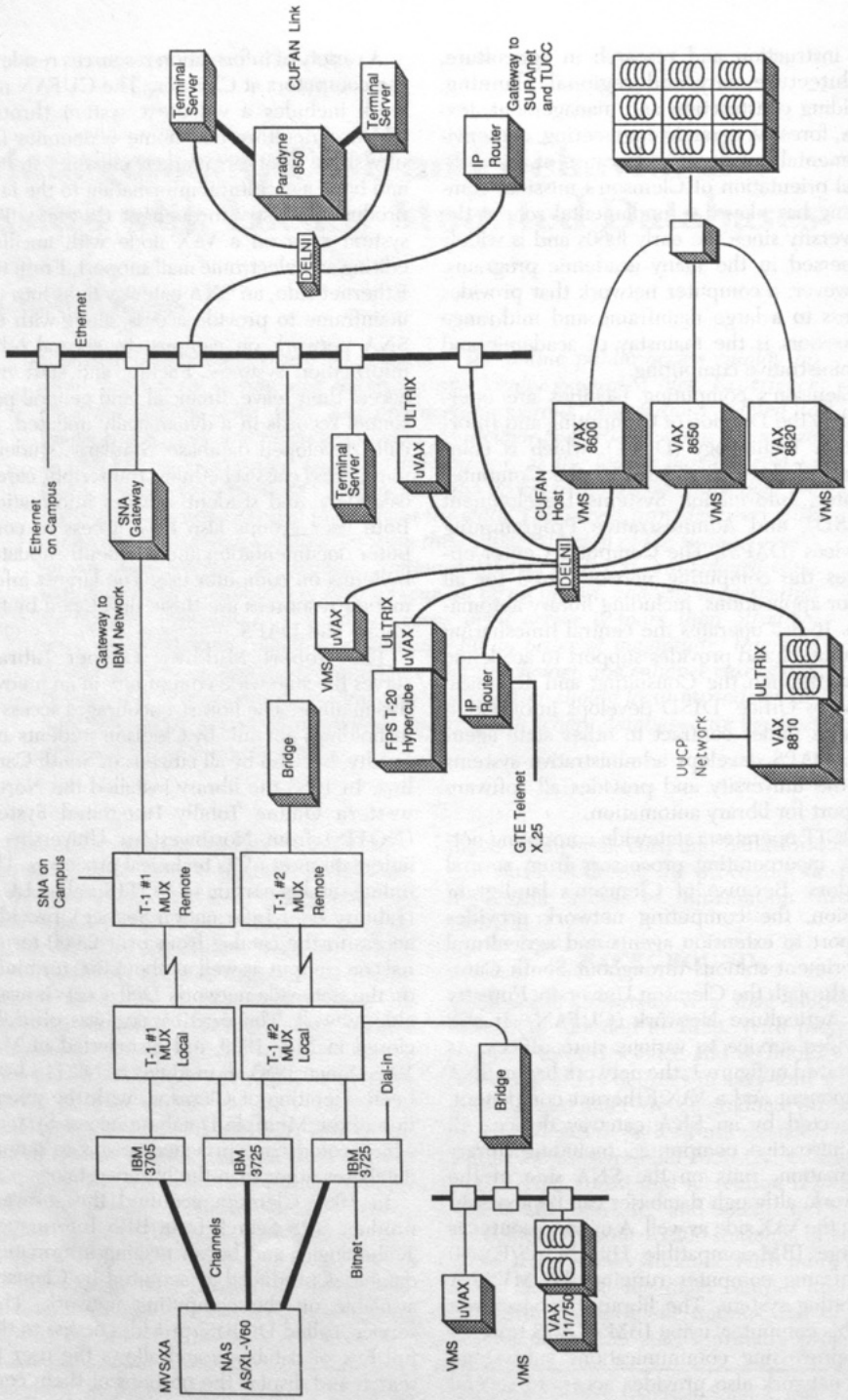
Clemson's computing facilities are operated by the Division of Computing and Information Technology (DCIT), which is composed of three departments: the Computer Center, Information Systems Development (DISD), and Administrative Programming Services (DAPS). The Computer Center operates the computing network used for all major applications, including library automation. It also operates the central timesharing computers and provides support to academic users through the Consulting and Technical Services Office. DISD develops information systems under contract to other state agencies. DAPS develops administrative systems for the university and provides all software support for library automation.

DCIT operates a statewide computing network incorporating processors from several vendors. Because of Clemson's land-grant mission, the computing network provides support to extension agents and agricultural experiment stations throughout South Carolina through the Clemson University Forestry and Agriculture Network (CUFAN). It also provides service to various state offices. As portrayed in figure 1, the network has an SNA component and a VAX/Ethernet component, connected by an SNA gateway device. All administrative computing, including library automation, runs on the SNA side of the network, although databases can be accessed from the VAX side as well. A major resource is a large IBM-compatible Hitachi AS/EX-80 mainframe computer running the MVS/XA operating system. The library's services run on this computer, using IBM's CICS transaction-processing communications subsystem. The network also provides access to several VAX computers, ranging in size from a MicroVax II to a VAX 8820.

A variety of information resources reside on the computers at Clemson. The CUFAN network includes a videotext system through which agriculture and home economics faculty share weather, market, current interest, and basic agricultural information to the farm products industry throughout the state. This system runs on a VAX node with ancillary editing and electronic mail support. From this Ethernet side, an SNA gateway links into the mainframe to provide access, along with the SNA network on campus, to several other information systems. Faculty and staff may access their leave, financial, and general personnel records in a dynamically updated, locally developed database. Similarly, students may access class schedules, transcripts, career calendars, and student services information. Both user groups also have access to computer documentation and frequently updated bulletins on computer use. The largest information resources are those developed by the library and DAPS.

The Robert Muldrow Cooper Library serves the statewide community in an innovative manner. The library encourages access to its holdings not only by Clemson students and faculty, but also by all citizens of South Carolina. In 1983 the library installed the Northwestern Online Totally Integrated System (NOTIS) from Northwestern University to automate most of its technical processes. The online catalog portion of NOTIS, called LUIS (Library User Information Service), provides access to the catalog from over 2,000 terminals on campus as well as about 300 terminals on the statewide network. Dial access is available as well. The card catalog was officially closed in May 1985 and dismantled in May 1988. Since 1985 all modules of NOTIS have been operating at Clemson, with the exception of the Multiple Database Access System, which could have provided means to mount databases other than the library catalog.

In 1987 Clemson acquired the software product BRS Search from BRS Information Technologies and began making information databases produced or acquired by Clemson available on the computing network. This service, called DORIS, provides access to the full text of databases and allows the user to search and display the portions of them containing the search terms of interest. Databases in DORIS include the commercial in-


Terminal Server
CUFAN Link
Terminal Server
Paradyne 850
IP Router
Gateway to SURAnet and TUCC
DELNI
Ethernet
Ethernet on Campus
SNA Gateway
Terminal Server
ULTRIX
uVAX
VAX 8600
VAX 8650
VAX 8820
CUFAN Host
VMS
VMS
VMS
DELNI
Gateway to IBM Network
uVAX
VMS
ULTRIX
uVAX
FPS T-20 Hypercube
IP Router
ULTRIX
VAX 8810
UUCP Network
GTE Telenet X.25
Bridge
SNA on Campus
T-1 #1 MUX Remote
T-1 #2 MUX Remote
T-1 #1 MUX Local
T-1 #2 MUX Local
Dial-in
Bridge
IBM 3705
IBM 3725
IBM 3725
Channels
Bitnet
MVS/XA
NAS AS/XL-V60
uVAX
VMS
VAX 11/750
VMS

dexes Magazine Index, Newspaper Index, Trade and Industry Index, Computer Index, and Management Contents (all made available from IAC) and the national bibliographies Agricola and ERIC, as well as such local documents as central stores inventory, campus organization minutes, and the Clemson campus directory. The database selection screen for DORIS is shown in figure 2.

Today, the electronic information access services provided by the Clemson Library have become a vital part of its mission. The development of these services involves close cooperation with Clemson's Division of Computing and Information Technology. The library automation projects are joint efforts of these organizations. In fact, the selection of the BRS software was made with criteria developed jointly by the library and DAPS. Inquiries to DAPS over a period of several years made it apparent that Clemson needed a text-retrieval package for nonlibrary applications including the faculty minutes, the telephone directory, and the central stores inventory of the purchasing office. Criteria important to the selection of a text-retrieval package included compatibility with NOTIS via CICS, fast retrieval on very large files, and powerful Boolean/keyword access to records. In addition, it was considered important that the software contain an easily modifiable interface so that screens presented to the user could be readily updated. BRS was chosen because it runs under CICS, uses the same search engine as the keyword module of NOTIS, and has a powerful interface modification tool in the form of Mentor (a module of the BRS search software). The software was purchased rather than leased because this was more cost-effective in the long run. Given an environment where automation is as heavily used as it is at Clemson, the library has made a substantial investment in computer hardware. At this time the network in the library includes 155 sessions running on eighty-three terminals on the NAS mainframe. Twenty-four of these terminals are installed for the public. Each public terminal runs two sessions: one locked into DORIS and the other locked into the public catalog, LUIS. Switching from one to the other is simple matter of pressing the alternate key and the insert key

**Database Selection**

The following databases are available.
Type the number that corresponds to the database you wish to search and press **ENTER**. If you need a more detailed description of the databases, type h and press **ENTER**.

1. CU Organization Minutes
2. CU Campus Directory
3. University Stores Catalog
4. CU Computer Resources Info System
10. AGRICOLA (1/84 thru 3/90)
11. AGRICOLA (3/90 Only)
12. Magazine Index
13. Newspaper Index
14. Computer Database
15. Trade and Industry Index
16. Management Contents
17. FOCUS (Dropout Prevention Database)
18. ERIC (Education Database)

Type a selection **number** and press **ENTER** or type **q** to Quit or **h** for Help and press **ENTER** -->

*Figure 2. Database Selection Screen under the DORIS On-site System.*

simultaneously. This, in effect, provides hot key instantaneous switching between the two information systems. Staff in the library also have available approximately forty Macintoshes for general office automation support. Most of these are hooked to a Dec Server or other device for access to the campus network. In addition, there are two remote centers in the library: one with sixteen terminals on the mainframe and a second with forty VT320 terminals on a VAX server. These are made available for teaching and nonlibrary use, but access to LUIS and DORIS is available here as well. Access to the systems is monitored under VTAM and RAC-F to provide control of terminal identification and security. Only Clemson users are allowed access to commercial databases on DORIS, although anyone may gain access to LUIS and locally generated databases on DORIS.

During the period in which both systems were implemented, a number of management and financial issues surfaced that had to be considered. In addition, Clemson computing and library staff attempted to deal with behavioral issues that surfaced relative to online access to information. The rest of this article reports on these issues and the efforts staff made to accommodate them.

## MANAGEMENT ISSUES

Automation of information services at Clemson has had one major goal: to provide comprehensive access at the lowest possible cost to users. The extent to which success has been achieved is due fundamentally to continued efforts to focus on reducing or eliminating barriers to information. Historically, barriers that have limited users' access to information have had physical, financial, and bibliometric aspects. The card catalog required users to come into the library building to determine the existence and availability of resources. This catalog, along with printed indexes to journal citations, required users to spend many tedious hours digging out information. Financial constraints traditionally have shaped cataloging codes to limit the number of access points in the catalog. Providing access by keywords or even to publishers' series would be an overwhelming task for library staff using a manual system and would certainly expand the number of cabinets required to house the cards. Combining printed indexes to different collections of data on the same subject would be so difficult that users would be required instead to repeat the same search strategy several times to be sure comprehensive retrieval is accomplished. All of these requirements impose substantial costs on users. Decisions made with a view to reducing these costs shape the program at Clemson.

One way to improve access to citations of journal literature is to acquire CD-ROM versions of the indexes. Typically, this approach provides relatively painless access for users, although there needs to be some investment in learning to use a microcomputer-driven CD-ROM index. In fact, Clemson installed the IAC Infotrac system in 1985 to improve access to basic resources for undergraduates. This approach was hugely successful as this CD-ROM product became very popular. That popularity caused staff to consider the eventual acquisition of many CD-ROM products. However, concern quickly developed that users would have to face a virtual arcade of CD-ROMs requiring many of them to learn a large variety of interfaces. Furthermore, even if networking CD-ROMs were easy, the number of access points would be limited and probably restricted to in-library use.

Locally mounted databases provide several advantages over CD-ROMs. The number of access points to the data need be restricted only by the number of computer terminals and dial access ports made available on the mainframe. This expands the number of points of contact with the system far beyond the walls of the library building. Furthermore, CD-ROMs often have some of the same bibliometric limitations of card catalogs and printed indexes. Building inverted indexes and storing these index points on a microcomputer hard disk drive for complete keyword access may overwhelm the disk drive, much the same way as too many cards in a catalog can overwhelm the cabinets available to house them.

Perhaps most significant of all, a large collection of CD-ROMs may easily mean a large number of interfaces. Networking experiments to date do not appear to have facilitated the development of common interfaces for a variety of indexes on CD-ROM. In contrast, careful selection of the mainframe software

readily allows for a common interface to as many indexes and databases as the library determines to load. In addition, eventual linking to an e-mail system and to the public catalog may be more likely with an online system than networked CD-ROMs. Efforts to accommodate these issues simplify access to information by users, but they impose the requirement on the library to develop programming resources and on staff to handle chores otherwise less familiar to librarians.

In Clemson's case, development of DORIS required a programming staff to develop the interface and to load data. Clemson has committed roughly one-half FTE to these projects. Coordinators were also needed to handle contract negotiation, training, publicity, and similar tasks. However, it should be recognized that many of these tasks must be accommodated in the case of printed resources and CD-ROM use as well. New users of either CD-ROM indexes or online systems require bibliographic instruction in the use of the product. In the case of DORIS, a segment has been included in the basic freshman orientation sessions to teach new users how to access the system. Additional workshops and tutorials have been introduced to assist faculty and graduate students with their use of DORIS. Current efforts by reference librarians who spend many hours with individualized instruction will diminish as familiarity among users with this kind of system increases.

In terms of impact on resources, the need for disk space is one of the most significant issues. The databases mentioned above together occupy 4,403 disc cylinders (3 gigabytes) after compression of data on Clemson's mainframe. (By comparison, NOTIS application with files and indexes occupies 2.37 gigabytes at CU.) Obviously, this disk space is not free; it costs roughly $30,000 per drive per year. Clemson staff take care to compress data whenever possible and to allocate this resource only when use warrants it. Current activity on the central stores catalog found on DORIS is low enough that this file will probably be dropped soon in favor of more useful information. In fact, the oldest year of data for the commercial databases, which is typically five years old, is scratched to make room for current information. Displacing older data appears to make better use of resources even though it requires acquisition of printed indexes for access to older data. Loading new data for new databases has an additional impact on resources in the form of program development.

Clemson does not buy commercial databases in a preloaded form. Preloading would make the mounting of databases easier, but it is important to Clemson to develop expertise with database loading because of locally generated data. The databases also cost less if negotiations are made directly with vendors. Overall, loading databases has not proven to be as difficult as might be perceived. The IAC databases are formatted into fixed-field records that were easily converted to the BRS fixed-field format. Clemson currently has thirteen databases available on DORIS as noted above. All were relatively easy to load. Greater difficulty was experienced in loading records available only in the MARC format, such as the cataloging records from the Government Printing Office.

The internal format used by the BRS software utilizes fixed-field records in a specific format. The BRS loader program requires records in ODCS (BRS' in-house) format with ninety byte records and tagged fields (au = author, ti = title, and so forth). A row of fifty or more asterisks between records is required, also. Therefore the library needs programs to format files for the BRS loader, that is, to reformat the records to match this form as the initial part of the load process. Several options are available to deal with this issue.

Under the current marketing approach of BRS, databases may be purchased from the company in a preloaded format. This allows the data to be loaded quickly and with a minimum of programmer effort. Databases are usually available for lower dollar outlays if negotiations are handled directly by the library with the vendor that creates the data. However, this option requires the Clemson library to acquire or write a load program to convert the data to the BRS format. The program to load from the IAC format was written in Cobol in-house. It was a fairly easy half-day effort, because the IAC format is easy to work with, consisting of eighty byte records with one field per record. A MARC format version written in-house is taking substantially more time. In some cases it may be cost-effective to have the vendor modify the

data ahead of time. Alternatively, BRS will make load programs available at approximately $5,000 each. Because Clemson has used the software to load and access several local databases, substantial familiarity with the load programs was required. This made the option of developing load programs viable as an in-house effort. Some additional considerations of importance should surface before loading of data is attempted.

However, Clemson has determined that it is prudent to acquire data from the vendor as preformatted or organized as the vendor is willing to support at no additional cost. Several examples serve to illustrate the reason. First, separate files for each year allows convenient dropping year by year if old years are rotated out on a regular basis. If several years of data are merged into one file, complex record stripping may be required to unload a single year's data effectively. Second, in the case of the IAC databases, it may be prudent to purchase some special modification of the data ahead of time. For some of their databases, IAC makes complete microfilm collections of the journal articles available in sequentially numbered reels. These sequence numbers are available in a separate file from the citation records and must be merged in if they are to appear in a search of the database. This is not an extremely difficult program to generate, but the matching process slows down the loading significantly. Third, for some databases, nonessential data may be readily stripped out by the vendor at the time they create the file for the library.

It should be noted that Clemson has installed access to the public catalog and other databases under separate, parallel systems. This is in contrast to the approach taken at other locations to install the databases all under the public catalog front end. Several reasons underlie the Clemson approach. First, the NOTIS Multiple Database Access System was simply not available at the time Clemson staff initiated the database project. Second, once the NOTIS module was made available, pricing considerations and the specific choice of indexes available ruled against a switch to it. Third, and more important, Clemson may have a more ambitious agenda than even now can be accommodated by the NOTIS system. Among projects on the drawing board are efforts to link to the Faxon and the Carl databases as well as access to the catalogs of other institutions.

## COST AND BENEFIT TRADEOFFS

In addition to the cost considerations noted above, specific attention needs to be paid to cost/benefit tradeoffs and several related issues. While disk space is expensive, not having information is also costly, as is having to get information from card catalogs, paper indexes, or CD-ROMs. Who pays the cost may differ depending on the approach followed in providing resources. An additional cost is borne by the library when it mounts a database online and thus makes it faster and easier for users to locate citations. When the library simply provides the index in printed form, thus constraining users to slow, tedious searching, an alternative cost is borne by the users. Halperin and Renfro provide a very good comparison of the tradeoffs of cost of print versus online dial access versus on-site access.[2] They make the point that calculating the direct cost of alternatives for the library is reasonably straightforward, but determining the costs to users is more difficult. Indeed, they go on to mention some of the issues, but by no means all of them. Clemson has emphasized the point that reducing the effort of users doing searches in printed sources versus online sources is perhaps as important as the library's budget.

Clemson's staff considered several costs that accrue to users and developed DORIS to minimize these as much as technically possible. The DORIS system was developed in lieu of CD-ROMs to minimize the number of interfaces required for users to learn. The interface in DORIS was designed to complement the online public catalog (LUIS) interface so that the learning requirements would be reduced still further. Terminal access was provided campuswide. This saves users the effort of coming to the library building to search an index. Microfilm cartridge reel numbers were incorporated where available into the IAC databases to give users immediate feedback regarding the library's ownership of the cited material as well the material's location. As the system grows, additional cost savings should help users more. An electronic mail service on campus is being modified to include screens that users can fill out to order books, borrow materials, or acquire photo-

copies. In the future, this will be modified still further to link with the DORIS and LUIS systems. These systems will be linked also to provide users with a command in DORIS to record each citation retrieved and to search LUIS for holdings based on those citations.

The productivity of librarians is also affected by systems like DORIS. If librarians make a printed index available, the user pays a major part of the cost of a search by personal effort. If librarians make the index available online, some of that burden is lifted from the user, who then perceives the productivity of librarians to be higher. When administrators are considering costs, they should know all the benefits that may accrue from their efforts to find funds to purchase hardware and software, whether those benefits accrue to the library or its users. As an added note, Clemson's reputation as an innovator in library automation has had positive effects on recruiting new library faculty.

In the case of Clemson's library, the software turned out to be a sunk cost. The university decided to have this software for text retrieval on several locally generated databases regardless. At the end of the 1987 academic year, excess earnings from contract services provided by computing services had produced a positive balance that needed to be eliminated for tax reasons. Having already examined several software products, a quick decision was made and an order executed to acquire the BRS Search software. It is interesting to note that this purchase amounted to a one-time expenditure of $120,000, compared to BRS gateway access to nine databases estimated to cost $233,000 per year. An additional cost is borne by the university in the amount of $12,000 for annual maintenance of the software. Of course, running an on-site system imposes some other costs as well.

Loading databases as large as some of the commercial files acquired by Clemson requires significant amounts of computer run time. The first load of five IAC databases mentioned above took 54.98 hours of wall time or 5.84 hours of CPU time. This load covered the years 1985 through 1988 and included 272 tapes containing 3,503,051 citations. These are fairly impressive statistics, especially to the programmer, who was only able to acquire an acceptable priority to accommodate this job early on a Sunday morning. This effort and other financially related issues, such as support for the program, had to be carefully considered.

In the case of Agricola, ERIC and two IAC databases, funding was secured from the colleges to support the acquisition of databases specific to the disciplines covered by the colleges. This may be a dangerous approach unless some guarantee to continue funding is provided by the college. If current library funding is not used to subscribe to the database, a risk is imposed if contingencies force the college to reallocate funds. The same would be true of a journal subscription purchased by research grant funds. When the grant is over, the journal may need to be dropped unless another source is located. In Clemson's three cases to date, a commitment by the college of agriculture is based on support provided because of a long-standing relation to a major corporation. The college of education provides funding support for ERIC because of its low cost and high visibility. The two IAC databases are supported by revenue from the business college's continuing education program. For all the other citation databases funding originates with the library's current operating budget.

Use of current operating funds to support subscriptions to databases appears to be a prudent choice for a library. Over the long run, the strong tradition in favor of incremental budgeting suggests that any new technology should be introduced slowly and steadily if libraries expect to be able to afford resources demanded by users in the future. Furthermore, backup copies of the indexes in a printed version need to be provided, because permanent retention of succeeding years of index data may not be justifiable. Each year of data requires continued funding for disk space, even though the data may become less valuable to users as it ages. Therefore the provision of on-site access to indexes must be viewed as an added layer of expense on top of existing, traditional operating expenses. Since provision of online access on a sporadic basis serves users poorly, the expense of providing on-site access should only be assumed if there is a willingness to keep to this path indefinitely. The same holds true for CD-ROMs. Clemson owns *Books In Print*, both in printed as well as CD-ROM

versions. The print version cannot be eliminated because it is needed for archival use and for use in areas where access is required infrequently. Duplicate copies of resources obviously add to the direct expenses of the library, but they also often make life simpler and easier for library users. The choice of which add-on service to develop is driven by some of the issues already mentioned, but price trends of various approaches also influence this decision.

In a recently published review of the Arms' book cited above, Steve Cisler pointed out that CD-ROM prices have not dropped as fast as predicted.[3] He notes that Hitachi predicted that CD-ROM drives would drop in price below $300 by 1987. That prediction was made only one year ahead of time, but it has yet to come true. This makes the relative price of on-site access more appealing each year. Cisler continues in this vein, quoting Arms, who notes that CD-ROM prices for works such as encyclopedias and Shakespeare collections may easily descend to a level affordable for individuals. However, categories of publications such as journal subscriptions and indexes may remain too costly for them ever to reach the home market. Over the long run, on-site availability may very well be the most viable option for immediate access to timely bibliographic databases.

Significant insights into relative costs may be derived from the data summarized in table 1. For several years, the Agricola database was the most heavily searched via Dialog by Clemson library users. Average direct search costs exceeded $30 each. In contrast, approximate per search cost on the local system is less than $3.75 each. This would seem to indicate potential cost savings from mounting research databases locally. However, this average is due to a large increase in the number of searches on the database, because of its free availability at Clemson. Had the number of searches remained the same, the average search cost would have been approximately $53.75. Furthermore, it must be remembered that this file can be acquired at a fairly low cost. A more expensive file such as a medical or engineering database might easily cost as much or more per search on a local system. Databases more useful for instructional purposes may demonstrate even more significant economies.

The IAC databases at Clemson have much less value for the research community than the student group. Connects to the IAC Magazine Index are largely by undergraduates actively pursuing term paper projects. Their use of this file costs the library an average of $.55 for each search. It would be hard to imagine a student for whom the few minutes of effort used to search this index online at Clemson would not be more than compensated by the results obtained. Surely the value received by the undergraduate must exceed the per-search expense assumed by the library. Overall, from a cost standpoint the experience at Clemson suggests that greater marginal value may be gained by undergraduates than by those doing research. Instructional purposes may be met by searches on limited files; whereas mounting enough years of a major research database to accommodate faculty could easily overwhelm the financial capacity of the library.

As a final word on the issue of cost of information, David Tyckoson provides a very cogent summary of the issue of pricing resources including electronic database access.[4] He makes the point that free access to information for users is only possible when the library acquires that information at a flat cost. Once made available in a library, an encyclopedia is as close to a true public good as it may be possible to achieve. As long as it is available to everyone equally and within the limits of its physical endurance, use by one person in no way diminishes use by others. That is, the same $500 expenditure on an encyclopedia may serve 100 users or 1,000 users, with essentially no difference in cost to the library.

In contrast, access to an online service such as Dialog must be priced to users so that the library can recover direct costs, which are accrued on a per search basis. Without being able to predict how much the library will spend in a year for a dial access database, it cannot be offered free of charge. Even if data are collected in one year on the level of use of dial access service, that survey serves poorly to predict how much should be allocated to provide free access the following year. However, if a database is mounted locally, the library expends a given amount to make the database available like a public good. This is analogous to the encyclopedia or printed index. Therefore libraries can make local data-

*Table 1. Direct Cost per Search on Clemson University Databases Over a Six-Month Period, October 1989 to March 1990*

| Database | Yrs. Covered | Cylinders Stored | Connects Oct. 89 | Nov. 89 | Dec. 89 | Jan. 90 | Feb. 90 | Mar. 90 | Total Connects Oct.–Mar. | Monthly Costs: Sub. | Soft Maint. | Storage | Cost/ Con. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agricola | 1985–90 | 1,102 | 43 | 241 | 140 | 371 | 385 | 371 | 1,551 | $ 583 | $ 63 | $ 281 | 3.59 |
| Agricola Late mo. | | 17 | 14 | 47 | 26 | 67 | 84 | 99 | 337 | | 63 | 4 | 1.19 |
| ERIC CIJE | 1968–90 | 507 | | 128 | 43 | 117 | 199 | 144 | 631 | 19 | 63 | 51 | 1.05 |
| ERIC RIE | 1981–90 | 221 | | 16 | 10 | 33 | 41 | 30 | 130 | 19 | 63 | 5 | 3.30 |
| CIJE + RIE | | 728 | | 170 | 59 | 144 | 253 | 208 | 834 | 38 | 63 | 97 | 1.18 |
| *Total ERIC* | | | | | | | | | 1,595 | | | | 1.30 |
| IAC Computer | 1986–90 | 289 | 35 | 233 | 103 | 202 | 334 | 262 | 1,169 | 417 | 63 | 74 | 2.84 |
| IAC Magazines | 1986–90 | 441 | 139 | 1,566 | 570 | 1,140 | 3,169 | 3,049 | 9,633 | 417 | 63 | 113 | 0.37 |
| IAC Manage Contents | 1986–90 | 67 | 17 | 144 | 57 | 105 | 197 | 161 | 681 | 417 | 63 | 17 | 4.37 |
| IAC Newspapers | 1986–90 | 678 | 36 | 400 | 133 | 280 | 695 | 818 | 2,362 | 417 | 63 | 173 | 1.66 |
| IAC Trade and Industry | 1986–90 | 1,034 | 43 | 324 | 92 | 218 | 428 | 339 | 1,444 | 417 | 63 | 264 | 3.09 |
| CU Stores Cat | n/a | 6 | 24 | 195 | 80 | 162 | 227 | 181 | 869 | | 63 | 2 | 0.44 |
| CU Directory | n/a | 21 | 174 | 1,329 | 841 | 1,608 | 1,976 | 1,484 | 7,412 | | 63 | 5 | 0.05 |
| Dropout Calendar | n/a | 4 | 5 | 29 | 19 | 38 | 28 | 33 | 152 | | 63 | 1 | 2.51 |
| Dropout Profiles | n/a | 6 | 8 | 69 | 39 | 50 | 62 | 77 | 305 | | 63 | 2 | 1.26 |
| CU Minutes | 1988–90 | 6 | 17 | 118 | 55 | 113 | 142 | 111 | 556 | | 63 | 2 | 0.69 |
| CU Comp'r Resources | n/a | 4 | | 67 | 114 | 232 | 368 | 316 | 1,097 | | 63 | 1 | 0.35 |
| Total or Average | | 4,403 | 555 | 5,076 | 2,381 | 4,880 | 8,588 | 9,278 | 29,163 | $2,742 | $1,000 | $1,091 | $0.99 |

bases available at no charge to users (or not available at all if the decision warrants) since budget requirements are predictable.

The effect on users is made apparent at Clemson by the level of use of Agricola. The search rate on Agricola climbed from 208 searches per year on Dialog to 200 per month on DORIS by the end of six months. Access has leveled out at about 250 connects per month on this database, which is of little interest to undergraduates. Similarly, connects to the Magazine Index run to 1,500 per month, which any experienced reference librarian might easily presume to be greater than the number of accesses to traditional printed indexes covering a similar collection of journals.

The bottom line today may be unclear, but the impression is strong that the tradeoff in direct costs to at least one modest research library favors expending library dollars to make on-site access to citation databases available, especially when they have high instructional value or heavy research use. Examination of some behavioral issues may make this impression clearer still.

## BEHAVIORAL ISSUES

When the staff of Clemson's library first made the online public access catalog available to users, it was done so with a carefully constructed publicity campaign. Two major concerns of that program were to maximize awareness of the catalog while making the system as inviting as possible. In order to do so, public relations staff at Clemson developed an advertising approach that ascribed a persona to the catalog. Since Northwestern had referred to their public access module as LUIS for some time, that name was retained and simply personified by means of a caricature. Campus news media portrayed the catalog as a little cartoon character that looked like a friendly being with the extremities of a hobbit and a torso and head resembling a terminal. His ready smile appears to have gone a long way toward convincing novice computer terminal users that online catalogs are no threat. That same kind of approach was followed with the introduction of on-site access to citation databases.

Although the name DORIS is an acronym, its readily familiar feminine nature was used to ascribe personality to this system as well. This was done deliberately to humanize what may otherwise be seen as mechanical and frightening. Despite the ease with which each of these systems may be used, even by a novice, the sight of terminals where card catalogs and printed indexes previously existed can often intimidate users from the start. Giving some human aspect to the system softens the initial impact. This works particularly well in conjunction with a help desk set up especially to assist users with the catalog and DORIS. For the first three weeks of each semester, staff establish a temporary information service adjacent to the LUIS/DORIS terminals. Any user that appears to be unfamiliar with the system receives immediate assistance and instruction if desired. This interaction provides a cordial introduction that includes the suggestion that the user familiarize himself with the interface via the help screens. Even though a little study is required with these screens, they will enhance users' ability with the systems; they therefore need to be as easy to use as possible.

The LUIS interface was developed at Northwestern with a great deal of competent input and study. As a result, the interface is elegant, simple, and powerful. Despite some criticism, there may not be a better overall design available in any other system, which is a credit to the developers. In any event, Clemson users were thoroughly familiar with it at the time DORIS was installed. Therefore the DORIS interface was modeled on LUIS, but with some obvious differences incorporated in order to make sure users know which system they are using at any time. The objective was to design an interface for DORISthatat would be as familiar as possible and as easy to use as LUIS, yet would not confuse users over which type of data they were searching. Lower-case bold letters were used to abbreviate commands, as in LUIS. Similarly, all commands that are logically useable from any given screen are included in screen displays at all points. It is desirable that users be able to see where they can go and are going without becoming either hung up or frustrated. The screen is formatted so that the data to be searched are input at the top rather than the bottom. This differentiates it from the basic search screen in LUIS and thus provides continuous information to the user on which system is being used, as shown in

figure 3. Substantial time was consumed in communicating information from librarians into screen designs for the interface.

Each database loaded on DORIS requires slightly different packets of information for help screens, which DORIS incorporates throughout. These are generalized wherever possible, but variation in the subject disciplines covered requires variation in examples. Although the interface in DORIS is command driven, there is a logical sequence to screens, which is likely to be followed by nearly every first-time user. Indeed, users typically proceed from the introductory screens, where the user's identification is required, to the database selection screen, and from there to a basic search screen. From a search screen one may proceed to search, to review results of a search, to return to the database selection screen, or to quit the system. From any screen, specific help is available related to the function of that screen. For example, from the basic search screen one may retrieve help that starts with a menu of selections on the organization of the database, basics of searching, refining searches, field qualification, Boolean operators, truncation, named persons, combining searches, error messages, and command stacking, as shown in figure 4. A separate set of help screens is available for each of these topics.

Once viewed, the user may proceed back to the help menu, the search screen, and so forth. Time involved in developing these screens included a significant amount of screen painting by the programmer, but even more time was required to develop examples. An example that is relevant to physics may not be suitable for history. Therefore, reference librarians evaluated the help screens to develop specific examples related to their subject expertise. No effort was made to determine the cost of this labor, but it is apparent that even more effort is required if users are to maximize results from DORIS.

Although some impressions were considered as to what types of skills users bring to searching DORIS and the catalog, little systematic consideration of some of the issues raised by Anne Lipow and others was incorporated in screen design or bibliographic instruction.[5] This is an oversight that is excused only by time constraints on the developers and lack of a full staff in the bibliographic instruction unit of the Clemson library. If the message Lipow brings (that consistency and bibliographic instruction issues are important to the online catalog) is important to the online catalog, it is doubly important with on-site databases. Commonality of search techniques between libraries in regard to on-site systems is less likely than with public catalogs. Staff in the Clemson bibliographic instruction unit are currently preparing improvements to help screens and instruction on the use of DORIS. It should be noted also that Clemson has doubled the staff assigned to this unit this year, in part to improve use of on-site services. This is important, since library staff have become more aware that faculty are not important users of systems such as DORIS at this point.

Faculty appear to depend on their own network and information-collecting techniques. Some of those techniques utilize the search skills of graduate students. Thus the students tend to use DORIS and similar systems more than faculty. Students use the system heavily to gather information relevant to writing papers as part of their learning experience. This meets the instructional mission of the university, not its research mission. In fact, in the use of Clemson's library only 15.3 percent of allowable direct library expenditures were assignable to the organized research program of the university in fiscal year 1987.[6] There is no reason to believe that a percentage such as this is atypical of research libraries. Therefore, on-site systems need to be designed with use by students and the unsophisticated kept uppermost in mind. Furthermore, the choice of databases to be mounted should be based substantially on their instructional value. The pattern of use at Clemson supports this contention, since the general citation databases are receiving four to six times as much use as the most heavily used research index. Additional insights related to user experience at Clemson and to behavioral issues affect database selection.

While Clemson as yet has no written selection policy, the need for such will probably arise in the near future. Currently, databases are selected on the basis of price, the general subject content's appropriateness to Clemson, and the availability of access by other means. Whether the software can handle the data, the quality of the product, the

**Search Screen for Magazine Index**

Search Query -->

NOTE : The Magazine Index may also be called MAGS in subsequent screens.

========== **Search Instructions** ==========

1. To search for a reference, type the word or words you wish to seek in the **search query** line, then press **ENTER**.

2. If you wish to refine your search strategy to obtain specific results, type **h** and press **ENTER** for Help screens with detailed instructions.

==========

Type r to Review/Combine previous searches, **h** for Help,
**c** to Change databases, or **q** to Quit and press **ENTER**.

**LUIS: LIBRARY USER INFORMATION SERVICE**

**LUIS** can be used to find **BIBLIOGRAPHIC** information, **LOCATIONS**, and **CALL NUMBERS for cataloged publications held by Clemson University Libraries. CIRCULATION** information is available for most titles in LUIS.

| | **SEARCH options:** | **COMMANDS:** |
|---|---|---|
| To search by | **TITLE:** | **t** |
| | **AUTHOR:** | **a** |
| | **SUBJECT:** | **s** |
| | **KEYWORD:** | **k** |

A SEARCH MAY BE MADE FROM ANY SCREEN. Type **t=** , **a=** , **s=** ,or **k=** ,followed by the search term. TO CORRECT A MISTAKE, type over the error or clear the screen to start over.

**TO QUIT LUIS FROM NON-LIBRARY TERMINALS, CLEAR THE SCREEN**

TYPE m FOR MORE LUIS INFORMATION.
TYPE a, t, s, or k for APPROPRIATE HELP SCREENS
TYPE news FOR LIBRARY-SYSTEM NEWS.
TYPE st FOR LIBRARIES HOURS.
TYPE COMMAND AND PRESS ENTER==>

*Figure 3. Basic Search Screen Displays for the DORIS and LUIS Systems.*

**Search Help for Magazine Index**

1. **Organization** of the Magazine Index database.
2. **Basics** of searching the Magazine Index database.
3. **Refining (broadening or narrowing)** a search.
4. Using **Field Qualification.**
5. Using **Boolean Operators.**
6. Using **Truncation.**
7. Searching for **Named Persons.**
8. **Combining** searches.
9. **Error Messages** while searching.
10. Using **Command Stacking.**

To get help with any of the above topics, type the number of the topic and press **ENTER**. After viewing the help screen(s) on the topic, you will return to this screen.

Type a number and press **ENTER,**
Or to return to the search screen, press **ENTER.** -->

**Search Help for Magazine Index**
Using the **AND** Operator

The and operator will narrow the search by decreasing the number of records retrieved. This operator requires that all the combined terms appear in any record before it will retrieved.

For example, the search query:
**terrorism** and **Ireland**
will retrieve the following record:

TI TITLE: **Terrorism**: tracing the international network.
DE DESCTIPTOR: Northern **Ireland**--Crime

Press **ENTER** to continue with Boolean Operators help or
type **m** and press **ENTER** for search help menu or
type **s** and press **ENTER** to Search. -->

*Figure 4. Search Help Screens for the DORIS On-site System.*

number of years needed, and an evaluation of the file contents against some standard are considered in selection as well. Overall, Clemson staff currently believe that the library should try to convince departments to pay for databases for instructional use if they can, and insist on it for research. This has had some impact on departmental budgets and raises an issue of ownership that may become a problem in the future. As a selection policy is developed, the need to develop alternate financial support will be examined with the need for the library to retain its autonomy in relation to evaluating the instructional resource needs of the students. To date, the databases selected have largely affected users positively.

Online access to indexes and other databases is very popular. For example, one of the most frequently used databases is the campus telephone directory. Part of this popularity may be due to the power of keyword access to retrieve the telephone number of Jennifer who lives in Johnstone Hall or Jeffrey who majors in journalism. However, queues at the twenty-four terminals in the public area of the library occur frequently.

As measured by wear and tear on the journal collection, use has increased significantly. Some unsolicited input from faculty has been more serious and very encouraging. Several faculty members have indicated that the online catalog and databases have contributed positively to the quality of student papers submitted for class assignments. This is probably attributable to the improvement in access to citations over printed indexes, which leads to more articles being read. The easier it is to find information, the more likely it is to be used. On the negative side, however, students tend to retrieve only a selected, current portion of the information available on a topic. For instructional purposes, this may be acceptable, but one must recognize that students may be reinforcing cursory research skills. (This same tendency probably occurs with printed indexes but is less easily observed.) Future design must address this problem, perhaps by making the link to further information even easier. In fact, additional encouragement has arisen in the form of requests for other added services.

The public catalog, LUIS, created a demand from users for access to journal citations. Online access to book citations, especially subject, motivated students to request improved access to journal contents. This demand provided significant input to the library staff in terms of seeking means to mount on-site access to citation databases. Following this, as users determined the existence of citations to articles relevant to their study, they immediately began to enquire as to when the full text would be available through the system. Alternatively, many voiced an interest in being able to move from a search of DORIS into a search of LUIS for information on holdings relevant to the cited journals. This has created demand for an electronic mail link and document delivery. The Clemson library has begun to deliver books, and future plans include developing projects to better meet both of these demands. Once those are met, still newer demands will surely surface. It is premature to predict, but a few suggestions of what kinds of things to do differently have become apparent.

If the IAC databases were loaded today, some additional modifications would be made to improve their usefulness. First, book reviews would be stripped out and loaded in a separate database. A significant number of largely irrelevant citations to book reviews are frequently retrieved in searches of the general indexes. These tend to be an interference, because book reviews are usually important only under circumstances where the user specifically desires them. Second, citations to the newswires would be removed from Newspaper and Trade and Industry Indexes if these files were reloaded. Again, these interfere with user success, since Clemson does not subscribe to any newswire. In fact, staff are investigating the value of loading on-site access to the full text of several newspapers and/or newswires as an alternative.

## CONCLUSION

Clemson's program to mount general-interest and research databases designed to meet the needs of students and faculty appears to have been implemented only shortly before this approach became generally popular among research libraries. In 1987 Clemson was one of five or six research libraries that had mounted databases locally. Since then, a survey reported by the Reference and Adult Services Division of the American Library

Association in January 1990 listed thirty-three institutions with on-site access to databases. Clearly, the dawning of a new age has come to research libraries.

The full portent of this new age is hard to envision. However, the lessons learned from early efforts at Clemson and similar schools with on-site access help clear the vision. Certainly, the power of local online access to information databases enriches the learning environment for students and eases the burden of information retrieval for faculty. Clemson's library and DAPS will continue to pursue this program in order to facilitate access to information by removing the barriers that constrain users.

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# The Impact of Automation on Professional Catalogers

**Kenneth Furuta**

*The introduction of the bibliographic utilities in the 1970s produced far-reaching changes in cataloging departments by allowing the bulk of the material to be processed more quickly and cost effectively by nonprofessionals. In turn, that change caused professionals' duties to shift to handling the more difficult items and ignited a body of literature that discussed those catalogers' future roles. This paper tracks the dislocations brought about by the utilities for professional catalogers and tests the foresight of the forecasters by analyzing job advertisements for catalogers from 1970 to 1989.*

The automation of manual systems inevitably changes jobs. Skills that were once important in older routines are rendered obsolete, while new skills demanding expertise on the automated system gain prominence. On a large scale, increases in productivity brought about by automation can lead to displacement of workers, especially in labor-intensive activities. In a 1981 paper, the Office of Technology Assessment noted, "it is self-evident that any innovation that creates new products and new industries will eliminate some jobs only to create others. Structural shifts in the economy will occur to the distress of the temporarily displaced."[1] The report further noted that changes also occur on the local level as organizations implement computerized systems.

Librarians are not immune to those shifts caused by automation. Indeed, the changes brought about by the introduction of the cataloging utilities in the 1970s have been sweeping. Library science literature tracked those shifts during that time. There is general agreement that the utilities have allowed duties once performed by professional catalogers, such as copy cataloging, to be executed at a lower organizational level.[2] In addition, automation has led to a reduction in the size of the cataloging staff and to a faster processing time.[3] The impact that those displacements had for professional catalogers has been addressed in the literature. However, the papers have largely described an automated library's work flow or portrayed the future role for professional catalogers. This paper seeks to explore the impact of the utilities on professionals, to trace the implementation of automation, and to test the foresight of the forecasters by analyzing job advertisements for catalogers from 1970 to 1989.

## LITERATURE REVIEW

The earliest studies on the impact of the utilities date from the mid 1970s and survey the effect of OCLC. The first, produced by the Cataloger's Group at Kent State University, canvassed nine Ohio universities in the fall of 1973.[4] Their results indicated that there was not yet a "massive OCLC-related change in cataloging patterns" and that librarians were freed from the clerical aspects of their duties.[5] In a 1974 study, Joe Hewitt found that the use of OCLC increased cataloging productivity.[6] However, at that time it was

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difficult to determine OCLC's effect on professionals. On one hand, interviewees felt that it was a "professionally broadening experience." On the other hand, it was also described as "dehumanizing" in about half of the libraries.[7] Hewitt did find some evidence of staff reduction and the reorganization of technical services departments.[8]

Hewitt identified a number of trends in the literature that continued. The first is the dehumanizing effect of automation that continued as the deprofessionalization of cataloging. In a survey conducted the mid-1980s, Ruth Hafter found that "increased reliance on networks creates a trend towards the deprofessionalization of cataloging" because "control over the work flow has shifted from the catalogers to library administrators and network personnel."[9] She further noted that the majority of cataloging was performed by library assistants.

Hafter's findings should be viewed with some suspicion because she developed her deprofessionalization hypothesis before gathering the data. Those data were then gathered from personal, on-site interviews. It is possible that her preconceived ideas biased those results. Judith Barnett also took issue with Hafter's results and criticized the study from a number of standpoints.[10] Nevertheless, Hafter's study, as well as other papers, indicates that the dehumanizing aspect of the utilities remains an issue.[11]

The next continuing issue that Hewitt identified relates to staffing patterns in cataloging. It should be noted that those patterns were among the causes of discomfort in Hafter's study. By the late 1970s it was clear that the increased productivity that the utilities brought would enable library administrators to cut the size of the cataloging units. In 1979 Peter Spyers-Duran confirmed Hewitt's findings for staff reduction.[12] In later papers, Karen L. Horny and Marie Bednar further documented that reduction.[13,14] In particular, Bednar notes the reduced need for professional catalogers.[15]

The productivity gains of the bibliographic utilities also led to the reorganization of cataloging departments because the bulk of the cataloging could now be performed rapidly by support staff. That change was confirmed by both Spyers-Duran and by the study conducted by Sally Braden et al.[16] Bednar's paper provided an inside look at the Pennsylvania State University Library. Among other things, she identified two different types of cataloging: copy cataloging, performed by nonprofessionals online with a high level of throughput, and original cataloging, which remained the domain of professionals.[17]

Beginning in the early 1980s, the revolution spawned by the utilities led to a body of literature that explored the future roles of professional catalogers. Throughout those papers there seemed to be general agreement that the future for catalogers lies more in the management of the automated systems. For example, Robert Holley stated that the "trend toward cataloger as manager and planner will intensify."[18] Walter High saw a similar role for catalogers.[19] However, Gregor Preston forecasted a somewhat different outlook, with professionals spending time in both public and technical services.[20] Nancy Eaton argued for an expanded role, with the cataloger advising on every aspect of automation in the library.[21] Thus, a consensus does not yet exist for the direction of catalogers' roles.

Although it is not the main focus of this paper, the shortage of qualified catalogers in the 1980s needs to be mentioned because it has had an effect on advertisements for catalogers. Automation has been blamed, in part, for the contraction. Laurie Smith first commented on the shortage in 1985.[22] Janet Swan Hill soon followed with her observations.[23] The situation was so critical that in 1985, the Cataloging and Classification Section (CCS) of the American Library Association formed a task force to examine the issue.[24] The problem continues today, as can be seen by a 1989 Simmons College Symposium on recruiting catalogers.[25]

The picture that emerges from the literature is that the utilities reduced the need for professional catalogers. Automation allowed many of their former tasks to be performed more quickly and cheaply at a lower organizational level. In addition, the relatively high hit rates offered by the utilities enabled libraries to process most of their items online. The remaining pieces that require original cataloging are those that are more difficult to process, e.g., non-English items, dissertations, or nonbook items. Those displacements have been blamed, in part, for the current shortage of qualified cataloging applicants.

In a recent paper, Hill confirmed this picture.[26] She further stated, "The decline in relative numbers of English language materials without copy, and the decreasing number of catalogers among whom to spread subject fields, will make foreign language competencies and a general breadth of knowledge increasingly important, except where catalogers serve specialized collections."[27]

## METHODOLOGY

To assess the impact of automation on professional catalogers, job advertisements were analyzed. This methodology is not new in library literature. In 1981 Ronald Rayman looked at postings in *Library Journal* to identify trends in the academic library employment market.[28] He found that the number of listings peaked in 1976 and then fell through 1979, the final year of his study. He concluded that the market was drying up. Raymond is to be criticized for the presentation of his data. He chose to present the data as ratios on tables, e.g., 21:95 or 11:69, instead of calculating percentages of postings for each category or drawing graphs. Thus, trends are very difficult to identify.

In a study published in 1988, Roma Harris and K. Joanne Reid analyzed the Canadian job market.[29] Among other things, they found that computing skills were becoming increasingly more important. However, they did not explore the duties and requirements of the job. In addition, they only looked at listings in 1980–81 and 1985–86, thus missing the introduction of the utilities in the 1970s.

An analysis that did explore duties and requirements for catalogers can be found as part of the CCS Task Force report.[30] The study was conducted using advertisements that appeared between January and March of 1985, thus giving a snapshot of the market situation at that time. Among other findings, the task force discovered that about a third of the jobs had major noncataloging assignments and that the majority of the advertisements were for academic libraries. The present study differs from that of the CCS Task Force in that it examines trends in the cataloger market.

*American Libraries* was selected for the source of data because it is one of the traditional places to advertise and because it contains postings for all types of libraries. Although the publication underwent a title change in 1970, its predecessor, the *Bulletin of the American Library Association*, had carried listings for vacant positions since 1945. Job advertisements from 1970 to 1989 were analyzed. That range of years was selected in order to include the beginnings of the utilities' implementation.

The January, April, July/August, and October issues of *American Libraries* were studied. These months were selected because they fall on a quarterly pattern, providing an even sample throughout a calendar year. All non-Canadian or non-United States advertisements were discarded because the rate of automation elsewhere may not be at the same pace. Listings for library school faculty were also ignored because the study focused on automation trends in libraries. Finally, those few advertisements that were impossible to categorize were deleted, e.g., those which simply announced that the XYZ library was looking for librarians. It should be noted that these categories were a small percentage of the listings. This method produced an overall sample of 6,136.5 FTE positions.

Those advertisements were further divided by type of position: administrative, reference/public service, cataloger, other technical services positions, bibliographer, automation, and miscellaneous. It should be noted that administrative positions ranged from department head upwards. Further, the miscellaneous positions were those that were impossible to classify in any other category. The cataloger positions were then separated out for further analysis. Any duplicate listings were discarded. Positions for which the duties were split were counted as a half cataloger. The listings fell into two categories: cataloger (548.5 total postings) and administration of cataloging (176 total postings). As with the CCS study, the exact number of supervisory listings was hard to discern because job titles are vague.[31] For example, "cataloger" may denote anything from an entry-level position to the head of the department. Nevertheless, all positions that had "cataloger" in the title were further analyzed for such aspects as automation experience, language needs, and supervisory responsibilities.

## FINDINGS

Overall, both the quality and the quantity

of the advertisements increased during the time period studied. Although the qualitative measure is subjective, it lies in the observation that around 1978–79 the postings began to lengthen and included more detailed information on the duties of the job and what was expected of the applicant. Before that time the advertisements were shorter and contained little more than a brief description of the job, requirements, and starting salary.

The total number of sampled advertisements is presented in figure 1. As can be seen, there is an overall decrease in the number of postings from 1970 to 1976. The increase that began in 1977 suggests that libraries changed their recruiting methods to place notices in *American Libraries* more frequently. However, it can not be assumed that the data represent the entire universe of vacancies. Many libraries, especially public libraries, do not list every opening in the national journals.

It is difficult to track developments in the 1970s with great precision because of the relative lack of advertisements. It is obvious that there were many more vacant positions in the 1970s than the data would suggest. For example, the annual placement survey for 1975 graduates states that there were 3,467 known placements, of which 2,344 were to professional positions in libraries.[32] However, projected for the entire year, the data from this study result in only 102 nonadministrative postings. Because the information in the job listings that fell into that gap was unavailable for this study, the results before 1978–79 must be viewed with some suspicion.

It should be noted that these data do not present a realistic picture of the structure of the library job market because of the overrepresentation of listings for administrative jobs. As can be seen in figure 2, they make up the majority of all postings. However, the trend, gained by linear regression, is downward. The reason for the abundance of administrative listings is the need to form a good applicant pool for a job. There are many people locally who have the needed skills to fill a clerk typist or copy cataloger position. However, there are few, if any, local people with the skills needed to perform at an upper-level administrative position. Thus, the fewer qualified local people for a vacancy, the further geographically the organization has to search.

The original intention of this paper was to track automation by different types of libraries. However, the data are insufficient to provide an accurate picture. As can be seen in figure 3, the percentage of listings for academic libraries has grown throughout the time period. Overall, they contributed 54.84 percent of the data. Public libraries accounted for 35.44 percent, and special libraries supplied the remaining 9.71 percent. Thus, the data are strongly biased toward academic settings.

Similarly, academic settings dominate the nonadministrative cataloger advertisements and provide 461, or 84.05 percent, of those

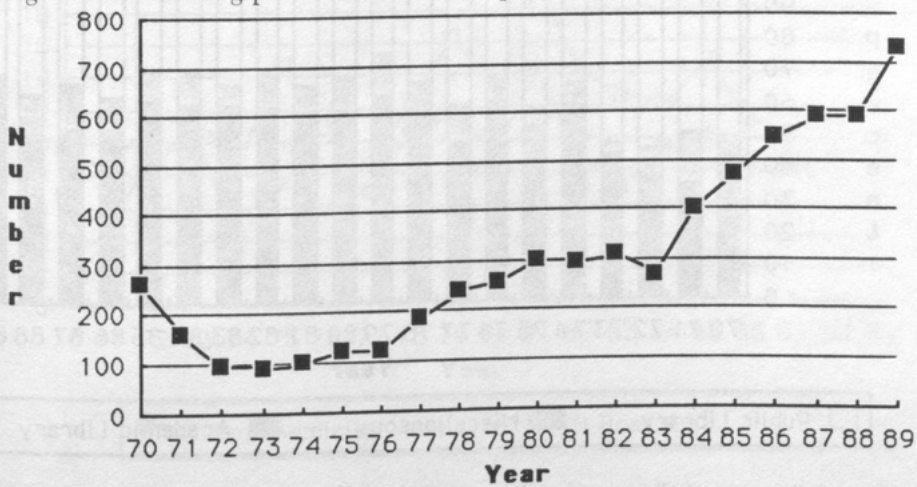


*Figure 1. Total Advertisements.*

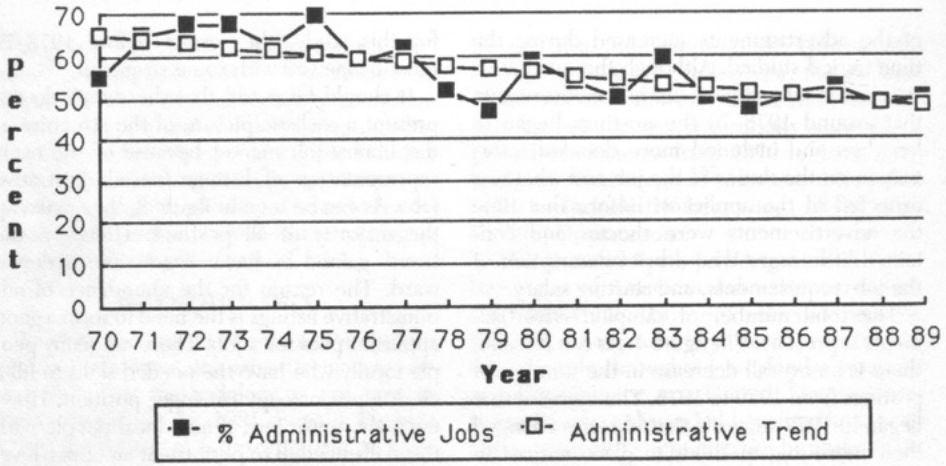


*Figure 2. Percentage & Trend of Administrative Postings.*

listings. There were only 33.5 public library listings (6.11 percent), while special libraries had only 54 postings (9.85 percent). However, the findings below still include public and special library positions.

The CCS Task Force found a similar distribution in their study. It stated, "this distribution may have more to do with advertising practices than with location of vacancies, but it is possible that academic libraries need more original cataloging than most other types of libraries."[33]

The advertisements show that libraries had been involved with automation throughout the period. This can be seen in figure 4, which lists the number of jobs that specifically focused on automation. Although the actual numbers are rising, the percentage of those jobs was generally low, ranging between 2.5 percent and 4.5 percent of all listings for any given year after 1977.

Figure 5 shows the percentage of listings for catalogers both for the nonadministrative positions and for all postings. Both categories

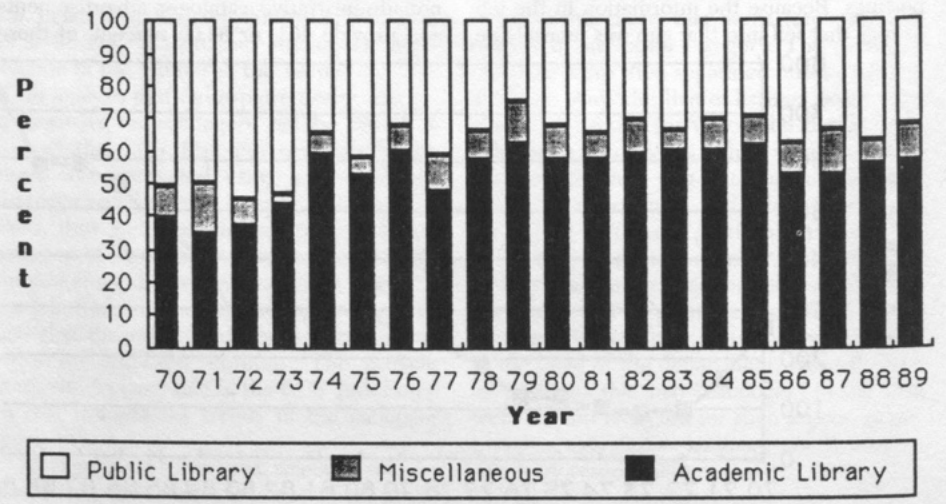


*Figure 3. Percentage of All Postings by Library Type.*

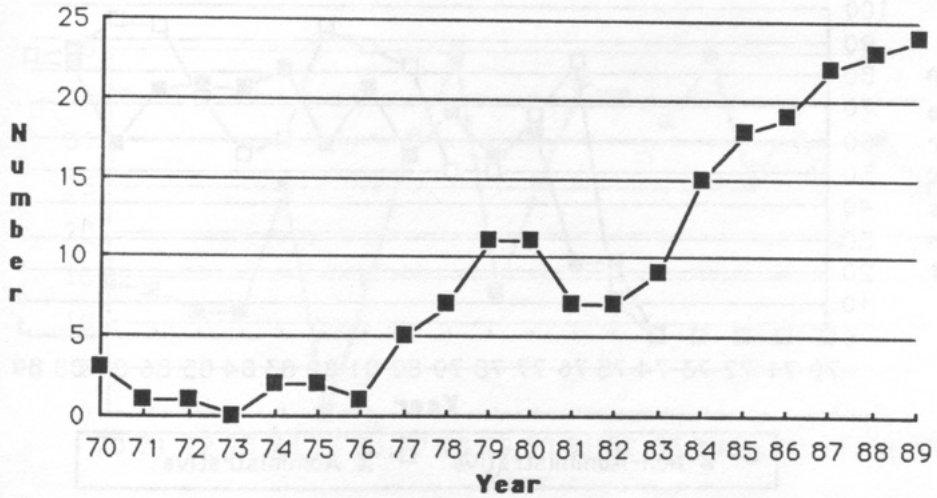


*Figure 4. Number of Automation Listings.*

display the same pattern, with the percentages beginning at a relatively low level before 1978. After 1978 they establish themselves at a higher level. Overall, the nonadministrative cataloger postings accounted for 9.52 percent of the total listings.

These data do not supply evidence to support or reject the assertion that automation has reduced the need for catalogers. Like the administrative positions, an organization needs a reasonable applicant pool for a vacant position. With the current shortage of qualified catalogers, a library has to look farther afield to form that pool. Thus, the higher level of cataloger postings in the later years is probably more a function of the shortage than of increased opportunities for catalogers.

The effect of automation on cataloging is presented in figure 6, which charts the percentage of advertisements in which experience with a utility was either required or desired. The first instances occurred in 1975. After that time the percentage of jobs in which automation was at least desirable has

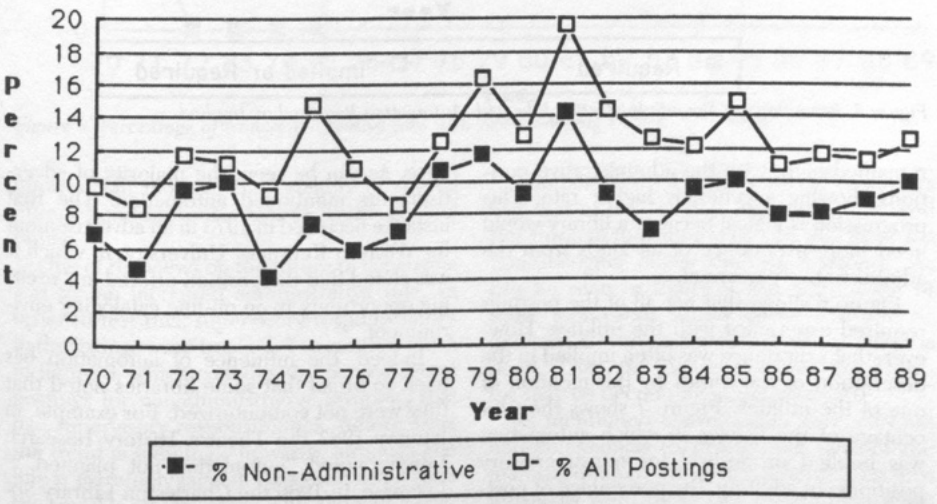


*Figure 5. Percentage of Cataloger Postings.*

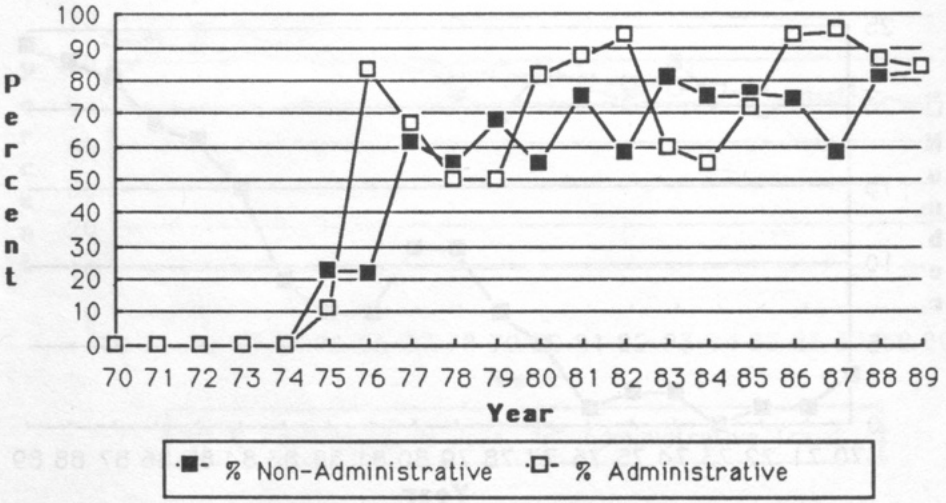


*Figure 6. Percentage of Jobs Requiring Automation.*

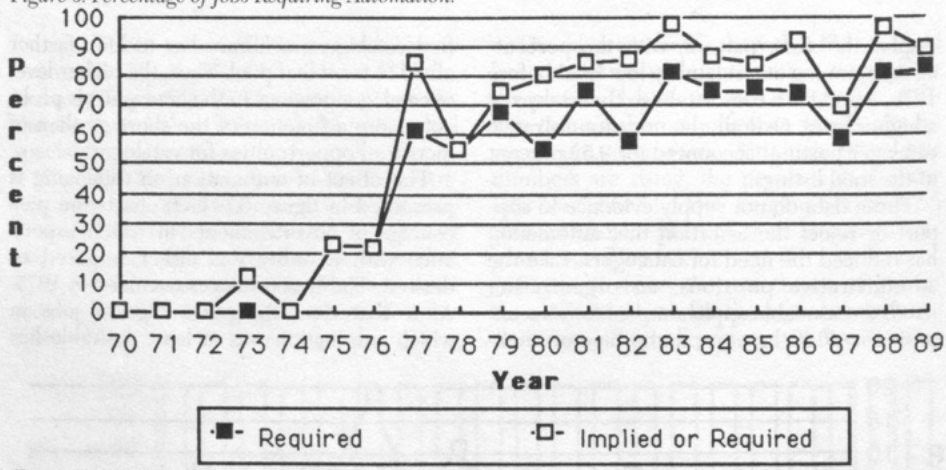


*Figure 7. Percentage of Nonadministrative Jobs with Automation Required or Implied.*

remained high, with the administrative positions showing a generally higher rate. This progression is logical because a library would need more experience of all kinds from the administrative personnel.

Figure 6 shows that not all of the postings required experience with the utilities. However, that experience was often implied in the description of the duties by the mention of one of the utilities. Figure 7 shows the percentage of the listings in which automation was implied or desired for nonsupervisory positions. In addition, the percentage of postings in which automation was required or desired is repeated to give a frame of reference. As can be seen, the majority of advertisements mentioned automation. The first instance occurred in 1973 in an advertisement for Western Kentucky University, in which it was stated that the position offered an "exciting opportunity in an on-line cataloging environment."[34]

Indeed, the influence of automation has been so broad that some libraries noted that they were not computerized. For example, in January 1983 the Theatre History Research Library noted "automation not planned."[35] Likewise, in 1986 the Charleston Library Society specifically stated that it was not automated.[36] It is interesting to note that both

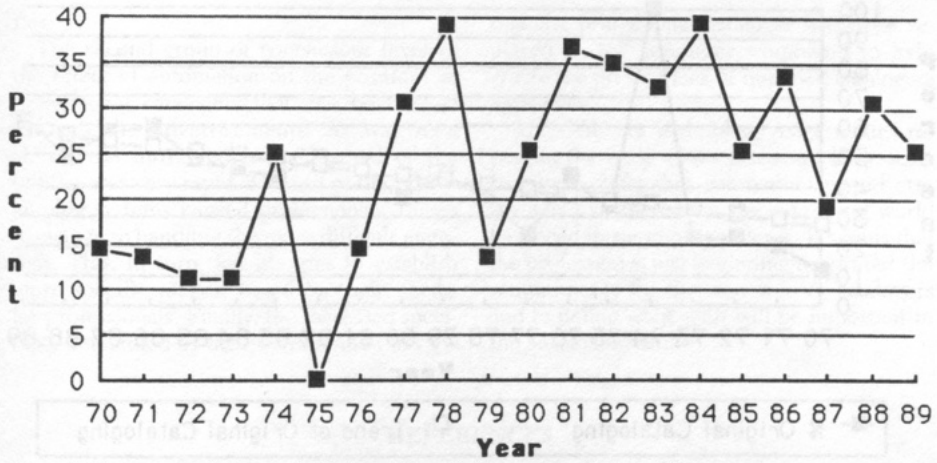


*Figure 8. Percentage of Nonadministrative Jobs with Supervisory Responsibilities.*

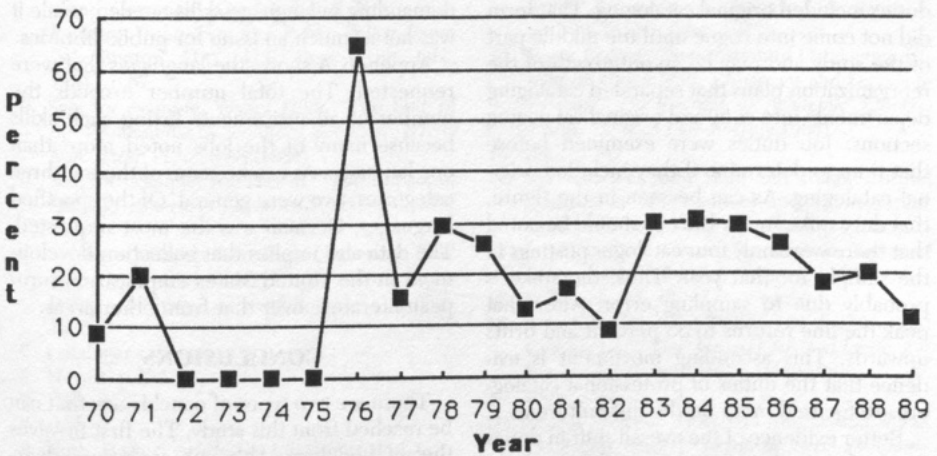


*Figure 9. Percentage of Nonadministrative Jobs with Noncataloging Duties.*

libraries fall more in the category of special libraries and are not available to the general public.

One of the views on the future of catalogers was for an increased administrative role. In order to test this, supervisory responsibilities in the listings were tracked. The result is given in figure 8, which contains the percentage of postings for nonadministrative positions that had supervisory responsibilities. Before 1984 the trend is seemingly upwards, although the line is extremely jagged. However, after 1984 the trend is clearly down. This reduction suggests that the future of professional catalogers may not lie in an administrative role.

Another view of the future of catalogers was that of the "holistic" librarian. I tracked this through the amount of jobs that included noncataloging duties such as reference. As can be seen in figure 9, the percentage of those jobs varies widely between 0 and 64 percent. However, the more recent trend is down. Thus, the idea of the "holistic" librarian may be decreasing in emphasis.

As mentioned above, automation enabled nonprofessionals to process the bulk of the material quickly. Those items left for the professionals were those that were much more difficult to catalog. Figure 10 gives the percentage of jobs and the trend in which the

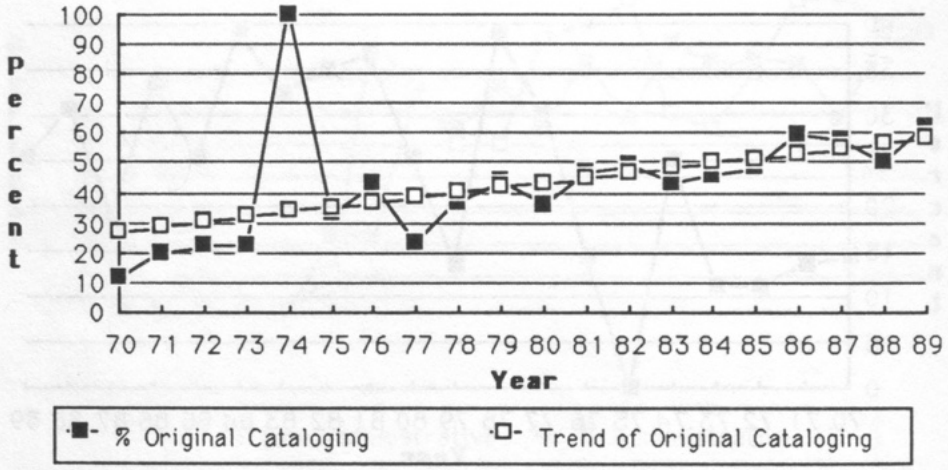


*Figure 10. Percentage of Nonadministrative Jobs with Original Cataloging.*

duties included original cataloging. That term did not come into vogue until the middle part of the study and may be an outgrowth of the reorganization plans that separated cataloging departments into copy and original cataloging sections. Job duties were examined before that time to determine if they included original cataloging. As can be seen in the figure, that duty spikes up in 1974. It should be noted that there were only four cataloger postings in the sample for that year. Thus, the spike is probably due to sampling error. After that peak the line returns to 33 percent and drifts upwards. This ascending movement is evidence that the duties of professional catalogers are focused more on the difficult items.

Better evidence of the overall shift in duties for professionals is found in the language requirements for jobs. It should be noted that the requested skills varied from "ability to catalog in," to a reading knowledge, to fluency. Figure 11 shows both the percentage of postings that request language skills and the trend. Both are rising, confirming Hill's assertion that language skills will become increasingly important for catalogers. As can be seen in table 1, academic libraries were far more demanding in language skills needed, while it was not as much an issue for public libraries.

*Table 1. Percentage of Languages Required by Type of Library*

| Library Type | No. of Postings | % of Postings Requiring Languages |
|---|---|---|
| Academic | 461.0 | 64.57 |
| Special | 33.5 | 38.10 |
| Public | 54.0 | 8.56 |

Appendix A shows the languages that were requested. The total number exceeds the number of advertisements listing such skills because many of the jobs noted more than one language. As can be seen, of the top three categories, two were general. Of the specified languages, German was the most requested. The data also implies that collection development in the United States emphasizes European literature over that from other areas.

## CONCLUSIONS

There are two types of conclusions that can be reached from this study. The first involves the methodology. Although analyzing advertisements is a good way to follow trends in libraries, there are too many uncontrollable variables to support far-reaching conclusions. For example, the lower need for catalogers would suggest that their percentage of postings would drop. Instead, it went up, no doubt due to the shortage of qualified catalogers.

Another uncontrollable variable is the type of library that places advertisements in *American Libraries*. As was seen above, public libraries seem to use other vehicles to contact potential applicants. Thus trends in public library jobs are much more difficult to track. Finally, although one has to be very careful about the questions asked when analyzing advertisements, they are a good source for some specific information, e.g., starting sala-

ries.

The second group of conclusions involves the effect of automation on the positions of professional catalogers that can be tracked through the advertisements. As was seen above, the introduction and spread of the utilities was very rapid. The use of the bibliographic systems caused professionals' duties to change to handling the more difficult materials. This, in turn, led libraries to establish more specific niches, based on their needs, for professionals. Finally, the increased specificity demanded by the libraries, and the view that the professional cataloger had been replaced by the computer, combined to help create the present lack of qualified cataloging applicants.

The Office of Technology Assessment's report in the early 1980s discussed large-scale structural shifts that automation would create. On a smaller scale, the cataloging world has faced those same problems. It seems that the profession is just beginning to sort out the requirements for the new role of catalogers and to define what skills will be important in the automated library.

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## APPENDIX A. REQUESTED LANGUAGES IN DESCENDING ORDER

| | | | |
|---|---|---|---|
| Unspecified | 97 | Greek | 3 |
| German | 93 | Persian | 3 |
| West European | 79 | Yiddish | 3 |
| French | 43 | Classical | 2 |
| Spanish | 42 | Hindi | 2 |
| Russian (Cyrillic) | 32 | Urdu | 2 |
| Romance | 26 | African languages | 1 |
| Slavic | 14 | Afrikaans | 1 |
| Japanese | 12 | Danish | 1 |
| Chinese | 11 | Dutch | 1 |
| Latin | 11 | Hungarian | 1 |
| Portuguese | 11 | Indonesian/Malay | 1 |
| Italian | 9 | Near East | 1 |
| Korean | 8 | Semitic | 1 |
| Hebrew | 7 | Sign | 1 |
| Scandanavian | 5 | Thai | 1 |
| Arabic | 4 | | |

# The Effect of the LASS Microcomputer Software on the Cost of Authority Work in Cataloging

**Ann M. Fiegen, Sara C. Heitshu, and Edward P. Miller**

*The unit cost of authority work as a separate component of copy cataloging is determined for one ARL institution. The costs are then compared over a two-year period as a microcomputer is added to support authority work. The implications of project implementation and training are examined in relation to cost factors.*

Automation of the cataloging process has done a lot to cut the cost of cataloging; however, libraries continue to look for new ways to cut those costs further. Deborah Tavenner's recent review of the literature of cataloging costs shows the sustained interest in this subject.[1] Two of the highest cost components of the cataloging process are authority work and the labor associated with that work. Labor-saving advances in authority work have lagged behind those made in the cataloging process. Some libraries with firmly established online catalogs still may retain manual authority files, which means typing each authority card and cross-reference individually.

A number of studies on the cost of cataloging have been undertaken. Tavenner's extensive bibliography gathers many cost studies together, yet she states that there is still a need for more research.[2]

The problems associated with conducting cost studies for comparative analysis were discussed in the 1986 OMS *Technical Services Cost Studies of ARL Libraries*. While 79 percent of respondents in the OMS survey agreed with the usefulness of comparative cost studies, only 24 percent had conducted studies in the previous three years.[3] Concerns over the usefulness of comparative studies included the many variables encountered between libraries and the lack of fixed criteria from which to base a study. The libraries that had conducted cost studies did so to gather background information and to prepare for automation changes.[4]

One of the more comprehensive cost studies of academic libraries was completed by Paul Kantor. Part of the study compared the costs of technical processing at eight research libraries in 1984 for the Council of Library Resources.[5] He found a wide range in processing costs that confirmed earlier reports. Kantor's figures showed that the cost of copy cataloging ranged from $3.94 to $8.58 with a mean of $6.66.[6] He proposed that the wide range is due to variations in management, organization, and quality of personnel and not to the quality of copy cataloging.[7]

The following report attempts to fill a gap by analyzing and comparing costs over time and during different stages of automation at one institution. What are the factors contributing to the cost of authority work, and what, if any, are the cost savings associated with progressive automation of authority work? Comparisons are made between the cost of manual authority work and those incurred using a microcomputer. The study is limited to the cost of name authority work as a separate function of the copy catalog process as opposed to postcataloging or catalog maintenance. Name authority work for original cataloging has not been included.

The introduction of microcomputers to li-

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braries has provided the opportunity to use them in authority card and cross-reference production. John Duke, at the time working at Iowa State University, developed a microcomputer-based program, NAF Card, for printing authority cards and cross-references using Microsoft BASIC. Duke viewed the program "as a bridge that will help us support a labor-intensive catalog until we are ready to move to a more sophisticated system."[8] Harriette Hemmasi at Humboldt State University used WordPerfect's Merge function to produce authority cards and cross-references.[9]

The University of Arizona Library was one of several libraries selected to perform a final test of the LASS authority software developed by Gary Strawn, then of Xavier University, now with Northwestern University.[10] Testing and evaluation proceeded in the first half of 1987. While it was perceived that the new system was an improvement over the older method of individually typing each authority card and cross-reference, statistical evidence was collected and analyzed to determine the impact of the new technology on authority work. A comparative cost analysis of authority work was undertaken spanning the three years of the transition. Total time for authority card production using the LASS system was gathered and compared to earlier estimated figures.

The configuration of the University of Arizona Library catalog department allows for a cost analysis of copy cataloging name authority work. It is possible to isolate the factors that make up authority work and study the impact efficiency measures can have on the cost of that work. The use of an OCLC M300 and the LASS software to download and print Library of Congress Name Authority records has made authority work more efficient and less costly. This was demonstrated by determining the unit cost of authority work before and after the addition of a microcomputer for authority and cross-reference card production.

The analysis was undertaken by comparing costs prior to the introduction of an automation project, during the transition period, and after full implementation. In the first phase (1985–86) Library of Congress Name Authority records were printed from OCLC and then typed on cards for as many as thirteen card catalogs. Locally created authority cards and references were also typed. The second phase (1986–87) was a transition period during which testing, implementation, and retraining occurred. An OCLC M300 was used to download authority records to a floppy disk. The records were converted into printed cards and cross-references using LASS software with an OCLC M300 and a dot-matrix printer. The final phase of analysis (1987–88) was completed after the new system had been fully implemented. This phase included a reassignment of duties and staff retraining.

## AUTHORITY WORK AND THE LASS PROJECT

Copy cataloging at the University of Arizona is performed primarily by two sections, one responsible for Library of Congress cataloging, the other responsible for contributed member cataloging. These sections review call numbers, descriptive fields, and topical subject headings and do all authority work for series. The copy cataloging units limit name authority verification to single surnames in the Library of Congress Name Authority File in OCLC. Other personal names, corporate bodies, place names, and uniform titles are reviewed by a separate authority section. The section is responsible for establishing the *AACR2* form of name and initiating any authority work. Once name authority work is completed, the bibliographic support section produces cards on OCLC using the edited copy. The bibliographic support section is also responsible for creating authority cards and cross-references.

LASS software formats OCLC authority records into printed cards. LASS is a microcomputer-based program that runs on IBM or compatible personal computers. It can be run from two floppy disks or a hard disk. Memory requirements are a minimum of 320K RAM. Input to the system is from two sources. Authority records are downloaded from OCLC using the SaveScreen function of the M300. These records can be edited either before they are downloaded or after conversion into LASS records. Locally created records can also be keyed in using a menu-driven work form.

Output consists of alphabetized printed authority cards and cross-references for multiple locations. MARC records can also be created for external storage for archival use or

can be exported into another database. One important distinction is worth emphasizing. The system is not designed as a local authority file. Once the records are processed they are deleted from the files.

Training can be accomplished easily. It was found that it takes two two-hour sessions for clerical staff to become independent users.

## COST ANALYSIS

A comparative cost analysis spanning the three years of transition was used to determine the effect a microcomputer using the LASS system had on authority work. The model used for the cost analysis can be seen in figure 1. The major criteria used to determine the unit cost per book for authority work were salary, supplies, equipment, and maintenance. A description of the criteria in table 1 follows:

A. *Books cataloged by copy catalogers.* The figures are minus 10 percent, which reflects estimated copy cataloging by original catalogers.

B. *Books searched by authority section.* The authority section keeps statistics on the number of headings reviewed. That figure was divided by 1.7 to arrive at the number of books searched by the section. The 1.7 was determined by counting the number of headings requiring authority work in a sample of 100 books.

C. *Salary.* The salary figures include direct and indirect benefits. The actual figures used represent the percentage of time spent on authority work by staff. For 1985–86 that included twelve staff; for 1986–87 ten staff; and by 1987–88 it had dropped to eight staff members.

The actual salary figures were taken from July 1985, July 1986, and July 1987 using the *Operating Budget of the University of Arizona.* The benefit costs were based on the University of Arizona employee-related expense rates for classified staff, which were 23.4 percent for fiscal year 1985–86, 21 percent for 1986–87 and 19.6 percent for 1987–88.

The salary formula is as follows:

$$\frac{\text{Direct cost (salary)} + \text{Indirect cost (benefits)}}{\%\text{ time on name authority work}}$$

Table 2 shows the amount of time devoted to authority work per week for copy cataloging. Estimates were compiled for 1985–86, and statistics were kept starting in 1987. The authority section spent 160 hours per week for the period 1985–87. In fiscal 1987–88 the hours dropped to 81 per week, a 50 percent reduction from the first year. The bibliographic support section spent 28 hours per week for fiscal 1985–86, and 14 hours per week for fiscal 1986–87. The following year, fiscal 1987–88, there was a further drop to 13 hours per week, which represented a 46 percent reduction from the first year.

D. *Supplies.* Card stock was calculated at $7 a box per thousand for catalog card stock and at $19.95 per thousand for continuous-feed card stock. After sampling, it was determined that seven cards were required per new authority record, while only three cross-reference cards were required per updated authority record. Using these, a figure for yearly card stock use was determined. Regular office supplies such as pencils and pens were not included.

E. *Equipment.* The figure was based on existing equipment dedicated to authority work and amortized over ten years.

F. *Maintenance.* In 1985–86 the network charged a combined price for telecommunication and maintenance per M300 terminal. Beginning in 1986–87 there were separate charges for telecommunication and maintenance. The modem charge is based on $3,264 per year.

Table 3 shows the total figures for the cost of authority work based on data from table 1. In 1985–86 the average cost of authority work per book was $4.61. Labor costs represented 94 percent ($4.34) of the total cost. The labor was divided between the two sections, with 13 percent being performed by the bibliographic support section and 82 percent being performed by the authority section.

The transition phase statistics (1986–87)

$$\frac{\textit{salary + indirect benefits}\ \textit{time spent on authority work + supplies + equipment + maintenance}}{\text{Headings on books cataloged receiving authority work}}$$

*Figure 1. Cost Analysis Model.*

*Table 1. Comparative Cost Analysis of Copy Cataloging Authority Work*

| | 1985–86 | 1986–87 | 1987–88 |
|---|---|---|---|
| A. Books cataloged by copy catalogers | 45,456 | 48,842 | 38,127 |
| Books with no authority work | 30,409 | 36,370 | 26,684 |
| B. Books searched by authority section | 15,047 | 12,472 | 9,443 |
| Percent books with authority work | 33% | 25% | 24% |
| C. Salary: | | | |
| Authority section | $56,629 | $65,249 | $26,308 |
| Bibliographic support | $8,668 | $4,664 | $4,329 |
| D. Supplies: | | | |
| Printer paper @ $16/box | $48 | $48 | $48 |
| Printer ribbon @ $3.50 ea. | $14 | $25 | $10 |
| Floppy disks @ $1.60 ea. | — | $16 | — |
| Card stock | $492 | $1,247 | $1,088 |
| E. Equipment: | | | |
| 7 Typewriters | $840 | $840 | $840 |
| Printer | $50 | $50 | $50 |
| OCLC M300 | $409 | $409 | $409 |
| DOS 2.1 | $60 | — | — |
| F. Maintenance: | | | |
| OCLC Telecom & maint. per terminal | $1,680 | — | — |
| OCLC Telecommunication per terminal | | $1,236 | $1,236 |
| OCLC maintenance per terminal | — | $480 | $480 |
| OCLC modem charge per terminal | $544 | $544 | $544 |
| Total Costs: | $69,434 | $74,808 | $35,342 |

reflect the increased costs of labor and supplies, primarily continuous-feed card stock, associated with implementation and training. The unit cost of $5.99 represents an increase of 30 percent ($1.37) more for authority work using the LASS system during its first six months of operation. The increased costs were primarily due to the redistribution of duties to higher-paid staff during the testing and implementation of the new system. The cost of labor for the bibliographic support section dropped 36 percent, while for the authority section it rose 39 percent, resulting in an overall increase in labor costs of 29 percent. The percentage associated with labor for the overall cost remained at 94 percent.

*Table 2. Hours Spent per Week on Authority Work*

| | 1985–86 | 1986–87 | 1987–88 | % change 1985–86 |
|---|---|---|---|---|
| Auth. Team | 160 | 160 | 81 | 50 |
| Bibl. Support | 28 | 14 | 13 | 46 |

A core group of three high-level paraprofessional staff was responsible for testing the system and for developing policies and proce-

*Table 3. Cost of Authority Work for Copy Cataloging*

| | 1985–86 | 1986–87 | 1987–88 |
|---|---|---|---|
| Cost of authority work per book | $4.61 | $5.99 | $3.74 |
| % change in cost per book from 85–86 | — | +30 | -19 |
| Cost of labor per book | $4.34 | $5.61 | $3.24 |
| % cost of labor per book | 94 | 94 | 89 |
| % change in cost of labor from 85–86 | — | +29 | -25 |
| *Bibliographic support section:* | | | |
| Unit cost of labor | $.58 | $.37 | $.46 |
| % cost of labor | 13 | 6 | 13 |
| % change in labor cost | — | -36 | -21 |
| *Authority section:* | | | |
| Cost of labor per book | $3.76 | $5.23 | $2.79 |
| % cost of labor | 82 | 87 | 76 |
| % change in labor cost | — | +39 | -26 |

dures. Within three months training expanded to clerical staff, who took over production of authority cards and cross-references. The core group continued to have responsibility for training and troubleshooting.

By the third year (1987–88), procedures were fully implemented, the testing phase was completed, and clerical staff were primarily responsible for card production using the new software. The 1987–88 unit cost of $3.74 represents a 19 percent drop ($.87) in per unit cost for authority work from the manual system. Labor costs decreased 21 percent for the bibliographic support section and 26 percent for the authority section. The total cost of labor per book had dropped from $4.34 to $3.24, or 25 percent, from the first year to the third. The percentage of total cost associated with labor dropped from 94 percent to 89 percent, or a 5 percent drop from the first year (1985–86).

## CONCLUSION

Time saved by staff was a major reason for lowered costs overall for authority work. Table 2 shows the hours per week spent on authority work by the two sections responsible. For the authority section this figure represents a 50 percent decrease, while the bibliographic support section experienced a 46 percent decline. This change has had the largest impact on the department as a whole, as it has allowed for some reassignment of duties from other cataloging areas to the bibliographic support section. Clerical tasks such as inputting previously performed by copy catalogers are now performed in bibliographic support by library clerks.

LASS represents an important step toward more efficient operation of a catalog department in a card environment. What is not measurable here has been the staff response to the new system. Library clerks are no longer tied to typewriters. The apprehension exhibited toward microcomputers by those unfamiliar with their operation dissipated as the staff quickly learned to use LASS. They perceive the knowledge gained from their use of LASS and the microcomputer as a positive step in their own development. Errors on cards are virtually nonexistent since keying is minimal. While there is an additional cost associated with implementation and retraining, there has been enough cost savings associated with this level of automated authority work to justify an interim project such as this.

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# Subject Analysis Tools Online: The Challenge Ahead

**Lois Mai Chan**

*As the online catalog continues to be developed and refined, the question arises as to how the traditional subject analysis tools, the* Library of Congress Subject Headings, *the* Library of Congress Classification, *and the* Dewey Decimal Classification, *can be most effectively adapted to the online environment. This article examines the limitations and potentials of these tools and the challenges of incorporating them online. The traditional and potential functions of these tools, the requirements for their becoming efficient online cataloging and retrieval tools, and recent developments toward these goals are discussed.*

In considering the topic of subject analysis tools, the question that comes immediately to mind is, Why are we concerned with tools? In *Sartor Resartus*, Thomas Carlyle made the following remark: "Man is a tool-using animal. . . . nowhere do you find him without tools; without tools he is nothing, with tools he is all."[1] This remark seems particularly apropos in the area of bibliographic control. For over a century, cataloging and subject analysis tools have informed the catalog in American libraries. It is these tools with which our catalogs have been created and by which their quality has been measured.

In subject analysis and access, the three major tools—the *Library of Congress Subject Headings* (*LCSH*), the *Library of Congress Classification* (*LCC*), and the *Dewey Decimal Classification* (*DDC*)—have been the mainstay in our effort to organize, represent, and arrange library materials. Although the underlying principles and validity of certain aspects of these tools have been questioned and criticized over the years, there has never been a truly serious effort to replace them with "better" or "more logical" tools. Now, with our catalogs evolving into online forms, these tools continue to be used. As we examine these tools in this context, we see limitations, potentials, and challenges: limitations because the tools were originally designed for a different form of catalog and therefore may not be totally suitable for online systems in all aspects; potentials because with online capabilities these tools can be made to perform many functions not feasible in manual systems; and challenges as we attempt to minimize their limitations and maximize their potentials, thereby rendering them effective tools in online systems.

Classification schedules and subject headings lists are sacred texts to subject catalogers. Over the years an attempt has been made to turn the "big red book" (i.e., *LCSH*) into a retrieval tool by placing it next to library catalogs. Nevertheless, online catalog use studies indicate that the red book is underutilized in retrieval, perhaps because it remains largely a mystery to catalog users.

Classification schedules have not been

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terribly useful in searching card catalogs in American libraries because in most of them, class numbers are not access points. With the development of online bibliographic systems and the prospect of incorporating subject analysis tools online, a whole new world of possibilities is opening before us. Our immediate challenge is how to bring them online in an efficient way, a task that presents both technical and financial problems. Our next challenge, and a greater one at that, is how to make these subject analysis tools not only more efficient for catalogers and technical services personnel but also helpful to catalog users.

To achieve these objectives, it will not be sufficient simply to mount machine-readable versions of our subject analysis tools online. Much more effort must go into rethinking and revamping the tools as well as redesigning the online systems that incorporate them. For the tools themselves, many of the features were originally designed to meet the constraints of the card catalog and shelf arrangement, such as inverted headings, indirect geographic subdivision, and distorted notational hierarchy for the sake of shorter numbers. These are of much less value or significance in online systems. On the other hand, many weaknesses in traditional tools may disappear simply because of the sorts of things we can do in automated systems; capabilities such as keyword searching, term combination, and automatic switching among synonyms can enhance retrieval performance in ways not possible in the manual environment. Our tools will undoubtedly undergo an increasing rate of change as we continue to take advantage of online opportunities. At the same time, much can also be done to design local online retrieval systems to realize the full potentials of our subject analysis tools even as they stand today.

## TRADITIONAL AND POTENTIAL FUNCTIONS OF SUBJECT ANALYSIS TOOLS

In a presentation at the ALA Annual Conference two years ago, I discussed the basic functions of a subject authority file. Here I would like to broaden that discussion to cover other subject analysis tools as well.

In an optimal environment, a subject analysis tool should function properly for both storage and retrieval. For information storage, a subject analysis apparatus serves two basic functions: cataloging/indexing and file maintenance. As a retrieval device, a subject analysis tool can guide users to controlled subject terms or codes and can show relationships among subjects.

Let us consider briefly these two functions. For storage, or catalog input, catalogers use subject analysis tools for constructing subject headings and assigning classification numbers and, especially in copy cataloging, for validation. They also use them extensively in file maintenance. What seems to be especially important here is that local catalog workers have timely access to additions and changes in our tools. Intercatalog compatibility has long been a common goal, one that has grown considerably in importance with the increase in shared and cooperative cataloging that has accompanied the growth of our large bibliographic utilities. When local workers can have immediate access to current tools instead of working with versions that are months (and sometimes more than a year) out of date as is the case in working with print products, the chance of matching new LC cataloging is greatly enhanced, to everyone's benefit. For file maintenance especially, something else is crucial for maximum efficiency: the capability to make global changes to all records or to designated groups of records. Improved and expanded systems that link authority files and bibliographic files should therefore be high on our priority lists.

Enhanced retrieval must be viewed as the ultimate function of subject analysis tools; all other functions should be considered secondary. Indeed, we can go so far as to say that unless the end result is improved retrieval, it is quite pointless even to have subject analysis tools. Online catalog studies have documented many subject search failures.[2] Failures due to the fact that relevant items are not in the database are easily understood and accepted. Yet far too many search failures are due to the lack of a mechanism that leads from the user's input terms to relevant records. This is an area where much can and needs to be done. In bringing the traditional subject analysis tools online,

our goals must be to make these tools effective retrieval aids. Online subject analysis tools can aid catalog users in two significant respects: for mapping the user's input terms and for navigating a search to its desirable conclusion.

In matching input terms with index terms in bibliographic records, online subject analysis tools can assist users in two ways: by providing the exact indexing vocabulary or class numbers and by automatic switching. With the subject authority file or classification schedules and indexes online, users may browse the system to identify the most useful terms. Term matching can also be accomplished through automatic switching, whereby the user's entry vocabulary is mapped to valid indexing vocabulary or class numbers without the user's being made aware of the switch.

Another potential use of online subject analysis tools is to guide the user to related terms or class numbers. The path between the subject being sought and the relevant documents in the database is not always obvious. A user reaches an impasse in the search process when the input term results in no retrieved items, too few retrieved items, or too many retrieved items. The next step should be to explore related terms, especially other levels of a given hierarchy. This step in the search process can be greatly facilitated if subject analysis tools are integral parts of the database. Classification schemes, particularly, can lead the user through the hierarchical structures and are especially powerful in generic searches. When dictionary catalogs superseded classed catalogs in American libraries, Charles A. Cutter was concerned about losing the advantages of subject collocation and saw the catalog's syndetic structure as counteracting the loss. Incorporating classification schemes online recaptures the advantages of the classed catalog while retaining those of the alphabetical catalog. We can have the best of both worlds.

As we look toward the future, there appear to be greater advantages to be gained. Many studies and experiments are being conducted in the realm of expert systems. Of particular interest here are expert systems that enable automatic cataloging and classification and those that provide aid in online searching. In such systems, the online subject authority file and classification schemes can serve as the knowledge base.

## REQUIREMENTS FOR EFFICIENT ONLINE TOOLS

As we attempt to incorporate subject analysis tools online, we should move toward systems in which thesauri and classification schemes are an integral part of the database, linked to bibliographic records. I have already mentioned how much users and catalogers can benefit from such systems. Two additional points: when catalogers can move directly from headings to records, they can easily ascertain how a given heading has been applied in the recent past—often the most effective means for judging its appropriateness; for users, an integrated system means that they can identify search terms online and create search sets directly from thesaurus or classification displays.

Another desirable goal for online systems is a means for ensuring compatibility among the various subject approaches—free text, controlled vocabulary, and classification. As databases grow ever larger, information overload and irrelevancy resulting from false coordination become increasingly problematic, and using various subject approaches to complement one another is a promising possible solution. Considerable system design may be needed, however, before potential complementarity can be made operative.

Furthermore, as online systems become more sophisticated, it is all too common that the catalog no longer reflects a single controlled vocabulary system. Particularly, in addition to the *Library of Congress Subject Headings*, many library catalogs contain records indexed according to other controlled vocabularies such as *MeSH* (*Medical Subject Headings*) or carrying numbers from classification schemes other than LCC or DDC. With many local systems also contemplating the incorporation of other data files, such as ERIC and MEDLINE, the issue of term compatibility becomes crucial. Carol A. Mandel's study, *Multiple Thesauri in Online Library Bibliographic Systems*,[3] points out both the potentials and problems of incorporating multiple controlled vocab-

ularies online. As we look toward further developments and increasing sophistication of online storage and retrieval systems, it is important that we keep in mind the goal of making these multiple tools compatible rather than working at cross-purposes. Making the tools compatible will entail both technical and intellectual efforts. This is more easily said than done, but it is a matter we must not slight as we forever improve online systems.

## CURRENT DEVELOPMENTS

The three major subject analysis tools—the *Library of Congress Subject Headings*, the *Dewey Decimal Classification*, and the *Library of Congress Classification*—are in various stages of development with regard to their incorporation into local systems in libraries. Efforts are currently being made on many fronts to effect and to expedite their integration into online systems. The following are some of the latest developments.

### *DDC*

All of the *Dewey Decimal Classification* scheme—the schedules, the tables, the indexes, and the manual—was put into machine-readable form in an editorial support system for the preparation of Edition 20. Thus, the groundwork is laid for setting up *DDC* as an online tool. Now that OCLC has acquired Forest Press, its resources and technical expertise give us reason to hope for accelerated progress in developing-DDC's usefulness as a classification tool serving a worldwide clientele. We can also hope that in the near future the needed work will be done to make *DDC* a maximally effective online retrieval tool as well.

### *LCC*

The *Library of Congress Classification* is the latecomer in terms of online capabilities. Presently the Library of Congress does not yet have a machine-readable version of the *LCC* schedules, but efforts are being made towards its automation. With the assistance of Nancy Williamson's work in identifying the structural components and characteristics of *LCC*,[4] the Library of Congress is developing a MARC authorities format for classification, an essential step towards converting *LCC* into machine-readable form. A draft of the format was presented to the library community this past spring, and it is currently being refined. Because of the enumerative nature of *LCC* and its many idiosyncrasies, the conversion will be an enormous task. But it is reassuring that efforts are being made, and slowly but steadily we are moving toward the realization of converting *LCC* into an online tool.

### *LCSH*

In recent years, the Library of Congress has devoted an enormous amount of energy and resources to making *LCSH* an effective online retrieval tool. This effort gives us reason to hope for continued progress toward the goal of incorporating this tool into local systems, preferably linked to bibliographic records. With such linked systems, we should see enormous improvements in the usefulness and effectiveness of *LCSH* for cataloging, for file maintenance, and for end-user retrieval.

## CONCLUSION

The advantage of having the catalogers and the catalog users play the game of information storage and retrieval by the same rules is obvious. Until now, the rules were an open book to the catalogers but remained largely closed to the users. With subject analysis tools online, users as well as catalogers will have access to the same rules, and we may even dare to hope that the terms used by catalogers to describe the documents will finally be matched with those most likely to be input by catalog users.

The subject analysis tools we have today were designed in a different age for a different form of catalog. It would be shortsighted if we simply mount these tools online and make them perform basically the same functions as in the manual system or tie them too closely to their print versions. On the other hand, in view of enormous financial implications, it would be irresponsible to suggest that we discard these tools completely and develop new tools totally designed for online systems. As we are still in the transitional stage from the card catalog to the online catalog, these tools must

now still serve many manual or semiautomated systems and online systems with varying degrees of sophistication. The question is, then, How do we bring the subject analysis tools online so that they can continue to serve the diversified needs of a wide range of systems presently operating, while at the same time remain viable and adaptable to systems in the future, some of which have yet to be developed? Herein lies the real challenge ahead.

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# Communications

## A Conversion of Serials Records: OCLC LDR to VTLS USMARC Format

**Susan Chickering, Teresa Strozik, and Gail Gulbenkian**

This article describes the process of converting OCLC Local Data Records (LDRs) for serials holdings to USMARC Format for Holdings and Locations as implemented by VTLS. VTLS Inc. engineered the smooth and easy conversion for Hamilton College's Burke Library in Clinton, New York. In only two months, Hamilton had a trained staff and a functional serials subsystem with full check-in. The library implemented claiming later when it had a complete vendor database in preparation for the Acquisitions and Fund Accounting System. Included in this article are details of the mapping from OCLC LDR format to USMARC format and a discussion of the benefits the Hamilton staff now enjoy with VTLS software.

### BACKGROUND

Hamilton College began its search for an automated library system in 1982. In 1985 the search intensified and narrowed, and by early 1986 the college had chosen VTLS. One of VTLS' main attractions was its support of the USMARC Format for Holdings and Locations. The format provides standardized local holdings information that:

- describes a specific copy of an item held by an institution;
- provides information peculiar to the institution itself;
- provides information for internal processing and maintenance of material;
- is associated with a particular bibliographic record; and
- is useful for cooperative acquisitions, interlibrary loan/document delivery, union list activities, and collection development.

In November 1988 the VTLS Serials Control Subsystem was scheduled for installation at Hamilton. At that time, the library was faced with a fast-approaching deadline. On December 31, 1988, the OCLC serials control subsystem, which it had been using since 1975, was to be discontinued.

### THE CONVERSION

As a first step in the data conversion process, the library asked OCLC to produce a tape of its local data records and serials bibliographic records as of the end of October 1988. At the same time, it stopped using the OCLC serials control subsystem.

VTLS training was scheduled for the week of November 15. As a result, Hamilton had to devise a temporary method for doing check-ins, providing check-in information for public services, and creating source documents to update the VTLS Serials Control Subsystem.

Hamilton decided to do two things: (1) continue check-in on OCLC without updating and (2) produce a hard copy of each check-in as receipts were processed. The hard copies were sorted alphabetically and by week and kept in the serials department, where they were available to the reference staff. The decision had two advantages: (1) neither the serials nor the reference staff had to learn an interim check-in procedure or format and (2) the hard copies could be used as source documents to update the system when it became available.

OCLC ran Hamilton's tapes on October 29, 1988. The tapes produced 4,884 serials bibliographic records from 8,417 local data records. Hamilton sent the tapes to VTLS for processing. For entry into the VTLS database, VTLS indexed the bibliographic records and, as precisely as possible, mapped the format of the OCLC Local Data Records to the USMARC format. The OCLC Local Data Record (LDR) fields were mapped to USMARC format as follows (see figures 1 and 2):

1. The OCLC number became the

| OCLC LDR | USED AS USMARC |
|---|---|
| OCLC #. . . . . | BIB RECORD LINK |
| FREQUENCY. . . . . | #W OF 853 |
| REGULARITY. . . . . | IGNORE |
| LIBRARY. . . . . | 852 #A YHM #B 0100 |
| COPY NUMBER | |
| If 1. . . . . | IGNORE |
| All others. . . . . | 852 #T |
| SUBSCRIPTION | |
| A(ctive). . . . . | 4 under ACQ. STAT |
| T. . . . . | 866 #6 1 TEMPORARY |
| C. . . . . | 866 #6 1 CANCELLED |
| D. . . . . | 866 #6 1 DEAD |
| LOAN CODE | |
| A. . . . . | 008/20/code B |
| N. . . . . | 008/20/code A |
| CALL NUMBER. . . . . | DEFAULT FROM BIB RECORD |
| LOCATION. . . . . | 866 #6 2 |
| FUND. . . . . | 994 |
| REMARKS. . . . . | 994 |

*Figure 1. Mapping OCLC LDR to VTLS USMARC Holdings.*

USMARC bibliographic record link.

2. OCLC's Frequency code was mapped to the USMARC subfield (indicating issues per year) of the 853 (Definition of Enumeration and Chronology/Publication Pattern for the Bibliographic Unit) field.

3. OCLC's Regularity code was ignored in USMARC.

4. OCLC's Library code was mapped to the USMARC subfields a (Institution/Location) and b (Location Number) of the 852 (Location/Call Number/Copy) field.

5. OCLC's Copy Number, if 1, was ignored in USMARC. Any other number was mapped to subfie1d t (Copy) of the 852 field.

6. OCLC's Subscription code A became 4 (serial currently received) in the Acquisition Status fixed field. Codes T, C, and D were translated as 6 1 Temporary (active for one year or less), 6 1 Cancelled, and 6 1 Dead (serial no longer published) in the 866 or free text (uncoded) field for the basic bibliographic unit. The subfield 6 value establishes the link between an 86x field and its 85x field. The value of 1 indicates the first definition in that field.

7. OCLC's Loan code A was mapped to 008 fixed field, position 20, code B, and code N to 008, position 20, code A.

8. OCLC's Call Number was not mapped because in USMARC the number normally defaults from the MARC bibliographic record. For this conversion, however, Hamilton did not want the call number displayed.

9. OCLC's Location code was mapped to 866 #6 2.

```
OCLC LDR                          USED AS USMARC

DEFINITION                        853 #6 8
#E.............................IGNORE
#F.............................IGNORE
#G.............................IGNORE
#V.............................#A
#P.............................#B
#Q.............................#C
#T.............................#F
#R.............................#D
#S.............................#E

CRHD                              863 #6 8.1 or Next
#A.............................#Z
#I.............................IGNORE
#J.............................IGNORE
#P.............................#A
#Q.............................#C
#R.............................#D
#S.............................#E
#T.............................#F
#Y.............................#I   [Requires going back to 853
                                    and creating #I (year) and #J
                                    (month) or (season).]
#O.............................PRINT CONSTANT #Z
#M.............................866 "MISSING"

RTHD                              863 #6 8.1
#A.............................#Z
#V.............................#A
#P.............................#B
#Q.............................#C
#R.............................#D
#S.............................#E
#T.............................#F
#Y.............................#I   (May require creating a #I in
                                    853.)
#M.............................866 #6 NEXT INCREMENTED CODE
                                  PRINT CONSTANT
                                  MISSING:REMOVE BRACKETS
                                  APPLY DEFINITION

SCHD;SIHD;PURC;CLMS............994

VTLS ALSO INSERTED THE WORD PERIODICAL IN THE 099 FIELD ON THE
BIB RECORD.
```

*Figure 2. Mapping OCLC LDR to VTLS USMARC Holdings (cont.).*

10. OCLC's Fund code was mapped to the USMARC 994 field normally reserved as a check-in field.

11. OCLC's Remarks were also mapped to 994.

12. OCLC's Definition field and subfields were mapped to 853 #6 8 and its subfields.

13. OCLC's Current Holdings field and subfields were mapped to 863 #6 8.1 or Next and its subfields.

14. OCLC's Retrospective Holdings field and subfields were mapped to 863 #6 8.1 and its subfields.

15. OCLC's SCHD (Summary holdings statement for copy), SIHD (Summary holdings statement for all copies of serial), PURC

```
Hamilton College Library- - - - - V T L S- - - - - MARC HOLDINGS SCREEN

Local lvl: 4              Operator: 00    Entrd: 891023   Used: 891026
Type: x    Enc lvl:       Acq stat: 4     Acq method: p   Lang: eng
Comp: 4    Gen ret: 8     Spec ret:       Com/cop: 1      MBR:
Lend: b    Repro:         Cancel:         Copies: 001     UPD:
     004    0005-73760
     035    0000-17430
     099    PERIODICAL
     245    Integrated serials control.
 1.  852    YHM \b 0100
 2.  853    6 8 vol. \b no. \u 12 \v r \i (year) \j (month) \w m
 3.  863    6 8.1 1-10 \i 1977-1987
 4.  863    6 8.2 11 \b 1-10 \i 1988 \j 01-10
 5.  866    6 2 Main Library
 6.  866    6 5 Note
 7.  866    6 9 Missing: v. 11 no. 5
 8.  994    SCHD;SIHD;PURC;CLMS
 9.  994    F8855-6-1308
10.  994    Notify Director when issue received

Please enter NEW COMMAND or 'HELP' for assistance
```

*Figure 3. USMARC Holdings Record Created from LDR.*

(Offline claim notice information), and CLMS (Claim control information) fields were mapped to 994.

16. VTLS also inserted the word *periodical* in the 099 field on the bibliographic record.

On November 30 VTLS shipped the mapped holdings records (see figure 3) and the indexed bibliographic records back to Hamilton. The library loaded the tapes into their VTLS system. By December 19, Hamilton had a serials control database that was current through October 1988 and ready for check-in.

In November, while the mapping was taking place, VTLS used a training database to train the three serials staff at Hamilton in the use of the VTLS Serials Control Subsystem. Meanwhile, the staff was also doing pseudo check-in on the OCLC system. During the week of December 19, just after tape loading, Hamilton started regular check-in on the VTLS system and was able to handle all serials received each day.

The staff sorted receipts alphabetically and then pulled the hard copy OCLC check-in sheets for them. The staff updated the holdings records from the hard copies at the same time they checked in the receipts. With the receipt of the new issue, the check-in screen was automatically set up. In this way, the online serials records were brought up to date with one pass.

Due to the shortcomings of the LDR, the mapping to USMARC format could not be 100 percent accurate, so the staff had to make some additional modifications to the 853/863 fields of the holdings record. Nonetheless, two support staff managed to complete current check-in, updating, and modifications for an average of 325 records per week. Currently, in half a day one person handles all check-ins for one day.

## CONCLUSION

A sound mapping program and coordination between Hamilton and VTLS allowed for an essentially painless transition. The serials staff found that knowing the OCLC system made learning and applying the USMARC Format for Holdings and Locations to serials relatively easy.

Since implementing the system, Hamilton has enjoyed the benefits of VTLS Serials Control. Because each VTLS holdings record is linked to its MARC bibliographic record, a user can retrieve holdings, check-in, and claims information from the same point used to access serials bibliographic information (see figure 4). Moreover, modifications to the defaulted values of the MARC bibliographic record are automatically reflected on the MARC holdings, check-in, and claim screens. Other special features include:

- automatic anticipation of next issues
- automatic updating of holdings records
- automatic reminders for late, missing, or claimed issues

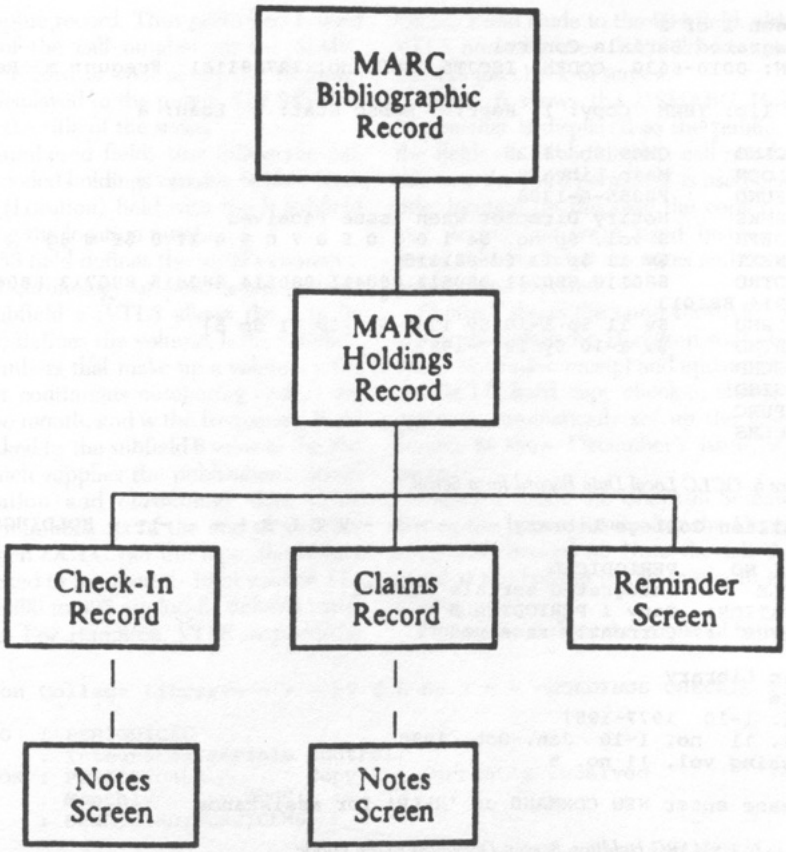


*Figure 4. VTLS Serials Control Data Organization.*

- generation of routing slips
- production of claim letters
- easy access to payment information
- bindery status function
- clear public displays

Hamilton College chose to implement an online serials function first followed by cataloging, OPAC, circulation, reserves, and finally acquisitions. Library personnel expect the ordering and accounting functions, along with acquisitions, to have been implemented by July 1990.

## A SAMPLING OF USMARC HOLDINGS RECORDS AND VTLS SCREENS

Figure 5 shows a typical OCLC Local Data Record for a phantom journal at Hamilton.

Figure 3 (shown previously) shows the VTLS USMARC Holdings record created from the mapping of that LDR. The first four lines represent the "coded holdings fixed fields" of the USMARC record. A user may update the fixed fields but cannot add or delete them. Note the OCLC Subscription code A mapped as "4" in the fixed field "Acq stat."

The unnumbered fields 004, 035, 099, and 245 of the sample record are reflections of those very same fields on the MARC bibliographic record and cannot be modified from the Holdings Screen. The 004 field contains the system-assigned bib-id, which is associated with the OCLC number. The 035 field contains the system-assigned holdings-id. The 099 field contains the word *periodical* because, by mutual agreement with Hamilton, VTLS inserted it in the 099 field of the serials

```
Screen 1 of 2
Integrated Serials Control
ISSN: 0010-6630  CODEN: ISCJT5  OCLC no: 127891181  Frequn: m  Regulr: r

Hld lib: YHMM  Copy: 1  Repr:   Subsc Stat: a  Loan: a

 1 CLNO     QH69 $b .I325
 2 LOCN     Main Library
 3 FUND     F8855-6-1308
 4 RMKS     Notify Director when issue received
 5 DEFN     $ vol. $p no. $e 1 0 3 0 5 0 7 0 9 0 11 0 $f m $g
 6 NEXT     $v 11 $p 11 $d 881115
 7 DTRD     880110 880211 880513 880411 880514 880615 880713 880810
880914 881013
 8 CRHD     $v 11 $p 1-10 $y 1988 $m [$v 11 $p 5]
 9 RTHD     $v 1-10 $y 1977-1987
10 SCHD
11 SIHD
12 PURC
13 CLMS
```

*Figure 5. OCLC Local Data Record for a Serial.*

```
Hamilton College Library - - - - - - V T L S - - - - - - - HOLDINGS SCREEN

CALL NO :  PERIODICAL
TITLE   :  Integrated serials control.
LOCATION:  Copy 1 PERIODICALS
STATUS  :  Currently received

Main Library
Note
vol. 1-10  1977-1987
vol. 11  no. 1-10  Jan.-Oct. 1988
Missing vol. 11 no. 5

Please enter NEW COMMAND or 'HELP' for assistance
```

*Figure 6. USMARC Holdings Screen Displayed to the Public.*

```
Hamilton College Library- - - - - V T L S - - - - -MARC HOLDINGS SCREEN

Local lvl: 4              Operator: 00   Entrd: 891023  Used: 891026
Type: x   Enc lvl:        Acq stat: 4    Acq method: p  Lang: eng
Comp: 4   Gen ret: 8      Spec ret:      Com/cop: 1     MBR:
Lend: b   Repro:          Cancel:        Copies: 001    UPD:
     004   0005-73760
     035   0000-17430
     099   PERIODICAL
     245   Integrated serials control.
 1.  852   YHM \b 0100
 2.  853   6 8 vol. \b no. \u 12 \v r \i (year) \j (month) \w m
 3.  863   6 8.1 1-10 \i 1977-1987
 4.  863   6 8.2 11 \b 1-11 \i 1988 \j 01-11
 5.  866   6 2 Main Library
 6.  866   6 5 Note
 7.  866   6 9 Missing: v.11 no.5
 8.  994   SCHD;SIHD;PURC;CLMS
 9.  994   F8855-6-1308
10.  994   Notify Director when issue received

Please enter NEW COMMAND or 'HELP' for assistance
```

*Figure 7. Holdings Record after Check-in of November Receipt.*

bibliographic record. Thus *periodical* is used instead of the call number on the MARC holdings record as well as on the Holdings Screen displayed to the public. The 245 field contains the title of the serial.

The numbered fields that follow the 245 are the "coded holdings variable fields." Note the 852 (Location) field with the b subfield containing the location number.

The 853 field defines the serial's enumeration and chronology or publication pattern. Here, subfield a (VTLS allows the a to be assumed) defines the volume, b the number, u the numbers that make up a volume, v the restart or continuous numbering code, i the year, j the month, and w the frequency. Field 853 is linked by the subfield 6 value to the 863 field, which supplies the publication's actual enumeration and chronology data using cardinal numbers. As of the end of October 1988, when OCLC ran the tape, the library had checked in numbers 1–10 of volume 11.

Fields 990 to 995 are locally defined variable fields. For Hamilton, VTLS mapped the OCLC Fund Code to the 994 field, although VTLS normally uses that field for notes related to the check-in screen.

Figure 6 shows the USMARC Holdings Screen that is displayed to the public. Note the fields on public display: call number (in this case the word *periodical* is used instead), title, location (in this case the copy number and *periodicals* were used instead), and status. Also included are notes and the actual publications received.

Figure 7 shows the same USMARC Holdings record after the Hamilton staff checked in the November receipt and updated it using the OCLC hard copy check-in sheets. This updating automatically set up the Check-in Screen to show December's issue as "Expected."

Figure 8 shows the Check-in Screen predicting the January issue after the December issue was checked in. Note the CL # command at the bottom of the screen to claim a missing issue.

Figures 9–12 show three special features of

```
Hamilton College Library- - - - -V T L S- - - - -HOLDINGS CHECKIN SCREEN

CALL NO   : PERIODICAL
TITLE     : Integrated serials control.
LOCATION  : PERIODICALS          Copy 1 - Currently received
FREQ      : Monthly        DOCS:
NOTES     : SCHD;SIHD;PURC;CLMS

     Issue                                          Received  Expected
 1.  vol. 11 no. 12 Dec. 1988                       20Dec88   15Dec88
Expected issue:
 2.  vol. 12 no. 1 Jan. 1989                                  15Jan89

Please enter NEXT, CK #, CL #, D #, M #, A, REMIND, CL, or # * (notes)
```

*Figure 8. Check-in Screen Predicting January Issue.*

```
/REMIND
Hamilton College Library- - - - V T L S - - - -HOLDINGS REMINDER SCREEN

     Date       Holding-id      Type       Remark
 1.   2Feb89    0000-01530        1        Check-in is expected
 2.   7Feb89    0000-01330        1        Check-in is expected
 3.   9Feb89    0000-01430        1        Check-in is expected
 4.  10Feb89    0000-14030        1        Check-in is expected
 5.  10Feb89    0000-15230        1        Check-in is expected
 6.  14Feb89    0000-10530        1        Check-in is expected
 7.  14Feb89    0000-15330        1        Check-in is expected
 8.  14Feb89    0000-17430        1        Check-in is expected

Please enter D #, M #, A or LINE # of selection
8
```

*Figure 9. Holdings Reminder Screen.*

```
Hamilton College Library- - - - - V T L S - - - - -MARC HOLDINGS SCREEN

Local lvl: 4              Operator: 00    Entrd: 891023  Used: 891026
Type: x   Enc lvl:        Acq stat: 4     Acq method: p  Lang: eng
Comp: 4   Gen ret: 8      Spec ret:       Com/cop: 1     MBR:
Lend: b   Repro:          Cancel:         Copies: 001    UPD:
     004   0005-73760
     035   0000-17430
     099   PERIODICAL
     245   Integrated serials control.
 1.  852   YHM \b 0100
 2.  853   6 8 vol. \b no. \u 12 \v r \i (year) \j (month) \w m
 3.  863   6 8.1 1-10 \i 1977-1987
 4.  863   6 8.2 11 \b 1-12 \i 1988 \j 01-12
 5.  863   6 8.3 12 \b 1 \i 1989 \j 01
 6.  863   6 8.4 12 \b 3-4 \i 1989 \j 03-04
 7.  866   6 2 Main Library
 8.  866   6 5 Note
 9.  866   6 9 Missing: v.11 no.5
10.  991   \aVTLS, Inc.  \b001      \c8901011      \d2888800001
           \e01jan89     \fp        \g8901011      \h890101
11.  994   SCHD;SIHD;PURC;CLMS
12.  994   F8855-6-1308
13.  994   Notify Director when issue received

Please enter NEW COMMAND or 'HELP' for assistance
```

*Figure 10. Holdings Record with Local Claiming Data.*

VTLS: the Reminder Screen, Claiming, and Routing List capability.

Figure 9 is the Holdings Reminder Screen that VTLS software creates to alert staff about issues not received and to be claimed. The /REMIND command displays this screen of ID numbers linked to check-in records where issues are expected but have not been received.

In Figure 10 the librarian has added local information about the claiming to the 991 field of the holdings record.

Figure 11 is an example of the ANSI standard claim letter that the system generates when a claim is made.

Figure 12 shows a Serial Issue Routing Screen listing the patrons on the issue's routing list, which may be printed by the librarian at check-in or in batch mode at the end of the day. ■■

```
TITLE: Integrated serials control.
TITLE NUMBER:  001
PUBLISHER:  VTLS, INC.
PLACE:  Blacksburg, Va. 24060

ISSUE(S)                                    NO OF          DATE OF
CLAIMED:  vol. 12 no. 8 Aug. 1989           COPIES:  1     CLAIM:  891023

PAID THROUGH: Publisher   SUBSCRIPTION ORDER NO: 8901011  DATE: 890101

SUPPLIER ACCOUNT NO:                INVOICE NO:  8901011     DATE:

ISSN:  9876-5432          CODEN:                SAN:

REASON FOR CLAIM:  Issue not received

CLAIM    VTLS, INC.                                        SERIAL CLAIM
SENT     1800 Kraft Dr.                                    SERIAL CLAIM
TO:                                                        SERIAL CLAIM
         Blacksburg       Va  24060                        SERIAL CLAIM


SHIP CLAIMED PIECES TO:  Hamilton College Library
                         Hamilton College

                         Clinton                    NY  13323

SUPPLIER:  CHECK APPROPRIATE RESPONSE(S)
< > REPLACEMENT SENT:  DATE SENT_____
< > ORDER ENTERED TO START WITH_____
< > DELAY IN PULICATION.  DATE EXPECTED_____
< > ISSUE COMBINED WITH_____
< > FREQUENCY CHANGED.  NEW FREQUENCY_____
< > TITLE CHANGED.  NEW TITLE_____
< > NEVER PUBLISHED_____
< > DISCONTINUED PUBLICATION.  LAST ISSUE PUBLISHED WAS_____
< > MAILED WHEN PUBLISHED.  REORDER AT $_____
< > OUT OF PRINT.  SUBSCRIPTION EXTENDED TO_____
< > OUT OF PRINT.  WILL REPRINT AND SUPPLY_____
< > OUT OF PRINT. NO FURTHER ACTION_____
< > ERROR IN CLAIM INFORMATION_____
< > TOO EARLY TO CLAIM.  NO ACTION_____
< > TOO LATE TO CLAIM.  REORDER AT $_____
< > PARTIALLY FILLED_____
< > REMARKS_____

SEND     Hamilton College Library                  RESPONSE DATE:_____
CLAIM    Hamilton College                          SUPPLIER:  Return one
REPLY                                                copy to subscriber
TO:      Clinton                NY  13323
```

*Figure 11. ANSI Standard Claim Letter.*

```
Hamilton College Library - - -V T L S- - - SERIAL ISSUE ROUTING SCREEN

SERIAL   :  Integrated Serials Control
LOCATION:  Main Branch
CALL NO  :  QH 69.I325
ISSUE NO:  v.11 no.12 Dec. 1988
DATE     :  20Dec88
NOTES    :  Notify Director when issue received

     BETT ANN                                  Circulation
     KENT TOM                                  Reference
     JONES BRIAN                               Technical services
     NICELY MARY                               Research Center
```

*Figure 12. Serial Issue Routing Screen.*

# News and Announcements

### Nancy H. Evans Named LITA Program Officer

Nancy H. Evans, formerly Data and Information Services manager at the Carnegie Mellon University Libraries, Pittsburgh, became the first program officer for LITA on April 23, 1990. Evans' responsibilities include developing and managing LITA's continuing education programs and providing professional support to LITA membership groups for program planning. She reports to Linda J. Knutson, LITA executive director.

During her tenure at Carnegie Mellon, Evans helped develop the Library Information System, one of the first locally loaded database systems in an academic library. Her professional activities include the organization of an ACRL discussion group on electronic library development and service on the editorial board of the *PACS-L Review*, an electronic journal covering issues related to electronic information services. She has also published several articles and given presentations on electronic information.

Evans has a B.A. in political science; an M.S.L.S. from the University of Tennessee, Knoxville; and a master's of public management degree from Carnegie Mellon. ■■

### LITA and OCLC to Sponsor Minority Scholarship

LITA and OCLC will cosponsor a $2,500 scholarship for minority students pursuing a degree in library/information science. The first scholarship will be awarded in 1991.

The purpose of the scholarship is to encourage the entry of a member of a principal minority group—American Indian or Alaskan native, Asian or Pacific Islander, African-American, or Hispanic—who is a U.S. or Canadian citizen into the library automation field.

The award will be administered by the LITA Minority Scholarship subcommittee of the LITA Education Committee. OCLC is providing funding for the scholarship. Applications will be available from LITA in September 1990. ■■

### OCLC to Provide Z39.50 Software to National Library of Canada

OCLC has developed software based on Open Systems Interconnect (OSI) protocol for information retrieval (NISO Z39.50) and has agreed to provide the software to the National Library of Canada (NLC). NLC plans to test the feasibility of using the software to provide intersystem access to union catalogs to support interlibrary lending.

OCLC began developing the software following the acceptance of the NISO standard in January 1988. OCLC developed the software with the intention of sharing it with the library community. OCLC Vice-President for Corporate Relations Kate Nevins said that "The Z39.50 software will overcome system design differences and allow universal computer-to-computer communication that will enable libraries to cooperate and communicate as well as broaden access to information."

The OCLC-developed Z39.50 software is also being made available to the University of California and the University of Pennsylvania. ■■

### OCLC and RLG also Cooperating

OCLC and the Research Libraries Group (RLG) have also agreed to cooperate in the implementation of standards for computer linkages.

The agreement is a significant outcome of the collaboration between OCLC and RLG on technical standards that started in 1987. OCLC and RLG have been working cooperatively to develop consistent input to computer-related technical standards of national and international standards organizations.

A memo of understanding between the two organizations now states, "As part of this agreement, OCLC and RLG will work together, as each organization evaluates new interlibrary lending and search and retrieval protocols, to assure compatibility of implementation decisions regarding computer-to-computer linkage."

Such linkage will utilize the Open Systems Protocol (OSI) Basic Reference Model, the Search and Retrieval Protocol Specification, and the Interlibrary Loan Protocol Specification using connection-oriented mode communications, ASN.1, and the Basic Encoding Rules.

The two organizations will conduct compatibility analyses this year. OCLC and RLG will also explore implementing this link to enable the users of each system to engage in automated interlibrary loan activity with organizations supported by the other system. ■■

### LITA and Meckler to Sponsor Award for Innovative Technology

LITA and the Meckler Corporation will cosponsor an award for technological innovation in libraries beginning in 1991. The award will recognize outstanding instances of the innovative uses of technology in a library and may be given to either an individual or a library.

The award will consist of a citation and a cash award of $500. The winner of the award will be selected by a jury appointed by the president of LITA.

The deadline for nominations is October 1, 1990. Nominations must include a complete description of the program and a statement on its unique merit. Nominations should be sent to William Gray Potter, Chair, LITA/Meckler Award, University Libraries, University of Georgia, Athens, GA 30602. For further information contact Potter at (404) 542-0621. ■■

### Utlas to Become OCLC Regional Network Affiliate in Canada

OCLC and Utlas International have signed an agreement whereby Utlas will become an OCLC regional network affiliate and will provide marketing, training, and support for OCLC products and services in Canada.

"With this agreement Utlas is in a position to offer a more complete range of services, complementary to Utlas' own products, to meet the needs of Canadian libraries more effectively," said Richard Newman, president and CEO of Utlas.

"This information alliance holds great promise for resource sharing among libraries in North America," said K. Wayne Smith, OCLC president and CEO. "We are pleased to welcome Utlas to the OCLC network community."

Utlas will initially focus its OCLC network activities on resource sharing and the EPIC service. Utlas is developing a program to present to its customers that encourages tape loading of bibliographic records into a newly established Canadian database that will reside in the OCLC Online Union Catalog. Canadian libraries will be able to search the OCLC database for North American holdings and request them on interlibrary loan through the OCLC Group Access Capability.

Utlas customers who become OCLC members or who use the OCLC Group Access Capability will also be able to use at OCLC-member price rates the OCLC EPIC service, an online reference system.

Utlas becomes the nineteenth OCLC regional network affiliate. Regional networks are organizations that contract to provide OCLC services and support to OCLC member and user libraries. OCLC works closely with networks in support of mutual cooperation and resource-sharing goals. ■■

# Recent Publications

## Book Reviews

***(The) Academic Library in Transition: Planning for the 1990s.*** Ed. by Beverly P. Lynch. New York: Neal-Schuman, 1990. 409p. $39.95 (ISBN 1-55570-043-8).

What issues face academic libraries today? To what extent should a library's environment be considered when addressing these issues? What plans should academic librarians make to help ensure that their libraries will be well-respected operations in the twenty-first century? In *The Academic Library in Transition*, University of Illinois at Chicago (UIC) librarians address these questions within their institution's context. Their work is a striking summary of the library's dramatic metamorphosis as UIC changed its mission from that of an undergraduate institution to a research university of the first degree.

The first chapter sets the stage with a brief overview and an analysis of the library's environment. Seven subsequent chapters address users and services, collections development and acquisition, documents, special collections, technology and automation, the university library building, and personnel. The final chapter presents the UIC library strategic plan—a succinct set of goals and objectives that UIC staff have developed for collections, services, facilities, and management to move their library into the twenty-first century effectively. Beverly Lynch provides an excellent administrative overview with explanations of operational philosophy in the introduction and in commentaries that follow each of the first eight chapters.

This book, which at first appears to be a massive "how we did it" article, is a complex study that will be most useful to a wide-ranging audience: students of academic librarianship, those new to the academic library environment, individuals planning new libraries, staff in libraries refocusing due to institutional changes in scope, and librarians who wish to chart a library's future in a logical fashion. This is a book to which librarians can turn and return for ideas that will give them additional perspective on their own environments. Coupled with *Information Literacy: Revolution in the Library* by Patricia Senn Breivick and E. Gordon Gee (American Council on Education, 1989), it can provide a powerful, personal short course for any academic librarian.—*Marion T. Reid, California State University, San Marcos.* ■■

***Adaptation of Turnkey Computer Systems in Sci-Tech Libraries.*** Ed. by Ellis Mount. New York: Haworth, 1989. $19.95 (ISBN-0-86656-859-X).

Do library professionals, or, specifically, science and technology librarians, need yet another book "to deal with the problems and benefits of installing a ready-made computer system in a sci-tech library?" Probably not. I found that there is very little useful information in this book that has not been better presented elsewhere or that is unique to the sci-tech library.

This book has five case study articles and one general article on system selection that were published simultaneously as an issue of *Science and Technology Libraries* (v.9, no.1).The case studies were written by different authors and have widely disparate emphases, consistency, detail, and usefulness.

Four of the case studies (two dealing with CLSI and one each with GEAC and NOTIS) are most appealing to librarians who have narrowed down their search to a few vendors. The information is very dated and indeed most of it is empirical or even subjective. If you don't recognize the vendor names you don't want this book. Because NOTIS is primarily marketed to very large academic libraries, this article (Nagle) may not be as useful or as timely as just scanning the NOTIS users' group file titled NOTIS-1 in the BITNET electronic mail system. The brief GEAC article (Stoll) mentions "A prototype system that connects the GEAC system into the laboratory computer network . . . ." I wonder how

generally applicable that is? One of the more useful case studies (CLSI-Robertson) gives useful uptime information (an outstanding 98 percent), searching deficiencies ("Titlequery . . . not really user friendly"), and dial-up OPAC irregularities ("lack of a logoff procedure . . . no help messages").

The fifth case study, written about Stevens Institute's solution (Johnsen and Widdicombe), did not include a mainstream turnkey library vendor but rather a "turnkey" microcomputer-based library "system" (The Assistant) on which Stevens helped guide the developer's effort. I wouldn't expect The Assistant to become a significant player in sci-tech library automation, but the study is useful for very small libraries thinking of developing their own systems.

If you are looking for a good general book on the RFI process, the RFP process, selection criteria, and implementation strategy for a turnkey library automation system, don't spend the $19.95. If you are looking for some subjective personal experiences and observations on particular systems as further evidence for supporting your selection decision, this book may be useful.—*Richard Sweeney, Polytechnic University, Brooklyn, New York.* ■■

***Computing, Electronic Publishing, and Information Technology: Their Impact on Academic Libraries.*** Ed. by Robin Downes. New York: Haworth, 1989. $22.95. (ISBN 0-86656-788-7).

This work is the publication in monograph format of volume 9, number 4 (1988) of Haworth Press' *Journal of Library Automation*. The eight *Journal* articles are indexed, according to Ulrich's, by at least ten services, including, for example, PAIS, CIJE, Information Science Abstracts, and Management Contents. In addition, the articles are nearly two years old. In the ever-changing world of automation and technology, what "their impact on academic libraries" was two years ago may not be the same today.

At the same time, these articles continue to have merit. Whether in serial format or monographic publication, they have something to say, and much of it is well said. Perhaps it is best now to read between the lines and look for current applicability rather than for the specific intent of comments in the context of 1988.

David Weber (Stanford) examines the province of management of information technology on the academic campus and discusses the organizational issues of library computing. Anne Woodsworth (Pittsburgh) looks from a different viewpoint at organizational structures and comments on the mutual support the library and the computer center can give each other. Karen Hunter (Elsevier) looks at the problems of bringing publishers and librarians together as partners in the coming electronic publishing world. Richard Wood (UMI) outlines the technical and legal aspects of CD-ROM technology and focuses on the importance of user involvement in the development process to ensure products that are useful and usable. Susan K. Martin (then Johns Hopkins, now Georgetown University) reviews the role of the systems librarian and outlines from where the incumbent in that position often comes and what he does; she then contributes a detailed list of the tasks that systems librarians should perform. Bert R. Boyce and Kathleen M. Heim (Louisiana State University) consider the education of the systems analyst and conclude that much needs to be done before processes that truly provide a formal education are in place and functioning. John Corbin (North Texas State University) speculates on what must be done to educate librarians to work in libraries and information centers that use information technology extensively. Donald E. Riggs (Arizona State University) concludes the volume with a discussion of expert systems and the contention that "expert systems will improve productivity in public services and strengthen the role of the public service librarian."

In his introduction, Robin Downes (University of Houston) provides an overview of the eight papers. He notes that library automation has shifted away from emphasis on internal database management and contends that the articles "will focus attention on new areas of computing applications, will broaden the definition of information technology, and will consider a broad range of implications for the organization and staffing of academic libraries." In 1988 each paper was valuable for its own sake; whether they quite achieve what Downes contends when taken together is another question. Perhaps if he had drawn together again their overall theme in a conclusion brought up to date for this later mono-

graphic publication, the cohesion between the papers would be more apparent.

Much has happened as speculated or predicted by these papers since they were first published nearly two years ago. A major undertaking in electronic publishing, for example, between the American Association for the Advancement of Science and OCLC was announced early this spring. A number of academic institutions have unified library and computer resources under one mantle. Expert systems have not moved as quickly, even though endeavors like Project Emperor, as a broad example, demonstrate the possibilities. Library education seldom moves rapidly enough to address an issue like formal systems librarian education while it is still an issue. Yet the partnerships described as possible and desirable by the eight authors are very clearly happening.

Although reasonable in price, this slim volume of a short hundred pages may not be justifiable if a library has the original serial issue. In any case, the articles are accessible through indexing services.—*Ross Stephen, Rider College.* ■■

***The Electronic Campus: An Information Strategy. Proceedings of a Conference Held 28–30 October 1988 at Banbury.*** Library and Information Research Report no.73. Ed. by Lynne J. Brindley. Wetherby, West Yorkshire, England: British Library Research & Development Department, 1989. 155p. $45 (ALA order code R187–5).

Policy considerations are not well documented in the expanding sphere of electronic campus infrastructure. These proceedings represent a toehold on the task of exploring key issues. Much of the discussion is invariably focused on the premise that we need to "rethink traditional organisation."

Nigel Gardner leads off with a discussion of the British "Computers in Teaching Initiative." He identifies a few of the principal obstacles to the use of information technology (IT) in teaching, particularly the lack of suitable instructional software. He suggests that Britain improve peer review, awards, and academic credit for software authors. For this he has a number of American precedents to cite.

Jack Meadows presents an analysis of the implication of IT for campus researchers in the United States. He notes that there is a quest for "3M" workstations that have a million bytes of storage, a million pixels of display, and a speed of a million instructions per second. He goes on to point out that artificial intelligence has not developed into products for researchers to use, that OPACs and hypertext help reduce the effort to keep up with literature, and electronic mail helps researchers keep up with one another. Meadows concludes by pointing out that electronic systems are expensive to provide for every researcher and that the impact on the publication cycle will not be great for some time.

Rowland Brown takes the view that with new workstation technology arriving daily, we must find new ways to use technology creatively. He advises that we must rethink, decide, and confront a number of issues; that is, we must make decisions and plan a process that will cause this kind of adaptation. Many will disagree and conclude that serendipity as well as economic and technical pressures will cause adaptation if it is to occur.

The summary of the Robert M. Hayes lecture adds a chorus to Brown by suggesting new technology causes change and that the way to cope is through strategic planning.

David Summers notes that technology has not drastically changed publishing, although he does not assess the possible changes that on-demand publishing may cause. He goes on to note that events in European publishing may become more complex with the possibility of a value-added tax being imposed and prices being deregulated.

Neil McLean characterizes the development of integrated library systems as the evolution of internal control systems for libraries. He presents a case for the notion that automation is funded primarily at the expense of materials rather than staff, although his statistics would not seem to support a statistical analysis because they cover too short a time span. McLean suggests that further development should be based on Robert Taylor's value-added model to ensure better user outcomes. This discussion seems to neglect the features in library systems that benefit the user, such as improved subject search mechanisms and features in circulation control that minimize interuser interference.

Ivan Sidgreaves explores the arena of competition and cooperation between libraries and computer centers. His observations ap-

pear to be on target, in that first, there is a growing demand for faculty input to automation planning, and second, patterns for management of distributed systems are not well established.

The remaining presentations are summaries, including case study reports by presenters from Southampton University, Aston University, Edinburgh University, Leicester Polytechnic, and the University of Leeds. A summary reprises Tom Stonier's historical footnote to the conference that compares the impact of information technology with that of the printing press. He pinpoints the crucial role of human "know-how" that makes development of higher skill levels a pressing issue.

The conference summary of "Syndicate Discussion," which must be focus groups, develops into a list of needs. Most of these needs relate directly to better funding, greater publicity, and more resources for information technology. Clearly the agenda set here would be a good starting place for those who must decide which issues to tackle next, perhaps in LITA or other information technology forums.

These proceedings represent a benchmark in British thinking on the subject. It is of less value to an American audience, where the issues and the implementation arena are shaded entirely differently. Other sources will provide greater technical detail, confront educational theory, and provide current assessments of technology.—*Norman Howden, University of North Texas.* ■■

**Gorman, Michael.** *The Concise* AACR2, *1988 Revision.* Chicago: American Library Assn., 1989. 160p. paper, $15 (ISBN 0-8389-3362-9).

The Anglo-American cataloging community has codified its rules for descriptive cataloging into a set of principles illustrated by examples. The latest version of its code (*Anglo-American Cataloguing Rules, 2d ed., 1988 Revision*, or *AACR2R*) consists of a great many principles and examples. The robust 677-page volume attempts to address any situation an experienced cataloger could encounter. Included are all corrections, changes, and additions that have been approved since the 1978 version of the code.

In a similar manner, Michael Gorman, an editor of *AACR2R*, has followed his *The Concise AACR2* (1981) with this revision. In addition to reflecting changes in certain principles of Anglo-American cataloging, it incorporates small organizational improvements to his previous abridgement. While it is not intended or recommended as a cataloging tool for libraries adding bibliographic records to large databases, it serves as a sound introduction to the basics of describing a work and assigning access points to it.

The rationale for creating a concise version is simple. A select few need to know detailed rules for describing three-dimensional artifacts or assigning uniform titles to parts of Homer's *Iliad*, while a great many—students, noncatalogers, and nonlibrarians who deal with catalogs—are better served by a distillation of the essential rules. Gorman's version reduces the cataloging code to a vital fifty-seven rules. It is unfortunate that his rule numbers do not correspond to those in *AACR2R*, but rational order in the full code is not entirely the same as rational order in its concise counterpart. Readers working from *The Concise* AACR2, *1988 Revision* to *AACR2R* can overcome this problem by referring to an appended "comparative table of rule numbers." The detailed index and many tables of contents serve those seeking a particular rule.

For those who are familiar with the earlier version of this work, changes to it range from the whimsical to the profound. Some new examples (such as the title *Elvis is Dead, and I'm Not Feeling Too Good Myself*) clearly are added to enliven some unexciting reading. Other rules, such as those governing the description of computer files or the rules of entry for persons using pseudonyms, reflect the major changes in formats and principles of the past decade. The comparative table is a clear organizational improvement over the marginal notes that served as references in the 1981 version. The change in rule numbering between the two concise versions should not be a problem; noncatalogers should neither need to refer between the versions nor have used the older versions so intensively that they will be disoriented.

It is possible for experienced catalogers to disagree over how concise such rules should be. Some might dispute particular exclusions, such as the lack of a rule governing changes of persons or bodies responsible for a work (*AACR2R*, rule 21.3). In the end, Gorman's

judgment seems as good as any and better than most.—*Jay H. Lambrecht, University of Illinois at Chicago.* ■■

***Information Science, the Interdisciplinary Context.*** Ed. by J. Michael Pemberton and Ann E. Prentice. New York: Neal-Schuman, 1990. 240p. paper, $39.50 (ISBN 1-55570-048-9).

This work presents a collection of papers presented at the 1987 ALISE (Association of Library and Information Science Education) conference under the theme "Information Science as a Discipline" together with selected papers written for a doctoral seminar at the University of Texas. All of the studies focus on a common theme: what is the interdisciplinary nature of information science and how is it related to the traditional domain of library science?

An introduction by Ann E. Prentice traces the historical development of the academic discipline, the emergence of new disciplines over time, and the trend toward interdisciplinary nature of information science. The consensus is that library and information science academic programs are becoming more interdisciplinary in nature and that this trend will continue. Discussion centers on defining the boundaries of the information science discipline and examining to what extent information science programs can or should expand to encompass other academic areas such as communications, computer science, or the humanities. Several models are provided to demonstrate possible paths of convergence of information science with other disciplines. In predicting the interdisciplinary direction that will be taken, a joining with the discipline of communication is most frequently mentioned. Both disciplines are relatively new, interdisciplinary in nature, share a common theoretical frame of reference, and focus on similar areas of research (although they take differing approaches to examine similar questions). All of the authors appear to be from the information science or library science field. It world have been interesting to have had an author from the communications field offer a view from the perspective of that discipline on the relationship of communications to information science.

Three case studies examine differing experiences and models in planning interdisciplinary information science programs at Rutgers, Syracuse, and the University of Hawaii. A brief paper discusses the closing of four graduate library schools. The overriding cause is seen as an inability of the schools to participate at the institution level and articulate the need for library and information science education to encompass new boundaries of the domains of information science and library science. They investigate the position of library science within the information science domain. In the final paper, Kathleen Eisenbeis concludes that "there is scant evidence for library and information science being one discipline." Rather than joining a unified domain, library science will become one part of an information interdiscipline.

The questions posed by this volume will be of immediate interest to library and information science educators—those who must make decisions on the future course of the profession's graduate programs. Library and information science programs are in a state of change as witnessed by the recent closing of well-known schools and current journal literature. All members of the profession should take note of the implications of these studies. The research represented in these papers points to the direction information science education may take in the future and the educations graduates of these programs will receive.

A bibliography brings together the classic studies on the theory of information science, recent research in the field, and research on education for library and information science. It is a valuable reference for students and practitioners.—*Andrew Lisowski, Library of Congress.* ■■

**Khosrowpour, Mehdi, and Gayle J. Yaverbaum.** *Information Technology Resources Utilization and Management: Issues and Trends.* Harrisburg, Pa.: Idea Group Publishing (471 Lindle Road, Suite 109, Harrisburg, PA 17111), 1990. 471p. $44.95 (ISBN 1-878289-00-4).

This book is composed of seventeen essays from different authors divided into four main areas: managerial and organizational issues, information technology applications, management of information resources, and protecting information resources. As information technology assumes greater strategic importance in both the profit and nonprofit arenas, the issue of managing these resources

will also grow in importance. Managers of information technology will increasingly need to set goals clearly and focus on priorities in order to succeed. Unfortunately, this work, on the whole, suffers from a lack of focus and unclear goals. The editors note that "The purpose of this book is to aggregate knowledge that will facilitate a manager's comprehension . . . assist a manger who must utilize and manage these resources, and . . . provide some understanding about the future . . . ." They then go on to state, " The text can be used in several ways. It is ideal as a test for a graduate or undergraduate course . . . ." The essays read as if they were intended for an academic audience, not for an audience of experienced managers.

Contributing to the lack of clarity is the wide range of topics covered. The editors have included just about every aspect of information technology that exists, including telecommunications, expert systems, executive information systems, office automation, microcomputers, DBMSs, disaster planning, legal aspects, and manufacturing. However, nothing ties all these disparate topics together. Indeed, the reader is left to wonder what the difference is between the section on managerial and organizational issues and the section on management of information technology resources. While the coverage is a mile wide and an inch deep, there are a couple of essays that do stand out. These include "Mapping the Corporate Microcomputer Strategy," "Telecommunication for Competitive Advantage," "Building Effective Expert Systems," and "Strategies for User Involvement."—*David R. McDonald, Arts & Sciences Library, Tufts University.* ■■

**Magrill, Rose Mary, and John Corbin.** *Acquisitions Management and Collection Development in Libraries.* 2d ed. Chicago: American Library Assn., 1989. 285p. $27.50 (ISBN 0-8389-0513-7).

In the five years since the publication of Magrill's first edition of *Acquisitions Management and Collection Development in Libraries*, collections development and acquisitions have experienced dramatic changes and challenges. Magrill's second edition maintains the format of her first, but each chapter and bibliography is thoroughly updated and expanded to account for those changes.

As in the first edition, a thorough but brief overview of the entire field of acquisitions and collection development is given that presents the essentials of each concept, followed by bibliographies giving current sources for more detailed information. This is not a source for those who want detailed procedures on how to perform each step of acquisitions or collection development; rather it is a conceptual overview of all the elements that relate to those activities.

Expanded or new sections include discussion of the RLG Conspectus, automation of acquisitions activities, bibliographic utilities and cooperative acquisitions, standards for ordering (BISAC and SISAC), collection overlap studies, electronic delivery of information, CD-ROM technology, and budget allocation. This rapidly changing field changes as publications go to press, as happens here in the discussion of CD-ROM publications: *CD-ROM Review* was included and has since ceased publication, while *CD-ROM End User* was not cited although it has been published since the spring of 1989.

Despite these inevitable slight flaws, this text is a valuable source for anyone who wants to become familiar with the broad field of acquisitions and collections development. — *Linda Pletzke, Library of Congress.* ■■

***Proceedings of the Conference on Application of Scanning Methodologies in Libraries, November 17–18, 1988.*** Ed. by Donald L. Blamberg, Carol L. Dowling, and Claudia V. Weston. Beltsville, Md.:National Agricultural Library, 1989.

Scanning text and graphics into machine-readable form is an area of increasing interest to librarians. Electronic information presents certain advantages in dealing with problems of access, space and storage, preservation, and resource sharing. The purpose of this conference, as stated in the introduction, was to provide an awareness of library projects utilizing scanning technologies, in the hope of giving guidance to others, and to stimulate new applications of this technology. The proceedings reflect a partial success in meeting these goals.

The importance of scanning as a method for inputting data relates to quality, speed, and cost issues. Is it possible to convert paper-based text and images to electronic form by scanning more accurately, rapidly, and cost-effectively than other methods of data input,

such as keying in, allow? Several of the papers in this volume attempt to address these issues, at least in part. Unfortunately, other papers describe projects that are interesting but provide little insight into scanning as data-conversion technology.

This volume contains ten previously unpublished papers on scanning projects. Each paper begins with an abstract that is fairly descriptive of its contents, and each appears in the order in which it was presented at the conference. As a result of this arrangement, there is no particular flow or cohesiveness to the volume.

A basic familiarity with terminology relating to scanning, computing, and typesetting is very useful in reading this book. Several authors attempt to provide definitions of terms and explanations of processes, while others provide sufficient context to understand their basic points. However, a novice in this area would probably find much of the jargon confusing. Most of the papers assume an understanding of the continuum of data conversion and the relationships among scanning, digitizing, storing, manipulating, retrieving, and displaying data.

The first paper, by Weibel, Handley, and Huff (OCLC), describes their research into the limitations of optical character recognition (OCR) technology. It gets the volume off to a good start with preliminary results of some studies, useful tables and charts, and descriptions of other projects in progress. The paper by Settler (LC) is a short description of a project contracted to one company to convert printed records into machine-readable form. While there is some discussion of history and results, there is disappointingly little about the technology used, the problems encountered, costs, or comparisons with other methods of conversion.

Holmes (National Archives and Records Administration) describes a multiyear project at NARA to evaluate technologies for retrospective conversion of archival documents to electronic form. This paper would have been a good beginning to the proceedings, as the author provides a number of valuable definitions of terms and methodologies, as well as comparisons of accuracy rates of OCR versus keying of data. His reporting on the NARA projects, analysis of problems, and conclusions are well written and contain some useful insights.

Another project under way at the Library of Congress is the Optical Disk Pilot Program, briefly described by Audrey Fisher. While the project as a whole is interesting, the discussion of scanning could have been expanded beyond the procedural details given. The emphasis in this paper is more on the storage of data.

The article by Walker (National Library of Medicine), although requiring a fair amount of background knowledge of computing, is well constructed. He addresses issues of efficiency and computer architectures for document conversion and points out several problems inherent in OCR technology.

The report by Andre, Eaton, and Zidar on the National Agricultural Text Digitizing Project is fairly detailed in its presentation of the preparation stages of the project and the limitations of available technologies. Unfortunately, at the time of the conference, much research was yet to be completed on the project, so results are sketchy.

Keenan and Oddy (Syracuse University) presented a paper on developing an optical disk system. While they include almost too much information on the rationale for their project, scanning is mentioned only briefly. Several issues are raised, but no clear results are given.

A good example of a small-scale project to utilize scanning to provide a cost-effective index to little magazines is given in a paper by Roberts and Berthold (SUNY-Buffalo). This article is a very detailed description of the project, including hardware, costs, and the scanning process. Less description of the collections involved and some discussion of problems, such as error rates in scanning, would have increased the value of this paper in this particular context.

A paper by Krell about an optical disk system at the Food and Drug Administration was too brief to be useful. Scanning is only mentioned in several places: the point of the article seems to be an assessment of the need for such a system.

The article by Miller, describing an experimental "desktop digitization" system assembled at the UCLA Graduate School of Library and Information Science, is probably the best in the volume in terms of balancing project purposes, description, costs, equipment, and

results. This study focuses rather narrowly on digitization and storage but includes some interesting data on work flow and storage media.

As with many published proceedings, this volume is a mixture of some pertinent articles, some interesting ones, and a few that are both. This particular book is further limited in its usefulness by the fact that the conference took place over a year ago, leaving one wondering about the progress that has been made since these projects began.

The value of this book lies in the fact that it covers an area still relatively new to library literature. It is best approached as an introduction to projects utilizing scanning, not as an examination of the technology itself. For an introduction to scanners and descriptions of the technology, one should first go to the computing literature or Mitchell Cahan's article, "Optical Character Readers/Text Scanners: A Market Analysis," which appeared in the June 1989 issue of *ITAL*. For those interested in investigating scanning projects, this volume does provide some data and avenues for further information.—*Kimberly M. Ginther-Webster, Carnegie Mellon University Libraries.* ■■

**Quarterman, John S.** *The Matrix: Computer Networks and Conference Systems Worldwide.* Bedford, Mass.: Digital Press, 1990. 752p. paper, $49.95 (ISBN 1-55558-033-5).

*The Matrix* is a comprehensive reference on today's corporate and academic regional, national, and international networks and conferencing systems. The heavy tome is a successor to the author's milestone article "Notable Computer Networks" published in the *Communications of the Association for Computing Machinery* in October 1986. The book's title reflects the author's characterization of the emerging worldwide metanetwork of connected computer networks and conferencing systems. The book contains detailed descriptions of many of these systems and their interconnections, overviews of the technology and standards that underlie them, and sketches of user communities they support.

The first half of the book contains background material that introduces some important topics for readers unfamiliar with them. Extensive references are provided for those who want more information. Chapters 1 and 2 introduce basic terminology and services so that chapter 3 can discuss networked communities and the effects of this technology and its applications on them and on the larger world. The basic underlying networking protocols are outlined in chapter 4. Management protocols and issues such as naming, addressing, routing, and interconnecting networks are treated in chapter 5. Chapter 6 considers building actual networks from the technology, including network names, numerical size and speeds, geographical extent, administration, and funding. Chapter 7 sketches the twenty-year history of the matrix, the intrinsic limitations that affect it, its user communities, and constructed and de facto standards for protocols; some speculations on the future are also included. Interoperabilty requires standards and committees to produce them; these are discussed in chapter 8.

The second half of the book—chapters 9 through 21—describes the matrix itself, giving details of specific current networks and conferencing systems and interconnections among them.

There is an extensive index of terms, organizations, and acronyms; programs, protocols, and standards; networks, conferencing systems, gateways, and countries; and personal names. Many companies and programs are mentioned and indexed.

Treatment of North America is exhaustive, but that for the rest of the world is uneven. While the larger countries of Europe are discussed, smaller countries such as Portugal are completely ignored. Much of the information is dated, with some sections obviously written in 1987 or 1988.

The organization of the book—a series of brief, numbered sections and paragraphs—precludes use as a text. Instead, it is a highly specialized reference book. An online database is under development to provide greater currency and better access. The author can be contacted at P.O. Box 14621, Austin, TX 78761.—*Richard W. Boss, Information Systems Consultants, Inc.* ■■

**Saffady, William.** *Optical Storage Technology 1989: A State of the Art Review.* Westport, Conn.:Meckler, 1989. $39.50 (ISBN 0-88736-396-2).

*Optical Storage Technology 1989* is the fifth and most recent of Saffady's annual surveys of "optical storage technology, concepts,

product developments, and applications." It is intended for a general data processing audience that includes librarians and information specialists.

The book is organized by major categories of optical storage media. Part one, the longest chapter, covers read-only optical disks. Saffady devotes the most space to CD-ROM, the most widely available medium, but also discusses video disks, compact disk-interactive (CD-I), and other related technologies. Read/write optical disks, including write-once (WORM) disks and erasable optical media, are surveyed in part two. A short third chapter, new since the 1988 edition, is devoted to optical cards and optical tape, two emerging technologies that were briefly discussed in the introduction to the 1988 edition.

For each medium, Saffady explains how the technology works, describes the equipment and lists manufacturers, summarizes market projections, describes types of applications, and gives examples of specific applications. He provides many literature citations for further reading on each topic. The technology and hardware discussions, while technical, are still understandable to a nontechnician. There may be more emphasis on technology and less on applications and software than a librarian making product purchasing decisions might want. In a few sections, overall trends are lost in a barrage of seemingly unimportant facts and literature citations. For example, Saffady devotes one and one-half pages to citing conflicting but generally over-optimistic published estimates of CD-ROM drive sales for each year since 1985. A summary, perhaps in tabular form, would have made the point more effectively.

Saffady provides a thorough analysis of the comparative costs for searching reference databases on CD-ROM and online, and a method for determining the break-even point where a CD-ROM subscription to a database becomes cost-effective. He emphasizes noncost factors that limit CD-ROM's usefulness and deemphasizes CD-ROM's potential for increasing search services and opening searching to end users. A similar analysis of costs for CD-ROM versus online cataloging and acquisitions systems would have been a useful addition. In a cost comparison for library catalogs, CD-ROM is shown to be much more expensive than computer-output microform (COM). It would have been fairer to include online catalogs as well, since the functionality of CD catalogs is closer to online than to COM.

The bibliography, while impressively extensive—at fifty-five pages, it occupies almost one quarter of the volume—is fraught with inaccuracies. A spot check revealed no fewer than twenty publications that are cited in the text but are either absent from or cited differently in the bibliography. In one case, two articles published separately but in the same journal issue are combined in the bibliography with the two separate authors cited as joint authors. Since the bibliography also includes older publications that are not cited in the text, annotations or subject classification would have made it much more useful. A vendor list, which includes names and addresses only, could be greatly enhanced by adding telephone and telefacsimile numbers and product listings.

The organization of this edition is the same as for the 1988 edition. All sections have been expanded and updated, with the most recent information available in early 1989, including citations to 1988 publications. In addition to the new third chapter on optical cards and tape, new sections have been added on multimedia CD-ROM, medical picture archiving systems, and customized implementations of optical filing systems. In a field that is developing as rapidly as optical storage technology, some information becomes out of date even before it can be published. But as Saffady says in his introduction, "the overall conceptual presentation should retain its utility" even though some of the specific details may be out of date.—*Fae K. Hamilton, Information Technology Consulting, Carlisle, Massachusetts.* ■■

**Stubley, Peter.** *Desktop Publishing for Librarians on the Apple Macintosh.* Brookfield, Vt.: Gower, 1989. 203p. spiralbound, $49.95. (ISBN 0-566-03622-3).

Stubley's book on desktop publishing has many useful features, although its targeted audience is the beginning to intermediate-level user. Concepts that experienced users would take for granted are explained in detail, so the neophyte is thus able to cope with discussion of scanners and laser printers without having to consult other texts. Advanced users will find some of this explanation annoy-

ing, but only slightly so.

This basic approach is what makes the book so valuable. Combined with sample menu screens and examples of completed productions, the book covers a large part of the Macintosh desktop publishing waterfront.

Specific desktop packages considered are Pagemaker; Ready, Set, Go!; and XPress. Each package is compared with the others and special characteristics of each (such as chaining text, exporting files, and scaling) are detailed. Frankly, one will not learn how to use any of these programs, but the author's intention is to explain and compare features and functions, making a purchase decision possible from this starting point. References to additional sources are given throughout the book.

In addition to desktop packages, word processing programs that can be used with a desktop package or as a stand-alone product to do desktop work are explored in the same manner. Included are MacAuthor and FullWrite.

Further chapters cover specific library applications, provide examples (including illustrations), and give the reader a fairly complete overview of hardware, software, and how it all fits into the library setting.

More examples of finished products or desktop products in various stages of completion would have been helpful, although not essential. Overall, this is an excellent book for any librarian wanting a good introduction to desktop publishing and to products available for the Apple Macintosh. A very useful glossary, software directory, and index conclude the work.—*Patrick R. Dewey, Maywood Public Library, Maywood, Illinois.* ■■

***Teaching the Online Catalog User.*** The Library Orientation Series, no.16. Ed. by Carolyn Kirkendall. Ann Arbor, Mich.: Pierian, 1989. 256p. paper, $30 (ISBN 0-87650-250-8).

This collection of papers and work session notes from the second biennial LOEX library instruction workshop in May 1985 is a good snapshot of the state of the art. The problem is that the picture is two to four years old for most of the material. Automated systems change and grow rapidly, and we as users, as well as those who use our libraries, are more computer literate than we were then.

From a public library's standpoint, *Teaching the Online Catalog User* would be useful in designing training for library staff but not as a resource for training the public. All of the papers and all but one of the samples of instructional materials are drawn from academic libraries. A public library's users are more diverse, with a much wider range of reading skills and computer literacy than the average college freshman today.

The most useful paper is the first, "Educating the Online Catalog User," by Betsy Baker of Northwestern University Library. She presents an outline of an hour-long training session, followed by a statement of training objectives that are valuable in planning one's approach.

Noelle Van Pulis of Ohio State University Libraries has included the complete script for a one-hour "LCS (Library Control System) lecture that gives a good feel for how much material can be covered in an hour with participants who are familiar with the library. Another useful script is the one developed at the University of Central Florida for a twenty-minute self-instruction audiotape.

The 100-page section of sample online catalog guides has many examples, some sparse and simple, some complete and complex, that provide different ways of presenting material. A review of these samples before designing or revising your own materials would be profitable.

On the whole, this is a useful book with considerable information to offer staff in the process of designing online catalog training. There are outlines, scripts, and samples to be absorbed and adapted. This is not, however, a book that will design your training for you. Your specific online system, your staff's abilities, and your users' needs will be paramount in your mind as you mine *Teaching The Online Catalog User* for the useful and the practical in your situation.—*Karen Caruso, Prince George's County Memorial Library System.* ■■

***Technology for the 90s: Microcomputers in Libraries (Research Contributions from the 1989 Computers in Libraries Conference).*** Supplement to Computers in Libraries, no.15. Ed. by Nancy Melin Nelson. Westport, Conn.: Meckler, 1990. 107p. $35 (ISBN 0-88736-847-X).

This volume contains essays by eight information professionals offering their insights

and advice on the eve of the final decade of the twentieth century. The authors were speakers at the opening general session of the Computers in Libraries Conference held in Oakland, California, in 1989. These papers present somewhat expanded versions of their original remarks. Although each essay addresses a different topic and every author brings a different perspective to the subject of library automation, there is a common theme. It is, as editor Nelson writes in her introduction, "the central importance of the library workstation." While space limitations preclude an examination or every essay, we can provide some examples.

William Gray Potter states the "online catalogs of today are . . . evolving into the online libraries of tomorrow." He describes a workstation that rivals and surpasses even the memex machine envisioned by Vannevar Bush with its ability to link patrons to a world of information.

Howard Curtis describes the growth of the microcomputer from "a hobbyist's gadget" to a central player in the information technology arena. He also makes some predictions about the future of workstations in the development of information systems.

Eric Flower contributes a somewhat more technical discussion of the 80386-based workstation. He takes the position that,although it represents the high end of the (then) available technology, libraries should begin planning for when it becomes the basic requirement for library computing,

Ralph Alberico presents an overview of the nebulous science of artificial intelligence and the branch with the most potential for library applications—expert systems. He says we can look forward to stand-alone expert systems and systems that act as front ends to online catalogs and databases of various kinds. He points out that knowledge representation uses techniques similar to those of cataloging and indexing to describe knowledge.

The arguments of these and other contributors (Milo Nelson on the future of the information specialist, Barbara Quint on online information, and Norman Desmarais on optical information systems) are neatly linked in the concluding essay by Jane Beaumont. She presents a view of "the world from your workstation" and maintains that librarians must "be able to handle the . . . general management of our systems and talk intelligently to vendors on these issues."

As with any collection of essays, these papers vary somewhat in the depth of their contributions. But that is not a negative statement. Some are simply adequate representations of where we are presently and what we might expect; others offer genuine insights into that toward which we should strive and the means by which we might get there.

Taken as a whole, this volume provides much useful information for those who must focus their attention on the immediate future of library computing. Keeping up with the technology is difficult enough; anticipating future developments is even more so. This book will help get you started.—*Dan Marmion, Oklahoma State University.* ■■

## Other Recent Receipts

*Listed here are books and other publications received for review that are of potential interest to LITA members. Some of these materials may be reviewed in later issues of* ITAL.

Adams, Roy. *Communication and Delivery Systems for Librarians.* Brookfield, Vt.: Gower, 1990. 269p. $63.95 (ISBN 0-566-05750-6).

Alberico, Ralph, and Mary Micco. *Expert Systems for Reference and Information Retrieval.* Supplement to Computers in Libraries, no.10. Westport, Conn.: Meckler, 1990. 395p. $47.50 (ISBN 0-88736-232-X).

Bawden, David. *User-Oriented Evaluation of Information Systems and Services.* Brookfield, Vt.: Gower, 1990. 224p. $54.95 (ISBN 0-566-05209-1).

*CD-ROM in the Library: Today and Tomorrow.* Ed. by Mary Kay Duggan. Boston: Hall, 1990. 126p. paper, $22.50 (ISBN 0-8161-1934-1).

*Computers in Libraries '90: Proceedings of Fifth Annual Computers in Libraries Conference, March 5–7, 1990.* Ed. by Nancy Melin Nelson. Westport, Conn: Meckler, 1990. 237p. paper, $40 (ISBN 0-88736-595-7).

Crawford, Walt. *MARC for Library Use: Understanding Integrated USMARC, 2d ed.* Boston, Mass: Hall, 1989. 376p. $38.50 (ISBN 0-8161-1887-6).

*Databases in the Humanities and Social Sciences* 4. Proceedings of the International Conference on Databases in the Humanities and Social Sciences, July 1987. Ed. by Lawrence J. McCrank. Medford, N.J.: Learned Information, 1989. 718p. paper, $50 (ISBN 0-938734-37-7).

Dewey, Patrick R. *National Directory of Bulletin*

*Board Systems.* Westport, Conn.: Meckler, 1990. 114p. paper, $39.95 (ISSN 08736-554-X).

*Directory of Expert Systems Tools.* Ed. by Anne Morris and Anne Reed. Medford, N.J.: Learned Information, 1989. 150p. paper, $76.50 (ISBN 0-904933-60-6).

*Effective Access to Information: Today's Challenge, Tommorrow's Opportunity.* Ed. by Alphonse F. Trezza. Boston: Hall, 1989. 153p. paper, $22.50 (ISBN 0-8161-1910-4).

Fenichel, Carol H., and Thomas H. Hogan. *Online Searching: A Primer.* 3d ed. Medford, N.J.: Learned Information, Inc., 1990. $16.95. (ISBN 0-938734-30-X).

*The Impact of Rising Costs of Serials and Monographs on Library Services and Programs.* Ed. by Sul H. Lee. New York: Haworth, 1989. 125p. $19.95. (ISBN 0-86656-885-9).

*Indexing: The State of Our Knowledge and the State of Our Ignorance.* Ed. by Bella Hass Weinberg. Medford, N.J.: Learned Information, 1989. 134p. paper, $30 (ISBN 0-938734-32-6).

*Integrated Library Use Skills into the General Education Curriculum* (also published as *The Reference Librarian, no.24*). Ed. by Maureen Pastine and Bill Katz. New York: Haworth, 1989. 334p. $44.95 (ISBN 0-86656-841- 7).

*Medline on CD-ROM.* Ed. by Rose Marie Woodsmall, Becky Lyon-Hartmann, and Elliot Siegel. Medford, N.J.: Learned Information, 1989. 506p. paper, $49.95 (ISBN 0-938734-36-9).

*Microcomputer Power: Option or Necessity?* Ed. by Wendy Culotta. Medford, N.J.: Learned Information, 1989. 96p. paper, $18.50 (ISBN 0-938734-31-8).

Miller, Rosalind E., and Jane C. Terwillegar. *Commonsense Cataloging: A Cataloger's Manual.* 4th ed. New York: Wilson, 1989. 180p. $38 U.S. & Canada, $43 elsewhere (ISBN 0-8242-0776-9).

*Modern Copyright Fundamentals.* Rev. ed. Ed. by Ben Weil and Barbara Friedman Polansky. Medford, N.J.: Learned Information, 1989. 452p. $39.50. (ISBN 0-938734-33-4).

*MS-DOS Software for Library and Information Applications.* Ed. by Paul F. Burton. Brookfield, Vt.: Gower, 1990. 140p. (ISBN 0-566-03617-7).

Ockenfelds, Ralf. *Tips & Tricks for your PC Printer.* Grand Rapids, Mich.: Abacus, 1990. 395p. paper, $34.95 (ISBN 1-55755-075-1).

*Optical Info '89.* Proceedings of the International Meeting for Optical Publishing and Storage, April 18–20, 1989. Medford, N.J.: Learned Information, 1989. 146p. paper, $80 (ISBN 0-904933-70-9).

Palmer, Marlene A. *Expert Systems and Related Topics: Selected Bibliography and Guide to Information Sources.* Idea Group Publishing (4751 Lindle Rd., Ste. 109, Harrisburg, PA 17111), 1990. 156p. $29.95 (ISBN 1- 878289-03-9).

Palmer, Richard Phillips, and Harvey Varnet. *How to Manage Information: A Systems Approach.* Phoenix, Ariz.: Oryx, 1990. 152p. paper, $29.50 (ISBN 0-89774-603-1).

*Proceedings of the Fifth International Expert Systems Conference, June 6–8, 1989.* Medford, N.J.: Learned Information, 1989. 244p. paper, $68 (ISBN 0-904933-71-7).

*Proceedings of the Fifty-second Annual Meeting of the American Society for Information Science, October 30–November 2, 1989.* Ed. by Jeffrey Katzer and Gregory B. Newby. Medford, N.J.: Learned Information, 1989. 268p. paper, $32 ASIS member, $40 nonmember (ISBN 0-938734-40-7).

*Proceedings of the Seventeenth North American Conference of the International Business Schools Computer Users Group, July 23–26, 1989.* Ed. by Ali Emdad. Medford, N.J.: Learned Information, 1989. 376p. paper, $37.50 (ISBN 0- 938734-38-5).

*Proceedings of the Tenth National Online Meeting, May 9–11, 1989.* Ed. by Martha E. Williams. Medford, N.J.: Learned Information, 1989. 506p. paper, $50 (ISBN 0-938734-32-2).

*Proceedings of the Thirteenth Annual International Online Meeting, December 12–14, 1989.* Medford, N.J.: Learned Information, 1989. 610p. paper, $90 (ISBN 0-904933-72-5).

*Proceedings of the Thirtieth Annual Conference of the American Translators Association, October 11–15, 1989.* Ed. by Deanna Lindberg Hammond. Medford, N.J.: Learned Information, 1989. 582p. paper, $50 (ISBN 0- 938734-39-3).

*Public Access CD-ROMs in Libraries: Case Studies.* Supplement to Computers in Libraries, no.17. Ed. by Linda Stewart, Katherine S. Chiang, and Bill Coons. Westport, Conn.: Meckler, 1990. 311p. $39.50 (ISBN 0-88736-516-7).

Schuyler, Michael, and Jake Hoffman. *PC Management: A How-To-Do-It Manual for Selecting, Organizing, and Managing Personal Computers in Libraries.* How-To-Do-It Manuals for Libraries, no.6. New York: Neal-Schuman, 1990. 213p. paper, $35 (ISBN 1-55570-076-4).

*UKOLUG Quick Guide to Online Commands.* 2d ed. Comp. by Adrian Arthur for the UK Online User Group. Medford, N.J.: Learned Information, 1989. 68p. paper, $29.50 (ISBN 1-870254-01-5).

White, Herbert S. *Librarians and the Awakening from Innocence: A Collection of Papers.* Boston: Hall, 1989. 382p. $38.50 (ISBN 0-8161-1892-2).

# Letters

To the Editor:

In my article "Contingency Planning Resources" (*ITAL* June 1990, p.179), there is a typographical error that undercuts the impact of one of the statements. The potential business losses due to the cited fire would have been $9 *hundred* million and not merely $9 million as printed.—*R. Bruce Miller.* ■■