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Information Technology and Libraries

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Government Publications in an Online Catalog: A Feasibility Study

Roseann Bowerman and Susan A. Cady

The emergence of online public access catalogs and the availability of machine-readable cataloging for U.S. government documents creates new options for including documents cataloging in a library's local bibliographic database. The results of a survey of libraries and related organizations that use GPO MARC records are presented. These results describe the beginning of the inclusion of documents records in online catalogs and some of the implementation problems that institutions are discovering in the process. The changes in GPO practices that could facilitate such endeavors are enumerated. Finally, four methods of obtaining GPO MARC records are compared and contrasted on the basis of initial costs, recurring costs, and quality.

INTRODUCTION

Traditionally, sizable government documents collections in libraries have been less likely to be cataloged than have other library materials. The most recent issue of the *Depository Library Biennial Statistical Summary*[1] indicates that only 70 depository libraries, or 6 percent, catalog all government documents; 666 depository libraries, or 56 percent, catalog less than one-tenth of their government documents. The primary reason for this omission has undoubtedly been an economic one. The resources required to catalog items and to maintain card catalogs in even a moderate-sized institution are so extensive that libraries have frequently chosen not to catalog documents in order to contain these costs. In fact, libraries have treated government documents like the journal literature—by providing access through separate indexes, which then require the user to verify in some way whether or not a particular item is held by a particular library. The effect of this decision has often been to make government documents less accessible than other materials, especially for users who rely on the main catalog as their primary method of locating items.

Peter Graham has recently examined the conflict between principle and practicality in the context of research library cataloging of government publications.[2] He concludes that the highest priority should be given to cataloging publications that are not well-indexed and that are of the greatest usefulness to the particular library's clientele. Graham also stresses that whenever cataloging data is cheaply and easily available, it should be obtained and integrated into the public catalog.

The time has come to reevaluate documents cataloging decisions carefully in light of rapidly changing technology and the availability of machine-readable cataloging for a large portion of the most heavily used government documents. In particular, the authors sought to explore the feasibility of including bibliographic records for U.S. federal government documents in a local library's online public ac-

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cess catalog. The premise was that if this could be done at a small fraction of the costs incurred in a traditional cataloging environment, libraries operating or planning public access catalogs might wish to include government documents in their bibliographic database. The decision of each such library would of course be influenced by its mission, the size of its collection, and the sophistication of its software, among other things.

The most significant contribution toward increasing the availability of machine-readable cataloging for federal documents took place in 1976, when the Government Printing Office (GPO) began cataloging federal documents on OCLC. In addition to making MARC cataloging immediately available to users of OCLC, the GPO offers subscriptions to monthly tapes containing these same records through the Library of Congress Cataloging Distribution Service (LCCDS). These tapes are also used by GPO to produce the *Monthly Catalog of United States Government Publications*. Any cost-effective method of obtaining cataloging eventually necessitates access to these bibliographic records. We refer to these tapes throughout as GPO MARC tapes since other GPO tapes, notably the Union List of Item Selections, do exist.

METHODOLOGY

The authors' investigation consisted of four elements. First, a literature search on the subject was conducted. Secondly, a study of applications of the GPO MARC tapes was made through a survey and telephone interviews. Next, records from a GPO MARC test tape were sampled, studied, and compared against Lehigh University's depository selections in order to create a library profile and to identify potential problems. Finally, a cost model and an effectiveness model were developed against which to measure alternatives for obtaining bibliographic records identified through the first two tasks.

The objective of the literature search was to identify sources that discussed the utilization of machine-readable bibliographic records for government publications in an online public access catalog. The authors also sought material clarifying the composition and use of the GPO MARC tapes. In fact, very little has been published on these subjects. Although the literature deals with the philosophy of cataloging government documents and with the use of GPO MARC records in the bibliographic utilities, no publications that describe the inclusion of records from GPO MARC tapes in an online public access catalog were identified. For this reason much information had to be obtained through personal communication. Nevertheless, "The Effects of Technology on Access to Federal Government Information" by Myers[3] provides important insights into a number of the potential problems in the GPO MARC tapes that would affect their use in an online catalog. Myers has identified four areas where GPO needs to improve its practices in order to allow libraries to add records to an online catalog without a costly editing process. There is a need for a cooperative LC/GPO agreement on subject cataloging, for documentation of GPO's changes in the tapes, and for error-correction tapes. Finally, Myers makes the point that GPO descriptive cataloging for printed copies is not appropriate for depositories, in light of the fact that these depositories are in many cases being sent microform, not printed publications.

Another recent publication, *Public Access to Government Information: Issues, Trends, and Strategies* by Hernon and McClure[4] describes the GPO MARC tapes and their use in bibliographic networks; however, it does not address in detail their implementation in an online public access catalog. Some additional information can be found on GPO MARC tapes and GPO cataloging in the transcripts of the semiannual meetings of the Depository Library Council.

GPO MARC TAPES

Since GPO began cataloging documents on OCLC in 1976, it has received an archive tape of its cataloging, as does any other OCLC member electing this service. The tape is then used to produce the *Monthly Catalog* and to distribute bibliographic records to subscribers through the

LCCDS. The tape is reformatted somewhat to match the other MARC tape products distributed in this way. There are three options for ordering GPO MARC tapes.[5] A test tape may be purchased for $100 (1984 price). This tape consists of a monthly tape chosen at random; it is not a specially composed tape for experimental purposes. (The test tape that was read at the authors' institution consisted of the entries for the July 1982 *Monthly Catalog,* with a total of 2,161 records.) The second, and most common option is to subscribe to the GPO MARC tapes on an annual basis. Tapes are distributed monthly and are not included in the complete MARC service package. The April 1984–March 1985 subscription is priced at $1,526. The 1982–1983 subscription resulted in subscribers receiving 34,820 records, according to the CDS. Finally, one may obtain retrospective GPO MARC tapes for a time period specified by the buyer and priced accordingly. From the initiation of the tape service, in 1976, to March 1982, approximately 120,000 records were issued.

SURVEY RESULTS

Identifying applications of the GPO MARC tapes was done initially by surveying organizations that provide bibliographic services to libraries. No attempt was made to survey any organization outside of North America. Respondents were asked to:

1. Describe their use(s) of the GPO MARC tapes,
2. Indicate if any of the survey information was confidential, and
3. Suggest other organizations to survey.

Of the twenty-eight organizations surveyed, twenty-five responded. Of the respondents, sixteen were currently using GPO MARC tapes or had immediate plans to do so. The organizations fell into four categories: bibliographic utilities and networks, commercial library vendors, database vendors, and individual libraries. Overlap exists between uses by commercial library vendors and by individual libraries, as the vendors are sometimes manipulating the tapes for applications by the individual libraries. Although there is no legal prohibition against reusing or manipulating the GPO MARC tape records, the CDS does caution MARC subscribers against wholesale redistribution of the MARC tape, since this practice could jeopardize future MARC distribution services.[6]

All three major bibliographic utilities make GPO MARC cataloging available to their members. In order to do this, RLIN and WLN load the tapes they purchase from GPO into their systems, while at OCLC the records are present as soon as they are input by GPO. Libraries may then use the records in the same ways that they use other bibliographic records in the database and at the same fees incurred for such other uses. Such uses include but are not limited to:

1. Current cataloging (cards and/or tape);
2. Retrospective conversion;
3. Interlibrary loan;
4. Reference and bibliographic verification.

WLN is considering the automatic addition of depository library holdings symbols to its database for GPO MARC records. A similar project has been discussed in the OCLC community and is referred to by Graham.[7]

The two networks that cite experience with the GPO MARC tapes are AMIGOS and PRLC (Pittsburgh Regional Library Center). The PRLC application is actually part of a contract to produce a COM catalog for the State Library of Pennsylvania and is more properly discussed under the section on individual libraries. However, AMIGOS reports that it plans to load the GPO MARC records into the AMIGOS SHARES system, a database for retrospective conversion composed of 3.5 million records from network archival tapes generated from OCLC cataloging. AMIGOS has also processed GPO tapes through its AACR2 conversion service and has built item records for various circulation systems.

The authors were able to identify six commercial vendors processing GPO MARC tapes. These are:

1. Autographics—Monterey Park, Calif.;

2. Blackwell/North America—Beaverton, Oreg.;
3. Brodart—Williamsport, Pa.;
4. Library Systems and Services Inc.—Rockville, Md.;
5. Marcive—San Antonio, Tex.;
6. UTLAS—Toronto, Canada.

The applications of the tapes vary with the company product line; however, in most cases the records are added to in-house databases that are used for card products, retrospective conversion, COM catalogs, and similar purposes. Two vendors, Autographics and Marcive, offer services specifically tailored to the government documents market. We shall describe these before returning to a discussion of the more general applications.

Beginning in July 1983, Autographics offered a GPO COM catalog in rollfiche. It includes all the records issued since the 1976 inception of GPO MARC cataloging and is updated monthly. The catalog is organized into three sections: author/title, subject, and report number. The author/title and subject sections contain notes and references from the LC Name and Subject Authority files. Series entries also appear in the author/title section. The report number section indexes technical report numbers whenever they exist. Subscribers to the $2,100-per-year service are loaned a motorized MICROMAX 800 reader in which to mount the rollfiche.

Marcive offers a service in which clients can automatically obtain GPO MARC records on tape and/or catalog card sets. This service is targeted to full and selective depository libraries in that records are extracted by GPO item number. (Customers can also obtain GPO MARC cataloging by submitting individual GPO stock numbers or *Monthly Catalog* entry numbers.) A library supplies Marcive with those item numbers for which it wishes to obtain records. Marcive matches the item numbers against the monthly GPO MARC tapes as soon as they are received and produces a card set and/or tape record for the library. Retrospective conversion using the tapes is also available. Marcive currently performs this service for three libraries.

Aside from these two examples, most of the commercial vendors offer retrospective conversion type services rather than ongoing access to new bibliographic records. Often they are handling the GPO MARC records in the process of producing a COM catalog for a client. However, one of the newest offerings is an exception to this general pattern. Library Systems and Services Inc.'s (LSSI) MICRO MARC enables clients with IBM PCs to input search key data on their microcomputers using an LSSI software package. The data is then polled by LSSI at night and run against a database of MARC records, including the GPO records. The final product may be cards and/or tapes. Original inputting is also possible. Communication costs are very low because no dedicated lines are needed, only short calls by LSSI at off-peak hours. MICRO MARC will search the database using the Superintendent of Documents (SuDoc) classification number as the search key. The service is very new and has not yet been evaluated as a source of bibliographic records for government documents.

The use of the GPO MARC tapes by online database vendors is quite straightforward. BRS and DIALOG load the tapes into the host computer to be accessed by their respective software packages. The sophisticated searching tools made possible by that software are similar to what is becoming available in fully developed local public access online catalogs. The use of Boolean operators and keyword searching significantly increases subject access as well as other types of access.

Finally, there are a few individual libraries utilizing the GPO MARC tapes directly. We will discuss applications being made by the following libraries:

1. State Library of Pennsylvania
2. Denver Public Library
3. Rick's College Library
4. University of Denver Penrose Library
5. Suffolk County (N.Y.) Library Cooperative
6. University of Utah Library

Both the State Library of Pennsylvania and the Denver Public Library are engaged in producing COM catalogs that include bibliographic records for government documents derived directly from the GPO MARC tapes. In both cases the libraries are regional depositories, so records are se-

lected from the tapes based on whether they are depository items or not. This information is supposed to be evident by the inclusion of the 074 tag in the record, with a GPO item number following it. For the State Library of Pennsylvania catalog, these records are then merged with the rest of the library's records from OCLC archive tapes to produce a comprehensive catalog. The first issue of the Pennsylvania catalog, which is being produced by Brodart, has not yet been completed.

For the Denver Public Library catalog, Autographics merges the GPO MARC depository records with DPL's OCLC cataloging of state (Colorado), regional, and local publications to produce a unified government publications COM catalog. Author, title, and subject access are provided for this catalog, which has now grown to 270 fiche according to DPL government publications librarian Donna Koepp. The catalog is currently updated twice a year and is distributed to DPL departments and branches and also offered for sale. The Denver Public Library also has a separate COM catalog for the rest of its collection and participates in the Colorado Alliance of Research Libraries (CARL) online catalog project. Koepp reports general satisfaction with the COM catalog but is hopeful that a greater degree of integration of documents and other library bibliographic records will be possible in the coming online environment.

Another regional depository library, the University of Utah, has actually begun loading GPO MARC records directly into its GEAC online catalog system,[8] which became operational in January 1984, and which contains about the same number of GPO MARC records as it does other records. The GPO MARC tapes were processed for the library by Marcive in order to limit records to depository items. According to circulation librarian Robert Murdoch, the library expects to continue loading GPO MARC records in order to observe the increased use of government publications resulting from this section. No major problems have been reported.

The Rick's College Library in Rexburg, Idaho, is currently in the process of loading monthly GPO MARC tapes in their entirety into its locally developed online catalog, even though the library is only a selective depository. The purpose of this project is to enable patrons to access the entire database with the understanding that users will still have to determine by a different mechanism whether the particular document can be obtained in-house or must be requested via interlibrary loan.

Both the Suffolk County (N.Y.) Library Cooperative and the Penrose Library at the University of Denver are creating databases limited to records for those government documents that are held by their respective selective depository libraries. At Suffolk County the records are extracted from the tapes using item numbers submitted by the member libraries, which are selective depositories. The tape manipulation is actually done under contract with the New York Public Library and results in a quarterly union COM catalog of government documents, which is distributed to all member libraries. Documents librarian Carolyn Woods reports that sometimes records exist in the COM catalog for which no documents are ever received and that documents are received for which no records are obtained from the tapes.

At the University of Denver the appropriate bibliographic records are selected from monthly GPO MARC tapes based on a profile of SuDoc classification numbers. Technical services head Ted Koppel has written a program that constructs this profile from the item records on the GPO Union List of Item Selections (ULIS) tape, which is available from GPO for approximately $75. The records on this tape consist of GPO item numbers with their associated SuDoc class stems (SuDoc numbers up to the colon) and the list of depository libraries selecting that particular category. Two advantages of this method are that the profile can be automatically created or updated and that the search against the GPO MARC tapes is done with SuDoc stems instead of item numbers. The reason the latter innovation is an advantage is that a significant percentage of item numbers appear to be missing from the GPO MARC tapes. This problem will be covered in more depth later. Like the Denver Public Library, the Penrose Library hopes to pro-

vide access to document records through the online catalog that is being cooperatively implemented by the five member libraries in CARL.

SAMPLING A GPO MARC TEST TAPE

In the next phase of this study, a program was created by the Lehigh University computer center in order to obtain specific information from a GPO MARC test tape. This program was designed to count the total number of records included on the tape and to read information from the fixed fields. This tally indicated that of the 2,161 records on the tape, 277 were serial records, 69 were printed or microform maps, and 106 were microfiche reproductions. There was no cataloging of original microform publications, nor was there any cataloging of microfilm reproductions. Several printouts were also produced. A sample of every twentieth record was printed, as were all 277 serial records. Finally, two sorted lists were produced: one sorted by the SuDoc number (indicated by the 086 tag) listing the corresponding GPO item number; the other sorted by the GPO item number (indicated by the 074 tag) listing the corresponding SuDoc number.

The GPO item numbers that appear in the 074 field of the records are of prime importance to any implementation of the tapes by depository libraries. Item numbers represent categories of documents that can be selected by depository libraries for automatic distribution from the Superintendent of Documents. An item number may designate only one or many publications. SuDoc class stems are associated with various item numbers. Table 1 illustrates the variety of publications that may be or may not be associated with an individual item number. Item number 431-C-14 represents only the *FAA Statistical Handbook of Aviation* (annual), whose SuDoc class stem is TD 4.20:. On the other hand, item number 582-E represents not only the miscellaneous category of publications considered HUD Handbooks, Manuals, and Guides, which will be assigned SuDoc number HH 1.6/3: (followed by Cutter number), but also three other series of publications, each with their own SuDoc number stems—*HUD Handbooks*, HH 1.6/6: (numbered); *HUD Guide*, HH 1.6/7: (numbered), and finally the *Planning for Housing Security* series, HH 1.6/11:. As of January 1984, there were 5,989 active item categories available for selection by depository libraries. When studying the sorted lists from the test tape, the authors discovered that of the 2,161 records, 329, or 15 percent, had no item number listed in field 074. This would lead one to assume that these 329 documents were materials not included in the depository distribution system and that a depository library would not automatically receive these documents. However, an earlier study by Steven D. Zink at the University of Nevada Library in Reno identified a discrepancy involving item numbers. Zink, using the 1981 *Monthly Catalog* observed that:

> After careful checking and rechecking, it was discovered that of the 234 non-depository titles listed in the January through July 1981 *Monthly Catalog*, 94 (or 40 percent) of all the non-depository titles had in fact already been received through the depository library program.[9]

The *Monthly Catalog* indicates that a publication is a depository item by including the item number and a black dot in the entry. Zink found some of these designations to be missing when they should not have been. Therefore, records on the test tape that lacked the item number were examined closely. By comparing the SuDoc class numbers of those records with the *List of Classes of United States Government*

Table 1. SuDoc Stems within Item Numbers.

Item No.	Publications	SuDoc Stem
431-C-14	*FAA Statistical Handbook of Aviation* (annual)	TD 4.20:
582-E	HUD Handbooks, Manuals, Guides	HH 1.6/3:
	HUD Handbooks (numbered)	HH 1.6/6:
	HUD Guide (numbered)	HH 1.6/7:
	Planning for Housing Security	HH 1.6/11:

Publications Available for Selection By Depository Libraries,[10] the authors found that 153 of these documents, or 46 percent, were actually in SuDoc classes that belonged to an item number category. One would logically assume that they too should have had item numbers included in their records.

Sally McLean, classification specialist at the Library Programs Service of the GPO, gave the following explanations for why item numbers may be missing from some tape records: since federal agencies often do not provide GPO with enough copies of particular documents, GPO will catalog these documents without item numbers on the assumption that they will not be distributed to depository libraries. However, some of these materials do eventually make their way into the distribution system. On other occasions, GPO does priority cataloging, for Library of Congress, of documents that again had not yet been received for depository distribution; and once again, item numbers are not included in the records, although these documents may also finally be distributed to depositories. GPO cataloging of "fugitive" materials outside the official distribution system accounts for another portion of missing item numbers. There are, of course, other cases of human error. GPO is attempting to improve the situation by intensifying its efforts to have federal agencies provide enough documents for depository distribution. GPO is also supplying the missing item numbers, after the fact, in the *Monthly Catalog* tables of corrections, which appear in each issue. These corrections are not a completely satisfactory solution for users of the GPO tapes, as will be explained later. For libraries which propose to select records from GPO MARC tapes by item numbers, the lack thereof will result in a failure to obtain catalog records for a number of the documents they have actually received.

Of equal or greater concern is the problem of errors in the SuDoc class number. An examination of the tables of correction in the January and February 1984 *Monthly Catalog* showed a total of thirty-one corrections to previously issued SuDoc numbers. Errors in the SuDoc number would result in records leading to an entirely different document or perhaps to no document at all. Should the error be in the keying of the item number, a library may find itself with records for materials it does not own, or without records for materials it does hold. In either case, the integrity of the database is threatened. At the present time, GPO does not make corrections to the earlier tapes; therefore, the incorrect information being fed into the files of tape users is correctable only by a search-and-change process using the *Monthly Catalog* table of corrections.

The examination of the GPO test tape also prompted the authors to consider the suitability of GPO's serials records for automatic inclusion in an online catalog. Information on this issue was sought from librarians who had attempted to use the tapes. They indicated that GPO's practice of including duplicate records on the tapes each time another issue of a serial was published made heavy editing of the records necessary.[11,12] At a recent Depository Library Council meeting, David Griffin of the Washington State Library indicated that WLN had decided to eliminate the use of the GPO serials records in its database because of this situation:

> The other problem with the serial GPO tapes is that they are (issuing) on each tape, essentially a record for the same serial but with a note indicating the specific issue. In other words, it's duplicates.[13]

Thus, it appears that one of the more serious challenges associated with use of the GPO tapes involves the serial records. In some situations, cataloging of government serials might better be handled on an individual basis rather than by indiscriminately stripping serial records off the tapes with no inspection or editing.

PROFILING A DEPOSITORY COLLECTION

The evaluation of alternatives for obtaining GPO MARC records for a depository library depends in part upon the size and character of the depository collection. The authors therefore compared the data from the test tape with the depository collection at the Lehigh University Libraries in order to develop a model for examining the major options available for obtaining

GPO MARC records. Part of the model required a prediction of the number of "hits" a library would make on a given GPO MARC tape. As a selective depository library, Lehigh University has chosen 3,268 out of the possible 5,989 item numbers available for selection (55 percent). Most of these documents are housed in a separate documents collection, arranged by SuDoc class number. However, in the past some government serials had been cataloged and were integrated into the rest of the library collection by Dewey decimal classification (DDC) number.

When the 2,161 records on the test tape were compared to the item numbers the library selects, it was established that a total of 1,046 records on the test tape represented Lehigh selections. The authors felt that among these records there were certain categories of documents that should be eliminated from inclusion in an online catalog because they are either ephemeral or simply too voluminous. An example of the latter is the House and Senate Reports and Documents (the Congressional Serial set in fiche and pamphlet formats). By omitting from the profile item numbers 1008-C and 1008-D, which amounted to 114 records on the test tape, Lehigh's hits were reduced from 1,046 to 932.

Given the problems with serials mentioned above, and the capability, either in-house or through a vendor, of excluding serial records from any stripping of the GPO MARC tapes, the authors concluded that this library's profile should eliminate all serials and maps. Part of the rationale for this resulted from a comparison of the 277 serial records on the test tape with the library's selection list. The authors found 129 serial hits. Of these, nearly 46 percent (59) were serials the library had cataloged at some time in the past. Nonetheless, as many documents librarians can attest, such a compromise is not an ideal situation, because the elimination of serials results in the deletion of records for some of the most heavily used documents. Thus, an additional 164 records (35 maps and 129 serials) were deducted from the total that the library would have extracted from the test tape. 768 records remained, as illustrated in Table 2. These constitute 35 percent of the total 2,161 on the test tape. For the purpose of examining the major options in obtaining records for the online catalog, it was assumed that 35 percent of the total cataloging records produced by GPO in one year would approximate the number of records Lehigh would derive from the tapes. Obviously a larger sample would be necessary to confirm this assumption. In 1982–1983 the GPO MARC tapes contained 34,820 cataloging records; therefore the authors project that Lehigh would have derived 12,187 records in such a year.

Table 2. Profile of Lehigh Records.

	Records	Percent
Total test tape records	2,161	100
Lehigh item selections	1,046	48
Items eliminated	− 114	− 5
Serials eliminated	− 129	− 6
Maps eliminated	− 35	− 2
Modified Lehigh extract	768	35

DEVELOPING A COST-EFFECTIVENESS MODEL

The final stage of this study was the development of a cost-effectiveness model for selecting among alternative methods of obtaining bibliographic records. For a comprehensive approach to this type of analysis, the reader is directed to chapter five of Carter and Bruntjen's *Data Conversion*.[14] Although the analysis suggested there is oriented to retrospective conversion, the cost categories are also quite useful in approaching this project. Carter and Bruntjen identify thirteen major cost elements which are further subdivided into an additional fifteen elements. The authors elected to divide the model into initial costs, recurring costs, and quality/effectiveness considerations. The model was applied to the specific conditions at Lehigh University using the following four alternatives:

1. Local stripping of the GPO MARC tapes
2. Use of a bibliographic utility
3. Item-based selection via vendor
4. SuDoc-based selection via vendor

The first alternative considered was the in-house acquisition and processing of the monthly GPO MARC tapes. The $1,526

tape subscription itself constitutes the major recurring cost. Per-record costs are calculated by dividing the tape subscription by the number of records derived, based on the preliminary profile of Lehigh's selections just described. A charge for computing time would be incurred under this alternative, but it would be small and would not result in a real cost in the library budget. Processing time is available at a minimal rate on a Cyber 730 and a DEC 2070 machine.

The GPO MARC tape alternative requires considerable initial cost in that some original programming must be done by the library. The Lehigh library staff does not include a programmer, and responsibility for library data processing is currently in a transitional stage. Assuming that the necessary programming were done outside the library, initial costs could approach $900, based on thirty hours of work at $30 per hour. In actuality, a university programmer's time is not always available to the library, even if this turned out to be the most cost-effective alternative. Other libraries may have a completely different situation, making this a less problematic and uncertain alternative.

The quality/effectiveness considerations raised by this method of obtaining records pertain to any attempt to automatically strip records from a tape. The possibility of editing individual records is eliminated by automatic stripping, and records without item numbers may be omitted, depending on the algorithm used. In addition, it will be necessary to make certain changes in the records before loading them in some online databases. For instance, GPO moves the OCLC control number into the 035 field and substitutes the *Monthly Catalog* entry number in its place. There is no 049 field in GPO MARC tape records, which can be a problem for some software. The tapes are also in a slightly different format than OCLC archive tapes.

The second alternative is the use of a bibliographic utility for obtaining these records. OCLC was used for this comparison. Recurring costs would include labor, first-time use charges, and tape charges. Labor costs were based on productivity data from an in-house retrospective conversion project. Trained student assistants, paid $3.50 per hour, could search and edit thirty-five to forty-five records per hour. First-time use charges were figured at non-prime rates of $1.27 per record and tape costs at $.06 per record. The purchase of additional tapes would not be necessary.

Initial costs for the bibliographic utility alternative would include equipment and staff time but no software. Staff time for hiring, training, and supervising student assistants was estimated at $10 per hour for twenty hours, although no new labor costs to the library budget are anticipated since these tasks can best be done by existing staff members. Because excess capacity exists on Lehigh OCLC terminals at night and on Saturday, it was not necessary to add equipment costs to this example. Other libraries might have to provide for these costs in the comparison.

The quality/effectiveness considerations here are at the opposite end of the spectrum from the tape alternative. Each record could be reviewed for the existence and accuracy of key elements such as item number. Should the library not arrange its documents by SuDoc class number, the opportunity exists to input local call numbers and locations document by document. Since depository items are often received before the GPO has cataloged them on OCLC, an appropriate lag time must be introduced to prevent wasteful effort in searching for the record too soon. The documents librarian can also exercise great selectivity in deciding whether or not to catalog an individual item, since no publications are automatically included by virtue of their item number or SuDoc stem. However, this would also increase the professional-staff time required.

Selecting records automatically through a vendor is the third alternative considered. For $.15 per record, the Marcive service enables a library to submit selected item numbers to be matched against GPO tapes. It would also allow the deletion of any serial or map records within those item numbers. Although the Marcive literature lists a monthly tape charge of $20, it is possible to avoid this by supplying and reusing one's own tape. The authors' institution would copy each monthly tape for storage at negli-

gible cost. The authors also figured a possible $50 charge per year for making "profile changes"—i.e., adding or deleting item numbers.

Initial costs include a $100 profiling fee by Marcive. There is no equipment cost, and staff time for making item selections is minimal. Quality/effectiveness issues are the same as those mentioned in the section on using GPO MARC tapes. There is no convenient method for inputting local call numbers or locations.

The final alternative is the matching of records with SuDoc numbers, again using the services of a vendor—LSSI in this case. Recurring costs include $.20 per record and some minor telecommunications costs. There is also a minimum charge of $50 per month, which might affect the overall cost per record at low levels. This alternative also requires labor to enter the requisite SuDoc class numbers at an IBM PC. Because no searching is required, the authors estimated that student assistants could key 200–220 records per hour. Since the LSSI package has not been inspected by the authors, this number is subject to adjustment.

The initial requirements for LSSI's MICRO MARC are an IBM PC and the $500 LSSI software. Because the library has an IBM PC with excess capacity, the authors again did not include any equipment costs. There will be staff costs in hiring, training, and supervising student assistants but these will be less than the OCLC training costs due to the simplicity of the system. The authors estimated $10 per hour for ten hours.

The quality/effectiveness tradeoffs are most closely allied to those in the OCLC alternative. Records for individual publications may be included or excluded, since the match is based on SuDoc number. Clients are notified of any non-matches. Individual records cannot be inspected or edited, but local call numbers and locations can be input. Timing could also present a problem due to the lag between distribution through the depository system and issuance of the corresponding GPO MARC records.

The major recurring and initial costs for the four alternatives are compared in Tables 3 and 4 respectively. Table 3 assumes an annual record volume of 12,187 and that the SuDoc class number serves as the local call number in the library.

In the particular situation of the Lehigh University Libraries, the GPO MARC tapes are the least expensive alternative with respect to recurring costs, and the Marcive alternative is the least expensive in terms of initial costs. This does not take into consideration questions of quality. The graph in figure 1 demonstrates the relationships among the four alternatives with respect to recurring costs alone, discounting all labor costs. It was necessary to exclude labor cost in order to illustrate clearly the effect of LSSI pricing: because there is a minimum charge of $50 per month, the cost per record is not linear until one reaches three thousand records per year, assuming an equal distribution of records from month to month.

On the basis of recurring costs alone, excluding labor, the points at which the GPO MARC tape alternative becomes less expensive than the other alternatives are 1,470

Table 3. Recurring Costs for Documents Records.

Option	Volume	Record	Labor	Profile	Total
TAPE	12,187	$0.13			$ 1,526
OCLC	12,187	$1.33	$0.10		$17,178
Marcive	12,187	$0.15		$50.00	$ 1,828
LSSI	12,187	$0.20	$0.02		$ 2,631

Table 4. Initial Costs for Documents Records.

Option	Software	Personnel	Equipment	Tape	Total
TAPE	$900				$900
OCLC		$200			$200
Marcive	$100			$20	$120
LSSI	$500	$100			$600

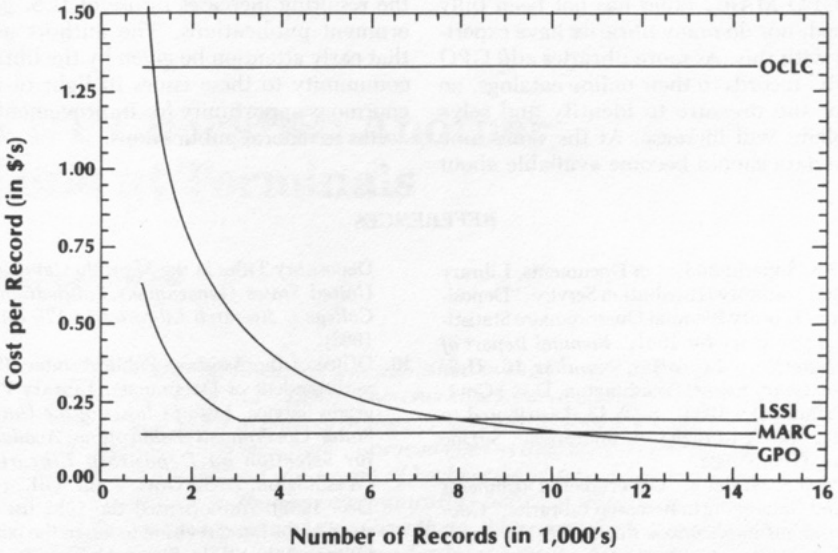

Fig. 1. Cost Analysis of GPO Records.

records for OCLC, 7,630 records for LSSI, and 10,170 records for Marcive.

A final question concerns the cost-benefit ratio for maintaining these records in the online catalog once they are indeed obtained and loaded. Will the increased size of the database be large enough to require significant additional memory and processing capacity? If so, will this increased capacity be of sufficient cost to present a barrier to the inclusion of documents records? In other words, will we return to the situation discussed at the beginning of this paper in which the cataloging or catalog maintenance costs make inclusion of government documents economically prohibitive? It is too early to speculate on these costs or to evaluate the increased benefits in terms of access and use. Inclusion of document records for several years would give this library the opportunity to measure increased use of documents resulting from improving bibliographic access without incurring large costs. MacKay at Trinity University reports a 300 percent increase in documents use, based on the inclusion of records in the CLSI circulation system.[15]

CONCLUSIONS

The authors set out to explore the feasibility of including bibliographic records for government documents in a public access catalog. At least four attractive alternatives exist for obtaining GPO MARC records. Choices among these alternatives involve many factors: the availability of equipment and programming expertise locally, the amount of selectivity a library wishes to exercise in deciding which documents to include, the volume of bibliographic records anticipated, and the importance to an individual library of reviewing and editing records. There may be additional factors, as well, in individual cases.

Considerable potential exists for increasing access to government documents through online catalogs. The availability of GPO MARC cataloging and the various ways it can be obtained reduce the cost of capturing the bibliographic records. The use of the SuDoc class number as the local class number eliminates the need to classify or catalog documents individually. The absence of the card environment allows libraries to contemplate the addition of such records to the main catalog without staggering increases in catalog maintenance costs. Finally, Boolean search capabilities allow access beyond that available in the card catalog or through printed indexes. On the other hand, the magnitude of the implementation difficulties associated with

the GPO MARC tapes has not been fully probed, nor do many libraries have experience with this. As more libraries add GPO MARC records to their online catalogs, no doubt the pressure to identify and solve problems will increase. At the same time more data should become available about the resulting increases in use of U.S. government publications. The authors urge that early attention be given by the library community to these issues in light of the enormous opportunity for improvement in access to federal publications.

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VDT Checklist: Another Look at Terminals

Walt Crawford

A CRT Terminal Checklist *was published in the* Journal of Library Automation *13(1):36–44 (Mar. 1980). This checklist is based on the earlier version and reflects four years of change in the marketplace and added knowledge of human factors. Terminals have improved even as they are being replaced by personal computers, and some form of keyboard and visual display screen is still the most likely method of communication between library staff and patrons and the computer systems that serve them. This checklist was prepared on behalf of TESLA, the Technical Standards for Library Automation Committee of the Library and Information Technology Association (LITA).*

INTRODUCTION

Visual display terminals (VDTs) are nothing new in library automation; for several years, a keyboard and visual display have been the standard communications device for people to direct computers and for computers to respond. As library automation grows and diversifies, keyboard/screen combinations become more common in more library settings, in public areas as well as technical processing areas. If you're selecting new devices or replacing old ones, you need to consider a number of factors; this checklist should help you identify factors and determine which ones are most important for your needs.

This checklist is loosely based on the *CRT Terminal Checklist* prepared in 1979 on behalf of ALA LITA TESLA, the Technical Standards for Library Automation Committee of the Library and Information Technology Association. That checklist appeared in the March 1980 *Journal of Library Automation*.[1] A more recent article, prepared by R. Bruce Miller on TESLA's behalf and considering health and ergonomic aspects of VDT use, appeared in the June 1983 *Information Technology and Libraries*.[2]

As in 1979, this checklist is prepared on TESLA's behalf but represents my own viewpoints and not necessarily those of the committee. The checklist focuses on displays and keyboards for general use; while specifically related to cathode ray tube (CRT) and other VDTs, much of the information also applies to personal computers as keyboard and display devices. Some points also apply to the specialized terminals used for OCLC, RLIN, WLN, and other technical processing and information retrieval systems.

Changes in VDTs

Since 1980, terminals have gotten better and cheaper, lighter and more rugged. Most terminals now incorporate microprocessors (dedicated computers), and many microcomputers make good terminals. Features which used to be expensive options are now standard; most older terminal designs are now either obsolete or obsolescent, even as newer terminals face possible replacement by powerful personal computers at moderate prices, produced on

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a mass scale (a phenomenon that did not exist in 1979).

Compromises made for economic reasons in 1980 should not be necessary in 1984: technology has made them unnecessary, and knowledge of ergonomics has made them undesirable. If you are using terminals purchased in 1980 or before, you should be considering replacements; with rare exceptions, your existing terminals should have been amortized and are probably a burden on those using them. See what's available now and how much more pleasant your working environment could be; while there are still no perfect terminals, today's low-priced models tend to be far better than those of 1979.

This checklist takes up selection steps and considers each aspect of a terminal. If you have not already done so, read the article by R. Bruce Miller in the June 1983 issue;[2] it includes an excellent discussion of health hazards, ergonomic guidelines, and a brief annotated bibliography. This checklist generally does not repeat information and suggestions appearing in Miller's article.

SELECTING A VDT: FOUR STEPS

There are hundreds of VDTs on the market and dozens of personal computers in the same general price range as the most expensive VDTs. You may well consider several dozen devices even in a brief search; you should take at least the first three of the four steps toward selection.

Step One: Evaluate Your Needs

There is no perfect terminal, just as there is no perfect computer; what's best for you depends on your intended uses and your budget. Before you start looking at terminals and computers, you should develop your own criteria and weighting system. Know your real uses and needs; desirable features for some situations may be drawbacks for others. Don't try to plan for too long a term; if a device serves you well for five to seven years, you should be more than satisfied. Go through this article and the Miller article, consider your situation, and make sure you know what you want before you start looking.

Before proceeding to the second step, you should have established your own selection worksheet: a set of criteria with weighting for each one, allowing you to make comparisons between models. You should have a budget range and know the number of devices you require; you should already be planning sites, so that you'll be able to use the terminals once they're acquired. If you have a budget range or some flexibility in the number of terminals acquired, your selection worksheet should be set up to help you use your flexibility. For each criterion and for the full set of criteria, you should have a minimum acceptable score and a level for complete acceptability (that is, the point beyond which further improvement would not be worth any additional cost under any circumstances). Your worksheet should include subjective measures and will almost certainly include many items that can't be answered as simple yes/no criteria (though objective yes/no criteria are the fastest and most conclusive way to narrow the field of choices). On the other hand, you should establish levels of minimal acceptability for each criterion and recognize that failure to meet any such criterion should immediately rule out a VDT: a "great" VDT that, for instance, only displays upper-case letters or emits a 65 dB, 15.7 kHz tone should be ruled out regardless of its other virtues.

Your worksheet should yield a set of numbers for each terminal considered; this will allow you to make relative judgements, particularly if you've established the guidelines in advance. That is, if your minimum total point score is fifty out of a complete acceptability level of ninety, and your budget allows a range of $500 to $900 per terminal, you should establish the relationship of price to points: in this case, you may be able to simply establish $10 per point as a break-even point. (Thus, if a $600 terminal scores sixty and a $750 terminal scores seventy-eight, the $750 terminal is a better bargain by your pre-established guidelines.)

Step Two: Survey the Market

Once you've got a basic set of criteria, weighting factors, and a budget, you should get a rough idea of what's available, so that you can refine your criteria and

budget and narrow your choices. Common sources of information include trade magazines and journals such as *Computerworld* and *Datamation*, the microcomputer magazines such as *Byte* and *Infoworld*, information services such as Datapro and Auerbach, and trade shows, including the National Computer Conference and various business-oriented shows. Some computer stores also handle terminals, as do some larger business-supply stores.

Terminals are not as glamorous now as they were ten years ago; personal computers have taken over the spotlight and most of the press. You may well consider a computer as a terminal replacement, particularly if you only expect to use the terminal part-time; all the sources above, and many more computer stores, will serve to inform you on personal computers through advertisements, reviews, and articles.

A few hours spent looking through journals and information services should give you a feel for the range of prices and devices available. Find out what special institutional arrangements you can make (or, in some cases, are required to make), then go to the most critical step.

Step Three: Observation and Use

You should now have your own criteria well defined and should have already started using your worksheet to establish the range of possibilities. With luck, you will have narrowed your search to a modest number of terminals or computers. Now you need to try them out; literature can't substitute for hands-on experience.

If you're buying VDTs for staff use, get the staff involved in the process: have them look at the literature, and bring one or more of them along to try out the terminals. Try to have at least one expert typist along; a staff member with bifocals or trifocals can provide critical judgement, as can a staff member with acute high-frequency hearing (most likely a woman or a young man). If you're making a large purchase, you may be able to do in-house comparisons of terminals, with all the staff members who will use terminals judging them; otherwise, you'll need to go to shops and user sites to try out terminals.

You may be able to look at a variety of newer terminals and computers by visiting other libraries, colleges and universities, and businesses; you can combine step three with step four in this process. If you can't think of at least a dozen nearby sites where terminals are being used, you probably live in an unusually isolated area. Site visits can easily be overdone; terminal purchases are small items unless dozens or hundreds of terminals are involved, and you can easily spend too much of your time and the time of your staff and the staffs of other institutions.

After you've narrowed the field and tried out the final group of terminals or computers, you may have a clear choice from a company you already know. If you're down to a difficult final decision, you should try to take the extra step below.

Step Four: Talking to Users

If possible, talk to people who use the terminals you are considering. If you can find libraries who use the same model, so much the better. If you're buying personal computers rather than terminals, or if you're buying several terminals at once, the store or manufacturer should provide you with names and numbers of customers.

When you're talking to present users, find out how long they've had the equipment: new purchasers tend to be more positive than those who have had more experience, particularly if the users you talk to helped to select the device. Stress the negative: every terminal and computer has flaws and weaknesses, and users are the only reliable source of negative information (other than the rare critical review). If a library uses more than one type of terminal, ask the staff to compare the models. If the user has no problems at all with the terminal or the company, you may be talking to an uncritical user.

VDT CHARACTERISTICS: THE SCREEN

Most VDT screens look alike at first glance: a CRT measuring twelve inches diagonally, displaying 80 characters on each of twenty-four lines, commonly with a twenty-fifth line at the bottom of the screen that carries status information. A number of VDTs, particularly those which are part

of microcomputers, vary from this common form; in addition, there are many detailed differences among "standard" CRTs. Your worksheet should include basic and ideal levels for most of the following items.

Number of Characters Per Line

Many inexpensive microcomputers display fewer than 80 characters per line (particularly when televisions are used as VDTs): the most common smaller number is 40 characters, but 20-, 32-, and 56-character lines are not unknown. Many programs will not work properly with lines narrower than 80 characters, and most uses will be severely hampered by narrower lines.

Some VDTs and microcomputers can display more characters per line, usually 132 (the line width of traditional computer listings). Such displays are useful for spreadsheet work and program listings; unless the terminal can be switched back to 80 characters, however, the smaller characters may be undesirable, as they will generally be harder to read.

Suggested standards: For nearly all library uses, 80-character lines should be the minimal acceptance level. If you expect the terminal to be used for financial work or programming, a switchable 132-character capability may be ranked higher; otherwise, 80 characters should be a simple yes/no criterion.

Number of Lines on the Screen

Most displays with 80-character lines have twenty-four text lines on the screen, yielding sufficient display capability for most purposes. Except for portable microcomputers, very few 80-character displays have fewer text lines. Screens that can display more lines are rare except in word processing uses, where a "full page" display (from fifty to sixty-six lines) is sometimes available. Full-page displays tend to be expensive and may or may not be desirable: to some eyes, the screen simply has too much information. Most library applications and most packaged programs are oriented to the twenty-four-line screen; such applications will look very odd on a taller screen.

Suggested standards: For normal use within a library, a twenty-four-line screen is a yes/no criterion. Note that the twenty-fifth line on the bottom of many VDTs is not a text line. That line is dealt with below.

Status Line

VDTs increasingly feature status lines at the bottom of the screen; such lines, always present on IBM 3270-class terminals, have spread to many of the least expensive devices. Whether you need a status line depends on the software to be used. In most cases, an optional status line (one not required by your software) serves no useful function.

You're likely to find a status line whether you want it or not; in this case, there is a crucial question: can the status line be turned off? Some high-quality, low-cost terminals display a set of terminal status codes in inverse video (black on green) on the status line; many users find the bright but meaningless line to be annoying and tiring. There should be a switch or a simple character sequence, which can be keyed in at the terminal or sent to the terminal by software and which will turn the status line off, leaving it black (not inverse).

Suggested standards: If your software uses a status line, its presence is mandatory. If not, a status line should carry no weighting by itself; a non-defeatable status line (or one which is difficult to defeat) should carry a negative weighting, possibly even an absolute negative weighting.

Screen Size

Most VDTs use rectangular screens measuring 300mm diagonally (12 inches), with the characters displayed over an area about 150mm (6 inches) high and 215mm (8.5 inches) wide. (While the screen is typically about 19mm high and 25mm wide at extremes, the outer portions are usually ill-suited to text display: the status line is not included in the 150mm height.) This yields a character cell size of 6.25mm high by 2.7mm wide, or about 1/4 inch high by 1/10 inch wide.

Miller proposes 3mm as a minimum acceptable height for characters; this means that a screen as little as 74mm high (3 inches) can be considered adequate. Most operators would disagree with this mini-

mum; for terminals which will be used for any length of time, a minimum of 4mm is about the smallest acceptable size. This means a display height of 100mm, the height usually found in a "9-inch" (225cm) screen. Such screens are not uncommon, particularly as monitors for microcomputers; their chief drawback is the narrowness of the characters: almost exactly 2mm wide, or less than 1/12 inch.

Some recent devices use a different screen shape, much wider than it is tall. Since the chief objection to 3mm characters is not their height but their very narrow width, such displays may well be worth considering. A 5-by-9-inch (roughly 125-by-225mm) screen has proportions similar to those of twenty-four single-spaced lines of typing, with a character cell as much as 4.5mm high by 2.8mm wide; such characters can be very legible, possibly even easier to read than the overly tall characters on a normal CRT screen.

At the other extreme, a number of CRTs have 14-inch diagonal measure (about 250mm); if the characters have enough elements (see below), such screens can be unusually legible. For the same number of character elements, however, a 12-inch screen will usually have clearer characters than a 14-inch screen.

Suggested standards: Minimum acceptable for extended work: cell size at least 2mm wide and 4mm high. Beyond that, this measurement is a subjective one that must be taken in combination with the measurement below.

Character Definition

Nearly all VDTs use matrices of dots or small lines to define characters. Typically, each character is made up of a certain number of dots within a defined cell (the "character cell"); the cell includes spacing between lines.

In 1979, the most common character was defined as a five-by-seven matrix in a six-by-eight cell. By 1984 standards, such a display is crude and may not be considered acceptable; a seven-by-nine display within a nine-by-twelve matrix is common, and higher densities are not all that rare. Dedicated technical processing terminals tend to have significantly higher densities. Higher-density characters are easier to read because they are more clearly defined, more distinctive, and look more like regular type.

Legibility has several components: character definition density, actual character design, size of screen, colors, and others. An overall legibility rating is necessarily subjective, but character definition density is one objective aspect of legibility. Two different seven-by-nine matrices may yield sharply differing legibility, but a poorly designed seven-by-nine matrix will probably be more legible than a well-designed five-by-seven matrix.

Suggested standards: Minimum acceptability: seven-by-nine character matrix within an eight-by-ten cell. Optimum density: include as part of the subjective legibility rating.

Character Set and Graphics

Odd as it may seem, there are still some terminals and microcomputers that display "full sixty-four-character ASCII"—upper case only—rather than the standard ninety-six-character ASCII set. Many terminals have graphics characters or alternate character sets; some terminals and microcomputers allow full graphics, using "bit-mapped graphics" (where an image of the entire screen, dot by dot, is stored in the computer).

If you need graphics or special characters, your choice of terminals will probably be constrained: your terminal must meet the requirements of your system. Otherwise, character set is basically a yes/no decision: anything less than ninety-six-character ASCII, including upper case only, is unacceptable in 1984. The full ALA character set, which is not standard ASCII, may well become available in future terminals (it is now available, but not in any known ASCII terminals that cost less than $1700); if full ALA Extended ASCII is available at a competitive price, it will serve you well in library processing.

Suggested standards: Minimum and optimum: full ninety-six-character ASCII.

Character Legibility

The previous two characteristics can be used to disqualify terminals without even

inspecting them. Legibility is more subjective; it requires actual inspection, preferably by the people who will be using the system. Don't judge a terminal by its legibility for eight people at once; terminals aren't designed for groups, and what serves a group may not serve an individual user nearly as well.

Character legibility is only one aspect of screen legibility, but it is an important one. In judging legibility, you are really judging whether the character set is clear, but also whether it is pleasant. A clear but annoying character font is fine for quick lookup, but is not as good for long sessions.

Some basic judgements of character legibility may be yes/no decisions. Do the lowercase letters *y, g, p* have true descenders, that is, go below the line of other lowercase letters? Do the letters have normal height relationships? Are the lowercase letters actually lowercase, or are they smaller capital letters? Finally, can you tell the close pairs of characters apart instantly, regardless of context?

The close pairs and sets include:

1, l
0, O
m, n
u, w, v
[, (, <, {
],), >, }
I, T

The last "close pair" was not regarded as a close pair in 1979. Oddly, design changes that have led to generally greater legibility have also (in certain cases) compromised the legibility of such an apparently clear case.

Other judgements of character legibility are wholly subjective. Most people will find a slightly serifed font more legible than a fully sans serif font, even though the sans serif font may appear "cleaner" at first glance. Any display on which the characters appear fully formed at 18 inches, or half a meter (the typical distance from operator to screen, assuming a detachable keyboard), will be more desirable than one, even a larger one, in which the dots or lines are distinctly visible.

Suggested standards: Minimum acceptable: true descenders, actual lower case letters, some serifs, and all character groups above easily distinguished. Optimum: subjective rating, depends on staff.

Screen Color and Polarity

In 1979, most visual display devices showed white characters on black or dark gray backgrounds. White-on-black displays are still common, but most users will find other alternatives more appealing. Basically, VDTs come with four color combinations and two polarities.

The colors normally available are black and white, black and green, black and amber, and full color. The polarities are positive and negative. Perhaps most common among current VDTs is black and green with negative polarity (green characters on a black background).

Europeans argue that amber displays are more ergonomically sound than green displays; most users agree that green and amber are both much easier on the eyes than white-on-black displays. Amber displays have had problems with flicker and with durability, but these appear to be on the road to resolution; meanwhile, while it is clear that amber-on-black is a sharper contrast than green-on-black, quite a few users are reporting preference for the green-on-black.

Positive polarity may appear more "natural" but does not, in general, seem to work very well. Some noted microcomputer manufacturers are claiming otherwise, introducing very high-definition, black-on-gray displays; such displays have not been in use long enough for objective long-term judgement. In most cases, dark letters on a light background appear well-suited to reflective light (ink on paper) but ill-suited to transmitted light (VDTs), where the light is directly in the user's face.

Full-color terminals are very attractive on an exhibition floor and can be sold on the basis of improved user efficiency. The results aren't in. A full-color display is much more expensive than a single-color display for the same clarity; some full-color displays compromise character definition. In any case, a full-color display makes no sense unless the software makes use of color.

Suggested standards: Minimum accept-

able: reverse polarity (or selectable polarity), green-on-black or amber-on-black; color only if character clarity is not compromised. Optimum: subjective test.

Flicker, Instability, Distortion, and Noise

Terminals are still imperfect; while most of these characteristics will not turn up in a showroom, they are worth checking with other users. There is no excuse for flicker. Some microcomputers only refresh the monitor image thirty times per second; this can, under some conditions, lead to flicker. "Non-interlaced" images, which are refreshed fifty or sixty times per second, should be flicker-free. If a terminal brags about "fast phosphors," look carefully at its performance under various lighting conditions including fluorescent light, the most difficult condition: fast phosphors, while very desirable for some special applications, can increase flicker.

Instability or distortion of any sort is simply unacceptable in any contemporary terminal or display, under any reasonably normal operating conditions.

Noise is a bit trickier. A display should be silent (unless, for some fairly unusual reason, it requires a fan). Most men and many women find all displays to be silent; many women, and a few men with acute hearing, can become very upset after working with some terminals and may not realize why.

Terminals can emit audible whine in the 15.5–15.7 kHz range for at least two different reasons: cheaply made or badly shielded flyback transformers, or poor filtering of video control signals in terminals with audio output. Most men can't hear anything at 15 kHz or above; those who can will tend to sense rather than hear the noise, and may even think that it is in their heads.

Many contemporary terminals have eliminated the 15.7 kHz noise problem, but many still have it. If a young woman with superlative hearing is not available for your test sessions, it may be worth creating a sound measurement system that will respond in the 15 kHz region. Requiring a person with superb hearing to use a terminal with significant emissions in the 15 kHz region ("significant" possibly being measured as fifty-five decibels or higher at an 18-inch distance from the screen) is a form of slow, subtle torture; no library caring about its staff would buy such a terminal.

Suggested standards: Minimum acceptable: no visible distortion or instability; refresh rate of at least 50 Hz; no emission in the range of 20 Hz to 24 kHz (with particular attention to the range of 15.5–15.7 kHz) in excess of fifty decibels. Optimum: even quieter, and with a refresh rate high enough that flicker can never be detected.

Glare, Contrast, and Focus

Glare is a problem with many VDTs, including some very good ones. Some newer VDTs contain anti-glare filters; such filters can be added at a cost of $50 or less to other VDTs. Proper siting is an aspect of protection against glare, as is proper lighting; at the same time, an anti-glare VDT is more desirable than one which is heavily subject to glare.

Any VDT should have crystal-clear focus; cheap televisions used as monitors have no place in a professional library operation. Contrast should be crisp. Brightness should be adjustable; on many monitors, brightness is the only adjustable characteristic.

Suggested standards: Minimum acceptable: accessible brightness control. Optimum: glare protection, contrast control.

Cursor, Display Enhancements, and Features

Just because a screen doesn't show colors doesn't mean you can't draw attention to text. Many, perhaps most, current VDTs allow for a variety of display enhancements, typically two levels of intensity, inverse video (dark on light), and blinking; some VDTs also allow for underlines. Such enhancements can increase the usefulness of a display.

The cursor should have optional characteristics; for those sitting at a terminal for half an hour or more, a blinking cursor is a continuing annoyance. Some terminals allow choice of solid cursor, solid blinking cursor, underline cursor, or underline blinking cursor. Such a choice allows you to tailor each terminal to existing needs.

Other features tend to be operation-specific. Is "block move capability" worth

anything extra to you? Probably not. A slave printer port may be useful, and is quite common.

Suggested standards: Minimum acceptable: cursor constant or selectable; at least one enhancement available under character-by-character software control (either blinking, dual intensity, or inverse video: any one will do nicely for special messages). Optimum: depends on application.

VDT Display Characteristics: Summing Up

These points cover the display. Don't let a salesman attempt to sell you a display by showing how wonderful it is very close up, or how good it is at a great distance. Most work will be done at distances of 450 to 700mm from the screen, roughly 18 to 27 inches; a terminal should be judged on the basis of its intended use.

Some issues that were relevant in 1979 are less so in 1984. Any terminal should automatically "wrap" any line that is too long: a one-hundred-character line should take up two display lines; if the last twenty characters disappear, the terminal should be removed from consideration. Virtually all contemporary terminals scroll (roll up existing lines when a new line is entered at the bottom); the differences in 1984 are between "jump scrolling" (where the display moves one full line at a time, jumping up) and "smooth scrolling" (where the display moves up one dot at a time, smoothly rolling the screen up). Some people prefer smooth scrolling, while some find that it is disconcerting; for most applications, most people probably don't care one way or the other. Scrolling is a subjective criterion.

The final suggested standard for display, then, is simply "niceness": how does it feel to use the screen; how does it look (can the display be tilted and rotated, does the frame surrounding the screen seem appropriate, etc.); how easy is it to read? These may be major considerations; frequently, a tiltable/rotatable display may be much more useful than one which is fixed.

VDT CHARACTERISTICS: THE KEYBOARD

Display quality is a blend of several objective and subjective characteristics. Keyboard quality is nearly all subjective, though a few objective measures can filter out unacceptable keyboards. An expert touch typist is the fastest and best judge of a keyboard; the qualities that make a keyboard pleasant for the expert will also help the novice.

Detachability

Most terminals and microcomputers introduced since 1981 have detached or detachable keyboards, usually sleek, low-profile keyboards attached to the display or computer by a coiled cable. If the terminals you're buying are for public use and security is a problem, you'll probably rule out terminals with detachable keyboards. In most other cases, you may end up requiring detachable keyboards. The virtues of a movable keyboard are subtle, but important for those using terminals for extended periods. You don't really get a detachable keyboard so you can put it in your lap—while some writers do this, most experienced typists would not find such a position useful. A detachable keyboard simply allows flexibility and control; sometimes, just moving the keyboard an inch forward and slanting it a bit makes typing more pleasurable.

Suggested standard: Strong weighting for detachable keyboard. For terminals intended for heavy use, detachable keyboards should be considered essential.

Profile and Design

Newer keyboards tend to be thin: usually less than 1.5 inches (or 40mm) at home row. A thin keyboard allows an operator to rest palms on the work surface; alternatively, a thicker keyboard can have a palm rest built in. Built-in palm rests are a mixed blessing; they make the keyboard so deep that good placement is difficult (rightly or wrongly, many skilled typists prefer to work close to the keyboard). A thin keyboard is usually preferable to a thick keyboard, all else being equal. The crucial point regarding height of keyboard has to do with the work station: the keyboard should be placed so that the keyer's arms form a right or oblique angle, that is, the home row should be lower than the elbow.

Design criteria for a good keyboard are well-known, though often ignored, and are largely embodied in the IBM Selectric keyboard. Briefly, those criteria include:

- Concave keys: each keytop should be hollowed out slightly, improving user confidence and accuracy;
- Full-stroke keys: keys should actually move, and there must be a recognizable feedback (touch, sound, or both) when the keystroke is complete;
- Horizontal keytops: each key should be level or nearly so at its outer edges (but concave within those edges);
- Sloping keyboard: the keyboard as a whole should slope, having a "stairstep" effect of several horizontal rows, each at a lower height than the one above;
- Matte finish and neutral color: keys should not cause glare, and should not have bright or interesting colors;
- Clear labels: keys should be clearly labeled, to assist those who are not expert typists and those who must move from keyboard to keyboard.
- Familiar layout and size: keys should be the same size and spacing as on a good electric typewriter and should generally be in the same positions. This generally implies a "Qwerty" keyboard (so named for the characters on the first alphabetic row); a "Dvorak" keyboard is theoretically more efficient, but should only be considered if those planning to use the terminal like the idea.

Most of these points should seem obvious as you read them; surprisingly, they are apparently not obvious to microcomputer manufacturers and some terminal manufacturers. The final point may be the most controversial. Supporters of the Dvorak keyboard (which has an entirely different layout based on letter frequency) correctly state that the Qwerty keyboard was designed to slow typists down and claim that the Dvorak keyboard allows for much greater efficiency. These claims are still open to question; the ease of retraining from Qwerty to Dvorak has not been demonstrated. At this point, the Dvorak keyboard may have the same difficulties in the United States that left-side driving would, even if it was proven safer: most people learn Qwerty, and most people don't want to relearn something that basic.

Suggested standards: Most points above should be absolute criteria: a keyboard that lacks concave keys in flat staggered rows, matte finish, neutral colors, and clear labeling, is simply not a good keyboard. Some form of feedback is required, but the desirable form is subjective; most experienced typists want some tactile feedback and minimal auditory feedback—if clicks are involved, the clicks should be controllable.

Repeating Keys

Most modern keyboards have delayed repeat on all keys, a feature usually called "auto-repeat" or "Typeomatic": any key held down for more than a second will begin repeating. Deliberate auto-repeat, with a suitable delay, is a desirable feature; a keyboard with a separate "repeat" key is far less desirable, and a keyboard with selective repeat is archaic. At the other extreme, some keyboards develop "bounce": characters repeat when no repeat was intended. Bounce is usually a sign of wear, and is unlikely to show up except when talking to other users; any keyboard with significant bounce problems should be rejected immediately.

Suggested standard: Minimal acceptability: auto-repeat on all keys (except control keys) with a one-second (or so) delay. No bounce after heavy use.

Special Keys

Several special keys are required for terminal operations. The rule for most special keys is that they should be easy to find when you need them, and hard to hit accidentally. The [ENTER] or [RETURN] key should be much larger than other keys, as should both [SHIFT] keys; the [ENTER] or [RETURN] key should usually be distinctly shaped and placed. A terminal must have a [BREAK] key for most telecommunications systems, and the [BREAK] function cannot usually be generated by other keystrokes; the [BREAK] key should always be in a position where it won't be hit accidentally.

Microcomputers usually have some form of [RESET] key, button, or key combination. A [RESET] key on the main keyboard is an invitation to disaster: well-designed

systems either have a button in a very special position on the disk drive, or use a multi-key combination for [RESET].

If a terminal will be used for computation or other heavy numeric entry, it should have a separate numeric keypad; the best pads will include decimal point, [ENTER], and sometimes basic arithmetic functions such as −, +, *, and /. If a terminal will be used with screen-oriented software (text editors, for instance), cursor movement keys will prove useful. There are many different opinions on the best placement for such keys, but the best placements are easy to recognize and remember and do not share keys with numeric keypads. "Diamond" placements are possibly the best, but also take up the most space; four keys in a square are nearly as good, and four cursor keys in a horizontal row appear to make a reasonable compromise between ease of use and size of keyboard.

Other special keys depend on the application. A keyboard with too many keys, particularly if they are not well laid out and clearly distinguished, is intimidating; a keyboard with too few keys is frustrating. Many terminals include function keys, which can be very helpful if the software supports them; otherwise, they may simply contribute to keyboard clutter.

Suggested standard: Large, clearly placed [RETURN] key; numeric keypad if terminal is to be used for multiple purposes; separate cursor keys. Optimal special key placement is a subjective decision.

Tabs, Rollover, and Other Aspects

Some older terminals don't have tabulation functions (and thus don't have a TAB key). If you're just using a terminal to search databases, you may not care; if you're using it for text editing and the like, a TAB key is essential—as is a clear method for setting tabs, which requires coordination of the computer and the terminal.

Some terminals and microcomputers allow rollover, storing keystrokes until the software can deal with them. "N key rollover," as it is usually called, provides a safeguard for fast and erratic typists; novice typists may actually be able to test roll-over better than experienced ones, as experts usually maintain smooth rhythms.

Suggested standards: Minimal acceptability: TAB key with clear method for setting tabs. Roll-over sufficient to handle occasional bursts of speed without losing characters.

Feel

The most subjective aspect of keyboards is also the single most important for heavily used terminals and microcomputers: *feel.* Some keyboards are soft and springy; some clatter but are reassuringly firm. No standard exists for keyboard touch and overall noise; different people have different tastes. Those who will use a terminal should be the judges of the keyboard's feel. This subjective aspect of keyboards cannot be overemphasized: keyboard feel may well be 30–40 percent of the overall weighting in judging a terminal and should probably be the primary (perhaps sole) criterion for judging acceptable keyboard. Other keyboard criteria may be distinct yes/no judgements; feel will always be subjective.

VDTS: OTHER ASPECTS

Most modern terminals are sturdy, but almost any terminal will eventually need servicing. You should be sure that servicing is available in some form that meets your needs. If you will be heavily dependent on terminals, service contracts with guaranteed turnaround times may be warranted; in other cases, you may prefer to rely on available carry-in service on a time and materials basis. If you are buying a large number of terminals, and intend to replace them after a few years, you might find it more economical to buy one or two more than you need, rather than paying for a service contract on all your terminals. Many terminals will go through a three or four-year useful life without requiring servicing.

You should ask about servicing before making a purchase. Can the dealer or manufacturer cite a mean time between failures (MTF) based on actual experience? How easy is the terminal to service? Can the service agency give you a mean time to repair (MTTR) or guarantee a repair or replacement time? If you choose carry-in service, how convenient is the service depot?

If you are considering a microcomputer to be used as a terminal part-time or full-

time, you will need to consider the software. Most probably, you will be able to choose from a number of different programs. Some terminal programs turn your computer into a "dumb terminal," with no special features. Better programs allow you to save information on disk or send information from disk to the remote computer; some also allow direct file transfer, though this requires compatible software in the remote computer. Your software must also work properly with your modem, and should give you enough flexibility to handle present and future telecommunications needs.

Other aspects of VDT selection and installation, covered in the *CRT Terminal Checklist* or R. Bruce Miller's article, involve locating a terminal and providing proper power. Site preparation is important and is covered in the earlier papers; by and large, all terminals will need similar site preparation and handling.

CONCLUSION

There are still no perfect terminals, but the medium-priced terminals of 1984 are much better than most high-priced terminals of 1980. Most of the good-quality terminals of 1980 are now obsolescent; few of them live up to today's nominal standards for VDTs. Many of the ergonomic issues raised with regard to VDTs are equally valid for typewriters; with VDTs, however, it is possible to do better.

VDTs can be an imposition in a library, causing distress and lowered morale. With care, involvement, but little or no additional cost, VDTs can make work easier and more pleasant. In today's market, library managers have no excuse for buying unpleasant, inadequate VDTs. A clear set of criteria and a clear procurement strategy, with extensive involvement of the users, should yield VDTs that will be a pleasure to use even after better ones appear on the market.

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Further Analysis of the CLR Online Catalog Project

Joseph R. Matthews and Gary S. Lawrence

The Bibliographic Service Development Program of the Council on Library Resources funded a cooperative, multi-year, in-depth investigation into the issues surrounding public access online catalogs. This project, called the Online Catalog Public Access Project, conducted a survey of users and nonusers in thirty-one libraries in the United States. The studies were performed by:

- *J. Matthews and Associates, Inc.*
- *Library of Congress*
- *Online Computer Library Center, Inc.*
- *Research Libraries Group, Inc.*
- *University of California, Division of Library Automation.*

INTRODUCTION

The purpose of this project, supported by the Council on Library Resources, was to provide decision makers with information that will allow them to choose strategies that will increase the utilization of the library and its collections. Increasing frequency and quality of use of the online catalog is thought to increase the utilization of the library and its collections. Therefore, user satisfaction with the online catalog is vital. This project identified characteristics of uses, tasks, the library setting, and the system interface that affect user satisfaction.

One important objective of this project was to determine the extent to which data pertaining to each participating online catalog system was consistent or varied, when compared to the aggregate data analysis previously reported on the CLR project[1] (see Appendix A). [Note: Those systems reported in the CLR study that provided too few observations (less than fifty) or did not support subject searching, e.g., OCLC, are not included in this analysis].

Another objective of the data analysis was to define various characteristics in a model of online catalog use which, alone or in combination with characteristics of other components, affect the success of the catalog search. This objective was accomplished by using statistical tests to identify these characteristics and to map their interactions through each component of the model.

The Online Catalog Conceptual Model

The underlying simple conceptual model of online catalog use that has guided this project suggests:

Users, with various characteristics, come to the library to perform various *tasks*. Entering a specific *library setting* (which includes both physical features and service features such as training, printed aids, and staff assistance), they use the online catalog's *system interface* to access the database

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in order to locate the materials that will satisfy their task requirements.

1. Users are defined by:
   a) Demographic characteristics
   b) A priori attitude toward the catalog
   c) Experience with the library and its catalogs
2. Tasks are defined by:
   a) The application (the "reason" for the search)
   b) The information brought to the search
3. The library setting is defined by:
   a) The physical setting for access to the online catalog
   b) Training and assistance features
4. The system interface is defined by:
   a) Access points—types of searches
   b) Search methods—character string versus keyword
   c) Search complexity—Boolean within and/or across indices, set searching, backup.

THE ANALYSIS

The first task in the analysis involved classification of the items in the user questionnaire (see Appendix B for a copy of this instrument) for the first component of the model—the user. The classification is as follows:

Demographic Characteristics

Question Number	Characteristic
54	My age group is
55	Sex
56	Current or highest grade completed
57	My academic area is (discipline)
58	Main focus of my academic work
59	Present affiliation (academic status)

A Priori Attitude Toward the Online Catalog

Question Number	Item
9	General attitude toward the catalog
10	Comparison of computer catalog to other catalogs
52	Heard about the computer catalog from
53	I learned to use this computer catalog

Experience with the Library and its Catalogs

Question Number	Item
48	I come to this library (frequency of use)
49	I use the computer catalog (frequency)
50	I use the library's other catalogs
51	I use another computer system

Table 1 shows the average score of each of the libraries included in this analysis on each of five criterion variables, i.e., those that attempt to measure user attitudes about success and satisfaction in using the online catalog. It is notable that the range of average scores among the thirteen library systems is extremely limited in comparison to the measurement scale for these five variables. Identifying causes of success or failure is difficult when responses are grouped so closely on the measurement scale. Within these narrow ranges, however, earlier analysis has shown that there are some statistically identifiable differences.

Our intention was to use the five criterion variables to identify user characteristics that made a statistically measurable and reliable difference in user success and satisfaction.

Analysis of Variance (ANOVA), a statistical procedure to determine the strength of a relationship among variables, was used, with the five success and satisfaction variables as dependent variables. However, limitations in the SPSS ANOVA procedure prevented the inclusion of more than five user characteristics at a time. Using multiple regression with dummy variables (i.e., variables coded "0" or "1" to denote presence or absence of a characteristic) as a method of analysis of variance allowed the remaining user variables to be added to the analysis.

Ten regression analyses were run, beginning with item 48 (frequency of library use) and item 49 (frequency of online catalog use) as independent variables. Variables from the list of user characteristics were added with each new run.

The Role of Test Libraries in the Analysis

The analysis focused initially on four

Table 1. Partial Presentation of Regression Analysis Demographics for Users*

	#48 Use of Library	#49 Use of Online Catalog	#50 Use of Other Catalogs
Stephen F. Austin State Univ.		3	
Claremont Colleges	3	4	1
Dallas Public	3	3	2
Univ. of California	4	5	4
Evanston Public	3	4	2
Iowa City Public	2	4	
Library of Congress	1		1
Mankato State	1	2	2
Mission/West Valley	3		1
Northwestern Univ.	1	4	3
Ohio State Univ.	4	5	3
Pikes Peak Public	1	4	3
Syracuse Univ.		5	2
Total	26	43	24

*The numbers represent the number of times that each core demographic variable appears in the five regression analyses.

large academic libraries, and for the most part analytical techniques and assumptions were tested on these four for reasons of computational economy. The following pages contain discussion of detailed findings from these four libraries (and others as well, if detailed test analyses were conducted), including consideration of variables that proved to have no significant effect on users' success or satisfaction. For the most part our discussion of library systems includes only the most important variables. Subsequent findings for the four large academic libraries, however, are then discussed in detail.

THE USER

A brief summary of typical user characteristics is presented here as an introduction to the additional information learned about the user as a result of this project.

Online catalog users are frequent library users, consult the online catalog frequently, and are only moderate users of other catalogs (card, COM, etc.) in the library. The user of the online catalog is not necessarily a user of other computers; he or she is a young adult and is highly educated. Within academic libraries, the majority of users are undergraduate students, from all academic disciplines, who are using the online catalog for course-related work.[2]

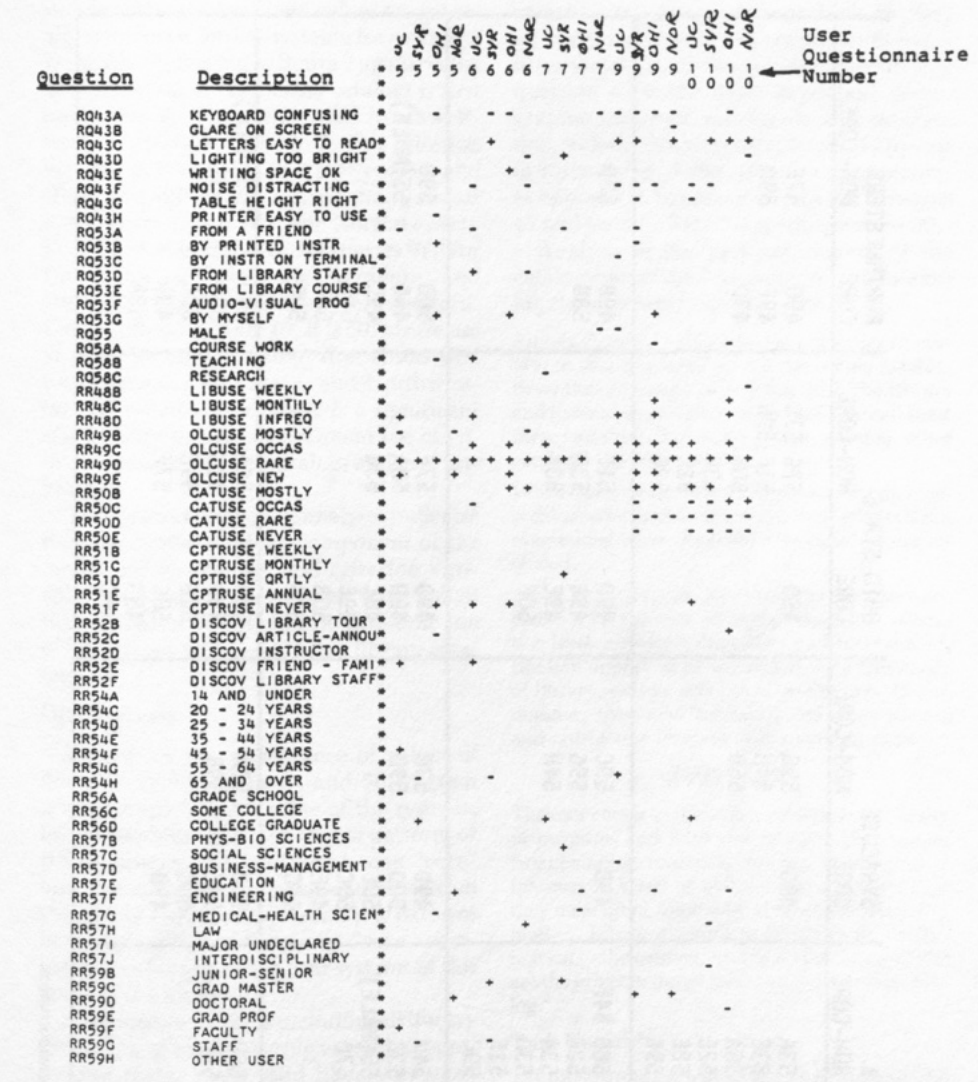
The variables that appear to be consistent across the four academic systems, across the criterion variables, and in the results of both regression and discriminant function analyses, are the effects of frequency of library use (item 48), frequency of online catalog use (item 49), and frequency of use of the library's other catalogs (item 50) on user satisfaction (as measured by the criterion variables).

These variables constitute the core of that category in the model that represents experience with the library and its catalogs. Figure 1 presents the results of the regression analysis of all user variables.

Regardless of the number of user characteristics included in the analysis, the tendency of effects to cluster around values of items 48, 49, and 50 (the "core" variables) remains.

Figure 2 is a listing of all those user characteristics that enter the regression equation. In most cases, the core variables comprise a substantial portion of all significant user characteristics. In many cases, they constitute more than half of the values entering the equation.

For criterion variable 5 (In this search I found . . .), values of item 49 (frequency of online catalog use) often enter the equation. Of particular note is the consistent appearance of the value 49D, which represents infrequent online catalog users. (With only two exceptions, all values of the core variables that enter the regression equa-



Minuses should be interpreted as effects of more user satisfaction
Pluses should be interpreted as effects of less user satisfaction

Fig. 1. Results of Regression Analysis for User Characteristics for Four Largest Academic Systems (By Criterion Variables).

tions represent infrequent or first-time users.)

The same pattern is evident for criterion variable 9 (attitude toward the online catalog). Infrequent and first-time use of online and other catalogs has some relationship to user satisfaction.

For criterion variable 10 (comparison of the computer catalog to the library's other catalogs), we find similar patterns. The effects of the core variables constitute at least half of all the effects noted for criterion variable 10 for all four systems.

Regardless of the number or nature of the other user variables included in the regression equations, it is generally a value of a core variable that enters the equation on the first step. Those variables (in this case, values) that enter a regression equation on the first step are those having the highest

	CALIFORNIA		SYRACUSE		OHIO STATE		NORTHWESTERN	
	CORE	NON-CORE	CORE	NON-CORE	CORE	NON-CORE	CORE	NON-CORE
CRITERION VARIABLE 5 Amount found	48D 49C 49D 49B 49E	53A 53E 56A 52E 52E 59F	49D	59G 54H 56D	49D	57G 57B 51F 52B 58B 53B 52C 53G	49D 49E 49B	57F 59D
CRITERION VARIABLE 6 Satisfaction of Search	50C 49C 49D 48D 49B	58B 54F 52E 53A 53D 51F 59C	49D	59C 59G 54H	49D 49C 49E 50B	51F 53G 53A	49B 50B	53D
CRITERION VARIABLE 9 Attitude toward the computer catalog	49D 49C 48D 50B	54H 53C 55(MALE) 57D	49D 50D 50E 50C 49E 49C	53B 59D	49D 48D 48C 49C 50B 50D	57F 58A 53G	50D 49D 49C 50C 50E 50B	59D 55(MALE)
CRITERION VARIABLE 10 Compared to card catalog	49C 49D 50C 50E 48D	56D 51F	50D 50E 50C 49D	57H 59B	50D 48C 49D 50E 50C 48D 49C	58A 52C 59E 57F	50D 50E 50C 49D 48B	55(MALE) 57C

Fig. 2. Regression Analyses of User Characteristics.

simple correlations. These values are generally consistent across systems for criterion variables. Referring to figure 2 again, value 49D (rare use of the online catalog) is first for Syracuse, Ohio State, and Northwestern for criterion variable 5. For criterion variable 6, it remains first for Syracuse and Ohio, and 49B (use of online catalog almost every visit) enters first for Northwestern. For criterion variable 9, 49D enters first for University of California, Syracuse, and Ohio State and second for Northwestern. For criterion variable 10, it is 50D (rare use of library's other catalog) that enters first for Syracuse, Ohio State, and Northwestern. As noted above, there is a significant relationship between infrequent use of online and other library catalogs and user satisfaction.

The series of regression analyses indicates that effects for the user component of the model across systems and criterion variables are generally associated with values that represent infrequent or first-time use of libraries or online and other library catalogs.

Observations

Except for the appearance of values of items 54 (age), 55 (sex), and 56 (highest grade completed) for some of the systems, little was observed in the way of patterns or trends among the additional, non-"core" user characteristics for some of the criterion variables. There are no discernible patterns in the groupings of these non-"core" characteristics for any of the four systems at this point in the analysis.

A regression analysis including all library systems, and incorporating variables representing users, tasks, and library support services, tends to reinforce the primacy of the three core variables and shows that variable 49, frequency of use of the online catalog, is the most important of the three, and therefore of the user variables taken as a whole. Table 1 reproduces partial results of this analysis. (Characteristics of task and library variables will be introduced later.) This table shows the number of times that each core demographic variable appears in the five regression analyses (one regression for each of the five criterion variables) for each library system. It is clear that the core variables as a group are important, for they all appear as significant regressors in every library system. It would also appear that question 49 is the most important demographic influence on success and satisfaction, at least in a statistical sense; it appears in forty-three of the sixty-five regressions, as opposed to twenty-six times for question 48 and twenty-four times for question 50.

Analysis of the first component of the catalog-use model has provided the following three general observations:

Among those user characteristics that are important to user satisfaction with the online catalog, those that represent experience with the library and its catalogs are most important. We call these three variables (the library, online catalog, other catalogs) the core variables.

While other user characteristics have strong independent effects, the strength of their effects is not maintained when the three core variables are included.

Other demographic characteristics may be associated with the core variables. Age, sex, education level, academic discipline, and academic affiliation appear to be associated with frequency of library, online, and other catalog use. In this manner, they may indirectly influence success and satisfaction levels of online catalog users.

THE TASK

The user comes to the online catalog for a variety of purposes and with information that ranges from complete to partial or even, in some cases, inaccurate. Users of online catalogs report that they most often come with subject-related information, bringing complete bibliographic information to the catalog, and that class assignments are the primary purpose for using the online catalog.[3]

Task Variables

Questionnaire variables that define the user's search task at the online catalog include:

Question Number	Item
1	I came to the computer search with (mark all that apply)
2	By searching this computer catalog I was trying to find (mark all that apply)
3	I searched for what I wanted by (mark all that apply)
4	I need this information for (mark all that apply)

In statistical investigations using the four academic "test libraries," it was found that question 4 showed few statistically reliable or meaningful relationships with criterion variables and was not subsequently included in our investigation of task characteristics. The remaining three task variables, including information brought to (question 1) and used in (question 3) the search, and the kind of search being conducted (question 2) were important factors in user success and satisfaction. Table 2 expands the partial presentation of regression results shown in table 1 by adding results for these three task variables. (Note: regression effects reported here are fully independent; that is, the statistical effects of the task variables are significant even after the influence of the three core demographic variables is taken into account.) Table 2 suggests that questions 1 and 3, appearing in thirty-three and thirty-four of sixty-five regression equations respectively, are somewhat more important than question 2 (appearing twenty-four times) in explaining user satisfaction.

For analytical purposes, however, questions 1 and 3 present some technical problems. As noted above, users were allowed to mark as many of the eight response categories for each question as they felt appropriate. The number of possible combinations of responses for each question is therefore 2 to the 8th power, or 256. Obviously, it becomes difficult to categorize each user's "task" when it may be described by 256 unique combinations of information elements.

Question 2 poses a similar technical problem, offering six alternatives in "mark all that apply" format, for a total of sixty-four combinations. However, the first three response categories, "specific book," "books on a topic," and "books by a specific author" account for 80 percent or more of responses in the libraries included in this study and about 81 percent of responses from all participants in the public access project.[4] Of those who responded to the Online Catalog Public Access Project's user questionnaire in categories other than 2A, B, or C, 57 percent marked choice E, "if a book that I know the library has is available for my use." Judging that users who so responded must also have been looking for a specific book (choice A), whether so marked or not, we determined that using only the first three categories would affect no more than 4 percent of the responses to question 2 (in fact, the effect is somewhat lower, because many who marked a response among the first three also marked a later category). Therefore, question 2 was recoded into three mutually exclusive cate-

Table 2. Presentation of Regression Analysis for Demographic and Task Variables

	Demographic Variables User Questionnaire			Task Variables User Questionnaire		
	#48 Use of Library	#49 Use of Online Catalog	#50 Use of Other Catalogs	#1 Come with	#2 Trying to find	#3 Searched by
Stephen F. Austin State Univ.		3		3	1	2
Claremont Colleges	3	4	1	4		1
Dallas Public	3	3	2	3	5	3
Univ. of California	4	5	4	2	1	1
Evanston Public	3	4	2	2	3	4
Iowa City Public	2	4			1	1
Library of Congress	1		1	3		3
Mankato State Univ.	1	2	2	2	1	3
Mission/West Valley	3		1	3	1	3
Northwestern Univ.	1	4	3	2	2	4
Ohio State Univ.	4	5	3	3	5	4
Pikes Peak Public	1	4	3	3	2	2
Syracuse Univ.		5	2	3	2	3
Total	26	43	24	33	24	34

	TASK			
COUNT ROW %	SPECIFIC BOOK	TOPIC	SPECIFIC AUTHOR	ROW TOTAL
LIBSYS				
AUS	18	60	5	83
STEVEN F. AUSTIN	21.7%	72.3%	6.0%	1.6
CLA	13	16	3	32
CLAREMONT	40.6	50.0	9.4	0.6
DAL	261	406	78	745
DALLAS PUBLIC	35.0	54.5	10.5	14.7
DLA	222	470	99	791
UNIV OF CALIF	28.1	59.4	12.5	15.7
EZA	81	72	18	171
EVANSTON	47.4	42.1	10.5	3.4
IOW	119	132	22	273
IOWA CITY	43.6	48.4	8.1	5.4
LOC	86	250	28	364
LIBRARY OF CONGR	23.6	68.7	7.7	7.2
MAN	43	153	4	200
MANKATO	21.5	76.5	2.0	4.0
MIS	3	7	1	11
MISSION	27.3	63.6	9.1	0.2
NOR	216	144	28	388
NORTHWESTERN	55.7	37.1	7.2	7.7
OHI	416	358	76	850
OHIO STATE	48.9	42.1	8.9	16.8
PIK	74	111	17	202
PIKES PEAK	36.6	55.0	8.4	4.0
SYR	379	410	64	853
SYRACUSE	44.4	48.1	7.5	16.9
WVA	24	58	8	90
WEST VALLEY	26.7	64.4	8.9	1.8
COLUMN TOTAL	1955 38.7	2647 52.4	451 8.9	5053 100.0

Fig. 3. Distribution of Tasks by Library System.

gories: specific book, topic, and author. Figure 3 displays the distribution of tasks so defined by library system.

Subject searching is more predominant among respondents who use the library moderately frequently (weekly to annually) (question 48), and less predominant for very frequent and first-time users. This conclusion is supported by use patterns at five of eight academic libraries (63 percent) and four of five public libraries (80 percent), or nine of thirteen libraries overall (69 percent). (Note: for purposes of this analysis, the Library of Congress is classified as a public, rather than academic, library.)

Very frequent users of the online catalog (question 49) are less likely to be looking for material on a topic. This is supported by use patterns at seven academic libraries (88 percent) and two

public libraries (40 percent), or nine libraries overall (69 percent).

Infrequent users of the card catalog are more likely to use the online catalog to search for material on a topic. This is supported by use patterns in six of eight academic libraries (75 percent) and three of four public libraries (75 percent), or 9 of 12 libraries overall (75 percent). (Note: Iowa City Public Library, which had eliminated its card catalog before the CLR study began, is excluded here.)

Taken together, these findings suggest that, in most participating libraries, *topic searching is more prevalent among those who are less experienced with the library and its catalogs*, both online and card. Although several interpretations are possible (and no plausible interpretation can be clearly rejected by statistical means at this point), this finding suggests that users may approach the catalog from the perspective of the bibliographic tools and techniques with which they are already familiar. That is, users with considerable experience in the card catalog may use the online catalog for known-item searching because that is the use with which they are most familiar (perhaps having learned from experience that subject searching in the card catalog is a difficult and often unproductive effort), rather than because they have no need to conduct topical searches.

Analysis for other (non-"core") user variables does show identifiable patterns or trends with regard to user-task relationships, with one exception: for the eight academic libraries, *the conventional belief that undergraduate students have a greater propensity for topical searching than graduate students and faculty is confirmed.* At the same time, on a percentage basis, topical searching by advanced students and scholars is not a trivial activity in the current generation of online catalogs. One possibility is that in academic libraries, topical searching varies by academic discipline. The hypothesis that task varied by discipline was tested statistically at each of the eight academic libraries using a standard chi-square test. In only one case was the variation in task by discipline found to be statistically significant (at the 0.05 level). At Ohio State University, respondents in the disciplines of Business/Management and Engineering appear significantly more likely to conduct topical searches: the percentage distributions are 57.3 percent and 57.0 percent for the two disciplines respectively and 42.5 percent for all Ohio State respondents.

The Relationship of Search Task to Success and Satisfaction

An examination of the relationship between search task and user satisfaction shows few statistically significant relationships. In sixty-five bivariate ANOVAs involving tasks and five criterion variables (for thirteen libraries), only fifteen (23 percent) showed a statistically reliable relationship at the 0.05 level or better. In this analysis users looking for items on a topic were less likely to be satisfied with the amount retrieved or with the overall results of the most recent search. However, topical searchers were more likely to uncover unexpected items of interest, and, in the two cases where a statistically reliable relationship exists, had a more favorable attitude toward the online catalog.

One thing that we can conclude from this analysis is that the *user's search task is more likely to influence assessments of the results of the search just completed* than to affect general attitude toward the catalog. Another is that *users are clearly more likely to find unexpected items in a subject search* than in one for a known item. In both cases, it may be possible to attribute the result to the structure of the questionnaire instrument. In a known-item search, results tend to be clear-cut: you either find the item you are looking for, or you don't. In a topical search, users are less likely to respond that they "found everything they are looking for," because they cannot be sure that they have found EVERYTHING, at least until they inspect the books; even then, who can be sure that they have retrieved everything of interest on a topic? Known-item searchers are more positive in their responses: they found everything or nothing, they were very satisfied or very unsatisfied. Topical searchers are more cautious: they found some of what they were looking for and were only somewhat satisfied or dissatisfied. This effect is displayed in table 3.

The foregoing analysis explores the rela-

Table 3. Crosstabulations User Task by Questions 5 and 6

User Task	Count Row %	RQ5 In This Search I Found More Than	All or Most	Some	Nothing	Row Total
Specific Book	1	319	789	407	405	1920
		16.6%	41.1%	21.2%	21.1%	38.8%
Topic	2	414	455	1320	407	2596
		15.9%	17.5%	50.8%	15.7%	52.4%
Specific Author	3	89	133	129	86	437
		20.4%	30.4%	29.5%	19.7%	8.8%
	Column	822	1377	1856	898	4953
		16.6%	27.8%	37.5%	18.1%	100.0%

Number of Missing Observations = 100

User Task	Count Row %	RQ6 In Rel to What I Was Looking for Search Very Sat.	Somewhat Sat.	Somewhat Unsat.	Very Unsat.	Row Total
Specific Book	1	1052	488	173	200	1913
		55.0%	25.5%	9.0%	10.5%	38.7%
Topic	2	1018	1005	313	262	2599
		39.2%	38.7%	12.0%	10.1%	52.6%
Specific Author	3	227	113	37	56	433
		52.4%	26.1%	8.5%	12.9%	8.8%
	Column	2297	1606	523	519	4945
	Total	46.5%	32.5%	10.6%	10.5%	100.0%

Number of Missing Observations = 108

tionship between tasks and satisfaction without considering the effects of user characteristics or library support variables. It is natural to ask about the influence of the kind of task on satisfaction when other factors are statistically controlled. Table 2 showed that one or more task variables appeared in the regression equations at least thirty-four times in sixty-five analyses. In sixteen of these cases, the task variable (from questions 1, 2, or 3) was related to search success (questions 5 and 6) and had something to do with subject searching (i.e., the user either had subject/topic information, was looking for books on a topic, or searched using subject heading or topic words). In two of these cases, the task variable was associated with higher levels of search success; in fourteen cases, with lower levels of search success. Therefore, we conclude that topical searching is linked with lower levels of perceived search success and satisfaction, even when the effect of other important variables is controlled.

Observations

An examination of the frequency with which a task variable enters into a regression analysis found that sixteen out of twenty-six times, a task variable was first. Thus, task variables do play an important role in the use and satisfaction of the online catalog. The task, i.e., searching for a specific book or item in the library's collection (a known item search) or a topic (subject search) should therefore be acknowledged by system designers. After all, system designers can do little to change the characteristics of users, but a separate and distinct focus and, by implication, a separate and distinct way of interacting with an online catalog (i.e., system interface) for a known-item search or for a subject search would seem prudent.

An analysis was run to determine whether task is influenced by academic discipline. The results, with one exception (Ohio State business and engineering students), indicate that academic discipline had no effect on task. One possible explanation for the larger amount of topical searching being done by OSU business and engineering students might be that, since their disciplines rely heavily on the journal liter-

ature to stay current, users will conduct topic or subject searches for monographs in the library only when they wish to start to look at a new area.

In general, the data analysis of the task brought by the user to the catalog suggests that the task is fairly uniform across all systems. What variability is observed seems to be a reflection on that wonderful human virtue of "adaptability." That is, the user is bringing whatever information is needed to get the job done, given the strengths and limitations of the particular online catalog that is available.

THE SYSTEM INTERFACE

The system interface, while not entirely "user-friendly" for all systems, is generally well received by the users of all the online catalogs. Users typically have positive feelings about the interface, with the majority of problems in the area of search control and display control. In essence, the user of the online catalog would like to be in control. Some problems are associated with subject searching, and the problems experienced by users are similar regardless of the type of library.[5]

The system interface is represented in the CLR questionnaire in two ways:

1. By thirty-two Likert-scaled variables (questions 11 to 42) that inquire about problems experienced by each respondent in using the online catalog system and its features and capabilities;
2. By specific information about each of the thirteen online catalog systems included in the present study.

The second source of data is more reliable, in that it does not rely on attitudes and impressions; a particular feature (e.g., keyword searching) either is available or is not. Unfortunately, the same conditions apply to all users of a particular system, so only inter-system comparisons are possible. This leaves the analyst with only thirteen cases from which to draw conclusions, an insufficient number for statistical purposes.

Our first approach, then, is to examine the users' attitudes about system capabilities and features as they relate to success and satisfaction and to the users' search tasks. In an earlier study (Matthews et al., p.122–43), it was found that the thirty-two Likert variables could be grouped into seven statistically independent factors for analysis, as follows:

Factor 1: Use of codes and abbreviations
Factor 2: Understanding displays
Factor 3: Entering commands and controlling the search
Factor 4: Searching by subject
Factor 5: Searching for known items
Factor 6: Delays (response time, long messages, available terminals)
Factor 7: Library services (staff assistance, printed aids).

The influence of these factors on user success and satisfaction is documented in Matthews et al. and summarized at the beginning of this section.

To discover whether user attitudes about the system for any of these seven factors were related to the user's search task, we conducted ANOVA tests on the effect of task on factor scores. Of ninety-one tests (thirteen libraries times seven factors), only fifteen (16 percent) yielded statistically reliable results at the 0.05 level or better, and the reliable results suggested no obvious trends or interpretations, with one exception. In four cases a relationship was found between task and factor 4, which has to do with difficulties in searching by subject. In all four cases, users who conducted a topical search had fewer difficulties with the subject-searching features of the system in general than did users conducting other kinds of searches. In three of the four cases (Iowa City, Northwestern University, and Ohio State University) system designers used the technique of matching the search to a list of subject headings and displaying the heading list before displaying actual catalog records. In a related result, three significant relationships were found between task and factor 6, which has to do with delay factors and user patience. In all three cases (Library of Congress, Mankato State, and Northwestern), topical searchers apparently had fewer problems with response times, message lengths, and other delay factors, and two of the systems display headings before displaying records.

Heading Display and System Features

These discoveries suggested that systems featuring a subject heading display are per-

forming differently, from the users' point of view, than systems not designed to display headings as the first result of a search. To explore this matter further, we first classified the participating library systems by their heading-display design. Systems fell into three groups:

1. Systems that automatically display headings as the first result of a search. This group consists of five systems: Stephen F. Austin University (DataPhase); Mission/West Valley College (ULISYS); Library of Congress MUMS/SCORPIO) [note: MUMS does not display headings]; Ohio State (LCS); and Northwestern (NOTIS).
2. Quasi heading systems. This category was created to account for the two libraries using the CLSI touch-screen system: the Evanston and Iowa City Public Libraries. This classification recognizes that the touch-screen interface displays some headings as the user proceeds through the search, but does not show a sequential list of headings until the lowest search level (just above retrieval of actual records) is reached.
3. Systems that display only records as the result of a search request. This class includes: the Claremont Colleges (TLS); Dallas Public Library; Mankato State; University of California (MELVYL); Pikes Peak Library District (Maggie's Place); and Syracuse (SULIRS).

A more complete description of each of these systems and their specific features will be found in chapter two of Matthews et al.

To discover whether systems with subject heading displays performed better than systems without this feature on each of the seven system factors, we first ranked each system according to the average factor score for all users of each system, on each of the seven factors. The average factor scores for all systems are displayed in figure 4, and relative rankings for each factor in table 4. Note that the "directions" of the numerical factor scores vary. A large positive mean score is "good" (i.e., on the average, users had fewer problems with this factor) for factors 1 and 3. A large negative score is "good" for factors 2, 4, 5, 6 and 7. Rankings are presented from positive to negative, with positive values having rank 1.

Because formal statistical techniques could not be applied to this question, we have chosen to note the number of heading-display systems appearing in the top and bottom four libraries as ranked on the mean scores for each factor. Generally speaking, we would expect that if there were no relationship between rank standing and heading display, about two of five heading-display libraries would appear in the top four (i.e., the top one-third), and an equal number in the bottom four. If heading display libraries are unusually effective or ineffective, they should tend to be more concentrated at one end of the ranking and less likely to be present at the other end.

	Factor: 1	2	3	4	5	6	7
	Use of codes & abbreviations	Understanding displays	Entering commands	Search by subject	Search for known item	Delays	Library Services
SYRACUSE	0.1951	-0.1073	-0.0391	0.1584	0.0495	0.0604	0.0064
PIKES PEAK	0.0445	-0.0084	0.0312	0.1526	0.1589	0.0284	0.0010
OHIO STATE	-0.0666	0.2242	-0.0436	-0.0455	-0.0381	-0.2571	-0.3329
NORTHWESTERN	0.1334	-0.1139	0.0786	0.0861	-0.1517	-0.0681	0.0802
MISSION	0.1164	-0.2193	0.0617	-0.2296	0.1430	-0.1482	-0.0013
MANKATO	0.1230	0.0126	-0.0477	-0.2089	0.0423	-0.1624	-0.1614
LIBRARY OF CONGRESS	-0.1438	0.1399	-0.0902	-0.1353	-0.0561	-0.0952	-0.0640
IOWA CITY	-0.0089	-0.1839	0.3251	-0.1063	0.1097	0.0385	0.0392
EVANSTON	0.0261	-0.1528	0.3045	-0.0564	0.0862	-0.0597	-0.0378
UNIV OF CALIF	0.2325	-0.2299	-0.1365	0.0730	-0.1045	0.1695	0.1904
DALLAS PUBLIC	-0.3328	0.0813	0.0537	-0.0686	0.0620	0.1660	0.1850
CLAREMONT	0.1208	0.0887	-0.0643	-0.1482	-0.0903	-0.0632	0.1292
STEVEN F. AUSTIN	-0.0343	0.1011	-0.3081	0.0007	0.0994	0.4943	-0.0394

The average expected factor value is zero. The average scores will therefore include plus and minus values.

Fig. 4. Average Factor Scores, by Library.

Table 4. Relative Rankings on each Factor, by Library

	Factor: 1 Use of codes & abbreviations	2 Understanding displays	3 Entering commands	4 Search by subject	5 Search for known item	6 Delays	7 Library Services
Claremont	05	04	10	11	11	08	03
Dallas Public	13	05	05	08	06	03	02
Evanston	08	10	02	07	05	07	09
Iowa City	09	11	01	09	03	05	05
Library of Congress	12	02	11	10	10	10	11
Mankato	04	06	09	12	08	12	12
Mission	06	12	04	13	02	11	08
Northwestern	03	09	03	03	13	09	04
Ohio State	11	01	08	06	09	13	13
Pikes Peak	07	07	06	02	01	06	07
Stephen F. Austin	10	03	13	05	04	01	10
Syracuse	02	08	07	01	07	04	06
Univ. of California	01	13	12	04	12	02	01

We also believed that the "quasi heading" libraries should receive separate treatment in this analysis, because the unique design of the CLSI interface might not be comparable to that of other heading-display systems.

The results of this analysis show that the number of libraries in the top four and bottom four are roughly equal, except for factors 4 (subject searching), 6 (user patience), and 7 (library support). In these three cases, systems that display headings are heavily represented in the top four and underrepresented in the bottom four. The "quasi heading" libraries appear in neither the top nor the bottom four except in factors 2 (displays) and 3 (command and control), where they both appear in the top four.

It would appear, then, that systems displaying headings are particularly effective in improving user satisfaction with subject-searching features and in reducing causes of user impatience with the system; we are unable to interpret the relationship between heading display and satisfaction with library support services. The CLSI touch-screen system, however, should not be classed with the other heading-display systems; it has no particular advantage with regard to system problems except that displays are apparently more understandable and users have less difficulty with command and control (touching the screen).

Heading Display and User Satisfaction

Given that the display of subject headings is an apparent advantage in subject searching and in diminishing burdens on user patience, we conducted an analysis to determine whether this feature has any direct effect on user satisfaction, using the average response for each system on the five success/satisfaction variables in place of the seven mean factor scores. The rank-order standings for each system on the five success/satisfaction variable are shown in table 5. We discovered that:

1. *In all cases, subject heading-display systems are found in the top four* in disproportionate numbers.
2. The effect is more pronounced for questions 9 and 10 than for 5, 6 and 7; *heading display appears to have a more marked effect on overall attitudes* toward the online catalog than on feelings about the success of the most recent search completed.
3. The two *"quasi heading" systems (CLSI)* appear to be more than ordinarily satisfactory with respect to the most recent search, but *are associated with somewhat less favorable attitudes toward the online catalog in general.*

Keyword Searching Features

A detailed inspection of the data on task and user variables suggested that topic searching may have been more predominant in two systems that featured searching

*Table 5. Rank Order Standings for Each System on the Five Success/Satisfaction Variables**

	User Questionnaire				
	#5 Amount found	#6 Satisfaction with search	#7 Other things of interest	#9 Overall attitude	#10 Compared to Card Catalog
Claremont	04	07	03	04	08
Dallas Public	13	06	12	03	05
Evanston	08	08	08	07	04
Iowa City	12	13	09	02	02
Library of Congress	06	09	13	11	11
Mankato	09	10	10	13	12
Mission	10	12	06	12	13
Northwestern	07	11	01	10	09
Ohio State	11	05	07	09	10
Pikes Peak	02	02	02	01	01
Stephen F. Austin	03	04	11	06	06
Syracuse	05	03	04	05	07
Univ. of California	01	01	05	08	03

*A lower mean score indicates a higher level of success or satisfaction.

by keyword. This possibility was explored further.

The four systems that support keyword searching are the Library of Congress (MUMS/SCORPIO); Mankato State; University of California (MELVYL); and Syracuse University (SULIRS). Table 4 showed that the rate of topical searching in these four systems ranges from 76.5 percent to 48.1 percent. If the thirteen libraries were ranked in terms of relative frequency of topical searching, the keyword systems would stand at ranks 1 (Mankato), 3 (LC), 5 (UC) and 10 (Syracuse). It was found that systems with keyword searching do indeed receive more subject searching: 58 percent as opposed to 48 percent in systems without the keyword feature. The difference is statistically reliable at the 0.001 level or better.

Further analysis shows that keyword searching does not influence the five success/satisfaction variables either positively or negatively, except for question 9 (attitude toward the computer catalog), where a preponderance of keyword systems appears in the four systems where the online catalog was rated most favorably.

Observations

In a review of those systems that do well with subject searching, the majority displays the possible (valid) subject headings that result from the user's subject search and allow (force) the user to be more selective. Bibliographic information for those records associated with each subject heading are then displayed upon user command.

Thus, *what is needed is an additional type of user interface that focuses on the type of search*—subject search or known-item search—*in addition to the traditional dichotomy of the novice and experienced user interface* (menu versus command).

Systems with keyword searching receive more subject searching and have fewer problems in the areas of codes and abbreviations and *known-item searching*. However, such systems do not handle command and control issues well.

There appears to be no systematic influence on success and satisfaction as the result of using an online catalog with keyword searching.

LIBRARY SETTING

The majority of online catalog users discover the online catalog by seeing it in the library; they learn to use it by themselves and about one-third of the users required no assistance at all. Both online assistance and HELP should be provided by the online catalog, and the chief physical problem appears to be the lack of physical space surrounding the online catalog terminal itself.[6]

In this section we will examine the influence of three library support variables on user satisfaction:

Question 8: I got help in doing this com-

puter catalog search from: printed material, online instructions, etc.

Question 52: I first heard about this computer from:

Question 53: I learned how to use this computer catalog:

At least one library support variable appears as a statistically significant factor in at least one of the five regression analyses for each library system. On the whole, it seems to be less important to user success/satisfaction than either user or task characteristics, but library factors still play an important role. Of the three library variables, the most important appears to be the source of assistance used during the search just completed (appearing in twenty-seven of sixty-five regressions, or 42 percent), followed by the means used to learn the computer catalog (twenty times, 31 percent), and by the way in which the catalog came to the user's attention (fifteen times, 23 percent).

It would be interesting to discover what aspects of assistance, training, and notification contribute most to user satisfaction or dissatisfaction. To explore this question further, we tabulated the regression responses for each library variable entering a regression equation, classifying them as to whether they increased or decreased success and satisfaction.

Once more we found that values of question 8 (help in using the computer catalog) have the most influence on success and satisfaction, followed by questions 53 and 52 respectively. With regard to sources of help, use of printed or online assistance, or getting help from a person nearby, always appear to enhance success/satisfaction. Obtaining aid from library staff is not always helpful. Those who say they got no assistance are generally less satisfied than those who say they did. The use of printed and online aids appears most influential in the positive direction, and failing to secure help is most influential in the negative direction.

Respondents who learned to use the catalog from a friend, from online instructions, or from library staff appear generally more successful and satisfied. Learning from printed aids appears to have a mixed record. The number of times when staff assistance enters the regression equations emphasizes the importance of library-based programs in introducing the online catalog to users.

Observations

In sum, libraries are doing a fairly good job with the physical setting and, compared to the other variables that make up an online catalog, this is one area that does not deserve additional attention (provided some basic issues are addressed).

The analysis shows that it is important to provide some form of initial instruction as well as sources of continuing aid for users of the online catalog. It may be appropriate to provide multiple methods; online, print and personal. Even though users show a propensity to get along without help, those who seek no assistance do less well than those who got aid from one of these sources.

PROJECT FINDINGS

It is important to note that the results of the analysis for each of the online catalog systems are remarkably similar to those of the aggregate analysis. This finding is indeed good news in that the results of the aggregate analysis have been published and are being referred to frequently by library practitioners. Thus, this analysis of individual systems confirms the results of the aggregate analysis.

However, it is also somewhat disappointing that some stronger distinctions did not emerge, as we had hoped that a closer examination of the data would reveal differences—especially differences with regard to the system interface, which would lead to some exciting insights. But, alas, our expectations were dashed against the rocks of reality, or the reams of computer printouts produced during the course of this project.

The one significant finding that did emerge as a result of this project is that a fresh perspective is needed to assist the user of the online catalog with subject searching. While the amount of subject (topic) searching varies, subject searching clearly is the dominant type of search entered by most users of the online catalog.

Thus, we have suggested that a different system interface is needed for subject searching, as opposed to known-item searching. This suggestion, coupled with

the two modes of system interface—i.e., expert versus novice (command versus menu)—usually provided by designers of the online catalog, means that a minimum of four system interfaces may be needed. These four modes of system interface are reflected in the following system interface matrix:

	Type of User:	
	Novice	Expert
Type of Search:		
Subject	Novice/ Subject search	Expert/ Subject search
Known item	Novice/ Known-item search	Expert/ Known-item search

Based on the results of this analysis, we are also suggesting that the subject search *should* display the headings that are retrieved in response to a subject heading request.

In summary, the four principal findings of this project include:

1. The user characteristics that are most closely linked with success and satisfaction in using the online catalog are those that relate to experience with the library and its catalogs; the most important of these is frequent experience with the online catalog itself. Other user characteristics, such as age, sex, and academic status, affect attitudes indirectly, by affecting the frequency with which patrons use the library and its services.
2. Designers of online catalogs should develop interfaces that differentiate by the kind of search being performed as well as the level of experience of the user performing the search. The search task is as important as the experience of the user as a determinant of success and satisfaction. At least two key features of online catalogs, the display of headings and the use of keyword searching, are shown to have different effects, depending on whether users are conducting topical or author-title searches.
3. User attitudes adapt (perhaps rapidly) to the capabilities and limitations of the online catalogs they use. Users who search in systems supporting keyword capabilities tend to search by topic more frequently than in systems without this capability. Approaches to the online catalog appear to be conditioned by the degree of experience and familiarity with the card catalog, with experienced card catalog users being more likely to perform author-title searches. As discovered by Frohmberg and Moffett,[7] users adjust their attitudes to a new form or level of library service rather rapidly, so that even when the quality of service can be shown to have improved, over a relatively short period of time (at Oberlin, three to four years), measured attitudes return to levels that existed before the service was introduced.
4. The form and nature of training and user assistance are important. Those who receive at least some initial training and assistance are more satisfied and successful than those who do not; the best sources appear to be library staff, friends or other nearby users of the catalog, and online assistance. Likewise, those who neither sought nor received assistance during the search are less likely to report satisfaction or success; the most effective forms of assistance appear to be from printed or online sources.

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APPENDIX A.
CLR ONLINE CATALOG
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APPENDIX B. USER QUESTIONNAIRE

Council on Library Resources

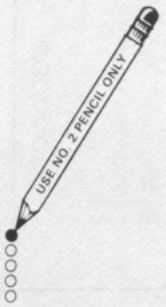
COMPUTER CATALOG STUDY

User Questionnaire

The library is conducting a study of its computer catalog to improve it. This questionnaire is a way to communicate your views. It should take you only about 15 minutes to complete. Your responses are confidential. Please do not write your name anywhere on the questionnaire. Thank you.

MARKING INSTRUCTIONS

- USE A NO. 2 PENCIL ONLY.
- FILL THE CIRCLES COMPLETELY.
- BE SURE TO ERASE CLEANLY ANY MARKS YOU WISH TO CHANGE.
- MAKE NO STRAY MARKS ON THIS QUESTIONNAIRE.



22179

DO NOT WRITE IN THIS AREA

NCS Trans Optic 05 15301 321

PART 1: ABOUT YOUR MOST RECENT SEARCH

INSTRUCTIONS: Please answer these questions about the computer catalog search you just completed.

1. I came to this computer search with: (Mark ALL that apply)

- a. A complete author's name ○
- b. Part of an author's name ○
- c. A complete title ○
- d. Part of a title ○
- e. A topic word or words ○
- f. A subject heading or headings ○
- g. A complete call number ○
- h. Part of a call number ○

2. By searching this computer catalog I was trying to find: (Mark ALL that apply)

- a. A specific book, journal or magazine ○
- b. Books, journals or magazines on a topic or subject ○
- c. Books by a specific author ○
- d. Information such as publisher, date, spelling of a name, etc. ○
- e. If a book that I know the library has is available for my use ○
- f. Another library that has a book, journal or magazine that I want ○

3. I searched for what I wanted by: (Mark ALL that apply)

- a. A complete author's name ○
- b. Part of an author's name ○
- c. A complete title ○
- d. Part of a title ○
- e. A topic word or words ○
- f. A subject heading or headings ○
- g. A complete call number ○
- h. Part of a call number ○

4. I need this information for: (Mark ALL that apply)

- a. Recreational uses ○
- b. Making or fixing something ○
- c. My work or job ○
- d. Personal interest ○
- e. A hobby ○
- f. Class or course reading ○
- g. A course paper or report ○
- h. A thesis or dissertation ○
- i. Writing for publication ○
- j. Teaching or planning a course ○
- k. Keeping up on a topic or subject ○

5. In this computer search I found: (Mark ONE only)

- a. More than I was looking for ○
- b. All that I was looking for ○
- c. Some of what I was looking for ○
- d. Nothing I was looking for ○

6. In relation to what I was looking for, this computer search was: (Mark ONE only)

- a. Very satisfactory ○
- b. Somewhat satisfactory ○
- c. Somewhat unsatisfactory ○
- d. Very unsatisfactory ○

7. I came across things of interest other than what I was looking for:

- a. YES ○
- b. NO ○

8. I got help in doing this computer catalog search from: (Mark ALL that apply)

- a. Printed material or signs ○
- b. Instructions on the terminal screen ○
- c. Library staff member ○
- d. Person nearby ○
- e. I did not get help ○

9. **My overall or general attitude toward the computer catalog is:**
(Mark ONE only)

a. Very favorable ○
b. Somewhat favorable ○
c. Somewhat unfavorable ○
d. Very unfavorable ○

10. **Compared to the card, book, or microfiche catalog in this library, the computer catalog is:**
(Mark ONE only)

a. Better ○
b. About the same ○
c. Worse ○
d. Can't decide ○

PART 2: YOUR EXPERIENCE WITH COMPUTER CATALOG FEATURES

INSTRUCTIONS: Mark the single column for each question that corresponds most closely to how you feel. If the statement does not apply to your experience at the computer catalog, mark the column, "Does Not Apply".

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE	DOES NOT APPLY
11. A computer search by title is difficult	○	○	○	○	○	○
12. A computer search by author is easy	○	○	○	○	○	○
13. A computer search by subject is difficult	○	○	○	○	○	○
14. A computer search by call number is easy	○	○	○	○	○	○
15. A computer search by combined author/title is difficult	○	○	○	○	○	○
16. Remembering commands in the middle of the search is easy	○	○	○	○	○	○
17. Finding the correct subject term is difficult	○	○	○	○	○	○
18. Scanning through a long display (forward or backward) is easy	○	○	○	○	○	○
19. Increasing the result when too little is retrieved is difficult	○	○	○	○	○	○
20. Reducing the result when too much is retrieved is easy	○	○	○	○	○	○
21. Understanding explanations on the screen is difficult	○	○	○	○	○	○
22. Using codes or abbreviations for searching is easy	○	○	○	○	○	○
23. Abbreviations on the screen are easy to understand	○	○	○	○	○	○
24. Locating call numbers on the screen is difficult	○	○	○	○	○	○
25. Searching with a short form of a name or a word (truncation) is easy	○	○	○	○	○	○

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE	DOES NOT APPLY
26. Using logical terms like AND, OR, NOT is difficult	○	○	○	○	○	○
27. Remembering the exact sequence or order of commands is easy	○	○	○	○	○	○
28. Understanding the initial instructions on the screen is difficult	○	○	○	○	○	○
29. Understanding the display for a single book, journal or magazine is easy	○	○	○	○	○	○
30. Understanding the display that shows more than a single book, journal or magazine is difficult	○	○	○	○	○	○
31. Interrupting or stopping the display of information is easy	○	○	○	○	○	○
32. Typing in exact spelling, initials, spaces and hyphens is difficult to do	○	○	○	○	○	○
33. Knowing what is included in the computer catalog is easy to remember	○	○	○	○	○	○
34. The order in which items are displayed is easy to understand	○	○	○	○	○	○
35. Displayed messages are too long	○	○	○	○	○	○

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE	DOES NOT APPLY
36. Selecting from a list of choices takes too much time	○	○	○	○	○	○
37. Entering commands when I want to during the search process is difficult	○	○	○	○	○	○
38. The rate at which the computer responds is too slow	○	○	○	○	○	○
39. The availability of signs and brochures is adequate	○	○	○	○	○	○
40. Signs and brochures are not very useful	○	○	○	○	○	○
41. The staff advice is often not helpful	○	○	○	○	○	○
42. It is hard to find a free terminal	○	○	○	○	○	○

YOU ARE MORE THAN HALF - WAY DONE

PART 3: IMPROVING THE COMPUTER CATALOG

INSTRUCTIONS: Select the response or responses that best reflect your views about changes that should be made in the computer catalog.

43. When I use the computer catalog terminal: (Mark YES or NO)

	YES	NO
a. The keyboard is confusing to use	○	○
b. There is too much glare on the screen	○	○
c. The letters and numbers are easy to read	○	○
d. The lighting around the terminal is too bright	○	○
e. There is enough writing space at the terminal	○	○
f. Nearby noise is distracting	○	○
g. The terminal table is too high or too low	○	○
h. The printer is easy to use	○	○

44. Select up to FOUR additional features you would like this computer catalog to have:

- a. Providing step by step instructions ○
- b. Searching by any word or words in a title ○
- c. Searching by any word or words in a subject heading ○
- d. Limiting search results by date of publication ○
- e. Limiting search results by language ○
- f. Ability to search by journal title abbreviations ○
- g. Ability to change the order in which items are displayed ○
- h. Ability to view a list of words related to my search words ○
- i. Ability to search for illustrations and bibliographies ○
- j. Ability to search by call number ○
- k. Ability to print search results ○
- l. Ability to search a book's table of contents, summary or index ○
- m. Ability to know if a book is checked out ○
- n. Ability to tell where a book is located in the library ○
- o. None ○

45. Select up to FOUR computer catalog service improvements you would like the library to make:

- a. More terminals ○
- b. Terminals at locations other than near the card catalog ○
- c. Terminals at places other than library buildings ○
- d. A chart of commands posted at the terminal ○
- e. A manual or brochure at the terminal ○
- f. An instruction manual for purchase ○
- g. Training sessions ○
- h. Slide/tape/cassette training program ○
- i. None ○

46. Select up to FOUR kinds of material you would like to see added to the computer catalog:

- a. Dissertations ○
- b. Motion picture films ○
- c. Government publications ○
- d. Journal or magazine titles ○
- e. Maps ○
- f. Manuscripts ○
- g. Music scores ○
- h. Newspapers ○
- i. Phonograph records or tapes ○
- j. Technical reports ○
- k. More of the library's older books ○
- l. None ○
- m. Other ○

47. BRIEFLY DESCRIBE ANY OTHER PROBLEMS WITH THIS COMPUTER CATALOG OR CHANGES YOU WOULD LIKE MADE TO IT: ○

PART 4: ABOUT YOURSELF

INSTRUCTIONS: Your responses are confidential. Please do not write your name anywhere on this questionnaire.

48. I come to this library:

a. Daily ○
b. Weekly ○
c. Monthly ○
d. About four times a year ○
e. About once a year ○
f. Not before today ○

49. I use this computer catalog:

a. Every library visit ○
b. Almost every visit ○
c. Occasionally ○
d. Rarely ○
e. Not before today ○

50. I use this library's book, card or microfilm catalog:

a. Every visit ○
b. Almost every visit ○
c. Occasionally ○
d. Rarely ○
e. Never ○

51. I use a computer system other than the library's computer catalog:

a. Daily ○
b. Weekly ○
c. Monthly ○
d. About four times a year ○
e. About once a year ○
f. Never ○

52. I first heard about this computer catalog from: (Mark ONE only)

a. Noticing a terminal in the library ○
b. Library tour, orientation or demonstration ○
c. An article or written announcement ○
d. A course instructor ○
e. A friend or family member ○
f. Library staff ○

53. I learned how to use this computer catalog: (Mark ALL that apply)

a. From a friend or someone at a nearby terminal ○
b. Using printed instructions ○
c. Using instructions on the terminal screen ○
d. From the library staff ○
e. From a library course or orientation ○
f. From a slide/tape/cassette program ○
g. By myself without any help ○

54. My age group is:

a. 14 and under ○
b. 15 - 19 years ○
c. 20 - 24 years ○
d. 25 - 34 years ○
e. 35 - 44 years ○
f. 45 - 54 years ○
g. 55 - 64 years ○
h. 65 and over ○

55. I am:

a. Female ○
b. Male ○

56. Mark your current or highest educational level: (Mark ONE only)

a. Grade School or Elementary School ○
b. High School or Secondary School ○
c. Some College or University ○
d. College or University Graduate ○

If you are not completing this questionnaire at a college or university, please stop here. Thank you.

If you are completing this questionnaire at a college or university, please continue.

57. The category that best describes my academic area is: (Mark ONE only)

a. Arts and Humanities ○
b. Physical/Biological Sciences ○
c. Social Sciences ○
d. Business/Management ○
e. Education ○
f. Engineering ○
g. Medical/Health Sciences ○
h. Law ○
i. Major not declared ○
j. Interdisciplinary ○

58. The main focus of my academic work at the present time is:
(Mark ALL that apply)

a. Course Work ..... ○
b. Teaching ..... ○
c. Research ..... ○

59. My present affiliation with this college or university is:

a. Freshman/Sophomore ..... ○
b. Junior/Senior ..... ○
c. Graduate - masters level ..... ○
d. Graduate - doctoral level ..... ○
e. Graduate - professional school ..... ○
f. Faculty ..... ○
g. Staff ..... ○
h. Other ..... ○

Thank you for participating in this study of the computer catalog. This completes the questionnaire. Please return it.

SUPPLEMENTARY QUESTIONNAIRE ITEMS

60 ○○○○○○○○○○○○○○○○
61 ○○○○○○○○○○○○○○○○
62 ○○○○○○○○○○○○○○○○
63 ○○○○○○○○○○○○○○○○
64 ○○○○○○○○○○○○○○○○

OCLC UPDATE

LS/2000 Micro Series—available for small libraries without large system prices.

"There is no comparable system for small libraries that can match LS/2000's price and comprehensive features including true keyword access and separately searchable locations."—Dr. Richard Dick, Director of Local Systems and Microcomputer Applications.

The new LS/2000 Micro Series provides economically designed systems for small libraries, specialized subcollections or libraries needing "starter systems" with upward compatibility. Cost-saving standard profiles are currently available for medical, legal, corporate, academic and public libraries.

The LS/2000 Micro Series incorporates powerful functions and features you'd expect to find in much larger systems—complete integrated software with keyword access, Winchester disk technology, and a fast, reliable backup system.

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It's priced right. . . because you acquire only the capacity you really need.

Because it operates in a standard office environment, the system requires no costly computer room preparation.

Because it uses the same data format as the LS/2000 automated system for large libraries, conversion is much easier as your needs and budget grow.

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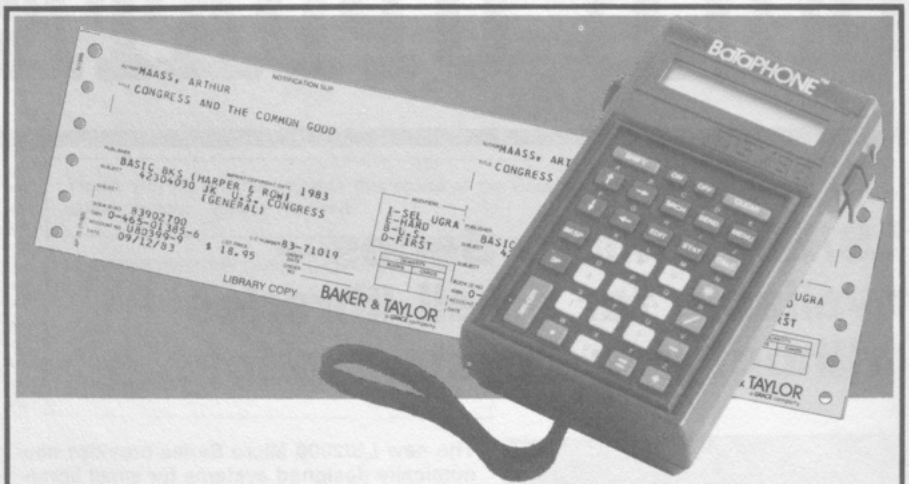

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Communications

Use of Optical Disks for Information Storage and Retrieval

John C. Gale

The opportunity for interactive access to information via telecommunications was introduced in the 1960s, less than twenty years ago. These timesharing systems allowed Boolean access to either full text or abstract textual information or to numeric information.

A new development promises to radically alter concepts of electronic information distribution. Optical storage technologies first researched in 1929 are coming of age. They enable the storage of billions of characters of information in a microcomputer environment.

Timeshared access to commercial computer databases has enjoyed tremendous growth over the past few years. This clearly reflects user needs for information and a willingness to pay for this service. Unfortunately, in most cases the information is only accessible to trained searchers. A layperson must usually learn access techniques that are difficult to remember without frequent usage. In most cases costs are not easily controlled by management.

At the same time there has been an explosion in personal computer sales. The IBM PC, introduced in late 1981, has set standards for the marketplace and influenced the sale of "IBM-compatible" microcomputers. As microcomputers penetrate the office, their users tend to be significantly less "computer literate" than the users of mainframe and minicomputer systems. They therefore are insisting on "user friendly" software that they can understand and use. The ease of using packages such as VisiCalc and Lotus 1.2.3 has spawned a whole new era of demands for easily learned software.

Users' desire for local control over computer power has increased as more and more microcomputers are used effectively by managerial, professional, and clerical staff. One of the features that they especially appreciate is the ability to control computer costs charged to their departments.

Unfortunately, there is also confusion in the eyes of lay people. As they view the microcomputer world, they see scores of alternatives for virtually every purchase: microcomputers, printers, spreadsheets, and word processors, ad infinitum. As a result, users wish to purchase products from companies with professionals who understand the technology and can provide stable solutions to known problems.

INTERNATIONAL THOMSON/ CARROLLTON PRESS

International Thomson specializes in publishing for professional markets with major offerings for the library, legal, financial, medical, engineering, and education communities. Carrollton Press is one of the Thomson companies that serves the library community. Its REMARC database is the complete shelflist of the Library of Congress in machine-readable form. In the past this has been used primarily to assist libraries in retrospective conversion from card catalogs to online catalogs. The REMARC database includes 4.2 million records that are not included in MARC as well as the 2 million records in MARC. In early 1985 it will be complemented by an additional 300,000 records, from the LC Law Library, not previously included in either database. These, plus some 250,000 law records already in MARC and REMARC, will make up a new, separate database called LAWMARK.

Thomson has been monitoring optical

John C. Gale is vice-president, International Thomson Information Inc.

storage technologies for the past two years. This past spring it became reasonable to test this technology with a prototype product in a microcomputer environment. The result was MARVLS (MARC and REMARC Videodisc Library System), which was demonstrated at the American Library Association Conference in Dallas in June 1984, at the American Bar Association Conference in Chicago in August, and at the Integrated Online Library Systems Conference in Atlanta in September.

OPTICAL STORAGE TECHNOLOGIES

An American, Reginald F. Friebus, is credited with inventing the optical videodisc in 1929. The first prototype using lasers for recording and playback was demonstrated by Phillips in 1972. MCA demonstrated a similar capability in the same time period.

Phillips has remained a leader in this technology, demonstrating an optical disc recorder in 1978 and a compact digital audiodisc in 1979. Significant advances have occurred in the 1980s. They include Phillips' initiation of a technique now known as DRAW (direct read after write). In this method a block of data is written, then immediately read to check its accuracy, and rewritten if in error. The first work was done by Magnavox and Phillips, with other early advances by Exxon, RCA, Thomson CSF, Xerox, and Toshiba.

Future developments in this area will include larger storage capacities and faster access times. Other advancing technologies include the CDROM, the digital data version of the compact audiodisc. It shares low replication costs and is currently manufactured as a high fidelity component. Forty companies hold licenses to manufacture this product. Storage Technology, Optimen (Xerox), Thomson CSF, Hitachi, NEC, and others are reported to be working on WORM (write once, read many) technology. Eraseable DRAW products are also a possible future offering.

There are three current optical storage technologies that deserve discussion. They are analog videodisc, digital optical disc, and digitally encoded videodisc. Digital optical storage devices enable storage of character and numeric information as well as digitized images. Replication of discs is expensive: it requires a file copy command to be executed by a person, and it can produce only one copy at a time. The user can make changes to data on the disc.

Analog videodisc has been in use for the distribution of movies for several years. It stores sound and can be used for the storage of individual pictures or frames. Also, its use as a component in interactive video for education and industrial training purposes began in the early 1980s. The cost of a replicate disc is relatively low. However, digital information cannot be stored. Users can not alter disc contents.

Digitally encoded videodisc combines the best features of both of these products from a database standpoint. It takes advantage of the low replication cost of the analog videodisc and the digital character storage capabilities of the digital optical disc. It is this product that was chosen for use in the product prototype.

In almost all cases products have been developed as rotating disc media, although some have experimented with fixed rectangles. Most are reflective technologies (they bounce a laser beam off a surface and test for a reflected beam). The reflectiveness of the surface is changed by burning pits or by forming bubbles. The most popular disc size is 12 inches, but some have developed 14-inch discs, and others are working on $4^{3}/_{4}$-inch media.

Vendors of digital optical disc drives include the Shugart/Optimem Division of Xerox, Thomson CSF, Storage Technology, and others. Analog videodisc drive vendors are numerous, including Sony, Pioneer, Panasonic, JVC, and Magnavox. Currently, Reference Technology and Laserdata offer digitally encoded videodisc systems.

Issues that an information provider should consider when selecting a hardware vendor's product vary with application considerations, but include storage capacity, data access time, data error rates, disc replication costs, media life, hardware cost per usable character of storage space, user write restrictions, compatibility with industry standards, customer support, and corporate stability.

STORING INFORMATION ON A DIGITALLY ENCODED VIDEODISC

The first stage in storing a database on a digitally encoded videodisc is obtaining a machine-readable copy of the database. Secondly, any desired indices are created. The resulting magnetic tapes are sent to a service bureau such as Reference Technology or Laserdata, which can translate the digital information into a videotape. The videotape is then sent to a mastering facility such as 3M. The mastering unit staff create one master disc that is used to stamp out thousands of copies of the disc, thus creating copies of the database. These discs are usually plastic with an aluminum reflective coating on the back. Two discs can be mounted back-to-back to form a double-sided disc.

The digitally encoded videodiscs can be compared to magnetic storage media in several ways. One is storage capacity. One of these discs holds one billion characters or one gigabyte of information. A "3350"-style magnetic disc drive can hold about three hundred thousand characters, or 30 percent as much. Ten reels of magnetic tape hold as much information as the optical disc. The same data could be stored on twelve to twenty-five hundred microfiche or on fifty to five hundred thousand pages of text.

Information on a magnetic disc can be changed by the user. Database distribution requires "read only" access by the user, so the digitally encoded videodisc is ideal. Both use a "head" to read data. However, the laser head is substantially further from the surface of the media, eliminating concern for head "crashes." Storage densities are currently ten to one hundred times higher with optical technology. In addition, longer archival life of the discs seems assured. Finally, the cost of making a copy of the database is substantially lower.

THE MARVLS PROTOTYPE

The first objective in creating a product prototype was to validate the technology. The second objective was to demonstrate MARVLS and observe prospective customer reactions.

Microcomputer software was developed that enables Boolean searching of a database on an optical disk using an IBM PC with 512K of random access memory. This software provides "user friendly" access to the information desired. When the user enters a query, the software passes a command to the disc drive via the hardware interface. The video disc drive bounces a laser beam off the disc. A photodetector detects the reflected beam and reconstructs the video signal. An analog-to-digital converter recreates the digital information and passes it back to the software. The result is displayed on the screen.

MARVLS is a desktop system. The final product will contain the entire MARC, REMARC, and LAWMARC databases on optical storage media. The prototype contains 228,000 records from the bibliographic (Z) and education (L) classes of the REMARC and MARC databases and appropriate indexing stored on a digitally encoded videodisc. Other components of the system are access software, a microcomputer, and an optical storage drive with interface.

Naturally, future product opportunities include a number of offerings for various vertical markets. These may be structured as single workstation systems, as is MARVLS, or as multiple-user microcomputer or minicomputer systems. Local area network systems are another strong possibility. In some cases multiple optical disc drives may be used. The information itself may be character, numeric, digitized or analog image, or audio in nature.

The primary advantage is local control of the system with known costs, as the costs for the hardware and information subscription are fixed. There are no telecommunications charges. The databases are easily browsed at no additional expense to the user. Substantial storage capacity is available with reasonable response times. Privacy to the searcher is another key benefit.

Database copies are easily produced and distributed by mail to users. For those with storage space concerns, the optical disc has been described as one hundred shelf feet in one-fourth inch of shelf space.

SUMMARY

Optical storage technologies provide a

new dimension in information access. The elements needed to make it happen have been developed, with personal computers providing the vehicle for access. Over the next few years these capabilities could revolutionize our ability to access information. ■■

Report on the Technical Services Directors of Large Research Libraries Survey of Minimal-Level Cataloguing

Michael Gorman

In January 1984, a survey of the Technical Services Directors of Large Research Libraries (TSDLRL) Discussion Group of RTSD (see Appendix A) on the use of limited or minimal cataloging was undertaken. A questionnaire intended to elicit responses concerning the institutions represented in TSDLRL and their use of "official" and "unofficial" types of minimal cataloging, and the methods of distribution of those minimal records (see Appendix B), was circulated to the group. All members responded by March 1984, and this paper presents a summary of those responses. (Note that the Library of Congress [LC], though a member of TSDLRL, was not asked to respond to this survey because its use of minimal cataloging, like other aspects of its work, is extensive and peculiar to that unique institution.) The survey was in no sense scientific, and may distress those who believe that librarianship begins and ends with the mastery of the chi-square. However, it does deliver information worth pondering and does suggest further lines of inquiry. The chief inquiry would add numbers of items, volumes, etc., to the categories listed in this report.

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The number of institutions surveyed was twenty-five. The number of responses received was twenty-five. The return rate was, therefore, 100 percent.

The first question dealt with the use and creation of National Level Minimal Bibliographic Records (NLMBR), as defined by documents issued by LC setting out the form and content of such records. The number of institutions using this standard was eight (32 percent).

The second question dealt with the categories of material that were cataloged according to the NLMBR standard. The answers were, as might be expected, diverse. In the following list, I have categorized the types of material and would point out that this listing does not purport to either assign value judgements or indicate the importance or quantity of materials described therein. (Each category was reported by one library unless a number is given, in parentheses, after the name of the category.)

Materials by type:
Pamphlets
Theses:
  Local
  American
  University Microfilm theses
Monographs more than four years old
Analytics
Radio, TV, and movie scripts
Art exhibition catalogues (two)
Audiocassettes of speeches

Materials by language:
Foreign language monographs
English monographs other than those on core subject (medicine)

Materials by subject, etc.:
Some science items
Some belles lettres
Africana pamphlets
Rabbinic materials

Materials chosen because of local conditions:
Items selected by bibliographers for minimal cataloguing
Items selected because subject access not deemed important
Older uncatalogued materials
Some gift collections
Items in languages in which the library lacks linguistic expertise
Some items with only one personal heading
Some translated articles

All of the eight libraries creating NLMBR records distributed those records to other libraries by one means or another.

These records are distributed in some instances through two systems.

Systems through which NLMBR records are distributed

System	No. of TSDLRL libraries distributing
RLIN	5
OCLC	2
UTLAS	2
MELVYL	1

In additional to those listed, one institution indicated that it would be preparing NLMBR records and distributing them through RLIN in the near future.

Of the twenty-five libraries surveyed, fourteen (56 percent) admitted to using a form of minimal-level cataloging other than that set out in the NLMBR specifications for at least some materials.

Of those fourteen libraries, eleven claimed to be using a "standard" for this minimal-level cataloging. However, the "standards" described by five of the respondents seemed to be without other than narrowly local sanction and I have, therefore, added them to the "non-standard" list. The six remaining libraries used, as their "standard":

MELVYL standards
RLG base level
AACR2 first level
CONSER (for fields used)
OCLC K level
LCS

The fourteen libraries using minimal-level cataloging other than NLMBR used it for a wide range of classes of material. I have categorized these in the same manner as for NLMBR records (see above), and the same qualifications apply.

Materials by type:
Microforms:
  master negatives
  other than master negatives
  for rare book collection
Dissertations:
  local (four)
  other than local
Serials:
  those not retained beyond current year
  scattered runs
  U.S. documents
Analytics
Corporate annual reports
Curriculum materials
Monographs more than three years old
Children's books (special collection)
Dime novels (special collection)
Some pamphlets (two)
ERIC documents
Current newspapers
Local technical reports

Materials by language:
Public Administration Library monographs
Architectural drawings
Judaica
Some archival materials

Materials chosen because of local conditions:
Low-use items with distinctive titles (keyword retrievable)
Some special collections

Of the fourteen libraries doing minimal-level cataloging other than that mandated by NLMBR, ten made those records available to other libraries, one made some of those records available, and three did not make those records available. Of the latter three, two declared that they would make such records available soon.

Seven libraries make their non-NLMBR records available through RLIN, two through OCLC, two through MELVYL, one through LCS, and one through publication of its catalog. (As before, these figures include libraries that make their records available through more than one agency.) The two libraries that intend to make their non-NLMBR records available in the future will use RLIN, in one case, and NUC, in the other.

The foregoing represents a summary of the use of NLMBR and other minimal-level cataloging by the largest research libraries in North America. Of that group, some use no minimal-level cataloging, some use one or the other method, and some use both.

Number using no minimal cataloging: seven

Number using only NLMBR: four

Number using only non-NLMBR minimal cataloging: ten

Number using both NLMBR and non-NLMBR: four

It is evident that there is considerable diversity among the largest research libraries in their use of limited or minimal-level cataloging. This report cannot, and does not aspire to, give more than the beginning of an outline of an approach to this important matter. It does suggest lines of inquiry that might profitably be pursued by others.

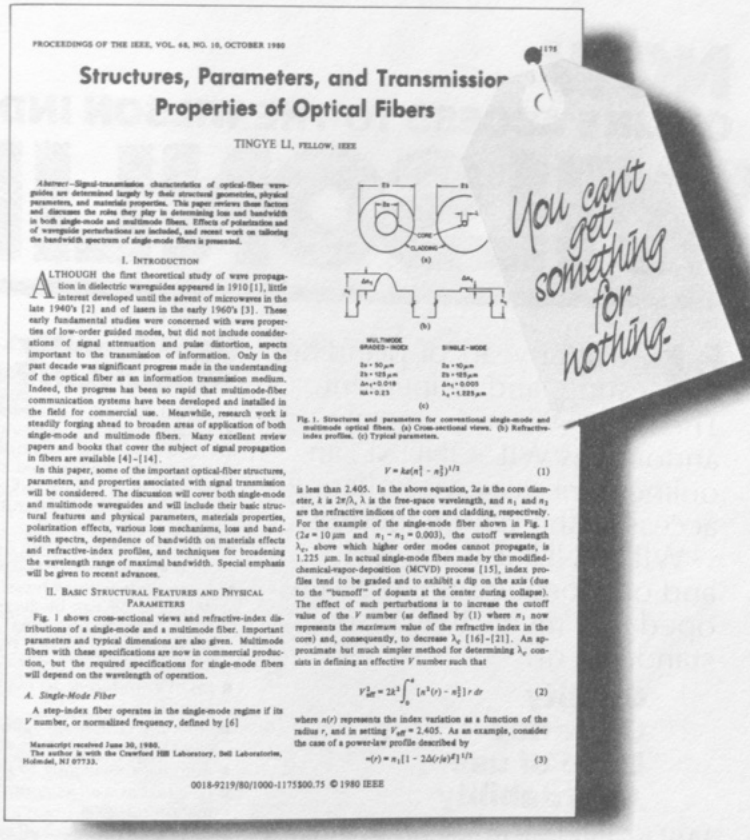
APPENDIX A. TSDLRL LIBRARIES SURVEYED

University of California–Berkeley Library
Columbia University Library
Harvard College Library
University of Minnesota Library
National Library of Medicine
Northwestern University Library
Princeton University Library
University of Toronto Library
Yale University Library
University of California–Los Angeles Library
Cornell University Libraries
Indiana University Libraries
University of Michigan Library
New York Public Library
Ohio State University Libraries
Stanford University Libraries
University of Washington Libraries
University of Chicago Libraries
Duke University Libraries
National Agricultural Library
New York University Libraries
University of Pennsylvania Libraries
University of Texas–Austin Libraries
University of Wisconsin–Madison Libraries
University of Illinois–Urbana-Champaign Library

APPENDIX B. SAMPLE OF QUESTIONNAIRE TO TSDLRL MEMBER LIBRARIES

(This questionnaire is concerned only with short records for items held by the library. It does *not* include order and other in-process records.)

1. Do you do minimal cataloguing according to the National Level Minimal Bibliographic Record?
   Yes [ ]
   No [ ]
2. If yes, list the *broad* categories of material which you catalogue in this way.
3. Do you make these records available to other institutions?
   Yes [ ]
   No [ ](Go to 5)
4. If yes, how?
   OCLC [ ] RLIN [ ] WLN [ ] UTLAS [ ] OTHER [ ] Please specify.
5. Do you do less-than-full-standard cataloguing other than that listed in Question 1?
   Yes [ ] (Please answer 6-9)
   No [ ]
6. If yes, does your cataloguing obey any "standard"?
   Yes [ ] (Please specify)
   No [ ]
7. If yes, list the *broad* categories of material which you catalogue in this way.
8. Do you make these records available to other libraries?
   Yes [ ]
   No [ ]
9. If yes, how?



PROCEEDINGS OF THE IEEE, VOL. 68, NO. 10, OCTOBER 1980

Structures, Parameters, and Transmission Properties of Optical Fibers

TINGYE LI, FELLOW, IEEE

Abstract—Signal-transmission characteristics of optical-fiber waveguides are determined largely by their structural geometries, physical parameters, and materials properties. This paper reviews these factors and discusses the roles they play in determining loss and bandwidth in both single-mode and multimode fibers. Effects of polarization and of waveguide perturbations are included, and recent work on tailoring the bandwidth spectrum of single-mode fibers is presented.

I. Introduction

ALTHOUGH the first theoretical study of wave propagation in dielectric waveguides appeared in 1910 [1], little interest developed until the advent of microwaves in the late 1940's [2] and of lasers in the early 1960's [3]. These early fundamental studies were concerned with wave properties of low-order guided modes, but did not include considerations of signal attenuation and pulse distortion, aspects important to the transmission of information. Only in the past decade was significant progress made in the understanding of the optical fiber as an information transmission medium. Indeed, the progress has been so rapid that multimode-fiber communication systems have been developed and installed in the field for commercial use. Meanwhile, research work is steadily forging ahead to broaden areas of application of both single-mode and multimode fibers. Many excellent review papers and books that cover the subject of signal propagation in fibers are available [4]–[14].

In this paper, some of the important optical-fiber structures, parameters, and properties associated with signal transmission will be considered. The discussion will cover both single-mode and multimode waveguides and will include their basic structural features and physical parameters, materials properties, polarization effects, various loss mechanisms, loss and bandwidth spectra, dependence of bandwidth on materials effects and refractive-index profiles, and techniques for broadening the wavelength range of maximal bandwidth. Special emphasis will be given to recent advances.

II. Basic Structural Features and Physical Parameters

Fig. 1 shows cross-sectional views and refractive-index distributions of a single-mode and a multimode fiber. Important parameters and typical dimensions are also given. Multimode fibers with these specifications are now in commercial production, but the required specifications for single-mode fibers will depend on the wavelength of operation.

A. Single-Mode Fiber

A step-index fiber operates in the single-mode regime if its V number, or normalized frequency, defined by [6]

$$V = ka(n_1^2 - n_2^2)^{1/2} \tag{1}$$

is less than 2.405. In the above equation, $2a$ is the core diameter, k is $2\pi/\lambda$, λ is the free-space wavelength, and n_1 and n_2 are the refractive indices of the core and cladding, respectively. For the example of the single-mode fiber shown in Fig. 1 ($2a = 10\ \mu m$ and $n_1 - n_2 = 0.003$), the cutoff wavelength λ_c, above which higher order modes cannot propagate, is $1.225\ \mu m$. In actual single-mode fibers made by the modified-chemical-vapor-deposition (MCVD) process [15], index profiles tend to be graded and to exhibit a dip on the axis (due to the "burnoff" of dopants at the center during collapse). The effect of such perturbations is to increase the cutoff value of the V number (as defined by (1) where n_1 now represents the *maximum* value of the refractive index in the core) and, consequently, to decrease λ_c [16]–[21]. An approximate but much simpler method for determining λ_c consists in defining an effective V number such that

$$V_{\text{eff}}^2 = 2k^2 \int_0^a [n^2(r) - n_2^2]\, r\, dr \tag{2}$$

where $n(r)$ represents the index variation as a function of the radius r, and in setting $V_{\text{eff}} = 2.405$. As an example, consider the case of a power-law profile described by

$$n(r) = n_1[1 - 2\Delta(r/a)^g]^{1/2} \tag{3}$$

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Fig. 1. Structures and parameters for conventional single-mode and multimode optical fibers. (a) Cross-sectional views. (b) Refractive-index profiles. (c) Typical parameters.

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Bibliographic Record Maintenance in the Online Environment

Judith Hudson

The online catalog is receiving a great deal of attention as more and more libraries plan integrated automated systems. Although much has been written about online catalogs, most of the material has concentrated on public access[1] or has described various types of online catalogs.[2] Aside from the subject of quality control[3] and authority control,[4] there is little in print about the maintenance of bibliographic records in the online environment. In order to plan effectively for integrated automated systems, librarians responsible for bibliographic maintenance must understand how bibliographic records are maintained in online catalogs. This paper describes methods used for the maintenance of bibliographic records in online catalogs and compares them with maintenance in the conventional card catalog. It concludes with a discussion of the similarities and differences between the two types of catalogs and some reflections on the impact of the online catalog on bibliographic record maintenance operations.

Bibliographic records are the basic element of library catalogs. Maintaining these bibliographic records is vital to the success of a catalog. There are five components of the maintenance of bibliographic records in a catalog: addition of bibliographic records to the catalog, identification and correction of errors, application of authority control, addition of information to the records, and withdrawal of records from the catalog. These components must operate regardless of the form of the catalog.

ADDITION OF BIBLIOGRAPHIC RECORDS

In looking at the first component of bibliographic maintenance, it is important to distinguish between the creation of bibliographic records and their entry into a catalog. Bibliographic records are created by catalogers who provide, in a structured format, bibliographic and subject information about an item of library material. Once created, the record may be treated in a number of ways, e.g., printed on catalog cards, coded in machine-readable form and stored on magnetic tape or disks, filmed and distributed on microfiche. In the end, however, the record will be entered into a file from which it can be retrieved by controlled access points.

The storage of bibliographic records in an online catalog differs from storage in a card catalog. The online catalog contains a single authoritative copy of each bibliographic record in a master bibliographic file and indexes containing entries for each access point in the master bibliographic file. In the card catalog, a copy of the cataloging record is placed at each access point assigned to an item. As a result the method of entering bibliographic records varies between online catalogs and card catalogs.

In the online catalog bibliographic records are keyed directly into the catalog, tape-loaded, or transferred directly from a bibliographic utility such as OCLC or RLIN. Direct keying occurs most often when brief or temporary records with limited bibliographic information are desired and machine-readable records are not available. Tape-loading is often used for the entry of retrospectively converted bibliographic records. Tapes containing bibliographic records in machine-readable form may be obtained by contracting with a vendor, by purchasing Library of Congress MARC tapes, or by purchasing archival tapes of materials cataloged through a bibliographic utility. Direct transfer of records from the bibliographic utility is often used for the day-to-day addition of new material to the online catalog. The terminals used to access the bibliographic utility are connected directly to the computer that operates the online catalog. As cataloging records are produced through the utility, the cataloging information is fed into the online catalog.

Bibliographic records enter the card catalog via manual filing. One copy of the bib-

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liographic record is placed in the catalog at each access point. In the online catalog one copy of the record is entered into the catalog, and the record is accessed via indexes. Since the bibliographic record is entered into the catalog just once, the addition of records is more efficient in the online catalog.

ERROR DETECTION AND CORRECTION

The second component of the maintenance of bibliographic records is the identification and correction of errors. A variety of methods are provided for detecting errors in online catalogs. These include automatic error detection, the catalog review file, the authority control system (which will be discussed in the next section), and the provision of offline printed listings.

As each new bibliographic record enters the catalog, it can be checked automatically to ensure that certain types of errors are not present. For example, the system can check to see whether required fields, subfields, tags, and indicators are included in the record. In addition, it can identify invalid or suspicious tags, indicators, and fixed-field codes. Another type of error that can be automatically detected is the omission of a field that must appear in conjunction with another (e.g., the omission of a series tracing when a series traced in another form field is present in a MARC record). When these errors are detected, the offending fields can be flagged and the records sent to a catalog review file.

The catalog review file, which has no counterpart in card catalog systems, contains records that require the attention of library staff. It provides the unit responsible for bibliographic maintenance with an opportunity to review records as they enter the master bibliographic file and at the time they need correction. Staff may place records in the catalog review file, or records may be sent to the file automatically. Some online catalogs send all new bibliographic records to the catalog review file while others send only those records in which an error or authority file conflict has been detected. In some online catalogs, new records that are sent to the catalog review file simultaneously enter the master bibliographic file. In others, new records in the catalog review file must be approved before they enter the master bibliographic file.

Some online catalogs permit the library to specify which categories of records are to go into the catalog review file. For example, all non-LC records might be sent to the file for review even though the system has not detected an error.

Catalog review files are organized in various ways. Most online catalogs arrange their catalog review files by date of entry. Some of them then subarrange by category of error or record. In these cases the library may specify which category of errors or records are to be grouped together (e.g., all authority file conflicts, all non-LC records, all records for one branch of the library).

Records may not stay in the catalog review file indefinitely. The library may be able to set a time limit after which the record will be removed automatically from the catalog review file and placed in the master bibliographic file if it is not already there. Some online catalogs allow for the automatic validation of all records placed in the catalog review file on a particular date with one command.

Bibliographic records already in the online catalog that contain errors may be corrected and sent to the catalog review file to be checked by a cataloger. In this case the field that has been corrected may be flagged, or both the old and newly corrected form of the field may be displayed.

Most online catalogs have provisions for printed reports that may be used to detect errors. In cases where the online catalog has no catalog review file at all, the printed products are especially useful since they are the only systematic means of reviewing new bibliographic or authority records.

Listings of all new headings added to the online catalog can help in identifying typographic errors. For example, a new heading of TWAIM, MARK, 1835–1910, might be easily identified as a typographic error. A printout of each new record that enters the online catalog might be used to proofread the records in the same way that catalog cards are proofread before they are filed.

In the card catalog errors may be detected before cards are filed while the cards

are being proofread. As cards are filed or revised, conflicts in headings and other problems may be discovered. Once the cards have been filed, errors may be found by patrons or staff. Corrections are made manually to each catalog card or by preparing new card sets on which errors have been corrected.

There are more similarities between the two systems for error detection and correction than there are in adding bibliographic records. Although the online catalog can do some automatic error checking, human intervention is necessary. This may take the form of proofreading or reviewing headings that are new to the catalog to identify errors and conflicts that will require decisions by staff, just as in card catalogs. Once detected, error correction is much simpler in the online catalog because the correction is made just once. Corrections to records in the card catalog require pulling, correcting, and refiling cards at each of the access points.

AUTHORITY CONTROL

The third component of bibliographic record maintenance—authority control—collects, records, and maintains the authorized forms of headings to be used as access points and those headings which act as *see* and *see also* references to lead the user to the authorized heading. Authority control is normally extended to those headings that use a controlled vocabulary: name headings, subject headings, uniform titles, and series entries.

Headings are formulated at the time the bibliographic record is created. When a bibliographic record is loaded into the online catalog, the authority file is checked automatically to see if the headings in the record are in the authorized form. If they are and no other errors are detected, the record goes into the master bibliographic file. In some cases the complete bibliographic record is stored in the master bibliographic file, and a linkage between each heading and its authority record is created. In others, each heading in the bibliographic record that is under authority control is replaced with a designation indicating its location in the authority file. The bibliographic records are stored in the "exploded" form. When the record is called up for display, each heading is retrieved from the authority file, and the record is reassembled and displayed in its original form. The latter method uses less computer space because the heading is stored once and only the location designation is stored in the master bibliographic file. A possible drawback to this method is that the need to reassemble bibliographic records each time they are called up for display may increase the response time to an unacceptable level. A compromise is to store the headings most commonly displayed (e.g., author, title) in both the bibliographic and authority records.

Because most online catalogs provide linkages between authority records and bibliographic records, global changes to headings are possible. When the authorized form of a heading is changed in the authority record, all bibliographic records containing that heading can be changed to the new form automatically. All indexes containing the heading will be changed automatically as well. Changes to the authorized forms of headings and indexes are simpler because the change is made only to the authority record.

If a bibliographic record contains a heading that is new to the online catalog, a new authority record will, in most cases, be created and labeled "unauthorized." In some cases all new authority records are placed in a review file for editing and authorization. In other cases, a list of all new headings is provided offline from which each new authority record can be reviewed and authorized.

Information may be added to authority records in three ways: (1) authority data can be keyed in manually—all online catalogs allow for this method of inputting authority data; (2) machine-readable authority records, which are available from vendors or from the LC authority tapes, can be added via tape-load—most online catalogs also allow for this method; (3) a few systems allow for the direct transfer of authority data from bibliographic utility terminals to the online catalog.

Bibliographic records containing headings that conflict with authority records in the catalog are identified automatically. Some online catalogs will send the record to the review file, flag the offending heading,

and provide the authorized form of the heading as well. Other catalogs will change the conflicting heading automatically and add it to the master bibliographic file. If there is no review file, a list of conflicts is provided offline.

Some online catalogs have separate authority files for names, series, subject headings, and uniform titles. Others have a consolidated authority file. Still others will allow the library to specify the authority file configuration at the time the catalog is implemented.

Changes to authority records in online catalogs are quite simple. The authority record is called up, corrections and/or additions are made, and the record is authorized. If a change is made to the authorized heading, all the bibliographic records will be changed automatically or by one global change command.

Authority control and the maintenance of authority records are different in card catalogs. Authority records for headings may be created at the time the new heading is created or after the fact. As headings are formulated, they are checked against the authority file to ensure that the authorized form is used consistently. If there is no authority record in the file, one may be created for the new heading. Authority control may be extended to all headings in the catalog, but few libraries maintain complete files of authority records for each access point in the card catalog. Many libraries have authority records only for those headings that require cross-references. Others may not maintain authority files at all, relying on external sources such as the LC subject heading list to provide the authorized forms and the syndetic structure for the staff and the patrons. A library's authority files may represent varied levels of comprehensiveness. For example, the Name Authority File might contain only those names that require cross-references while the Series Authority File might contain all series included in the card catalog.

Although separate files are usually maintained for the various types of headings, there may be some degree of consolidation. For example, the Name Authority File may include names used as subject entries as well as those used as main or added entries.

Some libraries do their authority work at the time the bibliographic record is created. Others use the "bounce" system, whereby the first time a card containing a heading is to be filed into the card catalog, the filer sends the card to the unit responsible for authorities. The heading is checked to see whether it is in an acceptable form, and, if necessary, an authority record is set up. If the form of heading is unacceptable, it is corrected manually. Filers and revisers participate further in authority file maintenance by noting conflicts in headings. Conflicting headings are sent to the authorities unit for resolution, resulting in the correction of one of the conflicting entries or the identification of the two entries as separate entities.

From time to time additions or changes must be made to authority records. Additions might be new cross-references or added notes and can be made fairly easily. Changes in authorized headings will be more complicated because some provision must be made for each bibliographic record that contains the heading. Options are to change each bibliographic record, to link the old and new headings, or to interfile the old and new headings without changing the headings.

The linking of authority records with bibliographic records in the online catalog is a significant improvement over card catalogs because it allows for automatic global changes. A further advantage is that authority records are entered into the catalog only once in online catalogs, whereas in card catalogs each cross-reference must be entered separately. The process of establishing and authorizing authority records and resolving conflicts remains the same between the two systems.

ADDING INFORMATION TO BIBLIOGRAPHIC RECORDS

The fourth component of bibliographic record maintenance is the addition of information to bibliographic records that already appear in the catalog. In the online catalog the bibliographic record can be called up, modified, and returned to the master bibliographic file in one session at the terminal. It may also be possible to send the newly changed record to the catalog review file to be revised. In the card catalog

the additional information may be added to some or all of a card set. In some cases it may be more efficient to produce a new card set and withdraw the old one. In all cases, cards must be removed from the catalog, modified or reproduced, and filed back into the catalog.

Adding information to bibliographic records is much easier in the online catalog, since the addition is made only once. In the card catalog, changes are made separately to some or all cards for the record under review.

WITHDRAWING BIBLIOGRAPHIC RECORDS

The last component of bibliographic record maintenance is the withdrawal of records from the catalog for materials that are no longer part of the library's collection. In the online catalog a bibliographic record may be withdrawn from the master bibliographic file with one command. The record in question will be checked automatically against the authority file, and headings no longer represented in the master bibliographic file will be purged from the authority file. As a result, all cross-references leading to the heading in question will be deleted.

Withdrawn bibliographic records may be stored in the online catalog in such a way that they are readily available for reinstatement, but not available through the public access subsystem of the online catalog.

In the card catalog the full card set must be removed, and each heading that is unique in the catalog must be identified. The corresponding authority record must be removed from the file, and all cross-references to the heading must be withdrawn. Some libraries may keep a file of withdrawn card sets or shelflist cards, but most have neither the staff to maintain such a file nor the space to house it.

Because the bibliographic record is stored only once in the online catalog, it can be withdrawn in one command. In addition, the linkage of authority records with bibliographic records allows for automatic purging of blind cross-references when the last instance of a heading leaves the catalog. In card catalogs, the cards for each access point must be removed separately, and the checking of the authority file must be done manually. In both types of systems, it is possible to store the withdrawn bibliographic records.

SUMMARY

This overview of the methods used to maintain the bibliographic records in a catalog has compared the procedures followed in online catalog systems with those used in card catalogs. Some of the procedures are the same while others vary greatly.

Those procedures that are the most similar in both systems relate to the evaluation of the data contained within the bibliographic record such as proofreading and resolving conflicts between headings. Those procedures that are the most different relate to the way information is stored and displayed in the two types of systems. The card catalog stores the same information in many places while the online catalog stores the information once, in the master bibliographic file or the authority file, and retrieves it for display upon request. This allows for a simpler method of input and change. In addition, the computer system can make comparisons and do automatic checking much more quickly than a staff member if clear criteria and a rigid structure are defined. The card catalog system is limited by the speed and accuracy with which humans can do these operations.

The methods by which bibliographic records are maintained in online catalogs have been described and compared with those used in card catalogs in order for librarians considering an online catalog to identify the options for bibliographic maintenance available to them. It should be noted that not all online catalogs include all of the features described above. In planning for an online catalog, the desirable bibliographic maintenance capabilities should be identified and specifications drawn up. Then the various online catalogs can be investigated to identify those that best meet the specifications.

EFFECTS UPON BIBLIOGRAPHIC RECORD MAINTENANCE

The implementation of an online catalog will have a great impact on those units responsible for bibliographic record maintenance. Less clerical staff time will be spent

on filing and modifying bibliographic records because the computer will take over much of this routine work. On the other hand, the level of sophistication demanded of the staff handling bibliographic record maintenance will increase. Staff will have to learn to manipulate records in the database. Quality control over the input and maintenance of bibliographic records will assume a greater importance since fewer staff will have the opportunity to review records. More time will be spent on revising records at the time they enter the online catalog. Responsibility for the review of bibliographic and authority records may be assigned in new ways since the online catalog provides the potential for decentralization of bibliographic record maintenance. In the past, maintenance was centralized because the card catalogs and authority files were available in only one place. With the online catalog, these files are accessible at any terminal, allowing for maintenance to proceed at many locations. As a result, subject specialists may be able to take responsibility for authority work in their fields or for enhancing the bibliographic records by providing more and better subject analysis.

The online catalog will greatly affect the level of staffing and responsibilities of the bibliographic maintenance unit. Responsibility for bibliographic maintenance will be divided in new ways among the current staff and may be assigned to staff who presently have little involvement in the process. In planning for an online catalog, librarians must anticipate the effects of its implementation on units responsible for bibliographic maintenance and adapt their procedures accordingly.

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Authority Control in Manual Versus Online Catalogs: An Examination of "See" References

Catherine M. Thomas

Authority control is the most time-consuming and labor-intensive aspect of cataloging. There has been no shortage of articles that question the economics and wisdom of authority control and/or that plead for optimizing automated systems without perpetuating outdated manual practices. Implementation of online catalogs, the proliferation of cataloging networks, and shrinking budgets have all served to elevate to new heights the issue of authority control methods. The Summer 1983 issue of *Cataloging Service Bulletin* indicated that the Library of Congress (LC) is reconsidering some its authority control practices in light of machine searching capabilities. In a questionnaire aimed at *CSB* subscribers, LC solicited re-

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sponses as to the usefulness of tracing certain types of cross-references. This study was also concerned with cross-references, and was conducted to discover some concrete ways to streamline authority control for a specific automated environment (MELVYL).

In providing authority control for a particular name, a cataloger establishes the heading and provides cross-references from variant and related forms to the established authorized form of the heading. Creating the reference structure is usually the more time-consuming of the two tasks because it involves ferreting out all of the variations a catalog user might possibly search under and then systematically linking each of these variations to the established heading. This study focused on cross-references—"see" references in particular because these are by far the most common. Questions that prompted the research are: What types of cross-references are necessary when searching a manual file and are totally unnecessary in the online keyword search environment; how prevalent are these types of cross-references? What, if any, categories of cross-references could be made obsolete by changes in cataloging practice or by programmatic additions to the particular searching features of online catalogs? To what extent does a library's local manual authority file replicate the machine-readable Library of Congress name authority file? With the prospect of a national computer-based authority file looming ahead in the not-too-distant future, is it reasonable to expect library budgets to continue to absorb the cost of local variations in the form of added cross-references that are not necessary in the online keyword search environment?

A library preparing to implement an online catalog, and, with it, online authority control, should (1) compare its present (presumably manual) authority control system with the machine-readable LC name authority database to determine the extent to which the LC file can serve the local institution's authority control needs and (2) consider the searching features being implemented in the online catalog system to determine the types of cross-references that will be needed for access to name headings in the bibliographic database.

The purpose of this study was to compare two authority control systems in terms of cross-references and to evaluate the differences vis-à-vis the power of the online keyword search. The hypothesis to be tested was that a substantial percentage of cross-references would be necessary only for searching a manual file and would be totally unnecessary when searching MELVYL. A decision of yes or no was made for each cross-reference as to its appropriateness in the online keyword search environment. It is anticipated that studies such as this one will have an effect on the planning libraries undertake for conversion from manual to automated authority control and on the design of searching algorithms for online catalogs.

The study was conducted at the Central University Library of the University of California, San Diego (UCSD) during summer 1983. In the context of this paper, the following definitions are appropriate:

- LC-NAF—the machine-readable name authority file created and maintained in the MARC format by the Library of Congress.
- Local authority record—An in-house typed card, produced by UCSD for its manual authority file to record the authorized form of a heading and its cross-reference structure. Decisions recorded on these cards are usually based on LC-NAF precedent.
- Keyword search environment—the keyword search capabilities provided by the production version of MELVYL, the University of California's systemwide online catalog. The specific search capabilities are explained below.

KEYWORD SEARCHING ON MELVYL

MELVYL provides access to name headings through keyword indexes. If there are cross-references to a name in MELVYL's authority file, keywords are generated from the cross-reference forms as well as from each word in the heading itself, so that for each name a "pool" of keywords is generated. Personal and corporate name searches are processed using the individual words in the search request as keywords. The words in the search request are matched with keywords anywhere in the

heading regardless of word order.

MELVYL removes the following stopwords from corporate name searches: AND, OF, ON, THE. At present, these are the only stopwords for corporate name searches. During the loading of records into MELVYL, a normalization process occurs in which acronyms and initialisms are squeezed together to create one keyword with the periods removed. Therefore, U.N.E.S.C.O. becomes UNESCO, but can be searched either way.

Automatic right-hand truncation is utilized in processing personal name search requests that contain forename initials. For example, the command FIND PA K. H. FISHER matches names that contain the keywords K#, H#, and Fisher. In this example, "PA" indicates that the personal author index is to be searched, and "#" signifies the automatic right-hand truncation that occurs when MELVYL processes the search request. With this abbreviated search request it is possible to pull up the heading FISHER, KENNETH HAROLD without the benefit of a cross-reference.

It is not necessary to enter personal name searches in inverted order by inserting a comma to specify the surname location. While inverted search requests containing the comma do serve to limit the number of search retrievals, the comma is not required for MELVYL to match on personal names. When searching on inverted forms of compound surnames, if the established form of the surname is not known, retrieval will be more successful if the comma is omitted from the search request. By omitting the comma, the exact location of the surname is not specified and MELVYL will search for all the keywords in the search request as possible surnames.

In addition to the searching features just mentioned, MELVYL performs other special processing functions that enhance retrieval but are not within the scope of the present paper. For a detailed explanation of MELVYL search processing, the reader is directed to MELVYL documentation issued by the Division of Library Automation, University of California Systemwide Administration. Also of interest is a series of articles that appeared in the December 1982 and March 1983 issues of *Information Technology and Libraries* under the title "In-Depth: University of California MELVYL."

Here are some examples of cross-references that are routinely provided for headings in manual files, and which MELVYL's keyword search capability has rendered unnecessary:

Oxford University Press.
x Oxford Press

Symposium on VLSI Technology.
x Symposium on V.L.S.I. Technology

International Conference on Mathematical Physics.
x Mathematical Physics, International Conference on

Obler, Loraine K.
x Obler, Loraine

Early, Stephen Tyree.
x Early, Stephen T.

Eby, Ronald Kraft.
x Eby, R. K.

García Márquez, Gabriel.
x Márquez, Gabriel García*

Lo, Ruth Earnshaw.
x Earnshaw, Ruth*

METHODOLOGY

At UCSD, Central University Library authority control currently exists in the form of more than 107,000 cards housed in the AACR2 Authority File. This file has been created since AACR2 implementation to complement the simultaneous opening of the AACR2 Catalog, also manual. A preliminary random sampling of the cards in the AACR2 Authority File determined that approximately 55 percent of the cards were for headings and the remaining 45 percent were for cross-references. It was also determined that 95 percent of the cross-reference cards were for corporate or personal name headings. The remaining 5 percent of the cross-references provided access to geographic headings, monographic series titles, and uniform titles.

Based on the results of the preliminary sampling, the research sample was limited to cross-references for corporate and personal name headings. Using a table of ran-

*When searching the cross-reference form, commas must be omitted from search requests in order for these cross-references to be considered unnecessary.

dom numbers, 426 cross-reference cards were randomly selected from the contents of the AACR2 Authority File drawers. The sample size allows for a 95 percent confidence level that the actual percentages based on this sample are no more than ±5 percent away from the percentages as reported. Only straight "see" references were included in the sample. Conference name headings were considered to be part of the corporate name heading category. Table 1 shows the composition of the sample.

For each cross-reference in the sample, the following supplementary information was retrieved: the corresponding local authority record to which the cross-reference referred and, when available, the latest version of the corresponding LC-NAF record. The local authority records provided source information for both the heading and the cross-reference in question. This information indicated the origin of each heading and cross-reference as either LC-NAF or UCSD. UCSD headings had been locally established and lacked LC-NAF precedent. UCSD cross-references also lacked LC-NAF precedent and had been created for local use either to enhance existing LC-NAF records or to provide access to those locally established headings that lacked LC-NAF precedent. Sources were checked to determine the extent to which the LC-NAF is replicated by the UCSD AACR2 Authority File. Each cross-reference was analyzed for its appropriateness in MELVYL's online keyword search environment. Cross-references that had been locally added to existing LC-NAF records were counted to determine the extent to which local enhancements are substantive given the keyword search capability.

Table 1. Composition of Sample

Type of Heading	# in Sample	% of Sample
Personal	310	73
Corporate	116	27
Total	426	100

RESULTS

As expected, the percentage of cross-references rendered unnecessary by the power of MELVYL's keyword search was high. Table 2 shows that 47 percent of the cross-references catalogers now routinely make for manual files could be dispensed with for MELVYL. These cross-references primarily fall into two categories: references from word-order inversions, and references from forms of the name that vary in fullness. The latter category contains only those cross-references that are *less* full in form than the established form of the heading.

Table 3 shows categories of cross-references that need to be retained when converting from a manual to an automated authority file. Truly variant forms such as pseudonyms, versions of the name in a language other than the language in which the heading was established, and spelling variations account for 56 percent of the total number of cross-references required. References from a form of the name that was fuller in form than the established form of the heading accounted for 39 percent of the necessary cross-references. It should be pointed out that 43 percent of the necessary personal name references fell into this category; these personal name cross-references were necessitated simply because the *established* form of the name was *less* full than other manifestations of the name that had appeared in print at one time or another. For corporate name references from place, it is noteworthy that due to an LC rule interpretation that has been issued since the references from place were established, at least nine of the eleven cross-references in this category would be inappropriate according to current cataloging practice.

Most of the cross-references that UCSD added to enhance existing LC-NAF records would not be necessary for searching on MELVYL. Table 4 shows that 28 (44 percent) of the 64 locally added cross-references would be substantive in the MELVYL search environment. However, 5 of the 28 local cross-references were from place and have been rendered obsolete by current cataloging practice; therefore 23 (36 percent) of the locally added cross-references are in fact appropriate for conversion to an automated file.

Table 5 shows that a large portion of the manual AACR2 Authority File replicates the LC-NAF. Fully 85 percent of the corporate and personal name headings that have been established for use by UCSD are available in a machine-readable form in the LC-NAF, and 70 percent of the cross-references

Table 2. Number of Cross-References Needed Given MELVYL Search Capabilities, by Type of Heading

X-Refs	Corporate	%	Personal	%	Total	%
Needed	65	56	160	52	225	53
Not Needed	51	44	150	48	201	47
Total	116	100	310	100	426	100

Table 3. Categories of Cross-References Needed Given MELVYL Search Capabilities

X-Ref Category	Corporate	%	Personal	%	Total	%
True Variant	35	54	91	57	126	56
Fuller Form	19	29	69	43	88	39
From Place	11	17	N/A	N/A	11	5
Total	65	100	160	100	225	100

Table 4. Number of Cross-References Needed Given MELVYL Search Capabilities, by Source of Reference

X-Refs	LC-NAF	%	Added by UCSD	%
Needed	176	59	28	44
Not Needed	122	41	36	56
Total	298	100	64	100

Table 5. Extent to Which UCSD Authority File Replicates LC-NAF

UCSD	Headings	%	X-Refs	%
Also on LC-NAF	362	85	298	70
Not on LC-NAF	64	15	128	30
Total	426	100	426	100

are available. A total of 128 cross-references were not available in the LC-NAF; 64 of these cross-references had been created for locally established headings that lacked LC-NAF precedent. Forty-nine, or 38 percent of the local cross-references would be appropriate to convert to a machine-readable form for use on MELVYL.

CONCLUSIONS

The hypothesis that a substantial number of the cross-references catalogers routinely make for searching manual files would be unnecessary for searching MELVYL was supported. Nearly one-half of the cross-references required in manual files could be dispensed with in MELVYL's online keyword search environment. References from word-order inversions and references from names that are less full in form than the established form of the heading are the primary targets for omission when converting from a manual to an automated file such as MELVYL. With search processing functions such as keyword indexing and automatic right-hand truncation, MELVYL has made it possible to streamline one of the more tedious aspects of authority control: creating the cross-reference structure.

The practice of adding cross-references to LC-NAF records when accepting them for local use is a costly one. The results show that most of the cross-references that UCSD added to enhance existing LC-NAF records would not be necessary for searching MELVYL. This finding, coupled with the fact that the LC-NAF is already in a machine-readable form suggests that wholesale conversion of a local manual authority file may be unreasonable. Since most of the name headings and cross-references established for local use do in fact replicate those in the LC-NAF, perhaps it would be advisable to locally convert only that portion of the manual file which lacks LC-NAF precedent *and* is required for searching in the online environment.

The results of this research suggest a change in cataloging practice that would make it possible to more fully utilize an online system featuring automatic right-hand truncation. If personal name headings were established in the fullest known form of the name, more than 40 percent of the personal name cross-references now required for machine searching could be eliminated. If implemented, such a rule change would shift the burden of enhancing retrieval away from the cataloger and onto the system. Almost any variation in

fullness, no matter how abbreviated, would yield search results without the benefit of cross-references if the fullest form was the established form. Further study is needed to address the implications of such a radical departure from current cataloging practice.

The search algorithms that MELVYL designers have built into their system are commendable. Are there other features that could/should be programmatically added? What authority control procedures could be adapted to better utilize automated functions? More research is needed to suggest practical ways to streamline and automate authority control with sophistication and foresight.

ACKNOWLEDGMENT

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Serials Automation at 3M—an Unusual Telecommunications Implementation

David Schrader and Dan Houlne

The 3M Company Information Services Department includes nine libraries—seven technical, one business, and one engineering. All nine are located in St. Paul, Minnesota, with eight in various buildings at 3M Center (the four hundred-acre, ten thousand-employee corporate headquarters and centralized research facility of 3M) and one in the Engineering Complex, five miles away. The nine libraries receive more than three thousand subscriptions, with most of the serials processing decentralized. The Library Processing Group is responsible for the ordering of library journals and for all serials activities related to 3M's twelve thousand corporate subscriptions. All other serials activities are handled by each individual library.

In January of 1982, a committee of Information Services personnel was formed and charged with investigating 3M's need for serials automation, evaluating such systems, and then recommending a serials automation system for 3M. The committee recommended that the LINX Serials Automation System from F. W. Faxon Company (Faxon) be used for all appropriate serials at 3M. Key reasons for this recommendation were:

1. The capabilities of the LINX System
2. The Faxon-maintained LINX databases
3. The support available from Faxon to create an electronic network tying all 3M facilities to LINX
4. The cost of acquiring and using the LINX System.

This article addresses only the unique aspect of 3M's use of LINX—the 3M LINX telecommunications network. Information on the specific capabilities of LINX, its databases, and its costs are available from Faxon.

The 3M LINX telecommunications network can be broken into three parts:

A. The hardware and software associated with LINX at Faxon

B. The local network at 3M

C. The telecommunications link between A and B.

LINX HARDWARE AND SOFTWARE

LINX runs in a "standard" IBM environment (see figure 1).

The LINX System processor is an IBM 3081 mainframe computer.

The data in the LINX System are organized in several IBM IMS databases. Terminal access to LINX is through IBM's CICS teleprocessing monitor and an IBM 3705 front-end processor.

IBM's Synchronous Data Link Control (SDLC) is used under Systems Network Architecture (SNA) with the IBM 3270 family of terminals.

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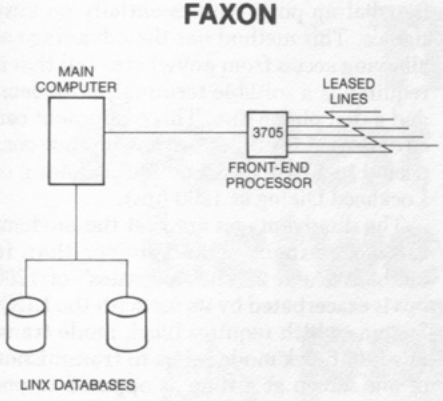


Fig. 1.

Asynchronous communication is provided through Telenet accessing a Datastream Protocol Converter at Faxon. This protocol converter supports six commonly used models of ASCII terminals.

THE 3M LOCAL NETWORK

The 3M network hardware for LINX (see figure 2) consists of a twelve-port Renex Protocol Converter, an IDS Prism 132 printer, eight Televideo 912/920 ASCII terminals, two Beehive DM5A ASCII terminals and associated modems and phone lines.

The Renex Protocol Converter is the heart of the 3M local network. It allows one high-speed link between 3M and Faxon to be shared by up to thirty-two terminals or printers. Its use in place of a standard IBM 327X cluster has the following advantages:

- It allows the use of almost any standard ASCII terminal in place of the more expensive IBM 3278–type terminal.
- It connects terminals asynchronously using dial-up and dedicated phone lines instead of requiring the use of coaxial cables to each individual terminal or printer. The cost of installing coax at 3M for use with LINX was estimated at $15,000.
- It allows an inexpensive ASCII printer to be shared by all terminals for local printing. An ASCII printer can be attached to any terminal that has a printer port. By contrast, in an IBM environment, a printer cannot be attached to an individual terminal and available printers are expensive and slow and offer comparatively poor print quality.

Terminals are connected to the protocol

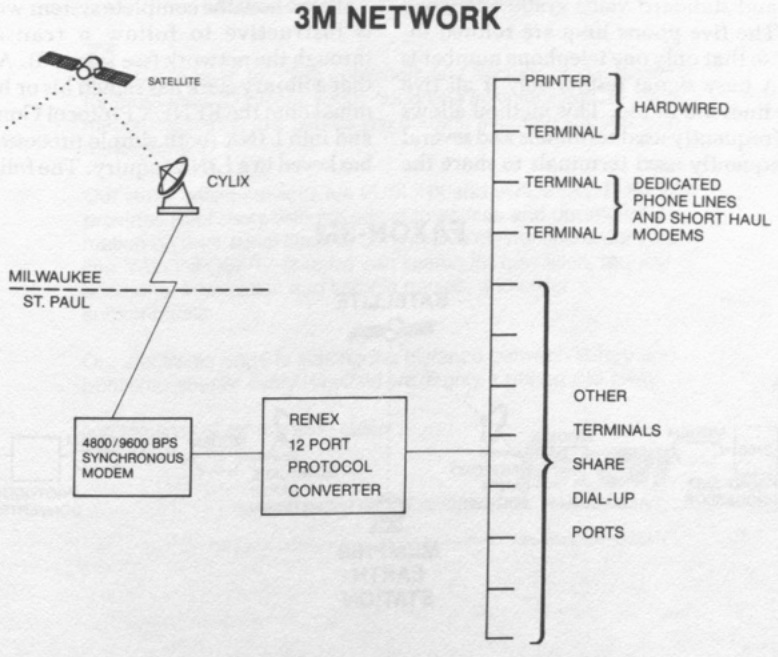


Fig. 2.

converter in one of three ways:

1. Hardwired. One terminal and the printer are cabled directly to the protocol converter. The transmission speed is 9600 bits per second (bps) which is approximately 960 characters per second. This method involves minimal cost and allows rapid transmission, but devices are required to be within fifty feet of the protocol converter.

2. Dedicated phone line with a pair of short-haul modems. Distances up to two miles can be handled inexpensively ($300 for a pair of Micom Micro 400 short-haul modems and $10 per month for a dedicated phone line within 3M Center), and transmission can be at up to 9600 bps. This method will work at even greater distances, but at slower transmission speeds (e.g., six miles at 2400 bps, and ten miles at 600 bps). A disadvantage of this approach is that the terminal cannot be readily used for other purposes—it has become, in effect, a dedicated terminal. Two heavily used terminals currently use this method of connection.

3. Dial-up phone with 1200 bps modems. Five ports of the protocol converter currently have 300/1200 bps auto-answer modems (RACAL-VADIC 3451s at $650 each) and standard voice grade telephone lines. The five phone lines are rotored together so that only one telephone number is used. A busy signal results only if all five phone lines are in use. This method allows seven frequently used terminals and several less frequently used terminals to share the five dial-up ports with essentially no busy signals. This method has the advantage of allowing access from anywhere—all that is required is a suitable terminal, a modem, and a dial phone line. This equipment can also be used for other tasks when not connected to LINX (e.g., online searching of Lockheed Dialog at 1200 bps).

The disadvantages are that the modems are more expensive and slower than in methods 1 and 2. The "slowness" of 1200 bps is exacerbated by its use with the LINX System, which requires block mode transmission. Block mode refers to transmission of one screen at a time as opposed to one line at a time. At 1200 bps, it takes sixteen seconds to transmit or receive a full screen of data (twenty-four lines of eighty characters each). At 9600 bps, it takes only two seconds.

COMMUNICATIONS LINK BETWEEN FAXON AND 3M

The telecommunications connection between 3M's protocol converter and Faxon's mainframe computer in Boston is a 4800 bps SDLC satellite link provided by RCA CYLIX. Although this link is rather complicated, it is transparent to the user.

To see how the complete system works, it is instructive to follow a transaction through the network (see figure 3). Assume that a library clerk has signed his or her terminal onto the RENEX Protocol Converter and into LINX (both simple processes) and has keyed in a LINX inquiry. The following

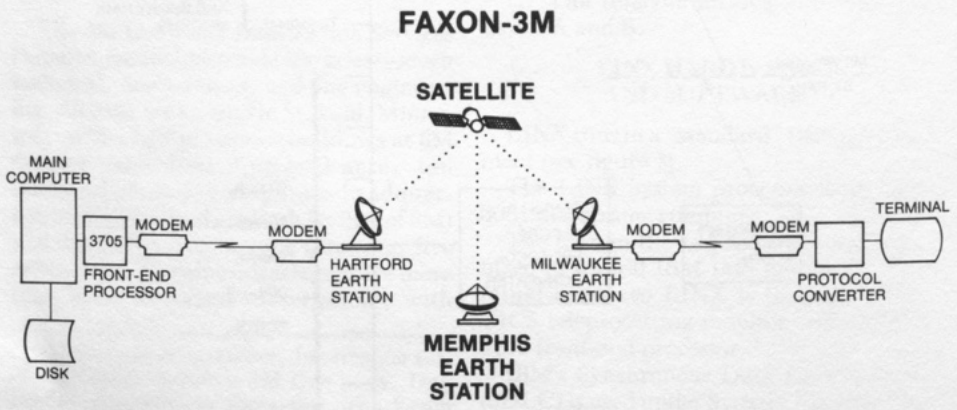
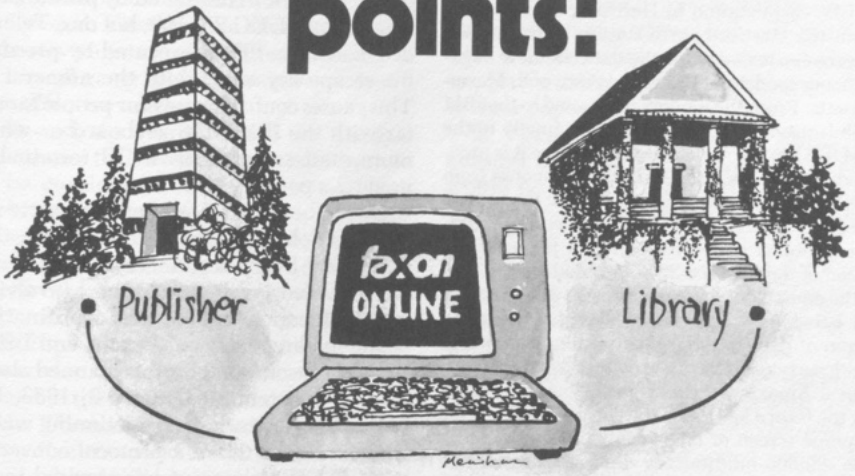


Fig. 3.

The shortest distance between two points:



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takes place when the return key is pressed:

> The screen image, which is stored in the protocol converter and, therefore, doesn't have to be transmitted from terminal memory to the protocol converter, is sent to the 4800 bps synchronous modem. From there, it travels 400 miles over a leased four-wire data circuit to the RCA CYLIX earth station in Milwaukee, Wisconsin. The Milwaukee earth station beams it up to a satellite in stationery orbit 22,500 miles above the earth and then down to the main CYLIX earth station in Memphis, Tennessee. From Memphis it is routed up to the satellite again and then down to another CYLIX earth station in Hartford, Connecticut. From the Hartford earth station, it travels 300 miles over a leased four-wire data circuit to a synchronous modem at Faxon in Westwood, Massachusetts. From the modem it is passed to the IBM 3705 front-end processor and then finally to the IBM 3081 mainframe computer where it is processed by the LINX software. The response from LINX then follows the same path in the reverse direction back to the protocol converter at 3M. The protocol converter converts the response screen of data from a 3278 terminal-type screen to the equivalent for the particular ASCII terminal being used and then routes this converted screen of data to the proper terminal via one of the three types of terminal connection mentioned above. Amazingly, the elapsed time from pressing the return key to the start of the display of the response screen of data is three to five seconds. The 180,000-mile journey alone requires one second traveling at the speed of light.

There are always trade-offs in any design. The negative aspects of the system as implemented at 3M were:

- Protocol converters that support SNA/SDLC protocol were just becoming available in late 1982 when the system was put together at 3M. As could be expected, there were some initial protocol converter problems. The most serious involved a compatibility problem between the protocol converter and the CYLIX network. A protocol converter software patch remedied this after a month of poor performance.
- The use of RCA CYLIX to link the local 3M network and Faxon's LINX System in Massachusetts was considerably less expensive than a dedicated four-wire data circuit leased from AT & T. However, the initial reliability of the CYLIX connection was not up to expectations. Recent performance has improved, however, and is approaching that of a leased four-wire circuit.
- When ASCII terminals are used with the Renex Protocol Converter, all 3278 terminal functions are emulated. However, the number and arrangement of keys varies from one type of ASCII terminal to the next and from a true 3278. This requires a different "cheat sheet" for each type of ASCII terminal. The cheat sheet lists the proper key or multiple-key sequence used to get each 3278 type of function. For example, the PF1 function is executed by pressing the PF1 key on a DEC VT-100, but on a Televideo 920C, the PF1 is executed by pressing the escape key along with the numeral 1. This causes confusion only for people familiar with the IBM 3278 keyboard or when more than one type of ASCII terminal is used by a person.

November and December 1982 were set aside for debugging the system. During this period, the Faxon account representative to 3M provided invaluable support involving LINX education for 3M users, coordination of file-loading details at Faxon, and LINX problem resolution. By the planned start-up of the system on January 3, 1983, the 3M-LINX Network was functioning well.

Overall, the use of a protocol converter with ASCII equipment has resulted in an effective, low-cost, and flexible local network at 3M.

Future plans for the system at 3M include upgrading the protocol converter from twelve to sixteen ports and replacing many of the 1200 bps dial-up connections with dedicated 9600 bps connections.

3M INSTALLATION—FAXON'S PERSPECTIVE

3M was an early DataLinx client of Faxon's. DataLinx provides online access to Faxon's databases and files and to LINX Courier, Faxon's electronic mail service. Faxon's databases and files contain comprehensive and current information on titles, prices, publishers, and machine-readable cataloging for serials publications as well as customer-specific records.

When 3M began looking into serials control systems, they were interested in SC-10, Faxon's Serials Control System, after hav-

ing already gained some familiarity with other Faxon files. SC-10 is an interactive serials check-in system and claiming service. It's designed to contain the title records for the library's complete collection of periodicals and serials, including monographic series and dailies. SC-10 clients receive full service claiming for Faxon-placed titles as well as regularly issued reports to assure up-to-date records. DataLinx and Courier are included in the SC-10 package.

The issues encountered by Faxon during installation of the system at 3M were many and varied. First was the challenge to provide service to so many different locations in a small geographic area and to do it in a cost-effective manner.

Second, the overall cost of the terminal equipment to be used at the installation had to be considered. All LINX installations previous to 3M were done using 3270-type terminals. Using this approach, a control terminal is attached to a leased line that is wired back to Faxon. This provides the library with unlimited access to the system. If multiple terminals are required at a particular location, up to seven can be attached to the control terminal using coaxial cable. These slave terminals can be placed up to five thousand feet from the control terminal and still perform perfectly.

Though this type of approach worked well for other LINX customers, it was obvious that 3M had special requirements that were not well served by a traditional 3270 configuration.

Initially, an attempt was made to mold the 3270 approach into something that would be suitable at 3M. Faxon's initial proposal for 3M called for a 3276 control terminal, seven 3278 slave terminals, and several IBM 8775 synchronous dial terminals. 3M rejected the proposal because of the difficulty and expense involved in running the coaxial cable between buildings and because the terminal equipment itself would have been enormously expensive.

As an alternative to the 3270 approach, the possibility of installing a protocol converter at 3M and connecting to Faxon via a leased line was considered. Under this configuration, the remote libraries at 3M would either dial into or be wired into the protocol converter via inexpensive local telephone circuits. Because of concerns about network integrity, Faxon network management had reservations about designing a site based on a protocol converter. These reservations were based on the following:

1. Past experiences with protocol converters at Faxon had not been completely positive. When Faxon installed two protocol converters in Westwood in 1981 to support numerous DataLinx customers with ASCII equipment, the installations required constant intervention and attention. This was inconsistent with Faxon's pledge to provide a high-quality, reliable product to their customers.

2. Faxon had reservations about the amount of time and technical skill that would be required from 3M to solve complex equipment problems in this environment.

3. At that time, Faxon considered ASCII terminals given 3270 capabilities through protocol conversion to be unsuitable for use with SC-10, the check-in system. When Faxon originally purchased in-house protocol converters for use by clients with ASCII devices, the devices were envisioned for DataLinx use only. For speed and convenience, SC-10 makes extensive use of 3270 functions. As described, some ASCII terminals require that 3270 functions be accomplished by striking several keys at one time or in sequence, and this might prove to be cumbersome to the casual user.

3M, after analysis and discussion, remained convinced that the protocol converter design best addressed their requirements and they requested a proposal based on its use. They answered Faxon's concern about technical assistance by assigning staff skilled in data communications to assist Faxon network staff with remote trouble definition.

In answer to Faxon's concerns about complicated key actions to accomplish 3270-type functions, 3M assured Faxon that its users were not accustomed to 3270 terminals and, therefore, could easily adapt to using the alternative commands. The cost-effectiveness of the proposed solution remained clear.

The selection of the protocol converter to be used at 3M was a relatively simple process. To be cost-effective for Faxon and 3M, the installation would have to be on Faxon's RCA CYLIX–based network, not Faxon's AT & T–based network. Because the Faxon host line into the CYLIX network is defined to the front-end processor as an SDLC link, all devices on the Faxon/CYLIX network must be SNA/SDLC compatible. At design time, there were only a few protocol converters on the market that offered that capability. After evaluating the choices and testing the protocol converter at Faxon, the Renex device was recommended.

On the whole, the 3M design and installation has been very successful from both points of view. Except for the initial problem of interfacing the protocol converter to the CYLIX network, both Faxon and 3M have been pleased with the system and network performance. 3M is a site where the design solution built around the IBM 3270 cluster is clearly inferior to the protocol converter approach that was taken there. While Faxon now feels much more confident in designing sites built around protocol converters, the original three reservations detailed earlier are still valid. Therefore, Faxon continues to endorse the 3270 cluster configuration and recommends that this creative alternative be put to use only where the more traditional approach is impractical. ■■

Reports and Working Papers

Survey of Public Access Television Services in Public Libraries

This survey was conducted through the facilities of the Allen County Public Library, Fort Wayne, Indiana, under the supervision of Rick J. Ashton, director. The project coordinators were Pamela A. Bieri and Pamela E. Sandstrom; the project assistant was Angie Scofield.

The purpose of this survey was (1) to locate and identify libraries in the U.S. that provide public access television production services to their communities; (2) to compile a list of resource materials that these facilities provide; and (3) to make this information available on a national scale to encourage networking.

A distinction was made in this survey between library audiovisual loan services and public access television production. We define public access television production services as including the following two elements: (1) ability to produce videotaped programs for the community; and (2) access to a cable channel for playback of these programs.

Our initial step involved review of earlier surveys and identification of libraries for a mailing list. After obtaining all possible mailing addresses from existing sources, we sent a letter to each state library requesting identification of access/library combinations within each state. Beginning in July 1983, we mailed out 157 surveys; 86 surveys were returned, a response rate of 55 percent. Thirty-eight of these libraries indicated that they were involved in some form of public access service, and six responded that they were in planning stages.

The results have been organized into nine categories: an alphabetical listing of libraries involved in public access services, current facility status (who has what), programming information, funding sources, budget/staff breakdown, volunteer programs, access services provided, type and value of equipment, and available written policies.

LIBRARIES RESPONDING TO THE SURVEY

Albany Public Library
Attn: Bob Katz
Media Librarian
161 Washington Avenue
Albany, NY 12210
(518)449-3380
Cable Affiliation: ATC

Alexander Mitchell Public Library
Cable Channel Seven
Attn: Janus Olsen
Library Director
519 South Kline Street
Aberdeen, SD 57401
(605)225-8578
Cable Affiliation: Aberdeen Cable Television

Allen County Public Library
Fort Wayne Telecommunication Center
Attn: Pamela A. Bieri
Telecommunication Services Manager
900 Webster Street
P.O. Box 2270
Fort Wayne, IN 46801
(219)424-7241
Cable Affiliation: Cox Cable of Fort Wayne

Ann Arbor Public Library
Attn: Dietmar Wagner
Reference Librarian
343 South Fifth Avenue
Ann Arbor, MI 48104
(313)994-2352
Cable Affiliation: Ann Arbor Cable Vision

Anoka County Library
Fridley Branch
Attn: Claire Fleischman

Media Librarian
1100 90th Avenue N.E.
Blaine, MN
(612)571-1934
Cable Affiliation: Storer

Arlington Heights Memorial Library
Attn: Susan Anderson
Cable Coordinator
500 North Dunton Avenue
Arlington Heights, IL 60004
(312)392-0100
Cable Affiliation: Cablenet

Bethleham Public Library
Attn: Public Access TV Person
451 Delaware Ave.
Delmar, NY 12054
(518)439-9314
Cable Affiliation: Adams Russell Cablevision

Cass County Public Library
Attn: Ray Riddle
Library Director
103 Oriole
Harrisonville, MO 64701
(816)884-6223
Cable Affiliation: Warner-Amex

Cloquet Public Library
CAT-7
Attn: Bootsie Anderson
Access Coordinator
406 Cloquet Avenue
Cloquet, MN 55720
(218)879-1532
Cable Affiliation: North American Communications

Dallas Public Library
Attn: Library Cable Production Manager
1515 Young Street
Dallas, TX 75201
(214)749-4100
Cable Affiliation: Warner-Amex

East Brunswick Public Library
Attn: Kevin O'Rourke
Studio Supervisor
2 Jean Wallings Civic Center
(201)390-6780
Cable Affiliation: Storer Cable Communications

Free Public Library of Woodbridge
Attn: William Spangler
Coordinator AV Services
George Frederick Plaza
Woodbridge, NJ 07095
(201)634-4450
Cable Affiliation: Suburban Cablevision

Galesburg Public Library
Attn: Bruce Barkley
Library Director
40 East Simmons
Galesburg, IL 61401
(309)343-6118
Cable Affiliation: WGPA

Great River Regional Library
Attn: Luther Rotto
Media Services Coordinator
405 St. Germain
Saint Cloud, MN 56301
(612)251-7282
Cable Affiliation: Storer Cable Communications

Green County District Library
Attn: Spencer Keech
Assistant to the Director
76 East Market
Xenia, OH 45385
(513)376-2995
Cable Affiliation: Continental Cablevision of Ohio

Greenwich Library
Attn: Wayne Campbell
Film/Video Coordinator
101 West Putnam Ave.
Greenwich, CT 06830
(203)622-7900
Cable Affiliation: Cablevision of Connecticut

Groton Public Library
Attn: Joseph S. Pacheo, Jr.
AV/TV Coordinator
52 Route 117
New Town Road
Groton, CT 06340
(203)448-1552
Cable Affiliation: Storer Groton

Iowa City Public Library
Attn: Connie Tiffany
123 South Linn Street
Iowa City, IA 52240
(319)356-5206
Cable Affiliation: Hawkeye Cable/ATC

John McIntire Public Library
Attn: Debra S. Rhodes
Extension Services Librarian
220 North Fifth Street
Zanesville, OH 43701
(614)453-0391
Cable Affiliation: Cablentertainment

Joseph Mann Public Library
Attn: Elsie M. Heitkemper
Library Director
1516 16th Street
Two Rivers, WI 54241
(414)793-5585
Cable Affiliation: Cablevision

Kenosha Public Library
Attn: Louise Pittman
7979 38th Avenue

Kenosha, WI 53141
(515)656-8058
Cable Affiliation: Total TV

L. E. Phillips Memorial Public Library
Eau Claire Public Access Center
Attn: Maggie Foote
Executive Director
400 Eau Claire Street
Eau Claire, WI 54701
(715)839-5067
Cable Affiliation: ATC Wisconsin Cablevision

Lancaster County Library
Attn: Robert Brock
LCLVP Video Coordinator
125 North Duke Street
Lancaster, PA 17602
(717)394-2651
Cable Affiliation: Lancaster Cable TV Associates

Lexington Public Library
Attn: Patrick McClintock
Automation Project Manager
251 West Second Street
Lexington, KY 40507
(606)254-6929
Cable Affiliation: Telecable of Lexington

Manitowoc Public Library
Attn: Kelly Krieg
Adult Services
808 Hamilton Street
Manitowoc, WI 54220
(414)682-6861
Cable Affiliation: Total TV of Manitowoc

Monroe County Library System
Attn: Bernie Smith
Ellis Reference & Information Center
3700 South Custer Road
Monroe, MI 48161
(313)241-5277
Cable Affiliation: Communications & Cablevision, Inc.

Monroe County Public Library
Community Access Channel 3
Attn: Rick Hayes
Director
303 East Kirkwood Avenue
Bloomington, IN 47401
(812)339-2271
Cable Affiliation: Horizon/TCI

Musser Public Library
Government Access Channel 29
Attn: Bonnie Estabrook
AV Coordinator
304 Iowa Avenue
Muscatine, IA 52761
(319)263-3065
Cable Affiliation: American Telecommunications Corp.

New Ulm Public Library
Attn: Dan Reilly
Library Director
17 North Broadway
New Ulm, MN 56073
(507)354-2151
Cable Affiliation: CTN Cable Network

Phoenix Public Library
Attn: Irene E. Pfeil
Librarian, AV Services
12 East McDowell Road
Phoenix, AZ 85202
(602)262-4796
Cable Affiliation: Western; American; Storer Cable

Pocatello Public Library
Attn: Randal L. Ammon
Video Services Coordinator
812 East Clark Street
Pocatello, ID 83201
(208)232-1263
Cable Affiliation: Group W

Portsmouth Public Library
Attn: Sherman Pridham
Director
8 Islington Street
Portsmouth, NH 03801
(603)431-2000
Cable Affiliation: Continental Cablevision

Racine Public Library
Attn: Patricia Kardas
Media Technician
75 Seventh Street
Racine, WI 53403
(414)636-9244
Cable Affiliation: Racine Telecable

Reading Public Library
Attn: Edmond J. Doherty
Library Director
Fifth & Franklin Streets
Reading, PA 19602
(215)374-4548
Cable Affiliation: Berks Community Television

Scottsdale Public Library
Attn: Debbie Tang
Adm. Library Coordinator
3839 Civic Center Plaza
Scottsdale, AZ 85251
(602)994-2471
Cable Affiliation: United Cable Television Corp.

Seattle Public Library
Attn: Steven Goldenberg
1000 4th Avenue
Seattle, WA 98104
(206)625-4870
Cable Affiliation: Group W & Viacom

South Hadley Library System
Attn: Constance Clancy
Library Director
Bardwell Street
South Hadley, MA 01075
(413)532-1241
Cable Affiliation: Commonwealth Cablevision

South River Public Library
Attn: Irene Cackowski
Library Director
55 Appleby Avenue
South River, NJ 08882
(201)254-2488
Cable Affiliation: Suburban

Steele Memorial Library of Chemung County
Attn: K. R. Fielding
Assistant Director
1 Library Plaza
Elmira, NY 14901
(607)733-9173
Cable Affiliation:

Tompkins County Public Library
Attn: Louis Mezgar
Library Director
312 North Cayuga Street
Ithaca, NY 14850
(607)272-4555
Cable Affiliation: ATC

Velma Teague Library
Attn: Shelley Mosley
Librarian II
7010 North 58th Avenue
Glendale, AZ 85301
(602)931-5576
Cable Affiliation: Storer Communications

Washington County Library
Attn: Kathleen M. Gisselquist
Audiovisual Librarian
3825 Lake Elmo Avenue North
Lake Elmo, MN 55042
(612)777-8143
Cable Affiliation: TDS

Weaver Memorial Library
Attn: Roberta Cairns
41 Grove Avenue
East Providence, RI 02914
(401)434-2453
Cable Affiliation: Times Mirro Cable TV

Windsor Public Library
Attn: Chris Powers
AV/Reference Librarian
323 Broad Street
Windsor, CT 06095
(203)688-6433
Cable Affiliation: Times-Mirror

Current Facility Status.

Name	Portable	Datacast	Studio	Interact	Other
Albany Public Library	NOW	NOW	NOW		
Alexander Mitchell Public Library Cable Channel Seven	NOW	NOW	NOW	NOW	
Allen County Public Library Ft. Wayne Telecommunication Center	NOW	NOW	NOW	NOW	
Ann Arbor Public Library	NOW				Direct Cable BC Hookup Used to Tape
Anoka County Library Fridley Branch	NOW	NOW			
Arlington Heights Memorial Library	NOW				
Bethlehem Public Library	NOW		PLAN		
Cass County Public Library*	PLAN	PLAN			
Cloquet Public Library CAT-7	NOW		NOW	PLAN	
Dallas Public Library	NOW	NOW	NOW		
East Brunswick Public Library	NOW	NOW	NOW	PLAN	
Free Public Library of Woodbridge	NOW	NOW			
Galesburg Public Library	NOW				
Great River Regional Library*	PLAN				Plan Catalog & Reference Service
Green County District Library	NOW				
Greenwich Library		PLAN			CG for Community Bulletin Board
Groton Public Library	NOW				
Iowa City Public Library	NOW	NOW	NOW	NOW	
John McIntire Public Library	NOW		NOW		
Joseph Mann Public Library	NOW		NOW		
Kenosha Public Library	NOW	NOW		NOW	
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	NOW	NOW	NOW		

Current Facility Status (continued).

Name	Portable	Datacast	Studio	Interact	Other
Lancaster County Library	NOW	NOW	NOW	PLAN	
Lexington Public Library*		PLAN	PLAN		Plan Online Catalog Display
Manitowoc Public Library		NOW			Now Use Local Cable Studio
Monroe County Library System					
Monroe County Public Library Community Access Channel 3	NOW	NOW	NOW	NOW	
Musser Public Library Government Access Channel 29	NOW	NOW			Now Have Portable Switch Equip with 6 Video Input
New Ulm Public Library	NOW	NOW		NOW	
Phoenix Public Library*	PLAN	PLAN	PLAN	PLAN	
Pocatello Public Library	NOW	NOW	NOW	NOW	Now Have Remote 2-camera Switching System
Portsmouth Public Library	NOW				
Racine Public Library Lakeshores Library System	NOW				Yes, Film Chain with Access to Editing
Reading Public Library			NOW	NOW	
Scottsdale Public Library*		PLAN		PLAN	PLAN
Seattle Public Library	NOW	NOW			
South Hadley Library System	NOW		NOW	NOW	
South River Public Library	NOW		NOW		
Steele Memorial Library of Chemung County	NOW		NOW		
Tompkins County Public Library	NOW				
Velma Teague Library	NOW				
Washington County Library Park Grove Branch Library*	PLAN	PLAN	PLAN	PLAN	
Weaver Memorial Library	NOW		NOW		
Windsor Public Library	NOW	NOW	NOW		

*Indicates libraries planning access services—sign-on dates within two years.

Written Policies Available.

Name	Type
Allen County Public Library Ft. Wayne Telecommunication Center	Volunteer Program, Operating Rules and Regulations, Workshop Outlines, Datacaster Community Notes, Other Forms for Specific Needs
Cloquet Public Library CAT-7	Volunteer, Operating, Workshop
Dallas Public Library	Operating, Workshop Guidelines, Datacaster
East Brunswick Public Library	Operating Rules & Regulations
Free Public Library of Woodbridge	Operating Rules & Regulations
Iowa City Public Library	Operating Rules and Regulations Workshop Guidelines Datacaster/Community Notes
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	Operating Rules & Regulations
Manitowoc Public Library	Datacaster Guidelines
Monroe County Public Library Community Access Channel 3	Operating, Workshop, Datacaster
Musser Public Library Government Access Channel 29	Operating Rules & Regulations Brochure
Phoenix Public Library	Policy Statement on How Library Will Use Cable When Operational
Racine Public Library Lakeshores Library System	Tape Lending Policies
South Hadley Library System	Volunteer Program Guides, Operating Rules & Regulations, Workshop Guidelines

Services Provided.

Name	Services
Albany Public Library	Library & Community Programming
Alexander Mitchell Public Library Cable Channel Seven	Library, School & Community Programming, Live/Tape Cablecast of City Commission & School Board
Allen County Public Library Ft. Wayne Telecommunication Center	Free Use of Trained Crew & Facility, Playback on Channel 10, MultiFormat Dubbing, PSA Community Notes, One Free Dub for Producer, Live Call-In, Use of Library Meeting Rooms, PreProduction Conferences
Ann Arbor Public Library	
Anoka County Library Fridley Branch	Library Programming
Arlington Heights Memorial Library	
Bethlehem Public Library	
Cass County Public Library	
Cloquet Public Library CAT-7	Community Programming
Dallas Public Library	Library Programming via Warner Amex. Developing Production Program
East Brunswick Public Library	Community Programming; Tape Dubbing for Fee ($15/Half-Hour, $25/Hour Plus Tape)
Free Public Library of Woodbridge	
Galesburg Public Library	Story Hours, Community Events
Great River Regional Library	
Green County District Library	Community Programming
Greenwich Library	
Groton Public Library	
Iowa City Public Library	
John McIntire Public Library	
Joseph Mann Public Library	Library Programming Only
Kenosha Public Library	Plan to Produce Community and Library Related Programs
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	Use of Studio & Portable Equipment, Community Programming, Live Call-In Capability
Lancaster County Library	Community Programming
Lexington Public Library	Access to Online Catalog, Link to Automated Circulation System, Plan to Do Programming
Manitowoc Public Library	Datacast Community Events and Library Services Information
Monroe County Library System	Use of Library Meeting Rooms and Sets and Props as Available
Monroe County Public Library Community Access Channel 3	Equipment Loan, Training Workshops, Request Programming, Library & Community Programming
Musser Public Library Government Access Channel 29	Use of VTR for Playback & Dubbing; Volunteer Training; Use of Library Facilities; Library Programming
New Ulm Public Library	Library & Community Programming
Phoenix Public Library	Library Plans to Produce Library & Community Programming as Access Facility in Future
Pocatello Public Library	Access to Equip, Training, Channel Time; Multiple Playback Times; Weekly Production/Programming Meetings Open to Volunteers & Producers; Live City Council Cablecast; Open Forum for Organizations & Individuals
Portsmouth Public Library	
Racine Public Library Lakeshores Library System	Library & Community Programming; Film to Tape Transfers
Reading Public Library	Library Programming Only
Scottsdale Public Library	Produces Half-Hour Community Weekly Storytime
Seattle Public Library	
South Hadley Library System	Weekly Cable Show-South Hadley Library Live
South River Public Library	Library Programming; Use of Staff, Equipment, Library Meeting Rooms
Steele Memorial Library of Chemung County	Loan Equipment, Library Programming, PSA Community Service, Air Programs Over 4 Cable Stations
Tompkins County Public Library	Loan Equipment, Library & Community Programming
Velma Teague Library	
Washington County Library Park Grove Branch Library	
Weaver Memorial Library	Library Programming (Literacy Program)
Windsor Public Library	Free Use of Equipment, Community Calendar, Community Interest Programming

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Budget Breakdown (By Percent).

Name	Budget	Staff	Maintenance	Equipment	Other	Employee Status Part-Time	Full-Time
Albany Public Library	$ 45,000	80	4	16			2
Alexander Mitchell Public Library Cable Channel Seven	$ 25,000	80	10	10		4	1
Allen County Public Library Ft. Wayne Telecommunication Center	$164,000	50	10	30	10		5
Anoka County Library Fridley Branch	$ 5,200	80	10	10		3	
Bethlehem Public Library						1	
Cloquet Public Library CAT-7	$ 5,000	30	20	25	25		1
Dallas Public Library							3
East Brunswick Public Library	$ 60,000	75	10	5	10	2	
Free Public Library of Woodbridge							1
Green County District Library	$ 43,000						1
Groton Public Library						2	
Iowa City Public Library							1
John McIntire Public Library	$ 26,000						
Joseph Mann Public Library						4	
Kenosha Public Library							5
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	$ 65,000	55	5		15	1	2
Lancaster County Library						1	1
Manitowoc Public Library							1
Monroe County Public Library Community Access Channel 3	$ 56,000	75	10	15		1	2
Musser Public Library Government Access Channel 29	$ 35,800	50	10	25	15		1
Pocatello Public Library	$ 55,000	60	10	15	15	1	1
Racine Public Library							1
Scottsdale Public Library						20	37
South Hadley Library System	$ 7,000		20	80			
Steele Memorial Library of Chemung County	$ 42,000	85	5		10	3	
Tompkins County Public Library	$ 9,000	60	15		25		
Velma Teague Library	N/A						2
Washington County Library							1
Weaver Memorial Library						1	
Windsor Public Library	$ 22,500		4	87	9		1

Programming Information.

Name	Hours/Week	Shared	Direct
Albany Public Library	2	N	Y
Alexander Mitchell Public Library Cable Channel Seven	5	Y, School System	N
Allen County Public Library Ft. Wayne Telecommunication Center	42	Y, Community Access	Y
Ann Arbor Public Library	1/2	Y, Ed. Institutions	N
Anoka County Library Fridley Branch	4	N	Y
Arlington Heights Memorial Library		N	N
Bethlehem Public Library	0		N
Cass County Public Library		Y, School District	N
Cloquet Public Library CAT-7	10	N	Y
Dallas Public Library		Y, 18 Channels	Y
East Brunswick Public Library	10	N	Y
Free Public Library of Woodbridge		Y, Woodbridge TWP School Board	N
Galesburg Public Library	1	Community Events	N
Great River Regional Library			N
Green County District Library	2	Y	N
Greenwich Library		Public Access Channel	Y
Groton Public Library			N

Programming Information (continued).

Name	Hours/Week	Shared	Direct
Iowa City Public Library	17	N	Y
John McIntire Public Library	3	Cablentertainment Comm. Cable	N
Joseph Mann Public Library		Y, Other Local Groups	Y
Kenosha Public Library	5	City Government	Y
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	20	Y, U.W. & District 1 Tech Inst	Y
Lancaster County Library	3	Lancaster/Lebanon IU	Y
Lexington Public Library		N	
Manitowoc Public Library	1	Datacaster Now Ch 37 Plan Ch 49	N
Monroe County Library System	1/4		N
Monroe County Public Library Community Access Channel 3	45	N	Y
Musser Public Library Government Access Channel 29	5	Y, City Government	Y
New Ulm Public Library		N	Y
Phoenix Public Library		Govt, Community, Educational	N
Pocatello Public Library	100	N	Y
Portsmouth Public Library		Y	N
Racine Public Library Lakeshores Library System	10	Y, Local Origination	N
Reading Public Library	1	Use Channels 3,5,10	Y
Scottsdale Public Library	1/2	N	N
Seattle Public Library		Cablearn	N
South Hadley Library System	1	N	Y
South River Public Library	1	Y, Borough Station	N
Steele Memorial Library of Chemung County	1	Y, Other Local Groups	N
Tompkins County Public Library	4	Y, Ithaca College Broadcasting	Y
Velma Teague Library	1	Community Services Department	N
Washington County Library			
Park Grove Branch Library		N	Y
Weaver Memorial Library			N
Windsor Public Library	14	Windsor Community TV, Inc.	Y

Funding Sources (By Percent).

Name	Library	City	Cable	Grant	Facility Fee	User Fee	Advertising	Other
Albany Public Library	100							
Alexander Mitchell Public Library Cable Channel Seven	1	3	45					51 (Pub. school system)
Allen County Public Library Ft. Wayne Telecommunication Center	74		26					
Anoka County Library Fridley Branch	90		10					
Bethlehem Public Library			100					
Cloquet Public Library CAT-7	20		15		35	5		25 (Yearly telethon)
Dallas Public Library			100					
East Brunswick Public Library	92		8					
Free Public Library of Woodbridge	75							25 (Board of Ed.)
Galesburg Public Library	100							
Great River Regional Library	50	25	25					
Green County District Library	100							
John McIntire Public Library	30			70				

Funding Sources (By Percent).

Name	Library	City	Cable	Grant	Facility Fee	User Fee	Advertising	Other
Joseph Mann Public Library			100					
L. E. Phillips Memorial Public Library	1	62	31			3		3 (Memberships)
Monroe County Library Community Access Channel 3	20	30	50	+/−5% (Sometimes)				
Musser Public Library Government Access Channel 29			100	(Franchise fee cable to city)				
Racine Public Library				100	(Emerging systems grant)			
Scottsdale Public Library				100				
South Hadley Library System Steele Memorial Library	10	10		80				
Chemung County Tompkins County Public Library	60			40				
Velma Teague Library			100					
Washington County Library	20		80					
Windsor Public Library	5		90					5 (Private contribs)

Volunteer Programs.

Name	Active Volunteers	Total Volunteers	Areas of Certification
Albany Public Library	20		Camera, Audio
Alexander Mitchell Public Library Cable Channel Seven	15		
Allen County Public Library Ft. Wayne Telecommunication Center	100	200	Camera, Portapak, Audio, Programming, Lighting, Assistant Directing, Directing
Arlington Heights Memorial Library	60		
Cloquet Public Library CAT-7	15	30	Camera, Portable, Audio, Programming, Lighting, Assistant Directing, Directing
Free Public Library of Woodbridge			Portable, Programming, Assistant Directing, Directing
Great River Regional Library	1		
Green County District Library	15	150	Port/Cam, Audio, Programming, Lighting, Assistant Directing, Directing, Editing
Iowa City Public Library	3	50	
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	20	40	Camera, Portable, General Production Class
Lancaster County Library	60	150	Camera, Portable, Audio, Programming, Lighting, Assistant Directing, Directing
Monroe County Public Library Community Access Channel 3	15	500	Camera, Portable, Audio, Programming, Lighting, Assistant Directing, Directing
Musser Public Library Government Access Channel 29	6	6	Camera, Portable, Audio, Lighting, Char Gen
Pocatello Public Library	40	300	Camera, Portable, Audio, Char Gen, Cablecasting
South Hadley Library System	9	30	Camera, Port/Cam, Audio, Programming, Assistant Directing, Directing, SEG
South River Public Library	10		Portable, Programming
Tompkins County Public Library	4	6	Portable, Audio, Lighting, Programming, Char Gen
Weaver Memorial Library	8	8	
Windsor Public Library	20	100	Camera, Port/Cam, Audio, Programming, Lighting, Assistant Directing, Directing

Equipment.

Name	Equip Value	Makes/Models
Albany Public Library		2-Sony 1610, Sony 3200 St/Cam; 2-Sony 2600-2610, Panasonic 3160 St/VTR; Sony 34540 Port/Cam; Sony 8400 Port/VTR; Panasonic 8500 Edit; Crosspoint Latch 6118 Spec Eff
Alexander Mitchell Public Library Cable Channel Seven	$ 15,000	Models Not Specified. Library Owns $15,000, Public School $100,000 Worth of Equipment
Allen County Public Library Ft. Wayne Telecommunication Center	$190,000	KY-2000 Studio Cam; Sony 5850 Editors; SEG 6112 Crosspoint Latch; TEAC 3 Mixer; Porta Cam Pana WV 3150; Porta VTR NV 8420; JVC 1/2-3/4Editor (5300-8200).
Ann Arbor Public Library		
Anoka County Library Fridley Branch		Pana NV1300, Sony VO2600 St/VTR; Pana Port/Cam; Pana NV8410 Port/VTR; Apple II Computer Spec Eff
Arlington Heights Memorial Library	$ 2,000	
Bethlehem Public Library		St/Cam; VTR Pana NV 8350; Port/Cam Pana WV 3150,WV 3320; Port/VTR Pana NV8420
Cass County Public Library		
Cloquet Public Library CAT-7	$ 50,000	Pana WV3800EN ST/CAM; 2-Pana NV8200 ST/VTR; Pana WV 3800, Everox 61p Port/Cam; NV8410 Port/VTR; NV-A960 Edit; WJ4600, WJ4600A Spec Eff
Dallas Public Library	$200,000	St/Cam Hitachi FP 21; St/VTR JVC6600; Port/Cam JVC KY1900; Port/VTR Sony VO4800; Edit Pana NV9600; Spec Eff Pana
East Brunswick Public Library	$ 75,000	3-JVC 1900 St/Cam; JVC 8200 St/VCR; 2-Hitachi GP7 Port/CAM; 2-JVC 4400 Port/VTR; JVC 8200 Edit; 3M Spec Eff
Free Public Library of Woodbridge	$ 15,000	2-Pana WV3150 Port/CAM; 2-Pana NV8420 Port/VTR; Pana VHS Edit
Galesburg Public Library	$ 3,000	
Great River Regional Library	$ 2,000	JVC 6500 St/VTR; JVC GS71 Port/Cam; JVC HR2200 Port/VTR
Green County District Library	$ 15,000	St/VTR Sony VO5600, Pana VN1310 Port/Cam; JVC KY1900 Port/VTR; Sony SLO340 M67 Mixer
Greenwich Library		
Groton Public Library		
Iowa City Public Library	$ 50,000	
John McIntire Public Library		
Joseph Mann Public Library	$ 1,650	TV & VHS (Other Equipment Owned by Cable Affiliate)
Kenosha Public Library		
L. E. Phillips Memorial Public Library Eau Claire Public Access Center	$ 65,000	IKEGAMI ITC 350 St/Cam; Sony VO2800; Pana NV8500, Sony VP200 VTR, Pana WV3400 AF Port/Cam, Pana NV8420 Port/VTR Panasonic NV8500, Editor NVA500, SEG ISI-902.
Lancaster County Library	$ 40,000	St/Cam Pana WV3990; St/VTR Pana NV9241 & WV9600 PORT/CAM Pana Eng Kit WV KT11 PORT/VTR Pana NV9400 Edit Pana WVA500
Lexington Public Library		
Manitowoc Public Library	$ 350	NEC Color Monitor
Monroe County Library System		
Monroe County Public Library Community Access Channel 3	$ 75,000	Pana WV3700, WV3100, WV3160 St/Cam; Pana NV8200, NV9200, Sony Sl0340, AV3650 St/VTR; Pana WV3100, WV3160, Sony 1800K Port/Cam; 2-Pana NV8410, Sony VO4800 Port/VTR; Sony VP2260, Pana NV8200 & 9600 Edit; Pana WJ4600 Spec Eff
Musser Public Library Government Access Channel 29	$ 45,000	Pana 3660B St/Cam; 2-Pana NV8500 St/VTR; Pana Port/Cam; JVC BR6200U Port/VTR; 2-Pana NV8500 Edit; Sony SEG 2000 Spec Eff
New Ulm Public Library	$ 5,000	Pana WV3320 Port/Cam; Pana NV8420 Port/VTR; Jerrold Teletral Edit
Phoenix Public Library	$ 15,000	Pana WV3160 St/Cam; Pana NV8300 St/VTR; Pana PK756 Port/Cam
Pocatello Public Library	$125,000	2-Hitachi FP10 St/Cam; Sony 5600 St/VTR; Hitachi FP10, Sony DXC1610 Port/Cam; Sony 4800, 3800, SLO-340 Beta Port/VTR; Sony 5850/5800, 2860/2260, SLO-340 Beta Port/VTR; Sony 5850/5800, 2860/2260, SLO-383 Beta Edit; Echo SE2, Ball Miratel Spec Eff

Equipment (continued).

Name	Equip Value	Makes/Models
Portsmouth Public Library	$ 6,000	
Racine Public Library Lakeshores Library System	$ 15,000	Pana 3900 St/Cam; Pana 9420 St/VTR; Pana 9420 Port/VTR
Reading Public Library		
Scottsdale Public Library	$ 2,500	St/VTR Sony VO5600
Seattle Public Library		
South Hadley Library System	$ 55,000	St/Cam Sony AVC3210, 3400; Pana WV361P St/VTR Sony VO1800; Pana PV1220 Port/Cam Sony AVC3400; Pana PK802 Port/VTR; Sony AV3400, 8400, VO3800 Edit SONY 3650, 8650, 3600 Spec Eff; Sony SEG-2 Plus Quod Monitor
South River Public Library	$ 6,000	Pana—Models not Specified
Steele Memorial Library of Chemung County	$ 50,000	2-Sony 1210 St/Cam; 2-Sony 2860, Sony 2600, Sony 8650 St/VTR; Sony DXC1610 Port/Cam; Sony VO 38000, Sony BW3400 Port/VTR; AEC RM 430 Edit; CM 3100 Spec Eff
Tompkins County Public Library	$ 40,000	JVC CR8300, 2-Sony VO2800 St/VCR; CSF Thompson MC301, Sony DXC1600 Port/Cam; Sony VO4800 Port/VTR; Sony VO5800 & VO5850 & RM490 Edit; Knox 55 Spec Eff
Velma Teague Library	$ 25,000	Port/Cam Pana777, Port/VTR JVC4700.
Washington County Library Park Grove Branch Library	$ 57,000	
Weaver Memorial Library		
Windsor Public Library	$ 15,000	Port/Cam Sony 1800K Port/VTR Sony 4800 Edit Sony 5850

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Burk, Leslie Chamberlin, and Roberto Esteves, eds. *Video and Cable Guidelines.* Chicago: Library and Information Technology Assn., Video and Cable Communications, American Library Assn., 1980.

Cherry, Susan Spaeth, ed. *Video Involvement for Libraries: A Current Awareness Package for Professionals.* Chicago: American Library Assn., 1981. ■■

News and Announcements

Data Phase Announces Microcomputer Software

Data Phase has announced the EastWind series of software products designed for microcomputers.

The first EastWind product performs circulation functions in both a stand-alone and network arrangement for special collections or smaller libraries. In addition, it can serve as a backup for ALIS I, II, and III circulation systems. The software runs on the IBM PC/XT; Apple IIe, IIc, III; and Data General microcomputers.

The EastWind circulation software includes the support of full MARC records, a flexible set of user-assigned parameters (including specification of MARC fields to be included in the bibliographic database and the length of these fields), and the support of a bibliographic database that is limited only by the capacity of the disk storage. The features permit tailoring of the system to meet the specific requirements of the library.

In a related announcement, Data Phase announced the formation of the EastWind Association, an international microcomputer users group. Membership is open to individuals and institutions interested in the applications of microcomputers in libraries and is not restricted to purchasers of EastWind software. Membership costs $35 per year and includes a newsletter and special reports. In addition, institutional members receive a discount on EastWind software and other microcomputer products sold by Data Phase.

The price of the EastWind Circulation software is $2500, and volume discounts are available. A lease plan also is available for libraries that prefer to purchase the software over a three-year period. Interested libraries should contact Data Phase at 9000 West 67th St., Shawnee Mission, KS 66202.

University of Cincinnati Signs with Biblio-Techniques

The University of Cincinnati has signed a software license agreement with Biblio-Techniques, Inc. of Olympia, Washington for an online public catalog and circulation/reserve system. The same software system was also selected for use at Columbia University, Johns Hopkins, University of California at San Diego, Indiana University, and the Toronto Metropolitan Public Library.

More than 120 hardwire terminals will be installed over the next two years in libraries throughout the main campus and two branch campuses. Users will be able to use BLIS through library terminals, the existing campus telecommunications network, and by dial-up access from remote computers. The BLIS online catalog component, based largely on the Washington Library Network's proven system, will be ready for faculty and students in selected libraries before school starts in fall 1985.

The university is cooperating with other Biblio-Techniques customers in designing enhancements for the Washington State University-based circulation/reserve functions. Installation of the circulation/reserve system is planned for mid-1985, with completion expected in 1986. ■■

Carlyle and NYPL

Carlyle Systems' online public catalog has been installed at the research libraries of New York Public Library and is now undergoing acceptance tests.

Dubbed CATNYP by NYPL, the initial system includes four terminals connected to a remote processor in New York and, via Telenet, to a host processor in California. Both the remote and host processors are manufactured by Carlyle as part of a new line of computers recently announced by the Berkeley, California company. Ap-

proximately 105,000 records are online.

Assuming the test is successful, approximately forty terminals will be installed later this year, and more than 1.2 million records will eventually be loaded into the system. Cost of the total system is approximately $300,000.

Installation of the system follows a study conducted by members of the library's Astor Fellowship group. After visiting a number of libraries using online catalog systems, the group determined that the Carlyle system best met NYPL's needs. Carlyle has been the prime contractor for the research libraries' printed book and microfiche catalogs since July 1983.

The initial database for the online catalog is the same as for the most recent edition of the book and microfiche catalogs, but the online catalog provides much more sophisticated searching capabilities. The research libraries have specified thirteen different indexes for searching by keyword and ten limiting indexes. Searches may also be limited by logical, or Boolean, connectors such as *and*, *or*, and *not*. Silent printers which enable the user to print citations in any of the four display formats used by the system, are attached to each terminal.

Carlyle Systems is located at 2930 San Pablo Ave., Berkeley, CA 94702, telephone (800) 227-2953. ■■

Faxon to Add Jaeger Catalog to New Online Database

The Faxon Company, Inc. and Alfred Jaeger, Inc. have announced the addition of the Jaeger Catalog of serial back volumes to INFOSERV, Faxon's online database of new serial titles.

INFOSERV currently offers libraries information on new, revised, and forthcoming titles via easy-to-use, menu-driven software. Orders and requests for further information and sample copies can be placed online.

Jaeger, a leading back-volume specialist since 1959, can build a collection from inception through 1983, in many cases, by utilizing its vast inventory, which is geared toward current trends in library purchasing. A single-issue service on an open-order basis is also offered.

Jaeger first came online with Faxon's LINX network in September 1983, enabling LINX users to transmit orders for back issues. With the addition of Jaeger to INFOSERV, existing catalog records will be enhanced to include access by keyword, title, publisher, and subject. In addition, INFOSERV will facilitate online requests and orders for volumes in the Jaeger database. ■■

RLG and Three Local Systems to Cooperate on Links to RLIN

The Research Libraries Group, Inc., (RLG) has signed memoranda of understanding with three library-system vendors to plan the development of a computer-to-computer link between their systems and the Research Libraries Information Network (RLIN).

The three participating vendors in this new cooperative effort are:

- The Libraries of Northwestern University, Evanston, Illinois, creators of the NOTIS library automation system;
- Biblio-Techniques, Olympia, Washington, vendors of the BLIS library automation system (based on features of the Washington Library Network system);
- Geac Computer Corporation, Ltd., Library Systems Division, Markham, Ontario, Canada, vendors of integrated local library systems.

RLIN is RLG's automated information network; the system supports bibliographic and authorities searching, cataloging, acquisitions, interlibrary loan, collection development data, and bibliographic data for special subject areas.

RLG has agreed with each of these vendors to plan the implementation of a "standard network interconnection" that uses computer-to-computer communications protocols developed by RLG staff, the Washington Library Network, and the Library of Congress, as part of its cooperative "linked systems project" (LSP). These protocols are based on the ISO Open System Interconnection reference model. They permit library and information retrieval applications on one system and computer to communicate with those on others. ■■

Baker & Taylor Introduces Acquisitions Software and Services

Baker & Taylor has announced its new BaTaSYSTEMS family of acquisitions software and electronic services. Initially, three BaTaSYSTEMS services will be available: the title search and order service, a full acquisitions system, and the title confirmation service. Each service offers electronic ordering and promotes on-site management of the acquisitions function.

The online title search and order service enables the library to search Baker & Taylor's database of more than 850,000 title records, to order electronically, and to print order slips.

The full acquisitions system is a combination software package and online service that enables the library to control ordering, fund accounting, and reporting functions on a personal computer.

The title confirmation service is a software package for personal computers that allows book orders to be keyed-in by ISBN for toll-free transmission to Baker & Taylor. Bibliographic data is then transmitted back to the library for on-site printing of slips and title confirmation reports. ■■

SIRE—Advanced Information Retrieval for Micros

KNM, Inc. has announced a new information retrieval system called SIRE, which is designed for individuals, offices or libraries with a need to store and retrieve records containing text.

SIRE enables users to design, build, maintain, and query their own databases—whether generated through word processing or directly typing the information into the system or obtained through an information service or network.

Some typical uses of SIRE include: office files, reports, correspondence, legal briefs, personal libraries, résumés and job descriptions, newspaper morgues, corporate library catalogs, and in-house databases.

SIRE performs the traditional retrieval functions, such as Boolean logic searching, without sacrificing retrieval speed or ease of use. The system also has a number of enhanced, new, or unique features, including:

- automatic statistical thesaurus and search on related terms
- ranked output, according to likelihood of usefulness
- use of documents in queries to find similar documents
- natural language or Boolean logic requests
- automatic matching on word stems
- truncation and wild card searching
- automatic full-text indexing and manual indexing
- field restricted searching
- up to 256 fields per document, all variable length

SIRE can support databases of up to 65,000 documents and a total of 16 million characters. SIRE runs on the IBM PC and XT under MS-DOS. VAX, VMS, and RSX versions will be available soon. Please inquire about versions for UNIX and other 16- and 32-bit machines.

SIRE can be ordered from KNM at 6118 Swansea St., Bethesda, Md. 20817. Purchase price for the PC version is $600. Educational and quantity discounts are available and demonstration copies may be purchased for $10. For more information, phone (301)365-4449. ■■

Serials Titles Added to UC Online Catalog

The Division of Library Automation (DLA) at the University of California at Berkeley has added a serials database of more than 500,000 titles to the MELVYL online catalog.

Until now, MELVYL contained only monograph titles. On August 1, the 1984 edition of the California Academic Libraries List of Serials (CALLS) was added as a separate database, accessible through MELVYL. The CALLS addition is in prototype.

DLA Director Edwin B. Brownrigg said, "Serials titles represent the first nonbook MARC format to be added to our online union catalog."

Containing 516,336 titles (representing 838,334 holdings), CALLS is a unified index to serials held by the libraries of four major California universities: University of California, Stanford University, University

of Southern California, and the nineteen-campus California State University.

CALLS has been produced in microfiche for several years and sold to libraries nationally. The entries include author, title, and holdings information, and, when available in the input record, the edition, imprint, ISSN, and CODEN. As a key-term index in key-word-out-of-context format, CALLS provides access to all significant words and phrases in the author and title entries.

MELVYL's monograph database, which combines library holdings of the nine UC campuses, has almost 1.5 million records.

DLA coordinates production of both CALLS and MELVYL and manages the computer system and telecommunications network that deliver MELVYL to terminals on UC campuses throughout the state. ■■

1984 OCLC Library Literature Contest Winners

OCLC has announced the following winners in its second annual OCLC Library Literature Contest.

Dixie A. Anderson, Coos Bay (Oregon) Public Library, for "Shared Usage: An Experiment that Works," *PNLA Quarterly* (Pacific Northwest Library Association), 48,no.3:28–31 (Spring 1984).

K. Bramley and A. E. Jeffreys, University of Newcastle upon Tyne, England, for "Using OCLC: Its Cost, Currency and Coverage," *Outlook on Research Libraries* 5,no.5:1–8 (May 1983).

Elizabeth Chadbourn McKee and Larry Stephen Perry, University of Arkansas, for "Reference and OCLC: A Practical Checklist of Questions for the Terminal," *RQ* (American Library Assn.) 23,no.3 (Spring 1984).

Doris R. Brown and Mary Bowman, DePaul University Library, for "OCLC Acquisitions Subsystem: Expanded Services vs. Increased Costs," *Technicalities* 4,no.1:12–14 (Jan. 1984).

Authors received a $250 cash prize per article. Judging was done by a panel of OCLC staff.

The OCLC Library Literature Contest is conducted annually to recognize those authors who have published articles addressing procedures or techniques that pertain to library automation in the OCLC environment. Specifically, the articles must address some aspect of using or preparing to use an OCLC service, product, or system. ■■

Library Receives Grant for Bookmobile Project

The Westminster, Colorado, Public Library has been awarded a grant totaling $11,327 to proceed with a project that is hoped to link the city's bookmobile with the mainframe computer. If successful, the project will bring the library's card catalog to every city block where the bookmobile stops, the first project of its kind in the nation.

The grant was awarded through Title I of the Library Services and Construction Act. The Colorado State Library and State Board of Education approved the proposed project and appropriated the grant.

The library plans to install a computer terminal in the bookmobile and use a radiophone link to the city's mainframe computer, providing over two thousand Bookmobile patrons with the opportunity to search for and request any item in the city's main or branch libraries. Patrons will also have the opportunity to request current status of any item which is overdue or on which they may owe a fine.

For further information on the project, call Katherine Phenix, (303)429-1546, ext. 260.

ANALOG Videodisk System Opens to Users at Library of Congress

The Library of Congress has made available to its users the first of six analog videodisks produced during the initial phase of its Optical Disk Pilot Program, begun in late 1982. Installed in the Prints and Photographs Reading Room, the disk with its player and a video monitor will make it possible for a library patron to quickly sort through, or stop and study, any one of almost forty thousand photographs, posters, architectural drawings, and other pictorial items from LC's prints and photographs collections.

In addition to offering attractive features for preservation, both digital and analog disk storage may offer unparalleled high-speed access to library materials, including some of the most fragile and important materials in the library's vast collections. With collections now totaling more than 80 million items and increasing at the rate of more than seven thousand a day, LC will closely evaluate each part of this pilot program with an eye towards wider use within existing resources in the future. ■■

Forbes Added to Information Access Company's Full-Text Online Databases

Information Access Company (IAC) has announced an agreement with Forbes, Inc. to add the publisher's magazine to IAC's full-text online databases of popular general interest and business periodicals.

The creation of the *Magazine ASAP* and *Trade & Industry ASAP* databases, which became available May 1, for the first time offers controlled vocabulary searching of the full text of major magazines. The IAC databases are accessible from virtually any computer or terminal through DIALOG Information Services.

The addition of Forbes to the *Trade & Industry ASAP* database brings to 131 the number of publications which will be included in the initial service. All issues of the periodicals from January 1983 are available online for research and reference. Existing material will remain in the databases as each new issue of the publications is added. ■■

Statement of Ownership and Management

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Recent Publications

Bibliographic citations were produced with the guidance of María Clark, Yale University Library, New Haven, Connecticut, in accordance with the American National Standards for Bibliographic References. *New York: American National Standards Institute, 1977. 92p.* American National Standards on Library Work and Documentation; *ANSI Z39.29-1977).*

Reviews

Dewey, Patrick R. ***Public access microcomputers: a handbook for librarians.*** White Plains, N.Y.; London: Knowledge Industry; 1984. 151p. (Professional librarian series). ISBN: 0-86729-086-2, hardcover, $34.50; ISBN: 0-86729-085-4, softcover, $27.50.

This book is a good guide for public librarians who lack computer expertise but who would like to initiate a program for making microcomputers available to their users. The justification is primarily to promote computer literacy, but also to provide educational programs and computer games. In order to assist the novice, the author clearly defines basic computer terminology such as hardware, software, central processing unit, and memory and peripherals such as disks, printers, and modems.

Fundamental considerations for the selection of equipment are also developed. The author suggests evaluation of the needs of the library and the community. He provides a brief description of a few major microcomputers. Likewise, types of software programs are described, and the author provides a list of programs particularly suited for public libraries. He suggests guidelines for libraries who are looking at new software programs. Since administrative planning is important to the success of new programs, Dewey suggests considering location, security of equipment, staffing, and scheduling.

One chapter of interest to librarians wishing to begin a public access microcomputer program describes nineteen projects already in existence. Many programs focus on training users to become computer literate, while others make available in the library educational programs that promote reading, spelling, and other skills, or that provide games. Already several libraries are lending equipment, most notably the Downers Grove (Ill.) Public Library, which circulates their microcomputers. The Alice and Hamilton Fish Library in Garrison, New York, circulates software.

Another interesting topic is computer activities capable of attracting users to the library. Dewey addresses this issue by listing a range of activities, from computer clubs and user groups to sponsoring games, tournaments, computer fairs, computer parties, contests, classes, and seminars. He suggests libraries advertise by fliers, handouts, and a column in the local newspaper.

Special emphasis is given to the North-Pulaski Branch Library where the author is the librarian. At this location an electronic bulletin board system (BBS) is successfully employed. Information normally found on a bulletin board is available in an online version. Users with their own personal computers can access the information by telephone through a modem. By February 1984, the North-Pulaski Branch Library had received more than ten thousand calls for this service. Recently, software programs that are in the public domain may be downloaded, or transferred from the library to the requester's computer, through the BBS.

Although the author briefly describes a few online bibliographic databases, such as *BRS after Dark* and *Knowledge Index*, he does not develop the possibility of the public library teaching users how to use these databases. He quickly dismisses the usefulness of bibliographic searching because of two issues: one, who will pay for the ser-

vice, and two, the continuing debate about the quality of searching down by end users rather than professional searchers. *BRS after Dark* and *Knowledge Index* are simplified versions that do not require sophisticated techniques and thus could be used by relative novices. The book falls short by giving them such a quick dismissal. Providing citations to articles on a given topic, as well as teaching people new library techniques, must certainly be a goal of all public libraries. Suggesting ways of financially providing the service, training the end users, and promoting the usage of remote databases, as noted above, would certainly have been helpful in this book.

This handbook is well organized and well written. Included are tables, a selected bibliography, a glossary of terms, an index, and several appendixes providing addresses of manufacturers of microcomputers, software companies, newsletters, journals, and bulletin board software sources. Much of this advice and information can be found in other books; however, the author does provide in one volume a good introduction to the public use of microcomputers.—*Karen Stabler, Tulane University, New Orleans, Louisiana.* ■■

Dowlin, Kenneth E. ***The electronic library: the promise and the process.*** New York: Neal-Schuman; 1984. 199p. (Applications in information management and technology series). ISBN: 0-918212-75-8, softcover, $24.95.

Exactly why libraries and other information service agencies have come to use computers and the electromagnetic media they manage is a question rarely posed in such generality. The early view was that computer-aided techniques were needed to survive the information explosion, with its enormous increase in the quantity of available materials. The recognition has steadily spread, however, that computers and related telecommunications and storage technologies are changing the terms in which the library and information science professions should consider themselves. It is now generally accepted, especially by the readers of this journal, that the innovative potential of computer-based systems is far more compelling than their substitutive potential. Most recently, attention has turned to a vision that places the computer at the dead center of things and rethinks the entire array of library services accordingly. The phrase "electronic library" has come into use as a generic descriptor descriptor for the resulting institution.

This very accessible book by the former president of the Library and Information Technology Association provides a general treatment of what is meant by "electronic library," along with a description of Maggie's Place, Pikes Peak Library District, which is put forward as the best approximation of the concept currently available. The book's frame of reference is keyed to that of Alvin Toffler's *The Third Wave*, and it argues forcefully that technological progress and public expectations require that highly centralized models of library service delivery give way to largely decentralized ones. It also asserts that the overall societal situation contains tremendous promise for libraries and librarians willing and able to recognize the opportunities and to assume the responsibilities. It is a manifesto of sorts for those excited by the challenge it presents.

The organization of this book is exemplary. Six premises "basic to the process of creation of the electronic library" are stated in the introduction and developed in the body. The first four chapters consider Toffler's concept of "the third wave," the roles of information, libraries, and librarians in the electronic age, and the need for change in library and information service organizations. Systems theory, hardware, and skills are the subjects of three middle chapters, which constitute the book's substantive core. All of this material is effectively summarized in two chapters concerned with a professional strategy for the future of library and information service and the promise of electronic libraries; it is also illustrated in a chapter devoted to Maggie's Place. The book attempts to mix philosophical views with practical information while considering both social and professional trends. It is an ambitious effort and, generally speaking, it succeeds admirably.

The most noteworthy and distinctive theme developed by this book is the role of

librarians in the technology-intensive world that has rapidly come upon these professionals and the institutions they represent. The book is clear and eloquent in its assertion that librarians and libraries have a key role in promoting and achieving a historic social transformation but that major efforts are needed to acquire the skills and effect the changes required. This approach avoids the frequently made mistake of focusing exclusively upon the wonders of technology and creating the impression that survival of the fittest will determine who will actually prosper using it. The message of this book is that all librarians are potential leaders in this process and that they have an obligation to themselves, their profession, and their clienteles to update their thinking and reform their service delivery methods.

This book is not without fault. Numerous typographical errors are a source of brief but very real distraction. Library schools are afforded a leadership role in the searching and experimenting needed to bring electronic libraries into being; both historical examples and contemporary observations render this a highly questionable placing of confidence. The definition offered for "public library" is too broad and simplified to serve any useful purpose; it is less objectionable to formulate such definitions in terms of the community a type of library serves rather than the services it offers. The general lack of detail and consideration for subtle but important conceptual variations will displease the specialists; a much more comprehensive reading list would have been an asset.

A highly recommended use of this book is as a resource for group discussions in instructional and professional settings. An appendix, which provides an "electronic library sensing instrument," is particularly valuable in this respect. Use of the instrument yields quantitative measures of individual, group, and organizational standings and desires for change with respect to creating the electronic library. Such measures can greatly facilitate the early stages of group efforts devoted to coming to grips with the concept, and the rest of the book furnishes ample stimulation for planning approximations of it. The impact of this book could be far-reaching if it provided such a framework and resource. Regardless, it is a welcomed articulation of the future from an adventurer who has been there.—*Paul Evan Peters, Columbia University Libraries, New York City.* ■■

Kilgour, Frederick G. ***Collected papers.*** Compiled by P. A. Becker and A. T. Dodson; edited by L. L. Yoakum. Dublin, Ohio: OCLC; 1984. 2v. (355, 521p.) ISBN: 0-933418-49-3, hardcover, $57.50.

I have, as an unrealized, and probably unrealizable, dream, the idea of writing about the Great Person theory of history as applied to librarianship. There is no doubt in my mind that the course of library history would have been altered significantly if the likes of Anthony Panizzi and Melvil Dewey had never existed. Modern library history also shows significant examples of persons whose contributions have been so influential that they have materially altered the practice and theory of our profession. My exposure to Great Library Persons began early. At the age of seven, I discovered that the library of the north London suburb in which I lived was *the* place to be. All kinds of instructive and entertaining possibilities were open there to a recently re-urbanized child of war. The presiding genius of this arcadia was an unassuming lady known to us all, and reverently, as Miss Colwell. Many years later, at library school, I discovered that this familiar, and taken-for-granted, figure of the forties suburban world was Eileen Colwell, the woman who, as far as I can tell, invented and perfected modern English children's librarianship. All unwittingly, I had known and benefited from my first Great Library Person.

Since that time I have worked with A. J. Wells (the founder of *The British National Bibliography*—a milestone in the history of bibliography and of libraries) and have met and talked to Seymour Lubetzky, S. R. Ranganathan, Eva Verona, D. J. Urquhart, Henriette Avram, and Frederick Kilgour—all persons of singular and lasting achievement; giants in our time and Great Persons all.

The volumes under review are the written monument of the last named—Frederick Gridley Kilgour. It might be thought that his real monument is to be found in the processing departments of thousands of libraries. Indeed, one is reminded of the filial tribute to Christopher Wren (*Se monumentum requiris, circumspice*) in that one realizes again—unless a person's avocation is writing, the deeds of a man or woman are usually of more importance than his or her written records. We must, therefore, see these volumes as a valuable archive rather than as an accomplishment entire unto itself.

Volume 1 of these handsome volumes (yes, they are handsome—well laid out and printed on a creamy paper, gleaming in a blue-and-gold binding and slipcase, they are oddly reminiscent of their progenitor) deals with the "early years." It covers the period up to 1967, the pre-OCLC years in which Kilgour worked at the Harvard library, for the U.S. government in some distinguished and interesting sounding roles, and at the library of Yale University, notably and lengthily as that eminent institution's medical librarian. In the pieces of this period, even the earliest, one can see the characteristic Kilgour virtues on display. The inquiring, scientifically oriented mind, the easy prose style that enables him to explain complex and esoteric matters in a manner that all interested persons can comprehend, and the practical bent that tends toward solutions, all these are present from the beginning. Taking some papers or less at random, we find essays on Justin Winsor (1941), William Harvey (1952), and Galen (1957); an excerpt from the Yale Medical Library report of 1951; "The Disappearance of Unbound Journals" (1962); and a number of pieces on the early use of computers in bibliographic control, especially in light of the Columbia-Harvard-Yale Medical Libraries Co-operative Computerization Project (early to mid-1960s). The latter project is of great significance in that it provides a bridge between this period and the early years of OCLC. I especially liked the brief, illustrated pieces in this volume headed "Medicine in Art." These are short, scholarly (but not stuffy) commentaries on depictions of medical craft from prehistoric times to the nineteenth century reproduced from *What's New* (1959–60). Their relevance to OCLC is imperceptible, but they have relevance to the understanding of a Great Library Person. More to the point, I suppose, we should note the following observations in a paper entitled "Research Libraries in Information Networks," which was delivered nearly twenty years ago:

> In the foreseeable future the principal development will be a speeding up of bibliographic services to each library by real time computer operations. . . . Still more distant in the future it is probable that the availability and flow of resources in the network will also be computer based, and at that time, the characteristics of the network, as well as research libraries themselves, may undergo a violent upheaval.

Prophetic, indeed, and, without Frederick Kilgour, those developments might still be "distant in the future."

A most readable and informative paper from the "early years" is "Technological Innovation in the United States," reprinted from the *Journal of World History* (1965). In this piece Kilgour describes more than two hundred years of primary invention and important technological innovation, relating these to the historical eras in which they took place. He charts the ups and downs of American invention, mentioning especially the technological drought that, in the main, afflicted America in the period up to the Second World War and was so gloriously remedied by the flood of innovation in the post-war period. It is as true for librarianship as it is for the wider world that (in Kilgour's words) "it has been America which has made the majority of the modern innovations that produced the Age of Automation."

Volume 2, *OCLC Years*, is an altogether weightier, longer, and, let us be frank, less entertaining affair than volume 1. It contains eighty-nine articles that center upon OCLC and library automation, the pictures are fewer and less interesting, and the whole volume induced momentarily, in this light-minded reviewer's mind at least, thoughts of Alice's immortal and definitive literary criticism: "What is the use of a book without pictures or conversations?" However, such moments pass and one can dip into any of the eighty-seven articles that lie

between the "Parker-Kilgour" report to the Committee of Librarians of the Ohio College Association (1965) and "Public Policy and National and International Networks" (from *ITAL*, 1983) with profit and instruction.

It is natural that, with such a voluminous output of papers and speeches centered upon a relatively narrow area, a certain repetition of themes, citations, and opinions should occur. The editors of these volumes have omitted little, and this results in a number of papers being included that are variations upon a theme and frequently include references to the same works (Baumol and Marcus' *Economics of Academic Libraries* is cited eight times in nine papers occupying less than fifty pages), the same examples, and, sometimes, similar phrases. This comprehensiveness, though valuable from the archival point of view (perhaps the primary reason for this publication), is wearisome in patches to even the most dedicated reader.

Kilgour holds, and has held for a long time, strong views on the nature of cataloging and of traditional forms of bibliographic control. I do not agree with some of his views, principally the one that holds that the nature of online systems makes traditional complex cataloging rules and classification schemes unnecessary. I would admit that my vested interest is as strong as his, but I would have thought that the history of OCLC (positive and negative) has shown that measures of standardization and decent uniformity are as essential, if not more essential, in the online union catalog as they are in any benighted premachine catalog. Kilgour's "Publication of Scientific Discovery: A Paradox" (1966) is a short conceptual piece that foreshadows his view of the matter of bibliographic control expressed more directly in, for example, "The Impact of Technology on Libraries" (1978), "Impact of *AACR2* on Economic Viability of Libraries" (1978—perhaps his most benign utterance on traditional cataloging codes), and "Library Catalog Design" (1981).

The heart of this second volume is the many articles on OCLC. Nearly one-fourth of the articles in this volume (twenty-one of eighty-nine) have OCLC or its earlier fuller name in their titles. Again, in reading these, one has to admire the consistency of vision and the singleness of purpose that so so manifest in Frederick Kilgour. His confidence in the grand design of OCLC and the accuracy of his predictions are inspiring; the essential correctness of his vision is everywhere manifest no matter how one may view OCLC's present characteristics.

In the 1965 "Parker-Kilgour" report we find a sketch for OCLC that recognized, as the first priority, "a shared cataloguing program" because "it is important to start the accumulation of machineable [a word that seems to have been a short-lived Parker-Kilgour coinage] cataloging information at the earliest possible moment." One should note that this was when MARC was not much more than a twinkle in Henriette Avram's eye. Following these essential first steps, the report recommended studies on interlibrary loan capabilities, core collections of heavily used materials, and duplication of cataloging activity. This was prescience indeed. It is notable that the report emphasized the shared cataloging element (that which makes a sound economic basis for a network) and the building of a large and comprehensive database (that which is the foundation of all network activities). In a 1974 piece, Kilgour professed himself surprised at the volume of ILL activity in OCLC, but this was surely disingenuous since he had predicted it years before. In 1977 (at IFLA), Kilgour is found correctly predicting the success of OCLC's newly formed formal ILL system. In 1983 he reported that the ILL system was working at 90 percent efficiency. Throughout *OCLC Years*, themes recur, prophecies become achievements, and vision begets practical success. These OCLC papers are eloquent testimony to the identity of a person and the institution he created, an institution that may never again reach the heights it attained under his direction.

Interspersed among the later papers on OCLC are speculative articles and speeches on such matters as the future of international library networks, the future of library automation, new information systems, the impact of technology on libraries, and "the next fifty years in libraries." No matter what one's own opinion, it would be

a rash person indeed who faulted the predictions of one who has been correct so often in the past.

This is an indispensable collection for the library historian of the future and challenging reading for all librarians today. It is a pity that its size and price will probably bar all but academics and students from having access to it. Perhaps OCLC should issue a pocket-size and pocket-priced selection—*The Essential Kilgour.*

Throughout his professional life, Frederick Kilgour has displayed all the attributes of a Great Library Person—vision, single-mindedness, faith, confidence, pertinacity, intelligence, and a certain inability to comprehend that the rest of us do not share, to an equal degree, those shining qualities. (This last is true of all those that I listed earlier—even the near-saintly Ranganathan and Lubetzky.) It was, I think, Tristram Shandy's father who noted the corregeiscity of Corregio; let us appreciate and celebrate the kilgourness of Kilgour and, through this written record, recognize the great achievements of a great career.—*Michael Gorman, University of Illinois at Urbana-Champaign Library and University of Chicago Graduate Library School.* ■■

Matthews, Joseph R.; Hegarty, Kevin, eds. ***Automated circulation: an examination of choices.*** Chicago: American Library Assn.; 1984. 126p. "Proceedings of a Preconference Sponsored by the Circulation Services Section, Library Administration and Management Association, American Library Association, July 8–9, 1982, Philadelphia." ISBN: 0-8389-0402-5, softcover, $15.

Automated Circulation is a collection of fifteen papers presented at the LAMA 1982 preconference on automated circulation systems. Despite a two-year lapse between presentation and publication, these presentations should not be dismissed as being dated. The papers contain a great deal of sound and timely advice, balanced with personal insight and experience. Vendor systems may change, but the basic concerns and problems with planning and implementing these systems do not. Librarians are still concerned about selecting systems, vendor contracts, and system implementation, and they will find these papers useful

in planning for library automation.

This book presents a potpourri of information ranging from advice on database creation to a discussion on why libraries automate. Basic principles, planning strategies, and realistic advice are presented. There is little expounding of "how we did it good at our place." Instead, real situations are used as illustrations, as opposed to being the main text of a paper.

Unlike an author of a book, these presenters have only minutes to gallop through a topic. It is interesting to note how well they have complemented and supported each other's work. The time restriction of delivering a speech has not diminished the quality of the information presented.

Although the emphasis of the preconference was automated circulation, this reviewer finds great significance in the fact that automated circulation as a topic unto itself is not really addressed. Instead, the presenters have taken a more generalist viewpoint. The audience is left with thoughts to stimulate them when planning an automated system, regardless of the primary function of that system. This may be indicative of the current trend to plan for integrated systems or may simply have occurred because there are basic approaches to automation planning. The reader of these papers comes away with a more balanced view of what is involved in planning and implementation.

Anyone currently involved in the throes of planning or just starting to think about automation would do well to read *all* of the papers. Particular emphasis should be given to Sager's dispelling of the myths of why we automate and to Epstein's discussion on implementation, which is more like a heart-to-heart talk on the facts of automated life. William Adiletta's presentation is a good, concise description of the mainstream approaches to data communication. (Simplified for the layperson, thank goodness!)

Many librarians freeze up at the prospect of creating specifications for an automated system or negotiating a contract with a vendor. Kevin Hegarty provides the reader with an outline of the major components of the contract. He also describes how the library should view its rights and obligations as a party to a contract. In addition, the appendixes to this paper contain detailed outlines for a request for proposal (RFP) and a contract. Here, in print, is a good answer to what should be in these important documents. As a counterpoint to Hegarty's article, Jane Burke provides an interesting insight into the vendor's perspective. Outside of emphasizing that profit motive is a driving force for vendors, Burke's presentation complements and expands on points raised in the Hegarty paper. Pat Barkalow's discussion of financial planning also helps bring into focus some of the comments from the Hegarty and Burke papers. Barkalow's presentation is a concise step-by-step approach to project planning. She identifies the task and cost relationships encountered at each stage of an automation project.

Readers should not overlook the papers concerning in-house systems since these systems are often good examples of how important comprehensive planning is to the continual growth of a system. Both George Happ and Tony Pierce emphasize this in their papers, as well as discussing some of the pitfalls of local system development.

Two major "make it or break it" factors in automation are site preparation and database creation. Carol Parkhurst gives the reader good, practical advice on site preparation and presents it in a very straightforward manner. Diane Mayo also takes a practical approach to database creation. She discusses the problems that one may encounter when trying to create patron, bibliographic, and item- or copy-specific databases. This is an article that could easily be used over and over by a library as it moves through the various stages of the automation process.

Michael Bruer's article on public relations is the final paper in the book. Publicizing the automation decision and process is frequently overlooked by libraries. Bruer provides sound arguments for its inclusion as a primary planning activity.

Libraries are learning from the automation experience, and this book is a positive reinforcement of that educational process.—*Nancy Gonce, University of Maryland, College Park.* ■■

Panel on Impact of Video Viewing on Vision of Workers. ***Video displays, work, and vision.*** Washington, D.C.: National Academy Press; 1983. 273p. ISBN: 0-309-03388-8, softcover, $14.50.

VDT news: the VDT health and safety report. New York, N.Y.: Microwave News; 1984– . ISSN: 0742-938X, $18 per year for individuals and $35 per year for institutions. Bimonthly.

In June 1983, *ITAL* presented "Radiation, Ergonomics, Ion Depletion, and VDTs: Healthful Use of Visual Display Terminals." This article provided background related to health effects known to be or suspected of being associated with the use of VDTs and gave guidelines for the safest use of those devices based upon available knowledge. Even though that available knowledge has continued to grow (still supporting the guidelines published in *ITAL*) and associated documentation has significantly improved, the controversial nature of the subject has led to a spate of publication that obfuscates the issues and that hides the good information. In the midst of this proliferation of words, two publications—one a monograph and one a newsletter—have appeared to provide us with sufficient data so that we can make informed decisions for issues related to the use of VDTs.

The monograph *Video Displays, Work, and Vision* is the report of the Panel on Impact of Video Viewing on Vision of Workers, which was established by the National Research Council's Committee on Vision. Although the charge to the panel was focused on visual issues, it was not possible to isolate visual aspects of VDT use from other, interrelated considerations. As a result, the report covers all aspects of health effects associated with VDTs. Topics covered include radiation emissions and their effects; display characteristics; lighting and reflections; anthropometry and biomechanics in VDT applications; visual tasks, functions, and symptoms; job design and organization variables; and design, practice, and standards for VDT equipment and work. This is a scholarly report but the charts, references, technical language, etc., do not interfere with the readable, easy-to-understand text. For those needing or wanting more in-depth information than that provided by the above-mentioned *ITAL* article, this book is probably the most efficient method to gain that information along with confidence in its accuracy. There are still many myths and unanswered questions about this subject, but a reader of the report should be equipped to separate fact from fiction.

Once a person has this foundation knowledge, then there is the onerous task of sorting through the morass of daily publications on the subject. The popular media are full of comments that are out of context, the unions are supporting restrictive legislation, big business is fighting that legislation, legislators can't decide what to do, scientists argue about what standards are needed, and so forth. It would take a full-time job to try to stay informed about new developments or . . . one can subscribe to *VDT News: The VDT Health and Safety Report*. This bimonthly newsletter (twenty pages in each of the first two issues) reports international perspectives on any health problems associated with VDTs and on any associated remedies. It covers both sides of legislative and union activities. It reports on standards and new technological developments. Sources of information are clearly stated and access to original data is made available when possible. *VDT News* is nicely printed in a visually pleasing format on sturdy paper. Based upon my review of the first two issues, *VDT News* appears to be the best single source for continuing information. More than any other source, the reporting appears to be balanced and straightforward. I hope that the standard for quality that has been set in the first issues will continue in the future.—*R. Bruce Miller, Indiana University, Bloomington.* ■■

Woods, Lawrence A.; Pope, Nolan F. ***The librarian's guide to microcomputer technology and applications.*** White Plains, N.Y.; London: Knowledge Industry; 1983. 209p. "Published for American Society for Information Science." ISBN: 0-86729-045-5, hardcover, $34.50 ($27.60 to ASIS members); 0-86729-044-7, softcover, $27.50 ($22 to ASIS members).

Unfortunately, *The Librarian's Guide to Microcomputer Technology and Applications* offers an excellent snapshot of library microcomputer applications as of the end of 1983. Unfortunately? Well, yes. As a snapshot it provides a glimpse of scores of microcomputer applications (as the title suggests), but a glimpse is all the reader gets. In spite of the title, the authors offer very little guidance in their discussions of the applications. Innovacq, for example, the excellent, full-feature, full-scale acquisitions system from Innovative Interfaces gets the same treatment (one brief paragraph) as the Glendora Public Library acquisitions system.

This is not meant as a put-down of the Glendora Public Library acquisitions system. It may very well be a fine system (although Woods and Pope fail to say so), but it is a system designed to run on a single-user Radio Shack desktop micro while Innovacq runs on a much larger, custom-designed, multiprocessor, multiuser system. This illustrates a very significant distinction that Woods and Pope neglect to emphasize enough: there are microcomputers and then there are microcomputers. One kind of microcomputer is the personal computer, typically a desktop device that integrates an 8-, 16-, or 32-bit CPU, keyboard, monitor, and limited auxiliary storage (like a floppy disk). Such a personal computer runs an operating system that, while it may allow concurrent tasks, is designed for a single user. Another kind of microcomputer-based system is made up of a CPU running a multitasking operating system and connected to a variety of peripherals (terminals, disk drives, tape drives, printers, etc.) more on the model of a multiuser mini or mainframe computer. Although the authors do devote a few words to this distinction in the second chapter ("Basic Microcomputer Technology"), they do not use this distinction in their discussions of applications in the later chapters.

The first five chapters of the book (approximately one-third of the volume) are devoted to general issues of microcomputer technology. The third chapter, "Software

Technology," covers operating system, database management packages, and programming languages. Consistent with the rest of the book, the authors make little effort to be comprehensive or to offer in-depth treatments of the subject matter. In their discussion of operating systems, for example, Woods and Pope devote one short paragraph to all but CP/M (which rates a whopping four paragraphs). They do not even mention MS-DOS or PC-DOS. Nor is there even a single sentence on dBase II in the section on database management packages. Astoundingly, the authors neglect entirely the whole area of telecommunications software.

The next two chapters cover software development and selection issues. These are without doubt the most informative chapters in the book. The advice offered in these two chapters is excellent and will be of use to the librarian considering the development or acquisition of a large-scale software package. What is lacking in these chapters, however, is any advice regarding the development or selection of small-scale software applications. Most users of microcomputers, in libraries and elsewhere, use their micros as personal computers running word processing, spreadsheet, and database management programs. The elaborate design and evaluation guidelines set forth by Woods and Pope are totally inappropriate for the librarian who wants to do some budget planning with a spreadsheet program.

Fully half the book deals with library applications for microcomputers, with four chapters covering public service, technical service, and management applications and with three appendixes. Appendix A is a "Directory of Selected Library and Library-related Microcomputer Uses" listing some two hundred entries including library name, name of librarian to contact, address, phone number, microcomputer brand used, and application type. The only conceivable use this directory can have is to guarantee sales of two hundred copies of the book to librarians with a desire to see their names in print. Appendixes B and C, however, list vendors of microcomputer hardware, software, systems, and services. These are very inclusive and provide a handy source of information for librarians sending out requests for proposals.

"Future Trends" is the final chapter of the book. In it Woods and Pope do make some fairly astute predictions. While they waste space on the Apple LISA (a marketplace failure), they do predict a BabyLisa, which has emerged as the Macintosh. It should be interesting to see what impact the Macintosh has on library automation.

It is regrettable that Woods and Pope do not consider the importance of the microcomputer as an intelligent work station in a distributed system. Librarians, perhaps more than any other "knowledge workers," require a device that they can use to perform strictly local processing or spreadsheet analysis, while at the same time communicating and exchanging data with institutional databases (like online catalogs), and that can also tap into regional and national networks, all with a minimum of manual logging on and logging off. Advances in local area networks (LAN), windowing or multitasking software, and more powerful hardware (such as the IBM PC AT) are laying the groundwork for these future microcomputer applications, next to which those described by Woods and Pope will seem pale by comparison.—*David Buxton, University of Virginia Library, Charlottesville.* ■■

Other Recent Receipts

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

Daniel, Evelyn H.; Notowitz, Carol I. *Media and microcomputers in the library: a selected, annotated resource guide.* Phoenix, Ariz.: Oryx; 1984. 157p. ISBN: 0-89774-117-X, hardcover.

Gordon, M.; Singleton, A.; Rickards, C. *Dictionary of new information technology acronyms.* Detroit, Mich.: Gale; 1984. "First published in Great Britain in 1984." 217p. ISBN: 0-8103-4309-6, hardcover, $56.

Issues in library management: a reader for the professional librarian. White Plains, N.Y.; London: Knowledge Industry; 1984. 184p. (Professional librarian series). ISBN: 0-86729-095-1,

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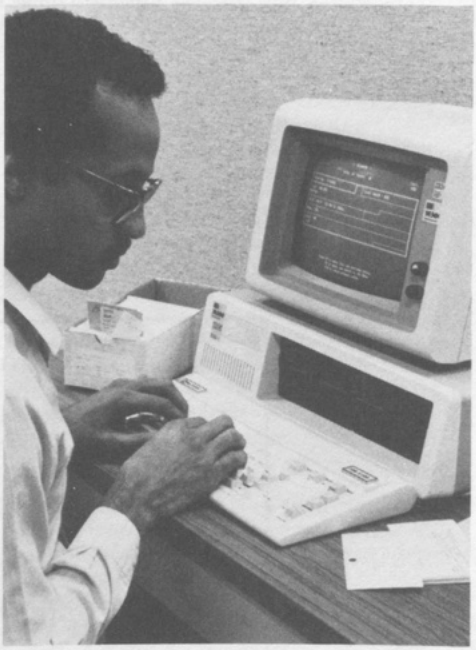

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hardcover; 0-86729-094-3, softcover. "The chapters in the *Reader* are drawn from previously published books in the Professional Librarian series."

Kantor, Paul B. *Objective performance measures for academic and research libraries.* Washington, D.C.: Assn. of Research Libraries; 1984. 76p. ISBN: 0-918006-09-0, spiral-bound, $25.

Kesner, Richard M. *Automation for archivists and records managers: planning and implementation strategies.* Chicago, Ill.: American Library Assn.; 1984. 222p. ISBN: 0-8389-0406-8, softcover.

Kesner, Richard M.; Jones, Clifton H. *Microcomputer applications in libraries: a management tool for the 1980s and beyond.* Westport, Conn.: Greenwood; 1984. 250p. (New directions in librarianship; 5). ISBN: 0-313-22939-2, hardcover, $29.95.

Ladenson, Alex, ed. *The urban electronic library in the communications era: papers presented at a seminar sponsored by the Urban Libraries Council and the School of Library and Information Science, University of Pittsburgh.* Chicago, Ill.: Urban Libraries Council; 1984. 111p. Softcover, $10.

Viggiano, Nancy M., ed. *Readings in technology.* New York, N.Y.: Special Libraries Assn.; 1984. 195p. ISBN: 0-87111-297-3, softcover. "In addition to the articles being reprinted from *Special Libraries,* are some papers published for the first time."

Weihs, Jean. *Accessible storage of nonbook materials.* Phoenix, Ariz.: Oryx; 1984. 101p. ISBN: 0-89774-084-X, softcover, $19.50.

Wood, Fiona. *Evaluation of a university library's catalogue: patron usage, problems and policy direction.* Canberra: Australian National University; 1984. 64p. (ANU Library occasional paper; 4). ISBN:0-86784-443-4, softcover, A$8.50. ■■

INDEX TO ADVERTISERS

Information Technology and Libraries Index to Volume 3 (1984)

Compiled by Kieth C. Wright