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Standards and Interfaces

The role of libraries is characterized by the functions they perform for society. Libraries communicate society's needs and share ideas and information. A major role is to participate in transmitting and exchanging information between users. On a more structured interface, publishing provides a communication medium used by libraries in all functions, formats, and representations of the word. One professional illusion in communicating the word is taking for granted the role of libraries and books without interface or standard. A parallel is found in Jean-Paul Sartre's acclaimed publication, *The Words*, where the process of communication is not an illusion, but a structured experience.

Such an experience necessitates interfaces and standards as requirements for orderly, even, measured participation of all concerned with libraries and society.

The development of library standards and interfaces rarely takes place in research-and-development laboratories. Standards are commonly agreed upon structures, often evolving from interfaces that provide a medium for conducting orderly operations within and between libraries and vendors. The designs of standards often result from common agreement for satisfying needs through established, uniform, transportable processes. Research funding for libraries and organizations is generally insufficient. The value, however, of library research is even questioned within ALA, with an inadequate organizational definition as to role and impact on the profession.

Thus, designs for standards result from the functional necessities of operating conventions and operating permutations. The standards process is fueled by an explosive technological environment that challenges the role of libraries within society.

As library practices evolve and interfaces develop, the use of libraries and information is facilitated. To expedite these standards, library-to-library cooperation, library and automation integration, and library-to-vendor interfaces are developed. Due to the socioeconomic context in which libraries exist, the use of conventions, interfaces, and standards provides libraries with mechanization and vendors with integration.

Forums for the discussion and implementation of conventions are well established. Professional organizations at all levels, within libraries and within our national political structures, have established interfaces between library mechanization and vendors, creating new dimensions, new roles, and new service patterns. The political and economic impacts cannot be ignored either. Library services today support quantitative and qualitative measurement of information handling needs and greater scrutiny of existing conventions and interfaces. Such scrutiny requires greater attention from the offices of research (in the library schools and professional organizations) to needs assessment and definition, as well as prioritization of goals and guidelines. The national government's objectives need coordinated funding at many levels: the Department of Education's Office of Libraries and Learning Technologies, the National Science Foundation, the Council on Library Resources, and others. In this way, purposeful research activities for standards will result in successful interfaces, extending the use of libraries within society.

Vendors clearly have a role and must accept obligations to contribute to an open information process. Much of their direction is established by their ability to market services

and products. Vendors and automation at times lead the profession as they contribute to the process of providing library services; vendor influences are significant as they manage a critical node within the library network of interfaces and standards.

Vendor/user discussion groups contribute to the professional forum to discuss, debate, and define opportunities from perceived needs. The socioeconomic structures of libraries permit the harnessing of vendor contributions within professional organizations. This process brings vendors and users together for standards development. This also suggests professional prioritization of need, followed by the appropriate planning objectives and action steps. The role of vendors and their ongoing contributions will have a greater impact on the future of libraries as the development of standards and interfaces is more clearly defined by the profession.

The underpinnings necessary for standards development, then, are structured interfaces between organizations, e.g., libraries and the book industry, libraries and the communications industry, libraries and the mechanization industry. Standards such as the BISAC book-ordering and invoicing formats were developed from structured interfaces among the above organizations and others to provide the interenvironmental bonds necessary for the management of libraries. Our well-honed invisible college, library conventions, library forums, and library schools provide sufficient input for standards design and development. These same entities provide a "silent cry" for additional structure. As a prerequisite, research offices at the national, professional, and vendor level must assess and validate the needs for library standards.

As this editorial is directed to a cross section of libraries and library users, it is an endorsement for the role of libraries in having a more structured political, professional, and functional assessment of the problems that impair library service and the development of standards that would permit freedom of the word.

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OL'SAM: An Intelligent Front-End for Bibliographic Information Retrieval

David E. Toliver

Bibliographic information retrieval systems have proliferated without inter-system coordination of access protocols, language syntax and usage, and assistance to users. In recent years, research projects have demonstrated prototype front-end processors that impose uniform standards and assist searchers. In 1980, three commercial microprocessor front-ends were introduced. One of them, OL'SAM, performs tasks that simplify searching and improve cost-effectiveness. These tasks include: logical multiplexing, access protocol management, command and response translation, strategy and response storage, user helps, and search activity logging. Front-end processors can be expected to facilitate searching in numerous other ways in the future.

INTRODUCTION

For several years now, the potential impact of microcomputers on the process of bibliographic information retrieval has been discussed at conferences and in the literature of library automation.[1-3] At the same time, members of the academic and research communities have developed and demonstrated prototypes of intelligent front-ends for searching: i.e., smart machines placed between users and retrieval machines, which mediate, augment, and enhance the retrieval process. These research efforts were largely carried out on main-frame computers or minicomputers. In 1980, commercially available front-ends for searching (employing microcomputers) were released for the first time. One of these state-of-the-art systems is the Franklin Institute's Online Database Search Assistance Machine—OL'SAM.™ This article will discuss OL'SAM's predecessors and competitors, the current capabilities of OL'SAM, some of the problems encountered during its development, and recommendations for further developments.

MOTIVATION FOR DEVELOPING INTELLIGENT FRONT-ENDS

Performing a complete and thorough online bibliographic search requires a varied and highly developed mixture of factual knowledge and intuitive skills. Some of these requirements arise from the subject of the search. Other difficulties result from the intellectual and mechanical problems of constructing a retrieval strategy. Yet another set of requirements arises from the variety of design philosophies and approaches taken by information retrieval systems. The original system designs were subsequently modified by the staffs of various organizations to adapt software packages to commercial bibliographic information retrieval.

Searchers can respond to subject-oriented problems either by learning about the subject, or by developing an effective pre-search interview with the end user. Developing retrieval strategies requires the integration of creative intuition with skills that can be learned either formally or on

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the job. The difficulties that arise from disparate design approaches, however, must be surmounted largely by rote learning: taking training courses, studying manuals, and finally by long hours of experience at a terminal. Controlling details at this latter level during a search can be the least gratifying and the most tedious part of the activity.

Consider the origin and results of these differing designs for retrieval systems. The development of diverse retrieval systems was made possible by the American free-enterprise system, with a healthy boost from several unrelated procurements by U.S. government agencies. The advantages of competition (improved service and a choice of capabilities) are numerous. However, with the diversity of services, few standards were established beyond that of the most basic communication requirements. Fortunately, development did occur in terms of families: the RECON family, the ORBIT family, etc. Even so, each of the services, Lockheed, SDC, BRS, NLM, and others, maintains a distinctive set of capabilities and syntax. This uniqueness of each system has hampered transferability. To apply a search strategy to more than one system, the user must rethink much of the search for each service, using that service's distinctive language and syntax.

Because of the tremendous investments required, hardware and software systems not originally developed for information retrieval have often been adapted to the bibliographic information retrieval process. For instance, the data communication networks were initially developed to link corporate computers and computer professionals with other computers at distant locations, not for use by librarians and information specialists. Unforgiving and sometimes puzzling log-in protocol sequences are the result.

Finally, retrieval systems were often designed without much attention given to the ease with which the systems can be used. Creating a very forgiving and flexible syntax for users is initially more demanding on human and machine resources than creating a machine-oriented syntax. Terse error messages are simpler to write than are messages that try to communicate what is wrong with a command to users at all levels.

Thus, because of the diversity of online searching systems, based on their historically independent development, there is an opportunity to apply intelligence at the front-end in order to standardize, simplify, and improve performance during bibliographic information retrieval.

PROTOTYPES FROM THE RESEARCH COMMUNITY

The National Library of Medicine, the University of Illinois Coordinated Science Laboratory, the Massachusetts Institute of Technology Laboratory for Information and Decision Systems, and Drexel University, jointly with the Franklin Institute, have all made significant contributions to the development of experimental intelligent front-ends for bibliographic information retrieval. These are only representative efforts in this area; other efforts have been made as well. Those discussed here have been selected because their objectives and philosophies are congruent with those of OL'SAM. The MIT and Drexel-Franklin projects, moreover, are direct predecessors of OL'SAM in that OL'SAM staff members were directly involved in their use or development. Each of these will be discussed in turn.

The National Library of Medicine by 1977 had implemented a demonstrable "user-cordial interface," directed to casual, nonstaff users of the NLM public card catalog. The project effectively simulated the card catalog at a terminal, drawing on the data in the CATLINE database of ELHILL III. Users are prompted for all input by menus and highlighted fields. Data are transformed into queries acceptable by ELHILL III. System responses were also transformed into screens that looked very much like conventional catalog cards.[4] The "user-cordial interface" was implemented on a Data General Eclipse minicomputer. The project represents a highly developed example of command-and-response translation. However, its general usefulness is severely limited by restricting access to a single database on a single host.

The University of Illinois Coordinated Science Laboratory reviewed and devel-

oped a theoretical model for a variety of "transparency aids." They furthermore prototyped a minitransparent system called The Searcher's Workbench (TSW). TSW was designed for novice users and is menu driven. It includes tutorial features for the novice, and an escape into a more conventional searching mode for the expert. A single front-end command language is translated into the syntax required by two hosts and five databases. TSW further provides access to the Vocabulary Switching System at Battelle and the Database Selector at the University of Illinois. Responses from the hosts are translated into a standard format. All input except the search terms themselves are managed through a touch panel. The system uses Alpha Microsystems' powerful microcomputer.[5,6] This represents a further step in implementing an intelligent front-end for bibliographic searching.

The Laboratory for Information and Decision Systems at the Massachusetts Institute of Technology created the Connector for Networked Information Transfer (CONIT). This package of programs was designed to allow access to all databases on several online bibliographic systems using a single front-end command language. The syntax of the language is not menu driven, but more closely follows that of most host languages, with a command verb and one or more command arguments. The command entered by the user at the CONIT front-end is translated into commands with the same function in the language of the vendor, while responses from the search system are translated for the user into a common format.[7-9]

CONIT provides extensive online explanations of the use of its commands, the databases appropriate for various disciplines, how to correct errors, etc. The entire package resides on the Honeywell MULTICS main-frame computer—an interactive research computer at MIT. A dial-out capability was implemented, involving changes to both the system hardware and software. Translation of commands and responses was achieved through a sophisticated rule-driven interpreter. The scope of CONIT, involving single-language access to all databases on heterogeneous hosts, is quite ambitious. However, the transportability of the package is severely limited, as it works only in the rather specialized MULTICS environment.

Finally, the Individualized Instruction for Data Access (IIDA) project at Drexel University and the Franklin Institute was developed to teach searching and to assist searchers while monitoring their activity. This assistance is provided before the searcher goes online and while the searcher is actually online with the host. The package is oriented toward end users: scientific and technical specialists who occasionally need information for which a computer search would be appropriate. A significant portion of the software involves computer-assisted instruction for bibliographic searching and an interactive strategy monitor.[10,11]

That part of the IIDA package that provided online access was adapted from the CONIT software on MIT's MULTICS computer. All the IIDA programs were subsequently developed and executed on MULTICS. The language taught and used by IIDA was DIALOG, with user access restricted to four databases on the DIALOG system. The real contribution of IIDA to machine-mediated searching was its demonstration of a computer-based strategy monitor. Detailed analyses were made not only of the command syntax, but of the intercommand and interresponse relationships as well.

The project, however, suffered from the same nonportability as CONIT, and has seen no further development or use in its present form since the end of the project. IIDA is the direct predecessor of OL'SAM. Several members of the IIDA staff subsequently worked on the OL'SAM project. Much was learned from both CONIT and IIDA about command-and-response translation and the interfacing of systems, contributing to the development of OL'SAM.

THE COMMERCIAL FRONT-END SYSTEMS

Three commercial microcomputer-based front-end systems for bibliographic information retrieval appeared in 1980. These were: CAST, developed by the Computer Corporation of America; Userkit, by

Williams and Nevin Associates; and OL'SAM, by the Franklin Institute Research Laboratory, Inc. The CAST and Userkit developments will now be briefly described.

The Chemical Abstract Searching Terminal (CAST) by the Computer Corporation of America (CCA) is a front-end system designed to help users who regularly access multiple online systems for retrieving chemical bibliographic data. A single front-end language, much of it menu driven, enhances access to those databases that are useful to the chemical information specialist. CAST was designed to facilitate such searching by capturing the results of a search on one host, reformatting parts of those results into a strategy acceptable by another database or host, automatically accessing the second system, and then applying the system-augmented strategy to the new host.[12]

CAST is implemented on a standard microcomputer. The system is packaged as a complete system that includes microcomputer, console terminal, quality printer, and 300/1200 baud modem. Although some rather impressive benchmark tests have been cited, its usefulness appears restricted to high-volume searching done at chemical information centers. The CAST product is currently available only on a customized basis from CCA.

The Userkit, developed by Williams and Nevin, is a microprocessor device that allows both searches and access protocols to be prepared prior to going online with most bibliographic hosts. Programs and protocols for up to twenty common hosts are stored in ROM (Read Only Memory). Approximately six hundred characters, representing a search strategy, can be stored in RAM (Random Access Memory). Stored-access protocols and command lines are transmitted with one or two keystrokes. At any time, the user can override the programmed interaction sequence with commands entered at the terminal in a conventional fashion.[13]

The Userkit includes hardware developed especially for the application. Professional knowledge of bibliographic information retrieval is necessary. Search commands or strategies are not analyzed, translated, or transformed in any way. Rather, the syntax of each host to be accessed must be known by the users of Userkit. However, it is clear that this device can significantly reduce online access time and simplify the process of accessing host systems. The Userkit is available for around $2000 from Williams and Nevin Associates.

Finally, the Online Database Search Assistance Machine (OL'SAM) developed by the Franklin Institute Research Laboratory, Inc., is a microcomputer system that serves as an assistant for searching the major online bibliographic databases. The OL'SAM device assists in various ways with bibliographic information retrieval and, in some cases, improves the cost-effectiveness of online searching. The search process is aided by informative prompts and messages; actual online searches are monitored and augmented while under way; and vital record-keeping functions are performed for all activity conducted on and through OL'SAM. OL'SAM performs a variety of assistance and administrative functions. The package is suitable for professional information specialists, managers of information centers, and professional subject specialists as end users.

OL'SAM software presently works using a general-purpose, commercially available microcomputer. OL'SAM uses the standard North Star Horizon II™ microcomputer, consisting of an industry-standard IEEE S100 main frame (12 slots), 64K Random Access Memory, a 4–MHZ Z80A™ microprocessor, 360K bytes of online floppy diskette storage, four serial and four parallel I/O ports, and North Star's version of the UCSD PASCAL™ operating system. In the standard configuration, the user supplies a modem and terminal(s). Any ASCII CRT or printing terminal with an RS232 interface is suitable. The hardware required can be used for numerous other functions, including word processing, accounting, and record keeping—all standard packages available from other sources. The OL'SAM software package in object form may be obtained from the Franklin Institute for $995. They will negotiate for the sale of the source code. The microcomputer and

added I/O board required can be obtained from distributors for less than $3000.

SUMMARY OF CURRENT OL'SAM CAPABILITIES

OL'SAM aids interactive bibliographic information retrieval in the following ways:

- Allows two users to perform two distinct and independent searches at two terminals through a single host password and over a single telephone line.
- Allows users at two terminals to work together on a single search. OL'SAM commands entered at either terminal are seen at both terminals; the response from the host is seen simultaneously at both terminals.
- Accesses most databases on the Lockheed, SDC, and both NLM systems through a single front-end language whose syntax belongs to the RECON family of retrieval languages.
- Provides prompting for commands and command argument elements.
- Automatically logs into hosts and simplifies switching between hosts. The user may choose a host and network, or allow OL'SAM to choose a default host or network.
- Records interactive searches and provides for the offline revision of these searches, which may later be transmitted to the hosts as batch retrieval requests.
- Maintains an extensive file of HELP paragraphs that provide information about searching in general and OL'SAM searching in particular. HELP paragraphs may be retrieved within the contex of a command, or explicitly though the HELP command.
- Parses all commands prior to transmission of their translations to the host computer. Error messages are informative and complete sentences.
- Optionally records on diskette the responses to requests for bibliographic information from databases.
- Maintains an administrative log on all searching activity, with a variety of report formats available.

OL'SAM performs its tasks by responding to commands entered by users following a double-colon prompt. There are sixteen command words, plus the "literal," a means by which the user can send a command to any host in its own language. The functions of the commands are summarized below. The command actions and syntax place it squarely in the RECON family. In some contexts, the language extends the meaning of commands as used by DIALOG, while in other contexts it performs a subset of the parallel DIALOG functions. In most cases, however, the syntax requirements are less rigid than those of DIALOG, resulting in "friendlier" interaction. The following list describes each of the OL'SAM commands:

LITERAL—By beginning any input with a double-quote character, all subsequent characters are sent verbatim to the host currently online. Any part of any other command can be indicated to go "as is" to the host, by delimiting that part with quotes.

HELP—Information may be retrieved about searching in general, searching with OL'SAM, search commands, the hosts, and the databases.

BAUD—The baud rate of the modem and both terminals may be changed, allowing communication at any mix of devices at 300 or 1200 baud.

BEGIN—The database, host, and network may be selected and connected.

RECONNECT—If the user is dropped by the network or the host, this will connect him again, keeping OL'SAM's internal tables intact.

EXPAND—This allows the user to review a portion of the database index to identify and select appropriate keywords.

PAGE—This allows users to see more of the database index, beginning with the last page seen with the EXPAND or PAGE command.

SELECT—Keywords and logical combinations of keywords and references can be specified to create sets of records containing those words and combinations.

COMBINE—In OL'SAM, this has been reduced to a synonym for SELECT.

LIMIT—A subset can be extracted out of a SELECTed set, by applying various criteria.

TYPE—Records in a previously created set can be reviewed at the terminal, in various formats.

PRINT—Records in a previously created set can be printed in various formats at the host computer. These will be mailed to the user.

DISPLAY—Information about the current

search session and about stored searches can be reviewed.

SAVE—The strategy of the current session can be stored on a floppy diskette in the OL'SAM front-end language.

TRANSMIT—A strategy, stored previously on a floppy diskette, can be translated for and transmitted to a specified host.

LOG-OFF—This allows the user to terminate a search session with a host, leaving the terminal ready for the next user.

MEMAVAIL—This is a system command that displays at the requesting terminal the number of 16 bit words of available memory.

UCSDOS—This is a system command that transfers control back to the UCSD operating system.

REMARKS ON THE OPERATION OF FEATURES

The discussion below follows the software features outlined in the "Summary of Current OL'SAM Capabilities," above.

Two Users Working Independently

A timed interrupt/polling scheme is in effect for all serial input/output under the search assistance program. This means that characters entered at any time from either keyboard or from the modem are serviced and saved in buffers. If both users make a request of the host at very nearly the same time, the request of the last user is held in the buffer until the host fully responds to the request of the first user. The pending request is then sent immediately to the host.

Normally during dual-user processing, each user has control of the system for an interval of approximately one second or less, with control of the entire system passing back and forth between the two users. The users are essentially transparent to one another. Tables are set up to convert consecutive set numbers known by each user into the consecutive set numbers known by the host, and vice versa.

In order that neither user experiences inordinate delays, TYPE requests for several records are broken down into several requests for a single record at a time over the same range. Stacked commands are similarly broken down into their individual commands. In this way, two complex user requests may be "interleaved" as a series of partial requests. When only a single user is online to a host through OL'SAM, commands are not broken down into partial commands.

Allowing Terminals to Work Together

By changing the system's underlying input/output, the two terminals are made to share the same input and output buffers. The movement of characters to and from these buffers is done independently to accommodate possibly differing device baud rates. An application of this version of OL'SAM might be an information specialist at one terminal, with a technical user at another terminal, perhaps at a remote site. The information specialist could handle the details of system access and command language, while the technical user could handle the entry and spelling of subject-oriented terminology.[14]

Accessing Several Hosts through a Single Front-End Language

The OL'SAM search assistance program takes apart (parses) all user search commands (except literals) in the front-end language. The host currently online and the rules for constructing a command acceptable to that host are also known by the program. The program takes the parts from the parsing process and puts them together according to the rules that apply to the current host. In a similar way, responses from the various hosts, for all critical commands, are analyzed and standardized for the user. Consistent characteristics of the response from the host make it possible to establish a set of parsing rules for the host's responses.

Prompting

The user input routine continually checks to see if the user has entered the escape-prompting character. If this character is found, OL'SAM does two things: it completes the word if it is partially spelled out and is from a limited set of alternative words and it prints the simple word or phrase prompt for the first or the next element of the argument, if one is allowed in the current context. The command up to the point of the escape character is parsed to determine its syntactic validity.

Automatic Log-In

The rules for exchanging strings in order

to gain access to a host are known in the program. Furthermore, the user passwords have been read in from the site-definition file and stored in memory. For each handshake, a maximum duration is allowed for the network or host response. If this duration is exceeded or if a message comes from the network or host that indicates failure, the automatic log-in is terminated.

Storing, Revising, and Transmitting Searches

All valid commands entered by the user and all set descriptions are stored in available memory known as the "heap." The heap is accessed to display commands and set descriptions with the DISPLAY command. When the SAVE command is entered, specifying a file, the contents of the heap are written as a text file onto the diskette. This text file may then be edited with the system editors. When the TRANSMIT command, specifying a file, is entered, the file is accessed and its contents are stored in the heap. With TRANSMIT, commands are taken from the heap and sent to the host, just as if the user had entered each in turn.

HELP Paragraphs

An extensive set of paragraphs describing the use of the system can be obtained using the HELP command. This facility is available both prior to going online and while online. These paragraphs are taken from a set of text files on the diskette.

Parsing

Values are maintained throughout the program that indicate parameters of the current state of the search. If the program recognizes something that is out of bounds or that otherwise is not recognized from within a well-defined set of alternatives, a syntax error message is sent to the terminal. This message indicates exactly where processing of the user input ended, and includes a short sentence indicating the nature of the error.

Recording Responses from the Host

All characters coming in from the modem are stored in a buffer. With the TYPE command, users have the option of indicating that they wish to save a machine-readable copy of the response. If several records are requested from the host, the request is broken down into a series of requests for one record at a time. At the end of each of these single-record requests, the contents of the buffer are written to the text file named in the TYPE command.

Maintaining the Administrative Log

Every time a search is done through OL'SAM, data is collected from the user. Other characteristics of the session are automatically collected as well. This data is then recorded on a set of administrative log files. A record is written to the diskette whenever a user changes databases or logs off a system. Reports can be generated off-line, based on this collected data.

PROBLEMS ENCOUNTERED

A number of problems were encountered in the development of OL'SAM. Some of these were a result of the selected microcomputer system. Others were a result of the design objectives. Still others were a result of the variety and dynamic nature of the host systems.

A typical computer system problem was the contention by the disk and the peripherals for CPU resources. Being a multi-user system, character input from the various devices is managed by a timed interrupt, followed by a status check on the two terminals and the modem. Most micros, including the North Star used by OL'SAM, are constructed in such a way that critical timing of disk I/O is managed by the CPU's execution of machine code. An interrupt during disk access would invariably result in a fatal disk I/O error.

The solution was to disable interrupts for device I/O during disk I/O. However, the arrival of characters from the host cannot always be predicted when the line is active; disabling interrupts could possibly result in the loss of data from the host. The short-time solution was to buffer any disk-access requests while characters are arriving from the host and to perform disk-oriented activity only when the host was at a wait state—i.e., following an input prompt. The long-term solution is to select and use hardware

that manages disk I/O independently of the user's CPU.

A typical design problem is represented by apparent system response degradation when two users are searching. Suppose a typical user maintains an active line for 60 percent of the time. A second user will want, on the average, 60 percent of the remaining 40 percent inactive time (as well as 60 percent of the active time). Thus, the second user raises total active time on the line to 84 percent. Sharing this between two users gives each 42 percent of the line. Adding a third user will raise total active time on the line to 93.6 percent, with each user getting, on the average, only 31.2 percent of the line. This cuts apparent system responsiveness in half for each user when there are three users, although the total line efficiency is improved by 50 percent. This is one reason why OL'SAM was designed to allow at most two independent searchers.

Each host system has features and capabilities that are unique and difficult, if not impossible, to efficiently emulate on other systems. For instance, adjacency searching, until recently, was only possible on DIALOG. Nested Boolean logic is not available on ELHILL III. Tailoring output formats is possible in the ORBIT family of languages, while DIALOG has eight standard formats. Keywords can be redefined by the user on ORBIT, but not on DIALOG. Many decisions had to be made as to which of the system-dependent capabilities should be included and which should be excluded from OL'SAM. A balance was sought in which OL'SAM provided a consistent front-end language, along with the flexibility of the literal mode, which allows use of all of these features unique to a given host system.

Finally, each host system is an evolving and changing entity to which OL'SAM must be able to continually adapt. Typical of this evolution are the recent changes made by SDC that allow term-selection from the index table, and provide adjacency searching, eventually, on all databases. Changes were made to OL'SAM to accommodate these ORBIT-system changes, making their analysis and usage consistent with that done for DIALOG-directed searches.

RECOMMENDATIONS FOR FURTHER DEVELOPMENT

Intelligent front-end processors for information retrieval are just beginning to appear. The number and type of tasks such devices can perform far exceed the tasks actually performed by the current version of OL'SAM. These tasks that could be performed by intelligence at the front-end include the following: training and preprocessing; validating and translating user input for data elements at the database level; providing access to additional hosts at the back end; providing a choice of command languages at the front end; and adapting the packages to other microcomputer and microcomputer operating-system environments. The following discussion explores some of these areas for further development.

Novice searchers could be presented with computer-assisted instruction (CAI) exercises prior to going online to host retrieval systems through intelligent front-ends. The front-ends would manage both the CAI and the online sessions. One set of exercises could lead the new searcher through some simple searches on general-interest databases such as ERIC. A short paragraph would describe each command or concept in turn to motivate the user to enter the appropriate command. Another set of exercises could present frames of information, and then test and review what has been learned. Topics to be covered might include basic concepts and commands, advanced concepts and commands, text searching, search strategy, database description and usage, and other facilities. Concepts developed by existing training systems should be examined and integrated where possible.[15]

A typical preprocessing activity might be assistance with the planning, organization, and expression of a search. This type of assistance might begin with users entering natural-language descriptions of their search objectives. The programs will isolate significant words in this description and will help the user to eliminate useless words from those isolated. The program then will guide the user into creating one or more concept-clusters, formulate a search, and

review it with the searcher. This search may either be saved, to be sent later to one or more hosts, or may be factored into other strategies as a substrategy.

Another preprocessing activity might be assistance in the selection of appropriate search services and databases. A small database of databases will be located on the microcomputer. This will index the intellectual content of databases available online. Information for this database could be gathered from vendor literature and other sources. Databases available through vendors will be classified according to subject matter. Other characteristics, such as vendor, date range, and cost will also be registered and factored into the selection process. The user will be helped in finding the databases appropriate for his search by querying this local information file.

Two types of front-end processors appear to be available: those which provide access to a limited number of databases but perform syntax validation and translation of database field elements, and those which provide access to a broad range of databases but do little to parse or monitor field elements at the database level. OL'SAM belongs to the latter category. The creation of a front-end processor that performs database-level validation over a broad range of databases would naturally be superior to either of the identified types. However, both the creation and maintenance of such a processor would require substantially more investment and coordination than has been made thus far.

A similar extension would be the addition of more host systems to those accessible through the intelligent front-end. In the short run, the extension should certainly be made to BRS and CSIN. Bibliographic host systems in Canada and Europe should also be considered for adding to the front-end access capabilities.

Another extension would be optional alternative front-end languages. Each site's preferred search language could be made available. For instance, the front-end could look like a member of the ORBIT/ELHILL family, or it could conform to the specifications of the European common command language.[16] The latter is a specification for a bibliographic information retrieval language, developed for Euronet.

Finally, the front-end packages developed should be as portable as possible. They should be written so that they can be brought up on any of the popular microcomputers with minimal adaptation. One way to do this is by choosing an operating system that runs on many different machines, and a single high-level language that compiles into various machine codes. The current OL'SAM environment, the UCSD *p*-System and UCSD Pascal, comes close to fulfilling this requirement. Another logical choice is a standard language that runs under CP/M—the de facto industry standard for microcomputer operating systems. In the case of CP/M, though, the choice of basic processors is more limited than those available under the *p*-System.

SUMMARY

In conclusion, the era of local intelligent front-ends for bibliographic information retrieval appears to have just begun. In the past seven years, the research community has made some interesting and valuable contributions along these lines. In 1980, commercial microcomputer-based front-end systems to assist searching first appeared. One such system is OL'SAM, developed by the Franklin Institute Research Laboratory, Inc. Although it has a variety of interesting and useful capabilities, OL'SAM can be expected to be followed by many systems that augment bibliographic retrieval at the front-end.

REFERENCES

1. E. Garfield, "Introducing PRIMATE—Personal Retrieval of Information by Microcomputer and Terminal Ensemble," *Current Contents* (July 17, 1978), p.551.
2. Allan D. Pratt, "The Use of Microcomputers in Libraries," *Journal of Library Automation* 13:7–17 (March 1980).
3. Phillip W. Williams, "Microprocessor Assisted Terminals for Online Information Systems," in *Proceedings of the Third International Online Information Meeting* (London, Dec. 4–6, 1979), p.139–46.

4. C. M. Goldstein and W. H. Ford, "The User-Cordial Interface," *Online Review* 2:269–75 (Sept. 1978).
5. M. E. Williams and S. E. Preece, "A Mini-Transparent System Using an Alpha Microprocessor," in M. E. Williams and T. H. Hogan, eds., *Proceedings of the Second National Online Meeting*, Mar. 24–26, 1981 (Medford, N.J.: Learned Information, Inc., 1981), p.499–502.
6. S. E. Preece and M. E. Williams, "Software for the Searcher's Workbench," in A. R. Benefeld and E. J. Kazlauskas, eds., *Communicating Information: Proceedings of the 43rd ASIS Annual Meeting*, V.17 (White Plains, N.Y.: Knowledge Industry Publications, Inc., 1980), p.403–5.
7. R. S. Marcus and J. F. Reintjes, *The Networking of Interactive Bibliographic Retrieval Systems*, NSF grant no. SIS-74-18165 (Cambridge, Mass.: MIT, 1976).
8. R. S. Marcus and J. F. Reintjes, *Computer Interfaces for Computer Access to Heterogeneous Information-Retrieval Systems*, NSF grant no. SIS-75-22946 (Cambridge, Mass.: MIT, 1977).
9. R. S. Marcus and J. F. Reintjes, "A Translating Computer Interface for End-User Operation of Heterogeneous Retrieval Systems," *Journal of the American Society for Information Science* 32:287–317 (July 1981).
10. D. E. Toliver, "A Program for Machine-Mediated Searching," *Information Processing and Management* 17:61–68 (1981).
11. C. T. Meadow and others, *Individualized Instruction for Data Access (IIDA): Quarterly Reports Nos. 1 through 8*, NSF grant no. DSI-77-26524 (Philadelphia: Drexel University and the Franklin Institute, June 1978–March 1980).
12. A. J. Horowitz and R. F. Bergman, "Improving Productivity in Multi-System Information Retrieval through the CSIN Intelligent Terminal," in M. E. Williams and T. H. Hogan, eds., *Proceedings of the Second National Online Meeting*, Mar. 24–26, 1981 (Medford, N.J.: Learned Information, Inc., 1981), p.287–92.
13. P. W. Williams, "A New Device to Simplify Online Searching and Reduce Costs," in M. E. Williams and T. H. Hogan, eds., *Proceedings of the Second National Online Meeting*, Mar. 24–26, 1981 (Medford, N.J.: Learned Information, Inc., 1981), p.503–14.
14. For a discussion of one-way conference searching see: Kathleen E. Shenton and M. Karen Lansberg, "Conference Searching at 1200 Baud," *Online* 5:42–43 (Jan. 1981).
15. Elaine Caruso, "TRAINER," *Online* 5:36–38 (Jan. 1981).
16. A. E. Negus, and A. E. Snowden, *EURONET-DIANE Users Guide (Common Command Language)*, prepared by Scicon Consultancy International for the Commission of the European Communities, DG XIII (May 1980). ■■

Communications

First Public Library Satellite Receiver System

Marion F. Donaldson: Lake County Public Library, Merrillville, Indiana

VHS, uplink, downlink, modem, disc drive, coaxial cable—all are terms heard daily at the Lake County Public Library (LCPL) in Merrillville, Indiana. This library, serving a population of 200,000 through a central library and thirteen branches, has implemented many new ideas as it keeps abreast of the vast technological explosion taking place in libraries today. Patrons now access materials through microfiche and an automated circulation system (ULISYS) that can be searched by author, title, and subject. Video, especially, has become important, and most recently LCPL has become the first public library in the country to install its own satellite receiver system.

People coming into the audiovisual department on the lower level of the new $5.5 million facility are constantly amazed, and many exclaim, "Libraries sure have changed!" The main attraction, of course, is the series of video carrels in this area. Any time of day or evening, both adults and children may be seen viewing the ten Sony Trinitron TV sets located in the video carrels or watching the large-screen projection system in the conference rooms. These TV screens display tapes from the library's video collection, 16mm films, commercial TV programs, and now programming direct from the satellites. Video is so popular that often patrons must wait to view the video programming that they have selected.

THE BEGINNING

Video services began at Lake County Public Library in 1980 with a revenue-sharing grant from the county. With these funds, a JVC color video camera and a 3/4-inch JVC video recorder/player were purchased along with a Panasonic 3/4-inch editing system, lighting, blank and prerecorded videocassettes, and a media van. Later, additional video equipment was purchased when the new audiovisual facility was built and furnished.

Included in the new area is a production studio containing a Shintron 505 character generator, an Echo Lab special-effects generator, sound equipment, a second color camera, and 1/2-inch VHS recorder/players. The studio and equipment were planned to permit the library to have a cable channel and to produce videotapes. Staff training tapes, as well as tapes to instruct the public on use of the library, are in process. TV monitors will soon be in the lobby of the library to show previews of upcoming library programs, to direct patrons to various departments, and to show the various services of the library. Local-history tapes are being made of each of the branch library communities, and each branch has video viewing capability. Videotapes are produced on 3/4-inch videocassettes and dubbed to 1/2-inch VHS for circulation to the public through the library's videocassette collection.

This collection (VHS) contains many feature films but also now includes consumer tapes, how-to-do-it titles, and series such as "Connections," "Civilisation," and "Touring Great Cities." Video circulation has been tremendous, and many titles are booked months in advance. The Indiana State Library has purchased video-duplication rights for some of its films and is making video copies available to libraries for 10 percent of the 16mm film price. Other films concerning the National Gallery of Art and the Indianapolis 500 have also been transferred and are available for only the cost of a blank cassette. When pur-

chasing 16mm films, it is always advisable to check on duplication rights, as often the duplication may be free.

NEW SATELLITE SYSTEM

Is the public responding to all of this new video service? The answer is an overwhelming yes! In fact, the response has been so great that Jack Swike, library board president, conceived the idea of a new service for the public—a satellite receiver system! Library Director Neil Flynn, who has promoted video at LCPL, also favored this service and began to implement the idea. The author, head of audiovisual services, researched the project and suggested procedures and equipment needed in providing the residents of Lake County with this advanced method of accessing information and entertainment programming. This video programming will be available throughout the entire building. While the building was in the planning stage, Carol Derner, assistant director, stressed that the audiovisual department must be planned for future technology, and this was implemented.

FUNDING AND JUSTIFICATION

Fortunately, the funding for this new satellite system was not a major problem, since money was made available from the construction fund for the new building. Even so, the project still had to be justified to the library board and to the public. The vast amount of educational programming available on the satellite in addition to entertainment was outlined. The idea of university courses offered via satellite by experts in their fields was appealing to many. Teleconferences, such as the Children's Book Festival, and those by ALA and the dietetic and law associations were explained. Still, the same question was always asked: Why does the library need a satellite dish when there are cable companies? The answers given were:

1. Not everyone has cable.
2. Cable companies generally use only one satellite and are unable to cover the wide variety of programming the library will be able to offer.
3. The library will have FM radio capability, which most cable companies do not have.

All of these answers seemed to justify the purchase of a satellite receiver system, and it was approved unanimously by the library board.

FIRST STEPS

How does one start such a project? The first step is to learn the language or terminology. When engineers and sales people proclaim that an LNC is better than an LNA, it really helps to be able to answer, "I understand," and really mean it! Also learning that the dish is an antenna and not a receiver helps in understanding how the system works. Periodicals such as *Radio Electronics*, with its "Satellite Teletext News" column, give the latest updates in the satellite field. Although many of the articles discuss how the consumer can put a TVRO ("television receive only") in his backyard rather than outlining commercial applications, the articles still give the basic concepts. Learning how a satellite system works is the next step.

An *uplink* is a satellite system or site that sends signals or programs up to the satellite, which then beams the signal back to Earth to a site called a *downlink*, or TVRO. Since uplinks are very expensive (approximately $60,000–$70,000), most libraries will not be able to consider broadcasting programs. Libraries will, however, be able to become downlinks or receive sites and should understand the elements of a simple TVRO. Following is a list of the components of a satellite system and basic details one needs to know:

Antenna—The most common antenna is a large, parabolic dish, which usually is made of fiberglass and covered with an aluminum coating. The aluminum is then covered with a dull paint or a gel coating. There are many kinds of dishes; some are all aluminum and some have different shapes. The dish reflects or gathers the signals coming down from the satellites.

Mount—It is important to have the dish firmly mounted and secured against high winds. Two kinds of mounts are available: Azimuth-Elevation (Az-El) and Polar. There are arguments for and against each of these mounts. Whichever one is chosen, however, it is possible to pur-

chase one that is motorized. This will permit the turning of the dish from inside a building.

Feed—To feed or direct the signals from the dish, there is a *feedhorn* that is attached to an LNC or LNA. There are three main types of feedhorns: prime focus, Cassegrain, and buttonhook. Each should be investigated.

LNA-LNC—An LNA is a *low noise amplifier*. It receives the 4GHz signal from the satellites, and then the signal is carried into the receiver. An LNC is a *low noise converter*. It receives the 4GHz signal and converts it or changes it right at the dish to a UHF frequency. It must be remembered that there are two kinds of LNCs—a *downconverter* and a *fixed frequency*. The latter is limited to using only one receiver.

Cable—Cable carries the signal from the dish to the receiver. LNAs require Heliax (Andrew trademark) or "hard" cable, which depending on cable size can average $2–$5 per foot. LNCs, on the other hand, can use RG59 or 6U *coaxial cable*, which is only $.14–$.16 per foot. If the control or operation of the dish is to be a great distance, it is certainly wise to consider the use of the LNC.

Receivers—There are two types of receivers: commercial and consumer. The commercial type is much more expensive but gives much better reception. Many consumer receivers have modulators in them and cannot be used with LNCs. Satellite signals come down to Earth either vertically or horizontally. Both a vertical signal and a horizontal signal cannot be received on one receiver at the same time. If the capability of viewing two channels at the same time is desired, then two receivers are needed. A receiver will then be needed for each channel viewed simultaneously. A receiver should also be *frequency agile*. This means that buttons can be pushed to select the twelve or twenty-four satellite channels. With other receivers, one tunes only one channel and may have to change or make adjustments with a screwdriver.

Modulator—From the receiver, the signal is taken to a modulator, which translates the signal to one that can be used by the TV set.

DECISIONS AND SOURCES OF ASSISTANCE

Once all of this information and technology was partially digested, the author began to call satellite companies and to talk to salespersons. It was a definite help to understand the basic operation of the system, but many issues soon were raised—issues such as:

1. Has there been a site survey?
2. What size dish is needed? Should it be aluminum or fiberglass?
3. Is an LNA or LNC best?
4. What kind of receiver is most desirable?
5. What about Ku band and DBS?
6. Turnkey system or component parts?

Talking to salespersons may be confusing; some are biased, and many contradict each other. With so many different answers, where does one turn? The most helpful and rewarding source of information proved to be the Public Service Satellite Consortium (PSSC). Mary Diebler, service development specialist, in the Washington, D.C., office, was most interested and sent literature that proved of great value. Her recent article in the September issue of this publication gives exact details on how libraries can and should proceed in selecting a satellite system.[1] This is excellent information and a must for librarians. PSSC engineers in Denver offered invaluable technical advice and helped resolve the predicament as to which size dish to purchase. They were also able to explain to a layperson just what gain a dish must have in order to be most effective and how to know if the company claim is true.

Armed with this information and having talked with a few agencies that already had installations, LCPL had its site checked but did not do a formal site survey. (It is possible to have such a survey done and then register it with the FCC so that in the future no one can block your site and cause microwave interference. This is very expensive and did not seem necessary in this situation.)

LCPL then decided that it must have commercial rather than consumer equipment in order to receive the very best

broadcast quality signal. It was decided that individual component parts would be purchased, and a local firm would do the installation. Other decisions were: two channels would be received at the same time; all domestic satellites should be accessed; there should be a steerable mount; and all sound frequencies should be received.

The following satellite equipment was purchased by Lake County Public Library:

Antenna—A thirteen-foot Vidare dish was selected. Fiberglass rather than aluminum was chosen because many advised that weather may be detrimental to aluminum. There was much controversy about the size of the dish. PSSC advised that a larger dish would be more reliable, and this is especially important when teleconferencing. Also it would provide better broadcast quality pictures.

LNC—Two 100-degree Scientific Atlanta LNCs were selected. This was due to the fact that the control room is well over 100 feet from the dish. These LNCs were used because the lower the noise temperature the better the reception.

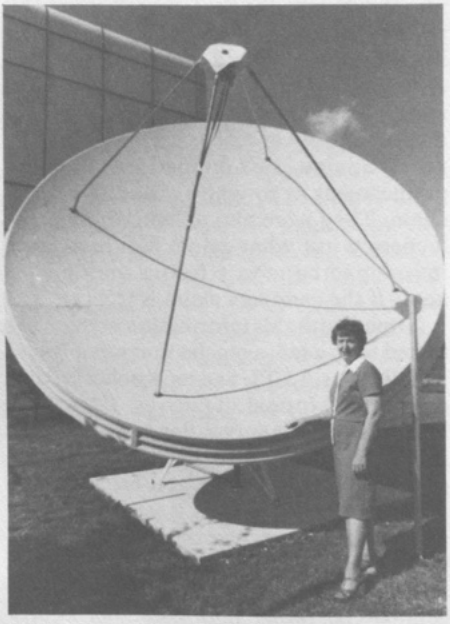
Receivers—Two Scientific Atlanta 6650 series receivers were purchased. Since two channels were desired at the same time, two receivers were needed.

Stereo Processor—A stereo processor was added in order to receive sound from all satellites. Most receivers have frequencies of 6.2 and 6.8, but the processor will make it possible to receive sound from all frequencies.

Modulators—There are modulators already in the video distribution system presently in the building. These will be used with the possibility of adding more in the future.

Mount—A motorized polar mount by Satcom Engineering was selected. A navigator (Microdyne) makes it possible to move the dish automatically from inside the control room. Adjustments from east to west and horizontal to vertical are easily made.

Cost—Total cost for the satellite receiver system was approximately $12,000.



The author with Lake County's "dish."

WHAT WAS LEARNED

Justification may be given for either a turnkey system or the purchase of component parts. If component parts are chosen, there may be trouble with the installation. On the other hand, choosing a turnkey system may mean sacrificing quality on one particular item. There is apparently no perfect choice, and there may be trouble with either selection. LCPL decided to purchase its dish separately and to have a local firm do the installation and furnish the electrical components and the mount.

When hiring any company, do not take the company's word for its experience in this area. There are many fly-by-nights in this new field, and it is difficult to know if one is being given the right information. Ask for references and telephone them—find out what was done well, what was not satisfactory, and if the company would be hired again.

Always check with the city or local governmental agency regarding any installation. Some require building permits; others do not. Some even want wire fences around the dishes! Again, be very careful—some city or local authorities can be very officious and may cause some problems and much aggravation.

THE FUTURE

It has truly been a challenge to venture into the world of satellite communication, and it is thrilling and even more challenging to contemplate the uses to be made of this new service to the public. Already things are happening! Some people are asking about entertainment offered, while many others are anxious to take advantage of the vast educational opportunities now available. Language teachers are requesting time for students to view programs from foreign countries and hear the languages being studied. Adults are asking to use the new service for both university courses offered for credit and vocational instruction and training. The Appalachian Community Services Network is presenting excellent programming on subjects such as data processing, time management, health, and job searching. The business community is previewing Biz-Net, the business service offered by the U.S. Chamber of Commerce in Washington, D.C., and librarians and educators are awaiting the 1983 teleconferences by ALA and the University of Southern Mississippi. The library is registering its new satellite facilities with the PSSC and envisions the opportunity to offer many more teleconferences to the public.

Challenges never end in the audiovisual and telecommunications world. Some study and thought must now be given to Direct Broadcast Satellite Systems (Ku band) scheduled for 1985 and how they will interface with the present C-band satellite system recently installed. Teletext and videotex systems are already here, and interactive video looms on the horizon just waiting for librarians to grasp it and make their services more accessible to the public. It is time for librarians to take action and become involved with this exciting area of electronic access and delivery of information. What is yet to come simply boggles the mind!

REFERENCE

1. Mary Diebler, "The Library Superstation: A Library Guide to Satellite Earth Stations," *Information Technology and Libraries* 1:231–37 (Sept. 1982). ■■

The Calgary Libraries Telidon Trial

Michelle Toombs: Calgary Public Library; and Bob Wilson: Southern Alberta Institute of Technology, Calgary, Alberta, Canada

After viewing Telidon demonstrations at the 1980 Canadian Library Association in Vancouver, a number of Calgary librarians returned home enthusiastic about the possibilities of videotex in libraries. With the leadership of Helgi Lessment, a free-lance librarian, a committee was formed to produce two workshops on "Videotex and Your Future" in the fall of 1980. These were very successful and concluded with a recommendation for continuing cooperative involvement in these systems by Calgary libraries. Suggestions were made by interested librarians and the result was a meeting between representatives of Alberta Government Telephones (AGT) and of the four major local libraries: Calgary Public, Mount Royal College, Southern Alberta Institute of Technology (SAIT), and the University of Calgary.

THE TRIAL

The outcome of this meeting was the Calgary Libraries Telidon Trial, which would run from July 1981 until June 1982. Wes Jamieson was made the trial's AGT contact, and the company undertook to provide at no cost eight end-user terminals, access to its PDP 11/70 computer and its inputting terminals, initial training, loading and updating of information pages, and technical assistance. The participating libraries agreed to provide the location, communication requirements and maintenance for the end-user terminals, information content, ongoing training for their own personnel, and participant and user feedback to AGT. The goals of the participants were: to construct a file of information of interest to member libraries and the community at large; to gain experience in file preparation and data management; to suggest future applications for Telidon and videotex in libraries; and to give the public

an opportunity to experiment with Telidon and to monitor user response.

With this agreement as a basis, staff at the four participating libraries arranged for training on the inputting terminal if they had not already done so, and began preparing pages for the trial. Each library handled this project differently based on their perceptions of the project and the degree of support from their respective administrators.

The Mount Royal College librarian prepared a number of pages of general information about her library and input them herself. The SAIT library set up a Telidon committee composed of interested staff at all levels. All underwent basic training in page preparation and then were divided into subgroups that worked on information pages for various departments of the library. The majority of inputting in this case was then handled by clerk-typists. The University of Calgary Library set up a volunteer committee, all the members of which learned how to prepare and input pages. Several people updated these pages once a week for the duration of the trial. Finally, the Calgary Public Library hired clerical staff specifically to do Telidon inputting and seconded a staff librarian to supervise the project on a full-time basis.

INFORMATION INPUT

The participants had direct access to input terminals and free editorial discretion regarding the choice and arrangement of information in individually assigned nodes on the tree structure. Since the summer of 1981, the public library has created 1,800 pages including:

- A file of approximately 1,000 clubs and associations in Calgary or with local connections. Current information, provided by each association with permission to use on Telidon, is linked to title and subject listings including address, phone, description of purpose, and meeting intervals. Patrons who have direct access to this list for the first time, have found the information useful, especially when searching for associations in a particular interest area (e.g., women's associations or film clubs).
- More than 500 scheduled programs and events at the sixteen Calgary Public Library locations have been promoted since the project began. For the first six months of the field trial, these programs were listed according to age group and then by location or subject. More recently, daily program listings record the events at all locations and for all groups on a particular date.
- Popular books, records, and videodiscs recently acquired at most locations are compiled on Telidon with monthly updates. Collection development specialists and public service librarians determine which titles should be included based on public demand.
- In a general information category are the winning ticket numbers for three main Canadian lotteries and federal and provincial cabinet ministers as well as local politicians. A hockey quiz and a Canadian book quiz were devised by library personnel. Information about library services has been kept to a minimum, with only selected services featured such as computer search services, bookmobile schedules, and city street maps that illustrate branch locations.

The three postsecondary libraries began by preparing pages on their hours, services, policies, and other activities, e.g., educational and employment opportunities.

Thanks to the work of the head of educational media services at the Southern Alberta Institute of Technology, Bob Thornborough, Telidon was adopted as the basis of a new campus communication system, and Telidon equipment has been purchased. Staff could work for an hour or two each day on more ambitious projects without having to commute to the telephone company's downtown office to input and update pages on the inputting equipment that AGT provided.

A delay in the arrival of SAIT's online catalog gave an added impetus to start a Telidon listing of all motion-picture and videotape holdings, which were no longer being listed in a separate computer printout. On the Telidon database are approximately 1,800 pages of listings by subject and title of all SAIT-owned video programs. The subject listings give title, playback request number, a program summary, year of production, and running time, while title listings give only title and

playback number. This listing will be useful for one or two years until the public catalog is online.

GENERAL CONCLUSIONS OF THE LIBRARY-INFORMATION PROVIDERS

1. The Telidon Information Provider System (IPS) is easy to learn and use, requiring no specific computer expertise. Staff with limited artistic training can utilize the many sophisticated graphic creation options to display the information in an attractive format. However, judicious use of text size, color, and graphics is advised. For example, one soon learns that dark blue is an undesirable text color. Complex graphics that take a long time to appear on the screen should be placed after textual information.

2. A trial period of several weeks to experiment with types of information and use of colors, graphics, and text size is advisable prior to a field trial.

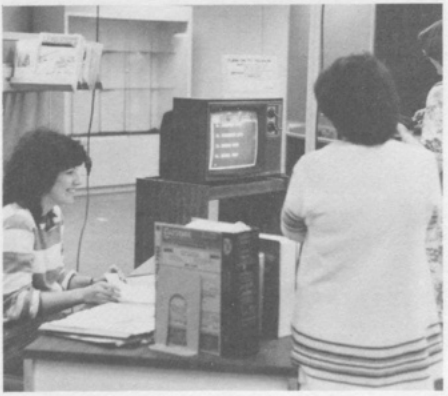
3. An intensive program of file preparation is necessary before the information can be added to the database. This involves choosing appropriate information, verification, editing, reformatting to fit the page or within the tree structure, and assignment of new subject headings. This process may absorb up to two-thirds of the total time to create a page.

4. Information in the database requires frequent review and scrupulous editing and updating. Accurate records of file names, data "addresses," index categories, and expiry dates are essential.

5. Programming assistance is necessary for the efficient management of large data files and the collection of statistics.

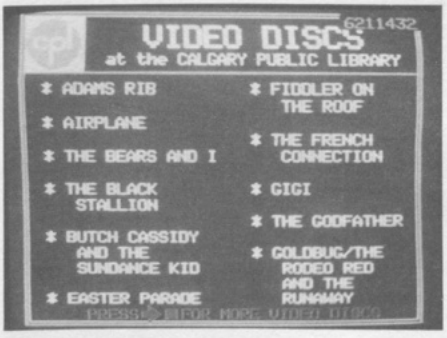
USER PARTICIPATION

Seven Telidon end-user terminals, provided by AGT, were located in highly visible public service areas at each of the participating libraries. Mount Royal College, Southern Alberta Institute of Technology, and the University of Calgary received one terminal each, while three terminals were placed in Calgary Public Library branches and the fourth at the Central Public Library information desk. All patrons had access to the user terminals and were encouraged to try Telidon with the aid of brochures and instructional handouts. At the public library, when a patron expressed interest in seeing Telidon, the regular staff member would connect the user terminal to the computer with a telephone call and explain the fundamentals of Telidon so that the user would feel comfortable exploring the database independently. At the campus libraries, library users could dial the telephone and log-on themselves. At all locations, staff were available to assist patrons if they encountered difficulties.

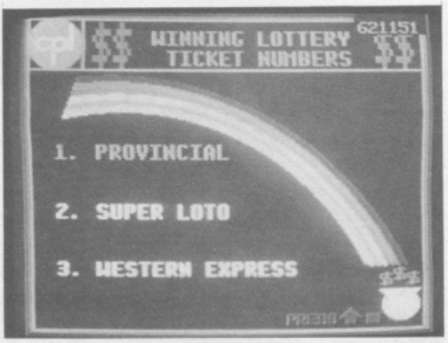


The Telidon terminal was kept next to the Information Desk at the Calgary Pubic Library.

The Telidon computer was available from 9 a.m. to 9 p.m., Monday through Saturday, and 1 p.m. to 5 p.m., Sundays. At the campus libraries, use was consistent throughout the day as students took advantage of the opportunity to try Telidon be-



Calgary Public Library

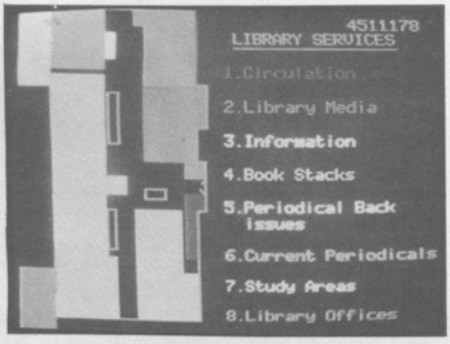


Calgary Public Library

tween classes. At the public library, terminals were busiest during evenings and weekends and particularly during lunch hours and after 3:30 p.m., where branches were located near schools. When crowds gathered, a fifteen-minute viewing session was suggested to give as many people as possible an opportunity to try Telidon.

Information about the user trial was recorded in various ways. Comment slips were available at all locations, and patrons were encouraged to register their observations about the system. At several libraries, staff maintained a daily log to record computer problems and patron suggestions for additional information. From computerized printouts of the number of log-ons and pages accessed, which AGT provided, it was estimated that patrons viewed an average of 12,000 pages at all the field-trial locations during a one-week period.

User surveys were established at the University of Calgary and Calgary Public Library locations, to determine how people responded to the arrangement of information, technical aspects of Telidon, and potential of videotex in the library. As a separate experiment, the Calgary Public Library survey was placed on the database, where patrons could respond to the questions with the keypad. From these information sources, the following observations about the database and user terminals in the Calgary Libraries Telidon Trial were registered:



Mount Royal College Library

1. In all the libraries, Telidon inspired considerable patron interest. Users quickly appreciated the potential of videotex to provide and exchange information locally and nationally and were curious to know when the service would be available commercially with more information. Video games were the most popular choice, monopolizing terminal use until they were made unavailable to encourage user access to other information. Patrons also requested consumer and educational information, entertainment guides, news, transportation schedules, and an electronic encyclopedia as additional sources of information.

2. The Telidon user terminal with numerical keypad is a very user-friendly information vehicle. The majority of patrons had no difficulty manipulating the keypad after an introductory explanation. Clearly worded brochures and help facilities on the database are of great value, but a high percentage of patrons required human contact when interfacing with an unfamiliar technical device. Because the computer logged-off automatically after a set interval of nonuse, it was necessary to dial the telephone to establish computer contact numerous times during the day. Having immediate power-on access to the database would have simplified and facilitated the use of the AGT database for both staff and patrons. To alleviate the situation some libraries prepared a "Welcome to Telidon" page, which remained on the screen until the next person requested to use Telidon.

3. Most patrons found the tree structure method of accessing information an easy concept to grasp. However, they frequently expressed frustration with the lack of information on the database. This was particu-

larly evident because a variety of index items were listed for demonstration purposes that did not connect to actual information.

Patrons occasionally became confused as they proceeded through a maze of tree-structure levels. Clear user instructions and prompt commands were discovered to be essential to guide the user at the end of an information search or between index pages.

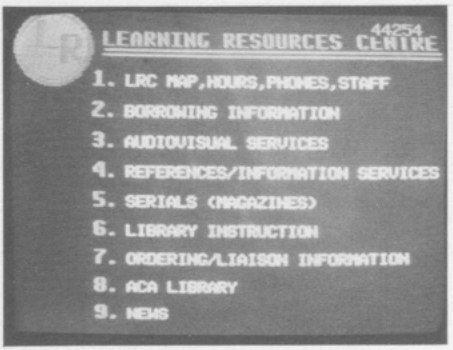
A patron who is seeking specific information finds wading through many index levels to be time-consuming. The tree-structure design is cumbersome for long, involved files where more than four or five choices are needed to reach the desired information. While the keyword-search approach would provide a more direct access to information, users thought they would prefer a combination of number choices and typed words to reach information.

4. Provision of a reliable service facility to respond to computer and equipment problems as they occur is important to avoid the inconvenience and embarrassment of extended terminal downtime.

5. Publicity at various intervals throughout the field trial heightened people's awareness of the new technology and encouraged people to make a special trip to the library to try Telidon themselves.

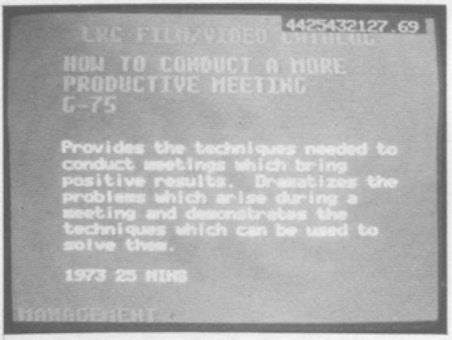
6. While the use of picture graphics on videotex pages is generally favored, viewers suggested that the graphics have a practical rather than a decorative application. For example, maps, floor plans, and technical and scientific diagrams are effectively illustrated with Telidon graphics. Patrons express impatience with the amount of time required to create graphics on frequently viewed pages such as index pages. If institutional logos are used to identify the information providers on each page, the logo design should be simple and unobtrusive.

Most of the libraries would like to extend their videotex involvement given the required equipment and staff time. The Southern Alberta Institute of Technology has designed a tree structure to reflect all campus interests, which is currently being prepared by an artist-inputter. The University of Calgary, which prepared library information pages, would like to produce more general campus information, such as registrar information, timetables, bus schedules, campus maps, course offerings, and events and hours of various facilities. The Calgary Public Library would like to pursue general information, such as community events and consumer information, in the preparation of videotex pages. All the libraries have at least considered broader library offerings, such as holdings lists, materials on loan, or lists and locations of indexes.

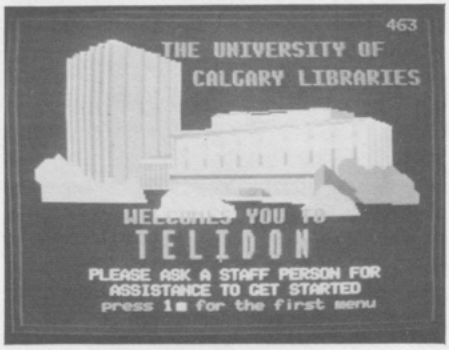


Southern Alberta Institute of Technology

Generally, the Telidon field trial has indicated several potentially useful applications of videotex in the library, which we have discovered is a versatile and effective means of displaying information, especially when that information is concise or requires continual updating. As Telidon-compatible databases are developed by government and private interests and become available to videotex subscribers through gateway services and the information network, the library will have access to



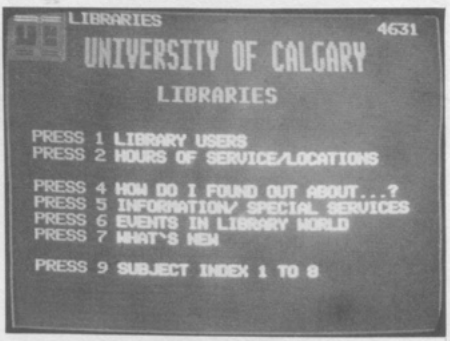
Southern Alberta Institute of Technology



University of Calgary

additional information resources. The library can also provide information about its services and programs to the information network. There are numerous in-house applications for videotex, such as electronic mail service between library locations or between videotex subscribers and the library. Information such as community or consumer information, not found in more-accessible formats, can be compiled on videotex to enhance reference service. The library might employ videotex to enhance its handicapped services or to assist in literacy education, while computer-assisted instruction or directions for patrons who wish to use the library or retrieve information is another possibility. With the multitude of potential uses for videotex in the library, we have discovered that it is important to identify an application that will enhance existing resources or provide a service not in existence already.

The libraries involved in the Calgary Libraries Telidon Trial regard their involvement in the AGT Telidon field trial as a very worthwhile endeavor, which has provided valuable experience in managing information on a computer database as well as demonstrated the potential of new information technology in library development.



University of Calgary

ACKNOWLEDGMENTS

Trial representatives of the two other participating institutions were Loree Adam, University of Calgary, and Carol Sinanan, Mount Royal College. The project received excellent cooperation and support from Wes Jamieson, Alberta Government Telephones; John Dutton and Bill Manson, Calgary Public Library; Ronald F. Peters, Southern Alberta Institute of Technology; and Oldrich Standera, University of Calgary. Special thanks also to inputters Chris Clark and Debbie Nikolay, Calgary Public Library, and Anne Griffith, Heather Cowie, and Sarah Whiting, Southern Alberta Institute of Technology. ■■

INFORM: Library Information at Your Fingertips*

Val Urbanek: Rockefeller Library, Brown University, Providence, Rhode Island

A new system for instruction and information dissemination called INFORM is operating at the Providence Public Library and at the Rockefeller Library at Brown University. Simply stated, INFORM allows the librarian to compile, organize, and maintain a database of simple and complex information in a way that is easy for a patron to access. The system employs the latest in user-friendly computer terminals: terminals with touch sensitive screens. In

*This article is a rewrite of a paper delivered at the July 13, 1982, Library Instruction Round Table (LIRT) program at the ALA Annual Conference in Philadelphia.

building the database the librarian must think through and determine user needs and questions, as well as structure and stylize the information accordingly. The system provides an outlinelike structure for the information so that it can be hierarchically and logically ordered. The nature and type of information in the system can and should be as broad as possible since the user's needs and interests will determine the direction, focus, and function the system will serve for him.

INFORM is a microcomputer-based turnkey system designed and developed by Peter Lipman, formerly the assistant university librarian at the Brown University Libraries, who is now the president of PL Systems, Inc., in Providence, Rhode Island. Although INFORM has a number of other nonlibrary applications—e.g., as a building directory, or as a public-relations and marketing tool for businesses, or as an exhibit and vendor directory for large conferences—libraries are an especially natural setting for the simplicity of this quick-access, logically structured, automated database manager. This past spring CL Systems, Inc., began marketing INFORM to libraries as a stand-alone system as well as a cordial front-end to their public access catalog (PAC). Through the development of an interface between the CL Systems LIBS 100 minicomputer and INFORM's micro, the user can alternate "talking" to the public access catalog and the INFORM public information/instructional database (i.e., the two different computers) by a simple touch of a specified pad on the display.

The hardware configuration of the INFORM System includes a North Star Horizon microcomputer with two 5¼-inch floppy-disc drives and multi-user timesharing software that can accommodate up to six touch terminals operating at 9600 baud. The system in its smallest version can contain at least the information of a 300-page book.

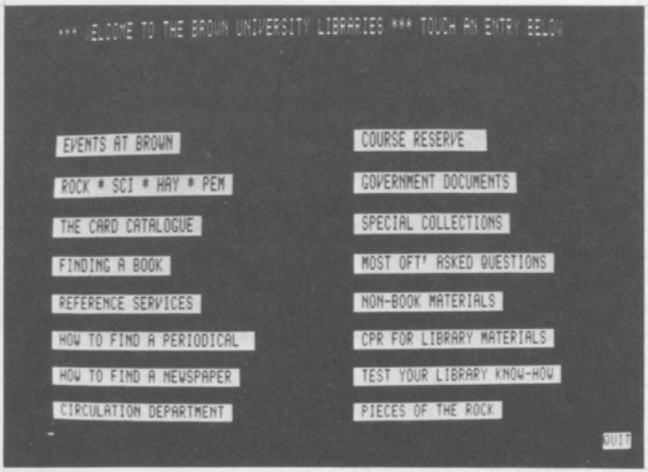
The system is maintained and updated at Providence Public Library by a secretary who is overseen by the library's head of reference, Dale Thompson. At Brown, a student who is responsible to the circulation supervisor performs the keying duties. The system is purposely designed so that the database can be built and maintained by noncomputer people.

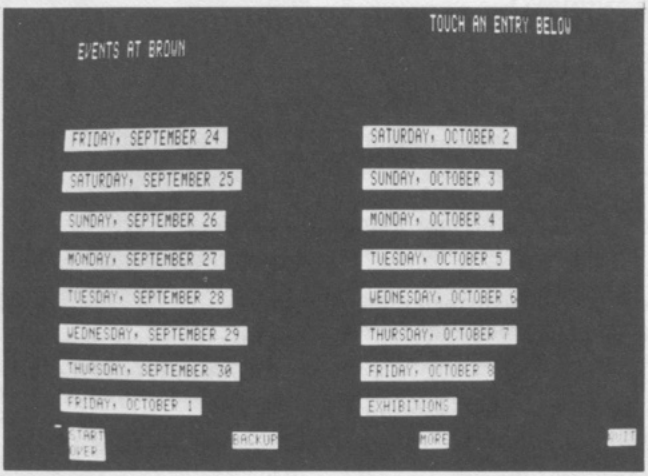
The introduction of public access terminals into a library for other purposes (circulation, automated catalog, etc.) generates a seemingly endless stream of detailed and frequently tedious questions on nothing more substantive than how to use the hardware, e.g., how to clear the screen, backspace, enter. Gradually these problems will abate as the growth of computer use continues; for now the keyboard itself must be recognized as the first obstacle to be overcome in providing users with computer-based information.

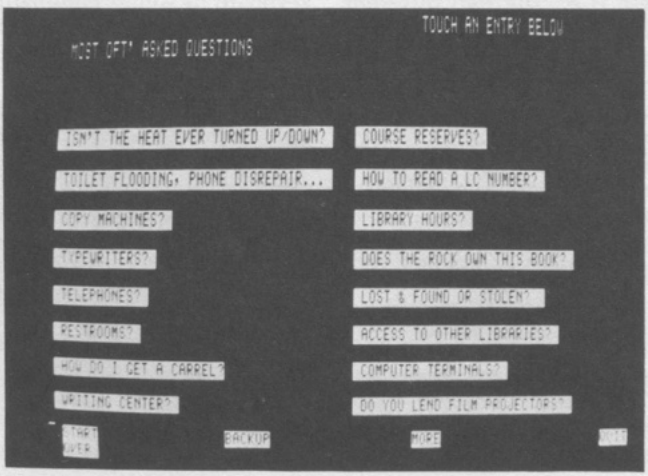
Val Urbanek and Merrily Taylor, director of the Brown University Libraries, at the INFORM terminal in the lobby of the Rockefeller Library.

INFORM skirts the entire problem of the keyboard by simply eliminating it. Touch-sensitive terminals allow access to information with no loss of eye contact with the screen. With INFORM, the user merely touches the menu entry that describes the information he wishes to access. When he touches it, either the screen displays text or another menu of selections that further refines the information the user is seeking. Within a few touches the user is reading, for example:

- Book reviews of some of the recent titles received.
- How-to information on the use of the card catalog.
- Events and/or activities in the library, college, or municipal community.
- Directions to the reserve-book room,


*** ELCOME TO THE BROWN UNIVERSITY LIBRARIES *** TOUCH AN ENTRY BELOW
EVENTS AT BROWN
ROCK * SCI * HAY * PEM
THE CARD CATALOGUE
FINDING A BOOK
REFERENCE SERVICES
HOW TO FIND A PERIODICAL
HOW TO FIND A NEWSPAPER
CIRCULATION DEPARTMENT
COURSE RESERVE
GOVERNMENT DOCUMENTS
SPECIAL COLLECTIONS
MOST OFT' ASKED QUESTIONS
NON-BOOK MATERIALS
CPR FOR LIBRARY MATERIALS
TEST YOUR LIBRARY KNOW-HOW
PIECES OF THE ROCK
QUIT


TOUCH AN ENTRY BELOW
EVENTS AT BROWN
FRIDAY, SEPTEMBER 24
SATURDAY, SEPTEMBER 25
SUNDAY, SEPTEMBER 26
MONDAY, SEPTEMBER 27
TUESDAY, SEPTEMBER 28
WEDNESDAY, SEPTEMBER 29
THURSDAY, SEPTEMBER 30
FRIDAY, OCTOBER 1
SATURDAY, OCTOBER 2
SUNDAY, OCTOBER 3
MONDAY, OCTOBER 4
TUESDAY, OCTOBER 5
WEDNESDAY, OCTOBER 6
THURSDAY, OCTOBER 7
FRIDAY, OCTOBER 8
EXHIBITIONS
START OVER
BACKUP
MORE
QUIT


TOUCH AN ENTRY BELOW
MOST OFT' ASKED QUESTIONS
ISN'T THE HEAT EVER TURNED UP/DOWN?
TOILET FLOODING, PHONE DISREPAIR...
COPY MACHINES?
TYPEWRITERS?
TELEPHONES?
RESTROOMS?
HOW DO I GET A CARREL?
WRITING CENTER?
COURSE RESERVES?
HOW TO READ A LC NUMBER?
LIBRARY HOURS?
DOES THE ROCK OWN THIS BOOK?
LOST & FOUND OR STOLEN?
ACCESS TO OTHER LIBRARIES?
COMPUTER TERMINALS?
DO YOU LEND FILM PROJECTORS?
START OVER
BACKUP
MORE
QUIT

business and industry department, photocopy machines.

There are no instruction manuals or handouts for the use of the terminal.

INFORM can anticipate questions most often asked by users and provide answers, enabling librarians to concentrate their efforts on other problems and concerns vying for their time. The librarian can provide an entry that reads "Questions and Answers," for instance, and when the entry is touched, the second display screen can list all of those repetitive questions that plague a public-service person. The user quickly scans the questions, touches the query he wants answered, and with the next touch he is reading the answer to his question. The system is continuously available for queries during library hours, giving personal attention to the timid, providing new horizons for the bold, handling hackneyed as well as difficult questions. In this manner, INFORM closes the distance between users and the librarian by forcing the latter to constantly think and rethink the users' needs and questions as they begin their orientation to the library.

If the experience at Brown is any example, one will find that access to a number of important resources, collections, and services depends on the user asking the right question of the right person. Implementation of an INFORM system requires the librarian to collect, update, edit, and, in many instances, compose information on the various services, events, and resources at the institution or in the community. A realization came soon after the first few weeks into the process that the compiling of the material is time-consuming. After all, INFORM's objectives are quite ambitious: to provide concise, accurate, and updated information in lucid prose so that users can easily learn what they need to know. Yet, the rewards are significant; as one Brown student noted on the evaluation sheet next to the terminal, "Where was this information four years ago when I was a freshman?"

Other reactions have ranged from something bordering ecstasy ("This is the most amazing thing I've ever seen in my life!") to a view of the system as an example of the continued dehumanization of society. Both comments were from Brown. At the academic and the public library, concern was expressed over the waste of electricity when the system was on but not being used—to the point of pulling the plug on the system. I am told that the terminal requires little more electricity than a 100-watt light bulb. It should be no surprise to anyone that observers at the public library report that the young almost attack the system, while the more mature ask permission to touch the screen.

One may counter with the question: "What are INFORM's advantages over existing hard-copy versions of library manuals?" The answer lies in the enormous flexibility gained by having information in a computer. The automated handbook has an advantage over its hard-copy counterpart because it does not become obsolete as soon as a policy is changed or a book collection is moved to another level. Other media attempting to achieve the same or similar ends suffer from the static nature of the finished product as well as the expense and time involved in updating. An INFORM database is dynamic and flexible, allowing addition and change with relative ease and no cost. Updates and editions can be added and deleted in word-processing fashion without rekeying the entire text. In fact, entering the database is little different than working on a typewriter, since the software takes care of formatting, right justification, and entry organization. An INFORM file in its initial keyed state resembles the example shown in figure 1.

The *=1* and *=2* symbols tell the software that the entry belongs respectively on the first and second display screen. A further breakdown to a lower level (there are five) could be accomplished in the manner shown in figure 2.

Daily or weekly updates are no longer prohibited by printing/copying costs, or by the time it takes to retype and edit the entire brochure. Finally, a hard-copy print of the displayed screen is possible since INFORM provides a print pad option that will generate a print for your user. Neither Brown nor Providence Public currently have a printer for this purpose.

Another feature that can help bridge the gap between user and librarian is the statis-

```
=1  QUESTIONS AND ANSWERS
=2  TYPEWRITERS?

                NO TYPEWRITERS

     The Library has no typewriters available for student use. However, there are typing
stations on level 3, 4 and E for your own mahcines.
=2  TOILET FLOODING, PHONE DISREPAIR . . .

TOILET FLOODING, PHONE DISREPAIR . . .

     Call or speak to Ernest Costa (863-2164), the Business Manager of the Library. During
non-business hours (after 5 M-F) inform the attendant at the Circulation Desk of the problem.
=2  HOW TO READ AN LC NUMBER

                HOW TO READ AN LC NUMBER

     In the Library of Congress Classification system the first line of the call number consists
of letters and numbers . . .

     The first line of an LC call number is read as a whole number . . .
```

Fig. 1. INFORM Input.

```
=2  HOW TO READ A CALL
    NUMBER.
=3  HOW TO READ A LC CALL
    NUMBER.

                TEXT

=3  HOW TO READ A DEWEY CALL
    NUMBER.

                TEXT
```

Fig. 2. INFORM Input.

tics feature. INFORM can accumulate statistics on how many times each screen of text is being read. This data can provide valuable suggestions on the proper placement and organization of the database. For example, if the library's hours is one of the questions asked most often and its entry reveals that it has been accessed/touched proportionately less than other entries, then consideration should be given to moving the hours entry to a position of greater prominence in the hierarchical structure or to using the system's cross-reference feature to enhance its visibility. This feature allows the text to be keyed once and tagged with a label so that it can be referred to from other points in the database. Through this mechanism the information about library hours could be made to appear in sections such as a listing of the hours of the main and branch libraries, in the general description of the main library and, finally, in a question-and-answer section.

Since changes in the INFORM database can be made quickly and easily, its interface with users must be and is a dynamic one. To misunderstand this point is to entirely misjudge the medium in the delivery of the message. If the information in the system is static, then no more will be achieved than the satisfaction of turning channels on a summer-rerun weeknight. The strategy is that users come to the INFORM terminals not only because the information is instructional and useful, but also because it is topical and immediately relevant. The hook is that users will come to look at the calendar of activities and events at the college or in the community, and then browse a few more entries and scan the material that is strictly library related. In this fashion INFORM comfortably serves many masters. Topical entries can be added for special events like graduation or for special groups such as alumni or Friends of the Library. Unique programs at the institution can be featured in order to bring the participants of a NEH summer seminar in touch with not only the readings for their course, but also with the all the services and resources the library has to offer.

The need exists to explore the possibility

that other duties, services, and projects could be undertaken if a greater percentage of the routine questions and elementary instruction handled by the public service librarian were to be decreased significantly. If the goal of user instruction is to bring the user as quickly as possible to a point where he can obtain the answers to his questions with minimal librarian intervention, then I am convinced that INFORM can complement and supplement the role of the librarian in accomplishing this goal. This author is already convinced of the value of this new system in the library. The academic year of 1982–83 will provide the real test of the system's usefulness and applicability in libraries. Statistics on use will be tabulated on a weekly basis, and evaluation forms will continue to be kept next to the terminals to chronicle user reaction. In a year, with the results of our observations and statistics, I believe that objective and conclusive evidence will substantiate the enthusiastic endorsement of this product. ■■

Update on Ordering Standards

Charles C. Stewart: The Baker & Taylor Company, Somerville, New Jersey

BACKGROUND

The need for standards precedes the history of library automation, but remains a critical part of the effort to integrate information technology and libraries. Standards are the expression of a consensus and represent the articulation by a variety of users as to how technology should be managed. See figure 1 in order to appreciate the breadth of standards work to be done.[1]

In last December's issue of *Journal of Library Automation* Sandy Paul reviewed the organizations (BISAC, ANSC Z-39, ANSC X.12) that have played an active part in standards development for the acquisitions process within libraries and within the

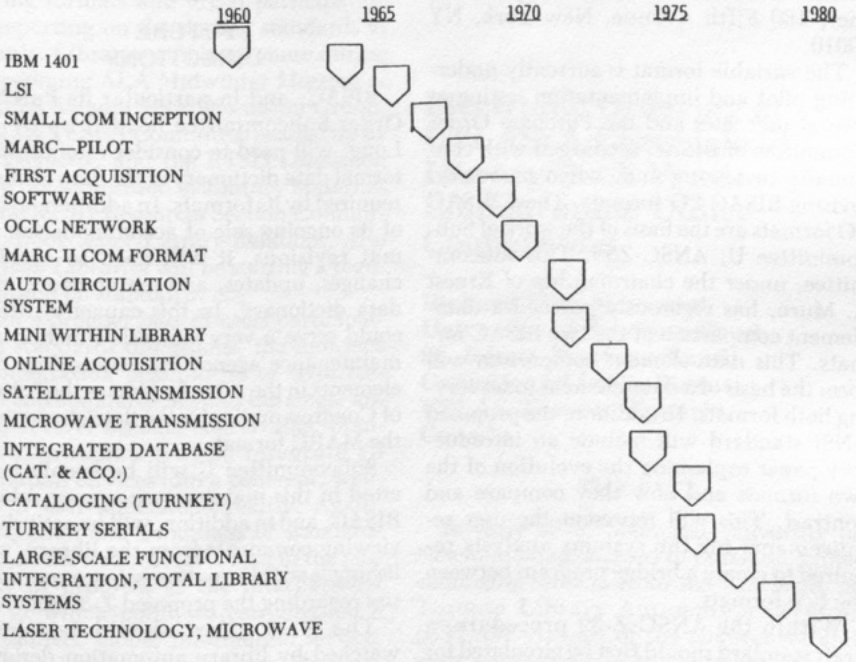


Fig. 1. Chronology of Library Automation.

business community at large.[2] In the same issue, Jim Long reviewed many of the standards currently in place that facilitate book acquisition (such as ISBN, SAN, BISAC purchase order, invoice, and title-update fixed formats)[3] and set the stage for his work on the variable-length purchase order (PO) format.

DEVELOPMENTS IN 1982

Since last year, many people and groups have expressed growing interest in standards development, and in particular, ordering standards. At its May 1982 meeting, BISAC approved its first version of the BISAC variable format. This new variable format accommodates simpler order transmission between purchasers and vendors in order to economize on data communications costs. Its structure is, however, flexible, and it can accommodate large amounts of data in its optional subfields. It provides an elegant coding structure along the lines of the MARC directory and tag concepts. Copies of these new formats, as well as related BISAC formats, continue to be available from the Book Industry Study Group, Inc., 160 Fifth Avenue, New York, NY 10010.

The variable format is currently undergoing pilot and implementation testing at several user sites and the Purchase Order Committee of BISAC is charged with continually reviewing and, when necessary, revising BISAC PO formats. These BISAC PO formats are the basis of the work of Subcommittee U, ANSC-Z39. This subcommittee, under the chairmanship of Ernest A. Muro, has vigorously pursued a data-element comparison of the two BISAC formats. This data-element comparison will form the basis of a data-element index serving both formats. In addition, the proposed ANSI standard will include an introductory paper explaining the evolution of the two formats and how they compare and contrast. This will represent the user requirements for the systems analysis required to create a bridge program between the two formats.

Within the ANSC Z-39 procedure, a draft standard should first be circulated for comment. The Subcommittee U standard should be at this stage by the end of 1982, and it is hoped that only minor revisions will be required during the early part of 1983. At this point, the Subcommittee U draft standard should be ready for ballot by the full Z-39 Committee and concurrent public review by ANSI, with the anticipation of approval by ANSI by June 1983.

In a related development, ANSC X.12, a subcommittee to develop formats for business-data interchange, has responded during 1982 to comments and criticisms of its first preliminary draft purchase order and invoice format of June 1981. By October of 1982 it should have issued its second draft package of standards for purchase order, invoice, and data dictionary for universal business-data interchange. X.12 was also actively reviewing communications protocols and may have issued them as well for review and vote by full X.12 by the end of 1982. One of the tasks ahead for the book industry and the library community must be to evaluate how useful X.12 can be for its needs.[4] BISAC and Subcommittee U will undertake to map where their data elements fit in X.12, as well as assure that book-ordering functionality is met.

FUTURE DIRECTIONS

BISAC, and in particular its Purchase Order Subcommittee headed up by Jim Long, will need to consider establishing a formal data dictionary of the data elements required by its formats. In addition, as part of its ongoing role of accommodating format revisions, it will need to consider changes, updates, and maintenance of its data dictionary. In this capacity, BISAC could serve a very valuable function as a maintenance agency for acquisitions data elements in the same fashion as the Library of Congress maintains the data elements for the MARC format.

Subcommittee U will be keenly interested in this maintenance-agency role for BISAC, and in addition, will be actively reviewing comments from the library, publishing, and information-science communities regarding the proposed Z-39 standard.

The X.12 effort should be closely watched by library automation designers during 1983 as pilot implementations are tested. Particular attention should be given

to the communications protocols employed as the world of computer-to-computer communication becomes more feasible. The other interesting trend to watch during 1983 will be developments in the international arena, as both business-data and book-acquisition-data interchange is tested, formalized, and standardized.

In summary, there are several demanding issues of concern to library automation practitioners regarding standardization. Standards need to be developed not only to accommodate new technologies and hardware as they develop, but also are required in the area of software development and even user interface. Data dictionaries go a long way in defining precise vendor specifications and user expectations; and there is a great deal of need for work to be done in this area, not only for the book acquisition process, but for other library technical services. The LITA Vendor/User Discussion Group, started at the 1982 ALA Midwinter Meeting by Brigitte L. Kenney and continued by Richard Rowe of Faxon at the ALA Annual Conference in July 1982, discussed ordering formats and urged participation and reporting on developing standards at all levels. Libraries can learn more during the upcoming ALA Midwinter Meeting of the LITA Vendor/User Discussion Group, the LITA TESLA Committee headed up by Paul Lagueux, and the RTSD Discussion Group on Acquisition of Library Materials and the RTSD Resources Section Committee on Bookdealer-Library Relations. Also *American Libraries* will be starting a regular column on standards.

With a broader base of users participating in standards discussions, the interface and integration possibilities of data elements and standards beyond the single application level become conceivable. Standards represent a way to integrate all information services into a coherent, well-defined, user-understood reality. Again, participation and awareness of standardization at the national level lead to the possibility of progress at the international level, at which point we can envision a truly unified, global information service. On this horizon, particularly, the developments in communications protocols and the pilot work by Ed Bushinski in interlibrary loan standardization must be recognized and carefully monitored.[5]

REFERENCES

1. Asha Capoor and others, "Turnkey Systems for Cataloging and Acquisitions" (Paper presented at First Annual Library Computer Conference, Philadelphia, Pennsylvania, 1980).
2. Sandra K. Paul, "Computer-to-Computer Communication in the Acquisition Process," *Journal of Library Automation* 14:299–303 (Dec. 1981).
3. James K. Long, "Electronic Order Transmission," *Journal of Library Automation* 14:295–97 (Dec. 1981).
4. See excellent overview article on the X.12 standards by Thomas C. Jones, "Paving the Way for Universal Document Interchange," *Data Communications* 11,no.7:123–31 (July 1982).
5. E. Bushinski, "Documentation/Bibliographic Data Elements in Manual and Machine Systems/Documentary Data Elements" (ISO/TC46/SC6/WG1/N71, June 23, 1982, International Organization for Standardization). ■■

Electronic Ordering at UTLAS: A Chronicle of Library/Book Vendor/ Bibliographic Utility Cooperation

Richard Ellis: Memorial University of Newfoundland, St. John's, Newfoundland, Canada; and Leslie Straus: UTLAS, Toronto, Ontario, Canada

THE PAST

In early 1979, Memorial University of Newfoundland decided to purchase online cataloging services from the University of Toronto Library Automation Services (UTLAS). As part of the changeover and with a view toward the imminent implementation of AACR2, it was decided to close the public card catalog and switch to

COM. This decision left the public on-order file (title-entry order slips in the card catalog) in limbo. After reviewing the costs associated with maintaining a manual on-order file and noting the significant proportion of titles having LC copy at time of order, it was determined that extending the use of UTLAS to the pre-order stage was likely to be cost-effective; this meant that on-order records would be included in the COM catalog. Essentially, titles were cataloged at time of ordering rather than at time of receipt. This decision was made more feasible because the processing unit that was responsible for pre-order searching had traditionally been responsible for post-receipt verification as well.

At the same time that Memorial was implementing UTLAS, one of Memorial's major book vendors, John Coutts Library Services, was also contracting for services from UTLAS. Coutts became a UTLAS client in order to provide a cards-with-books service for those customers who had this requirement and to do online verification of problem orders for its firm-order customers.

These two developments were proceeding independently until October 1979 when the Fourth International Conference on Approval Plans and Collection Development brought together the acquisitions librarian from Memorial, the UTLAS contact from Coutts, and the necessary quantity of Milwaukee's most famous product. It was quickly recognized that with Memorial's permission, Coutts could have access to Memorial's UTLAS file. Further, if Coutts knew which records in the file to read, Coutts could copy those records destined for them on an in-house terminal-printer.

The attractions to Memorial were twofold. First, with a single keying, both an on-order record and a purchase order would be generated. Second, there would be some savings of time in delivery of orders to the vendor. As mail strikes are not unknown in Canada, it was anticipated that this procedure would be more reliable as well.

It was possible, therefore, to arrange for electronic transfer of orders by (1) using the UTLAS electronic mail facility to communicate record numbers to the vendor, (2) giving the vendor read-only access to the library's own file by establishing a subaccount of the library's account for the vendor, (3) having the vendor access the library's file using the record numbers communicated via the initial electronic mail message, (4) having the vendor acknowledge receipt of the orders through the electronic mail facility. With UTLAS' blessings, this system was implemented in early 1980 on a test basis.

The anticipated advantages of the system—savings in labor and time for Memorial—were realized with the valuable side effect of encouraging rapid and regular communication between the vendor and the library; the electronic mail facility, unlike the long-distance phone call, was not "saved" for important matters only and was soon widely used in the claiming, reporting, and general querying process. The vendor benefited by receiving orders known to have been verified against a large bibliographical database. In addition, two mail strikes took place in 1980–81.

Some problematic aspects came to light during this test period. Since the vendor was reading complete bibliographic records used for cataloging purposes, the abundance of numeric tags and indicators associated with the MARC format made for a format that was not "user friendly" from the vendor's point of view. The one-by-one inputting of record numbers by both library and vendor consumed a significant amount of staff time. The vendor asked UTLAS to create a display format for order records that stripped out the MARC tags and made the order information (e.g., fund numbers, number of copies) more readily discernible: both vendor and library requested the creation of a single order search key to free them from inputting the eight-digit record number.

Concurrently, UTLAS had begun development of its own acquisitions control system. Steps had already been taken to stabilize the order information field in the UTLAS record structure and to generate products using this field. Initially, development focused on the centralized batch production of purchase orders, which was pioneered by Mississauga Public Library (reported in the *Journal of Library Auto-*

mation, V.13, no.4, Dec. 1980). These purchase orders were system-sorted by vendor and printed in 8½-by-11-inch format on a weekly basis. When Memorial University joined Mississauga Public Library as a second pilot-test site, UTLAS took on the responsibility of sending the orders directly to the vendor and a checking copy of the orders to the library. If errors were found by the library, a short note went to the appropriate vendor. An error listing of orders that failed to be printed was also sent to the library for re-input.

Building on its experience with online authorities control, UTLAS created a vendor authority file with a mechanism that automatically linked an order record with the matching vendor record and allowed text substitution of the vendor's full name and address on acquisitions products.

Although the batch system of purchase-order production functioned satisfactorily, it was becoming apparent that there was a definite trend in the library acquisitions marketplace toward local control over purchase-order creation. It was realized that online acquisitions products would allow libraries to use the system in a more comprehensive way: for instance, orders that required accompanying documents or payments—difficult to handle in a batch system—could be handled easily through an online system. Online purchase-order creation could also be developed to allow direct electronic access to the book trade; if the necessary security was provided, libraries and vendors could use the same sets of commands to access order records online, making unnecessary separate development for the two groups of users. What was most important was that a system be designed with ample flexibility to accommodate their diverse needs.

In early 1982, UTLAS decided to commit its resources toward bringing to market its accumulated test experience with electronic ordering and bibliographic control of order information in the form of an online acquisitions control package.

THE PRESENT

The result of this effort is ACCORD (Acquisitions par CATSS/CATSS Ordering), which was launched in June 1982. ACCORD gives vendors electronic access to incoming orders, use of the electronic mail facility for reporting and other communications, and reading access to the UTLAS database for their internal bibliographic searching needs. ACCORD gives libraries integrated cataloging and acquisitions functions, the option of ordering from whomever they please, local control over the scheduling, formatting, and printing of their own orders, and, if they choose an ACCORD vendor, freedom from purchase-order printing altogether.

The purchase-order record contains only the information that is important to the vendor, while the library is free to enter into its full order record as much additional data as it wishes for internal purposes. The authorities processing that allowed text substitution of vendors' names in the batch product now occurs online when the appropriate vendor code is entered. Where the vendor is not in the UTLAS vendor file, the library simply keys in the vendor's full name and address and gives an alternative order command.

In order to provide a full fund-accounting facility and the capability to produce a wide range of management statistics and reports, UTLAS has entered into a marketing agreement with Innovative Interfaces of Berkeley, California, for the INNOVACQ 100 acquisitions system, which includes an online interface with ACCORD.

THE FUTURE

ACCORD presently provides for computer-to-terminal electronic ordering, yet UTLAS recognizes that computer-to-computer transmission will become feasible for a growing number of book suppliers in coming years. UTLAS is participating in the deliberations of BISAC (Book Industry Systems Advisory Committee) regarding formats for direct-order transmission. Additionally, UTLAS is monitoring the progress of the industry through contact with its vendor clients. New developments in this area will be accommodated as they arise. ■■

WLN Online Order Transmission

Bruce Ziegman: Washington Library Network, Olympia, Washington; and Brian Aveney: Blackwell North America, Lake Oswego, Oregon

In November 1982, the Washington Library Network (WLN) began transmitting orders for library materials online to cooperating vendors. WLN became the first U.S. network to offer this service to its members. During the first stage, WLN's purchase-order form "print image" will be transmitted. Next year, WLN plans to offer a BISAC format alternative. The network offers this facility to all participants who use the acquisitions subsystem and to all interested vendors.

WLN first introduced its online computer system in 1976, beginning with a shared cataloging facility. Authority control, quality control, and powerful search capabilities (including subject and keyword searching) have been hallmarks of the WLN bibliographic subsystem since its inception. In 1978, WLN introduced the acquisitions subsystem and, in 1979, brought up a retrospective conversion subsystem. Over ninety libraries have online access to WLN now; thirty-one of them are using the acquisitions subsystem. Most acquisitions users will begin transmitting their materials orders online to vendors in November.

The WLN computer system uses a portion of an AMDAHL 470/V8, an IBM-compatible computer with sixteen megabytes of main storage, located at Washington State University in Pullman, Washington. The system is mainly programmed in PL1, although the acquisitions subsystem was done in IBM Assembler. WLN uses CICS as its teleprocessing monitor and ADABAS as its database management system. The database contains nearly 2.5 million bibliographic records in LC MARC format and over 2.8 million name, subject, and series headings in the linked authority file. Participants have attached over four million holdings symbols and local call numbers to bibliographic records.

One of the most significant features of the acquisitions subsystem is its integration with the bibliographic subsystem. By linking acquisitions records to bibliographic records, users gain access to orders using all the search access points—ISBN, ISSN, LC card number, author, title keyword, subject, and series—as well as purchase-order number. Acquisitions provides formatted order screens for order creation; once created they are maintained and updated online through receipt and payment. The automatic claiming feature tracks late orders at intervals selected by each library and automatically produces claim letters. The fund-accounting module allows libraries to monitor their encumbrances, expenditures, and free balance with a minimum of effort.

Once an order completes the order cycle, it can be removed to a magnetic-tape history file at the library's discretion. Acquisitions also utilizes a standing-orders file, allowing libraries to create permanent records for serials and keep an online payment history for each title.

Most updating is done online, in real time on the acquisitions subsystem, and users can check the status of orders or accounts at any time. In addition, over twenty printed and microfiche products and reports are available as needed. These include purchase orders, claim letters, routing slips, selector notification cards, lists of titles in process or serials in the standing-orders file, up-to-date accounting reports, microfiche copies of records on the history file, and several management reports. In designing acquisitions, WLN staff tried to create a responsive system which can be rapidly updated online but which is supported by the kinds of printed products and management information needed by acquisitions departments, fiscal offices, and library administrators.

ONLINE ORDERS

First impetus for the online ordering project came from a vendor—Academic Book Center in Portland, Oregon. Don Chvatal, vice-president for research and development, interested WLN in the idea, but the departure of WLN's acquisitions programmer delayed action. The project

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                                                      09/27/82
Fools : a comic fable / Neil Simon'..   Simon, Neil'..  1st ed'..
New York : Random House, 1981'.


Send latest edition'.


                                ISBN/LC#
                                0394523903
QTY      PRICE  VEN CAT#
  1      10.50                          BILL TO
                                        Rasmuson Library/Order Clerk
                                        University of Alaska
                                        310 Tanana Drive
     Blackwell North America Inc        Fairbanks, Alaska 99701
     6024 SW Jean Road, Bldg G
     Lake Oswego, OR  97034             SHIP TO

                                              SAME AS ABOVE

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**********  University of Alaska              HAD          47 ORDERS PRINTED


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**********  BLACKWELL NORTH AMERICA INC       RECEIVED       84 ORDERS.**


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Example of WLN's Electronically Transmitted Order.

got rolling again, however, when Brian Aveney, director of research and development at Blackwell North America in Lake Oswego, Oregon, offered programming assistance. Aveney worked with Bruce Ziegman (WLN manager of library services) and Terry Buckles (WLN senior design programmer) on the design of the online ordering facility. These three did the majority of the design work in consultation with the other vendors who expressed interest (including ABC, Baker & Taylor, Book House, Midwest Library Service, Scholarly Book Center, and Taylor-Carlisle) and a number of WLN participants.

Since the WLN software has been replicated elsewhere[1] care was taken to minimize changes to the programs. Existing logic was modified as little as possible, and source-program line numbers were maintained.

The major changes to the PL/I programs involved the loading and use of a routing table organized by institution (library). The table records each library's decisions on how to treat orders destined for each of its major vendors. For each vendor, a library may specify direct-order transmission and/or centralized printing by WLN for shipment to the library. Orders for vendors not specified in a given library's table default to central printing, as do all orders for libraries not in the table. It is not expected that a library would choose to bear the duplicative expense of producing orders both ways in practice; this feature is, however, useful for testing.

With the printed forms, a library has

control over the shipment of orders to its vendors. In online transmission mode, WLN assumes the control and therefore the responsibility. The design takes this added responsibility seriously in three ways: reporting, backup, and monitoring. Statistical reporting allows both the library and WLN to keep track of activity. Backup is provided by storing each vendor transmission as an IBM-generation data set, allowing retransmission at the vendor's request should there be any problems on its end. Regular monitoring of vendor pickup allows WLN to spot any problems. Should a vendor have problems in pulling orders for any reason, it is possible to force printing of the orders at WLN.

With the new facility, vendors may establish an account with WLN and use low-speed (300 or 1200 baud) dial-up ASCII terminals to list off library orders in their own facilities. The WYLBUR text-editor package allows the vendor to access a file of orders left for the vendor by participating WLN libraries prior to each batch-order production run. Currently, orders are produced three times a week. Vendors may pick up orders at their convenience. The generation data-set control allows order batches to be reprinted when necessary.

The PL/I coding was completed by Aveney during two weeks at WLN headquarters in Olympia soon. Building the routing table in Assembler, testing, program implementation, and systems support facilities were done by Buckles soon after. During the test phase in October and November, orders from the University of Alaska–Fairbanks, Washington State University, Boise State University, Gonzaga University, Montana State University, and Portland State University were transmitted to BNA and ABC. Minor modifications, chiefly addition of labels for some print fields, were made as a result of these test transmissions. The online ordering facility was made available to all vendors and all WLN acquisitions users in November.

REFERENCE

1. Thomas P. Brown and Raymond DeBuse, "Replicating the Washington Library Network Computer System Software," *Journal of Library Automation* 14:202–5 (Sept. 1981). ■■

EDITOR'S NOTES

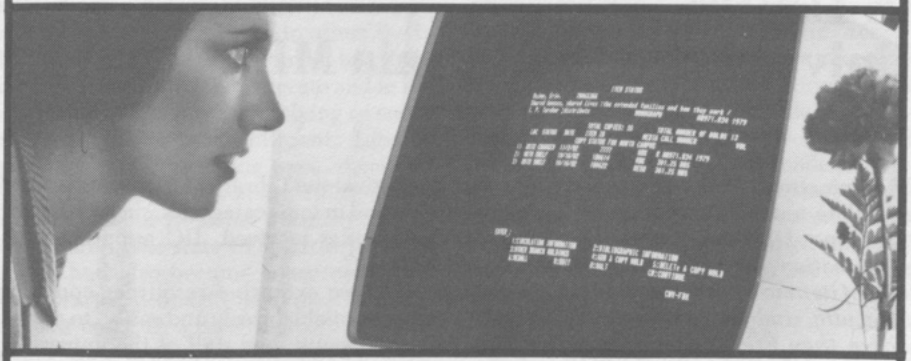
Only a Matter of Cost

At the WesCan ASIS annual meeting in Vancouver, B.C., this September, I had the opportunity to spend an hour or so "playing" with a Telidon terminal in the hotel lobby along with Jim Quick, the Blackwell regional sales manager for the Northwest. Both Jim and I were very impressed with the capabilities, but dismayed by how long it took to "paint" the pictures.

We related this to Alan Burke of Infomart, Toronto, a Telidon software supplier attending the meeting. He replied: "It's only a matter of cost." After an initial chuckle, we pursued the comment. Alan's point is that we often confuse a design and an implementation. Speed is not a limitation of Telidon, merely a problem with current hardware.

Hank Epstein has commented on the same sort of confusion in many automation presentations. The question, "How fast is X circulation system?" is a nonquestion unless one is discussing a specific load on a specific configuration.

YOU NEED TO KNOW THE DIFFERENCE.



There *is* a difference between automated, stand-alone library systems.

Especially between the Automated Library Information System and the rest.

And, if you're in a position to make an investment decision for your library, you need to know what the differences are.

DIFFERENCES IN SOFTWARE DESIGN.

ALIS' fuller integration provides more power, even in generic library functions like "Charge" and "Discharge."

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ALIS' on-site training programs help you master the skills to integrate ALIS into *your* library.

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DataPhase

In-Depth: University of California MELVYL

The University of California has developed an online union catalog for public access that is one of the largest and most advanced in the nation. To make the library collections of its nine campuses easily available to all faculty, students, and staff, regardless of where they are located, the university planned and implemented a series of programs to enhance access. Chief among these was the development of the union catalog.

Because of the catalog's size, complexity, and importance, ITAL *has presented this special section of articles describing MELVYL. Additional articles will follow in the March issue.*

With the exception of Stephen Salmon, who as assistant vice-president heads the Office of Library Plans and Policies at the university, all the authors are members of the Division of Library Automation.

Planning for Library Automation: The Origins of MELVYL

Stephen R. Salmon: assistant vice-president for library plans and policies

Individually, the libraries of the University of California's (UC) nine campuses form an impressive group of research libraries. Seven of the nine are members of the Association of Research Libraries, and two of them—Berkeley and Los Angeles—rank third and fourth among academic libraries on the ARL's rather complicated Library Index.[1] Collectively, they constitute—at least potentially—one of the great library systems of the world. With more than 18 million volumes, the collections rival the Library of Congress (LC) in size, and in some categories, such as current serial titles received, UC apparently exceeds LC.

If these extensive resources could be made available, freely and easily, to all students, faculty, and staff of the university, the support provided to scholarship, research, and instruction would be unparalleled. Realization of this potential—as yet only partially accomplished—is the goal of an ambitious library development plan adopted by the university in 1977.[2] A key element in that plan, without which achievement of the goal would be impossible, is an extensive program of library automation.

LIBRARY PLANNING IN THE UNIVERSITY

The university's first formal library plan was adopted in 1961. It made no mention of automation—few documents did, in 1961—but it recognized the need to share library resources throughout the university and recommended several steps that were subsequently funded by the regents:

- Reproduction of the catalogs of the Berkeley and Los Angeles libraries for use on the other campuses.
- Purchase and operation of vehicles to expedite intercampus lending between the Santa Barbara, Riverside, and Los Angeles campuses in the south, and the Davis and Berkeley campuses in the north.
- Additional clerical and other services at Berkeley and Los Angeles to facilitate intercampus lending.
- A permanent fund to allow faculty and graduate students to pursue study and research on UC campuses other than their own.

By 1966, new campuses (and new campus libraries) had been established at San

Diego, Irvine, and Santa Cruz, and a revised library plan strongly reaffirmed the policies of intercampus cooperation and "complementarity." Five years later, however, drastic changes in other planning assumptions were beginning to affect the libraries. The 1970 census pointed to a sharp downward shift in the birth rate and in immigration to California, implying an end to rapid increases in enrollment. Library plans for rapid expansion were, therefore, suddenly inappropriate. By 1971, with a new climate of financial austerity abroad in the land, the state's Department of Finance had also become concerned about the libraries, primarily from the standpoint of their costs. In a two-volume report, the department argued for "increased interdependence, cooperation, and coordination" and recommended that "budgetary restraints be used to insure compliance" with this policy.[3] In plain English—made plainer each succeeding year—the state refused to appropriate additional funds for the UC libraries until the university adopted a new library plan stressing these principles.

There were strong academic reasons for pursuing such a course as well. The faculty had become increasingly concerned about the adequacy of the collections and collection growth, and with each campus trying to develop its collections independently the competition for funds was intense, the strains on intercampus cooperation inevitable. A succession of committees wrestled with formulas designed to deal with the problem equitably, without much success. A larger policy context clearly was needed, and in 1974 a Library Policy Task Force supplied it, recommending as one of the key "bases" for library planning that "the library holdings of all the campuses be considered a single University collection rather than nine separate collections."[4] To maximize the use of resources—both scholarly and financial—the task force urged "the greatest possible reliance on intercampus cooperation and resource sharing."

The task force also provided specific recommendations on how all this should be done. Clearly the campus collections could not be used as a single university collection unless the users knew what was in it. Accordingly, said the task force, "the first requirement for establishing the unity of the University collection is to provide complete bibliographic access to all users on the campuses," and "the development of plans to insure complete bibliographic access should receive the highest planning and budgetary priority." "Automation should be used as appropriate to provide" such accessibility. To provide improved physical access, the task force recommended a "direct borrowing" process to replace traditional interlibrary loan, and an enhanced delivery system capable of providing any book in the system within forty-eight hours.

THE 1977 PLAN FOR DEVELOPMENT

After considerable review and consultation, the president of the university endorsed the recommendations of the task force and appointed a steering committee to implement them. Among the committee's early acts was the establishment of a library planning office in the university's headquarters, to begin immediate preparation of a new and comprehensive library plan, based on the principles embodied in the task-force report. Preparation of the plan involved a series of drafts, each of which was reviewed by an ever-widening circle of administrators, librarians, faculty, and staff, involving literally thousands of people in the end. By July 1977, broad consensus on the specifics of the plan had been reached, and the university formally adopted it. For the past five years, this plan has served as the basis for concrete action in all phases of library development, including not only automation, but also space planning, acquisitions, and staffing.

Equally important, the plan has served as the basis for each year's budget requests to the state legislature. Although there was no way to predict such unfortunate timing in advance, the university's first request for funding the recommendations of the plan was presented just as the state's voters were passing Proposition 13, which drastically cut revenues to cities and counties— and indirectly to the state. Deep cuts were made in various portions of the state's budget, including the university's portion, but the

legislature nevertheless appropriated several million dollars in additional funds to begin implementing the library plan, and—except for the portion involving new buildings—appropriated the balance of the funds needed the following year.

AUTOMATION UNDER THE PLAN

Among the key features of the 1977 plan is an extensive use of automation. OCLC cataloging terminals were quickly installed at those campuses not already using either OCLC or RLIN. After completion of a competitive bidding process initiated even before the plan was adopted, CLSI was selected as the circulation system for the campuses, and installed (by now) on six of them. A Union List of Serials with a keyword approach was produced on microfiche, and in successive editions was enlarged to include the holdings of the nineteen campuses of the California State University, Stanford University, and the University of Southern California.* Although not specifically a part of the plan, important campus automation projects have proceeded in consonance with it, notably the Technical Processing System at UCLA.

By far the largest and most significant of the automation projects initiated by the plan, however, has been the development of a university-wide online union catalog. If the collections of the university's libraries are to be used as a single collection, and the resources in this collection made easily available to all students and faculty of the university, a union catalog is clearly an absolute necessity.

DEVELOPMENT OF THE ONLINE CATALOG CONCEPT

It was obvious that the task could not be accomplished with card catalogs. Indeed, the efficacy of card catalogs even for campus collections had come increasingly into question. Both the Berkeley and Los Angeles campuses had charged a series of committees with the task of studying the desirability of closing their card catalogs and replacing them with an alternative form. Berkeley's catalogs, the oldest and largest, contained 8 million cards, reflecting "the problems of size, encrustation, and complexity that the span of years, differing policies, and a variety of working methods have evolved." The size of the catalogs, "coupled with many types of brief, limited, and special slips and cards both temporary and permanent, location designations and symbols, techniques and procedures," constituted "a very complicated tool for users and staff alike."[5]

There were other reasons for questioning the continuance of card catalogs on the campuses as well. Filing into them had become complex as they grew larger, a problem not only for the staff but for the users as well. The cards were subject to theft, difficult to detect unless the theft was a large one, as when UCLA lost all cards on India. The catalogs were inevitably out of date because of filing delays. And perhaps most important, the card catalogs were difficult to change; merely updating a single subject heading was very expensive by the time all of the cross-references as well as the cards themselves had been changed.

Because of these considerations, the campuses were already interested in new catalog forms. If the proposed union catalog could replace campus card catalogs as well—particularly without additional costs to the campuses—so much the better.

Book catalogs had been considered as one alternative for several years. Indeed, the university had already produced a forty-eight-volume book-form union catalog for five years' worth of cataloging,[6] a project widely noted at the time because of its size, complexity, and pioneering use of format recognition, but widely criticized, at least within the university, for its numerous errors and lack of bibliographic integrity. There are advantages to the book form: the computer handles the filing (with, it must be said, some difficulty) so the manual costs and backlogs associated with this activity are eliminated, and multiple copies may be produced, so that each library and branch may have one. But there are important dis-

*The Union List of Serials is now entitled *California Academic Libraries List of Serials* (CALLS) and is available from CALLS Distribution, CLASS, 1415 Koll Circle, Suite 101, San Jose, CA 95112.

advantages as well. The users must still cope with filing problems, and figure out where the rules—and the computer—have put the records in which they are interested. As soon as the catalog is printed, it is out of date, so that frequent supplements are necessary; each supplement, however, creates a separate filing sequence, and a separate place to look. Most importantly, continuously cumulating and printing a book catalog becomes very expensive within a few short years.

Computer-output-microform (COM) catalogs reduce the costs considerably, because production of the film or fiche copies is much less expensive than producing full-size paper copies. While the union catalog was in development, in fact, both the Berkeley and Santa Cruz campuses switched to COM catalogs locally, the latter from a book catalog. Initially it was assumed that the union catalog would be in COM form as well. But except for the cost differential, the problems of the book catalog are perpetuated in a COM catalog: filing problems, lack of currency, and multiple filing sequences all remain. Even the cost becomes a problem more quickly than might be imagined. By the time the final version of the library plan was prepared, enough calculation had been done to show that a COM union catalog would actually be more expensive than an online catalog in the long run, at least if the COM catalog were cumulated frequently enough to be useful.

What gradually emerged, therefore, was a decision to use COM only as an interim step, and then (produced much less frequently) as backup to an online union catalog. The advantages of the online approach were multiple; not only were the problems of the book and COM forms eliminated, but new possibilities emerged as well:

- It could be easily updated—in real time or overnight—and hence would be much more up to date.
- It could be more accurate because corrections and changes could be made easily and immediately.
- It would allow faster catalog searching for the user because the computer could do the searching and display the results within a few seconds.
- It could provide for searching under multiple terms, or keywords, not just the initial words of the headings chosen in the cataloging process.
- It could allow combinations of terms or keywords to limit or define a search more precisely.
- The interactive nature of an online system could make it easier to provide guidance to the user in finding and locating material.
- The filing rule problems would be greatly lessened, both for librarians and users, because the computer would both store and retrieve all the information.
- A variety of display formats could be used (and chosen) by the user.
- The terminals used for the online catalog could be used to provide access to other databases, or terminals already in use for other purposes could be used to access the union catalog.

In contrast with the existing card catalogs on most of the campuses, an online catalog could also be much more complete; it could display several entries at once, on the same screen, to facilitate browsing; it could be more portable (that is, terminals could be installed at various locations on campus, even in dormitories and offices); and the terminals would not only occupy less space but would allow greater flexibility in providing space for them.

The final plan, then, strongly endorsed the online catalog as the form of the union catalog, with a microfiche version as backup. Reserved to the campuses was the right to decide whether to use it as a replacement for the local card catalog, although this was "expected" by 1984/85.

DEVELOPMENT OF THE UNION CATALOG DATABASE

Regardless of the form, the union catalog obviously would be worthless without a significant number of records to put in it, so the first step was to begin building the database. Equally clear was the need to begin capturing current cataloging in machine-readable form as soon as possible. In 1976, several campuses had begun using either OCLC or Stanford's BALLOTS for cataloging, and within the next three years

OCLC was installed at the remaining campuses. The major task then became the retrospective conversion of older records.

For a number of years, all campuses had been sending one card for all works cataloged to what was then called the Universitywide Library Automation Program (ULAP), in anticipation of the need for a union catalog. Many thousands of these cards had been matched against the machine-readable MARC file housed at ULAP, and the local campus locations and call numbers had been added. Arrangements had also been made with OCLC to convert records not found in the MARC file at its Columbus facilities. The 1977 *Plan for Development* envisaged a continuation of this process for all records with imprint dates of 1973 or later, so that the scope of the initial union catalog could be easily defined to users.

The campus libraries, however, had strong reservations about proceeding with retrospective conversion in this fashion. Corrected cards representing changes to the records or changes in the holdings of the campus libraries had not been routinely supplied to ULAP, so that the accuracy and currency of the file was in serious question. At the very least, records converted centrally would have to be reviewed and edited at the campuses, which would add significantly to the cost.

Another concern was that several campuses had subject-oriented conversion projects already under way and wanted to continue them; these projects would have to be coordinated somehow with conversion efforts at ULAP to prevent duplication of effort or variant records for the same book at the same campus. Because of these factors, the university decided in 1979 to pursue retrospective conversion almost solely at the campus level. Standards and guidelines were prepared to assure consistency and bibliographic quality in the union catalog; however, *what* was converted, as opposed to *how* it was converted, was left to the judgment of each campus. Since 1979, more than 600,000 records have been converted at five campuses (Berkeley, Davis, Irvine, Riverside, and San Diego) using either OCLC or RLIN as the mechanism. Some collections, such as the law library at Davis and the undergraduate library at San Diego, have been completely converted, at least for monographs; others are less far along, and for some collections, retrospective conversion has not yet begun.

The experience so far has confirmed the validity of this approach. Campuses have been able to convert directly from their shelflists, ensuring an accurate and up-to-date record, and they have been able to convert portions of their collections that were most meaningful or useful to them, in some cases using records for local by-products, such as COM catalogs of particular collections. The costs to date have been reasonable: an average of $1.37 per record in 1979/80, and $1.67 in 1980/81. The one disadvantage of this approach is that it is impossible to describe the present scope of the union catalog database to the *user* of the catalog in any meaningful way: it simply contains all records converted to machine-readable form so far.

In 1981, the university reached agreement with Carrollton Press on a joint project that will make millions of additional records available for the university's retrospective conversion program. Under the agreement, the university's Division of Library Automation (DLA, the successor to ULAP) makes available its computing resources and editing software to allow Carrollton to edit the records it has converted from the Library of Congress shelflist, so that they can be included in Carrollton's REMARC project. In return, the university will have the REMARC database, eventually containing some 5.2 million records, available online for campus conversion projects.[7]

PRODUCTION OF THE UNION CATALOG

As the database began to grow, the next step, technically, was to begin combining the records in a meaningful way to make a true union catalog. The library plan had proposed to do this through production of a COM catalog as an interim step while the online catalog was being developed. Such a product would test the ability of the developing software to merge records successfully and maintain bibliographic quality,

and it would have immediate usefulness, as a union catalog, in and of itself.

In late 1977, a prospectus was issued outlining in specific detail the proposed design for such a catalog.[8] It would emphasize quality control; conform to national and local standards; incorporate a system of authority control; preserve all access points in the cataloging records received from the campuses; and provide exact holdings information. The format, for the COM version, would be an index-register catalog, with a register containing complete records (including MARC tags), and indexes by name, title, and subject. This document laid the bibliographic foundation for all future products, including the online catalog. Surprisingly, and in marked contrast to the extended debate over certain provisions of the various drafts of the library plan itself, there was remarkably little reaction to the detailed proposals in the prospectus, which meant that planning and programming could proceed without significant changes in design philosophy.

By 1979, the first product was ready. This was a pilot edition, deliberately unprepossessing in size and scope. It was intended "to test Union Catalog processing capabilities and display formats, to gather data on campus cataloging practices, and to focus campus discussions on Union Catalog problems and prospects." It contained some 28,000 records from eight campuses, drawn from OCLC archive tapes for cataloging performed at UCLA, Irvine, Riverside, and San Diego, and records from the MARC conversion project for these campuses and four others. To test the physical format, two versions were sent to the campuses: one on microfiche and the other on microfilm loaded into automatic film readers. Both fiche and film versions incorporated the index-register format. The pilot accomplished two purposes: it demonstrated that the software could successfully merge records through computerized editing; and it elicited a substantial number of helpful comments on format and content.

The 1979 pilot was followed by the first production edition of the union catalog in February 1980. On 610 fiche in five binders (the equivalent of 75 to 100 printed volumes) were all of the records with imprints of 1976 and later that were in machine-readable form by that time. About 205,000 came from OCLC cataloging or retrospective conversion; 114,000 from RLIN; and 24,000 from the MARC conversion project. The 343,000 records thus input merged into about 148,000 unique titles; 54 percent were held at only one location, the rest at two or more libraries.

Production of the catalog was significant for four reasons. First, it successfully merged OCLC and RLIN records, a complex task that no one had mastered before. Second, it incorporated a system of postcataloging authority control, using a computerized method of matching name entries against the LC name authority file, and generating cross-references as appropriate. Third, it included an index to topical subjects based on the keyword approach used earlier in the Union List of Serials. This provided benefits not found in the card catalog: it brought together geographic subjects used either as a main heading, as a qualifier in a main heading, or as a subheading, and it brought together related subjects even if the term was embedded in the subject heading. For example, all works on African tribes were shown together, as were all works on various types of equations. Fourth, the register demonstrated graphically the way in which the software combined records for the same editions of the same work, while still retaining campus variations in cataloging. There was more variation than most of the campuses had expected—even the entry for the *Anglo-American Cataloguing Rules*, second edition (i.e., AACR2), had four different versions of the title—and the graphic display of variations stimulated interest in more uniform procedures.

The next edition of the fiche union catalog, in the spring of 1981, indicated how rapidly the size of a catalog in this form was likely to grow. In one year, the register had grown from two binders to seven, and the name and title index from two binders to five. The number of records input to the catalog totaled more than 1.3 million, which boiled down to 733,000 unique titles. For the first time, all nine campuses were represented. The Santa Cruz campus had had a machine-produced book catalog

since the campus was established, and a special program was written to convert most of these records to the union catalog format. Records from two related institutions—Hastings College of the Law, in San Francisco, and the Lawrence Berkeley Laboratory—were also included.

A questionnaire in late 1980 had shown that the register was seldom used, so only 30 copies of the spring 1981 edition were distributed, as contrasted with 150 copies in the previous edition. More significantly, the 1981 edition contained no subject index. One reason was the extra cost that would have been involved. The most important reason, however, was that enhanced subject access to the database was now available through the *online* union catalog.

DEVELOPMENT OF THE ONLINE CATALOG

Planning for the online catalog had proceeded in parallel with the development of the database and the production of the microfiche union catalog. For the most part, in fact, the development steps for one were indistinguishable from the development steps for the other. Systems and software for building a merged and consolidated database, for authority control, and for indexing were to a great extent the same, regardless of the display format. What remained to be developed was a user interface, terminal-handling protocols and software, a telecommunications network (also with related software), and adequate computer resources to support the whole.

Soon after the plan was published, and indeed before the funds had been received from the state, the university considered implementing a distributed processing system, with distributed databases on all campuses, but rejected this approach in favor of a more conventional centralized system. With this decision made and the resources in hand, work began on building the new DLA computer center and remodeling existing space to accommodate the DLA staff. Begun in February 1979 with a scheduled completion date in September of the same year, the remodeling was not actually completed until July 1980. As a consequence, the equipment to develop and implement the online catalog was not available until much later than anticipated. Nevertheless, a small test catalog of about 7,000 records was mounted, using borrowed hardware, by Christmas of 1979. Used only by DLA staff, the test system enabled programmers and systems personnel to try out the developing online software and continue development of the user interface.

By July of 1980, the new computer center and expanded DLA quarters were occupied. This meant not only a great savings in cost, as compared with rented space and rented computer time; it meant also that DLA had complete control of its own computing, and could optimize the computing resources for the project. As a result, development of the online catalog proceeded swiftly. The following month, in August 1980, the system was first demonstrated outside DLA, at a meeting of head librarians and other library officers. For this purpose, and for the balance of this year, the 1980 edition of the database containing 148,000 records was used.

So far only library staff had seen the developing online system. To introduce it to the public, a prototype online catalog was proposed, with a database large enough to be useful to faculty and staff. The prototype would test not only the system, the telecommunications network, and the computer support underlying it all, but more importantly would test public reaction and the all-important user interface. Necessary changes could then be made before the full, continuing, production online catalog was installed.

Several proposals for specialized or subject-oriented databases for the prototype were rejected, for various reasons, and in the end outside events decided the issue. With the end of AACR1 cataloging by LC (and UC) on December 31, 1980, that date became a natural cutoff point, and the database for the prototype online catalog was defined as all records in machine-readable form cataloged before January 1, 1981—the same database used to produce the spring 1981 microfiche version of the union catalog.

A pretest of the prototype online catalog using this database (about 733,000 records for 1.3 million holdings) was made avail-

able on a limited basis to staff on the campuses in April 1981, so that campus library personnel could become familiar with it before the public started using it. By July, after frustrating delays in getting telephone connections installed, terminals were available in all libraries. Only one detail then remained: a name for the system.

For dealing with the general public, calling it "the prototype online union catalog" or "the University of California On-Line Union Catalog" seemed cumbersome, and the shorter, in-house name—"It"—was obviously ambiguous. Conditioned by WYLBUR, the text-editing system developed by Stanford and used by DLA, and MILTEN, the telecommunications dispatcher with the same heritage, and in honor of Melvil Dewey, one of the greatest innovators in cataloging (as well as in spelling), the catalog was christened MELVYL. It caught on quickly, and has served the purpose well, with only one disadvantage: students now look in the catalog for works by "Herman Melvyl."

On August 17, 1981, MELVYL was officially declared up, and has remained up, with relatively minor interruptions, since that time. In practice, it remains available not only during the planned hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, but around the clock, seven days a week, except for scheduled maintenance. Much of the downtime has been due to power failures, and because of this an uninterruptible power supply—essentially 4,000 pounds of batteries, with elaborate switching devices—is being installed.

For the prototype, 100 terminals were distributed to the nine campuses. Over 200 more are being added this year and several hundred more in the following few years. To support this many terminals, changes are being made in the telecommunications network. Until recently, all communications took place over telephone lines, but in January 1982, the first microwave link began operation between DLA and Santa Barbara, and other links are projected for the near future. Completion of the microwave network, however, awaits the completion of a comparison, now under way, between microwave and satellites as competing alternatives, with rapid changes in technology making satellites more and more attractive. DLA is also installing packet-switching equipment, such as that developed for the Defense Department's ARPANET, in order to make more efficient use of whatever telecommunications medium is finally selected.

The most significant change in MELVYL, however, will come later this year when the production system is finally implemented. It will incorporate the records in machine-readable form, including those converted since December 1980, making the total number of unique records more than two million; more importantly, the database will be updated nightly, or as often as new records are received, adding an estimated 12,000 records per week. It will include AACR2 records, and will use the Library of Congress "flipped" authority file. It will incorporate new functions and access points for the user, and provisions for campus library staff to edit records online. With the additional terminals, it will also be more readily available to all of those who wish to use it.

In short, MELVYL will soon become the major library resource it was intended to be. And it will then begin to serve its larger purpose as the key to a university library system second to none in its support of scholarship and research.

REFERENCES

1. Carol A. Mandel and Mary P. Johnson, *ARL Statistics 1980–81: A Compilation of Statistics from the One Hundred and Thirteen Members of the Association of Research Libraries* (Washington, D.C.: Association of Research Libraries, 1981), p.27–29.
2. University of California, Office of the Executive Director of Universitywide Library Planning, *The University of California Libraries: A Plan for Development, 1978–1988* (Berkeley: The University, 1977), 210p.
3. *The Management and Operations of the University of California: The Library System of the University* (Sacramento: California Department of Finance, 1972), 2v.
4. *Report of the Library Policy Task Force, University of California Library Policy to 1980–81* (Berkeley: Univ. of California, 1974), 5p.
5. Virginia Pratt and others, *To Close or Not to Close* (Berkeley: The General Library, Univ. of California, 1975), p.1.

6. *University of California Union Catalog of Monographs Cataloged by the Nine Campuses from 1963 through 1967: A Supplement to the Catalogs of the University Libraries at Berkeley and Los Angeles Published in 1963* (Berkeley: Institute of Library Research, Univ. of California, 1972), 47v.
7. For a fuller discussion, see Susan Kallenbach, "The REMARC Project," *DLA Bulletin* 2, no.2:6 (July 1982).
8. Mike Berger, *University of California Union Catalog: A Prospectus* (Berkeley: Office of the Assistant Vice-President, Library Plans and Policies, Univ. of California, 1977), 30p. ■■

The User-Friendly Catalog: Patron Access to MELVYL

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MELVYL, the University of California's online union catalog, was developed by the Division of Library Automation (DLA) as part of the ten-year *Plan for Development* for UC libraries published in 1977.[1] The catalog makes it possible for library patrons and staff at any campus to access the library collections at all of the nine campuses of the university.

The general principles that served to guide the development of the catalog are:

- *The online catalog must be user friendly.* Patrons should be able to search for materials in UC libraries with a minimum of instruction. The catalog must accommodate the entire user population ranging from experienced searchers to first-time library patrons.
- *The catalog must improve access to UC collections.* Patrons at one campus should have access to bibliographic records of books at other campuses equivalent to that available at their own campus. In addition, the online catalog should provide more comprehensive, sophisticated, and flexible search and display capabilities than card or microfiche catalogs.
- *The catalog must meet the bibliographic needs of the university libraries.* The catalog must be based on the traditional functions of the library catalog: to bring the works of an author together, to describe uniquely each edition of a work, and to indicate uniformly the subjects of works in the library.
- *The catalog must have a syndetic (cross-reference) structure that is transparent to the user.* The authority control subsystem must automatically retrieve the works of an author through authoritative and cross-reference forms of the author's name, so that the user need not be familiar with cataloging practices to do a thorough search.

A prototype version of MELVYL has been operating now for over a year. From almost 100 terminals in 32 of the UC libraries, patrons have been able to locate materials held by their own campus and any of the other campuses in the UC system.

In late fall of this year, DLA will begin to implement the production version of MELVYL. Two major changes will mark the transition: the prototype's static database will become updatable nightly or as new records are received, and the current database of 733,412 records (representing 1.3 million holdings) will be replaced by one of more than 2 million records (representing more than 3.5 million holdings).

The primary purpose of the prototype was to test whether an online library catalog could be used satisfactorily by the library patron. It also provided the opportunity to test the hardware, software, and telecommunications, and to ferret out unforeseen problems that would have to be addressed in the production version of the catalog.

To monitor patterns of use, an extensive transaction monitoring system was developed that made it possible to re-create an individual user session for statistical analysis. Statistics compiled from these sessions were submitted to Statistical Package for the Social Sciences (SPSS) for tabulation

and reporting. With the aid of a grant from the Council on Library Resources, an online questionnaire was developed to help assess users' reactions to the system. DLA also asked campus library staff to gather user comments and suggestions. Some of these suggestions have already been incorporated into the system. A direct-dial Catalog Assistance Desk at DLA also helped to point up problems that needed to be addressed.

THE INDEXES: ACCESS POINTS TO THE CATALOG

MELVYL provides comprehensive access to the catalog through six primary indexes, one secondary index, and three number indexes. The primary and number indexes are used to search the catalog directly—that is, they are used to initiate a search—while the secondary index is used only to modify previous search results.

Primary indexes provide access to the catalog by keyword. There are six primary keyword indexes:

1. Personal author (PA)—Personal authors from main entry, added entry, and series fields
2. Corporate author (CA)—Corporate authors from main entry, added entry, and series fields
3. Title (TI)—Titles from main entry, added entry, title, and series fields
4. Uniform title (UT)—Uniform title main and added entry fields
5. Series (SE)—Series and series added entry fields
6. Subject (SU)—All subject fields, local and LC

To avoid ambiguity, the abbreviated two-letter code (in parentheses) must be used in search commands.

The only secondary index in the prototype, the DATE index, was built from the Date 1 position in the 008 field of the LC MARC record. Publication dates are used to limit (modify) the results of a completed search to a particular date or range of dates.

There are three control number indexes that can retrieve records (and more will be added to the production catalog):

1. LCCN Index—Library of Congress Card Number
2. ISBN Index—International Standard Book Number
3. ISSN Index—International Standard Serial Number

(Examples of how indexes are used in searches appear below in the section on the COMMAND dialogue mode.)

Building the Primary (Keyword) Indexes

Except for the personal author index, the primary indexes were built by generating one keyword for each word in the specified fields and subfields. This comprehensive indexing gives a user the power to access the bibliographic record without having to understand cataloging practices. For example, the title index contains main titles, uniform titles, series titles, and added entry titles.

For the personal author (PA) index, a special algorithm was used to generate keywords only from the $a subfield of personal author MARC fields (MARC tags 100, 400, 700, 800). The algorithm created compound keywords composed of the surname in combination with forenames and forename initials for both authoritative and cross-reference forms of personal author names.

This special handling gives flexibility to the user because the algorithm will create the correct keywords whether the user types a name in direct order or inverted order (with a comma between the surname and the forenames). If the user types either HENRY F. JAMES or JAMES, HENRY F., then MELVYL will return the same result.

The results are also precise because the algorithm preserves the order of the forenames and distinguishes the surnames from the forenames. This prevents a search for books by Henry F. James from retrieving books by James F. Henry, which would be the result of the simple keyword approach as used, for instance, in the subject (SU) index.

This algorithm was not applied to personal names in the subject index, creating an inconsistency between PA name searches and SU name searches. This inconsistency will be corrected in the production catalog.

Authority Control in MELVYL

The basis for authority control in

MELVYL is the Library of Congress Name Authorities machine-readable file, which contains authoritative forms and cross-references for personal, corporate, and conference names, and uniform titles. Because comparable authority files were not available from LC for subjects or series, there was no attempt to control these access points.

The MELVYL authority control system matches the headings from the access fields in bibliographic records against records in the authority file. If a match occurs, the authority record is linked to the access field, creating keywords from cross-references so that the user can access books by cross-reference forms of the name.

This syndetic structure has been made transparent to the user, so that, for example, books by Samuel Clemens will be automatically retrieved by a search for the pseudonym Mark Twain, and books by Bob Woodward can also be accessed through the full authoritative form of his name, Robert Upshur Woodward.

THE PATRON INTERFACE

In anticipation of its potential as a replacement for card and microfiche public catalogs, MELVYL was designed primarily for patron use. It was therefore important to provide a human-machine interface to accommodate users with widely varying experience—from patrons with little knowledge of library catalogs, manual or online, to experienced searchers of online library systems. These are the specific guidelines used in the design of MELVYL's patron interface:

- The user should always be able to understand the results of a request and what actions can be taken next.
- System responses should be consistent. Similar requests should always have similar results.
- The user must not be frustrated by lack of response or burdened with too much explanation. Brief messages should be limited to a line or two; fuller explanations should fit on one screen.
- System messages should be clear, concise, and informative; they should be neither intimidating nor condescending. Specialized library or computer jargon should be avoided. Error messages should indicate how to obtain more information.

The major components of the patron interface are the two dialogue modes, LOOKUP and COMMAND, and an extensive HELP/ERROR system. LOOKUP mode is designed for patrons who want to search for books without learning the command language. It offers a small subset of the functions available in COMMAND mode, which carries the full range of MELVYL's search, display, and session control features. The other major component, the HELP/ERROR system, provides the user with detailed help, if needed, throughout a session. A user can ask for HELP at any time in either dialogue mode, but HELP capabilities are much more extensive in COMMAND mode where the HELP/ERROR system also serves a tutorial function.

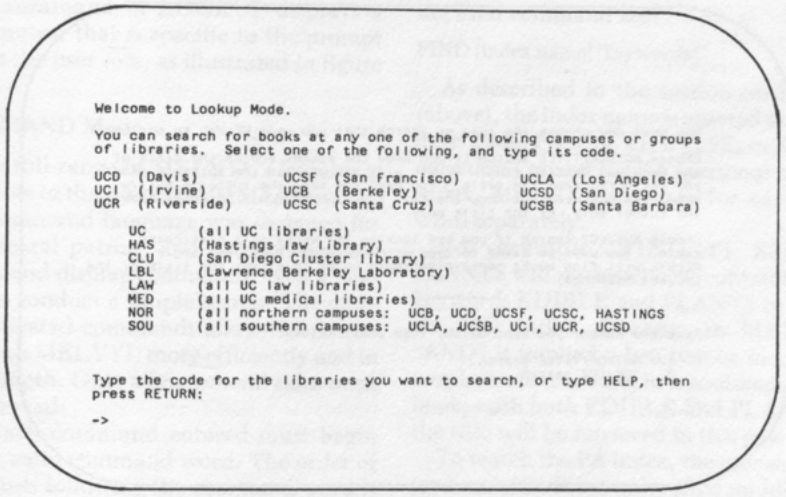
LOOKUP Mode

LOOKUP mode is largely menu-driven: it presents the user with a series of screens with instructions and a list of numbered options. Simply by making choices and responding to prompts, the user can conduct a search for books and display the results. The system automatically formulates the appropriate command based on the numbers and keywords typed in by the user. In a typical LOOKUP session the user will:

- select the campus to be searched (figure 1)
- select the type of search to be performed—author/title or subject (figure 2)
- type in the appropriate keywords
- select records to be displayed from the search result
- start a new search or end the session

Although the sequence in a LOOKUP session is somewhat inflexible, compared to COMMAND mode, the user can exercise the following options at any point in a session:

- request a HELP screen specific to the situation by typing "HELP" or "?" (figure 3)
- end the session by typing END or LOGOFF
- begin again by typing START
- switch to COMMAND mode by typ-



This is the first screen the LOOKUP user sees. The prompt arrow (at the bottom of the screen) always signals the user when to type information.

Fig. 1. Initial LOOKUP Screen.

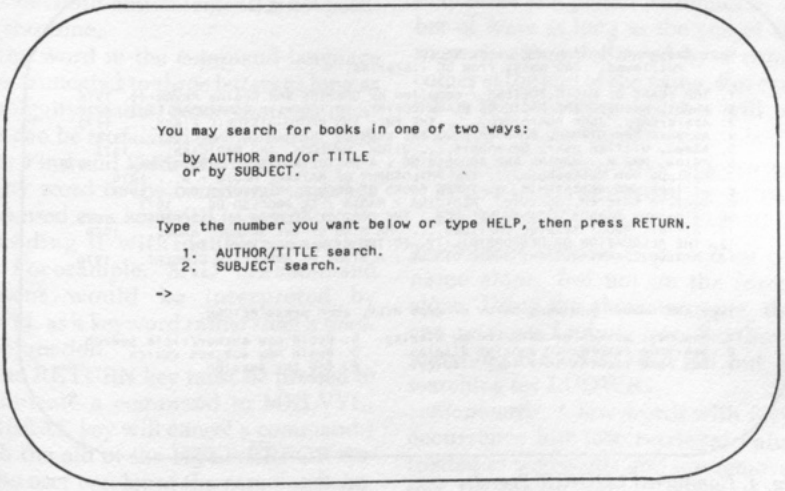


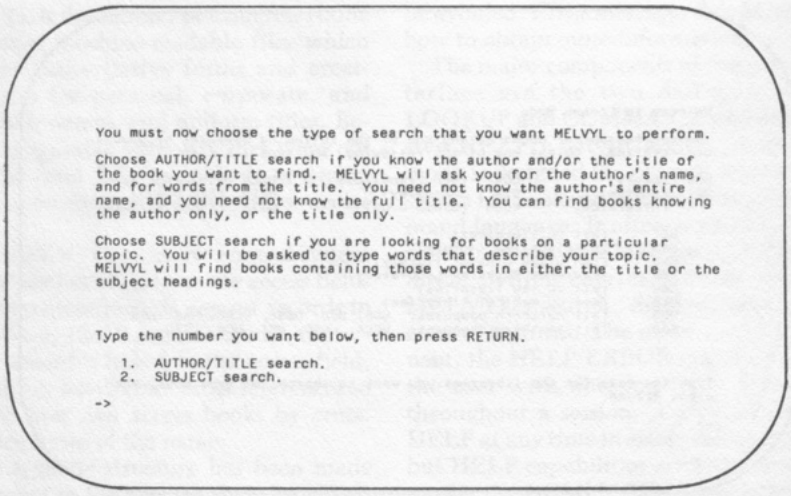
Fig. 2. LOOKUP Search Prompt Screen.

ing SET MODE COMMAND

Figure 4 illustrates the first screen of a completed LOOKUP search.

Special Search and Help Functions in LOOKUP

Author and subject searches in LOOKUP receive special treatment because the user is assumed to be unfamiliar with the bibliographic distinctions maintained in the indexing between personal, corporate, and conference authors, and between natural-language subject words and LC subject headings. Therefore, an author search is treated as a request to search both the personal author (PA) index and the corporate author (CA) index. Similarly, a subject (SU) search is treated as a request to search



If the user typed HELP instead of making a search selection following figure 2, the above explanation would be displayed.

Fig. 3. A LOOKUP Help Screen.

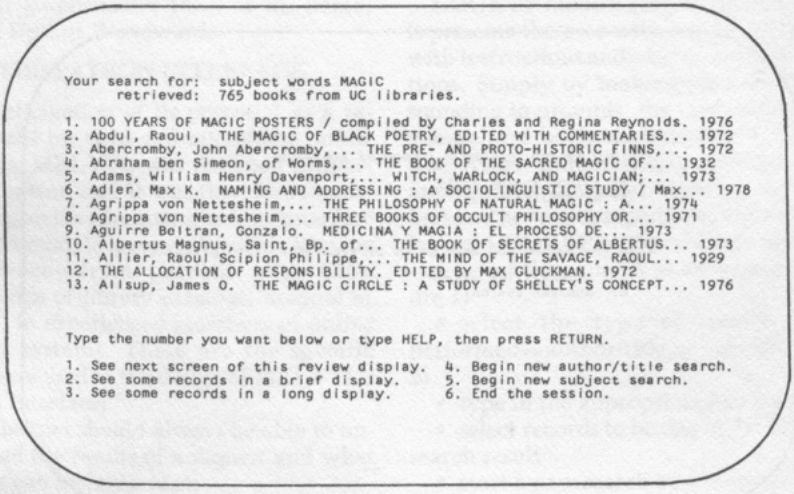


Fig. 4. Completed LOOKUP Search.

for title words in the title (TI) index and Library of Congress subject headings in the SU index. Figure 4 illustrates the results of a LOOKUP subject search. Some of these books were retrieved on MAGIC as a title word, not as a subject heading. For example, the first title, "100 Years of Magic Posters," has the subject heading CONJURING and would have been missed if only the SU index had been searched.

According to weekly statistical reports, subject searches in LOOKUP mode are popular, consistently accounting for more than half of the total LOOKUP searches.

Though not nearly as flexible as COMMAND mode, LOOKUP has a series of special error messages and Help screens. When the user keys in a response that is not valid, the LOOKUP system displays an error message, then repeats the prompt screen. The

Help command in LOOKUP displays a Help screen that is specific to the prompt screen the user sees, as illustrated in figure 3.

COMMAND Mode

The full range of MELVYL's features is available to the user in COMMAND mode. The command language was designed for the general patron, and with only a few search and display commands, even a novice can conduct a simple search. The more sophisticated commands allow the patron to search MELVYL more efficiently and in more depth. Only a few general rules must be followed:

- Each command entered must begin with a valid command word. The order of the words following the command word is flexible provided the order is unambiguous and logical.
- There may be only one command word in each statement. Command "stacking" (stringing together several commands in a single command statement) is not possible at this time.
- Any word in the command language may be truncated to three letters as long as no ambiguity results. Some common commands can be truncated to one letter, such as F for Find and D for Display.
- Any word in the command language may be used as a keyword in searching by surrounding it with double quotation marks. For example, "AND" in a command statement would be interpreted by MELVYL as a keyword rather than a Boolean conjunction.
- The RETURN key must be pressed to communicate a command to MELVYL. (The BREAK key will cancel a command.)

With the aid of the HELP/ERROR system, the user can learn the commands online, but printed guides are also available at the terminal. Learning by trial and error is easy in MELVYL since error messages tell the user both what went wrong and what to do next.

The FIND command

The FIND command is used to initiate a search. The BROWSE/SELECT commands (described below) are an alternate method of searching. The components of the Find command are:

FIND [index name] [keywords]

As described in the section on indexes (above), the index name is entered as a two-letter code: PA, CA, TI, UT, SE, or SU. For all indexes except the PA (personal author) index, MELVYL searches for each keyword separately.

For example, FIND TI EDIBLE PLANTS will retrieve books containing the keywords EDIBLE and PLANTS in the title (TI) index. Because in MELVYL "AND" is implied when two or more keywords are consecutive in a command, only books with *both* EDIBLE and PLANTS in the title will be retrieved in this case.

To search the PA index, the user may enter a name in direct order (first middle last) or inverted order (last, first middle). Initials may be substituted for any forename—MELVYL treats the initial as an implied truncation and will search for any forename beginning with it. The user may enter compound surnames in a number of ways as long as the end of the surname is either followed by a comma or comes at the end of the name. For example, all of the following searches will retrieve Ludwig van Beethoven:

FIND PA LUDWIG VAN BEETHOVEN
FIND PA VAN BEETHOVEN, LUDWIG
FIND PA BEETHOVEN, LUDWIG VAN

The user is allowed to search on the surname alone, but not on the forenames alone. Using the above example, the user can retrieve Ludwig van Beethoven by searching for BEETHOVEN but not by searching for LUDWIG.

Stopwords. A few words with very high occurrence but low retrieval value are treated as stopwords and are removed before the search request is processed. No words are stopped for PA index searches. The stopwords for the other indexes are:

For CA searches: AND, OF, ON, THE.
For TI searches: A, AND, IN, OF, THE.
For SE searches: AND, OF, THE.
For SU searches: AND.

Truncation of Keywords. The # symbol allows the user to search on word roots, such as BICYCL# for bicycle, bicycles, bicycling, etc. Any keyword may be trun-

cated to as few as two letters; however, if the surname of a personal name is truncated, no forenames can be included in the search. Only right-truncation is possible in MELVYL.

Boolean Searches. Boolean operators (AND, OR, AND NOT) may be used to combine indexes or keywords in a search request. If the user enters more than one operator in a search, MELVYL processes them in order from left to right within each index, and then from left to right across indexes. However, the implied AND is always processed first. At this time parentheses cannot be used in search formations.

Modifying Searches. Figure 5 shows how the secondary DATE index can modify a search result. The AT command then further limits the search to a particular campus.

The DISPLAY Command

With the DISPLAY command a user can see the bibliographic records retrieved from a search in any of four formats: REVIEW, BRIEF, LONG, and MARC. The components of a DISPLAY command are:

DISPLAY [record numbers] [display format]

For example, DISPLAY 1-200 REVIEW produces a listing in the REVIEW format of records 1 through 200.

Records in a search result are numbered consecutively. When specifying record numbers, the user may:

- enter the numbers separated by spaces or commas, e.g., 5 6 8 or 5, 6, 8
- insert a hyphen to indicate a range, e.g., 110-150
- enter the word ALL to indicate all the records
- enter the word LAST (or L) in a range, e.g., 95-L

If the user does not request specific record numbers, all records in the current search result are displayed beginning with the first record, and if the user does not request a specific format, the records are displayed in BRIEF (in LOOKUP mode, the default display format is REVIEW).

REVIEW format (figure 6) has a maximum of two lines per record and consists of the main entry, title, and date of publication. If the main entry and title are too long for the allotted space, the data is truncated, which is indicated by ellipsis (. . .).

The BRIEF format (figure 7) is the shortest display that includes call numbers. Consisting of the main entry, title, edition, imprint, and call numbers, it provides the patron with the basic information for identifying and locating a book. The format is compact so that more than one record can fit on a screen.

The LONG format (figure 8) is for the patron who needs more information about

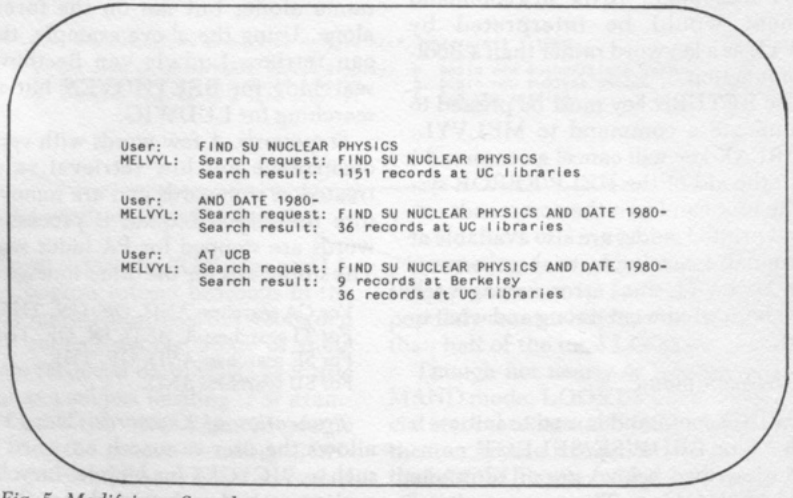


Fig. 5. Modifying a Search.

```
User:    DISPLAY 1-4 REVIEW
MELVYL:  Search request:  FIND SU IMAGINATION CHILDREN
         Search result:   4 records at UC libraries

1. Cobb, Edith, 1895-1977.  THE ECOLOGY OF IMAGINATION IN CHILDHOOD... 1977
2. Griffiths, Ruth.  A STUDY OF IMAGINATION IN EARLY CHILDHOOD AND ITS... 1970
3. Piaget, Jean, 1896-  MENTAL IMAGERY IN THE CHILD; A STUDY OF THE... 1971
4. Singer, Dorothy G.  PARTNERS IN PLAY : A STEP-BY-STEP GUIDE TO... 1977
```

Fig. 6. REVIEW Format.

```
User:    DISPLAY 3 BRIEF
MELVYL:  Search request:  FIND SU IMAGINATION CHILDREN
         Search result:   4 records at UC libraries

3. Piaget, Jean, 1896-
   Mental imagery in the child; a study of the development of imaginal
   representation by Jean Piaget and Barbel Inhelder, in collaboration
   with M.  Bovet and others.  Translated from the French by
   P. A. Chilton.
     New York, Basic Books 1971
       UCI  Main Lib  BF723.I5 P513
       UCSC McHenry   BF723.I5P513
       UCSD Central   BF723.I5 P513
       UCSD Cluster   BF723.I5 P513
```

Fig. 7. BRIEF Format.

the book—for example, the series statement for an interlibrary loan request. It contains the main entry, uniform title, title, series, notes, subjects, added entries, and call numbers. This display is arranged in paragraphs with each paragraph labeled for content.

The MARC display, not shown here because of its length, is a tabular format of the entire bibliographic record in MARC coding. It is for librarians and others familiar with MARC tags, indicators, and content designators.

Instead of requesting one of the display formats, the user may select portions of the MARC record by specifying field names or field tags. Examples of these commands are:

DISPLAY 2, 4, 9 PUBLISHER MARC
DISPLAY SUBJECTS
DISPLAY TAGS 600-650

The resulting display will include the speci-

```
User:     DISPLAY 3 LONG
MELVYL:   Search request:   FIND SU IMAGINATION CHILDREN
          Search result:    4 records at UC libraries

3.
Author:           Piaget, Jean, 1896-
Uniform title:    L'image mentale chez l'enfant. English
Title:            Mental imagery in the child; a study of the development
                    of imaginal representation [by] Jean Piaget and Barbel
                    Inhelder, in collaboration with M. Bovet [and others]
                    Translated from the French by P. A. Chilton. New
                    York, Basic Books [1971]
                  xix, 396 p. illus. 24 cm.

Notes:            Translation of L'image mentale chez l'enfant.
                  Includes bibliographical references.

Subjects:         Imagination in children.

Other entries:    Inhelder, Barbel, joint author.

Call numbers:     UCI  Main Lib   BF723.I5 P513  (CU-I)
                  UCSC McHenry    BF723.I5P513   (CU-SC)
                  UCSD Central    BF723.I5 P513  (CU-SCu)
                  UCSD Cluster    BF723.I5 P513  (CU-SCL)
```

Fig. 8. LONG Format.

fied fields (with MARC coding if MARC is included in the command), as in figure 9.

The BROWSE/SELECT Commands

The BROWSE command is used to review the access fields in an index. This is particularly useful for reviewing LC subject headings to discover new headings that might lead to more books. For example, the command BROWSE SU NUCLEAR POWER results in a display of the following subject headings:

1. Seabrook Nuclear Power Plant, N.H.
2. Shippingport, Pa. Nuclear Power Station
3. Space vehicles—Nuclear power plants
4. Space vehicles—Nuclear power plants—Addresses, essays, lectures
5. Stopping power (Nuclear physics)
6. Stopping power (Nuclear physics)—Congresses
7. Stopping power (Nuclear physics)—Handbooks, manuals, etc.
8. Stopping power (Nuclear physics)—Indexes
9. Three Mile Island Nuclear Power Plant, Dauphin Co., Pennsylvania

The SELECT command can be used to turn a BROWSE result into a search for the bibliographic records containing one or more of the retrieved headings. The user can select the headings by number, range of numbers, or by specifying ALL. Figure 10 illustrates the use of the SELECT command with the above BROWSE result to see the bibliographic records for the books with subject heading number 3, Space vehicles—Nuclear power plants.

A browse of the PA index results in a special display of name headings with cross-reference headings listed under the authoritative form of the name. For example, browsing the PA index for the mystery writer Amanda Cross produces the following display:

Browse request: BRO PA Amanda Cross
Browse result: 1 author name found in the personal author index

1. Heilbrun, Carolyn G., 1926-
   ALSO KNOWN AS:
   Cross, Amanda

The SET and RESET Commands

When a user begins a session, MELVYL automatically sets certain characteristics for the session. These sessions are known as system defaults. For example, MELVYL sets defaults for the library being searched (default: all UC libraries) and the display format (default: BRIEF [in COMMAND mode]). The user may override the defaults with the SET command, and return the parameters to the system defaults with the RESET command. For example:

SET LIBRARIES UCSF [retrieving only UC San Francisco records]

```
User:    FIND SU MAGIC
MELVYL:  Search request:  FIND SU MAGIC
         Search result:   324 records at UC libraries

User:    DISPLAY SUBJECTS
MELVYL:  Search request:  FIND SU MAGIC
         Search result:   324 records at UC libraries
         1.
         Subjects:        Magic

         2.
         Subjects:        Magic -- Great Britain
                          Witchcraft -- Great Britain

         3.
         Subjects:        Sociolinguistics
                          Names, Personal
                          Forms of address
                          Magic
                          Taboo, Linguistics
                          Euphemism

         etc.
```

Fig. 9. Displaying Portions of the MARC Record.

```
User:    SELECT 3
MELVYL:  Search request: BROWSE SU NUCLEAR POWER (SELECT 3)
         Search result:  4 records at UC libraries

User:    DISPLAY REVIEW
MELVYL:

1. Crouch, Holmes F.  NUCLEAR SPACE PROPULSION, BY HOLMES F. CROUCH.  1965
2. Lob, Horst.  KERNTECHNIK BEI SATELLITEN UND RAKETEN; NUCLEAR... 1970
3. Samaras, Demetrios G.  APPLICATIONS OF ION FLOW DYANMICS.  1962
4. SPACECRAFT CHARGE BUILDUP ANALYSIS, BY WILLIAM S. WEST AND OTHERS  1971
```

Fig. 10. Searching with the SELECT Command from a BROWSE Result.

RESET LIBRARIES [returning the default so that all UC records are retrieved]

The SHOW Command

The SHOW command allows the user to see the default settings in effect for the current session. In addition to SHOW SETTINGS, SHOW LIBRARIES, and SHOW FORMAT, SHOW MODE tells whether the user is in COMMAND or LOOKUP mode and SHOW SEARCH shows the last search request and the number of books retrieved. With the SHOW NEWS command, the user can read about the latest changes in the system.

The HELP/ERROR System

The HELP/ERROR system is a user-assistance system. It is crucial to the user-friendly concepts on which MELVYL is based. This system gives the COMMAND-mode user as much help as is needed in al-

most any situation. It also serves a tutorial function: users can teach themselves the command language simply by using the HELP commands. The system is composed of three parts: the HELP glossary, error messages, and unqualified HELP request messages.

The HELP Glossary

The glossary consists of approximately 140 terms related to MELVYL. The user can type HELP followed by a term, and if the term is in the glossary, MELVYL will display a screen explaining it. If the term is not found in the glossary, a message suggests that the user check the spelling of the request or type HELP GLOSSARY for a list of terms and their definitions. The system automatically records any terms the user asks about that are not in the glossary; these can be reviewed later by staff and added to the glossary if appropriate.

The glossary includes all of the terms in the command language as well as a number of terms that have special meaning in MELVYL (e.g., LOOKUP MODE, LONG SEARCH, or SECONDARY INDEX), terms that belong to library or computer jargon (HEADING, KEYWORDS, DATABASE), and terms that are necessary for an understanding of MELVYL (CATALOG, LIBRARY, AUTHOR).

Each glossary screen includes a list of related glossary terms for additional information. When possible, the screens relate to each other in a hierarchy or "tree" structure. The user can enter the "tree" at any point, and can move in any direction to broader, narrower, or related terms, but the response to each HELP glossary request is always just one screen. This keeps the user from having to wade through pages of text to find the one kernel of information needed. Figure 11, for example, is the response to the request HELP STOPWORD.

Error Messages

Error messages are simple, concise, and specific. To keep from annoying users who are experienced, no error message exceeds two lines. The message is as specific as possible, often including the data just as the user entered it. If appropriate, the error message suggests a HELP command that might aid the user in difficulty. Every effort is made to keep the messages positive, nonthreatening, and free of jargon. In figure 12 are some examples of error messages.

Unqualified HELP Requests

If at any point the user is unsure of what to do next, he or she may type HELP alone. MELVYL will respond with an explanatory screen tailored to the situation. If the user is not in an error situation, the screen consists of a description of the user's last

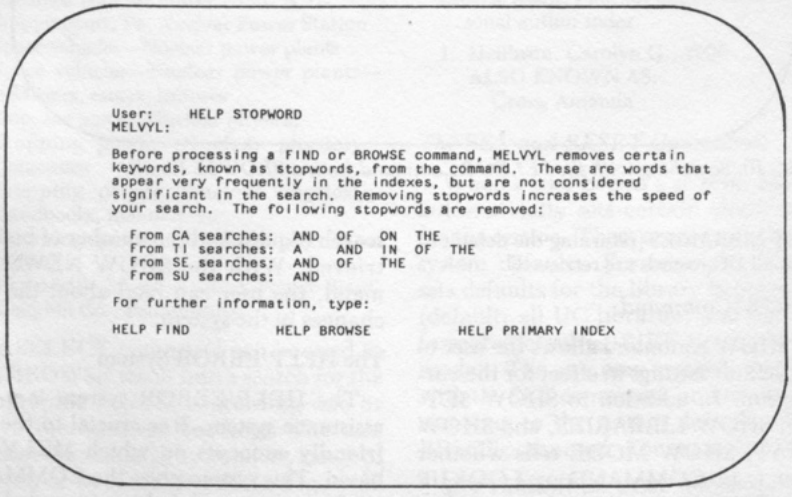


Fig. 11. A Help Glossary Screen.

action and its results, followed by a list of all the options available at that point. Each option includes a HELP glossary term with instructions that tell the user how to pursue that option. This is illustrated in figure 13. (Note that some of the data supplied by the user is inserted into the text of the HELP message.)

If the user has just made an error (and therefore received an error message), typing HELP results in an amplification of the error message, with suggestions for additional HELP requests (see figure 14). This is an aid to the novice, who can read the full HELP screen if needed.

If the user makes the same error three times in a row, the HELP/ERROR system automatically displays the HELP screen for that error condition, rather than just repeating the same error message.

MELVYL recognizes ninety-six error conditions as well as forty-four nonerror

```
User:    SET LIB
MELVYL:  You must supply a library name after SET LIB.
         Type HELP LIBRARIES for a list of valid library names.

                        * * * * *

User:    FIND TI AND OF THE
MELVYL:  Your search request consists entirely of stopwords,
         and cannot be processed.  Type HELP STOPWORD for
         information.

                        * * * * *

User:    HLEP
MELVYL:  You may not begin a command with HLEP.
         Type HELP VERBS for a list of valid verbs.
```

Fig. 12. Samples of Error Messages.

```
User:    HELP
MELVYL:

Your search,

FIND TI MYTHICAL MAN-MONTH

retrieved one book from Berkeley, and it has been displayed to you in
BRIEF format.  If you did not find what you were looking for, check the
spelling of your search.  Then be sure you are searching the correct
indexes.  Remember that the on-line catalog contains records for only a
small percentage of the books in the University.  Check your local
catalog for a more complete representation of the books in your library.

You may now:

Begin a new search - type HELP FIND for instructions.
Display your retrieved record in another format - type HELP DISPLAY or
  HELP FORMAT for more information.
Browse the indexes - type HELP BROWSE for more information.
See what your default settings are - type HELP SHOW for information.
Set or reset your default settings - type HELP SET or HELP RESET for
  more information.
End your session - type END to end the session.
```

Fig. 13. An Unqualified HELP Request.

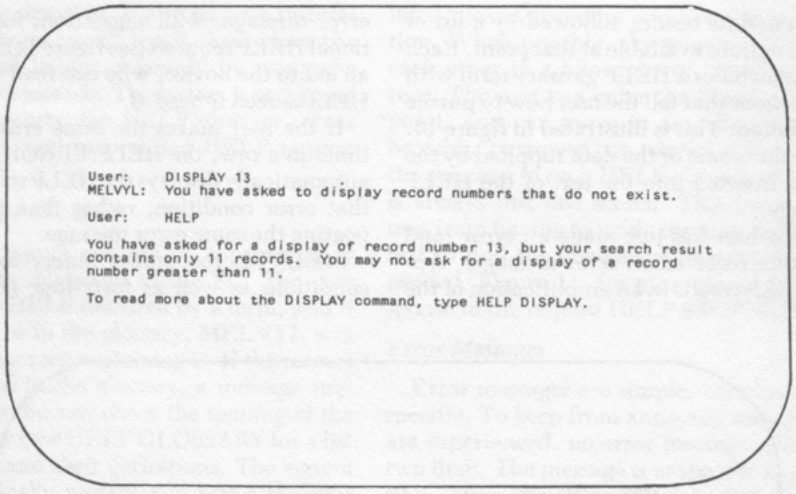


Fig. 14. Requesting HELP Following an Error Message.

situations for which a user might type HELP alone, such as:

> Search completed by FIND, no retrievals
> Search cancelled by BREAK

Many of the nonerror HELP screens can be varied according to the user's specific request. The information is inserted into the screen just before it is transmitted to the user's terminal.

Printed Materials

Printed materials are an important part of the patron interface—they complement the online instructions and HELP/ERROR messages. The documentation for MELVYL includes:

Users' Guide. Fan-folded to a quarter of letter-size paper, this guide is a ready reference for searching for books in MELVYL. It includes a "Quick Guide" that summarizes the command language.

Reference Manual. The manual for the prototype MELVYL has a detailed description of all commands, including those not normally used by library patrons and therefore not included in the *Users' Guide.* The manual also describes how MELVYL processes search commands and how the database and the retrieval system are constructed. The appendixes contain details of fields used in each of the display formats, descriptions of the normalization routine applied to search requests, the contents of each of the primary and secondary indexes, and a list of names and codes that can be used to change library settings for libraries searched.

DLA and campus library staff have also introduced MELVYL to the public through press releases and signs on and near the terminals, and individual campuses have developed supplementary printed materials and have organized demonstrations of MELVYL.

THE NEW MELVYL TO COME

MELVYL is undergoing some significant changes. Some of these will become visible when the prototype catalog moves into production status in late 1982, others will be added over the following year.

The most important change will be in the size and design of the database. The production catalog will open with more than 2 million monograph records and it will be updated nightly or as often as DLA receives LC records and records from RLIN and OCLC input by UC campuses. The new database design reduces redundant storage of information to accommodate the significant increase in the number of records, the update functions, and an enhanced authority control subsystem.

Based on the extensive statistical evaluation of catalog use and suggestions from li-

brary staff and patrons, the patron interface is being modified and improved. Although MELVYL users have expressed much satisfaction with the system, only a few patrons use its full capabilities. The majority are still using LOOKUP mode without realizing how easy it is to learn COMMAND mode. A majority of searches are for subjects, but the BROWSE feature is seldom used, even though it was designed for improving subject access. Plans for improvement include development of a tutorial mode, better printed materials, improved online instructions and messages, and enhancement of the command language.

Other new features that are planned for MELVYL are:

- Additional Access Points. Several secondary indexes will be added: language of publication, country of publication, dissertation indicator, and government publication indicator. For technical processing purposes, indexes will be added for OCLC, RLIN, and local system numbers.
- A New Author Command. The command FIND AU will be added to COMMAND mode. It will combine the PA and CA indexes so that the user will no longer have to distinguish between personal and corporate authors. (This combined search is already available in LOOKUP mode.)
- Exact Search Function. Exact searching will be implemented for TI, CA, and SU keyword searches. The user will be able to specify the exact words of a title, corporate author, or subject heading and retrieve only exact matches. For example, an exact search for WAR AND PEACE would retrieve Tolstoy's novel *War and Peace* and any other books with only those words in the title and in that exact order. Currently, only the keyword search is available, which would retrieve all titles with the words *war* and *peace* in them in any order, such as "Australia in Peace and War." The user will also be able to truncate exact searches so that all titles *beginning* with the specified words will be retrieved. In this case a request for WAR AND PEACE# would retrieve a title such as "War and Peace Aims of the United Nations" and any others beginning with the words "War and Peace" (including Tolstoy's novel).

MELVYL's goal is to help all patrons of the University of California libraries in their quest for library materials. Modifications will continue as the catalog grows, reflecting the changing needs of the libraries as MELVYL replaces the card and microfiche catalogs.

REFERENCE

1. University of California, Office of the Executive Director of Universitywide Library Planning, *The University of California Libraries: A Plan for Development, 1978–1988* (Berkeley: The University, 1977). ■■

Building a Merged Bibliographic Database: The University of California Experience

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Teresa L. Montgomery: bibliographic analyst

It was known from the beginning that the database for the University of California On-Line Union Catalog would be large. The 1977 master plan, which first proposed the creation of the catalog, projected a database of 6 million records by 1985–86.[1] Because of the magnitude of the project, manual intervention in the creation of the file was not viewed as practical. The goal was to design a system that would create and maintain an accurate database and that would do so automatically. Resources were to be spent on sophisticated processing techniques rather than on labor-intensive editing procedures.

The database-building scheme had to take into account the fact that records would come from a number of systems including OCLC, RLIN, LC, and local UC files. The number of contributing libraries was expected to be large. There are nine UC campuses, but because there are nu-

merous independent libraries and affiliated organizations within the UC system, the number of cataloging units was expected to be as high as forty. (It is the cataloging unit rather than the campus or individual library that contributes records to the union catalog.) All records currently accepted for inclusion in the catalog are fully coded MARC-format monograph records, but they have many differences in representation of local data, profile conventions, and so forth.

Building the union catalog database (UCDB) was the first step in the On-Line Union Catalog project. Several databases were built to be displayed first on microfiche and later in experimental online catalog databases. As development progressed, changes were made to increase the sophistication of the processing system. The culmination of this development process is the continuously updatable production catalog to be implemented in late 1982.

This article focuses on three critical areas in building a union file. The first is the development of a local record format with standard content designation for data received from different technical processing systems. The second is the maintenance of data when update records are received, and the third is the development of the merged union catalog record.

STANDARDIZING INPUT DATA

Quite early it was decided that the best way to deal with diverse input streams with different characteristics was to translate them all into a standard record format. The first priority was to manipulate input data so that it could be processed in a common technical environment. For example, RLIN, OCLC, and LC extensions of the ASCII character set were translated into EBCDIC with consistent representations for the extended ALA character set. Also, the physical format of the records was converted to an IBM standard varying block format.

The union catalog was to carry detailed shelving location information rather than merely designating what library held a title. For this reason much effort was devoted to developing a coding scheme for various location data that would support the creation of a standardized holdings display. The location "Reference," for example, could appear before or after the call number, in full or abbreviated form, and in upper- or lowercase in local catalogs. It was necessary to develop a convention for storing holdings data in a uniform way even though contributors might have different conventions in their local card catalogs. Letters or symbols not readily recognized as words that precede the class number in the campus record are designated as call number prefixes. All other automatic or input location stamps, such as Reference, are standardized and designated as additional sublocation information. They display after the call number regardless of local display conventions.

In the first test database, the 090 call number field was expanded to carry most location data. The following subfields were defined to carry the data.

- $a Class number—LC-like call number
- $b Book number—LC-like call number
- $c Free-form call number. If divisions within call number are known, each portion of call number is placed in a separate $c.
- $d Call number prefix
- $e Campus name
- $f NUC code
- $g Primary sublocation
- $h Additional sublocations (repeatable)
- $j Holdings information note

From these data elements a holdings display was designed, shown in figure 1. This pattern for displaying local holdings information has proved quite versatile and few revisions have been required.

In addition to the holdings information, the 090 field at first contained the following data:

- $p Part or volume information (stored as input, maintaining OCLC or RLIN coding conventions)
- $q Acquisition number
- $r Circulation system number
- $s Other campus number

These subfields were added primarily for reference by library staff and could be seen only in the MARC display seldom used by the public.

It was soon clear that this expanded 090

UCI Main Lib	Z5939 .A73 Ref Oversize
UCLA Art	*Z5939 .A512c
UCR General	Z5939 .A75 Ref
UCSB Arts Lib	Z5939 .A73 1979 Arts Ref

Fig. 1. Sample Holdings Display.

field did not deal adequately with copy and volume information nor with the local notes or numbers associated with a single copy or volume of the work. Some data from input records, especially from the RLIN system, were lost in this scheme. For this reason a new hierarchical record structure has been adopted for the forthcoming production database. It was felt that this structure would be most advantageous for organizing the information of numerous cataloging units in a merged file. Five different record segments were developed, as shown in figure 2.

- Bibliographic Segment. This segment contains the information about the bibliographic work and follows the U.S. MARC content designation for fields 00X–8XX.
- Maintenance Segment. This segment contains the control numbers and dates necessary to correctly update each record received from campus input. There is one maintenance segment created for each OCLC, RLIN, or other record entering the UCDB.
- Holding Segment. Library location code, call number, summary holdings information (if provided), and location level notes are stored in the holding segment. Each holding location received in an input record is placed in a separate holding segment. Thus, a maintenance segment may have more than one holding segment following it.
- Copy Segment. Each copy segment represents a single copy number. Included in the copy segments are copy level notes and copy-specific call numbers.
- Volume Segment. The volume segment carries information used in the control of the physical piece both for multivolume and single-volume works. It includes acquisitions numbers, circulation system numbers, status information, and so forth. The volume segment represents a single volume or a volume range that is treated as a unit.

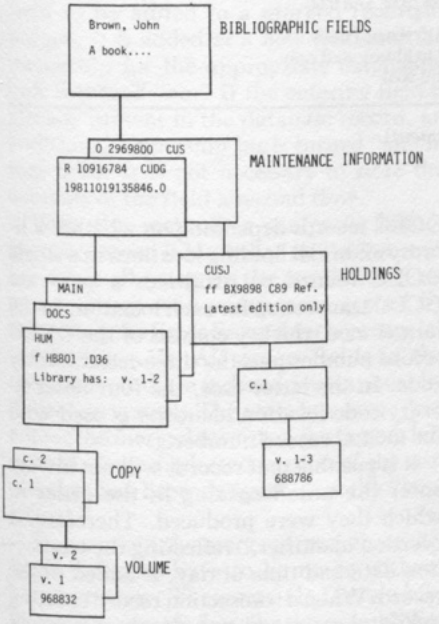


Fig. 2. Record Structure.

The bibliographic, maintenance, and holding segments are required in every input record. The copy and volume segments will not be created when the incoming record has no information at that level of detail. It is possible to have volume segment information without a copy segment when no copy information is provided in the input record. Figure 3 lists the presently defined 9xx fields that make up the local data portion of the UCDB record. (Data elements are listed as represented in the MARC communications format and not as actually stored in the UCDB.)

All records received for addition to the union catalog are translated into this DLA extension of the MARC format. Local data is stored in a separate local data file record consisting of maintenance, holding, copy, and volume segments. Data describing all copies of a work are placed in the bibliographic file. With all records in the same format, it is now possible to begin to merge them into a single database.

MAINTENANCE OF RECORDS

Upon entering the database, previous

BIBLIOGRAPHIC SEGMENT

000		Leader codes
001	$a	UCDB record number
	$z	Previous UCDB record number
00x–899		Base record fields–variant fields

MAINTENANCE SEGMENT *R*

901	$a	System source code (R—RLIN, O—OCLC, etc.)
	$b	System number
	$c	Location code
	$d	Bibliographic format code
902	$a	Version identifier (date & time of transaction)
903	$a	Cataloging unit
904	$a	Date of campus 'first time use'
	$b	Date(s) of campus revision(s) *R* (keep last two)
906	$a	Date of input to UCDB
	$b	Dates of replacement in UCDB *R* (keep last two)
908	$a	Cataloger's/keyer's initials
909	$a	OCLC 910 fields information
910	$a	Local system number *R*
915	$a	Nonprinting notes *R*
919		Reserved for DLA error handling *R*

HOLDING SEGMENT *R*

920	$a	Location code
922	$a	Campus (display only)

HOLDING SEGMENT *R* (cont.)

924	$a	NUC code (display only)
926	$a	Primary location (display only)
928	$a	Call number prefix
930	$a	Call number, class portion
	$b	Call number, book number portion
	$c	Call number, unformatted *R*
932	$a	Additional sublocation/input stamps
934	$a	Summary holdings note
935	$a	Other local notes *R*
939		Reserved for DLA error handling *R*

COPY SEGMENT *R*

940	$a	Copy number
942	$a	Copy call number, class portion (if present)
	$b	Copy call number, book number portion (if present)
	$c	Unformatted call number
948	$a	Other copy level notes *R*
959		Reserved for DLA error handling *R*

VOLUME SEGMENT *R*

960	$a	Volume designation
	$b	Volume number
	$c	Volume designation/number
961	$a	Acquisition system number
962	$a	Circulation system number
964	$a	Volume status notes
965	$a	Other volume level notes *R*
969		Reserved for DLA error handling *R*

Indicators:

1st 0 = Automatically generated from coded input data
1 = Keyed by campus
(valid for tags 922, 924, 926, 928, 932, and 934)

2d 0 = Field to be displayed to general users
1 = Field to be displayed to library staff only
(valid for tags 934, 935, 948, and 965)

*Fig. 3. Data Elements (*R* = Repeatable Data Element).*

versions of incoming records must be identified and eliminated. Data in the maintenance segment is used to match superseded and current versions of the record.

Records are updated in the UC union catalog by replacing the full record. A transaction record from OCLC, RLIN, or LC replaces a previous version of that record in the database. In order to update records correctly, a maintenance key is derived for each record. Records with the same key are assumed to be two versions of the same record. For LC records, this key is the LCCN. For RLIN records, the key consists of the RLIN record number, the library identifier, and the format code.

There are two types of keys created for OCLC records depending on whether a library enters all holding locations in a single OCLC record or produces a separate OCLC transaction for each location. In the former case, the key consists of the OCLC record number plus the three-letter library code. In the latter case, the four-letter library code/location identifier is used with the OCLC record number.

It is possible that records will not always enter the union catalog in the order in which they were produced. Therefore, a "version identifier," reflecting the transaction date and time of day, is added to the record. When a transaction record entering the database matches a database record's maintenance key, the version identifiers

are checked to determine which record is the latest record.

MERGING OF RECORDS

Each incoming record must also be compared to all the existing records in the database to see if it represents the same bibliographic entity as any of them. If it does, the records must be merged.

Records that are determined to represent the same edition of the same work are merged so that a composite record is created. This contrasts with some systems where only one version of a record is allowed, and with other systems where each contributor's records are kept in separate files. Although independently developed, the DLA design is similar to the RLIN clustered database concept. In the composite record, there is a single bibliographic segment that contains all the unique 000–899 field data from the various original input records. When two records contain identical fields, the field is stored only once. Each field in the union catalog record has a string of ownership bits associated with it. Each bit in the string represents a cataloging unit contributing records to the database and is either "on" or "off" (one or zero). When a field to be added to a merged record is unique, it is added as a new field and the ownership for the appropriate cataloging unit is turned "on." If the entering field is already present in the database record, an additional ownership bit is turned "on" in that field. It is not necessary to store the contents of the field a second time.

With this method, a composite bibliographic record is built that minimizes storage while allowing for the possibility of reconstructing each component record by extracting the fields flagged for a particular cataloging unit. All access fields in the merged record are indexed for retrieval by the online system. The user, however, does not see the merged record on the screen, but instead views a selected version of the record that has been designated as the "base record."

To carry out the merge process three difficult decisions have to be made without human review. These are: (1) Do two bibliographic records describe the same bibliographic entity? (2) Which of the components in a merged record is the best record to designate as the base record and to display to the general user? (3) Are two fields (from the records being merged) similar enough that only one of them needs to be stored in the database? If the fields are almost alike but are not identical, which one should be preserved?

Consolidation Key Algorithm

In early versions of the union catalog, the database was constructed sequentially and match keys were used to determine which records should be merged. Match keys consisted of a series of characters extracted from data elements in a bibliographic record. A two-step approach identified which records should be combined. In step one, a key was constructed consisting of the LCCN and truncated title. The truncated title consisted of the first ten characters of 245 $a excluding initial articles. Records that matched on LCCN/Short Title were considered to be the same entity. A further comparison of records was made on a more complex consolidation key. When two records had identical keys, they were considered to be the same entity and were merged.

The consolidation key was constructed by extracting data from a number of fields in the bibliographic record.[2] All data in the keys were normalized for capitalization, abbreviations, and spacing. The consolidation key consisted of the following elements:

1. Main or added entry. Forty characters were extracted from the 1xx field or, if no 1xx field was present, from the first 7xx field. Different algorithms were used for personal name, corporate name, conference name, and uniform title fields.
2. Title. The first twenty and last ten characters from the 245 $a and $b were extracted.
3. Date. The date in positions 7–10 of the 008 field was used.
4. Publisher. After excluding common words, the first twenty characters were extracted from the first 260 $b.
5. Edition. The first numeric string from 250 $b or, when no numerics were present, the first ten characters were used. Words such as *edition* were omitted.

6. Pagination. The largest numeric string from 300 $a was extracted. It was rounded off to the nearest ten pages if it was greater than ten.

This consolidation approach was quite successful considering the simplicity and rigidity of the system. Only rarely did we find records merged incorrectly, and this most often occurred when the match was based on LCCN/truncated title. It sometimes happened because derivative cataloging for different editions of a work was done from the same LC record without changing or deleting the LCCN from the record for the variant edition. It also occurred when the publisher incorrectly used the LCCN for an earlier edition in an updated edition. Although extremely rare, we did observe a few false merges based on the full consolidation key. In one case the only difference between records was the place of publication, London versus New York. In this case, the algorithm did not successfully separate the British and American editions. In testing the consolidation key algorithm designed for records without LCCNs, we also uncovered a few instances where all the data matched except the middle of the title. For example the following two titles have identical publication information, date, and paging:

Better homes and gardens deck & patio projects you can build.

Better homes and gardens storage projects you can build.

Failure to merge like entities was a more serious problem than incorrect matches; a minor variation in any of the data incorporated in the key was all that was required to keep two records for a work apart. Such differences were fairly common, especially in representing publishers' names.

Weighted Consolidation Scheme

Three elements led to the decision to change our consolidation procedure for the production database: a desire to refine our consolidation of records, a change in our database design, and the possibility of direct access processing. A weighted scheme was selected because it would allow records to merge if they reached a designated score even if there were minor variations in the way data were recorded. Also the scoring system can be continually revised and refined based on experience.

The new scheme uses the same data elements listed above (LCCN, author, title, date, publisher, edition, and pagination). In addition, ISBN and place of publication are taken in to account. Different kinds of matches are defined for each of these elements. A weight is assigned based on how closely elements match and how effective they are in discriminating between works.

The degree of similarity between two records is determined by accumulating weights as their fields are compared. When the matching score or weight reaches a predetermined level, the records are consolidated.

Because of the threshold concept, it is desirable to compare fields in an order based on their accuracy in identifying the bibliographic entity and their efficiency for processing.

Steps in Record Matching Using a Weighted Scheme

As a new record is received, the entire database is searched for records with corresponding LCCNs, ISBNs, or truncated title keys. Records from the database that match the incoming record on any of these elements are placed in a record pool of potential matches for further consideration. Two conditions that would preclude the matching of these records are examined next: if the dates (008 position 7–10) differ by more than two years, or if there is a numerical or ordinal expression in the edition statement of both records that does not indicate the same edition, the records are eliminated from the initial pool.

Records remaining in the pool now have weights assigned to them for date and numerical edition match. The next step compares LCCNs and titles. LCCNs are considered to match or not match. Titles, however, can have different degrees of match. Partial matches occur when one title is embedded in the other or when some, but not all, keywords in the titles match. At this point, the weight total for each record in the pool is checked again to see if the weight is high enough to guarantee a match.

If the merge threshold has not been reached by any record after the title match, then the remaining data elements are matched in the following order: author, pagination, country of publication, ISBN, and publisher. The weight is checked against the threshold after each additional data element is matched. When the threshold is reached, comparison ceases. If all data elements have been checked without reaching the threshold, the pool record is considered a nonmatch. Pool records having weights that are near the threshold are designed for review by DLA staff. The review is used to further refine the weights given to various data elements and to determine the optimum threshold for determining that consolidation should occur.

The weighted scheme improves the chances that like records will match without increasing the number of incorrect matches appreciably. The ability to identify partially matching data elements is a key factor in increasing the accuracy of consolidation. A character-by-character match is always checked for first after normalizing spacing, punctuation, capitalization, etc. If the exact match test fails, two techniques are used to determine partial matches. One of these is examination for an embedded match. When one version of a field is contained in the other version, an embedded match occurs and a positive score can be given. This is particularly useful in comparing titles or publishers' names that differ in fullness. Using the embedded match principle one can give some positive score when comparing the publisher "McKay" and "McKay and Sons." In an exact match key situation, this is not possible.

A review of the commonality of keywords between two fields is a second method of determining whether two fields have a positive relationship. Take, for example, two representations of a title:

English speech rythm and the foreign learner
English speech rhythm and the foreign learner

Although the misspelling of *rhythm* keeps the titles from matching exactly and neither is embedded in the other, they do contain enough common keywords to give them some positive consideration. For numerical data, partial credit can be given for near matches based on the numerical differences in their values. Two collations recording 299 pages and 301 pages can be given a higher score than two collation statements that show more disparity in paging. (To enable near matches to be identified, paging is no longer rounded off, as had been done in the earlier consolidation key approach.)

Determining which records should merge is a key function in the creation of the UC union catalog database. A weighted scheme offers substantial advantages over a simple key match. However, design of a merging algorithm that is 100 percent effective is probably not feasible given the almost unlimited possibilities for variations in the representation of bibliographic data. Even manual review of two cataloging records may not be sufficient to resolve the question without examination of the physical volumes.

Identifying Matching and Varying Fields

When it has been determined that two records should merge, the bibliographic segments of each record are combined into a single bibliographic record. Each field in the incoming record must be compared with those in the existing record to determine whether they are the same. If they are, the ownership bit flag for the cataloging unit that created the incoming record is turned "on" in the matching field in the database record. If they are not, a new field must be added with the appropriate bit flag turned "on."

In the first union catalog database any variation between two fields caused them to be stored twice in the merged record. Fields were compared character by character as they were input. It was soon discovered that data fields were often redundantly stored because of inconsequential differences such as the presence of a trailing blank in one of the two fields. As an interim measure, leading and trailing blanks were eliminated in all subfields and trailing hyphens and periods were eliminated at the ends of fields before fields were compared. This reduced the number of instances where intellectually identical data were stored twice.

Before taking more drastic measures to eliminate storage of unimportant variant data, a study was undertaken to answer two questions: (1) What impact is the storage of variations having on the storage space required for the database? (2) How much storage space could be saved by normalizing data before comparing fields?

A statistical study showed that variant data accounted for 12.66 percent of the size of the union catalog database. In some cases variant fields contain important data such as added access points that should be preserved in the merged record. In other cases they contain less critical differences in spacing, punctuation, or capitalization while the intellectual content of two fields is the same. The rate of variation that was discovered indicated that it was worthwhile investigating ways to reduce needless storage of variants. At the same time the rate was not high enough to warrant elaborate steps that would significantly increase processing time and costs. In a database of 733,412 records (426,192,816 characters), just under 90 percent of the variant data was found to be in the fields shown in table 1.

Printouts of sample variations from the fields in table 1 were examined, and as a result several simple algorithms were developed and tested for their effectiveness in identifying fields with minor variations so they could be eliminated from the database. By normalizing certain data in the fields before fields were compared, it was possible to ignore minor differences and declare that the fields matched. Table 2 shows the effect of normalization of various data elements when this was performed on fields that had already had trailing blanks and ending punctuation normalized.

Table 1. Variant Data Statistics

Tag	Total Characters in Variant Fields
008 (Fixed length data elements)	6,323,881
020 (ISBN)	805,220
050 (LC card number)	643,356
100 (Personal author)	755,362
245 (Title)	11,098,249
260 (Imprint)	3,830,982
300 (Collation)	2,417,992
440 (Series—traced)	1,471,068
490 (Series—untraced, traced differently)	3,020,392
500 (General note)	5,946,093
504 (Bibliography note)	1,064,211
505 (Contents note)	2,735,679
650 (Topical subject)	3,820,275
700 (Added entry—personal name)	1,424,517
710 (Added entry—corporate name)	677,057
740 (Added entry—title)	707,458
810 (Added entry—corporate series)	1,388,277

Table 2. Normalization of Variations Test Results

Data Normalized	Percent of Variant Fields Eliminated
Punctuation	2.5
Umlauts	.2
Ampersands	.1
Diacritics	2.9
Spaces	1.9
Capitalization	1.9

When all the algorithms were performed together, 14.3 percent of the variant fields were eliminated. The improvement was greatest for nonrepeatable fields such as 1xx, 245, 250, and 260. Twenty to thirty percent of the variant fields were eliminated for these tags. As expected, there was less improvement in repeatable fields where variations were more likely to represent different intellectual content.

Once a good picture was obtained of the extent, causes, and possible treatment of variant fields in the UCDB, the next step was to present this information to a committee of contributors to the catalog. The committee reviewed DLA's proposals to determine whether they were willing to have their data replaced with a field from another record that differed from theirs in the areas described above. Only one revision was made as a result of this review. Some campuses were reluctant to eliminate different use of diacritics unless the retained field came from the Library of Congress. Because varying the rule according to the source of the field presented operational difficulties, it was decided to maintain variant diacritical representations in the database.

The algorithm in figure 4 was developed for creating a key for use in comparing fields to see if they matched. The changes described are only made when fields are compared. The fields retained in the database are kept as they were received, not as they were normalized. The comparison key consists of the entire field including indicators, subfield delimiters, subfield codes, and text. When the normalized fields match, the version coming from the record with the highest base record weight is kept (the assignment of base record weight is described in the next section).

Some variant data is handled in other phases of union catalog processing. Variations in name headings are controlled in the union catalog's linked authority file. Notes that are created to meet local card catalog needs such as "For full information see main entry card" are removed during input record processing. Abbreviations in access fields are handled by indexing both the full and abbreviated fields rather than by standardizing the form in the record. Thus U.S. is indexed under both *U.S.* and *United States*.

Determining Base Record

The union catalog database often contains merged records consisting of multiple components. The library patron, however, needs to see a single coherent record. One of the component records in the composite record is designated as a "base record," and this is the record displayed to the user. Access fields from both base records and other records are used to retrieve the record through the catalog's indexes.

In the first UC database the LC MARC record was always designated as the base record. The LC MARC database is maintained as part of the UC union catalog, although it is not retrieved by the general user unless there is a UC library that holds the title. The preference for LC records was quickly refined to exclude Cataloging in Publication (CIP) records, since they generally lack full data available in the corresponding campus record. In records with no LC component, the base record was the first record received. As the database grew, we foresaw a need for a more discriminating approach to the selection of the record

1. Change ampersand to 'bandb.'
2. Change lowercase alphabetic characters to uppercase.
3. Punctuation: Eliminate left brackets.
   Change other punctuation to blank.
4. Change fill character to blank. (Fill characters indicate that a value has not been supplied.)
5. Change field and record terminators to blank.
6. Remove leading and trailing blanks in all subfields.
7. Reduce multiple blanks to one blank.
8. Remove delimiter, subfield code 'e,' and text within the subfield in the following fields: 100, 110, 400, 410, 600, 610, 692, 693, 696, 697, 700, 710, 796, 797, 800, 810, 896, 897. (This subfield contains relator information.)

When LC is included in a merged record, any 050 (LCCN) fields contributed by other libraries are eliminated.

Fig. 4. Variations Comparison Algorithm.

to be viewed by the public. For example, we did not want to display a brief record when a fuller one was available.

Again we felt that a weighting scheme was desirable. It would allow us to look at a number of characteristics of the record and to adjust our scoring and thresholds as we gained experience or as conditions changed.

A "base record weight" is now assigned to each record before it enters the database. It is calculated from the following information:

1. The source of the record as reflected in the cataloging unit bit. LC records are given precedence.

2. Encoding level. Precedence is given to more complete encoding.

3. Descriptive cataloging level. High scores are given to AACR2 records, lower scores to non-ISBD records, and so forth.

4. Error conditions. Negative score is given to records when any error conditions are detected in the record. Errors in the DLA system can be of different severities and the severity level is reflected in the score assigned.

Consideration was given to using the newly defined 039 field that indicates the level of bibliographic control and coding detail in a record. This idea was rejected for the time being because the field may not be present in the record or may not reflect upgrading by the cataloging unit that most recently used the record. Although use of the

039 field has been deferred, we will consider it again when it becomes widely available.

SUMMARY AND CONCLUSIONS

The current fiscal climate has fostered increased interest in resource sharing among libraries. At the same time inadequate funding has endangered many existing union list activities that are based on labor-intensive centralized union card catalogs or manually edited and merged machine-readable lists. The UC experience demonstrates the feasibility of an alternative, the creation of a unified union catalog database from diverse input sources without manual intervention.

A sophisticated software package is required for processing and merging records automatically. From 1978 to 1982, basic procedures for creating a bibliographically accurate union catalog database have been continually upgraded. The composite database record contains all the significant data from component input records without redundant storage of like data. The advantages of this approach include minimizing storage requirements and preserving records as input by each source (1,359,521 holdings were consolidated to form a 733,412-record database in the prototype union catalog). Merging all records for the same item, selection of a "base record," and linking to a name authority file also allow the user to see the union file as a single integrated catalog.

The creation of the UC union catalog has demonstrated the continuing need for development and implementation of standards for cataloging records. The current system would not be possible without an input stream of fully coded MARC-format records. The need for a consistent database is so important that the University of California libraries have recently agreed to a standard mandating the minimum-level record that will be accepted into the union catalog system.

The lack of standards for the transmission of local holdings data has been a continuing roadblock to developing simple and efficient processing of input records. Although a system has been developed for the common representation of local data in the UC union catalog database, the amount of processing required to translate all records to this format is a drain on resources that could be better spent in other areas. Development of a national standard for holdings data is eagerly awaited.

Currently many libraries are considering the creation of databases for resource sharing. In creating bibliographic records, resource-sharing needs must be considered in tandem with the requirements for local databases if multi-institutional files are to be built successfully.

REFERENCES

1. University of California, Office of the Executive Director of Universitywide Library Planning, *The University of California Libraries: A Plan for Development, 1978–1988* (Berkeley: The University, 1977), p.70.
2. For a fuller discussion of initial consolidation procedures, see Katharina Klemperer, *Bibliographic Specifications for Consolidation of Records* (Berkeley: Univ. of California Division of Library Automation, July 1978), 27p. ■■

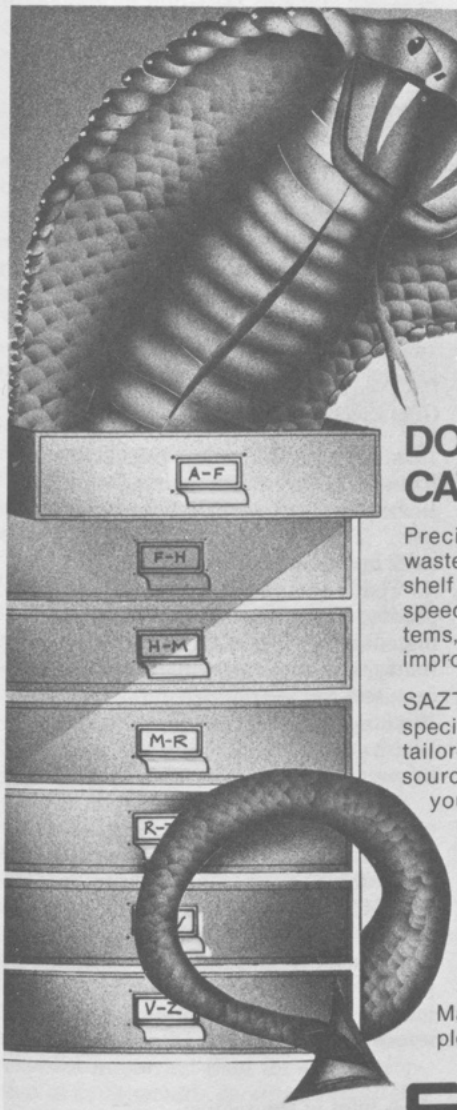
EDITOR'S NOTES

Integration

If we are moving into the age of integrated library systems, does that mean our current systems are properly described as disintegrated library systems?

Library Symbol 

Does anyone else find it amusing that ALA seems to feel a nonverbal symbol is more effective in identifying libraries than the word "Library"?



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News and Announcements

Special *LRTS* Automation Issue

The January/March 1983 issue of *Library Resources & Technical Services* will focus on questions of online public catalog access.

Papers from the July 1982 ALA preconference, "Prospects for the Online Catalog," include: "The Catalog as Access Mechanism," by Patrick Wilson; "Characteristics of Online Public Catalogs," by Stephen R. Salmon; "Technology and the Online Catalog," by Peter S. Graham; and "The Human Dimension of the Catalog," by Leigh Estabrook.

From the 1982 Annual Conference program, "Subject Analysis in the Online Environment," sponsored by the RTSD CCS Subject Analysis Committee, are: "Use of Classification in Online Retrieval," by Elaine Svenonius; "Practical Considerations of Current Capabilities of Subject Access," by Anne G. Lipow; and "Futuristic Aspects of Subject Access," by Phyllis A. Richmond.

"A New Information Access Tool for Children's Media," by Theodore C. Hines and Lois Winkel, completes the issue. ■■

Great Expectations: Vendors vs. Users

Vendor support of automated library systems is the Midwinter ALA theme for LITA's Vendor/User Discussion Group. The discussion group will meet between 9:30 and 11:00 a.m. on Sunday, January 9. The program has been titled "Great Expectations: Ongoing Vendor Support of Automated Systems." Both users and vendors will speak out on their conceptions of the appropriate support role in the automation environment. Nancy L. Eaton, director, University of Vermont Libraries, will give a presentation from the user's perspective. Richard H. Goldberg, president of CL Systems, will present the vendor's point of view. The presentations will be followed by a discussion of the problems and issues concerning ongoing vendor support. James H. Kennedy of AMIGOS will summarize the group discussion. ■■

U.S. News Washington Letter Goes Electronic Over THE SOURCE

In its first electronic edition, the *U.S. News Washington Letter* advised subscribers to THE SOURCE to "buy stocks now." The very next day, August 17, the stock market went through the roof.

"That is how electronic publishing is supposed to work," says Taylor Walsh, managing editor of THE SOURCE, "providing timely, important information that people can use." Not every story in the *U.S. News Washington Letter* may be quite as timely, Walsh admits, "but it is just the sort of vital information our upscale subscribers want."

A dozen or so brief stories on investment opportunities, economic trends, and key government activities are carried by the *Letter* each week. Subscribers to THE SOURCE can read the week's *Letter* as early as 8:30 a.m. every Monday morning. Each issue contains the same stories as the printed version, organized in a "menu" format for simple selection over a terminal screen. ■■

ALA Joins in Interactive Home Information System

Reviews of new adult and children's books, drawn from *Booklist* and *Openers*, publications of the American Library Association, will be included in Viewtron®, an interactive home video information system. This videotex system, which allows subscribers to interact with a variety of electronic databases through their television sets, telephone lines, and a special keyboard decoder, will have its commercial in-

troduction in mid-1983 to 5,000 homes in the southern Florida counties of Dade, Broward, and Palm Beach.

Booklist, ALA's semimonthly reviewing journal for library book selectors, and *Openers*, a tabloid newspaper on current authors and reading for public library patrons, both highlight recommended books and other media for children, young adults, and adults. Selections from each issue of these publications will form a database of book reviews, available to Viewtron® subscribers along with news, weather, sports, and financial information, and a variety of consumer services including shopping, entertainment ticket orders, travel arrangements, and games. The reviews will be indexed and made available through various access routes or "menus," in screen displays specially designed for the ALA book-review file.

Viewdata Corporation of America, Inc. (VCA), of Miami Beach, a subsidiary of Knight-Ridder newspapers, is the developer of Viewtron®. VCA will provide regular reports to ALA of usage, comparisons with other features in the system, and specific response to ALA's reviews. ■■

iNet® Trial Begins

The Computer Communications Group (CCG) of the TransCanada Telephone System began the iNet Gateway trial on July 12, 1982. In total, twenty-six libraries are participating in the trial. Of these, the primary group of six institutions, the Bibliographic Common Interest Group, is providing databases for the trial. Their objective during the one-year trial period is to collect important data for the development of a nationwide decentralized bibliographic network. By using the value-added network services of iNet as a vehicle, the Bibliographic Common Interest Group will link up incompatible systems and test the interchange of bibliographic information among them.

In the iNet Gateway trial, Bibliographic Common Interest Group participants are utilizing a total of 86 alphanumeric terminals, alphageometric terminals, and integrated voice/data Displayphones. The group will be linked to such services as videotex and electronic mail. During the trial, the group will access the databases of some thirty private- and public-sector information systems. In return, it will make its databases available to other iNet participants.

The Bibliographic Common Interest Group is composed of the National Library of Canada (coordinator and participant), the Canada Institute for Scientific and Technical Information (CISTI), and the libraries of Carleton University, the Université du Québec, the University of Guelph, and the University of Waterloo. ■■

Humanities and Social Sciences Database Conference

The 1983 "International Conference on Data Bases in the Humanities and Social Sciences" will be held at Rutgers University, June 10–12. Scholars are invited to send abstracts (in duplicate) of papers they would like to deliver at the conference to

Professor Robert F. Allen, Room 427, Alexander Library, Rutgers—The State University, New Brunswick, NJ 08903. ■■

New PLA Videotape Introduces Easily Used Output Measures

The Public Library Association (PLA), a division of the American Library Association, has produced a videotape to introduce community-based performance measures to library staffs and trustees. The tape continues PLA's trend away from the use of national standards toward local determination of library needs.

Made with the support of CL Systems, Inc., *Measure for Measure: Output Measures for Public Libraries* follows a librarian from her initial doubts, through the evaluation process, to her conviction of the need for output measures. In the videotape, the librarian introduces the procedures to her staff. Some uses of the measures are discussed briefly and demonstrated when the librarian speaks to a civic group in the final scene.

Produced by Library Video Network, the thirteen-minute tape is available in any format for $90 (rental, $45) from PLA, American Library Association, 50 E. Huron St., Chicago, IL 60611. ■■

MARS/RASD Search Service Documentation Samples

An updated packet of documentation samples used to promote and administer search services are now available from ALA Headquarters Library. The packet was prepared by the Machine-Assisted Reference Section of ALA's Reference and Adult Services Division (RASD), which has worked on updating them since 1981.

An attempt was made with the updated packet to illustrate the wide variety of materials contributed. However, inclusion of a particular form does not serve as a recommendation of an ALA/RASD/MARS standard.

The documentation categories in the packet include:

1. *Search Request Forms*
   a. general
   b. detailed checklists
   c. detailed narrative
   d. specialized
2. *Explanation of Results* (Purpose: to explain system and/or database elements sometimes with a sample citation included, or to suggest ways of locating material cited.)
3. *Evaluation Forms*
4. *Billing Forms* (Some "search request forms" provide space for billing information.)
5. *Log Sheets* (To verify vendors' invoices and to gather statistics.)
6. *Statistics Forms* (To measure the activity of the search service and/or searcher.)
7. *Policy Statements*
8. *Publicity*
   a. posters/fliers
   b. brochures—basic explanation of search service
   c. brochures—basic explanation of the service with a list of databases
   d. database price lists

The packet may be borrowed from the ALA Headquarters Library, 50 E. Huron St., Chicago, IL 60611. Submit request for "Search Service Documentation Samples" on a standard interlibrary loan request form. ■■

Northwestern Announces Reliance on Online Catalog

Northwestern University Library's online catalog LUIS (Library User Information Service) has become the university's primary access tool for recently acquired library materials.

Utilizing video display units distributed throughout the library and in several academic departments, the online catalog can now be searched in the traditional catalog manner by authors, titles, series, and subject headings. The addition of subject access in March made it possible to discontinue production of cards for the author/title and subject catalogs.

LUIS is the public access module of Northwestern's automated library system NOTIS (Northwestern Online Total Integrated System), which has been under continuous development since 1967. In a self-teaching "user-friendly" mode, LUIS

affords access to a NOTIS database of more than 500,000 bibliographic records representing materials added to the Northwestern collections since 1970 as well as all serial titles and records for materials held by local participants sharing Northwestern's system.

NOTIS is being adopted by a number of libraries in the United States and was successfully installed at the National Library of Venezuela following Northwestern's completion of a special project to build a database of Venezuelan bibliographic materials. ■■

RTSD to Telecast 1983 Annual Conference Program

A video teleconference on bibliographic tools, scheduled to be presented during ALA's 1983 Annual Conference in Los Angeles, can be attended by persons across the country without their traveling to Los Angeles. " 'Blood, Toil, Tears, and Sweat': Rules and Formats" will be telecast live to local libraries acting as receiving sites around the nation. This innovative program, scheduled for 8:30 a.m. to 1:00 p.m., Tuesday, June 28, 1982, is sponsored by the Cataloging and Classification Section of ALA's Resources and Technical Services Division (ALA/RTSD/CCS).

The program will focus on bibliographic control in national and international online environments and is designed to promote national and international standardization and cooperation and to discuss the adequacy of the current tools in a national and international framework.

Seating is limited at the local receive sites and the conference, so early registration is advised. The registration fee (approximately $20–$30) will cover an information packet to complement the speakers' presentations.

A preliminary network of receive sites has been established: Albany Public Library, Albany, N.Y.; Arlington County Central Library, Arlington, Va.; Atlanta Public Library, Atlanta, Ga.; Boulder Public Library, Boulder, Colo.; Hennepin County Library, Minneapolis/St. Paul, Minn.; Nicholson Memorial Library, Garland, Tex.; Oak Park Public Library, Oak Park, Ill.; Port Washington Public Library, Port Washington, N.Y.; and Thomas More College Learning Resource Center, Fort Mitchell, Ky.

Any library interested in serving as a receiving site should contact Mary Diebler, Service Development Specialist, Public Service Satellite Consortium, Suite 907, 1660 L Street, NW, Washington, DC 20036, no later than December 31, 1982.

For further information about the program contact William Bunnell, Executive Director, RTSD, ALA, 50 E. Huron St., Chicago, IL 60611, (312) 944-6780, ext. 312; or Judith P. Cannan, 4106 Duvawn St., Alexandria, VA 22314, (202) 287-6428. ■■

New Video Cable Information Packet Available from LITA/VCCS

A new information packet for librarians and others concerned with video in libraries is now available from ALA's Library and Information Technology Association (LITA) Video and Cable Communications Section (VCCS).

The video/cable information packet includes a bibliography of cable-TV periodicals, a bibliography on satellite communications, the results of the Public Service Satellite Consortium (PSSC) Cable Library Survey and the PSSC National Satellite Network, and the October 1981 issue of *Community Television Review*, much of which is concerned with community access to information through library video.

The kit also contains the October 1980 issue of the *Federal Communications Commission Information Bulletin*, which is devoted to cable television and the regulation and legislation concerned. The ALA pamphlet *30 Questions Librarians Ask about Taping Copyrighted Television Programs for Educational Use* is included as well.

Barbara Ortiz, chair of the LITA/VCCS Video and Cable Utilization Committee, prepared the kit. The price is $8.50. All orders must be prepaid. Write: LITA/VCCS, American Library Association, 50 E. Huron St., Chicago, IL 60611. ■■

Recent Publications

Bibliographic citations were produced by María Clark, Yale University Library, New Haven, Connecticut, in accordance with ANSI Z39.29-1977, American National Standard for Bibliographic References, *New York: American National Standards Institute, 1977.*

Reviews

The computer programme [videorecording]: a series of ten 25-minute programs. [London]: BBC Enterprises; [1982]. Various formats; sd.; color. Available from Films Incorporated, 733 Green Bay Rd., Wilmette, IL 60091. Ten 3/4-inch (U-matic) videocassettes, single mounted—one program per cassette, $2,600. Five 3/4-inch (U-matic) or 1/2-inch (VHS, Beta 1, or Beta 2) videocassettes, double mounted—two programs per cassette, $1,700. Ten 16mm film prints, one program per reel, $4,275. Rental, duplication, and broadcasting information on request toll free (800) 323-4222; in Illinois call collect (312) 256-3200.

The Computer Programme is a series of ten half-hour video programs intended to introduce computer concepts to a lay audience. The program series was produced by the BBC in 1981/82 to develop computer literacy among the British public. Rather than focusing on hardware and software details, the series emphasizes functional, societal, and economic implications.

The programs are presented in the form of a dialogue between an initially computer-naive reporter and a computer expert. Throughout the series the reporter uses his newly gained knowledge of concepts previously introduced to understand successively presented concepts of increasing complexity. Interspersed are brief interviews with computer users from several countries describing applications such as an order-and-inventory system developed by a sweetshop proprietor, the French electronic telephone directory, and a hospital food service scheduling system.

Program one, "It's Happening Now," introduces the concept of the computing tools, from Stonehenge to the fastest computer today, the Cray 1, and home microcomputers. "One Thing after Another" presents the basic concepts of programming, using micros as an example. "Talking to a Machine" illustrates a simple but useful program to control the arm of a robot and introduces such concepts as the subroutine.

"It's on the Computer," program four, describes the need for computer storage, the various types of storage, and how each type of storage is used, using a hospital application as an example. "The New Media" explains remote computing using teletext (Prestel), electronic banking, and other examples of electronic cottage and offices of the future. "Sound and Moving Pictures" explores graphics, voice input, and computer-generated speech. "Let's Pretend" is about games, modeling, and simulation. Examples shown include a flight simulator of a jumbo jet used for pilot training, and the ten-day weather forecast for the European continent.

"The Thinking Machine" describes artificial intelligence and examples where the computer program learns by doing. "In Control" discusses the use of microprocessors in automobiles, washing machines, and factory applications. A home computer is used to control the heating and cooling in the home. The final program, "Things to Come," discusses computer-controlled farming and banking as examples of the extension of computers in the coming years.

The programs are presented in a professional and entertaining manner. The examples serve well to illustrate the concepts. At the end of each segment, the concepts explored are reviewed and illustrated with in-

creasingly more sophisticated BASIC programs. The programs are extremely effective in improving the computer literacy of the viewer. This reviewer, with more than twenty-five years of experience in the field of computing, found the series delightful, educational, and interesting. This series is equally useful for the novice.

Because of the effective balance of information and entertainment, the series is eminently useful for patrons and students of any age. The series is especially recommended for library staff as a continuing education tool.—*Hank Epstein, Information Transform, Inc., Madison, Wisconsin.* ■■

Masuda, Yoneji. ***The information society; as post-industrial society.*** 1st U.S. printing. Bethesda, Md.: World Future Society; 1981. 171p. ISBN 0-930242-15-7 (pbk). Translated from the Japanese by Bernard Halliwell. Reprint of the Tokyo: Institute for the Information Society; 1980 edition. Available from: World Future Society, 4916 St. Elmo Ave., Bethesda, MD 20814. $12.50.

Book jacket illustrators: How often do they even see, much less read or appreciate, the books they cover? *The Information Society* jacket merits note because it does reflect and aptly introduce the book's content and its author's world view. The cover illustration, "Gaifu-Kaisei" by Hokusai Katsushika, depicts a looming, cinnamon-hued, templelike Mt. Fuji, thrusting into a Shangri-la sky striped with whipped-cream clouds.

Two systems diagrams appear on Fuji's face. The top diagram contrasts the industrial with the information society, using two Fuji-like triangles. The industrial society features individualism and material-productive power as its bases, with consumption needs on top. The information society features synergism and information-productive power as its bases, with achievement needs at its peak. The bottom diagram is a flowchart of the computer-communications revolution, with its societal impacts. The revolution is characterized by the mass production of original information, dynamic control and feedback, creation of complex normative information, and the formation of cognitive information networks.

These new capabilities express themselves in automation, knowledge creation, and system renovation, the churning crustal plates whose relentless grinding reorders and transforms the economy, society, polity, and culture.

On the far side of this black hole in history, the utopian benefits are many and varied: increase of free time, liberation from subsistence labor, increase in lifetime value, satisfaction of self-actualization needs, the formation of information utilities, the realization of participatory democracy, and the emergence of voluntary communities. The dystopian risks and costs, if any, are not identified.

Japanese intellectual, utopian futurist, systems thinker, devout person, democrat (small *d*), egalitarian, and Hi-Tech True Believer (Computation-Communication Division)—author Yoneji Masuda is all these, and all are crucial dimensions of his perspective. Like all visionaries, he is at points (including some crucial points) washed away by the excesses of his own enthusiasm. At such points, the reader may wish that the author's perspective had been tempered and balanced by those of the cultural anthropologist, the alienated youth, the blue-collar worker, the middle manager or bureacrat, or the local political leader. And at such points it is easy and tempting—too much so—to dismiss him as a dreamer or a zealot.

It would be a mistake to do so. Masuda has a great deal of useful knowledge, insight, and vision to share with the world community as it struggles out of an unsustainable past into an anxiety-ridden future.

The Information Society is less a whole than a collection of essays written during the 1970s, reworked for a book, *Information Economics*, published in Japan (Sangyo Noritsu University Press, 1976), then finally updated and translated here. As such, the flow is somewhat uneven and there is, at times, an annoying repetition of main ideas.

The book is divided into two parts addressing, respectively, the "Emergence" and the "Framework" of the information society. "Emergence" consists of four essays

in a total of forty-two pages. "Framework" offers eleven essays in 106 pages. A selective list of references has twenty-seven entries, a glossary that explains the usage of fifty-four terms, and an index which has about 325 main headings.

Chapters 1 and 2 are useful references for those who need to gain some idea about what has actually been going on at the leading edge of the information society—or who need ammunition to convince others that the quill pen may not be writing the latest word.

"The Plan for Information Society—A National Goal toward the Year 2000," was presented to the Japanese government in 1972 by the nonprofit Japan Computer Usage Development Institute. A brief account of practical related developments since is fascinating.

Chapter 2 highlights analogous societal experiments in Canada and Sweden. The reader who wants a comprehensive or current account of such developments must look elsewhere, perhaps to the Institute for the Future in Menlo Park, California, or to the Center for Futures Research at the University of Southern California, both of which have been monitoring this area.

"Image of the Future Information Society" fleshes out the image conveyed by the dust-jacket diagram already described. Chapter 4 offers a four-stage developmental model for the information society (big-science-based, management-based, society-based, individual-based) and a parallel evolution of "computer space" from limited through regional-national to global.

Part II, "Framework of the Information Society," opens in Chapter 5 with a definition of the "information epoch," a definition which, regrettably, is difficult to grasp or apply: "The span of time during which there is an innovation in information technology that becomes the latent power of societal transformation that can bring about an expansion in the quantity and quality of information and a large-scale increase in the stock of information." Masuda treats the "objectification" of information, by which he means the creation and supply of information apart from a human mind, namely in a computer. Drawing on systems thought, he outlines a simple model of the information cycle, reminiscent of the TOTE (or Test-Operate-Test-Evaluate) model. Masuda also distinguishes between affective and cognitive information, with emphasis on the latter, and dwells on the notion of *feedforward*, as contrasted with *feedback*, *feedforward* occurring in a situation where "a goal exists, but the boundaries of control are not fixed, and must be adjusted dynamically to a changing situational relationship." The chapter concludes with a consideration of the societal impact of the information epoch, again fleshing out the model illustrated on the dust jacket.

"Globalism: The Spirit of a Neo-Renaissance," is a two-page note which characterizes globalism as "spaceship thought" plus "the idea of symbiosis" plus "global information space." "Time-Value: A New Concept of Value," is not about the economic concept of interest, but is the author's way of describing goal-oriented behavior featuring *feedforward*.

A ten-page discussion of the information utility is offered in Chapter 8. Masuda speaks of the "information infrastructure," which he defines as that set of facilities through which "anyone, anywhere, at any time will be able easily, quickly, and inexpensively to get any information which one wants to get." Required are central computing facilities accessible through terminals to the general public at a nominal price. Information utilities for business, government, and citizen are compared and contrasted, with a plea stated as a prediction that the citizen-oriented utility will dominate, enabling autonomous group decision making while avoiding a controlled society. Masuda also outlines his vision of a global information utility.

The "Information Axis Economy" (Chapter 9) is an economy in which information is the core need around which not only the economy but the rest of society develop and in which information, the "quaternary sector," exceeds in economic importance the value of the other three sectors (goods, energy, services). This is ground opened years ago (and currently being revisited) by U.S. economist Fritz Machlup. Ted Bradshaw at the University of California Institute of Governmental Studies also

is doing seminal work in this field.

Participatory democracy in the information society is explored in Chapter 10. Briefly, Masuda asserts that parliamentary democracy cannot survive in the information society, because citizens will place self-realization even above material needs, because governmental actions will have such intimate and pervasive impact on individuals, because many issues can be formulated and resolved only at the global level, and because technological change will make participatory democracy (as contrasted with parliamentary or representative democracy) not only feasible but very apparently so. Problems identified for such a democracy include equal access to accurate and fair information, decisions directly impacting the state's sovereignty, and problems which cannot be solved even when all views are taken into account. The author's views are filled with good intentions and based on democratic ideals, and sound amazingly like those of our own flower children in the sixties.

"Computer Privacy: Copernican Turn in Privacy" seizes on a painful nettle of the information society. Here, as at no other point in the book, Masuda acknowledges the darker shores of human nature. He foresees computer privacy problems evolving from "no problem" in the already-vanished big-science-based stage; through issues involving use of personal data files for unintended purposes in the management-based stage; to issues concerning citizen-state relations and group or class discrimination in the society-based stage; to threats of intimate tyrannies—governmental and organizational—so grave that—in the stage of individual-based information utilities—new political, economic, and social systems will be required, while only complete control of the utilities by autonomous citizens can avert the perennial peril of descent into a new slavery.

Chapter 12 considers relations between the industrialized and the unindustrialized worlds. Masuda concludes that the information gap will broaden and deepen the industrialization gap, unless the less-developed nations are offered large amounts of integrated assistance on both fronts.

"The Goal Principle" identifies four types of goal-seeking *feedforward* systems—dependent, controlled, balanced, and synergistic.

Masuda foresees a desirable future for the information society in voluntary communities, an idea he explores in Chapter 14. Like traditional cooperative communities, voluntary communities will be formed through voluntary association and will feature voluntary management, a strong sense of mission, and synergism. Unlike traditional cooperative communities, voluntary communities will become the primary unit of social organizations, organized around the concept of information space—that is, "invisible but perceptible space functionally bound together by information networks based on computer-communications technology." Such communities will be globally oriented as well as open, multi-layered, multi-centered, and characterized by cooperative functional labor. Business and the voluntary sector will become intimately symbiotic, with essential participation in management not only by autonomous workers but by the citizenry as well.

The Information Society concludes in Chapter 15 with Masuda's vision of "Computopia: Rebirth of Theological Synergism." He foresees that Computopia will emphasize personal goal-setting and goal-seeking, freedom of decision, equality of opportunity, a flourishing of diverse voluntary communities, and interdependent and synergistic societies free of any overruling power. The alternative, he believes, is the automated state. Computer-based innovation will, in Computopia, become the "ultimate science." In turn, this new order within humanity will open the way to a new relationship between humanity and the Supreme Being, however imagined, grounded in the premise that "spiritual rebirth depends upon the cooperation of the will of man and the grace of God."

Such are the highlights of *The Information Society*. Recounted so flatly and briefly, Masuda's work may sound pretty much the same as that of a hundred other titles reviewed in *The Futurist* or elsewhere over the years. And, in some ways, it is. There is a familiar naiveté/innocence about the innate powers of reason, the inevitabil-

ity of desirable societal evolution, etc. But *The Information Society* is both less and more than that. The author's values, perspective, and limits are openly on view. While some of the ideas he introduces are little more than circumlocuted names, he takes on the difficult task of thinking head-on about the Big Picture.

Elusive, vague, contradictory, unfinished, unclear, unbalanced, incomplete? Of course. Masuda, as all of us, is a product of the past struggling to foresee a fundamentally new and different, complex future, which even now is hurling itself upon us. The specialized historian almost certainly could identify comparable works written in the century after the death of Jesus, or when the English textile revolution began, or Henry Ford began mass-producing Model T's. The significance of such works lies not in their clarity, completeness, or correctness. Rather, their significance lies in insisting on the importance of the New Beast Slouching toward Bethlehem to be born, and the importance of trying to comprehend what is happening, what it means, and the choices it poses. Read *The Information Society*. Be frustrated and dissatisfied with it. Think through and share your criticisms with others. Think through and write down *your* notions about the emergent information society. Offer them up for others to shoot down. Never will there be a greater chance to shape the information-society future than now. There may be little time to influence it at all by conscious design, if in fact it is not already too late. That alone is sufficient reason to read and reflect on this book.—*David C. Miller, DCM Associates, San Francisco.* ■■

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.

The "Other Recent Receipts" section will reappear in the next issue of ITAL.—*David L. Weisbrod, Book Review Editor.* ■■

Statement of Ownership and Management

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Extent and Nature of Circulation

("Average" figures denote the number of copies printed each issue during the preceding twelve months; "Actual" figures denote number of copies of single issue published nearest to filing date—the June 1982 issue.) Total number of copies printed: Average, 7,516; Actual, 7,550. Paid circulation: not applicable (i.e., no sales through dealers, carriers, street vendors, and counter sales). Mail subscriptions: Average, 6,533; Actual, 6,410. Total paid circulation: Average, 6,533; Actual, 6,410. Free distribution by mail, carrier, or other means, samples, complimentary, and other free copies: Average, 444; Actual, 450. Total distribution: Average, 6,977; Actual, 6,860. Copies not distributed: Office use, left over, unaccounted, spoiled after printing: Average, 539; Actual, 690. Returns from news agents: not applicable. Total (sum previous three entries): Average, 7,516; Actual, 7,550.

Statement of Ownership, Management and Circulation (PS 3526, July 1981) for 1982 filed with the United States Post Office Postmaster in Chicago, September 30, 1982.

Highlights of LITA Board Meetings

1982 ALA Annual Conference, Philadelphia

These highlights are published to inform division members of the activities of their board. They are abstracted from the official minutes.

FIRST SESSION
JULY 12, 1982

The meeting was called to order by Vice-President/President-elect Carolyn Gray, who presided in the absence of President Kenney who was ill. The following board members were present: Carolyn M. Gray, S. Michael Malinconico, Nancy L. Eaton, Bonnie K. Juergens, Arlene Farber Sirkin, Anne T. Meyer, Heike Kordish, and Donald P. Hammer, LITA executive director. Staff: Laura Stewart.

LITA Award. Epstein reported on the presentation of the LITA Award to Phil Long and his wife, LeAnn.

Epstein then reported on the procedure he used to locate a firm agreeable to providing a stipend for the LITA Award. Gaylord Bros., Inc., Syracuse, New York, agreed to provide $1,000.

A motion was made by Nancy Eaton, seconded by Bonnie Juergens, and voted that:

> LITA accept Gaylord's gift of $1,000 per year for a cash award to the LITA Award winner, for five years, the details to be worked out by Carolyn Gray and Don Hammer.

X-3 Membership. Hammer reported on the negotiations between himself and the president of CBEMA, the sponsors of the ANSI X3 Committee, which LITA is attempting to rejoin. The problem is the $3,000 service fee in 1982 and $3,500 fee for 1983.

A motion was made by Bonnie Juergens, seconded by Arlene Farber Sirkin, and voted that:

> LITA commit a maximum of $3,000 per year for support of ANSI X3 Committee membership and instruct the President to seek the balance of the required funds from other appropriate organizations.

MARBI Committee Report. Elaine Woods asked the board to approve placing the committee members on electronic mail.

In the future, a summary of the MARBI meeting minutes will be published in the newsletters of the three sponsoring divisions.

The board approved Ms. Woods' request by consensus.

LITA Legislation and Regulation Committee Report. Bradley reviewed the committee's proposed changes and additions to the Federal Legislative Policy Statement which is now being revised.

A motion was made by Nancy Eaton, seconded by Arlene Farber Sirkin, and voted that:

> The LITA board strongly endorse the entire legislative policy statement as reported orally by Lynne Bradley, and that Ms. Bradley supply the board with copies of the statement as time permits.

VCCS Report. Sirkin reported that the VCCS Utilization Committee has completed the new Video Information Kit which will be sold from LITA headquarters.

ALA Professional Ethics Statement. Gray brought up the matter of LITA endorsing the revised ALA Professional Ethics Statement. The board endorsed the Ethics Statement by consensus.

LITA Programs and Institutes. Juergens suggested that she felt that the board should provide guidance and in other ways help the organization to put on good, quality programs. The board should do more mon-

itoring of committees and give more guidance. Among the suggestions made to improve the quality of LITA programs was more follow-up from the Program Planning Committee, forming a "policing" committee to monitor activities being organized, and getting more people involved in committee work. The "policing" suggestion will be placed on the 1983 Midwinter Meeting agenda for dicussion.

The board asked Bonnie Juergens to work with the Program Planning Committee concerning these matters and to review the program check-off form intended to help monitor committee activities. She is to report back to the board prior to Midwinter.

Standards Setting by ALA Divisions. The board referred the matter of the ALA document on standards setting by the divisions to TESLA with instructions to review it and report back during the Midwinter Meeting.

Automation Vendor/User Discussion Group. A motion was made by Nancy Eaton, seconded by Bonnie Juergens, and voted that:

> the board approve a Vendor/User Discussion Group and that this be referred to the Bylaws Committee for a function statement.

SECOND SESSION
JULY 12, 1982

The meeting was called to order by Vice-President/President-elect Carolyn Gray, who presided in the absence of President Kenney. The following board members were present: Carolyn M. Gray, Hugh C. Atkinson, Nancy L. Eaton, S. Michael Malinconico, Bonnie K. Juergens, Anne T. Meyer, Heike Kordish, and Donald P. Hammer, LITA executive director. Staff: Laura Stewart.

Microprocessor Discussion Group. Harry Broussard recommended that a Microcomputer Committee be established. The board instructed Broussard to develop a function statement for the proposed committee and to await the final report of the LITA Goals and Long-Range Planning Committee.

Proposed Budget Review Committee. Vice-President Gray recommended that a Budget Review Committee be established to handle those budgetary matters that the board now considers.

A motion was made by Bonnie Juergens, seconded by Hugh Atkinson, and voted that:

> Budget review committee be appointed with a function statement to be developed by the vice-president/president-elect.

Proposed ALA Planning Committee Networking Committee. The ALA Planning Committee has proposed the establishment of an ALA Networking Committee intended to improve access to information. The board asked Gray to prepare a statement based on a letter written by President Kenney, and forward the board's concern that such a committee is unnecessary as it could have no affect on the development of networking in the United States, it would add to ALA's costs, and it would overlap with units and activities already existing in both LITA and ASCLA.

Proposal to Enlarge the Size of the LITA Board. It has been recommended that the LITA Board be increased in order to enable the appointment of subcommittees and to make it easier to have a quorum. By consensus, it was decided to increase the board by three members-at-large. The Bylaws and Organization Committee was instructed to draw up a statement for the next ALA balloting.

Proposed LITA Orientation Meeting and Reception. Gray reviewed the need for an orientation program for LITA committee chairs and any other members interested. Plans for such a meeting at San Antonio were reviewed. Gray and Juergens will develop the program.

THIRD SESSION
JULY 13, 1982

The meeting was called to order by Vice-President/President-elect Carolyn Gray, who presided in the absence of President Kenney. The following board members were present: Carolyn M. Gray, S. Michael Malinconico, Hugh Atkinson, Nancy L. Eaton, Bonnie Juergens, Anne S. Meyer, Heike Kordish, and Donald P. Hammer, LITA executive director. Staff: Laura Stewart.

Legislation and Regulation Committee

Report. Hammer and Bradley asked the board to allocate a certain amount of funds for travel of one or two people who could be relied on to make a quick trip to wherever hearings are held on subjects of interest to LITA.

A motion was made by Bonnie Juergens, seconded by M. Malinconico, and voted that:

> one thousand dollars be made available to support LITA participation in legislative testimony activities.

Bradley reported that the officers of GODORT would like LITA to establish a joint LITA/GODORT discussion group and also have liaison between the two organizations. The board decided by consensus that these activities should be referred to ISAS. ISAS should contact GODORT and discuss these matters with them and report back to the board at Midwinter.

Bradley asked the board to establish a discussion group on cable franchising. She has a petition signed by twelve LITA members, and Charles Kritzler is willing to serve as interim chairperson. The group would like the discussion group to be LITA-wide, but the board felt the group should start as a VCCS group and later, if the interfusing of technology warrants it, the group can be made division-wide.

A motion was made by Malinconico, seconded by Juergens, and voted that:

> the board urge the VCCS Executive Committee to form a Video Cable Discussion Group.

As information for the board, Bradley then spoke of the need for a discussion group on off-air recording.

Bradley reported on the cable bill now before the U.S. Senate and asked the board to allow Mary Diebler and Bradley to draft a statement that in the name of LITA will ask for a postponement of the bill. After discussion, a motion was made by Hugh Atkinson, seconded by Nancy Eaton, and voted that:

> the board moves that it opposes bills reducing local authority over cable franchising and directs appropriate subgroups to make such representations to the Congress.

Privilege of Voting Extended. Since Mary Diebler, vice-chairperson of VCCS, was attending the board meeting in place of Arlene Farber Sirkin, a motion was made by Hugh Atkinson, seconded by M. Malinconico, and voted that:

> the board extend to Mary Diebler voting privileges.

Proposed LITA Policy on Institutes and Workshops. The board considered the proposed LITA policy on the sponsorship of LITA institutes and workshops by outside organizations. The policy statement was adopted, with editorial changes, by consensus.

Program Planning Committee Report. There are two proposed preconferences for Los Angeles. One on "Online Catalogs, Online Reference" is proposed by Steve Salmon and Brett Butler.

After the preconference is held, an additional program would be held during the conference week that would include a panel to evaluate the preconference and provide follow-up. The board asked for more information by October 1.

The second preconference proposed is from VCCS called, "Cable Communications Interaction: Information Delivery for the 80's."

The board suggested that the proposed preconference be changed to a four-hour program in Los Angeles. Tyner was instructed to contact Joyce Capell and tell her to provide a budget, if needed, request for special funds (by October 1), a program, and speakers by Midwinter.

Tyner reported that RTSD has asked LITA to cosponsor a preconference in Los Angeles on microcomputers in the technical processing area. The cosponsorship was approved unanimously.

Catalog Form, Function and Use Committee Report. Gorman, as LITA representative to the Catalog Form, Function and Use Committee, reported that the committee is being set up by RTSD and has a permanent RTSD chairperson.

He feels that the charge to the committee is too broad and that the committee should be given some kind of authority or coordinating role as there is no way for it to function as a large interdivisional committee. The board should study the implications of the committee's charge. After discussion, the board asked Gorman to write his rec-

ommendations to be sent to it prior to Midwinter.

Publications Committee Report. The board endorsed the following statement presented to it by Charles Husbands, chairperson of the LITA Publications Committee:

> LITA express its appreciation and gratitude to Patricia Barkalow for getting the LITA Newsletter started in such an effective manner. The form, substance, and timeliness of the Newsletter have been impressive. On departing the office of editor, she leaves the Division a healthy publication and a legacy of ideas for future consideration.

Husbands presented a tentative recommendation to pay an honorarium to *ITAL* authors of perhaps $250 per article. There was no objection from the board so it is taken by consensus that the editor may proceed.

Husbands reported that Judy Schmidt would like to resign as *ITAL* advertising editor as soon as a replacement can be found.

Goals and Long-Range Planning Committee Report. Joseph Matthews, acting chairperson, reported on the recommendations of the Goals and Long-Range Planning Committee. The board will consider the final report at its Midwinter meetings. Vice-President Gray asked the chairperson of the Bylaws and Organization Committee to work with the chairperson of the Goals and Long-Range Planning Committee in exploring the implications of the proposed structural changes in light of the overall ALA organization.

National Conference Committee Report. Berna Heyman reported on the progress of the National Conference Committee in planning that conference to date. All of the committees are operating and many activities and events are being developed.

The board congratulated Heyman and

VOTE TALLY FROM THE ELECTRONIC MAIL SYSTEM
Ballot 1 (May 19, 1981) through Ballot 8 (May 25, 1982)

Ballot 1: (concerned 1980/81 LITA Board) Allocation of funds for AVS Congress at San Francisco, 1981 ALA Annual Conference.
Ballot 2: Approval of Telecommunications Committee's preconference and exhibit booths at Philadelphia.
Ballot 3: Approval of VCCS program at Philadelphia Annual Conference.
Ballot 4: Resolution of vacant director-at-large position on LITA Board.
Ballot 5: Approval of $3,000 seed money for president's satellite program at Philadelphia.
Ballot 6: Approval of implementing database project.
Ballot 7: Including chair of Microprocessor Discussion Group on electronic mail.
Ballot 8: Approval of Microcomputer Institute in Milwaukee on November 7–9, 1982.

	Ballot Number							
Board Member	*1**	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Brigitte L. Kenney*	Y	Y	Y	N	A	N	Y	Y
Carolyn M. Gray		O	Y	N	Y	Y	Y	Y
S. Michael Malinconico*	O	O	O	O	Y	Y	Y	O
Nancy Eaton*	O	O	Y	N	Y	Y	Y	Y
Hugh C. Atkinson		Y	O	N	Y	Y	Y	Y
Bonnie K. Juergens*	O	Y	Y	O	Y	Y	O	O
Anne T. Meyer		Y	Y	N	O	Y	Y	O
Jay B. Clark		Y	O	O	O	O	O	Y
Arlene Farber Sirkin		Y	O	O	Y	O	O	Y
Ronald Miller*	Y							
Kenneth J. Bierman*	Y							
Barbara E. Markuson*	O							
Helen Cyr*	O							
Marilyn J. Rehnberg*	O							
Angie W. LeClercq*	O							

*1980/81 Board Ballot 1 only.
Key: Y = Yes A = Abstain N = No O = Not voting

her committees on their work in planning and organizing the conference.

Proposed "Distinguished Lecture Series." Gray asked the board for a statement of approval or disapproval on whether or not she should continue to investigate the establishment of a Distinguished Lecture Series sponsored by LITA. The board approved by consensus. Gray will draft a letter intended to locate a vendor or vendors who will support the series financially.

Audiovisual Section Report. Anne Meyers reported that the vice-chairperson/chairperson-elect resigned shortly before he was to take office. The newly elected vice-chairperson, Barbara Ortiz, will assume the role of chairperson for the 1982/83 year and will again run for the office of chairperson for 1983/84. The AVS Executive Committee has approved this procedure because it is felt that one of the problems in AVS has been that the officers have not been in office long enough to implement an effective program. Barbara Ortiz will make the AVS appointments for 1983/84.

Electronic Mail. Hammer asked the board what should be done about putting additional LITA committee and discussion group chairpersons on EMS as requests are made.

Nancy Eaton volunteered to work with Hammer in drawing up a policy statement for the board on EMS and the statement should be distributed to the board prior to Midwinter.

A motion was made by Bonnie Juergens, seconded by Nancy Eaton, and voted that:

> LITA devote up to $150.00 for ONTYME usage by Harry Broussard and members of the Microprocessor Discussion Group. ■■

LITA BOARD OF DIRECTORS MEETINGS
RECORD OF VOTES—1982 ANNUAL CONFERENCE

	Motions (In order of appearance in the "Highlights")									
Board Member	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Brigitte L. Kenney	O	O	O	O	O	O	O	O	O	O
S. Michael Malinconico	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Carolyn M. Gray	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nancy L. Eaton	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hugh C. Atkinson	O	O	O	O	Y	Y	Y	Y	Y	Y
Bonnie K. Juergens	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Anne T. Meyer	Y	Y	Y	Y	Y	O	O	Y	Y	Y
Jay B. Clark	O	O	O	O	O	O	O	O	O	O
Arlene Farber Sirkin	Y	Y	Y	Y	O	O	O	O	O	O
Mary Margaret Diebler*										Y

*The Board gave special voting privileges in the absence of Arlene Farber Sirkin, 7/13/82.
KEY: Y = Yes N = No A = Abstain O = Absent

Letters

To the Editor:

In response to your questions about *War and Peace* (editorial, June 1982), I answer that while I may watch a TV adaptation of it, I know that such an experience is not the same thing as reading the book.

The only way to read *War and Peace* is to read it, all 1,146 pages (in the Modern Library edition). I have seen three film and TV adaptations of the book and each left out precisely those elements that make it a great work of literature rather than just another good historical novel: the inner thoughts and feelings of the characters, Tolstoy's reflections on the meaning of history.

Few people will want to sit in front of a video display terminal to read a 1,146 page novel. Many will buy or borrow the book and carry it away with them to read in a comfortable chair, under a tree, in bed, even in the bathtub. The book remains a remarkably versatile, portable and cheap medium, and reports of its imminent death are premature.

Automation has many cost-efficient applications for academic libraries. However, information retrieval in the form of summaries and adaptations (even with lights, color and bells) will never substitute for thoughtful reading of texts. If librarians try to convince their faculty colleagues that it will, they will be regarded with well-deserved skepticism.—*Joan Tracy, Assistant Librarian for Technical Services, Eastern Washington University, Cheney, Washington.*

To the Editor:

Couldn't resist sending a note commenting on your editorial in the June *ITAL*. While I agree that print is essentially linear (hell, not "essentially," it is—period), it has multi-dimensional access. Not if you are reading a novel, but searching discreet pieces of information in encyclopedias can be done without scanning everything before the article. We have had a great deal of trouble getting Jonathan (our son) to read for pleasure. He grabs print information sources and really uses the encyclopedia (the new *AAE* is very graphic as well), but prefers TV and movies for entertainment. And, of course, the new video games. I think much of the argument is not over failure to read, but failure to read what the previous generation read and in the same manner. Music is an even better example because we are still using sound waves—and can even have "Switched on Bach"—but are breaking in certain ways with accepted tradition in the use of the sound and the patterning.

Some thoughts arise from reading the piece on Telidon graphics; an especially good article, I read it in conjunction with the article in the latest *High Technology* on microcomputers. And I just feel I have to answer the charge usually heard that we map folk are all Luddites.

Back in the days when we heard that microfilm was going to save the world, the map community felt that the film format wasn't very good or useful most of the time for maps and the quality of the photography lost too much: for us the medium has always been the message. Now with very good resolution microfiche read on a good reader, those objections aren't heard (and the National Archives is doing interesting things with 105mm film); we still don't think the quality of hard copy reproduction is good, it needs a lot of improvement.

A colleague from the Geological Survey was being shown a demonstration of DIDS (Domestic Information Display System—U.S. Dept. of Commerce) and he observed that those computer graphics were some of the best he had seen—but still weren't good enough for the Survey. True, they have pretty strict demands, and most of the rest of us might find the current state of computer cartography quite satisfactory (not perfect, of course). But the point is not that

he rejected the technology; he made demands on it and wouldn't settle for less than was needed.

When we come to online catalogs, we have found the problem is not that map librarians aren't willing, but that a lot of libraries don't consider maps to be catalogable items. Maps are on MARC tapes, maps are entered on OCLC, RLIN promises to have maps—it's not the map community dragging its feet.

We dearly love our maps as artifacts, but that doesn't mean we can't appreciate the proper technology for disseminating cartographic information—the making of even traditional maps involves a lot of technology.—*J. B. Post, Map Librarian, Free Library of Philadelphia, Philadelphia, Pennsylvania.*

To the Editor:

Last weekend's multi-dimensional wilderness experience convinced me that the days of text are numbered. If people still carried books instead of portable radios, cassettes, and TVs, I would have been subjected to the din of frogs, birds, even crickets. The human-machine interface may be more real than the illusion of nature, a scenario originally forecast by Brando (*On the Waterfront*, 1954): "Crickets make me noivous." Besides, neither crickets nor books can drown out the sound of drilling equipment.

Reference librarians and online searchers have often alerted us to the difficulty of identifying and interpreting individual information agendas. "The Last Horse Soldiers" convinced me that you are absolutely correct in stating that you are surrounded by machines which are smarter than you are and brought me to the realization that we've been approaching automation from the wrong direction. Machines are logical, precise, and consistent, so why hang the albatross of individuality around their effi-

cient necks? Instead of all the fuss about machine-readable cataloging (MARC), we should be devising standards for machine readable people (MARP).

Ah, the world according to MARP: No more silly secrets or surprises, and just think of the implications for genuine authority control. Once the user is fully automated, *e* (no longer a mere *she* or *he*) can communicate directly with all manner of computers and eventually with other MARPs. One might have an entire existence from meals to mah-jongg partners programmed in advance through interactive menu driven programs. What a relief, logical people who don't make puns, try to guess your sign, or ask if you've read any good books lately.

Only one question remains to be resolved in the paperless society and I have every confidence that our sanitary engineers are already working on it.—*Agnes Morehead, Albany Institute of History and Art, Albany, California.*

To the Editor:

Thank you for reviewing *Resource Sharing & Library Networks* in the June 1982 issue of *Information Technology and Libraries.*

We wish to announce that the journal is now under the new editorship of Glyn Evans, Director of Library Services for the State University of New York Central Administration, and will change title to be called *The Network Librarian* starting with Volume 1, #4.

We hope that after the newly revised journal has made its appearance, criticisms such as that raised by Mr. Leonhardt may rapidly evaporate.—*Bill Cohen, Publisher, Haworth Press, New York City.* ■■

EDITOR'S NOTES

Thank You

Judith G. Schmidt, who will be leaving the editorial board at the end of this volume, has been with *ITAL* and its predecessor, *JOLA*, through thick and thin. Judy joined the journal as book-review editor in 1978. In 1979, she accepted the position of advertising editor. Judy stayed with the journal during the unfortunate hiatus in 1979–80, and helped pull it together again when this editor arrived.

Judy is currently assistant coordinator of cooperative cataloging projects in processing services at the Library of Congress. Judy joined LC as an intern in 1969. In addition to LITA activities, Judy has been active in the Federal Librarians Round Table, the Women's National Book Association, and the Library of Congress Professional Association.

Welcome Aboard

ITAL is proud to welcome William Z. Schenck as our new advertising manager beginning with the 1983 volume. Bill was advertising manager for *North Carolina Libraries* from 1979–82, and led a seminar on "Effective Methods of Obtaining Advertising for State Journals" at the ALA 1981 Annual Conference.

In real life, Bill is collection development librarian at the University of Oregon. He previously worked in acquisitions at the University of North Carolina at Chapel Hill and Yale University. He has published in the area of library acquisitions practice, and has reviewed materials for a number of library publications. Bill's MLS is from UNC–Chapel Hill, 1972.

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Compiled by Theodore C. Hines

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