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Information Technology and Libraries

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The Last Horse Soldiers

There is little question that, against virtually any given enemy, a soldier is both safer and more effective in a tank than on a horse. Yet, there was a certain romantic sadness in the cavalries as the horse soldiers disappeared.

The vocabularies of the future are taking shape around us today. As a culture, we are becoming more media-literate and less literate in the traditional, bookish sense. As ever, children are bellwethers in ways of seeing the world.

The myriad of articles about the future of books and libraries, while discussing permutation after permutation of presentation, continue to equate information with text. The problem with text is its bandwidth; it is two-dimensional, static, colorless, and fundamentally linear. Life is at least three-dimensional, constantly in motion, colorful, and nonlinear. Why should we assume that, with rich new technologies of information transfer, society should continue to prefer the relatively impoverished subset of information that text can accommodate?

What will be the information technologies of tomorrow? They will clearly be broad bandwidth, allowing use of live action, animation, sound, color, multiple images, image rotation, dissolves, and other sophisticated techniques. We can identify the swaddling clothes of information systems of the future in events of today.

When I go to the store, the cash register calls out the prices as it reads the labels. In many factories today, workers tell voice-activated machines what to do and the machines do it. *Sunset* magazine reports that media rooms are appearing in Western homes. SONY is selling a hand-held TV set, smaller than a paperback book, for under $300. NASA used high-resolution computer animation techniques to generate images of the space shuttle on my TV set the other morning. Broadband local networks encompassing digital, voice, and video signals are part of the office-of-the-future offerings of many computer system vendors. The only words in the current hit movie, *Quest for Fire*, are in the titles and credits. Cable hookups and personal computers are becoming common in homes; many rural Americans have their own satellite antenna. Microprocessors are everywhere—in cars, in cash registers, in TV sets, in appliances; it's hard finding a machine these days that isn't smarter than I am.

The illustrations for the Telidon article in this issue are a case study in loss of signal. Telidon is brilliantly colorful; *ITAL* is black and white. Telidon images move, grow, blink; *ITAL* stares back. Telidon is interactive and menu-driven; *ITAL* is inherently linear.

Test your own environment for changes. Make two lists: those members of your family who are more likely to read *War and Peace* rather than watch it on TV, and vice versa. Which list is longer? Is your family typical?

Information technologies affect the way we see and interact with the world. Gutenberg's invention established text as the basis of much of our vision of the world. Our children's view of the world is being shaped by different technologies. The question is not whether the newer, richer technologies will displace text for most uses. The question is when.

BRIAN AVENEY

The CLR Public Online Catalog Study: An Overview

Douglas Ferguson, Neal K. Kaske, Gary S. Lawrence, Joseph R. Matthews, and Robert Zich

In early 1981, the Council on Library Resources (CLR) funded five organizations to conduct a coordinated study of user responses to public online catalogs. The principals in this consortium are J. Matthews & Associates, the Library of Congress, the Online Computer Library Center (OCLC), the Research Libraries Group (RLG), and the University of California. The main study involves a questionnaire completed at the terminal by catalog users and another questionnaire completed in the library by individuals who have not *used the computer catalog. The survey will be conducted at thirty library systems having seventeen different online catalog computer systems. The survey questionnaires and methodology were pilot-tested late in 1981, the main data collection was to be done in spring 1982, and analysis and reporting will take place during summer and fall 1982. This report describes the scope, objectives, and status of the study.*

BACKGROUND

The database design efforts of the 1960s leading to the system building of the 1970s are resulting in direct access to online catalogs by library users in the 1980s. Terminals are moving from behind reference and circulation counters to catalog areas, stack areas, library halls, offices, and other high-use locations. These terminals connect to a variety of systems, ranging from commercial circulation systems, to bibliographic utilities, to locally developed in-house online catalogs.

In parallel with these developments, research has addressed the number of terminals needed for a public online catalog,[1] catalog database enhancements, [2] and the nature of subject access.[3] Related work has been done on human-factors design in terminals[4] and software psychology.[5] Important as the increasing amount of relevant research is, implementation is not waiting for research. More and more systems are being made directly available to the clientele of academic and public libraries.[6]

THE COUNCIL ON LIBRARY RESOURCES INITIATIVE

Against this backdrop, the Council on Library Resources (CLR) funded a joint study by RLG and OCLC to assess critical issues and problems in designing, developing, and operating public online catalogs. A survey, an issues analysis paper, and a working session were completed during June–August 1980. Thirty-five organizations known to be operating or developing public access systems were surveyed. An is-

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sues paper was prepared and discussed at a working session attended by twenty-five representatives from libraries, bibliographic utilities, and library networks in the United States and Canada. Participants in the working session identified four priority areas for systematic study and cooperative efforts, which are listed below:

1. Analyzing user requirements and behavior.
2. Monitoring existing public access systems.
3. Developing cost management methods.
4. Developing distributed computing and system linkages.[7]

Subsequently, the Council received proposals to conduct studies on the use and nonuse of public online catalogs. Under the aegis of the council's Bibliographic Service Development Program (BSDP), these organizations were asked to coordinate their efforts. The outcome was a study of a larger number of online catalogs, user populations, and types of libraries than any one organization could support. Additional benefits of this cooperative effort include pooling research and organizational resources, and improved communication and cooperation focused on the problems and potentials of public online catalogs.

The Council on Library Resources funded in part a contributing research project that was conducted by OCLC entitled "Online Public Access Systems: Data Collection Instruments for Patron and System Evaluation." The results of this work are reported in "Online Public Access Catalogs: The User Interface."[8] The report describes the commands used by these systems and defines the functions they offer. The institutions included in this analysis were: OCLC, RLG/RLIN, University of California, Ohio State University, Northwestern University, the Claremont Colleges, Dartmouth College, Mankato State University, Mission/West Valley Colleges, and Pikes Peak Public Library District. Each institution's system was examined from several different perspectives.

SCOPE AND OBJECTIVES

The study focuses overall on identifying user's problems with the human-computer interface and their preferences for improving it. Nonusers will be asked to identify barriers to their use of the online catalog. The specific goals of the questionnaire survey are:

1. To produce data and interpretations that will enable designers of public online catalogs to improve system interface features. The system interface includes commands, displays, indexes, and similar software- and hardware-related features.
2. To produce data and interpretations that will enable libraries to improve the implementation and support services (the organization interface) for public online catalogs.
3. To collect additional data that will enable libraries to extend public online catalog services to potential users.

In addition to the questionnaire data, some of the participating organizations will collect and analyze data from staff interviews, reference desk logs, computer transaction tapes, focused group interviews, and controlled question searching. These additional substudies will not be described in this report but they will be reported in the literature.

A FRAMEWORK FOR EVALUATING THE USER INTERFACE

For the objectives of the questionnaire study a framework was defined that highlighted several elements of the user interface. We assumed that a *user* with a *question* searches a catalog *database* using an *interface* that has *system* features and *organization* features. The interface is whatever is available in the immediate terminal situation to assist the user in searching. The system and organization aspects of the interface derive from the fact that user behavior is influenced both by system capabilities and by capabilities provided by the library organization.

The system interface includes commands, messages, displays, and other software features such as indexes. The organization interface includes terminal equipment, the physical setting (such as furniture and lighting), staff assistance, printed aids and educational support (such as orientation or training sessions). Essentially the

system interface is everything from the edge of the screen inward and the organization interface is everything from the edge of the screen outward.

This framework enabled us to define a series of questionnaire items that ask for responses in five areas: (1) questions and purposes users bring to the online catalog; (2) problems with the system interface; (3) problems with the organization interface; (4) preferences for improving the database, system features, and organization features; and (5) demographic characteristics of users.

THE FOCUS: THE HUMAN-SYSTEM INTERFACE

The overall focus of our research is the online catalog and how it is used (see figure 1). "Online Catalog Variables" displays the major areas of this human-computer-interaction research project. Each of these variables will be assessed by one or more research methodologies. Each library's collection size and major program will be noted and related to the findings. Library staff members will record their ideas and problems with the systems in logs, and they will take part in focused group interviews. Information on the system such as size, type, display, and dialogue methods will be analyzed. And, last but not least, patrons will be asked to complete questionnaires and participate in focused group interviews as well.

In addition to these methods, some transactional analysis will take place. Transactional analysis in human-computer-interaction studies means the study of the machine-readable dialogue created when a patron interacts with a system. Not all systems have the ability to record or monitor these interactions because of the high costs of an increased system capacity. At this writing, transactional analysis of sample data is planned for the following systems: University of California (MELVYL), The Library of Congress (MUMS/SCORPIO), Ohio State University (LCS), Northwestern University (LUIS), Syracuse University (SULIRS), and Dallas Public Library (LSCAN).

The general project is the largest online catalog use study to date, and possibly the largest catalog use study ever undertaken. The questionnaires are the only research tools that will be used on a wide scale at all locations in the study. For a fuller under-

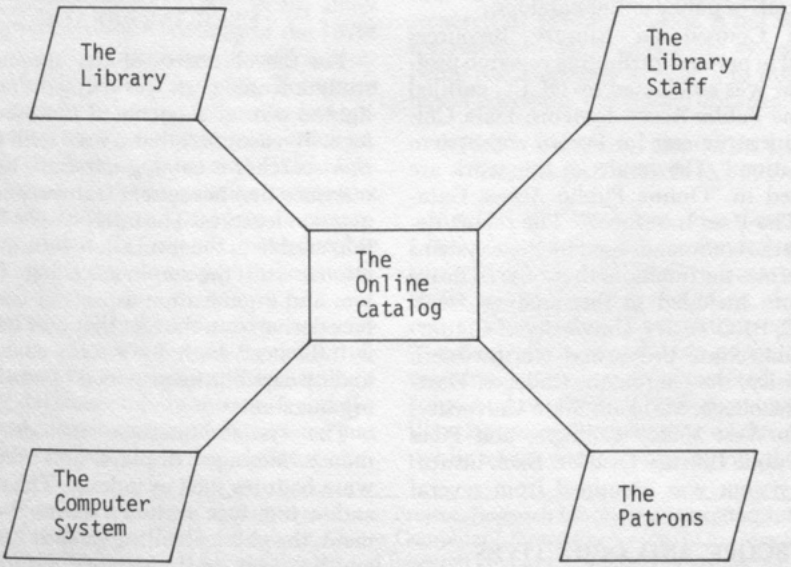

Fig. 1. Online Catalog Variables.

standing of these questionnaires, we move on to a discussion of the data collection method.

DATA COLLECTION APPROACH

Library patrons who either have or have not used the online catalog are asked to complete a self-administered questionnaire. At most participating libraries, users fill out a printed six-page questionnaire. At the University of California libraries, the user questionnaire is administered online to users of UC's MELVYL online catalog system. Users are selected to complete the questionnaire immediately after using the terminal, and nonusers are selected to complete the questionnaire when they are in the library. User experiences and opinions are solicited about the catalog use just completed, about various features of the online catalog system and library services associated with it, and about suggestions for improving both the system and services. Nonusers are asked their reasons for nonuse and about their perceptions of an online catalog. Comparable demographic information is collected from both users and nonusers.

User and nonuser data is collected during randomly chosen time blocks of about four hours each in the morning, afternoon, and evening at library locations where there are terminals. Sample sizes for each library system are in the range of 300–1,500 users and 200–300 nonusers. It is important to note that nonusers are selected from among those who are in the library: this population does not include nonusers of libraries, but is comprised of library users who are not users of the online catalog. This definition of nonusers accommodates resource constraints and permits the study to emphasize a population that is potentially more likely to use the online catalog in the future.

QUESTIONNAIRE CONTENT AND TESTING

The content of the UC online user questionnaire and the printed user questionnaire is the same. The user questionnaire consists of fifty-nine items and the nonuser questionnaire consists of fifteen items. The user questionnaire has four parts including a demographic part. Part 1 asks ten questions about the use just completed, such as its purpose, satisfaction with search results, amount retrieved, and assistance used in searching. Part 2 asks twenty-nine questions about problems with system features such as commands, displays, and assistance capabilities. Part 3 asks five questions about preferences for improving library capabilities, for improving services associated with the catalog (such as signs and brochures), and for improving the database.

The nonuser questionnaire has two parts, including a demographic part. Part 1 consists of six questions, including the reasons for nonuse, perceptions of time required to learn to use the online catalog, and difficulty expected in using the online catalog. The two questionnaires have three substantive questions in common: overall attitude toward the online catalog, likelihood of future use, and a summary comparison of a card (and other print-form) catalog and a computer catalog. In addition, the two questionnaires have several demographic items in common, including frequency of library use, frequency of catalog use, frequency of computer use, and the user's age, sex, and education. Academic, but not public library users, are asked about academic areas (such as humanities or social sciences), about the focus of their academic work (such as teaching or research), and about academic level (such as freshman/sophomore or graduate student–doctoral level). Copies of the questionnaires, are displayed in appendixes 1 and 2.

Both questionnaires were reviewed at various stages by consultants and librarians. They were pretested at several sites, including Evanston (Illinois) Public Library, the Library of Congress, Northwestern University, and Ohio State University in the spring of 1981. The test version provided write-in responses for many items and these were analyzed to improve question wording and response (answer) categories. In addition, the pretesting involved open-ended and follow-up interviews. After extensive revision, the entire survey was pilot-tested at almost all participating library systems in the fall of 1981. Once again, follow-up interviews were con-

ducted and respondent write-in comments were analyzed. The pilot-test data were analyzed, and modifications were made to the questionnaires and data collection procedures.

DATA ANALYSIS AND REPORTING PLANS

Data from the University of California online questionnaire is transferred under program control to files for subsequent statistical analysis. The printed questionnaires are in machine-scannable form and are completed by filling in response circles for each question. The questionnaires are machine-scanned at RLG and the resulting tapes are transferred to the University of California Division of Library Automation in Berkeley, California, where they are processed using Statistical Package for the Social Sciences (SPSS) statistical programs. Frequency statistics are produced for each library system and selected cross-tabulations and correlations are produced for each participating organization.

Individual SPSS files will be produced for each of the five participating organizations. Each organization will then analyze and interpret the data for its own library systems. A list of those library systems is in appendix 3. The project is also exploring the possibility of producing SPSS tapes to be made available to researchers, with accompanying documentation.

Final reports will be prepared and submitted to the council during the fall of 1982. A symposium cosponsored by CLR and the University of Denver Graduate School of Librarianship was held on January 21, 1982, in Denver, to review progress on the project. A recent article in *American Libraries* by Larry Besant reported on that meeting.[9] Preliminary reports on the study findings will be made at the 1982 Annual Conference of the American Library Association and the American Society for Information Science. Material will also be prepared for publication in the professional literature.

Operational public access to online catalogs, while in its infancy, confirms that libraries are on the brink of a new era. This era portends improved patron access to the collections of American libraries. The results from this series of studies, supported by the Council on Library Resources, will provide important new information to improve the existing computer catalogs and guide the development of future online catalogs.

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APPENDIX 1. NONUSER QUESTIONNAIRE

Council on Library Resources

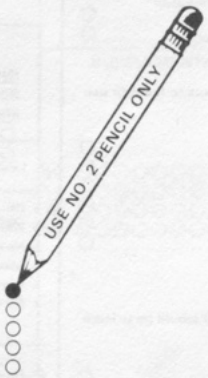
COMPUTER CATALOG STUDY

Questionnaire

The library has a computer catalog and not everyone has had a chance to use it yet. If you have NEVER USED THE COMPUTER CATALOG you can contribute to the quality of library services by completing this questionnaire. It takes about five minutes. Your responses are confidential. Please do not write your name anywhere on the questionnaire. Thank you.

MARKING INSTRUCTIONS

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



11113

DO NOT WRITE IN THIS AREA

NCS Trans-Optic 05 15300 321

PART 1: WHAT YOU THINK ABOUT THE COMPUTER CATALOG

INSTRUCTIONS: Please mark the response that best describes how you view a computer catalog.

1. I have not used the computer catalog up to now because:
(Mark ALL that apply)

a. I do not like to use computers ○
b. I did not know there was a computer catalog ○
c. I do not know where it is ○
d. I have not had time to learn to use it ○
e. I have not taken training sessions on how to use it ○
f. There has not been any staff at the terminals to assist me in using it ○
g. The terminals were all in use when I wanted to use it ○
h. I have not needed to use any library catalog recently ○
i. The card catalog is easier to use ○
j. The card catalog contains more of the information I need ○
k. I am a visitor or infrequent user of this library ○

2. How much time do you think it takes to learn to use the computer catalog?

a. A day or more ○
b. Between 1/2 of a day and a day ○
c. Between an hour and 1/2 of a day ○
d. Between 30 minutes and an hour ○
e. Between 15 minutes and 30 minutes ○
f. 15 minutes or less ○

3. How difficult or easy do you think it would be to learn to use the computer catalog?

a. Very difficult ○
b. Somewhat difficult ○
c. Somewhat easy ○
d. Very easy ○

4. My overall or general attitude toward the computer catalog is:

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

5. How likely are you to use the computer catalog in the future?

a. Very likely ○
b. Somewhat likely ○
c. Somewhat unlikely ○
d. Very unlikely ○

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

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

PART 2: ABOUT YOURSELF

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

7. I come to this library:

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

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

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

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

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

10. My age group is:

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

11. I am:

a. Female ○
b. Male ○

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

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

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

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

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

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

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

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

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

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

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

SUPPLEMENTARY QUESTIONNAIRE ITEMS

16. ○○○○○○○○○○○○○○○○
17. ○○○○○○○○○○○○○○○○
18. ○○○○○○○○○○○○○○○○
19. ○○○○○○○○○○○○○○○○

APPENDIX 2. USER QUESTIONNAIRE

Council on Library Resources

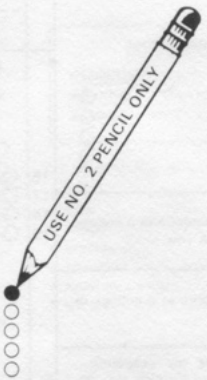
COMPUTER CATALOG STUDY

User Questionnaire

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

MARKING INSTRUCTIONS

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



14769

DO NOT WRITE IN THIS AREA

NCS Trans-Optic 05 15301 321

PART 1: ABOUT YOUR MOST RECENT SEARCH

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- a. YES ○
- b. NO ○

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

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

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

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

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

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

PART 2: YOUR EXPERIENCE WITH COMPUTER CATALOG FEATURES

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

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

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

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

YOU ARE MORE THAN HALF - WAY DONE

PART 3: IMPROVING THE COMPUTER CATALOG

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

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

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

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

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

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

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

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

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

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

PART 4: ABOUT YOURSELF

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

48. I come to this library:

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

49. I use this computer catalog:

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

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

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

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

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

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

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

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

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

54. My age group is:

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

55. I am:

- a. Female ○
- b. Male ○

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

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

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

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

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

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

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

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

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

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

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

APPENDIX 3. PARTICIPATING LIBRARY AND COMPUTER SYSTEMS

STUDY PARTICIPANTS	COMPUTER CATALOG USED
J. Matthews and Associates	
Claremont Colleges	LOLC* (Claremont TLS)
Evanston Public Library	CLSI
Mankato State University	LOLC*
Mission College	ULISYS†
Pikes Peak Library District	LOLC* (Maggie's Place)
Stephen F. Austin State U.	DataPhase
West Valley College	ULISYS†
Library of Congress	MUMS/SCORPIO
The Research Libraries Group (RLG)	
Dartmouth College	LOLC*
Northwestern University	LOLC* (LUIS)
Stanford University	RLIN II
University of California Div. of Lib. Automation.	
UC Berkeley	UC/OLC (MELVYL)
UC Davis	UC/OLC (MELVYL)
UC Irvine	UC/OLC (MELVYL)
UC Los Angeles	UC/OLC (MELVYL)
UC Riverside	UC/OLC (MELVYL)
UC San Diego	UC/OLC (MELVYL)
UC San Francisco	UC/OLC (MELVYL)
UC Santa Barbara	UC/OLC (MELVYL)
UC Santa Cruz	UC/OLC (MELVYL)
Online Computer Library Center (OCLC)	
Case Western Reserve University	LOLC*
Dallas Public Library	LOLC* (LSCAN)
Iowa City Public Library	CLSI
Ohio State University	LOLC* (LCS)
Syracuse University	LOLC* (SULIRS)
Ohio University	OCLC
State Library of Ohio	OCLC
University of Akron	OCLC
University of Texas, Austin	OCLC
University of Texas, Dallas	OCLC

*LOLC = Library Developed Online Catalog.
†This catalog shares the same hardware and software.

Telidon Graphics and Library Applications

Andrej Tenne-Sens

Telidon was introduced in 1978 as "the Canadian videotex system" featuring high-quality graphics that distinguish it radically from other videotex systems. Telidon's alpha-geometric method of graphic-information encoding is equally well suited to use in one-way broadcast (teletext) systems and two-way (videotex) systems. As well, Telidon can be used in personal computing systems, in enhancing existing databases, in "common visual space" applications, and in electronic mail systems. The Telidon presentation level code has been adopted, with extensions, as the basis for Bell System videotex services, and as such it is emerging as the North American standard. Telidon graphics can enhance some of the usual library automation functions but will be most evident in general user applications of videotex and teletext in which the library will play an increasingly important role.

HISTORY

On August 15, 1978, the Canadian Department of Communications unveiled at its Research Centre "the Canadian videotex* system," eventually to be called Telidon.[1] Although it was a latecomer on the videotex scene, having been preceded by the British Prestel and the French Télétel systems, nevertheless its innovative graphics-display capabilities were rooted in fundamental graphics communications research performed by its inventors during most of the previous decade.[2] The Canadian government quickly realized the potential of Telidon as the basis for a new electronic information industry to serve not only special users, such as businesses and institutions that could afford the relatively expensive existing computer-based information storage and retrieval systems, but also the average citizen. Videotex and teletext services have built into them natural economies due to the use of equipment most people already have in their households: the television set as an effective colour video display unit, and (typically) the telephone or CATV cable for data communication. Only one other piece of equipment is necessary in addition to these: an adapter that incorporates both communications hardware and a decoder to translate the received data into text and graphics on the television screen.

In January 1979, the Canadian government officially launched the Telidon pro-

*In this paper the term *videotex* is used to denote interactive data systems, which permit the user to display on a television screen any of the tens or hundreds of thousands of "pages" of information stored in some central computer database, using a two-way communication link. The term *teletext* is synonymous with the term "broadcast videotex" and refers to systems in which a few hundred pages are transmitted invisibly as a signal ancillary to a normal television broadcast in the vertical blanking interval; selected pages can be displayed with equipment substantially the same as that used in interactive videotex systems.

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gram with an eventual funding of $41 million for a four-year period. During this time the technology is to be transferred to Canadian industry, i.e., equipment manufacturers, systems operators, and information providers alike are being encouraged to adopt the Telidon standard in their videotex and teletext systems.[3] As a result, by the end of 1981 there were more than sixteen systems planned or in operation in Canada, seven in the U.S., and three internationally, with the announcement of new systems at a rate of about one per month.

TELIDON GRAPHICS

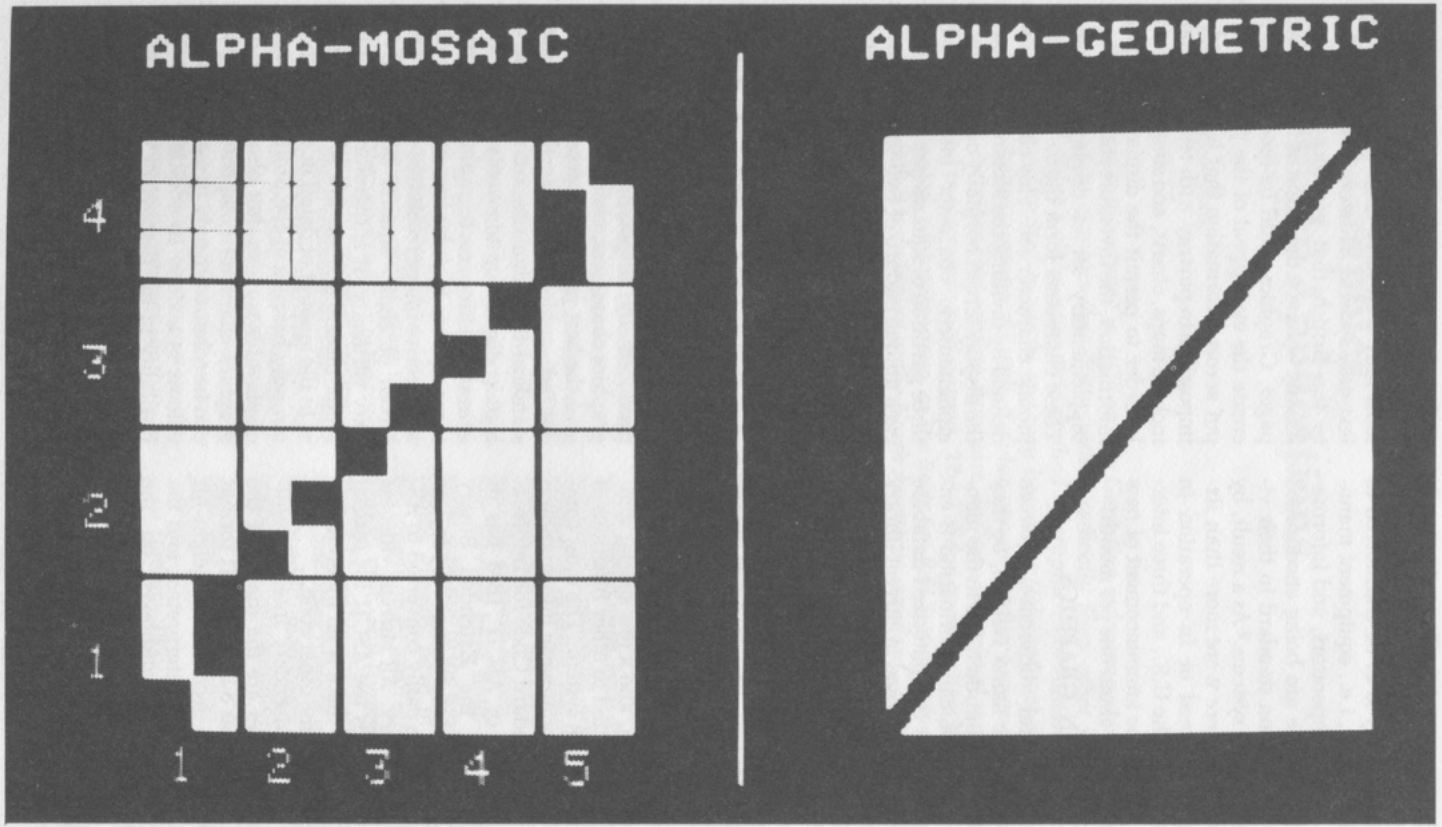
The fundamental difference between systems bearing the name Telidon, be they videotex, teletext, or other, lies in the manner in which graphical information is encoded. Traditional computerized database systems such as those used in current library automation systems are solely alphanumeric systems. The so-called presentation-level protocol for such systems, using the terminology introduced by the International Standards Organization's work in open-system interconnection,[4] defines the eight-bit code for the displayable alphanumeric characters. These include both upper- and lower-case letters, numerals, punctuation marks, and a few special symbols and codes related to other functions of the communication system. The most common code for alphanumeric information is the American Standard Code for Information Interchange, or ASCII. IBM has its own code called the Extended Binary Coded Decimal Interchange Code, or EBCDIC, which is easily converted to ASCII where necessary. All current videotex and teletext systems use ASCII for textual information, since there is no inherent advantage in using some other code.

Resident in the decoders' internal semiconductor memories are the shapes of the ASCII characters: as data in ASCII format are received by the decoder, each eight-bit character, or byte, is interpreted, and the appropriate shape is displayed on the screen. The British and French systems display the characters in a natural sequence, that is, character by character from left to right, line by line from top to bottom, because this is the normal sequence of writing and reading most of the world's languages.

The original videotex and teletext systems may well have been conceived to be text-only systems. However, it was evident to the British that graphics could enormously enhance the value of the displayed pages. Graphics could be used to both increase the eye appeal of the pages, and to put across information that is awkward or impossible to portray with text; this would include maps, charts, and simple diagrams. In order to permit the display of graphics information, the inventors chose to define a supplementary set of display characters. These characters form the so-called alpha-mosaic character set. This character set is defined by dividing the rectangular area on the display screen normally occupied by an alphanumeric character into a two-by-three partition of squares (see figure 1). For each unique pattern of two-tone colourings of these squares, there is assigned one eight-bit code that resembles the ASCII code. Other codes define the "foreground" and "background" colours (for both the alphanumerics and the mosaic graphics), text sizes, and other parameters. The standard colours are black, white, red, blue, green, yellow, magenta, and cyan.

In alpha-mosaic systems, graphics are produced by displaying strings of the graphics characters, chosen by the artist to give the best possible representation of the desired subject. If North American-standard television sets are used, one can legibly display up to twenty lines of forty characters. Since each graphics character is three squares high by two wide, this gives an effective image resolution over the entire screen of eighty squares horizontally by sixty vertically. It is therefore evident that alpha-mosaic systems are severely limited as to the amount of detail in a given image, not only because of the limited number of displayable squares, but also because each graphics character comprising six squares can be coloured in only two of the standard colours at a time. In addition, there is no flexibility in the manner in which the image is produced on the screen: all images must appear character by character, line by line, filling the screen from top to bottom.

As far as alphanumeric information is



On the left the character boundary lines—not normally visible—have been added to clarify the form of each alpha-mosaic graphics character. The two areas shown correspond to the area covered by four lines of five normal-size characters each; a complete "page" on a normal television screen would show twenty lines of forty characters each. (This and the other illustrations are directly photographed from a Telidon terminal having a resolution of 256 points horizontally by 200 points vertically.)

Fig. 1. Details of Alpha-Mosaic and Alpha-Geometric (Telidon) Representations of a Diagonal Line.

concerned, Telidon's presentation-level protocol is identical to that of the alpha-mosaic systems, namely ASCII. But the way in which graphical information is defined is radically different, giving rise to the term *alpha-geometric*.

Alpha-geometric Telidon systems place much of the computing burden to produce fine graphics in the receiving terminal itself. The terminal is, in the proper sense of the word, a microcomputer, complete with input/output ports, read-only memory (ROM), random-access memory (RAM), and a general-purpose microprocessor such as, for example, the Zilog Z-80 or Motorola 6809. What the terminal receives for display are picture description instructions, or PDIs, which tell the terminal what to draw and where on the screen, in an organized and systematic manner. The resolution typically available is roughly 250 individually resolvable points horizontally by 200 vertically, each of which can *independently* assume any of the eight aforementioned colours plus six shades of gray between full black and white. If the application requires it, terminals with even more resolvable points and displayable colours are possible to display the same data with better image quality.

The standard version of PDIs describes five basic geometric forms from which all images are constructed: individual points, straight lines of any length and orientation, rectangles of any size, arcs (including circles), and irregular polygons of any number of vertices (figure 2). The PDIs are a series of commands and coordinate specifications that tell the terminal what to draw where. For example, to display a line, the terminal is instructed that a line must be drawn; this requires essentially one byte of information. The terminal is then told where the ends of the lines are located; typically this requires six bytes of information. It is now up to the terminal itself to draw the best line possible between the two specified end points. Rectangles are specified by the coordinates of two diagonally opposite corners, arcs by three points, dots by one coordinate specification, and polygons by specification of the vertices' coordinates. Other code words are used to define colours, specify whether areas are to be outlined only or filled in, whether lines should be solid or dotted or dashed, and in the case of filling, what the fill pattern is to be. Text can be displayed at any location on the screen; moreover, it can be written left to right, right to left, or up to down.

Telidon graphics are therefore built up, graphical element by graphical element. The stream of PDIs received usually describes large background features first, the foreground features, and finally ever-finer details until the picture is complete. Watching the picture being displayed is much like seeing a time-lapse movie of the creation of the image by the original artist. Images of excellent detail are thereby possible, (figures 3 and 4), and features can be made to blink.

The Telidon code also permits the display of quasi-photographic images in a manner similar to facsimile. In the photographic mode, an image is displayed point by point, line by line, usually over a limited portion of the screen, with each point coloured in one of eight gray shades (figure 5). Production of the PDI data for such images can be easily done automatically from the video output of a TV camera.

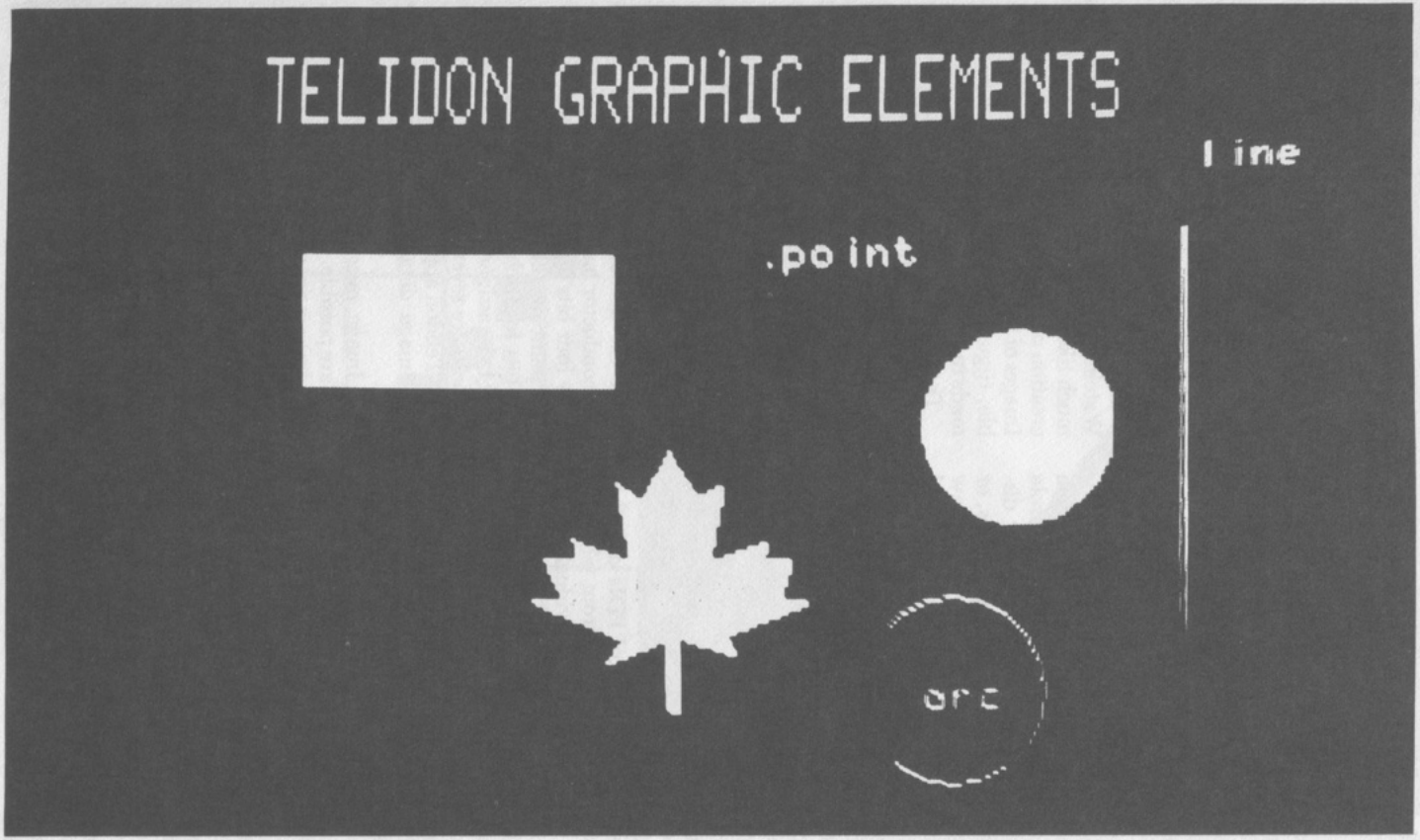
An important component of good-quality Telidon terminals is the frame store inside the decoder. The frame store is a semiconductor memory that associates typically four bits of memory to each displayable point on the image. Since there are four bits for each point, this permits each point to be assigned one of sixteen colours.

There are several important advantages of the Telidon approach to graphics:

1. Image detail and realism are very good.

2. Image overlays and simple animations are possible.

3. Images are simple to create using several methods of image creation. The most common way is to use a dedicated image-creation microcomputer system called an information provider terminal. No technical knowledge is needed to operate this machine, and images are virtually sketched on the TV screen using an electronic graphics tablet. Other less versatile ways of creating Telidon images include using a personal computer, or using the host computer in a videotex system where such capability is



The circle and arc are two forms of the same PDI command. Lines can be displayed with any orientation. Areas may be filled with solid colour, filled with various meshlike textures, or simply outlined.

Fig. 2. Examples of Telidon's Five Basic Graphics Elements

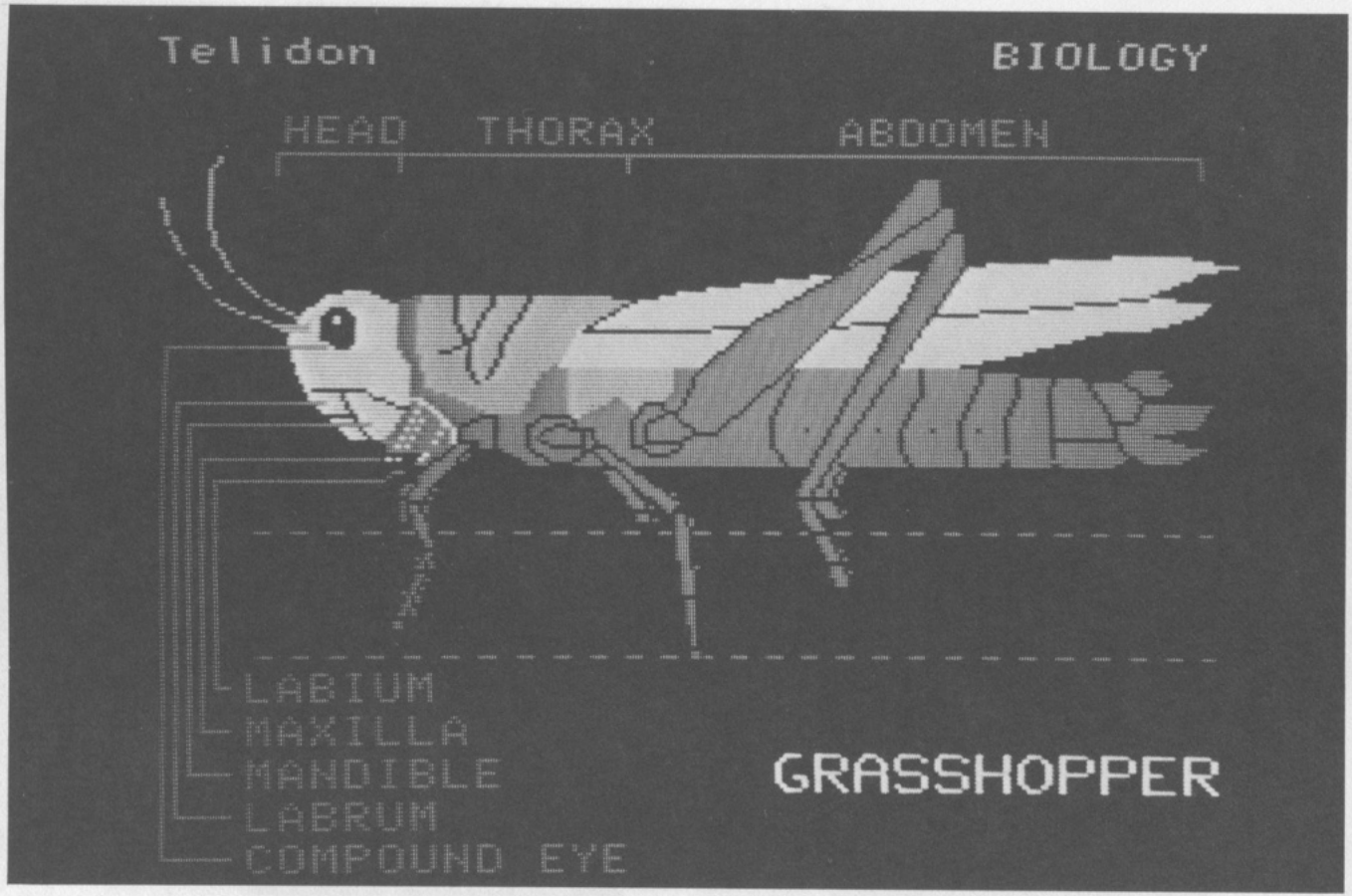
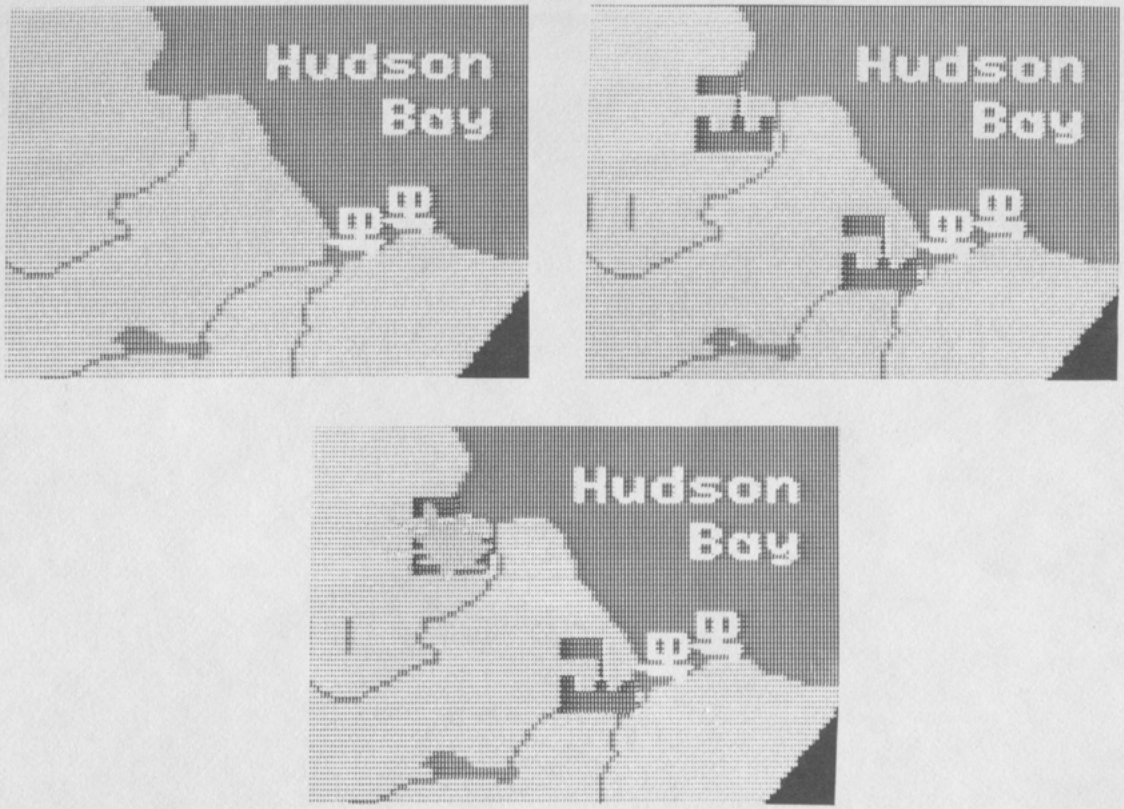


Fig. 3. A Typical Telidon Diagram Showing the Degree of Detail Possible.



Events described in successive pages of the text, which appears on the right half of the screen, are appropriately illustrated: the arrival of explorers' ships, the construction of two forts, and the destruction of one of the forts. The area shown here is one-tenth of full-screen area. Similar manipulation of images can be used to produce simple animations.

Fig. 4. Detail of a Map Accompanying a Lesson in the Early History of Manitoba.

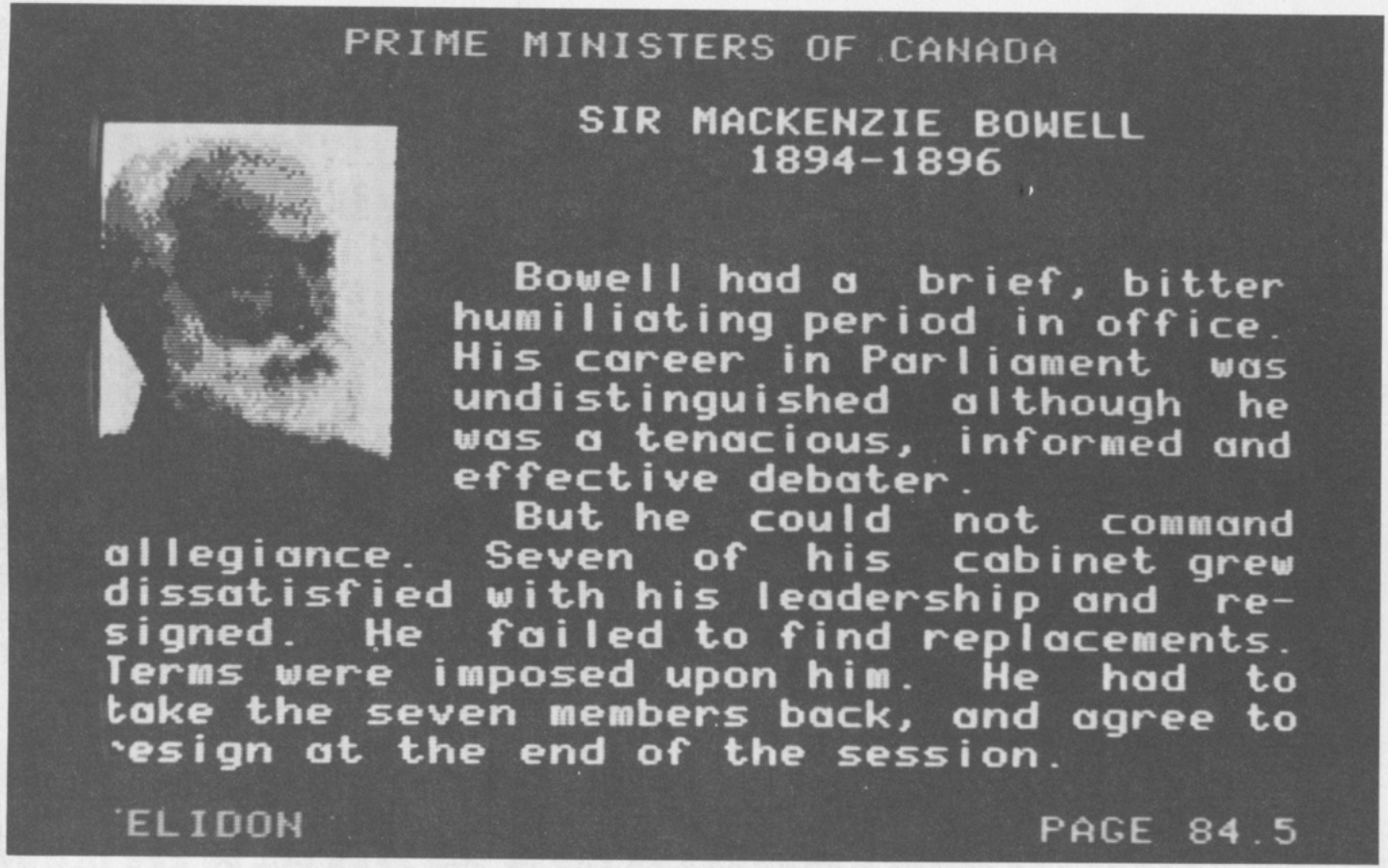


Fig. 5. A Telidon Page Containing a Quasi-Photographic Image.

supported by the host software.

4. Telidon images can be stored on any digital storage medium including hard magnetic disc, semiconductor memories, even audio magnetic recording tape and videodisc.

5. Telidon images can be transmitted over any medium. There is no inherent limitation on the transmission speed of Telidon graphics, so that any standard digital communications equipment may be used in accordance with system requirements. Standard public switched-network telephone lines permit transmission speeds up to 4800 bits per second; currently, 1200 bits per second is a popular speed. Transmission media can include wire pairs, cables, optical fibres, microwave links, line-of-sight laser links, and satellites.

6. Telidon images can be displayed on a wide variety of electronic display media and the same data will serve all such displays. Both black-and-white and colour televisions may be used; any of the three major world television standards are suitable for Telidon display. For special applications, high-resolution monitors may be desirable. In this case the terminal hardware could support a resolution of 500-by-500 points, for example, or higher. Since the data files specify coordinates of the elements that make up each image, it is not necessary to change the data to suit the receiving terminal; each terminal simply draws the image *as best it can* according to the data.

7. Telidon is designed to be immune from technical obsolescence. Any of the foreseeable technical developments such as faster and denser computer memories and devices, higher-resolution display systems, and broader-band transmission systems such as the two-way CATV systems now being installed, will serve to enhance rather than make obsolete Telidon-based services. Information now being created in the Telidon format may become outdated in the light of general advancement of knowledge, but will never have to be reformatted for technical reasons. This is analogous to the fact that books printed hundreds of years ago on obsolete equipment are still readable.

TELIDON SYSTEMS AND EXPERIMENTS

There are now a large number of experimental and commercial Telidon systems, both of the videotex and teletext variety, in Canada and abroad. Table 1 presents a list of a few of the major ones. Notable among these are the Ontario Educational Communications Authority, Bell Canada, and WETA experiments, which involve the

Table 1. Some Telidon Systems Planned and in Operation as of December 1981

Operator	Location	Number of Terminals	Type of System*
Ontario Educational Communications Authority	Ontario	55	V,T
Bell Canada	Toronto; Quebec City	490	V
Project Grassroots	Southern Manitoba	320	V
Manitoba Telephone	Elie, St-Eustache, Manitoba	150	VF
Alternate Media Centre of NYU/Station WETA	Washington, D.C.	60	T
Government of Venezuela	Caracas	25	V
Canadian Broadcasting Corporation	Toronto; Montreal; Calgary	550†	T
Ontario Department of Industry & Tourism	Ontario	2,000†	V
Times-Mirror	Los Angeles	200†	V
Frittsco, Inc.	San Joaquin Valley, CA	500†	V
Time, Inc.	Orlando, Florida; San Diego, California	300†	TS
Cablesystems Pacific	Portland, Oregon	TBA†	T

* V = videotex via telephone line or two-way cable; T = teletext; VF = videotex via optical fibre; TS = teletext via satellite and one-way cable.
†In planning.

transmission of information provided by local libraries. The Time, Inc., experiment will include material gleaned out of that publisher's other magazines, thereby providing electronic periodicals access to specially designed consumer magazines.

The value and impact of videotex services on the public library's role was well demonstrated by the Online Computer Library Center's (OCLC) Channel 2000 experiment (non-Telidon). Among the services included in this experiment were a 32,000-article video encyclopedia, a bibliographic reference service, a public information service, hōme banking, and a community calendar. Similar services are common to many of the Telidon services listed in table 1. It is notable, however, that the OCLC Channel 2000 report specifically mentions that in the encyclopedia "illustrations or graphics had to be omitted."[5] The quintessential feature of Telidon in the context of videotex services is that it permits inclusion of most of such illustrations and graphics.

Telidon's graphics code has applications other than to videotex and teletext services alone. Currently, the Communications Research Centre is perfecting the so-called common visual space (CVS) application. CVS systems will permit voice and graphics dialogue over public-switched telephone networks. Two people at a distance will be able to draw and modify a common image visible on their respective monitors while conversing at the same time, much as individuals in proximity can work on the same sketch on a blackboard. In electronic mail services, Telidon code will permit efficient storage and transmission of company logos, graphs, charts, maps, etc. Indeed, the code may be used to enhance even existing data systems with efficient graphics capabilities where such capabilities are useful; this point will be pursued upon discussion of library automation systems.

TOWARDS A NORTH AMERICAN STANDARD

The Telidon systems listed in table 1 that are currently operational are all based on the original version of PDI encoding first enunciated in 1978. Considerable effort by the Department of Communications ensured the recognition of alpha-geometric graphics as an international standard within the aegis of the United Nations' International Telecommunications Union. A landmark event took place at the international conference "Videotex '81" in Toronto, in May 1981, when AT&T, after consultation with the Department of Communications, announced the Bell System videotex presentation-level protocol. Bell's graphic coding scheme[6] is essentially that of Telidon, with some extensions fully in keeping with the Telidon philosophy of extensibility of features while maintaining compatibility with established databases and user hardware. Canadian equipment manufacturers have adapted their product lines to include the new capabilities of the Bell System standard. It appears that this standard is now becoming the de facto North American videotex standard and will probably extend into teletext and other types of services as well, for reasons of economy.

Briefly summarized, Bell System's extensions of the PDI code are the following:[7]

1. There is included an alpha-mosaic graphics character set. This permits relatively easy access to videotex data encoded in European format. Some preprocessing of European data is still necessary, however, since the codes for colours, text sizes, etc., are different from the European codes.

2. There is included a dynamically redefinable character set (DRCS). DRCS permits the host computer to define the shapes of special characters at the beginning of a session. For example, if the user signs on into a mathematics lesson, many of the special symbols such as Greek letters, integral signs, etc., may be down-loaded into the DRCS section of the decoder. It may take a dozen bytes to define each DRCS character at the beginning of the session, but thereafter it will take only one or two to call each up as required.

3. It is possible to define "macro-PDIs." A macro-PDI is a two- or three-byte identification code for a previously transmitted sequence of PDIs. It is useful for the display of repetitive graphics such as logos and is analogous to DRCS except that it is used for economy of data for graphics transmission and display.

4. A wider range of colours is possible. The new code allows specification of virtually any colour, although practical imple-

mentations of terminals will probably be limited to the simultaneous display of any 16 colours out of a choice of 4,096. Blink processes of complexity greater than just on-off will also enrich the display.

5. Smooth complex curves using so-called spline functions will be definable with a minimum of coordinate specifications.

6. A new PDI called the "increment" will permit description of freehand curves such as personal signatures.

One should not be left with the impression, however, that further developments are precluded. On the contrary, the North American standard specifically mentions, but does not yet define, standards for both three-dimensional images and full-colour quasi-photographic images. In addition, research is in progress for the addition of synthesized voice and sound to Telidon images. Communication protocols are being developed for common visual-space services. Pattern-recognition machines to convert images on conventional hard copy automatically into PDIs must be developed to satisfy the rapidly growing demands for database content. Also under development are picture manipulation instructions, which will serve to improve the quality of animations. These instructions will permit portions of the image to be expanded, shrunk, rotated, or simply moved in various ways.

TELIDON AND LIBRARIES

Electronic data systems are appearing both within the institutions traditionally set up for the gathering, storage, and access of information, i.e., the libraries, and among those whom the libraries would serve, i.e., the public.[8,9]

Within the library, automation systems are most commonly used for online catalog data entry and file maintenance; online searching according to subject, author, ISBN number, etc.; circulation control; serials management; accounting; and acquisitions.[10]

It is the online search functions that might best utilize the high quality of Telidon graphics. First, PDIs make it possible to store and display non-Latin-based alphabets. Such alphabets are displayable with even the simplest Telidon terminals using the five basic geometric forms, and those including the DRCS capability can be down-loaded and display variant alphabets with transmission efficiency equal to that of standard character sets. Thus, one could list items using their particular language of authorship, even for pictographic languages such as Chinese. Secondly, indexes based on visual symbols other than alphabets could be constructed to aid access to library material. Two examples would be music scores for which the first few bars could be displayed to aid the musician in finding a piece whose melody he/she knows; and structural chemical symbols to help the organic chemist find references to chemicals according to their molecular structure.

Videotex systems can potentially provide a very wide range of new information services to the home. The data banks to which the terminal may be connected via telephone line or two-way cable make it possible, as in the Channel 2000 experiment, to provide encyclopedic reference services, online bibliographic search services, ordering of books or other merchandise from the home, up-to-date revisions of rapidly changing information such as news headlines and weather reports, etc. Canadian manufacturers are also producing Telidon terminals that can be used as personal computers. Such computers can access not only isolated pages of information from host computers, but also entire software packages (for nominal fees). The tremendous possibilities of such systems have only just begun to be explored. We will not, however, discuss all of the new services videotex makes possible, but rather we will restrict our speculations to how Telidon's high-quality graphics could be put to use in library applications for the home user and library patron. Among the possible uses are the following:

- Information provided by libraries via videotex or teletext databases can include charts, diagrams, maps, even black-and-white photographs. Community calendars reporting hours of library operation can include maps of library locations with public transportation routes. Moreover, this information can be kept up to date as often as desired.
- Home online bibliographic search and

ordering services can include sample images from listed books. The covers of best-sellers or even simple interior illustrations could be displayed.

• Telidon terminals within the library could be used by patrons for aid in the use of the library itself, complete with floor plans showing the particular locations of given categories of information.

• Many children's books could be offered online. Telidon would be particularly suitable since in children's books the amount of text per page is significantly less than in adult books. As long as standard television sets are used as displays, they will be hard pressed to display more than twenty lines of forty characters each, a format that easily accommodates whole pages of children's books. Moreover, the characteristically simple illustrations can very effectively be encoded into PDI format. An interesting variety of story is one in which the reader can determine the course of events by having to make choices at key points in the story. In this way, the child can exercise a degree of control of the medium that is not possible with conventional television.

• In Canada, it is envisaged that videotex databases will be interconnected across the country using packet-switched data networks. It will thereby be possible to easily and rapidly obtain information from libraries other than those in one's local area. This will do much to help even out the disparities in richness of information between small, remote communities and large, relatively wealthy urban centres.

• When used for teaching, the computer is recognized as being infinitely patient. Some writing and reading skills could be taught to young children with visual interest added by colourful graphics. Any type of font may be displayed to show children the different forms the same letter may take.

• Many libraries now stock nonprint audiovisual material such as filmstrips, records, videotapes, and lately, videodiscs. Filmstrips are characterized by their still frames rich in graphics content and their suitability for projection to audiences. Similar linear sequences of images in Telidon format could be naturally stored in the host computer for display to individuals or groups of people. This would be a powerful teaching tool for use in the classroom, since literally thousands of such "electronic filmstrips" could be accessed on demand by the teacher. A normal television monitor could serve a small class; projection-TV monitors could be used for larger audiences.

These are just some of the applications that come to mind for library-related Telidon applications. Undoubtedly others will arise as a result of Telidon's efficient graphics storage and transmission capabilities.

CONCLUSIONS

Electronic database systems, be they institutional, such as those in library automation systems, or commercial, such as home computer networks and, lately, videotex services, have generally been limited to text-only services. The Telidon graphics code adds a new dimension to such services by making it possible to include detailed graphical information as well. The perceived added value of good-quality graphics will popularize consumer-oriented services, and with them will come the public's greater demand for libraries' involvement as information providers and in some cases as system operators.

ACKNOWLEDGMENT

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GUIDELINES FOR OFF-AIR TAPING

30 Questions Librarians Ask about Taping Copyrighted Television Programs for Educational Use: Interpreting the Guidelines for Off-Air Taping has just been published by the American Library Association. It responds to issues raised for librarians and others interested in the dramatic new developments in the technology of material transmitted via broadcast media.

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Status of Bibliographic Record System Elements

C. Lee Jones

The phrase "bibliographic record system" is used in this article to identify the several functions that contribute to the total bibliographic record structure of the country. Not only is this system composed of the large shared-cataloging services and their subsystems, it is also composed of those systems employed by individual libraries to accomplish the many tasks that revolve around bibliographic records. The discussion divides the bibliographic record system first by market type: government sector, other not-for-profit organizations, and the for-profit sector. It is then divided by function: shared cataloging services, interlibrary loan services, online public-access catalogs, circulation control systems; serials control systems, and acquisitions systems. In the aggregate, all of these elements plus the journal citation retrieval systems (not included in this review) compose, by virtue of future linking possibilities, the bibliographic record system.

In late 1978, as the result of discussions with many individuals and organizations, the Council on Library Resources (CLR), having received support from seven private foundations (Carnegie Corporation of New York, Commonwealth Fund, Ford Foundation, William and Flora Hewlett Foundation, Lilly Endowment, Inc., Andrew W. Mellon Foundation, and Alfred P. Sloan Foundation) and the National Endowment for the Humanities, created the Bibliographic Service Development Program (BSDP). The three principal goals of the program are:

1. The provision of effective bibliographic services for all who need them;
2. The improvement of bibliographic products; and
3. The purposeful control of costs of bibliographic processes and services in individual libraries.

In pursuit of these goals, CLR formed a program committee composed of senior executives of the three U.S. shared cataloging services and the Library of Congress (Fred Kilgour, OCLC; Ed Shaw, RLG; Rod Swartz, WLN; and Henriette Avram, LC), and representatives of the research library community (Carol Ishimoto, James Govan, and Joan Gotwals). The program committee has helped define the areas of BSDP activity, and after three and a half years believes the time has come to evaluate progress and prospects.

As part of this evaluation, an effort has been made in this document to identify and record the status of various elements that, taken together, form our de facto nationwide bibliographic record system. It should also be recognized that this summary is almost instantaneously out of date. The areas dealt with are rapidly changing ones and refuse to hold still while one examines them

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or shares the results of an examination with others. What may have been true when this document was prepared (December 1981), may not be true by publication time.

The discussion will be limited to those library functions for which bibliographic records are essential. Only providers of systems or services based on bibliographic records will be included. Clearly, there are several kinds of providers; those in the federal/state government sector; those in the academic sector; those in the public/private sectors; and those in the profit/not-for-profit sectors. There is a complex mix of categories of providers, some acting as profit-making agencies at one time and as not-for-profit agencies at another. The categories used in this summary are government, not-for-profit, and for-profit sectors. Though economic motives are real and in the end can not be ignored, the more pressing issues revolve around the necessity of recovering at least the total costs of providing services. Only in the government sector (both state and federal) is there a subsidy that can be counted on to support services. That is not to say that libraries do not provide operating subsidies to for-profit and not-for-profit providers of services, subsidies that for the most part are not acknowledged or recognized.

Bibliographic records continue to be essential to libraries and their users for a variety of purposes and functions. It has been more than a decade since the majority of records came directly from the Library of Congress (LC) in the form of printed catalog cards. Now records are provided by a number of agencies and take several forms: magnetic tape, magnetic disk, book catalogs, and microforms as well as printed cards. These agencies, all with ties to LC, though few having any operational ties with each other, can be considered, in the aggregate, as components of a nationwide bibliographic record system.

For convenience, these agencies can be grouped according to the functions they provide. The functions that will be examined include shared cataloging services, interlibrary loan or document delivery, online catalogs, circulation systems, serial control systems, and acquisitions systems. Relationships between providers will be indicated in the first function in which the provider is mentioned, in most cases, the shared cataloging services section.

SHARED CATALOGING SERVICES

Nearly all agencies that provide bibliographic services are represented in this function. It covers the provision of cataloging information created by others for the purpose of sharing that information with subscribers or members. It does not mean that the information must be in machine-readable form, though most often it is.

Government Sector Providers

There are several government sector providers, but one is dominant, the Library of Congress (LC). LC produces more bibliographic records than any other single library in the United States and is likely to continue to do so. These records are the standard by which others measure their quality and, indeed, many replace locally generated records with appropriate LC records as they become available. LC distributes the machine-readable records it produces via the MARC Tape Distribution Service run by the Cataloging Distribution Service of LC. The fee for this subscription service is a function of the cost of making copies of the records available in machine-readable form, approximately three cents per record. LC records generally are not available online from LC, but on magnetic tape only. Nearly all of the shared cataloging services subscribe to the LC MARC tapes and use them as the backbone of their services. LC distributes bibliographic records by form of material; that is, one can subscribe to the "Books" records or the "Serial" records or the "Authority" records or any of several other categories of records as separate units.

The National Library of Medicine (NLM) is another federal supplier of bibliographic records. It provides records it produces directly to other suppliers, both for profit and not for profit. NLM provides direct access to its bibliographic records through its online service known as MEDLINE. This agency provides access to its online files for the cost of telecommunications and the incremental cost of provid-

ing online access. There is no effort to recover all costs of creating the database.

The National Agricultural Library (NAL) is the other U.S. national library that creates and, through OCLC, provides access to its bibliographic records. This library also provides access to a number of special agricultural databases which it produces.

The Government Printing Office has for several years been cataloging an increasing portion of its output, also using the OCLC system, and provides this information to LC for subsequent distribution through the LC MARC Distribution Service.

The National Library of Canada (NLC) and LC have cooperated in an exchange of bibliographic records for many years. NLC's records are distributed in the U.S. through the LC MARC Distribution Service. NLC also distributes its records via a subscription service to interested institutions including the Canadian shared cataloging services. The Canadians are presently studying a system that would allow institutions to obtain records online directly from NLC. This project is still very much in a developmental stage but looks as if it may include a mechanism for linking several of the Canadian shared cataloging services.

There are several foreign national libraries which provide tapes of their bibliographic records to LC; LC redistributes only Canadian records through the MARC Distribution Service. Records from certain national bibliographies can not be distributed by LC because of the expectation of royalty payments for the subsequent use of these records. Foreign records, however, continue to be available in other forms since national libraries still produce paper copies of their national bibliographies that are used by some libraries to obtain cataloging copy. In spite of conditions which preclude subsequent redistribution, LC still supplies copies of its machine-readable bibliographic records to those foreign national libraries providing their records to LC. LC records are provided to foreign national libraries with no restrictions on their subsequent use, nor any expectation of royalty income.

An example of a state agency providing bibliographic record services is the Washington State Library which developed and still sponsors the Washington Library Network (WLN). WLN, along with other organizations that are often referred to as "utilities," will be referred to in this document as a shared-cataloging service. It serves the Pacific Northwest and some subscribers in Arizona. Through an online computer network, WLN provides a cooperative cataloging service based on records received by subscription from the Library of Congress and on records contributed by its subscribers. WLN provides service to all kinds of libraries in its principal area of operation and promotes the leasing of its software to organizations that can take advantage of it. It hopes to share future development work with those who acquire the software and upgrade it. WLN provides a range of services to its members that goes beyond shared cataloging services. Though WLN is presently under the administrative control of the Washington State Library Commissioners, there is some discussion of turning WLN into a self-supporting, not-for-profit organization.

Not-for-Profit Sector Providers

Government agencies are just one segment of the not-for-profit providers of shared cataloging services. The oldest and largest of these, outside of the Library of Congress, is Online Computer Library Center (OCLC), located in Dublin, Ohio. OCLC provides shared cataloging services to over 2,000 libraries of all kinds, serving over 4,000 terminals in those libraries from a database that contains over 8 million bibliographic records and 107 million holdings records. This organization is the dominant one in providing shared-cataloging services to the nation's libraries. Most any library can purchase OCLC services. It is also possible for groups of libraries to pool their processing requirements in order to obtain OCLC service. Like all other shared cataloging services, OCLC bases its service on LC MARC records and the original contributions of its subscribers. An original contribution from a subscriber will be replaced by an LC record, when and if it is received and can be identified. Initially, OCLC participants had to pledge to do all cataloging of materials in alphabets processed by the

OCLC system on OCLC. However, this requirement has been modified since few large institutions could honor such a commitment. There is also some indication that noncontributing libraries will soon have access to the OCLC database.

OCLC recently announced that it will market a Total Library System (TLS) based on the system developed by Claremont Colleges. Using an HP-3000 and records from the OCLC cataloging system, the TLS will provide online catalog and catalog maintenance services, as well as an acquisitions system, fund control, and a circulation system.

OCLC has a unique, interdependent relationship with many of the regional and state networks. It is presently talking with WLN in an effort to strengthen services provided to subscribers of both systems.

OCLC works closely with the Library of Congress to provide administrative management and system support for the construction of the CONSER file. One of the thornier problems facing the library community at the moment is the fact that those institutions building the CONSER file were formerly all using the OCLC shared cataloging system. Some of these institutions have moved to the Research Libraries Information Network (RLIN) system and no online or other means of coordinating their contributions to the file have been developed. CONSER participants have talked with representatives of OCLC and the Research Libraries Group (RLG), but no accommodation relative to sharing of CONSER data between the two systems has resulted. The only accommodation so far is a monthly CONSER record update service based on a snapshot of the CONSER database produced by OCLC and distributed by LC.

Third parties have managed to merge and use information from the OCLC, RLG, and WLN databases. SOLINET, on contract from the American Association of Law Libraries, produced a microfiche document of the holdings of law libraries that use all three of the U.S. shared cataloging services.

CLR's BSDP has opened ways for the three services to work together on several projects. All are working on a project to evaluate online public-access catalogs, and on a project to bring into existence a Name Authority File Service for use by all the libraries of the nation. The Association of Research Libraries (ARL) is coordinating efforts by OCLC and RLG on yet another project, this one involving bibliographic records of microform material. The project involves contributing machine-readable copies of bibliographic records of microform material to the Library of Congress. LC would like to use these records for its own needs and would also like to redistribute all contributed records via the MARC Tape Distribution Service. So far, the redistribution issue is an unresolved problem.

UTLAS (University of Toronto Library Automated System) is a large Canadian shared cataloging service. It obtains records from, among others, the Library of Congress and the National Library of Canada. It provides what amounts to a private file service for its subscribers, since one institution can not use another's records unless it has permission to do so. Like other shared cataloging services, UTLAS provides several other services to its customers. It has signed a memorandum of agreement with the Research Libraries Group to do cooperative development and to share files. UTLAS has expressed a willingness to work with other shared-cataloging services. So far, all customers are Canadian except for one U.S. library and a Japanese book wholesaler, Maruzen.

The Research Libraries Group (RLG) assumed ownership of the BALLOTS shared cataloging service developed at Stanford University and renamed the system the Research Libraries Information Network (RLIN). RLG is an organization owned and operated by a collection of research universities and independent research libraries. There are several program areas which are central to the goals of the organization including shared cataloging, collection development, resource sharing, and preservation. The newly reconfigured RLIN II system is the bibliographic operating system providing support for these programs. When RLG assumed control of BALLOTS, there were a number of smaller institutions, primarily in California, obtaining shared cataloging services through that system. RLG pledged to continue providing services to them. With these excep-

tions, only RLG members are provided with shared cataloging service, though access to the database by any institution is available through search only accounts.

RLG has signed memorandums of agreement with two other shared cataloging service organizations, UTLAS and WLN. The agreement with WLN has had the more obvious results. The two organizations are working with the Library of Congress to create a system linking their authority systems for the purpose of sharing authority records. Other relationships, especially those with OCLC, have been mentioned earlier.

One of the more ubiquitous library organizations is the regional network. In a sense, WLN is a full-service regional network since it supports an online shared cataloging service. CLASS (California Library Authority for Systems and Services) is another unique sort of network. It provides access to the RLIN system for those who are not RLG members, at least within California. Most other regional networks that provide access to shared cataloging services provide them on behalf of OCLC. Some of these organizations were formed exclusively to market OCLC services while others were organized for other purposes but later became brokers of OCLC services. Service contracts exist between OCLC and these regional networks, establishing the context in which OCLC services are provided through the network. The networks are usually incorporated bodies (MINITEX, the state-run network for Minnesota, is an exception) controlled by the institutions they serve. The governing boards normally determine what the activities of the network will be and what rates will be charged to network customers. Often premiums are charged in order to provide the network with capital to develop other services. The principal activity of these networks is to market OCLC online services, to train those who will use the services, and to bill and collect for services rendered. Other services may be developed by one regional network or another, but there is no other common set of services.

For-Profit Sector Providers

While the not-for-profit sector must recover the costs of providing services in order to continue providing those services, the for-profit sector must recover costs plus sufficiently more, to encourage investment and to reward risk. It is not unusual for a profit-making organization to have business relationships with organizations in the government and not-for-profit sectors. All of the for-profit organizations which provide current shared cataloging support services base those services on LC MARC records which they purchase from LC. WLN has a relationship with a for-profit organization known as Biblio-Techniques, which markets the WLN software and supplies installation support services, sometimes on contract from WLN.

Another profit-making shared cataloging service, provided by Informatics, is known as Mini-MARC and is based upon a copy of the LC MARC record set provided on machine-readable floppy disks. Libraries can buy the system which includes a microcomputer, the floppy disks, a microfiche reader, and a set of indexes in fiche form. When a library does not find a desired record in the system, it must create an original one or find cataloging copy in another source. Unless the library already belongs to a machine-based shared cataloging service, that original record has no way, at the moment, to become a part of the nationwide set of databases that is likely to constitute the national bibliographic record set. A recent addition to the Mini-MARC service is access in search-only mode to the RLIN database for verification purposes. This will most likely take care of the needs of smaller libraries, except for special local items that even research libraries are slow or loathe to add to their collections.

Brodart and Blackwell North America (BNA) offer different kinds of shared cataloging services: Brodart services based on records for items found in *Books In Print* and BNA services based on MARC records plus contributions from client libraries. Such organizations will often take shelflist information and attempt to find matching records in their database. The records matching the shelflist records from a library will be collected on a magnetic tape representing the holdings of that library. As the library continues to buy materials through that vendor, additional machine-readable records will be supplied to the li-

brary. These vendors will also provide card sets if a library is not interested in machine-readable records. Currently, there is no way for the holdings of these libraries, even if they are fully compatible with national standards, to enter the national or regional bibliography unless the library supplies a tape to a regional network or to a shared cataloging service. As the nationwide bibliographic record system moves closer to reality, a way will have to be found to incorporate these records for at least local or regional purposes.

Bibliographic Retrieval Service (BRS) has developed a private-file shared cataloging service. As with other vendors, the basis for the system is the LC MARC set. A BRS customer can search the LC MARC set, draw off records representing materials being added to or already in the collection, and create a machine-readable file of its holdings. There is even a way to build private or original bibliographic recordq for materials for which no record can be found. Again, the only way these records, or the fact that a library holds this or that item, can enter the nationwide bibliographic record set is for the institution to contribute the information to one of the shared cataloging services.

Carrollton Press has contracted with the Library of Congress to create brief, machine-readable records for all non-MARC records in the LC shelflist. They have excluded only those records with non-Roman characters. The Library of Congress, under the terms of the agreement, can only redistribute 15,000 of these records per year, and then only if they have been upgraded. Carrollton Press is trying to find organizations to buy individual records for purposes of retrospective conversion of library holdings to machine-readable form. In most instances, an institution buying a record is not allowed to make it available to others for sharing purposes. The Carrollton contract being negotiated with Seattle Public Library does not have that prohibition. The other major institution agreeing to purchase records from Carrollton Press is the University of California System libraries. UC, incidentally, is providing online editing services for the Carrollton database. Carrollton has also attempted to encourage libraries not only to purchase records from the database, but to contribute to it. A library would be rewarded for such a contribution with royalties for subsequent use of the contributed record. It is not known how many libraries are participating in this program. Lockheed's DIALOG is providing access to the Carrollton Press database. It is not clear if Lockheed does more than sell access, and presumably, provide copies of claimed records.

This is not intended to be a comprehensive account of all providers of shared cataloging services that exist, but it should suffice to present an idea of the scale of the activity. Though some actually sell bibliographic records, they are still sharing the intellectual effort of other libraries, principally that of the Library of Congress.

INTERLIBRARY LOAN

There are even more institutions involved in interlibrary loan or document delivery services than in shared cataloging services. Here as well, there are government organizations, other not-for-profit and for-profit organizations involved in the activity. An effort will be made to identify the relationships among the various groups providing information that facilitates either interlibrary loan or document delivery.

Government Sector Providers

The national libraries for medicine and agriculture both have massive programs designed to move interlibrary loan requests from institution to institution as well as to provide access to the information required. These networks, the Regional Medical Library Program and the NAL's AGRICOLA, occasionally have direct links with other state or regional network organizations providing similar services. With the infrastructure in place for the RML Program, the National Library of Medicine is moving to the sidelines in terms of providing funds to support the normal operation of interlibrary loan services, expecting local funding sources to fill the gap.

The Library of Congress is not a participant in any formal program to support interlibrary loan demands, but it does stand

ready to provide back-up services for any network or library. LC's interlibrary loan load is already quite heavy and efforts to redistribute requests that in the past were directed to LC are much appreciated. Each new interlibrary loan network service tends to remove some of the potential burden on LC.

LC does, however, produce one of the more important bibliographies for interlibrary loan purposes in the National Union Catalog (NUC). NUC has been a printed product, but efforts are under way to produce subsequent cumulations in microform. The data may also be made available in machine-readable form. LC has already begun discussions with OCLC, RLG, WLN, and UTLAS to determine if future contributions to the NUC can be sent to LC in machine-readable form. Each of the shared cataloging services has agreed to the plan, but they have not all agreed that LC will be allowed to redistribute these contributions in machine-readable form. The issue seems to be one of loss of revenue if these records are made available to all LC MARC subscribers, including the for-profit sector. Discussions continue on this topic.

There are a variety of state systems, including New York's NYSILL (one of the few with formal ties to NLM's Regional Medical Library Program), Illinois' ILLINET, and Minnesota's MINITEX. These systems provide interlibrary loan services to the libraries of their state and sometimes neighboring ones as well. It is not uncommon for state systems to take advantage of other systems like the OCLC ILL subsystem. State organizations often feel that they should be the focus for all state-wide programs including interlibrary loan. Some of these programs take advantage of for-profit document delivery agencies and some avoid such contacts.

The British Library Lending Division (BLLD) has proven to be such a reliable source of material that a substantial number of U.S. libraries routinely use that source for documents they have difficulty securing in North America. The Center for Research Libraries has a program of forwarding requests it can not fill to the BLLD. Often these materials are available in the U.S. but can not be located easily. Other foreign sources of interlibrary loan material are not so readily tapped. For the most part, it becomes a matter of "hit or miss" in locating materials in foreign libraries. As OCLC expands into other countries, beginning first with England in 1982, this sort of international lending could become easier for those who have access to OCLC services, if issues like required royalty payments for subsequent use of records do not get in the way.

Not-for-Profit Sector Providers

The shared cataloging services, OCLC, RLIN, WLN, and UTLAS, all have or are developing some form of interlibrary loan service. The OCLC version will accept a request online and a list of five possible sites for each request. The first site is queried and, failing to get a fill, the second is queried, and so on. Those using the service are quite pleased with it though there is some load leveling that needs to be done to keep libraries from going only to the largest or most responsive institutions first. As in most systems, those libraries that perform well in responding to requests receive a disproportionate share. This problem has existed in most previous systems and will not go away. There are some system software enhancements that can force a more equitably distributed load, but so far they have not been implemented by any of the shared cataloging services.

OCLC data suggest that there has been some load leveling as a result of the availability of additional location information. Most institutions have experienced increased ILL loads and, though some will dispute it, institutions which attempt to give priority treatment to filling requests, find their request loads rising rapidly. Many local or nonbibliographic networks, composed of libraries that also happen to belong to OCLC, use the OCLC ILL subsystem to support their interinstitutional borrowing, giving preference to filling requests from fellow network members.

The shared cataloging services, other than OCLC, use an electronic-mailbox-like service for moving requests around. (WLN's version is to be implemented in 1982.) Individual institutions are responsible for managing their own requests, since

there is not an OCLC-like queuing option in the other systems. RLG institutions have agreed to give their members priority interlibrary loan service. When institutions follow this pattern, they are trying to convince the users of the local collection that the resources of the entire cooperating group constitute the home collection.

Some regional networks use the databases of one or more of the shared cataloging services to support an interlibrary loan network. The Pacific Northwest Bibliographic Center (PNBC) is an example. PNBC uses the databases of both OCLC and WLN to serve the needs of their users who don't have access to both. Often a regional network, whether providing a brokerage service for shared cataloging or not, will produce a regional union catalog for interlibrary loan. The University of California Division of Library Automation routinely takes records from both RLIN and OCLC and builds an online union catalog of materials in all of the libraries of the University of California system. Union catalog activity ranges from very large online operations, as in California, down to card systems maintained for the use of small groups of libraries usually related by virtue of geographic proximity.

A very special type of interlibrary loan provider is the Center for Research Libraries (CRL) in Chicago. It has nearly 200 members who cooperatively own and store at CRL those materials which have some utility, but which can serve their needs from a remote site. Some members keep informed of holdings at CRL by actually filing cards for CRL holdings in their local catalogs. This will soon be unnecessary since CRL has begun doing its cataloging on OCLC. In order to assure that these records are available to all its members, it plans to provide copies of its OCLC archive tapes to RLIN, WLN, and UTLAS. It will then be possible for each member of CRL to include in its bibliography all of the holdings of the center just as though those materials were part of the local collection.

The Universal Serials and Book Exchange (USBE), normally thought of as a source for acquiring individual serial issues lost from a collection, provides issues in response to requests for interlibrary loans. USBE can usually provide access to issues from the most heavily used titles for the most recent few years.

For-Profit Sector Providers

There is an enormous array of institutions providing document delivery services as an alternative to interlibrary loan. These services are provided in order to realize a profit, which results in some good and some not so good conditions. The largest negative element is the fact that only those materials that can be made to pay for themselves by virtue of high demand rates are included in collections maintained for the purpose of filling requests. If a title is not "selling," it can not be carried long in inventory. The second negative is the fact that because profit and reward for risk are involved, prices tend to be high.

However, for this higher price one can usually count on prompt, accurate service. Consistent failure in either of these areas will result in a provider going out of business. Prompt, accurate service is worth the price to some who can not tolerate the wait that many interlibrary loan transactions often require.

Lockheed, SDC, and BRS, the database service vendors, all offer a document delivery service. As a user finds what is required during a database search, a request for the item can be entered immediately online. Each of the vendors automatically forwards these requests, using electronic mailbox systems, to a variety of fulfillment contractors, including some libraries. The vendors have developed load leveling software so that no single fulfillment site is asked to do more than it is capable of producing. Charges are handled just like search fees.

The Institute for Scientific Information (ISI) is another for-profit document fulfillment agency. This is an outgrowth of its primary business, indexing, but has proved lucrative enough to be expanded. As ISI begins to provide direct online access to its own databases, the document delivery element is likely to become an even more important feature.

There is yet another class of for-profit document delivery companies represented by FIND/SVP and others. These organiza-

tions do literature searches and put packages of material together for their clients. They are almost always located near major libraries and use the resources of these libraries to do their business. These organizations do not have access now to the databases of the shared cataloging services, unless they can gain such access through a library, and are likely to be future customers of the nationwide bibliographic record system but will not be contributors to it.

ONLINE PUBLIC ACCESS CATALOGS

One of the more rapidly growing products of libraries' burgeoning bibliographic databases is online public access catalogs. These are systems that are designed to allow library users to access a database via computer terminal. Often such a service will be provided in place of or as a supplement to card or book catalogs. Many smaller institutions are hoping to discard completely their card or book catalogs in favor of the machine-readable alternative. As with functions discussed earlier, online public access catalogs are provided by a variety of sources, though few (except for WLN and LC) are provided by a government agency.

Not-for-Profit Sector Providers

Each of the shared cataloging services supports an online catalog in one or more of its member/subscriber institutions. WLN supports online public-access terminals, providing access to the WLN union catalog at several of its subscriber's libraries. COM catalog services are also provided by WLN. OCLC has about a hundred institutions that use the OCLC union catalog as their online public-access catalog. There are many more OCLC subscribers that have used their archival tapes to load bibliographic data into either home-grown or commercial online catalog systems. OCLC also markets the Claremont Colleges' Total Library System, which includes an online public-access catalog. The RLIN system supports individual databases for each member institution, one of which, Stanford University, uses its database as an online public-access catalog. All of the shared cataloging services are cooperating in an effort to evaluate these catalogs in terms of their ability to meet the needs of library users and in terms of the interface between online catalogs and users.

There are a number of institutions that have created their own online public-access catalog systems, including the University of Chicago, Northwestern University, Mankato State University, and the Dallas Public Library. These institutions have used bibliographic records that they have produced in their own systems or those that they have generated in one or another of the shared cataloging services, and used them as the raw material for their online catalogs. Some, particularly the system developed and implemented at Mankato State, have received wide acclaim for their "user friendliness" (a current euphemism for "easy to use"), and for their utility for library users. Many of these systems are currently being evaluated so that those who develop the next generation of online public-access catalogs can be guided by the experience of those that exist today.

It should be noted that the Library of Congress has developed two systems that provide online public-access catalog services, one operates under MUMS and the other under SCORPIO. Both systems are available in the database search area of LC, and both are subjects of the evaluation project.

For-Profit Sector Providers

The market for online public-access catalogs is a growth market and there are several vendors vying for a piece of it. Among the most sought after systems are those of CLSI, GEAC, and DataPhase. These systems each provide online public-access catalogs, some as subsystems of their circulation systems. Some of these, principally CLSI, also offer networking services that allow several institutions to link their circulation systems and their online public-access catalogs. This is a very young market area and there will be many more vendors in the act before the market is saturated.

Some institutions have used the private file services of BRS to develop their online public-access catalogs. Dartmouth is the premier institution in this category. Both

Dartmouth and BRS are learning from the experiment, and both are providing innovative elements to the resulting system.

The impact of online public access catalogs is just beginning to be felt. There are a number of consultants who specialize in circulation systems and resulting online public-access catalogs, but there is still much to be learned and many innovations to be marketed before there is any stability in this area.

CIRCULATION CONTROL SYSTEMS

One of the very first uses of the Hollerith card for library support functions occurred in a circulation system at the University of Texas in the mid-1930s. The urge to apply various automated systems to library problems has manifested itself in both technical processing and in circulation systems. Before computers were widely employed, several vendors sold circulation systems that helped keep track of the transactions that take place at the circulation desk. There were also a number of systems, like the one at Texas, that were developed at individual institutions. At the moment, computers are being applied to the management of circulation activity by individuals, and groups of institutions, by shared cataloging services, and by for-profit vendors.

Government Sector Providers

There is only one federal source of a circulation system and that is NLM's Integrated Library System (ILS). That system, for which software is available through the National Technical Information Service, has been developed by NLM to provide inexpensive library automation systems for smaller libraries. There is also a private firm that specializes in ILS installations.

There are several states that attempt to provide circulation services for libraries in the state. No state has tried to develop its own software, usually preferring to use the systems developed, sold, and maintained by the for-profit sector. Examples of such systems include Illinois and Wyoming. There are several consultants who specialize in developing state-wide plans for linked circulation systems. These systems have occasionally grown into online catalog systems as well. In the sparsely populated western states these systems are seen as the only viable way to share scarce resources and to develop contacts among widely separated institutions and communities.

Not-for-Profit Sector Providers

Of the major shared cataloging services, only OCLC intends to provide a circulation system for the use of its subscribers. The system is being tested at this time, and is understood to be a decentralized system. In other words, the system runs on local hardware, drawing records for the database from the OCLC database. It is not yet clear whether these records are provided online or by tape. It is also possible for an institution to ask OCLC to provide the computing power for the system at additional cost.

WLN is interested in developing an interface between its system and DataPhase circulation systems. Recognizing that institutions may want to exercise other options, WLN has indicated that it will develop interfaces with other systems as well.

RLG has decided not to develop a circulation system unique to that organization, but to capitalize on the various systems that their members have already developed or purchased. This will require the development of interfaces with each circulation system in use, but will guarantee a substantial amount of institutional autonomy.

Many institutions that are owners or subscribers to the various shared cataloging services have already developed their own circulation systems. Penn State, Ohio State, and Northwestern are examples of such home-grown products. These institutions are often quite satisfied with their systems and not at all inclined to change to something that might be more "standard" yet not precisely responsive to local needs.

For-Profit Sector Providers

As suggested above, profit-making vendors have long been in the business of helping libraries mechanize their circulation systems. Those vendors that had the largest investment in the earlier noncomputer circulation systems have been late in offering computer-based circulation systems. Many of the present companies that sell circulation systems do so as their only business, some having developed out of efforts of sin-

gle institutions to produce computer-based circulation systems. Those companies that focus their attention on circulation systems (with online public-access catalogs as natural outgrowths) tend to offer the more sophisticated, flexible systems. Those organizations that include automated circulation systems as part of an array of products (not necessarily computer-based products) for the library market tend to offer less complicated systems probably more suited to the smaller library. As vendors realize that one system just will not fit the needs of all libraries, they attempt to develop multiple systems, some suitable for large libraries and others for smaller environments.

The companies focusing their energies on circulation systems and other computer-based products for the library market include CLSI, DataPhase, GEAC, etc. Brodart and Gaylord are examples of companies offering computer-based circulation systems as part of their larger product line for libraries.

One special type of vendor is represented by CTI, Library Systems Division, which creates turnkey systems based on microcomputer systems. CTI, using Apple IIs and IIIs, has developed and now markets circulation systems for small- to medium-sized libraries. They have also developed systems for the Microdata computer. While Gaylord offers minicomputer-based circulation systems (System 2000), they have also announced an Apple-based system for smaller libraries and bookmobiles.

SERIALS CONTROL

One of the more complex tasks in libraries is the management of the nearly infinite publication variations presented by serials. This very complexity has meant that librarians have been eager to apply computer technology to the problem, but have, as often as not, been only partially successful. Often seen as the first step in an automation project at an institution, failure in this element has frequently led to the abandonment of the larger project. Caution has been the order of the day with those who appreciate the complexities of the serial control problem. The caution and the difficulty of the task have led some to focus on more attainable goals like computer-produced lists of serials, initially for single institutions and, subsequently, for groups of institutions. These regional union lists were local machine versions of the union list of serials produced by the Library of Congress. While the Union List of Serials is not in machine-readable form, LC is in the process of preparing New Serial Titles in machine-readable form as an outgrowth of the CONSER project.

Government Sector Providers

Here again, with the exception of union lists of serials, only NLM is a factor in providing serial control services. As part of the Integrated Library System, there will eventually be a serials control module. NLM has also implemented another scheme to help control serials within NLM itself. It has contracted with several vendors to not only supply serials, but to receive, check in, and process them for the shelf. The vendor not only delivers the serials but also a computer tape (in NLM specified format), which is used to update NLM's own machine-readable serial records.

Several institutions in cooperation with NLC and LC have been instrumental in creating a machine-readable database of serial information and holdings. This CONSER database is being built in accordance with agreed-upon procedures by contributions from these institutions. LC, principally because of a lack of experience in a cooperative record-building project of this kind, committed itself to authenticate all contributions. That commitment has resulted in long delays in moving a contributed record into the authenticated database. This experience, however, has influenced the way other similar future projects will be handled.

WLN is the only state agency known to be providing a serial control service to its users, including serials cataloging, union lists, and subscription control, but not check-in. There are many state and regional union lists of serials, which often form the basis of interlibrary loan networks and some collection development projects.

Not-for-Profit Sector Providers

The not-for-profit sector has been cautious about developing and providing serial control systems, but both OCLC and WLN have done so. The OCLC serials subsystem

is used by a few libraries, but it has not caught on as many thought it would. UTLAS plans a serial control system as an outgrowth of an acquisitions system that is under development.

As indicated above, many individual institutions have attempted to create serial control systems, but few have succeeded. Some of those who have functioning systems include UCLA and Northwestern. The Washington University School of Medicine Library in St. Louis produced a serial control system known as PHILSOM (Periodical Holdings in the Library of the School of Medicine). That system, created in the mid-1960s and modified into an online system today, has been adopted by many libraries of all types and sizes. It may be the most widely used serial control system in the country.

For-Profit Sector Providers

Two of the larger serial subscription agents, EBSCO and Faxon, have each introduced serial control systems for the library market. These systems grew out of internal efforts to manage their business and have been undergoing significant modification to fit the needs of the library market.

Meta Micro Library Systems now offers a serial control system including cataloging, searching, check-in, routing, claims, and management reports. The complexity of this particular library function has served to limit the number of for-profit firms offering serial control systems.

A related business is that of binding and binding preparation. At least one bindery, Universal Bookbinding, has developed a computer-based system to help libraries determine when a title should be ready to bind. The system can either be operated by the bindery or can be leased and operated by the library itself. This system is similar to some of the serial control systems that include bindery preparation as one of the modules.

ACQUISITIONS SYSTEMS

Another function that many agencies are trying to tame with the help of computer technology is acquisitions, those processes required to purchase a precisely identified item, receive it, account for its purchase, and forward it for subsequent processing. The tasks involved are often full of drudgery and require precision that a computer can handle quite well if it is fed properly. One of the more perplexing aspects of acquisitions systems is how to make the accounting end of the system interact with local institutional accounting systems. Local financial officials tend to be more than casually cautious about another set of computer programs interfacing with the financial structure of the host organization. The resolution is sometimes to interrupt a logical flow of information in order to put it on tape for later integration into the institutional accounting system. This is one way of solving an interface problem, but the problem is going to grow, not diminish. Some acquisitions systems are marketed in modules so that a library can purchase only those modules it can use, e.g., all but the accounting module.

Because the newer acquisitions systems depend upon existing bibliographic records whenever possible, the organizations that are active in providing these systems are also active in one way or another in manipulating bibliographic information in other parts of their business.

Government Sector Providers

In the federal area, all of the national libraries have acquisitions systems developed to meet their own unique requirements, but they do not make the systems themselves available to other libraries. LC plans to make information available about materials on order or in process in the online public access catalog. NLM, through its previously mentioned Integrated Library System, provides an acquisitions system as an integral part of the ILS package. It is not the system NLM uses.

Of the many state-based systems, only WLN is known to offer an acquisitions subsystem to its subscribers. This system will soon include the electronic transmission of orders to vendors. A major goal of the WLN acquisitions system is the development of resource sharing and collection development programs among its participants.

Not-for-Profit Sector Providers

The shared cataloging services are the principal sources of acquisitions systems in

the not-for-profit world. OCLC has completed testing of its first version of an acquisitions system for its users. Though there is still much work to be done on it, more than a hundred institutions are authorized to use the system.

RLG's RLIN has just introduced its acquisitions system and is in the process of fine-tuning it. One of the principal objectives of the RLIN system is to share acquisitions information among its members for purposes of cooperative collection development and resource sharing. Clearly, any set of institutions using the OCLC subsystem could arrange to do the same thing. The challenge will be to find a way to share that information among institutions using different shared cataloging services. Because several of RLG's members already have acquisitions systems to which they are committed, RLIN will have to develop a way to interface with these systems as well.

UTLAS also has an acquisitions system now under development. The unique feature of this system is a local microcomputer to handle accounting information.

Some of the larger institutions have developed acquisitions systems that work, a valuable characteristic for a computer system, especially when handling fiscal data. Some of these organizations will consider other systems only when they can achieve the same or better reliability and then only if there are clear service or economic benefits to be realized.

For-Profit Sector Providers

There are several different for-profit groups providing acquisitions systems to libraries. First, there are the book jobbers who find it in their interest to sell acquisitions systems that interface with their own internal systems. Baker & Taylor offers the LIBRIS system, which is being tested at eleven sites. The advantages to the library are several in that Baker & Taylor assumes responsibility for upgrading the system and for assuring that it works. The negative side of the coin is that the system can be used to order from other vendors, but the advantages of online ordering are lost. Brodart, another company offering an acquisitions system, does not support fund accounting. Though these systems are designed to attract more book-buying business, they also provide for the use of other vendors, though, so far, not in an online mode.

A second vendor type is the vendor that gets into the acquisitions system area because they already have close contacts with libraries that are automating other functions. This is apparently the case with CLSI and DataPhase. They have penetrated the circulation and online catalog markets in libraries and see acquisitions as a logical extension or marketing benefit of the business, selling or giving their acquisitions software to client libraries. Indeed, this module could pave the way for integrated library automation systems.

A similar vendor is Innovative Interfaces, Inc. (III), which markets a system to provide a link between an institution's OCLC terminal and its CLSI system. III has just announced a computerized acquisitions system capable of producing management reports, some in graph form.

A specialty vendor is Sigma Data, which markets an acquisitions system only to federal libraries (currently nine customers). They share and cooperatively build a database maintained on a central computer, but software is modified for each library to integrate the system with requirements for financial procedures and accounting as specified by the agency.

The final vendor type is the consultant or consulting firm that builds a workable acquisitions system using microcomputing technology and sells the package as a turnkey system. The customer, after some basic training, should be able to start using the system immediately. Ringgold Associates represents this group of entrepreneurs.

SUMMARY

A key element in each of these functions is the fact that there is now no way to tie all of these resources together for the purposes of research and scholarship. The problem is not so much to create an enormous database accessible to one and all. Rather, the problem is to create a way for the resources of any given set of institutions (though they may use different shared cataloging services) to be drawn together at a point of need, e.g., at a patron or reference terminal. Libraries and librarians have been trying for years to create aggregations of resources that will meet future needs. It has

never been possible to create such an aggregation at one institution except in very limited fields of interest. The technical mechanism to identify and aggregate, from a variety of sources, the resources any individual library user may need is possible in the near term. To implement such a mechanism may make no economic sense in the business plan of a shared cataloging service, but it can be made to carry its own weight if appropriate agreements are forged among the principal partners. Only after the resources of the major shared cataloging services are linked can libraries and library users begin to tackle the even larger problem of including the enormous resources of the for-profit sector in the nationwide bibliographic record system. ■■

EDITOR'S NOTES

ETAOIN SHRDLU

One person's information can be another person's gibberish. A sharp-eyed printer stripped the obvious nonsense, "ITLBDC 1(1) 1–80 (1982); Inf Technol Libr," from our cover and table of contents for the March issue. Unfortunately, it was our first issue as *ITAL*, and the American Chemical Society calls that nonsense a coden. C'est la vie!

Caveat Emptor

Hank Epstein of Information Transform suggests caution in looking at text processing software for microcomputers. In looking at documentation for an impressively powerful package for a very popular personal computer, Hank noted a figure for maximum work space. Doing some quick calculation, he determined that one could store only about five text pages in a document. Multiple documents are, of course, possible. However, while one can link documents together for output, features such as global searches or changes do not work across document boundaries.

We Too

"What better magazine to experiment with electronic composition and delivery of a manuscript than a publication about computers?" began the press release from the Source. We were only mildly surprised when we read further and saw they meant *Popular Computing*. After all, we've been using the ONTYME system through CLASS. We've received short mss., news items, and just memos by electronic mail. For the March issue, B. Kenney sent a draft editorial from Denver, queries and copy edits were sent back, final ms. returned, and then mailed (USPO) to ALA from BNA, all in one working day. It took someone else to make us aware just how unconsciously we've adopted this technology. It's amazing how ONTYME passes when you're having fun.

Vendors and Users

There's a news item about the Vendor/User Discussion Group on page 183. The Midwinter Meeting was exciting. This promises to be an active and effective group. If you're a vendor or user of automated systems, stop by their meeting this summer.

Punny Thing

Have you noticed that whenever the acronym *ITAL* appears, it is set in italics?

Bibliographic Access & Control System

Betsy Kelly, Cynthia Fedders, Audrey Powderly, and Deborah Yedlin

The Washington University School of Medicine Library's Bibliographic Access & Control System (BACS) was developed to solve problems of bibliographic access and circulation control in a medium-sized medical library. BACS has been in use in this library since December 1980. The system consists of an online card catalog with patron access via keyword or exact searches, circulation control, serials management, MARC format card editing, authority control, and a variety of management tools. All system programming and development was done in standard MUMPS running on a minicomputer at the Washington University Medical Computing Facilities. BACS successfully combines two labor-intensive library functions, circulation and bibliographic control, into one computerized system.

The Bibliographic Access & Control System (BACS) was designed at the Washington University School of Medicine Library to improve bibliographic access to the Library's collection and to solve serious problems of circulation control. This paper will give a brief summary of a few of the more than 150 different BACS functions as well as an overview of the design, development, and uses of the system.

HISTORY

The Washington University School of Medicine Library has a long history of using automation, beginning in the early 1960s when Estelle Brodman saw clearly the direction in which libraries and the information industry were moving. Her foresight and support helped put this library among the leaders in library automation. Under her guidance the library kept pace with the developments in automation technology in cataloging, [1,2] serials control (PHILSOM),[3] and circulation control.

The library became a member of OCLC, Inc., in October 1974, and utilizes the records from that system to produce catalog cards while also adding our holdings to its database. The multitude of problems inherent in maintaining the traditional card catalog and the changes soon to be made with the implementation of AACR2 prompted an investigation in 1979 into alternatives to the library's card catalog. A library committee submitted a report recommending that the Library computerize its bibliographic information, and offered suggestions for implementing this recommendation.[4] Late in 1979, library staff began planning a project to convert all catalog information into machine-readable form.

Separate plans had begun in the fall of 1979 to develop a new circulation system. The system then in use was batch-processed, using keypunched cards to produce overdue notices and limited statistics on a monthly basis. It was inflexible, cumbersome, and unreliable, and necessitated manual filing and pulling of keypunched

Betsy Kelly is head of access services and Cynthia Fedders is online cataloger at the Washington University School of Medicine Library, St. Louis, Missouri; Audrey Powderly, cataloger at the Washington University School of Medicine Library at the time this paper was written, is now head of technical services at the University of Nebraska Medical Center; Deborah Yedlin is head of technical services at the Washington University School of Medicine Library. Manuscript received September 1981; accepted December 1981.

cards by library staff. While it had made the best use of computer technology available in the early 1960s, even modifications made in succeeding years had failed to keep it viable. By 1979, this system was ineffective as a circulation control mechanism.

Although the initial concept of a new system was of one that would record only those items currently checked out, it became apparent after surveying the literature,[5,6,7] and viewing other available systems, that an online circulation system interdependent with an online catalog should be considered.

In the early months of 1980 the separate activities of converting catalog information into machine-readable form and developing a new circulation system were merged and a set of criteria was established, outlining the basic requirements for a circulation control and online catalog system. For the next year, librarians from the Access Services and Technical Services departments worked closely with Simon Igielnik, director of the Washington University Medical Computing Facility, to design and program the system. The design combined circulation and bibliographic access for monographs with the previously established serials control system, PHILSOM. Together they constitute the Washington University School of Medicine Library's Bibliographic Access and Control System.

HARDWARE REQUIREMENTS

BACS runs on a DEC PDP-11/40 minicomputer, housed at the Medical Computing Facility within the medical complex. The programs are written in standard MUMPS. Staff access to BACS is through Lear Siegler CRT terminals, model ADM-3A with lowercase option. Patron access is through a slightly modified Microterm MIME 2A CRT. INTERMEC 9300 bar-code readers are used with the staff CRTs. Notices and reports are produced on Texas Instruments' TI 820 KSR and Decwriter III printers.

Bar-code labels purchased from Data Composition, Inc., of San Francisco are used to create unique identifiers for books, journals, and library patrons. The bar-code consists of fourteen digits, following the format established by CLSI: the first digit indicates whether the bar code identifies a patron or an item (2 = patron, 3 = item); the next four-digit sequence (always 2201) was assigned exclusively to Washington University School of Medicine Library by CLSI. The following eight digits provide a unique identifier for each item or library user; and the final digit is a check digit.

The data in the system is controlled by library personnel, with security safeguards built in to prevent unauthorized data entry and editing. The management function is the central safeguard, allowing department heads to assign specific functions and passwords to appropriate staff members.

BIBLIOGRAPHIC MODULES—MONOGRAPHS

The bibliographic data for monographs is generated from OCLC archival tapes. Twelve six-month tapes from October 1974 through June 1980 were used to create the initial database. Monthly OCLC tapes have been added since then, to keep the database current. Tapes are received from OCLC in ASCII, 1600 bpi, variable block length, and are translated to ASCII, 800 bpi, fixed block length, for loading into the MUMPS system. Translated tapes are checked at the Medical Computing Facility to ensure that the data is intact and readable by the MUMPS programs. Records are loaded onto the online system in a MARC format similar to the MARC format used by OCLC. A user-oriented bibliographic record is produced using a mapping table that codes each appropriate MARC tag and indicator into fields such as author, title, series, subject, publisher, etc.

Search keys are then established for a variety of search types. All fields in the MARC record are keyed for the Boolean search. In addition, author, title, series, subjects, call number, OCLC number, ISBN, LC card number, and an internally assigned record number are keyed for exact searching, and author, title, subject, and series are further keyed for keyword and approximate-spelling searching. Circulation data is later associated with each bibliographic record.

An interface between the OCLC terminal and BACS has been developed to provide the most current database possible. This allows automatic record transfer from OCLC into the library's bibliographic database for monographs, and will elimi-

nate using OCLC monthly archival tapes for updating. Subscription to the OCLC tapes will be continued as a backup to the automatic transfer system.

Three files with cataloging functions were created within the bibliographic module for monographs: the MARC format file, the manual authority file, and the machine-generated authority file. The MARC file contains records in MARC format, generated from OCLC archival tapes. Functions associated with the MARC file are searching, editing, and deleting existing records, and inputting new records and cross-references. By using these functions, data can be updated for location changes, adding holdings, and for converting previously cataloged items into MARC format. In addition, adjustments can be made to names, series, and subjects throughout the entire database. A single term can be input to replace every occurrence of an outmoded term. For example, the subject heading "Drug Abuse" can be easily replaced by the new subject heading "Substance Abuse," using a single function.

The manual authority file consists of two subfiles: a file of verified names and series, and a file of subjects. It functions as the traditional authority file. Names and series are verified and added to the file as the established form used by the library to provide consistent form of entry. Each name and series authority record contains the established name, the BACS field in which it appears, and the source of verification. All subject headings in this authority file have been verified using the most recent edition of *Medical Subject Headings (MeSH)*. Each subject authority record contains a MARC tag, indicator, and a major descriptor or subheading from *MeSH*.

The manual subject authority subfile interacts with the system whenever records are added to the database. When records are processed, the system checks subject headings in each record against the subject authority. The occurrence of a heading not in this subfile does not halt the processing of the records into the database. Instead, after the record is created, a message is printed, listing the subject heading in question. The new subject heading is then verified and manually added to the subject authority.

The machine-generated authority file is created from the bibliographic records. Names, titles, series, and subjects are listed as they appear in the database. This allows the user to browse specific forms of headings. It is accessed through the keyword search by using a "#" or "##." A single "#" will produce a list of all subjects beginning with the letters entered; a double "##" will result in a list of any headings containing the entry in question.

Other cataloging functions were developed to detect duplicate records in the bibliographic database which resulted from the recataloging of books, and the production on OCLC of multiple sets of cards for special files. These functions use a number of different comparison points, such as OCLC record number or Library of Congress card number, to pinpoint duplicates. Once detected, duplicates are deleted from the bibliographic file.

BIBLIOGRAPHIC MODULE—SERIALS

The bibliographic data for serials held by the library is taken from PHILSOM III. PHILSOM III is a computerized serials control system run by the library to maintain its own journal holdings and the holdings of fifteen other medical libraries. The system also supports a fiscal accounting system that produces extensive statistical reports. PHILSOM Network controls the standard bibliographic entry for each title, and the individual serials departments control all information specific to a particular library, such as holdings, location, and fiscal information. This library is currently using the online mode of PHILSOM III, which provides for check-in of journal issues, and maintenance of local serials bibliographic and fiscal information.

The bibliographic data and holdings information for each journal title in BACS is updated on a monthly basis using tapes produced by PHILSOM Network. Unlike the bibliographic module for monographs, no input, edit, or delete functions have been programmed in BACS for serials. These changes will continue to be made online within PHILSOM III.

CIRCULATION MODULE

The circulation module manages all tra-

ditional circulation functions including check-out, check-in, renewals, overdues, holds, recalls, and waiting lists. Since this library does not levy fines for overdue material, the system does not currently calculate fines, nor keep any fiscal records on delinquent patrons. Instead, the library has the right to suspend borrowing privileges of delinquent borrowers. After appropriate recall and overdue notices have been sent, an automatic hold is placed on the patron's record. No further borrowing is permitted until the record has been cleared. Statistics to support collection development, quantify circulation activity, and justify resource allocation are easily compiled from data in this module. The six major files in the circulation module are: (1) barcode/circulation data, (2) patron records, (3) circulation transactions, (4) wait lists, (5) in-house use, and (6) temporary file.

The bar-code/circulation data file contains the assigned bar-code and circulation data for each book and journal issue or volume for which there is a record in the system. The bar code is the keystone of the circulation module, since a patron cannot borrow nor an item circulate without one. Books, bound journal volumes, and unbound journal issues are each given bar codes from a designated numerical range that serves to identify its physical format. Circulation data includes the date, volume, issue, and copy numbers, length of circulation period, shelving location, borrower's number, date checked out, and date due. Functions within this file allow assignment of bar codes to specific bibliographic records, and searching and editing of circulation data associated with those records. A bar code can be reassigned to a different record, or deleted from the system, but cannot be attached to more than one record at a time.

The patron file contains the bar code and personal information and a list of items checked out for each borrower. The functions associated with this file allow patrons records to be entered, edited, searched, and deleted.

The circulation transaction file uses the information already contained in the bar code and patron files to manage check-out/in, renewals, and overdues. During check-out and renewal activities, the staff receives an abbreviated patron record, which shows any possible holds against the patron. The system notes whether the item to be checked out or renewed has a waiting list or falls within a special circulation class. Data stored in this file can be manipulated to produce extensive statistical reports that were previously unavailable.[8] For example, heavy use of various sections of the collection can be monitored, correlating circulation activity with the patron's class (faculty, staff, student, etc.) and department or with specific subject areas, providing data that will aid in collection development decisions.

The waiting-list file maintains a list of patrons who have requested specific items. Information is available by item or patron and the entire list can be displayed as needed. Recalls are produced from the information in the waiting-list file and notices are sent to patrons currently holding items for which another patron is waiting.

The function used to establish an in-house-use file provides a method for sampling a variety of activities using the bar-code/circulation data file. By entering into the file the bar codes of items fitting a specific category, a numerical total is maintained that shows activity for a designated period of time. For example, recording the bar codes of all items collected from the photocopy room will aid in evaluation of photocopy facilities; recording in-house use of journal titles with restricted circulation periods may indicate a need to reconsider their circulation status.

A temporary file module was programmed in order to circulate items for which bibliographic data does not currently exist in BACS. These include materials cataloged since the last OCLC archival tape was added and any items cataloged prior to October 1974. Each entry in the temporary file contains a free-text field and a circulation string created automatically upon completion of data entry. A standard temporary record contains the date of entry, call number, first word of the main entry, and a brief title. The temporary record number is the same as the bar code assigned to the item. All words and numbers in the temporary file are searchable. As permanent records are added to the bibliographic files for these items, the circulation data is

transferred to the permanent record and the temporary record is deleted.

USER ACCESS

A variety of search keys can be used to access the bibliographic data for books and audiovisuals cataloged after 1974, all serials held by the library, and the circulation data associated with these records. While there are a total of 22 functions available for searching data on the system, four (book-and-journal keyword and book-and-journal exact searches) were grouped for patron use under one search function available to the public through a specially modified terminal located in the public area of the library. Other locations in the medical center can also become access points through terminals already in use for other projects in laboratories and offices.

Initially, the person using the public terminal is offered a "list of choices" which includes "instructions for use," and the four search functions. Choosing the "instructions for use" will provide a general introduction to the system, specific descriptions of each of the four searches, and will explain the mechanics involved in using the system through the patron terminal.

If the user chooses the keyword search for books, he can combine keywords from the author, title, subject, and series, and then limit the information displayed by specifying a particular date or range of dates (see figure 1). This keyword combination search utilizes an implied Boolean "and," finding all records that contain all of the words entered in each field. Additionally, if it finds no exact matches for the words entered, the system will approximate spellings. All trailing "s's," double consonants, and vowels (except for initial letter vowels) are dropped in the approximate level resulting in a display of records that contains words with all the consonants entered in each field. A keyword search with the same approximation feature can be used to retrieve journal information by entering keywords from the journal title (see figure 2). Journal subject searching (if different from title words) is not currently available to the public.

If the user chooses the truncation/exact search approach for a book, he can enter as much of an author's name, a title, subject, series name, or call number as he knows exactly (see figure 3). Each word must be spelled correctly and must be entered in the exact order it appears in the record. All words in the field need not be entered and the last word entered can be truncated. The search will be done for all records containing all the letters entered, in the order entered, for the specified field. This search allows the user to browse as though in a traditional card catalog or shelflist. Journal titles can be searched in the same manner through the truncation search.

After selecting the desired search type from the "list of choices," the patron is guided through the search process by prompts. A minimum of prompts and instructions have been included in each search based upon the belief that a computer terminal is a familiar tool for many of the library's users. The patron can press the "HELP" key to get more specific instructions as to what response is expected, or can return to the "instructions for use" for detailed explanations.

The system's response to any search query has two levels. The initial list of entries produced for any of the book searches contains a display of record number, brief title, author (or entry input by the user), and call number for each item that meets the search criteria. A journal search response includes the journal record number and title. By entering a specific record number from the initial display, the bibliographic record and its associated circulation data will be displayed. Two different formats (centered or left-justified on the screen) for five levels of bibliographic information are available. Each of the five levels displays increasingly more data. While one of the five levels and one of the two formats are preassigned to each person logging onto the system with a valid user code, a user can request a display other than his preassigned one by entering a "/" and the format and level numbers after entering the record number to be displayed. The patron terminal is "logged on" each morning and will automatically display brief records to anyone using the terminal, but will accept the command to display a fuller record.

OTHER SYSTEM FEATURES

The flexibility of the software package

```
          SEARCH CHOICES:

          1= INSTRUCTIONS FOR USING THIS SYSTEM
          2= BOOKS BY KEYWORDS/DATES
          3= BOOKS TRUNCATION
          4= JOURNALS BY KEYWORD
          5= JOURNALS TRUNCATION

          PLEASE ENTER 1,2,3,4, OR 5   >2

BOOKS BY KEYWORD/DATE:
ENTER KEYWORD(S), RECORD # OR RETURN FOR
EACH OF THE FOLLOWING FIVE ITEMS:
AUTHOR       >CHARLES ROB
TITLE        >(ANY)
SUBJECT      >SURGERY
SERIES       >(ANY)
DATE(S)      >1965-
TRYING KEYWORD SEARCH:
 RECORD #                                                  CALL #
    18634 Specialty board review:...                       WO 18 R628s 1976
          Rob, Charles.
    21799 Vascular surgery...                          WO 500 R628 v. 3 1968
          Rob, Charles, ed.
    21800 Abdomen and rectum and anus...               WO 500 R628 v. 4-5 1969
          Rob, Charles, ed.
    21807 General principles and breast...             WO 500 R628 v. 1 1968
          Rob, Charles, ed.

BOOKS BY KEYWORDS/DATE:
ENTER KEYWORD(S), RECORD # OR RETURN FOR
EACH OF THE FOLLOWING FIVE ITEMS:
AUTHOR       >21800
                 WU#= WO 500 R628 V. 4-5 1969
              AUTHOR= Rob, Charles, ed.
                      Smith, Rodney, ed.
                      Morgan, Clifford Naunton, ed.
               TITLE= Abdomen and rectum and anus / edited by
                      Charles Rob, Rodney Smith and Sir Clifford
                      Naunton Morgan.
           PUBLISHER= 2d ed.
                      Philadelphia :  Lippincott, c1969.
                      2 v. (838 p.) :  ill
              SERIES= Operative surgery ; 4-5
B  RECORD # DATE   VOLUME      COPY CD LOC  BARCODE      USER  DATE OUT  DATE DUE
B     21800 1969        4         1    MEZ          10002584 21-MAY-81 4-JUN-81
B     21800 1969        5         1    MEZ                IN

BOOKS BY KEYWORDS/DATE:
ENTER KEYWORD(S), RECORD # OR RETURN FOR
EACH OF THE FOLLOWING FIVE ITEMS:
AUTHOR       >
```

Keyword/date search for books allows searching a single bibliographic field or any combination of the author, title, subject, and/or series and then qualifying the output by date. This display of record 21800 is for patron use and includes only brief bibliographic and circulation data.

Fig. 1. Keyword/Date Search for Books.

available through the Medical Computing Facility made it possible to include in BACS a number of features not currently offered by commercially available systems. Not only does the system have both keyword and exact searches without requiring special syntax, but complex Boolean search logic is also included to provide more powerful searching capabilities. Although the Boolean searches are time-consuming in terms of actual computing time and are not now designed for patron use, the searches open the possibilities of accessing and manipulating the bibliographic data and allow for more complex analysis of the collection and its use.

BACS also has word processing capability. A document can be entered, edited, and then printed out in final form on a printer. Using this feature, a manual describing all of the functions of BACS was stored in the computer and may be edited

```
          SEARCH CHOICES:

          1= INSTRUCTIONS FOR USING THIS SYSTEM
          2= BOOKS BY KEYWORDS/DATES
          3= BOOKS TRUNCATION
          4= JOURNALS BY KEYWORD
          5= JOURNALS TRUNCATION

          PLEASE ENTER 1,2,3,4, OR 5  >4

KEYWORD ACCESS TO JOURNALS:
ENTER KEYWORD(S) IN JOURNAL TITLE, JOURNAL # OR RETURN:
JOURNAL   >PEDIATRIC ANALS
TRYING KEYWORD SEARCH: -- NO JOURNAL CONTAINED ALL KEYWORDS
TRYING APPROXIMATION SEARCH:
    10070003  ANNALES PAEDIATRICI
    73400003  PEDIATRIC ANNALS

KEYWORD ACCESS TO JOURNALS:
ENTER KEYWORD(S) IN JOURNAL TITLE, JOURNAL # OR RETURN:
JOURNAL    73400003
      FULL=PEDIATRIC ANNALS
SET # 1
      HOLD= 1 1972 1981/1N1-3/2-9/10N1-5/
      COML= ALL HOLDINGS SHELVED IN GENERAL STACKS

DO YOU WANT TO SEE WHICH JOURNALS ARE CHECKED OUT FOR SET #1  >YES

J  JOURNAL #  SET   VOLUME     ISSUE CD LOC  BARCODE     USER  DATE OUT  DATE DUE
J   73400003   1       8         0    STK          10002262 15-MAY-81 29-MAY-81
            NOTE:1979 PP1-410

KEYWORD ACCESS TO JOURNALS:
ENTER KEYWORD(S) IN JOURNAL TITLE, JOURNAL # OR RETURN:
JOURNAL   >
```

Misspelling of "ANALS" caused no hits on first try and default to search of approximation level keys. Record displayed is for patron use, giving full title, holdings, and shelving information, as well as a list of all volumes currently checked out.

Fig. 2. Search for Journals by Keyword Showing Approximation Feature.

and printed whenever needed. When changes are made to the system itself, these changes can be quickly incorporated in the text of the system documentation. This documentation can also be accessed online, function by function, by entering a "??" in response to any system prompt.

The system maintains a record of usage that can be checked by library staff and used as supporting data for more efficient use of BACS capabilities. The kinds of searches initiated on each terminal can be evaluated in order to offer user training for improved efficiency and effectiveness.

A comprehensive acquisitions system is available and handles production of purchase orders, fund encumbrance, and invoice accounting.

While Washington University School of Medicine Library is a single unit with remote storage facilities, but without actual branch locations, BACS has the capability of supporting branch or multiple library operations. In addition to the bibliographic and circulation data described above, each record is identified as belonging to the WUSM Library. If, for example, the library considered one of its remote locations a branch, or if the Washington University School of Dental Medicine Library wished to use the system, their records could be maintained concurrently with the medical school library's records, while being identified as belonging to another location. A larger bibliographic database would then be available to the library's patrons while circulation activities would be controlled by the holding library.

CONCLUSION

The Washington University School of Medicine Library's Bibliographic Access & Control System was developed to solve the circulation and bibliographic-access prob-

```
          SEARCH CHOICES:

          1= INSTRUCTIONS FOR USING THIS SYSTEM
          2= BOOKS BY KEYWORDS/DATES
          3= BOOKS TRUNCATION
          4= JOURNALS BY KEYWORD
          5= JOURNALS TRUNCATION

          PLEASE ENTER 1,2,3,4, OR 5   >3

BOOKS TRUNCATION SEARCH:
A=AUTHOR, T=TITLE, S=SUBJECT, X=SERIES, W=WU CALL NUMBER
PLEASE ENTER EITHER A,T,S,X, OR W   >S
PLEASE ENTER SUBJECT OR RECORD NUMBER   >BRONCHI

RECORD #                                                    CALL #
   29799 Selective bronchography and...                      WF 500 S464 1979
         (Bronchi)
   17274 Broncho-pulmonary...                               WF 500 M722b 1976
         (Bronchi -- pathology)
   28441 Bronchology ...                                     WF 500 B869 1979
         (Bronchial Diseases)
   29799 Selective bronchography and...                      WF 500 S464 1979
         (Bronchial Diseases)
   15533 Technique of flexible...                            AV MV4 no.1 1976
         (Bronchial Diseases -- audiovisuals)
   15533 Technique of flexible...                            AV MV4 no.1 1976
         (Bronchial Diseases -- diagnosis)
   27062 Pediatric bronchology ...                          WS 280 S997p 1978
         (Bronchial Diseases -- in infancy and childhood)
   10902 Bronchial carcinoma, by Thomas...                  WF 500 S555b 1974
         (Bronchial neoplasms)
   26605 Clinical application of...                          QZ 310 C641 1977
         (Bronchial Neoplasms -- congresses)
   15117 Early detection of chronic...                      WF 546 S785e 1976
         (Bronchitis)

PRESS RETURN TO CONTINUE >
```

All items listed include a subject heading beginning with "Bronchi."

Fig. 3. Books Truncation Search Showing Results of Truncated Subject Entry.

lems of a medium-sized medical library. It is modular in design, utilizes standard bar codes for both items and patrons, and has searching capabilities and added features designed to surpass current commercially available systems. BACS successfully combines two labor-intensive library functions, circulation and bibliographic control, into one computerized system.

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Retrospective Conversion of Three Library Collections

Carolyn A. Johnson

Conversion activities are reported for the retrospective conversion via OCLC of three library collections—a main, a rare-book, and a historical collection. The library characteristics that determine the rate of conversion are: the standards of cataloging in the card catalog, in the cataloging database, and in the online catalog; the hit rate; the special needs and problems of each library; and the staff. The simultaneous conversion of three collections with similar procedures and standards minimized variables and provided an opportunity to study the effects of the special needs and problems of each collection. Conversion rates for each project are compared.

Although most libraries are looking toward an automated catalog, the increased cost of retrospective conversion and decreased library budgets have caused catalogers and administrators to take a more critical look at the start or continuation of conversion projects. There is a need for more reporting from established retrospective conversion (or "recon") projects to compare methods and costs.

The degree of conversion, the method used, the level of staff, the quality of the cataloging database and past cataloging, and the choice of computer system vary sufficiently with each project so that comparison of rates and costs becomes questionable unless information on procedures, standards, and staff accompany the statistics.

In this study the conversion activities at the University of South Carolina are reported for the conversion via OCLC of three library collections—the main library collection (Thomas Cooper Library), the rare book collection, and the historical collection (South Caroliniana Library). Descriptions of the collections, procedures, staff, and standards are provided to explain the variation in conversion rates.

INTRODUCTION

DeGennaro summarized the state of the problems of retrospective conversion.[1] Computerizing library collections is more difficult and will take longer than originally thought due to the higher standards of accuracy of cataloging imposed by the national network. During the transition from a manual to a fully automated bibliographical system, both the old card catalog and the new computer system must be maintained. Changes must be made to keep the traditional card catalog current as well as the machine-readable tapes "refreshed."

There is a growing awareness that records input into a national database must be as complete and as up to date as possible for future use. This implies more conversion projects by library staff versus commercial vendors so that sources and books can be checked and substandard records upgraded. A survey of recon libraries and an analysis by Crismond[2] show that minimum

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standards for recon are desired by most of the recon libraries. Input standards for recon have been set by OCLC's Internetwork Quality Control Council to be equal to that of other inputting libraries, levels I (full standard) or K (minimum standard).

Different library characteristics and conversion goals determine the rate of conversion. It is difficult to compare statistics from different projects because each library has a unique history of cataloging quality, procedures, cataloging needs, level of staff availability, and standards for the online catalog. In this case study, the problem of varying procedures, desired standards, and staff have been minimized.

Butler et al.[3] plotted the cost of conversion with the degree of conformance to several library parameters. As the number of discrepancies increased, the cost of conversion also increased. This is due to the increased time or higher level of staff needed.

Few reports have been made in the literature on the actual rates of conversion. A Palinet survey recorded rates of conversion of 25–100 records updated per hour.[4] However, the degree of editing is not clear.

In the past, most statistics have been informally reported and have consisted of the number of records updated per hour at the terminal. The time needed for supervision, training, verification, and catalog maintenance was not always accounted for. Since this support time accounted for 50–85 percent of staff time in these three projects, an additional statistic used for comparison and estimation is the number of records updated per staff hour. In this report both statistics are calculated for three varied collections of one library. Together these statistics provide a more realistic estimate of average conversion time and comparative conversion rates among different types of library collections.

Statistics were calculated for the ten-month period that the three projects were operating together (table 1). The majority of the rare book collection to be converted was completed in this ten-month period. The other two projects were started before the rare book conversion and are still in progress. Statistics for the twenty-four months of the Thomas Cooper Library conversion and the twenty-one months of the South Caroliniana Library conversion are presented with the same rare book statistics in table 2.

All three projects had the same goals and minimum standards; however, each library collection had special needs and problems. The simultaneous conversion of three collections provided an opportunity to observe the effects of these special needs and problems. The fact that the projects ran during the same time period eliminated significant variation in three complicating factors: OCLC downtime, OCLC slow response time, and AACR2 implementation. Staff differences were also minimized. The three projects were supervised by the same professionals. The paraprofessionals have remained with the projects. Each of the student assistants who worked on the rare book conversion also worked on one of the other projects.

COLLECTION BACKGROUND

Brief library profiles describe the type of collections converted and aid in the evaluation of the conversion statistics. All three collections are represented in the union catalog.

The Thomas Cooper Library's main collection is chiefly twentieth-century English language monographs, with the balance of the collection mainly Germanic, Slavic, and East European. The following parts of the shelf list were converted: *A–C, H, J, Q–Z*. A total of 24,086 and 47,514 records were converted during the ten- and twenty-four-month periods, respectively.

The South Caroliniana Library is a historical collection of works published in or about South Carolina and works written by or about South Carolinians. The collection is mainly mid-eighteenth-to-twentieth-century English language monographs. Many of the works converted were pamphlets, limited printings, or articles detached from journals.

The rare book collection consists mainly of eighteenth-to-twentieth-century English and Latin monographs. The collection has extensive holdings in American and English literature, Civil War materials, Egyptology, ornithology, and natural history. In the ten-month period of conversion, 1,985 records were converted.

Table 1. Statistics for Concurrent Projects

	Cooper Library		S. Caroliniana Library		Rare Book Library	
	No.	%	No.	%	No.	%
Records converted						
Exact/minor editing	17,207	71.4	2,023	19.5	1,312	66.1
Major editing	5,122	21.3	3,001	29.0	236	11.9
Work forms input	1,757	7.3	5,324	51.5	437	22.0
Total updated	24,086	100.0	10,348	100.0	1,985	100.0
Time (hours)						
Terminal time	1,568	27.2	1,076	15.9	293	49.9
Offline time	4,188	72.8	5,699	84.1	294	50.1
Total time	5,756	100.0	6,775	100.0	587	100.0
Conversion rate						
Updated/terminal hour	15.4		9.6		6.8	
Updated/staff hour	4.2		1.5		3.4	

Table 2. Statistics for Project Completed to Date

	Cooper Library		S. Caroliniana Library		Rare Book Library	
	No.	%	No.	%	No.	%
Records converted						
Exact/minor editing	31,859	67.1	2,691	16.5	1,312	66.1
Major editing	12,548	26.4	5,113	31.4	236	11.9
Work forms input	3,107	6.5	8,477	52.1	437	22.0
Total updated	47,514	100.0	16,281	100.0	1,985	100.0
Time (hours)						
Terminal time	3,537	28.6	1,780	15.4	293	49.9
Offline time	8,844	71.4	9,751	84.6	294	50.1
Total time	12,381	100.0	11,531	100.0	587	100.0
Conversion rate						
Updated/terminal hour	13.4		9.1		6.8	
Updated/staff hour	3.8		1.4		3.4	
Length of project (months)	24		21		10	

RETROSPECTIVE CONVERSION PROCEDURES

To better evaluate the statistics, the basic conversion process is described below. Individual differences that affect the rate of conversion are mentioned throughout. The Cooper project started first, and the procedures were adapted slightly for the other projects.

Trained student assistants worked from a shelflist drawer and searched OCLC for all monographs card by card. Shelflist cards not found in the database were flagged with a green jacket, photocopied for searching, searched in the printed NUC, and inputted into OCLC from printed work forms. For works found in the database, the two records were compared. The following fields were checked: 010, 090/092, 1XX, 245, 250, 260, 300, 4XX, 5XX, 6XX, 7XX, and 8XX. If discrepancies could be solved at the terminal by quickly checking LC or local files, database records were edited and updated. If the book or NUC had to be checked, if name forms were involved, or if other higher-level decisions had to be made, printouts with the local call number and a description of the problem were made; red jackets were put on these shelflist cards. Problems were solved by the supervisors.

Both the card catalog and the online catalog were kept up to date with name forms. Generally, only the online catalog was kept up to date with subject headings.

If there were sufficient differences between the database record and the catalog

card, new cards were produced (i.e., additional access points, incorrect name forms, major changes in dates). If minor changes were made that might affect a later comparison of the database record and the catalog card, the minor discrepancy was marked on the back of the shelflist card (i.e., slight paging differences, exclusion of printing date).

Records updated at the terminal were divided into three categories: exact matches/minor editing, major editing, and work forms. Those records needing major editing required approximately four to five changes to meet the needs of the collection and the minimum standards. This distinction was made in order to justify the longer terminal time that was used for upgrading records and for adding local notes.

DETERMINANTS OF CONVERSION RATES

The library characteristics that determine the rate of conversion are: (1) the library's cataloging standards; (2) the quality of past cataloging; (3) the quality of the database; (4) the degree of uniqueness or the hit rate; (5) the special needs and problems of each library; and (6) the available staff. This study compares the conversion of three collections that vary in all of the above points with the exception of the first. All three projects had the same standards for the records updated.

Cataloging Profiles

The discrepancy between the desired cataloging standards and the past cataloging history was a major factor in determining the extent of offline time. For the rare book collection, past descriptive cataloging was precise and detailed. LC name forms were generally used. There was little discrepancy between past standards and standards for the online cataloging, although, in the process of conversion, the form of notes was modernized to conform to present styles. Most of the offline time (50.1 percent of total time) was spent searching NUC for card copy and preparing work forms.

Cooper cataloging ranged from good to excellent. Much of the cataloging had LC copy. The past practice of dashed-ons and adapting LC cataloging for other editions were two minor problems. AACR2 had the greatest effect on the Cooper recon. Most of the offline time (72.8 percent of total time) was spent on catalog maintenance, information verification, training, and supervising.

The South Caroliniana Library was the original library of the university. Catalogers and cataloging practice varied immensely. Although there was some consistency in name forms, there was little verification with LC. The major problems were: (1) subject headings were outdated and only on the back of the main entry card; (2) there were no name authority or series decision files; (3) different card sets for multiple printings had to be consolidated; (4) previously unidentified duplicates were frequently found; (5) many typographical errors that were previously overlooked had to be checked and corrected; (6) there was no recent inventory; (7) the choice and form of main entry were often incorrect; and (8) many pamphlets were bound in one or more pamphlet sets.

The quality of past South Caroliniana cataloging was sufficiently inconsistent that every subject heading was checked by recon staff and every name form was searched by a trained NUC searcher. Descriptive cataloging was modified at least to the national standards used at the time of cataloging. Many card sets had to be reproduced. In the conversion process a name authority file and series decision file were established.

Hit Rate

Another of the major determinants of the rate of conversion is the hit rate. The hit rate is defined as the percentage of records found in the database. Thus, it is the sum of major editing and exact matches or minor editing.

The hit rate depends on the uniqueness of the collection, the size, the age, and the language mixture. The rare book collection had the largest age range (eighteenth to twentieth century), followed by South Caroliniana (mid-eighteenth to twentieth century), and then by Cooper (twentieth century). The size of the collection converted was the reverse, Cooper the largest, and rare book the smallest.

Language was not a major factor. South Caroliniana had very little foreign language materials. Rare book had some Latin and French. Although Cooper has a fair percentage of foreign language material, the collection that was converted in this study included only a small percentage of French, German, and Spanish.

The hit rate was very high for Cooper (92.7 percent), slightly lower for rare book (78.0 percent), and lowest for South Caroliniana (48.5 percent). The hit rate was a major factor in determining the procedures and staff needs. With the South Caroliniana project, only 19.5 percent were exact matches/minor editing and 29.0 percent were major editing. It was not time-efficient to train South Caroliniana student assistants to edit and update database records. They searched the database and made printouts of the problems; the paraprofessional did all updating.

Only 48.5 percent of the South Caroliniana records were found in the database; 51.5 percent had to have work forms prepared. Preparing workforms is a time-consuming process. With the additional problems present in the South Caroliniana library, 84.1 percent of the time was spent offline collecting information, checking books, verifying name forms and subject headings, and making any necessary catalog maintenance changes to upgrade the card catalog. Both South Caroliniana and rare book had two card catalogs to maintain, the individual library catalog and the union catalog.

Special Needs

The quality of the database records and the special needs of each library determine the amount of time spent at the terminal for each record. If the quality of cataloging of the database record is LC or equal to LC, less time is spent upgrading cataloging. The rare book and South Caroliniana records needed significantly more routine editing than the Cooper records.

For each rare book record, the following was added as needed: (1) more detailed paging and size; (2) local binding notes; (3) bibliographical history notes; (4) ex libris notes; and (5) other special printing notes or dates. Thus, all 049, 300, 590, and some 090 fields had to be edited for each record.

South Caroliniana records had an additional tracing for all South Carolina publishers and many South Carolina persons. Different printings were noted for South Carolina publications. Extensive bound-with notes were needed for the large amount of pamphlets bound together. Thus, all 049, 092, and some 590 and 690 fields were added.

Staff

The size of staff varied for each project. The Cooper project was the largest with two full-time paraprofessionals and three to five student assistants working twelve to twenty hours per week. The South Caroliniana project was slightly smaller with one full-time paraprofessional, one part-time NUC searcher, and two to four student assistants working twelve to twenty hours per week. The rare book conversion consisted of one student assistant or library school intern working fifteen to twenty hours per week with some assistance from the rare book paraprofessional. The consultations with and the preparation of work by the rare book paraprofessional were not included in these statistics. If that time were considered, the statistics for the number of records updated per staff hour would have been slightly lower.

One part-time professional supervised all three projects with the advice and assistance of the catalog department head. For one year the professional worked full time with the three projects and concentrated on the most difficult project, the South Caroliniana conversion.

The emphasis of paraprofessional time was different for each project. The South Caroliniana paraprofessional spent a majority of time preparing workforms, maintaining the card catalog, and updating records. The Cooper paraprofessionals spent most of the time training, answering questions, and deciding name authorities.

STATISTICS

Editing

The rare book conversion did the least amount of major editing (11.9 percent) and had about the same amount of exact matches/minor editing (66.1 percent) as the

Cooper conversion (71.4 percent). However, almost twice as much time was spent at the terminal for the rare book conversion (49.9 percent versus 27.2 percent). The low major editing statistic may be due to the fact that the source of many records used by rare book recon is other rare book cataloging. Generally, more care has been taken in cataloging rare materials; this results in a more complete database record with fewer errors.

The South Caroliniana conversion did the most major editing (29 percent). This probably resulted from the lower quality of the older database records and the additional tracings needed for their catalog.

The large percentage of minor editing for the rare book project could be due to the fact that one lengthy rare book note was considered as one change, as was a quick page or date change. A slightly different interpretation of major and minor editing may also have been a factor. However, it is reasonable and evident that rare book conversion takes significantly more terminal time. To input a work form for the rare book or South Caroliniana conversion took more time because the general record was first input and then reformatted and updated for many of the local changes.

Conversion Rates

The number of records updated per hour at the terminal has been used as the statistic for comparison of conversion rates. This study provides evidence that this statistic is not the only one needed for comparison or evaluation of recon projects. The only rate that takes into consideration all the factors that determine time needed for editing, verification, and support activities is the number of records updated per staff hour.

As was seen through the previous description, offline time is significant for all three projects for varying reasons. Offline time for the three projects are: Cooper (72.8 percent), South Caroliniana (84.1 percent) and rare book (50.1 percent).

There is a significant difference between the number of records updated per terminal hour and per staff hour both within the individual library and among the three libraries (table 1). If only the number of records updated per terminal hour is considered, the ranking for conversion rates is as follows: (1) Cooper (15.4 updates/terminal hour); (2) South Caroliniana (9.6 updates/terminal hour); and (3) rare book (6.8 updates/terminal hour). However, if total staff time is accounted for, the ranking changes to: (1) Cooper (4.2 updates/staff hour); (2) rare book (3.4 updates/staff hour); and (3) South Caroliniana (1.5 updates/staff hour).

This last statistic of updates/staff hour reflects more accurately the distribution of staff time and the conversion rates. The Cooper and rare book project are significantly different if only terminal hours are considered (15.4 and 6.8, respectively), but close if total staff time is considered (4.2 and 3.4, respectively). This is due in part to the increased training time needed for the Cooper project resulting from its greater size, longer duration, and variety of cataloging. The rare book project used student assistants with previous recon or copy cataloging experience; little supervision was needed. These factors combined with the history of excellent cataloging in both the rare book collection and in the rare book database records produced a conversion rate of updates/staff hour similar to the Cooper rate.

The large difference between the South Caroliniana updates/terminal hour (9.6) and updates/staff hour (1.5) gives an indication of the large amount of time used for offline support activities that are needed to maintain the quality of the online catalog. Both statistics are needed to explain the distribution of staff time.

Statistics for the conversion completed at the time of this writing can be found in table 2. The rare book conversion was basically completed before OCLC implementation of AACR2 and automatic conversion of the database. However, the statistics for the last ten months of the other two projects were adversely affected during the four months prior to and the first six months after AACR2 implementation.

A comparison of the South Caroliniana and Cooper statistics in both tables 1 and 2 provides an estimate of the effect of AACR2 and machine conversion on the rate of retrospective conversion. The Cooper project was affected the most; statistics dropped

from 15.4 to 13.4 updates/terminal hour and 4.2 to 3.8 updates/staff hour. This 13 percent decrease is due to the increased amount of time spent verifying name forms before input of new records and changing name forms in the card catalog as well as slow OCLC response time and increased downtime. The percentage of each type of editing and the hit rate stayed approximately the same.

The South Caroliniana statistics were affected less by AACR2. Since the conversion rate is lower and the project smaller, fewer name forms were encountered. In addition, most of the names were local or old and therefore not likely to be in the online name authority file.

COST FACTORS

Cost factors associated with a recon project are: online time, overhead, equipment and supplies, and staff. Overhead was minimal, and online costs were minimized by using early-morning and evening hours for updating. Besides one additional OCLC terminal and printer that were purchased, staff salaries accounted for a major part of the costs.

Staff time and cost statistics determine if it is more efficient to have a majority of the conversion completed by lower-level staff, who need to be trained and supervised, or by professionals, who need little training and supervision but are paid two to three times the student assistant's salary. For example, the recon statistics for these three projects may appear low; however, almost half of the work was done by student assistants and half by paraprofessionals.

For the South Caroliniana project, it was determined that to obtain the desired quality of work it was more cost-efficient to have paraprofessionals rather than student assistants edit and update database records. The combination of the higher level staff and low conversion rate made the South Caroliniana project approximately three times more expensive than the other two projects.

The Cooper conversion cost slightly more than the rare book conversion because of the size of the Cooper project and the larger amount of time paraprofessionals spent training and supervising student assistants. Before the projects started, it was thought that the rare book conversion would have been the most expensive because of its detailed requirements; however, in this study it was the least expensive because of the high quality of cataloging and the use of experienced staff.

CONCLUSION

There are too many variables in recon projects and library collections to consider these results completely predictive; however, the statistics and information reported can provide guidelines for the estimation of the rates of conversion for three types of library collections—a main library, a historical collection, and a rare book collection. Background information on the collections converted, level of staff, and recon procedures were presented to allow for comparison. Although other libraries may vary in the characteristics of the library collections, their history of cataloging, the standards for their online catalog, and the staff available, this report may aid in the prediction of comparative time and cost estimates for branches of a main library or for special collections.

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Communications

Dissemination of Scientific Information by Satellite

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A number of observers are of the opinion that the present pattern of publication of scientific and scholarly articles in a wide variety of specialized, small-circulation journals will collapse under the increasing volume of papers being produced and the increasing economic pressures facing conventional journal publication practices. One alternative to the current method of dissemination of these papers is suggested here. This article is concerned primarily with the technical aspects of the problem. Economic and administrative concerns are not dealt with.

In order to establish the basis for the proposal, some consideration of volume of production is first necessary. There are on the order of one million papers produced each year.[1] At a generous estimate, each of these papers will be assumed to be 5,000 words, or about 30,000 characters, in length. This results in an annual production of about 30 billion characters per year. If we assume 200 working days per year, the daily production is 150 million characters. At present, a large proportion of these characters are transcribed into digital machine-readable form prior to their being published on paper. The increasing use of cold-type photocomposition methods and computer typesetting will increase this proportion even further. An even higher proportion of the abstracting and indexing (A&I) services produce computer-readable versions of their products before transcribing them to paper. This proportion will also grow in the immediate future.

At present, the A&I services receive paper copies for the articles that they abstract. It would be possible for them to receive machine-readable versions as well as, or in lieu of, paper copies. If this were done on a large scale, a new distribution method is possible.

The proposed distribution system consists of the use of synchronous communication satellites in a somewhat different manner than has been common thus far. Each A&I service would transmit its abstract and indexing or classification terminology to one of several ground stations. The original publisher (or one of the A&I services by agreement) would also transmit the original document. The article-plus-abstracts would then be transmitted from the ground to a satellite, then from a first to a second, and from there to a third. Each would retransmit the signals back to earth, where they could be picked up by ground stations. Using three satellites allows reception from any point on earth.

Present satellite transmission capabilities permit data transfer in the range of ten Gigahertz (10 billion bits per second). Assuming that ten bits are required per character, this is equivalent to one billion characters. Since the daily volume is 150 million, as noted above, transmission time for the total would be under two-tenths of a second.

Practically, of course, there is no need for such blinding speeds. It would no doubt be simpler and cheaper if these signals were interleaved with the others, in much the same way that digital data is transmitted in the "vertical blanking interval" in the present teletext systems. If we pessimistically assume that this slows the transmission by a factor of 10,000, then transmission time becomes 2,000 seconds, or 33.3 minutes. If we then assume that the system is operational for say, half the day, the data could be cycled through the system twenty-four times. As will be noted below, this repetitive cycling can simplify the receiving process.

On the receiving end, a ground station

will receive the signals and feed them to a computer system. From this point onwards, the procedure is essentially current state of the art. The computer system will contain a series of "profiles" presently in use, along the lines of current SDI profiles. Any portion of the abstract, index data, or full text can be scanned. Since the portion of a transmitted document that "hits" on a profile will occur well into the text, the receiving system will not know until too late that the current document was one that should have been kept. However, if the document's identifying number comes at the end, as well as at the beginning of the text, that number could be captured by the receiving system in its internal memory. Then, when the transmission loop cycles through again, the receiving system will have a table of numbers identifying those documents to be captured. Thus, on the first cycle, the receiving system would scan the data as it streams by, and capture those document-identifying numbers that correspond to "hits." On the second cycle, the system would record the entire texts of those identified in the first pass. Assuming the 33.3-minute-cycle time, the entire process would require a little over an hour.

Once captured locally, the output can be processed by the system to produce, in effect, custom-designed abstracting and indexing bulletins, COM or paper copies of the full texts, or any of a variety of other products. It would be possible, of course, for any receiver to "subscribe to a journal" by designing a profile that selects all articles from a particular publisher or journal.

Several variations might be developed. Institutions could install their own systems, especially in view of the fact that receiving antennas are priced below $5,000 now. Alternatively, one organization might act as an agent for several users, running their profiles and producing their abstracting bulletins, COM copies, or whatever is requested.

The system would have a number of advantages. First, it would reduce the tremendous volume of paper that is being printed and shipped all over the world. Secondly, there would be less chance of significant new developments being overlooked, as a subscriber to this service has, in effect, a subscription to everything, regardless of its geographic or bibliographic origin. Thirdly, by eliminating the paper production and distribution process, the substantive content of the papers themselves will be disseminated much more quickly than is presently the case.

There are, of course, a number of administrative and economic problems involved. While it is true that the transmitting stations will accumulate an archive of previously transmitted papers, at the rate of 150 million characters a day, it should not be forgotten that this same archive is in fact being constructed today, albeit in a much more disorganized form as the various A&I services accumulate their daily production. It is also true that some forms of scientific and scholarly communication cannot be adequately represented by digital transmission and are hence unsuitable for this system. Copyright is obviously a serious consideration as well. It would probably be necessary to work out some "royalty-per-paper-or-abstract" payment system so that the publishers and authors are remunerated for their efforts in producing the texts that form the basis for the system's input.

The scheme proposed here is obviously not suitable for retrospective searching. The system is not capable of holding any reasonable fraction of the already published literature in its transmission loop. Also, the system is purely a serial search mechanism. In conjunction with extensions of present online services, however, the system could provide copies of earlier papers. Once particular items were identified as pertinent through present search methods, the system could direct that the text of that item be transmitted from whichever source it originated and picked up by the requesting agency. Perhaps the other half of the twenty-four-hour-channel capacity could be used for this "transmission on demand" of earlier articles. This would be the electronic analogue of the present "document-on-demand" services provided as an adjunct to search services (e.g., DIALORDER on DIALOG).

It would be economically difficult to develop a system of this kind solely for the dissemination of scientific information; however, by sharing the channel with other

large-volume text producers such as the larger newspapers and journals of the world, it could be more feasible. Daily global or regional weather forecasts, the wire-services news reports, and other such "daily-update" data could also be handled by this system, though, of course, the time slots would have to be appropriately allocated.

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Retrospective Duplicate Resolution for the Harvard Distributable Union Catalog

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In the summer of 1981, the Harvard University Library produced its first distributable union catalog (DUC) on microfiche. The initial DUC contained, in addition to entries for serials, acquistions records and cross-references, monographic cataloging for forty-eight of the Harvard libraries.

Machine-readable monographic cataloging for participating libraries had been collected from monthly OCLC-MARC subscription service tapes since 1977. Because a copy of a catalog record appears on an OCLC subscription tape whenever a terminal operator orders cards, cancels holdings, or performs certain corrective transactions, a significant proportion of records received duplicated other records for the same titles. Since subscription records based on a single record in OCLC's online catalog have the same utility control number, these duplicates are easily identified. A minimal maintenance system had been in effect, which allowed an editor to review all duplicates and to delete unwanted ones. A monograpic master file was kept containing one good machine-readable catalog record for each *holding* of a title at Harvard. At the time of the first microfiche catalog, this file contained 266,327 records for 236,524 titles.

In the design of the DUC, the library switched to a master-record concept, where each *title* is represented by a single machine-readable bibliographic record. Holdings information is retained in and displayed from locally generated holdings fields stored within the master record, with one such field for each holding of the title at Harvard.

The implementation of the new union catalog production system, then, required two major changes to the retrospective monograph file. First, local information scattered throughout each record had to be consolidated into a single holdings field. Second, the contents of the master file had to be converted from one record per holding to one record per title, with multiple holdings fields when necessary.

Because of the massive number of duplicates already accumulated, it was decided to choose (hopefully) the best record from each "duplicate family" (records with the same OCLC number) to be the master record by machine whenever possible. Manual editing would be performed only for records in "problem" categories. A series of PL/1 programs were written to perform both the format conversion and as much of the duplicate resolution as possible.

A holdings field was designed and designated with the tag "995." The format (which has since been expanded to include additional data from both OCLC and RLIN records) allowed for the following data elements:

subfield *i* = local code indicating the holding collection

subfield *c* = text appearing before call number
subfield *a,b* = call number used by holding library
subfield *d* = text appearing after call number
subfield *n* = local note
subfield *z* = technical processing information

A table of OCLC-like library profile information was constructed, with one entry for each contributing collection, to enable selection of the correct call number, subject headings, etc., from the OCLC record. The first program then created holdings fields using information in this table to gather, supplement, and format data from the holding library (049), call number (050–099), and local notes (590) fields within the record. Source fields used in the creation of the holdings field were deleted from the record and the holdings field added. At the same time, information to aid in the automatic resolution of duplicates was collected and appended to the front of the converted record.

A second program analyzed each family of duplicates and wrote out transaction records that (a) indicated which member should be chosen as master record, or (b) indicated the entire family needed to be printed for editorial review. Families containing no LC MARC cataloging (identified from the 040 subfields *a* and *c*) and families containing one or more multivolume monograph records (identified by clues in the fixed fields and the collation) generated "review" transactions. Otherwise, the best record was tentatively identified by eliminating family members in a series of tests until only a single record remained.

The first test was a comparison of record status (OCLC Rec stat) according to the hierarchy of values: *c, p, n, d*. If, for example, in a family of three members, one had record status *c* and the other two were *n*, the *c* record was selected. If two had status *c* and one had status *n*, the *n* record was eliminated from consideration and the next test applied to the two *c* records only.

The remaining tests, in order of priority, were: (a) encoding level hierarchy: "blank," *1, J,* 8, *W, E, I, K, L;* (b) modified record code hierarchy: *e, m, s, d, r, o, x,* "blank"; (c) number of traced series; (d) longest record length (counting nonlocal bibliographic data only); and (e) latest production date.

The program then reviewed its tentative selection in light of the other records in the family. If the candidate for master record was not LC MARC or AACR2 (identified by the presence of 87*x* fields indicating a heading had been changed in OCLC's database conversion) and any other record in the family was LC MARC or AACR2, a "review" decision was written. Otherwise, a transaction indicating the chosen candidate was outputted.

The final program applied the decisions made by the selection program. If a master record was indicated, the holdings fields from the not-chosen records were inserted into the chosen record, and the not-chosen records were discarded. If review was forced, the entire duplicate family was printed. Editors selected the best record in each family from the printout, and their decisions were keyed in the same format as those automatically generated by the selection program. These were then applied in successive runs of the third program, until all cases of duplication were resolved.

In this manner, 48,812 duplicates representing 19,709 titles were resolved by machine and 6,890 duplicates representing 3,212 titles were examined and resolved by editors. The entire process was completed in less than two weeks. ■■

Nonroman Scripts and Computer Terminal Developments

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ROMANIZATION

Although the number of languages used in the world are myriad, there are only ten major scripts in use for book production. These ten scripts account for over 99 percent of that book production.[1] Listed in sequence of quantity produced, they are:

Roman (English, French, German, etc.)

Cyrillic (Russian, Bulgarian, etc.)
Japanese
Chinese
Devanāgarī (Sanskrit, Hindi, etc.)
Arabic (Arabic, Farsi, Urdu, etc.)
Korean
Greek
Thai
Hebrew

In most American libraries, an effort is made to provide bibliographic descriptions in the original script for nonroman materials. However, bibliographic control and public access for those materials are maintained through the process of romanization.

Romanization is a method for converting a word that is written in a nonroman script into a word that sounds like the original but is written in the roman alphabet. This can be accomplished by transliteration or by phonetic transcription. Transliteration is simply the letter-by-letter exchange of the symbols in one alphabet for the symbols in another alphabet (often with the addition of diacritics to provide clues for pronounciation). Phonetic transcription, on the other hand, uses the roman alphabet to reproduce the nonroman word in the approximate sound of a target language, e.g., English.

These simple definitions do not reveal the problems that can be encountered when there is an attempt to apply the procedures. The scripts that are nonalphabetic (e.g., Chinese) cannot be transliterated because they do not have letters that can be exchanged with a roman counterpart, and there are word-characters that represent no sound. Even some alphabetic scripts often are not truly transliterated; Hebrew and Arabic are conventionally written with only the consonant sounds while the vowel sounds are supplied only in speech. "Hgdh" is the literal letter-by-letter transliteration of a common Hebrew word that is pronounced "Hagadah." Popular romanization schemes for these languages supply the vowel sounds. This offers the opportunity for variant results of romanization. Cyrillic transliteration can be straightforward, provided that you are aware of which language is involved; a Russian word and a Serbian word that are composed of identical characters may be transliterated differently because transliteration schemes reflect the slightly different pronounciations between the languages. The ironic result is that the two words would be filed in radically different places in a roman alphabet sequence even though they would be side by side (where they logically should be) in a Cyrillic alphabet sequence. Even allowing for rigid adherence to a specific romanization scheme, it is difficult for all users of data that have been romanized to be completely aware of which "standard" has been applied. Depending upon one's language bias, the romanized form of the name of a famous Russian composer could be sought in the following forms: Čajkovskij, Chaĭkovskiĭ, Tchaikovsky, Tschaikovsky, and Tschaikowsky. In the public catalog of the General Libraries of the University of Texas at Austin, entries for those names would be found in the following numbered catalog trays: 1162, 1318, 8617, and 8832. In order to go immediately to the "proper" form of the name, it is necessary to know what romanization standard is used by the General Libraries, what the origin of the name by language is, and what the nuances of the romanization scheme are. If the wrong form is chosen first during a search and the solitary cross-reference card is missed in a drawer that has 1,200 other catalog cards, the search is ended and it is ended with failure.

American libraries go to great effort to create original script bibliographic descriptions. Yet the access points are romanized and are interfiled into one continuous alphabetic scheme. (Libraries in other countries simply create separate files for each script group.) The accuracy of the romanization and the comprehensiveness of the related reference structures are dependent upon the precision of human beings. There is not even an attempt to provide references to most romanized titles. The negative aspects of romanization cannot be denied and they have been stated very eloquently and at length by Spalding[2] and Wellisch;[3] there is no point in recapitulating those expositions here. On the other side, it can even be conceded that there are occasions in which a romanized name or title provides access that is equal to or better than the original

nonroman script, e.g., the music student that does not know the Cyrillic alphabet could not find cataloging for a Russian composer in a Cyrillic alphabet file, but he might succeed with romanized access. The actual point here is that romanization does provide a limited form of access to nonroman material. However, we should try to go beyond that limit by finding methods to also provide original script access for nonroman material so that service can be provided to those who have specialized linguistic backgrounds as well as to the average person who is simply trying to pursue a romanized citation from the daily newspaper.

IMPACT OF ONLINE DEVELOPMENTS

In an environment of card and other hard-copy catalogs, the limitations of romanization can be pragmatically tolerated because of related economic constraints. However, online access via CRTs to the information in those catalogs provides us many more options. Even when nothing special has been done to manipulate romanized data, access is improved simply through the advantages of screen displays. It is no longer necessary to study bibliographic data in a card-by-card mode; it is possible to scan lists and to move from record to record without worrying about overlooking a card because two have stuck together. Derived search keys and keyword searches allow for the retrieval of more specific data without the necessity of rooting through card after card of unrelated cataloging; the more specific retrieval reduces the opportunity for human oversight. Online authority control offers the opportunity to make references transparent to the user and to eliminate that chance of missing the single card with a reference in that drawer that has 1,200 other cards.

There are other enhancements that would require special programming. It would be possible to input a primary romanized alphabet for each nonroman language that would be accessed online. Available variant romanization schemes for each of those scripts could then be input as a series of tables and could be linked to the primary alphabet. Romanized access points could be labeled according to language and could be marked as romanized. The variant forms could then be automatically generated by the program, e.g., the input of "ch" labeled as Russian could be searched by "ch," "tch," or "tsch." Obviously this might be a very "busy" program, but that could be controlled through restrictions of the program's use to selected situations. As useful as this procedure might be, it still does not cope with human error during the input of the original romanized access point and it does not provide for vernacular access.

INPUT AND ACCESS OF ORIGINAL SCRIPTS

A straightforward solution to the romanization problem is to provide access in the original script for nonroman materials for the specialist and to provide machine-generated romanized access and automated authority control for those materials for the generalist. Conceptually, this solution would not be difficult to achieve in an online environment. All that is required is a keyboard with which to input original script characters and a CRT to display those characters. The keyboard is used to transmit a code for each character to the CRT and to the main frame. As long as the codes remain distinct, the potential number of characters is infinite. A CRT is actually similar to a relatively fine resolution scoreboard or a sign on an old-fashioned movie marquee that operates by turning the lights either off or on to form a pattern. If the matrix of lights is too crude to form the desired characters, then simply add more "lights" per character via a higher resolution screen.

Because of the logistics problems in having a simple keyboard that could provide access to all needed scripts, a library might choose to have a variety of specialized terminals for its online public catalog. Most of the terminals would have Roman alphabet only. The Slavic languages collection might have one or two terminals with a combined Roman and Cyrillic keyboard. The Middle Eastern collection would have a terminal with Roman-Arabic-Hebrew capabilities. The classics department could use a Roman-Greek terminal.

The bibliographic control division would have at least one of each of these special terminals and would also have the ability to input all types of diacritic marks and special symbols. Input would be in the original script as displayed on the item being processed. Names would be input in their original script when appropriate. There would be tables in the system software that would contain the various romanization schemes for the scripts that could be processed by the system. Appropriately marked nonroman access points would have additional romanized forms automatically created during the processing of the data (indexing, authority control, etc.). Processing would be simpler for library staff and the results would be more accurate thanks to the machine intervention.

AVAILABLE HARDWARE

Although there are a variety of multiscript CRT terminals on the market, most are not suitable for library use because they incorporate only pairs of limited character sets, e.g., an English-Russian terminal would not be capable of processing Polish or Bulgarian because Polish has Roman script characters that are not found in the English alphabet, and Bulgarian has Cyrillic script characters that are not found in the Russian alphabet. The complete ALA/MARC character set is generally unavailable. Additionally, these special terminals are often expensive and may not be readily compatible with existing library hardware and systems.

Telex Computer Products, Inc., has spent several years working with the University of Texas at Austin General Libraries, with the Ohio State University Libraries, and with the Library of Congress to develop a terminal that can meet the special needs of libraries. The Telex 476L display terminal has many special hardware features but the topic to be discussed here is one special feature of that terminal. The 476L has multiscript input and display capabilities. The terminal that is now available accommodates the complete ALA/MARC character set (including diacritics, special symbols, subscripts, and superscripts) plus several additional special characters and symbols. Diacritics display as part of their associated characters instead of beside the characters as is seen on other terminals. It also has Hebrew (with right-to-left input capability) and Cyrillic character sets. The Cyrillic character set incorporates the letters currently in use in all of the Slavic languages that use the Cyrillic alphabet. (Due to keyboard-size limitations, the Cyrillic character set does not have the Macedonian letter S; that letter must be input from the ALA/MARC character set.) The Cyrillic character set also includes the Russian characters that were dropped by the reformed orthography in 1918; this means that a library can use the original script to catalog older Russian materials and those published by expatriates in Paris, San Francisco, etc. By using a combination of Cyrillic and Roman characters it is also possible to input and display bibliographic data for the many non-Slavic languages that use the Cyrillic alphabet as the foundation for their scripts.

Figure 1 is a graphic layout of this multiscript keyboard. The keyboard is arranged for the convenience of input. The character set control keys are on the left of the keyboard. They include:

SPCL: Special, i.e., the extended Roman alphabet characters and symbols seen on the right of some key tops

LCM: LC MARC, i.e., Roman alphabet, numerals, and symbols

CYR: Cyrillic, seen on the front of the "typewriter" keys

HBW: Hebrew, seen in white with a black background on the right of the "typewriter" key tops

SUB: Subscript

SUP: Superscript

Diacritics are accessed via the keys on the right of the keyboard. Where possible, the diacritics are arranged logically, i.e., marks that go below letters are "lowercase" on key tops and marks that go above letters are "uppercase" on key tops. Punctuation for Cyrillic and Hebrew; alpha, beta, and gamma; and some command keys are accessed in combination with the ALT (alternate function) key. SPCL, SUB, SUP, and diacritics are available with any script mode and do not require the operator to leave a script mode to key one of those symbols.

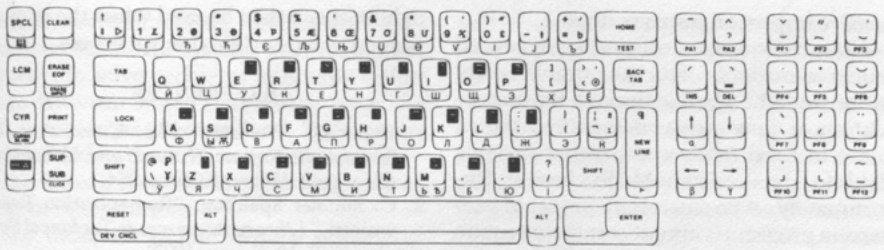

Fig. 1. TC 476L Multiple Language Keyboard (ALA/MARC, Crillic, Hebrew).

An important aspect of the 476L multiscript feature is the actual internal design. The various scripts are modular. This will allow the script groups to be changed in a simple manner. If the ALA/MARC-Cyrillic-Hebrew terminal does not meet all of your needs, perhaps you should have an ALA/MARC-Arabic-Hebrew terminal and/or an ALA/MARC-Cyrillic-Greek terminal. Even though all of these variations are not readily available now, the design allows for their creation on a demand basis. This creates production economies that can be passed on to the product consumer. A library can plan on using the basic terminal throughout its system with only minor modifications for special applications.

Other organizations and companies are developing terminals that can handle the problems of Oriental (nonalphabetic) scripts, e.g., the Research Libraries Group and Transtech Corporation.[4] Because those terminals will not be available until late 1982, they are not discussed here.

UNANSWERED QUESTIONS

The design and creation of a terminal for the input and display of nonroman scripts is only one step (albeit an important one) toward overcoming the problems presented by romanization for library bibliographic data.

How practical would it be to input data in its nonroman script form and then to have software generate the variant romanized forms from tables of romanization schemes? How many variant romanization schemes for how many languages would be optimum to assist a searcher who could not search with the original script? Should romanized forms be integrated with all similar access points or should they be accessed only upon a special request from the searcher? If the romanized forms are created and stored at the original time of data entry, there is the problem of data storage, clutter in the database, and poor response time to access the larger database. However, if the romanized access is created only on demand, the programs are likely to be long and, again, online response time may be degraded.

If a library has several terminals with different display capabilities, how much system overhead will be required to keep track of terminal addresses and their related capabilities in conjunction with the codes for the scripts? The required escape sequences for eight-bit characters are simply longer codes to accommodate the nonroman characters; that length will also have a negative impact on processing times.

The machine search algorithms for nonroman data may be complex due to the need to sort each script group separately. Scripts like Hebrew and Arabic that read right to left will further complicate this situation because the computer sort cannot begin at the literal beginning of a field that contains data in those scripts. In order for a search key to match the logical sequence of one of these strings of data, it will be necessary for the search program to: (a) interpret the start of message coding; (b) identify the script as a right-to-left type; (c) find the end of message signal (i.e., the true start of message); (d) match the search key to the data beginning at the first logical character; and (e) reconstruct any matches so that the display of data is in the logical right-to-left order. There are probably more efficient versions of this algorithm and various other methods to manipulate the nonroman data but even the best are likely to have an ex-

pensive impact on response time.

Conversion of existing romanized machine-readable data to original script forms could be possible through the manipulation of language and modified record codes in fixed fields and selected variable fields for data coded in MARC format. Unfortunately, even a carefully prepared conversion program is almost certain to require some human editing for each bibliographic record. Based on other conversion experience, it is clear that this human interaction can be very expensive.

CONCLUSION

As more and more library bibliographic data become accessible online, every viable opportunity should be taken to overcome the negative aspects of romanization. Even if a library cannot currently justify online original script access because of related costs (this would most likely occur for libraries with collections of nonroman materials that are not voluminous or specialized), that library should prepare for the time when those costs are reduced. This preparation can be accomplished by inputting romanized data into existing online systems. Care should be taken to follow any applicable standards and thought should be given to the future requirements of computer-assisted manipulation of the romanized data to add original script access. Input of romanized data now will also have immediate benefits because of the improved access offered by online systems.

Libraries with large, specialized nonroman collections should try to answer some of the cost questions that have been posed earlier. If the cost-benefit analysis is favorable, then those libraries can take full advantage of the state-of-the-art hardware that is now available. They can use original script input to simplify the creation of online data, and they can use the computer to provide sophisticated, flexible, and accurate access to those bibliographic records. If the cost-benefit ratio is not yet favorable but the analysis shows that it will be favorable in the near future, those libraries should consider the use of terminals with multiscript capabilities for current systems if the terminals can be justified now due to other special features. The multiscript capabilities can then be used when the time is right to pursue original script access.

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Circulation Systems Interface via Dial-Up Access

L. James Gosier and Mary E. Crisco: Harford County Library, Bel Air, Maryland

Across the nation, libraries are independently acquiring automated circulation systems with the result that some neighboring systems have different languages and different access procedures to their databases. Since cooperation and interlibrary loan are long-established traditions within the library community, it is natural that we look for methods by which online systems can interface. Initially, we think of direct hardware linkups that require vendor cooperation, translators, compilers, or software innovations. Vendors, however, are in the business of selling their product and give this area of concern low priority. We, the user, must seek other ways to cooperative access.

In our review of the literature, it doesn't appear that much effort has been made to get different kinds of systems to communicate even on a primitive level. And it appears to us further that the automated

systems were hindering interlibrary cooperation because the systems were thought of as ways to solve problems internally rather than between systems. *It would seem the obvious step has been missed.* Because the mechanism is there, dial-up access is something we can do without depending on vendors to find solutions.

To date, six public library systems in Maryland have purchased automated circulation systems. Harford County recently installed the DataPhase ALIS II system, and experimented with accessing the other online systems in the state. The only method available to us was dial-up access via standard RJ 232 coupler operating at 300 baud. If this could be done, the possibility of future cooperative interface could then be considered without putting money into software or elaborate hardware.

The experiment was very simple and easy to do. Our automation project director contacted neighboring Baltimore County, and then Montgomery County. Speaking to Kim Evans, Baltimore County Public Library, we asked: (1) Do you have a dial-up port available? (2) At what baud rate do you transmit? (3) May we have permission to try dialing into your system for inquiry? (4) What are your procedures for signing on and off? (5) What are your search strategies? With answers to these questions, we proceeded to dial up the Baltimore County CLSI system to do a title inquiry. Since title search is the only file available for their branches to search, it was the only file we could access at this time. In actuality, our terminal via dial-up modem became a branch terminal of the CLSI system. It was possible because both HCL and BCPL have a dial-access port and operate at 300 baud. *It is as easy to communicate with systems on this primitive level as it is for one branch in a system to communicate with another branch in a system.*

Maryland Interlibrary Loan (MILO) is an excellent interlibrary loan system on a course of self-destruction because of limited funding and rapid growth. MILO, centered at Enoch Pratt Free Library, has a BCPL-CLSI terminal for their ILL activities. Pat Wallace of MILO called Harford and asked about reversing the above process. She was able to access Harford's DataPhase system with no difficulty. They have repeated the inquiry by title, subject, and author several times with no problems. Online interaction between systems can relieve MILO from having to manage the loans of available materials so that it can concentrate on searching for items not readily available in most public libraries.

Montgomery County Public Library has yet another vendor, Systems Control. Marcia Kolb, coordinator of automated circulation systems, gave permission and directions for experimental access. She requested a telephone call before starting since it is necessary for them to do some behind-the-scenes work to enable access. All was quickly in readiness, and the dial-up inquiry was very successful, as was later access to Towson State University's CLSI system.

Harford Community College's IBM and CLSI systems in Prince George's and Howard countries are future prospects for linking after port acquisition.

As a member of Cooperating Libraries of Central Maryland (CLCM), Harford County has distributed to CLCM libraries instructions for dial-up access to Harford's DataPhase system and has provided a special password for their convenience. A dedicated dial-up port is being investigated for this purpose. CLCM Coordinator Jo Ann Pinder has established a task force to explore the matter more fully and to maximize the effectiveness of this kind of hookup by fully appreciating the procedural complexities involved when working with a diverse group of libraries. With the cooperation of the other systems, we hope to be able also to share delinquent patron information and thus curtail crossover patrons who misuse borrowing privileges.

Because online access provides up-to-date databases and because it is so easy and relatively inexpensive, it will dramatically affect loans between systems. But, because direct interlibrary loan becomes so enticing as collections are more readily available, new problems are created. For example: (1) Who has first rights to a given item? (2) How can we monitor whether systems are staying within ILL guidelines? (3) If direct loaning becomes commonplace, should state-aid formulas for subsidizing ILL be revised? (4) Libraries not accustomed to loaning are faced with the prospect of being visibly excluded from ILL because of unwillingness or inability to allow access. However, the problems are small in comparison to the new abilities we have with an automated system.

DataPhase has instituted interface with OCLC/WLN and continues to pursue other areas of direct interface. Our DataPhase consultant, Barbara Lamolinara, and the DataPhase company encouraged us to try the experiment. With the advent of the DataPhase Public Access Catalog in 1982, future public use may become feasible.

This small effort to communicate through automation has been exciting and promises new ventures for the future. It is possible that this experiment could lead to greater impetus for hardware interfacing such as is now being tried by Boulder, Colorado's Irving Project. California's North Bay Cooperative Library System is currently conducting an LSCA-funded project to provide dial-up access to one Gaylord and three CLSI circulation system databases. So, we are really not unique in our endeavors.

Harford County has found that online systems can interact with each other. With present technology we can do much more than we currently do. The various systems need to agree on this type of interaction and set up some vehicle for procedural development. Even with this primitive online capability, it means, in our estimation, a quantum jump in provision of interlibrary loan service because it eliminates much paperwork and dead-end searching. At present, it is one method of supplementing the overworked ILL system. It seems so simple; it works; and it could very well begin a whole new avenue of cooperation for automated systems in Maryland. ■■

Video PATSEARCH: A Mixed-Media System

Jacque-Lynne Schulman: Pergamon International Information Corp., McLean, Virginia

The Video PATSEARCH system consists of a videodisc player operating under an intelligent videodisc interface unit (VIU), and a microcomputer display terminal. The terminal is used to search the online PATSEARCH database from a remote host with local microcomputer control to automatically select and display drawings of the retrieved records. This system provides online access to the 750,000 U.S. patents issued since 1971 with computer retrieval of patent drawings and chemical structures, along with patent abstracts and other textual information. The VIU offers the unique capability to integrate computer retrieval of textual information with videodisc display of graphics.

PATENTS AS AN INFORMATION RESOURCE

Patents are an important source of technological information. Innovation gener-

ates new and improved products and services. This process of innovation is based on the modification of existing technology or the application of new technology from research and development. All ideas come from information and all discoveries begin with it. If we think of developments such as the telephone, radio, or transistor, we are thinking of inventions disclosed through patents.

The objective of the patent system is stated in Article I, Section 8 of the U.S. Constitution: "To promote the progress of the useful arts" by providing protection for inventors. The purpose of patents is the promotion of technological progress. Inventors are given an incentive to make an early and *complete* public disclosure of their inventions. In exchange, they receive a patent or grant, giving them the right to exclude others from exploiting the invention.

The requirements for issuance of a patent include complete disclosure of the invention and that the invention be novel, useful, and unobvious. Patent law also requires a complete disclosure of the invention, sufficient to enable anyone skilled in that technology to make use of the invention. The patent must also include a summary and assessment of the background or relevant technology used in the invention. The patent, therefore, is a stand-alone document, that both summarizes previous developments in a field, and presents new information about the field.

Patents are thus, not for inventors only. The information contained in the patents is useful for anyone collecting and disseminating technological information.

UNIQUE SYSTEM REQUIREMENTS

A system was needed that would provide rapid, interactive retrieval of patent documents using any of the information on the front page, including key words from the abstract and title, company names, inventor names, classification codes, or other textual information. In addition, a need was seen to provide random access to the drawings associated with these patents as well. Video PATSEARCH has been designed to meet these requirements.

Unlike other forms of scientific information, the patent offers a unique source of standardized bibliographic and descriptive information. United States patents are required to contain drawings, if appropriate, that illustrate the principal of the invention. Of the drawings which may be contained in the patent, one is selected as being most exemplary of the invention described and normally appears on the front page of the patent. In addition to standard bibliographic information such as inventor, patent issue date, application date, title, etc., the patent is required to contain an abstract that describes the invention. All of this information also appears on the front page of the patent document.

In designing this system, it was important to make the graphic image in the form of the front page drawing available. The drawing offers a unique information display of the content of the invention. There is some truth in the phrase a picture is worth a thousand words. The typical user of patent information approaches the query with a definite idea of the invention sought. Seeing the actual drawing of the invention being scanned offers an extremely rapid, efficient, and effective way to determine the relevancy of the retrieval.

In the initial design phase of the system, microfiche was considered as the graphic storage medium. However, an additional system requirement was user convenience. A completely manual microfiche retrieval system such as that represented by ERIC document collections was not acceptable. In such a system, the user is required to determine relevant documents from title or abstract, then manually retrieve the associated microfiche from file drawers of fiche, insert them in a reader, and find the appropriate frames. Current microfiche or microform storage and retrieval devices also did not appear to meet these needs. Although storage densities are high enough, the retrieval means available so far for these systems are electromechanical with limitations in maximum storage capacity. The patent graphic collection of 750,000 images would fill available, moderate-cost local storage and automatic-retrieval fiche systems. As the collection grows, the capacity of these systems would be exceeded. The

electromechanical nature of the devices leaves open the question of reliability through mechanical failure.

Instead, a system was sought that would allow fast random access under some sort of automatic control. With the DIU interface, initially developed at the National Library of Medicine's Lister Hill Center, Pergamon was able to develop a system that met the needs of the patent information user. Using the microcomputer-controlled laser disc, it is possible to allow instant retrieval by linking the graphic location and the patent record through mapping available on the microcomputer floppy disc.

SYSTEM COMPONENTS

Microcomputer

A specially designed and constructed microcomputer was created. It uses commercially available control boards and custom software to provide the sophisticated videodisc-player control with patent graphic-display features. It also supports a universal terminal function, operating with an ASCII-compatible, dial-access computer host. In addition, an optional enhancement permits interface with the two commercially available, chemical-substructure search and display systems. The American Chemical Society's CAS online system and the DARC Questel system from France provide online chemical searching using substructure parameters such as elements, number of atoms, and arrangement of rings. Both require graphic support, emulating Tektronix terminal output for online display of the chemical structures retrieved. The Video PATSEARCH chemical-search enhancement fully supports this, permitting one terminal system for universal access to hosts such as DIALOG, online patent-drawing display and chemical-substructure search and display.

The microcomputer in the system is a Z80-based microcomputer operating under the CP/M operating system on a single disc drive using a 5¼-inch floppy disc. The system program has been written in a high-level language (Pascal) to reduce hardware dependence. For example, as new micro boards become available, Pergamon will be able to upgrade the system without extensive software changes. This disc contains, in addition to the necessary software to control the disc player and terminal displays, a special mapping program, or look up table, which permits the random access of graphic images through a connection table linking patent number with frame location for the associated graphic image.

The microcomputer controls two viewing screens. One screen, for textual information, is the interface between the user and the remote host computer. The other screen is a graphic-display screen for the images generated locally by the videodisc player. The microcomputer also includes a specially designed keyboard with function keys. The microcomputer is designed for automatic log-in. When the user begins the search session, he is permitted to select from a menu of options displayed on the text terminal. When the user selects the Video PATSEARCH option he is automatically logged-in to the PATSEARCH database. The function keys permit manipulation of the system, alternating text and graphic display or simultaneous text and graphic display as desired by the user.

The system provides a search list with up to 200 document numbers, and a tag list provides storage of an additional 200 document numbers. During the search session, as patent numbers are displayed to the user, those numbers are automatically entered onto the floppy disc. This becomes the "search list" for that retrieval session. The user can also create a second list, a subset of records through the tag function. Selected patent numbers are tagged or added to the "tag list." In this way the user is able to create a subset of documents from the patent database, having created the search set using parameters such as keyword in the title or abstract, inventor or company names, geographic location, or other search criteria. The user is able to quickly scan the selected documents, viewing the front-page graphics associated with each. Desired documents can then be set aside, in effect, in the tag list for later review. The user can then scan, looking only at graphics, going back to selectively review the full textual information associated with each graphic.

The system operates at 1200 baud with a user option of 300. As previously stated, Video PATSEARCH is a universal termi-

nal, allowing access to any compatible dial-access system. An optional enhancement permits full utilization of graphic input and output capability of both the CAS online and DARC chemical-substructure search systems.

Videodisc Player

The videodisc player currently used is the industrial optical-videodisc player produced by DiscoVision Associates (DVA model PR-7820-2). This is a modified version of the standard player which can be directly connected to a host processor. An eight-bit, parallel-communications protocol provides controls for "send," "receive," "acknowledge," and status information between the player and microprocessor. In addition to its use in the Video PATSEARCH display system, the player is compatible with commercially produced optical videodiscs and thus can be used for other applications on the user site. As used in the system, the videodisc player scans for a single desired frame and then displays the graphics on that frame.

The Videodisc

Each videodisc consists of concentric tracks with one video frame per track. Each side contains 54,000 frames in the standard NTSC (National Television Standards Committee) video format. The Video PATSEARCH system utilizes less than 50,000 of these frames on each side.

The creation of the videodisc begins with photographing the patent front-page graphics. Pergamon was confronted with massive problems of file integrity in collecting and arranging 750,000 source documents. A collection of documents was borrowed from a patent depository library. Although the collection was theoretically complete, some patents were missing and others were lacking the critical front page. Copies of the missing and incomplete patents were obtained from other sources. After assuring that the graphics file was complete and in correct sequence, a film was made.

From the film, the videodiscs are presently mastered and duplicated for Pergamon by DVA, using videotape as an intermediate format. A glass master disc is created by exposing the prepared photosensitive material with a laser beam modulated by the output of the signals recorded on videotape. The glass master is then photoetched. After an addition of reflective coating, two sides are joined to form a single two-sided disc.

The videodisc player creates a graphic image by focusing a laser light beam on the surface of the videodisc, then monitoring the reflective-light pulses. The reflective light is a frequency-modulated signal that results from differing depths of the pits and peaks. Thus the signal is not a series of "offs and ons" or "zeros and ones" but is actually gradations of "off and on."[1]

Since the laser-read head does not actually contact the disc there is no wear associated with repeated use. This is in contrast to CED-type discs with an estimated life of 400 uses before noticeable degradation of image occurs. No such degradation from use has thus far been reported with optical videodiscs. Each videodisc contains an audio track which is used to store the program that identifies the disc for the videodisc player.

It has already been noted that each videodisc side contains approximately 50,000 patent drawings and chemical structures. The videodisc player can only read one at a time. The current collection of patent documents from 1971 through 1981 contains over 750,000 items. Therefore, there must be some mechanism for videodisc changing by the user.

When the user requests display of a graphic not available on the videodisc side currently mounted, the microcomputer displays the appropriate frame with a message, instructing the user of the correct disc side to be mounted. The microcomputer, under user control through the function keys, then permits the user to turn off the videodisc player, mount the correct disc, and restart. The videodisc player then automatically seeks the desired graphic for display. Not all U.S. patents contain a drawing or chemical structure on the front page. Patents such as those for processes may not contain a graphic. In those cases, the videodisc player is instructed by the microcomputer to display an appropriate message which states that no drawing is

available for that patent.

It is necessary to create an index with each videodisc. This index contains the location of graphics, special target messages such as "no drawing available for this patent," and the conversion chart for patent number to frame number. As new videodiscs are acummulated and issued each quarter, a new floppy disc, with the new map or index, will also be issued.

EVALUATION

Barrett has stated seven requirements for mass storage systems.[2] The following discussion evaluates the Video PATSEARCH system using his criteria:

1. archival nonerasable medium
2. fast access time
3. high data rate
4. low cost
5. volumetric efficiency
6. data and/or image storage
7. expandable to at least 10^{15} bits capacity

In his review of existing information storage systems. Barrett concludes that neither the existing magnetic tape nor microform systems satisfactorily meet these requirements. Video PATSEARCH represents a novel approach which does meet them through a combination of online retrieval with optical videodisc display.

Archival Nonerasable Medium

The optical videodisc used with the system represents an archival nonerasable medium. The laser-read videodisc, used in this system, offers a permanent archival storage device. Unlike the capacitance or CED-grooved technology used by RCA and others, there is no actual contact between a read head and the recording surface. The laser-read image is produced with a light beam so that repeated readings of the recorded surface do not degrade the quality of the stored image.

Fast Access Time

It is estimated that the access time for any of the 50,000 images on a side is two seconds or less. This compares most favorably with manual fiche systems, especially the large collections of documents such as

those represented by the ERIC document collection. Automatic carousel fiche systems offer retrieval time of 15 seconds.

High Data Rate

The data transmission rate for actual viewing of the graphic image is a human factor determined by how quickly the user is able to scan the drawing to determine its relevance. This rate is obviously higher than that of reading textual information alone, as the user is scanning a picture in its entirety for useful information rather than reading text word by word.

Low Cost

Although the initial cost of mastering a disc is in the range of $5,000 per disc, (exclusive of the cost of gathering and copying the document collection from which the disc has been mastered) the distribution cost per disc is quite low, about $10 per disc.

Volumetric Efficiency

Each disc stores 50,000 images per side yielding 100,000 images per disc.

Data and/or Image Storage

The disc offers a unique capacity for storing graphic information in the form of full or half tones. In the Video PATSEARCH application, the front-page drawings of U.S. patent documents are used. These are black and white line drawings. The graphic display mechanism provided by the videodisc offers unique retrieval of this visual information. The textual information is stored at a remote host, offering complete retrieval of any element from the inverted file of the front page information from the U.S. patent documents.

Storage Capacity

The system utilizes the 40 gigabyte storage capacity of the remote host for textual information in conjunction with the analog or graphic-image storage capacity of the discs. The videodisc collection of graphics is itself expandable through the addition of additional discs. The system initially consists of 8 discs with 100,000 images per disc. Additional discs will be issued as new patents are available.

SUMMARY

The system thus described, Video PATSEARCH, is a unique commercial application which combines optical videodisc under microcomputer control with remote, large random-access database. The system has been designed to provide user interface for the retrieval of patent information. The availability of the VUI and optical videodisc technology suggested a unique solution to the patent information problem. Other technologies, which may become available in three to five years and enhance this process, include the optical digital disc. Work is now under way at the National Library of Medicine's Lister Hill Center, and in private industry, to develop an optical digital-disc storage medium. It is estimated that the optical digital-videodisc will be capable of storing 50,000 pages of full text per disc of text.

ACKNOWLEDGMENT

The Video PATSEARCH system was designed for Pergamon International Infor-

mation Corporation by Online Computer Systems, Inc., of Gaithersburg, Maryland.

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■■

"Circulation One Hundred Years Later": An Address Presented at the Annual Conference, June 2036*

Larry Auld: University of Illinois at Urbana-Champaign

In this year 2036, it is appropriate that we should look back and review 100 years of progress and development in what was once narrowly called library automation, and which we now generally refer to as information services. The fact that we no longer specify the computer connection, but take it for granted, is itself indicative of how far we have come, for in their early years, the Library of Congress, the Bibliothéque Nationale, and several other of the oldest of our great information services were almost exclusively print oriented and completely dependent on humans for their organization, administration, and, most importantly, services to their clients, or, as they were called then, users.

This complete dependence on humans for all aspects of information service is difficult for us to grasp today. We can understand the concept of human intervention in the occasional overriding of an imperfect or wrongly chosen algorithm, but a complete dependence on humans is difficult for even the student of nineteenth- and twentieth-century history to comprehend. (I might note that it is equally difficult for us to comprehend automobiles of that period—vehicles that were self-(auto) powered but not self-guiding! Vast numbers of people "drove" these machines without any computer assistance whatsoever. It is only in this light that we can accept the otherwise altogether improbable numbers of persons killed and injured in what were euphemistically called "accidents.")

Information services in the early and mid-twentieth century, insofar as they existed, were located in buildings called libraries, which housed collections of books and periodicals. Primary access was through manually prepared, precoordinate indexes or catalogs, usually typed or otherwise reproduced on cards that were filed by hand into stationary wooden cabinets of drawers. Each catalog tended to be unique, for the cost of duplicating one of these handmade catalogs was very high. The maximum number of access points was generally six or fewer (e.g., author; title; call number (used almost exclusively as a location device); and one, two, sometimes three, or rarely more subject headings). Any alterations required that the cards be withdrawn from the catalog by hand. For minor changes, the same cards could be reused and refiled by hand, while for major changes, a new revised set of cards would be produced and hand-filed. The acquisition of books and periodicals required other hand-prepared files. It was not unusual for a bibliographic citation to be hand-copied as many as five times (or even more) between the time a book was selected and when it was processed and ready to be used.

Users of the library could borrow most materials. (The common term was "check out.") These books, journals, etc., that could be borrowed were referred to as the circulating collection, and the records of this process were called circulation files, which were also hand-prepared.

The staffs of these libraries were divided among librarians (professionally prepared in undergraduate or, later, graduate programs), clerks, and hourly persons. However, the users regarded all of these employees as librarians, because the public at large had no ready means of differentiation, for,

*Larry Auld reports finding this transcript of an address in the ALA archives. The name of the speaker has been lost, but it appears that the individual must have been a participant and observer for much of the period described.

seemingly, all library workers did the same thing: they worked in a library and checked out books. Accordingly, they were all called librarians by users. (The inherent difficulty this presented was occasionally recognized but little was done to correct the situation.[1])

Given these cumbersome and labor-intensive procedures, one would have expected the librarians to jump at an opportunity for simplification by utilizing whatever mechanical assistance was available; yet, there was great resistance to any such changes. In fact, the general lack of prescience in adopting new technologies in libraries from 1935 to 1985 is quite surprising. A quick survey of the period will demonstrate how slow libraries were to begin the transition toward becoming centers of information services.

One hundred years ago, in 1936, Ralph Parker designed a book circulation system at the University of Texas that is often regarded as the first step toward library automation.[2] As with many other anniversaries, the choice of 1936 is arbitrary. We could as well celebrate Charles Babbage's analytical engine, the first vacuum-tube computer, the first OCLC transaction, or the first optical text input machine. But Parker's circulation system was a special occasion, for it truly marked the beginning of machine control of library data.

Parker's system was primitive and scarcely noteworthy by today's standard. The user wrote call number, author, title, name, and address on a tabulator (or punch) card. The card was punched with the due date in Hollerith code and hand-filed by call number. Periodically, the entire card file was passed through a card sorter, and cards representing overdue books were dropped out. Over the next quarter century, several other libraries adopted unit-record (or punched-card) equipment to handle the mechanical aspects of ordering books, fund accounting, circulation control, and even crude printed book catalogs. While few of these retain any historical significance, they did initiate a few librarians into systematic work-flow analysis and explicit description of product needs, and, thereby, encouraged an understanding of the potential for computer applications in libraries. However, it is important to note that the shape of library service received by the user was essentially unaffected by this introduction of unit-record equipment. Rather, these were attempts to improve internal housekeeping tasks; although the work of the library staff was made less repetitious, more efficient, and (presumably) more rapid, the overall day-to-day operations and the services available to users remained much the same.

Early solid-state computers in the 1960s and 1970s enabled these same housekeeping tasks to be done even more quickly and more efficiently; yet with few exceptions, the shape of services to users continued unchanged. Hans Peter Luhn demonstrated selective dissemination of information and Keyword-in-context index techniques as early as 1958; however, these attracted only tepid interest outside special libraries. Northwestern University's user-oriented circulation control system allowed individuals to check out materials themselves, but access to materials was otherwise unaffected. OCLC service prior to ca.1980 was principally online cataloging and printing of catalog cards, and was directed to library staff members, although a few libraries ventured to place terminals in public areas for public use; again, no significant change in user access was either intended or achieved. LCS (Library Control System), first introduced at Ohio State University in 1970, was designed to enhance user access to materials, but through library employee intermediaries; however, a limited number of terminals in public locations for patron use demonstrated a ready user acceptance.

In 1980, OCLC, then as now the largest of the information service utilities, was utilized for its catalog database of 6,000,000 entries by about 2,300 libraries, mostly academic. A scattering of other libraries of all types had devised book ordering, fund accounting, circulation control, and, occasionally, catalog production systems that relied on computer assistance. Over all, the same pattern prevailed: the computer had been adopted as an aid in performing traditional tasks and for providing traditional services that had previously been accomplished by hand methods. Nevertheless, many librarians viewed this process as a tremendous upheavel in their lives, and

they looked forward to the day when the conversion of their shelflist would be complete and life would return to normal. The adoption of the computer to accomplish routine and repetitive tasks previously performed by hand was viewed as the ultimate goal and effect of automation.

But this was, in fact, only a beginning, for at least 90 percent of the impact on libraries of the computer (together with associated communications networks) has occurred since 1980. A substantial portion of that impact has altered the very form, nature, and shape of information services to users, or, as we now prefer, clients.

The exact turning point is obscured by the erratic political and economic conditions of the early 1980s. By 1985–87, there was widespread recognition of the need to develop information services, and the computer technology and expertise was clearly available. Kilgour and others at OCLC had earlier demonstrated the effectiveness of universal access through the interlibrary loan module they tested in 1979–80. At the same time, with the developing LCS network, the resources of Illinois libraries were rapidly becoming one pool of materials available to the entire citizenry of the state. These two events, originally proposed and developed as an efficient and effective means of sharing resources through interlibrary borrowing of research and other less common materials, quickly became de facto demonstrations of the futility and absurdity of treating each separate library as a self-sufficient yet severely limited information agency. When millions of titles became available to every user of every library, the number of physical volumes owned and housed by the individual library became irrelevant.

During 1978–79, F. W. Lancaster and associates prepared their scenario of the paperless society in the year 2000.[3] Although not appreciated at the time (he was wrongly accused of predicting the total demise of printed books), this scenario of online publishing replacing print publication proved to be largely correct for scientific materials and research and scientific libraries. But then as now, the scenario encountered difficulty in projecting full computer support to the smaller school and public libraries.

In 1970, the concept of an online database that could be searched from remote terminals by interested persons had been demonstrated as feasible. By 1980, more than 250 databases could be searched online, courtesy of various vendors for modest to moderate fees. Library school students flocked to the few courses that gave instruction in online searching techniques. Librarians transferred into or out of positions depending on whether they were attracted to or repelled by the demands for online searching. Library users who paid for online searches began to assume the role of clients.

These same developments in computer and communications network technology made it possible also to transmit full text to any location no matter how remote. The location of original texts assumed less and less importance.

A parallel development during the late 1970s was the marketing of small inexpensive desk-top computers for the home or office. Several chain stores sold small central processing units, CRT screens, keyboards, and tape cassette or floppy disc memories. Prices varied from $500 (the monthly cost of a small comfortable city apartment) to several thousand dollars (the price of a new automobile); capabilities were similarly varied. A number of periodicals for the owners and users of these small computers appeared regularly on the newsstands. Resourceful users quickly devised programs to enable them to employ these small machines as smart terminals with which remote access to computers everywhere became an everyday activity limited only by money and ingenuity—ingenuity that was sometimes devoted more to avoiding costs than to using the data accessed.

This rapid proliferation of small computers quickly produced a situation in which hundreds of individuals possessed far greater access to data files than their libraries could offer to them. Many libraries reacted as they had earlier to radio, talking movies, and television with an attitude of "it will go away if we ignore it" or "condemn the new medium and its unfair competition."

However, a significant number of libraries were more rational and developed a three-point program of (1) providing train-

ing in the use of databases, (2) serving as a clearinghouse of information on databases, and (3) offering expert consultation on all aspects of databases from creation through organization and maintenance to final use. Two additional roles were gradually added: (1) creation of databases and aids to searching databases (e.g., online directories) and (2) utilization of databases on behalf of clients who did not have the necessary equipment or were not interested in doing their own searching. By thus becoming an essential part of the database scene, these libraries became our first institutionalized information services as we know them today.

It is at this point that we must recognize those noninstitutionally based information services that we also take for granted. No one knows just when the first librarian severed the institutional ties and set up business as a free-lance information broker. There were probably only a dozen or two in 1970 and several more dozen by 1980. In any case, although their visibility and numbers were small, they offered a clear demonstration of the feasibility, practicality, and need for their services.

One small and particularly well planned effort was FIND. This information clearinghouse began in 1969 with a $12,000 grubstake and within ten years had annual receipts of about $2,000,000 and was generating a modest profit. Its subsequent growth and dominance is common knowledge, and it is no accident that FIND served as a model for several of its strongest competitors.

The social implications of providing information both as a free service through tax-supported institutions and for a fee through commercial organizations continues as a topic of discussion. It has long been recognized that information cannot be free: someone has to pay for it. The question is who. For those categories of information that are considered essential, we provide the client with free access through tax support. For those "nonessential" categories, the client pays a predetermined or negotiated fee. Even with our very low unit costs for computer processing, those who can afford to buy data have greater access than those who cannot afford such purchases. There was a time when it was predicted that technology would resolve this issue, but it remains a social issue and will always require a social answer.

These events that I have described revolutionized libraries, vastly altered the services provided, and led to our wide range of information services. The information services of 1995, whether "free" (via tax support) or on a pay-as-you-go basis, bore scant resemblance to the libraries of 1970 or before. Services that had been based on small, self-sufficient collections of print materials accessible only through hand-prepared catalogs were broadened to a wide interdependent network dealing in recorded information in all media, access was greatly enhanced through online files, and professional work had shifted increasingly away from repetitive tasks and a perpetual presence at public desks to specialization in the handling of information, its access, use, and management.

But, as you know, the biggest change came at the turn of the century with the achievement of an algorithm that could effectively describe a language. Machine translation efforts had been going on for more than half a century, and they were successful so long as a direct word-for-word translation was all that was required. But nuances of meaning, idioms, and even verb tenses reduced all attempts to the level of scarcely literate verbiage that had lost much of its meaning.

Surprisingly, the breakthrough came out of archaeology. The Linear *A* and *B* scripts found in eastern Mediterranean sites frustrated many attempts at decipherment and translation. With the help of computer analysis, they were gradually understood, and in an effort to summarize this understanding, an algorithm describing Linear *A* was constructed. The program was intended to serve as a multidimensional note pad, and it served this purpose for several years. Then, the size of the file passed the point of critical mass and, in effect, the program began to process Linear *A* in a literate sense. Quickly, an analogous algorithm describing Linear *B* was developed, and with simultaneous processing of the two algorithms, Linear *A* could be translated by machine into Linear *B*, and vice versa. A public demonstration included a translation from Linear *A* to *B* of a modern poem

written for the occasion; scholars judged the translation to be "altogether faithful to the original, and extraordinarily poetic." As a sequel, the Linear *B* version was retranslated back into *A* and compared with the original; only one word had been altered—a change in a word ending, which corrected an error in the original. It was only a matter of months until several modern languages had been similarly accounted for in algorithms, and, with the help of heuristics, machine translation was a common occurrence.

Almost immediately, it was realized that, with a subsidiary program, textual information could be described, analyzed, and classified entirely by machine. Since the Year of the Algorithms, as it was called for a while, the cataloging, indexing, abstracting, and classification functions have been almost exclusively accomplished by computer. Only rarely are errors detected, and the cause can usually be traced back to an imperfection in the algorithm describing the language.

Again, the shape of the service available to information service clients was altered. Obviously, the vast uniform online catalogs and indexes were continued as a common denominator among the various services, although now they were entirely machine generated. A second form of catalog or index began to be produced through a symbiotic pairing of the human intellect and these language algorithms and used extensively. The personal, customized catalog or index had been an ideal for a century or more as a way in which the unique and special needs of the local community or the individual user could be recognized and provided for. But, so long as catalogs and indexes were hand-produced, few libraries or individuals had been able to afford the associated costs. This ideal continued unrealized as many of the repetitive bibliographic housekeeping tasks were assigned to unit record machines or computers, but always the cost prevented the ideal from being realized. Even with algorithms and heuristics there is a cost, but it is now so reduced as to no longer be a major impediment, and I daresay each of you in your ongoing work with clients use your own personalized catalogs and index files on a daily basis if not more often. Consider how the services you give your clients would be curtailed if you did not have these personal files: you might lose half or more of your daily business.

In closing, let us take a very quick look into the future. It would be foolish for us to assume that development will stop as of today in this year 2036. Just as 1936 was not the same as today, 2136 will be still different. It will be interesting to see how different, and to observe the further changes in information services that will take place.

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A Word Processor in the Library

Russ Chenoweth: Van Pelt Library, University of Pennsylvania, Philadelphia

INTRODUCTION

In October 1981, on the initiative of the library director and in consultation with the university's Management Information Systems Office, a Wang work station was installed in the Van Pelt Library and connected to a port in the university's Wang 140 word processor system. The intention of the director was to begin to introduce "automated office" concepts and practices to the library administration and to encour-

age experimentation with these powerful capabilities by technical and public service departments. Three months of use have already proved this to be a valuable resource in a library setting.

EQUIPMENT

The Wang 140 word processor is the largest of the Wang systems. A system consists of up to thirty ports supporting work stations associated with a central storage and communications unit. Each work station contains a microprocessor and up to 64KB of random access memory and can operate as an almost independent minicomputer. Word processing and BASIC language programs run fully inside the terminal and can call additional stored text or program segments from the central disk memory as needed. File maintenance and the archiving of less used documents is done automatically by Management Information Systems staff.

A high-quality, forty-character-per-second printer is linked to our terminal indirectly through the central unit, so that while some documents are being printed or queued for printing, others may be created or edited. The printer may be set for ten- or twelve-pitch or proportionally spaced type and type elements changed. Forms and single sheets are accepted as well as continuous stock.

The library rents the use of the work station and port for a flat monthly fee, which includes twenty-four-hour system availability, text storage, servicing, paper and ribbons, and technical advice.

CAPABILITIES

The primary capability of the Wang 140 is a sophisticated word processing program, designed to provide easy text entry by persons with no data processing background and only a few hours of training on the Wang equipment. General functions, such as creating a new document, editing an old document, or printing a document, are selected from a menu display. Specific operations, such as inserting, deleting, and centering text, are accomplished by pressing one or two keys. Other features of the word processing program are automatic text storage and recall, moving and copying of sentences, paragraphs, or entire documents, automatic location and replacement of words and phrases, and automatic index generation.

Additional major capabilities of the Wang 140 system include sorting and processing of record files and the writing of programs in the Wang BASIC programming language.

TRAINING

Two library staff members, the business manager and a reference librarian, received three days of training under the supervision of the University Management Information Systems staff, using a well-designed workbook at a terminal.

The necessity of a three-day training period appears to conflict with the claim that use of the word processor is quick and easy to learn. It is not difficult, and an untrained person can enter and edit text after only a few minutes of instruction. The word processing training program workbook and reference manual are clear and accurate and permit a confident user to accomplish unfamiliar operations. However, for an organization to make the most effective use of the Wang word processor, it is necessary to have someone trained fully in all its capabilities.

Over the course of the following two months these two staff members gave twenty one-hour introductory sessions for other library staff. No more than four persons were scheduled at a session so that each could receive ten to fifteen minutes of hands-on experience. Several especially interested staff members received additional training.

The purpose of these brief sessions was to familiarize a large number of library staff members with the range of capabilities available, so that they could begin to think of applications in their own work.

APPLICATIONS

Even in the short period of three months we have already experimented with a variety of uses. These might be categorized under the headings: word processing documents, lists, and BASIC programs.

Word Processing Documents

As a text processor, the Wang has been used by the director of the library to write

and edit journal articles. An online search services manual was produced, including our own procedures and summaries of the command languages for the DIALOG, BRS, and SDC systems. Saved on disk, this document is available for editing whenever features are added or changed in any of these systems. Another manual is being prepared to guide reference department staff in the use of the Research Library Group's RLIN database. Portions of this manual are already in use, but the manual as a whole will continue to grow and change rapidly as the various features of this new system are developed. Up-to-date information and a usefully finished product are not mutually exclusive with this equipment. The library telephone directory and weekly newsletter are also being produced on the Wang.

Another way in which the reference department expects to use the word processor is in the production of bibliographies. We maintain many brief bibliographies of reference materials on a wide range of social science and humanities topics, such as energy, government documents, romance languages, education, and funding sources, and we constantly develop new bibliographies as we sense a need for them. There are several ways in which the Wang can help us in this process. We have entered (1) the text of a number of bibliographic citations common to many bibliographies and (2) standard paragraphs on using the card catalog and defining reference tool types, such as bibliographies, guides, indexes, etc., into a "glossary" document. Selected entries can be recalled from the glossary by pressing only two keys and inserted at any point in a new document. Therefore, new bibliographies can be efficiently constructed by pulling a framework from the glossary and adding new material as needed. Any of the newly added citations that appear to have a general applicability can then be added to the glossary and made available for future bibliographies. Text can also be copied directly from other bibliographies that have been stored as word processing documents, although this is a less efficient process. Finished bibliographies will remain in disk storage, available for updating and borrowing. A particularly quick and effective way to produce a new bibliography would be to copy a closely related existing document and delete irrelevant text before adding new citations.

Lists

The maintenance and processing of lists is another capability of the Wang 140. The reference department has made a list of all Research Library Group libraries, with their corresponding National Union Catalog, OCLC and RLIN location symbols. These records can be sorted alphabetically by library name or by any of the location symbol lists to provide quick identification of a holding library. The Biological and Medical Sciences Library is planning to produce a serials list as a word processing document. Because capital letters sort first, abbreviations will appear at the head of this list.

The Wang 140 has a separate "list processing" program, designed to permit the selection of records by multiple search keys and sorting of the selected sets by up to sixteen fields. We expect to make use of this feature but have bypassed it temporarily, as some of these features are also available in a particularly fast and flexible manner through our own Wang BASIC programs.

BASIC Language Computer Programs

We have converted several reference department programs, originally written in Pascal for one of the university's large computers, to Wang BASIC. One program processes records representing individual online search transactions and produces monthly and year-to-date statistical reports. Another program calculates per-minute costs for the 170 online searchable databases and lists the record for each base, with system availability, coverage, and costs, separately under up to four assigned subject headings. An updated list is produced quarterly. This program could have been difficult to convert, as BASIC lacks the pointer data structure needed to produce linked lists; but Wang BASIC has a prepared subroutine that supports the automatic creation and processing of key-indexed files. Related programs facilitate the addition of new records and the editing of existing ones through a formatted screen display.

Another family of programs will produce

newspaper or periodical lists in which title records are associated with a histogram that indicates holdings on a two-century scale. These lists can be sorted on any field, such as by title, by date, or by city and then date. Several other existing statistical programs will be converted when they are needed. All program output can be made a word processing document for further editing.

SUMMARY

The chief value to us of the Wang 140 has been in its ease of operation as a text processor. A number of end users have been enabled to do creative work rapidly and without reliance on our small clerical staff. We have also experimented successfully with its more sophisticated features. The Wang system literature emphasizes repeatedly that the uses to which this and similar systems can be put are limited only by the imagination of the user. We are finding this to be the case. ■■

Creating a Research Agenda: A Personal View

Douglas Ferguson: The Research Libraries Group

A research agenda is to good research as a restaurant guide is to good nutrition. The former might lead to the latter but not necessarily. In late 1981 Cuadra Associates completed "A Library and Information Science Research Agenda for the 80's" with the support of a grant from the Department of Education's Office of Libraries and Learning Technologies (OLLT). The project produced a very specific result: a set of twenty research project descriptions that represented the iterative judgment of twenty-five individuals who selected the twenty from a larger set of about one hundred descriptions.

The path to this "top twenty" involved fairly widespread exploration in the research environment that will appear in the final report.[1] Recent research publications and reports were reviewed and grouped in a classification scheme similar to the one used in the *Annual Review of Information Science and Technology*. Funding sources and patterns for the past ten years were identified and described. Interviews were held with "gatekeepers," a wide range of (unidentified) researchers, library administrators, and university faculty. Almost one hundred research project descriptions were prepared by fifteen researchers who met at Airlie House for three days, with ten other individuals dubbed "practitioners." The resulting twenty projects and a discussion summary were reviewed by a group that included the heads of most of the professional associations concerned with information science and information service.

As a participant in the Airlie House meeting, I ask myself what these twenty mini-proposals mean. Certainly no one believes that this and only this list of proposals should be funded. Similarly, I can't imagine anyone defending the idea that project four should be funded or completed before project fourteen. Why then a list and what does it mean? My impression is that OLLT wanted to avoid generalities and get the research community to focus on specifics. With specific examples, funding agencies might be in a better position to coordinate research and identify types of research that are being or might be done by the private sector. Whatever the background thinking, the sponsors were very clear that they wanted the conference participants to think beyond Department of Education needs and say what is less important as well as what is more important.

In my own mind the twenty proposals are exemplars that point to problem areas at the conceptual level and program areas at the operational level. As such they are indicative and concrete. If one were to look for themes in the proposals here is what they might be: (1) expand the electronic environment for information delivery; (2) use the technology of that environment to monitor and meet information requirements; and (3) demonstrate the impact of new forms of information service in economic terms.

In the area of the electronic information environment there were proposals for making electronic publications and viewtext services at least as usable as books and refer-

ence services. In the area of assessing and meeting information requirements there were proposals for improving information delivery at the point of use by marketing services and redesigning the human-computer interface. In the area of demonstrating impact there were proposals for cost studies and productivity studies. Finally, two proposals stressed the need for better diffusion and application of research in the field and the need to study activity related to intellectual freedom.

What will be the fate of this agenda? If agendas tell us what to *think about* rather than *what to think*, then this agenda may be a useful attention-getting device. Fortunately, the fate of research is not tied to the fate of agendas or else we might see library and information science research become a lost item in the federal household. No one in his/her right mind, and certainly no one in the Department of Education, believes that could happen. As of this writing, the ERIC or NTIS number has not been assigned to this report, assuming there is an ERIC or NTIS by the time you read this.

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Multiprocessing: Strategy for Growth

Lyndon S. Holmes:
C L Systems, Inc.

HISTORICAL PERSPECTIVE

Since major developments in library automation were begun in the early 1970s, the library marketplace has expected a continually evolving growth in the functional and performance characteristics of its automation systems. In 1973, for example, an online library computer system with sixteen terminals was considered a large system. By today's standards, however, many libraries are implementing automation networks that support 100 to 200 or even more terminals.

Concurrent with this growth in performance has been the requirement to improve computer system reliability and availability. As a greater proportion of the library's operations are automated, the cost of computer downtime increases to the point where even a few minutes of system unavailability becomes prohibitively expensive for the library staff and patrons.

Future automation needs require that a single, integrated library automation system support many hundreds, if not thousands, of terminals. Terminal access points will multiply dramatically from today's dedicated terminal in the library to tomorrow's multipurpose professional and home microcomputer that will communicate with the library information center over high-capacity cable communication links. As the business and domestic communities' dependence on the library information center grows, the ability to support computer systems that provide uninterrupted and cost-effective information availability will become increasingly more important. The underlying architecture of the library automation system of today must anticipate these future needs if the library is to retain its central role as a collector, organizer, and disseminator of information.

THE LIMITATIONS OF TECHNOLOGY

A computer system is comprised of several key functional components, each of which affects the amount of work that the computer system can perform in a given amount of time. Often, the capacity of the computer's central processing unit (CPU), main memory, or disk storage device limits at some level the effective transaction-processing rate of an online system. When this limit is reached, users experience a marked increase in the response time required for the computer to process a transaction. While saturation of the computer's capacity may not be indicative of any inherent design problem in the system, it does present a severe operational problem for us-

ers. Unless a strategy exists to expand the system's processing capacity, users will ultimately abandon use of a system that cannot satisfy their needs.

Two principal strategies exist for solving this finite system capacity issue. The system can be modified to use individual components that have larger processing capacities. For example, a more powerful CPU may be substituted that can execute instructions more rapidly. Alternatively, a larger main memory could hold more tabular data at one time, thereby reducing the time required to process a transaction. However, since the ratio of computing power to cost is not linear, this has proven to be an extremely expensive way to achieve incremental growth. Furthermore, extensive and expensive software changes are often needed to accommodate such larger components, particularly if the component change involves switching between different computer manufacturers, or different product lines of the same manufacturer.

An alternative capacity growth strategy involves the *addition* (rather than replacement) of identical or functionally similar processing components to augment the existing computer configuration. Thus, the processing capacity of a system can be almost doubled by incorporating a second set of hardware components that share the transaction load with the original components. Interconnecting hardware and appropriate software assure that the two subsystems "multiprocess" together correctly and efficiently. If the capacity of this "tandem" configuration is exhausted, additional hardware subsystems can be added to further increase the overall system transaction processing capacity. Since the add-on components are functionally and architecturally compatible with the already existing hardware and its software, no software enhancement costs are encountered.

More importantly, the cost of increasing computing power with this approach is very closely linear with respect to the amount of computing power gained. This is particularly significant when the baseline (i.e., single processor) configuration is low cost, since incremental additions of processing capacity then become low cost as well. Incremental system growth with the associated incremental financial outlay provide the library with a practical economic approach to automation that requires no compromise of future growth plans—system capacity grows to meet the evolving processing needs of the library in a justifiable financial framework.

The multiprocessing strategy for growth also provides the potential for satisfying the requirement of enhanced system availability. Since many multiprocessing configurations contain at least two of each system hardware component, the configurations can be implemented in a manner that provides some degree of ongoing system availability, even if a hardware component fails. This flexibility is clearly lacking in the approach that uses a single, large-capacity computer—if the one large processor fails, all system capability is lost.

THE C L SYSTEMS MULTIPROCESSOR APPROACH

In concert with its philosophy of ongoing systems evolution, C L Systems, Inc. (CLSI), has adopted the latter, multiprocessing strategy as the approach best suited to the evolving needs of library automation.

CLSI's multiprocessor system (MPS) architecture has been designed and implemented to satisfy the parallel requirements of increased transaction processing capacity and enhanced system availability. Today, for example, a typical four-processor system using Digital Equipment Corporation PDP 11/44 processors can support more than 200 terminals for a library with an annual circulation volume of up to 10–12 million. System availability is increased from an industry average of 97 percent for a single processor system to better than 99 percent in the multiprocessor configuration. The underlying architecture of the system, with the potential to configure up to thirty-two processors in a single, integrated multiprocessor system, will allow a single system to support more than 1,000 terminals concurrently.

The CLSI LIBS (Library Information and Bibliographic System) 100 system was originally implemented on a single DEC PDP 11/04 processor, supporting up to sixteen terminals. The sophisticated operating

system and application software developed by CLSI allowed very high functional and quantitative performance to be obtained from a hardware configuration smaller than many of today's home and personal computers. This same software was enhanced to run on the PDP 11/34, thereby quadrupling the system's transaction processing capacity. Recently, a further 50 percent capacity increment was added to the single processor system by the PDP 11/44 computer. The total processing capacity of a system will be increased even further by the off-loading of central system functions into intelligent, microprocessor-based terminals. It has been CLSI's experience that substitution of more powerful processors has provided progressively smaller increments of processing capacity, indicating the finite and imminent capacity limitations of the single processor architecture strategy.

DIVISION OF SYSTEM FUNCTION

Implementation of a set of integrated and coordinated processing functions in a multiple computer environment requires that the computers interact cooperatively so that the interprocess coordination is not compromised. The architecture of the LIBS 100 software supports the partitioning of functions among processors, while maintaining the necessary coordination among these functions.

The LIBS software performs two basic activities—transaction processing, and database access and maintenance. The transaction processing functions handle user terminal interaction, data editing, and data display formatting; the database maintenance functions access and maintain data in the disk-based storage media. The two sets of functions interact by the passing of data access requests, and the resulting transfer of data records themselves.

The functional partitioning of the system activities between transaction and database processing in the LIBS 100 system is reflected in the technical implementation of the software. Although both functions can co-reside in a single computer, this structure permits the transaction processing to be executed by one or more computers, and the database processing to be handled by another processor. Multiple processors are interconnected by very high speed "datalinks" (one million characters per second each) that are used to pass data requests and data records between the transaction and database computers. This division of function is the basis for implementation of the LIBS 100 multiprocessor architecture.

User terminals are normally connected to the transaction processor, in which reside the programs that support the terminals and process transactions. When a terminal executes a program that requires data from the system's database, a data access request is created by the transaction processor, and sent across the interprocessor link to the database processor. A program in the database processor receives the request, accesses the appropriate data from the database, and sends the data record(s) back to the transaction processor. The terminal's program in the transaction processor then formats the data appropriately for final transmission to the terminal.

All software required to support the multiprocessor intercommunication has been developed by CLSI. This software supports industry-standard, DEC-compatible device controllers. By tailoring this software to the preexisting LIBS operating system and application software, the maximum performance potential of the device controllers has been achieved.

ENHANCED SYSTEM RELIABILITY

Since a LIBS 100 multiprocessor system contains at least two of each major system component (i.e., processor, main memory, disk controller, disk drive, etc.), it is possible to configure the system to tolerate one or more hardware faults or failures. Thus, for example, a three-processor system can continue to operate at a reduced performance level if any one of the three processors fails. Continued operation of the system in a degraded mode is significantly more desirable than total system unavailability—an unavoidable condition in a single-processor system.

In order to minimize system downtime when a component failure occurs, reconfiguration of the multiprocessor system to ac-

commodate a failed component must be accomplished within the routine operating procedures of the system operators. Consequently, such reconfiguration cannot require the physical reconnection of system components. However, it may be necessary to functionally reassign database accessing or terminal support activities from one processor to another. In the LIBS multiprocessor system, this is achieved by two principal hardware components—disk drive dual porting, and terminal switching through an intelligent port selector (IPS).

The LIBS database is kept on disk storage units that can be accessed by either of two processors. The disk drive accommodates two sets of access cabling or channels, where each channel is connected to a different processor. Normally, one processor designated as the database processor accesses the disk drives through one of the two channels. Should this processor fail, the database disks are accessed by the second processor through the second channel connection. The disk dual port configuration thus assures uninterrupted access to the database even if a processor failure occurs. Since the dual channel connections are permanently installed, no physical reconnection of disk drives to processors is required to circumvent a processor failure.

When a transaction processor fails, it is necessary to reconnect the terminals attached to this processor to one or more of the other processors in the multiprocessor configuration. If the system contains only two transaction processors, this switching could be accomplished by a simple two-way toggle-switch arrangement. However, since such a switch can connect a terminal to one of only two processors, its use is limited to the two-processor configuration.

By contrast, unlimited switching flexibility is provided by a device that will connect any terminal to any one of a large number of processors. The LIBS 100 multiprocessor system typically uses such a switch, called an *intelligent port selector*. This microprocessor-based unit allows each terminal's communications line to be selected individually for connection to the appropriate processor in the multiprocessor configuration. Thus, several different terminal/processor interconnection strate-

gies may be defined to accommodate various processor failure configurations. Depending on which processor has failed, the port selector will be configured to distribute the terminal connections of the failed processor among the remaining operational processors. The port selector is reconfigured by giving it a series of terminal/processor relation commands. These commands are prestored on an intelligent terminal and sent to the port selector under operator control when a reconfiguration is required.

The intelligent port selector satisfies the criterion that no physical reconnection be performed to functionally reconfigure the terminal connections in the event of processor failure.

INTERSYSTEM ACCESS

The intelligent port selector's interconnection flexibility also allows it to be used as a vehicle for providing intersystem, or networking, access for user terminals. A terminal connected to the port selector will normally communicate with its host system. However, the terminal may request the port selector to connect it to some other computer system, in order to provide alternate database access or function capabilities. For example, an inquiry terminal in a branch library could request connection to a remote information service database, in order to satisfy a patron's information request.

Most significantly, the port selector allows networking access between dissimilar systems. Whereas some networking architectures require that all systems have the same characteristics (i.e., manufacturer or vendor), the networking access provided by the intelligent port selector provides complete freedom with respect to the types of system that may be interconnected. This flexibility anticipates the reality that libraries and other information suppliers will operate with dissimilar systems, but that compatible intercommunication must be possible. For example, a terminal connected to a LIBS 100 system could access an online retrieval utility or a neighboring circulation system from another vendor. Of course, compatible communications protocols are necessary to do this.

FUTURE PERSPECTIVE

In 1973, it was difficult to conceive of today's 100–200 terminal system as being a functional need, technologically possible, or financially justified. A similar reaction occurs today with respect to the 1,000-terminal system that could exist later in this decade. If history repeats itself, however, such growth will occur; and the library's automation strategy therefore must anticipate this likelihood, and must adopt a technical strategy that provides a cost-effective and technologically feasible growth path for tomorrow's systems.

The integrated multiprocessor system is the only strategy that can achieve these objectives. In fact, even an integrated system comprised of thirty-two processors, capable of supporting up to 2,000 terminals, and providing virtually 100 percent availability may fall far short of tomorrow's processing needs. The multiprocessor system may become an element within a broader integrated multisystem network, where any number of multiprocessor systems participate in an interlinked network of systems. In this architecture, a terminal connected to one processor in one system would be able to communicate with another terminal or database connected to a different system in the network. This future interconnection will be facilitated by the development of definitive standards for communication between systems at both functional and technical levels.

Multiprocessor system networking provides a strategy for unlimited growth in library automation. The library community and its vendors must recognize the likely inevitability of automation growth, and consequently adopt a suitable growth strategy. Today's implementation of technology must anticipate this direction, and avoid placing the library in a dead-end path that prevents automation growth. Adoption of a viable, long-term automation growth strategy that supports the library's role as a collector, organizer, and disseminator of information will greatly enhance the future role of the library in the information industry. ■■

Reports and Working Papers

The US/MARC Formats – Underlying Principles

John Attig: Pennsylvania State University, University Park

A review of the MARC family of formats for machine-readable cataloging, conducted under contract to the Library of Congress' Network Development Office by David Weisbrod of Yale University, started with the assumption that developments in library automation and the accumulation of experience in using the MARC formats might suggest specific changes to the formats for improved efficiency. The list of problems perceived as needing attention proved long and complex. It became evident that work should first concentrate on developing a statement of underlying principes for content designation in the US/MARC formats.*

Using the report as a basis, John Attig of Penn State University, drafted a statement of principles for inclusion in MARC Formats for Bibliographic Data *and* Authorities: A MARC Format. *This statement has been discussed by representatives from the bibliographic networks and the ALA RTSD/LITA/RASD Representation in Machine-Readable Form of Bibliographic Information Committee (MARBI) in October 1981 and January 1982. The MARBI Committee will host an open discussion on this statement of principles on Sunday, July 11, during the ALA Annual Conference in Philadelphia. Those interested in commenting on these principles are urged to attend. Anyone wanting to make comments in writing may direct them to the Library of Congress, Processing Services, Automation Planning and Liaison Office, Washington, DC 20540, Attn: MARC Communications Format Specialist.*

1. Introduction

1.1 The US/MARC Formats are standards for the representation of bibliographic and authority information in machine-readable form.

1.2 A MARC record involves three elements: (1) the record *structure*, (2) the *content designation*, and (3) the data *content* of the record.

1.2.1. The structure of US/MARC records is an implementation of the *American National Standard for Information Interchange on Magnetic Tape* (ANSI Z39.2–1979) and of *Documentation—Format for Bibliographic Information Interchange on Magnetic Tape* (ISO 2709–1973).

1.2.2. Content designation—the codes and conventions established to explicitly identify and further characterize the data elements within a record and to support the manipulation of that data—is defined in the US/MARC Formats.

1.2.3. The content of those data elements which comprise a traditional catalog record is defined by standards outside the formats—such as the *Anglo-American Cataloguing Rules* or the *National Library of Medicine Classification*. The content of other data elements—coded data (see section 9 below)—is defined in the US/MARC Formats.

1.3. A MARC format is a set of codes and content designators defined for encoding a particular type of machine-readable record.

1.3.1. At present, US/MARC formats have been defined for two types of record: *Authorities: A MARC Format* and the *MARC Formats for Bibliographic Data*. These two types of record are mutually exclusive and functionally distinct.

*The final report of the MARC Format Review Project, *Principles of MARC Format Content Designation*, will be published by the Library of Congress in 1982.

1.3.2. The *MARC Formats for Bibliographic Data* is a family of formats defined for the identification and description of different types of bibliographic material. US/MARC bibliographic formats have been defined for Books, Films, Machine-readable Data Files, Manuscripts, Maps, Music, and Serials.

1.3.3. The US/MARC Formats have attempted to preserve consistency across formats where this is appropriate. However, as the formats proliferated and became more complex, definitions and usages have diverged. While complete consistency has not been achieved, a continuing effort is being made to promote consistent definition and usage across formats.

2. General Considerations

2.1. The US/MARC Formats are communications formats, primarily designed to provide specifications for the exchange of records between systems. The communications formats do not mandate the internal formats to be used by individual systems, either for storage or display.

2.2. The US/MARC Formats were designed to facilitate the exchange of information on magnetic tape. In addition, they have been widely adapted for use in a variety of exchange and processing environments.

2.3. The US/MARC Formats are designed for use within the United States. An attempt has been made to preserve compatibility with other national formats. However, lack of international agreement on cataloging codes and practices has made complete compatibility impossible.

2.4. The US/MARC Formats serve as a vehicle for bibliographic and authority data of all types, from all agencies. Historically and practically, the formats have always had a close relationship to the needs and the practices of the library community. In particular, the formats reflect the various cataloging codes applied by American libraries.

2.5. Historically, the US/MARC Formats were developed to enable the Library of Congress to communicate its catalog records to other institutions. National agencies in the United States and Canada (Library of Congress, National Library of Canada, National Agricultural Library, National Library of Medicine, and Government Printing Office) are still given special emphasis in the formats, as sources of authoritative cataloging and as agencies responsible for certain data elements.

2.6. The institutions responsible for the content, content designation and transcription accuracy of data within a US/MARC record are identified at the record level, in field 008, byte 39, and in field 040. This responsibility may be evaluated in terms of the following Responsible Parties Rule.

2.6.1. Responsible Parties Rule.

a) Unmodified records: The institution identified as the transcribing institution (field 040 $c) should be considered responsible for content designation and transcription accuracy for all data. Except for agency-assigned data (see section 2.6.2.1. below), the institution identified as the cataloging institution (field 040 $a) should be considered responsible for content.

b) Modified records: Institutions identified as transcribing or modifying institutions (field 040 $c,d) should be considered collectively responsible for content designation and transcription accuracy. Except for agency assigned and authoritative-agency data (see section 2.6.2. below), institutions identified as modifying or cataloging institutions (field 040 $a,d) should be considered collectively responsible for content.

2.6.2. Exceptions.

2.6.2.1. Certain data elements are defined in the US/MARC formats as being exclusively assigned by particular agencies (e.g. ISSN). The content of such *agency-assigned* elements is always the responsibility of the agency.

2.6.2.2. Certain data elements have been defined in the US/MARC Formats in relation to one or more *authoritative agencies* which maintain the list or rules upon which the data is based. While it is possible for other agencies to create similar or identical values for these data elements, content designation distinguishes be-

tween values actually assigned by the authoritative agency and values assigned by other agencies. In the former case, responsibility for content rests with the authoritative agency; in the latter case, the Responsible Parties Rule applies, and no further identification of source of data is provided. Authoritative-agency fields are:

050 Library of Congress Call Number
060 National Agricultural Library Call Number
070 National Library of Medicine Call Number
082 Dewey Decimal Classification Number

2.7. In general, the US/MARC Formats provide content designation only for data which is applicable to all copies of the bibliographic entity described.

2.7.1. Information which applies only to some copies (or even to a single copy) of a title may nevertheless be of interest beyond the institutions holding such copies. The US/MARC Formats provide limited content designation for the encoding of such information and for identifying the holding institutions. (see, for example, subfield $5 in the 7XX fields).

2.7.2. Information which does not apply to all copies of a title, and is not of general interest, is coded in local fields (such as field 590).

3. Structural Features

3.1. The US/MARC Formats are an implementation of the *American National Standard for Information Interchange on Magnetic Tape* (ANSI Z39.2–1979). They also incorporate other relevant ANSI standards, such as *Magnetic Tape Labels and File Structure for Information Interchange* (ANSI X3.27–1978).

3.2. All information in a MARC record is stored in character form. US/MARC communication records are coded in Extended ASCII, as defined in Appendix III of *MARC Formats for Bibliographic Data*.

3.3. The length of each variable field can be determined either from the "length of field" element in the directory entry or from the occurrence of the "field terminator" character. Likewise, the length of a record can be determined either from the "logical record length" element in the Leader or from the occurrence of the "record terminator" character. The location of each variable field is explicitly stated in the "starting character position" element in its directory entry.

4. Content Designation

4.1. The goal of content designation is to identify and characterize the data elements which comprise a MARC record with sufficient precision to support manipulation of the data for a variety of functions.

4.2. For example, MARC content designation is designed to support such functions as:

(1) Display—the formatting of data for display on a CRT, for printing on 3×5 cards or in book catalogs, for production of COM catalogs, or for other visual presentation of the data.
(2) Information retrieval—the identification, categorization and retrieval of any identifiable data element in a record.

4.3. Some fields serve multiple functions. For example, field 245 serves both as the bibliographic transcription of the title and statement of responsibility and as the access point for the title.

4.4. Display constants (text which implicitly accompanies particular content designators) are defined in the US/MARC formats, in order to conserve data entry and storage. For example, $x in field 490 (and other fields) implies the display constant "ISSN", and the combination of tag 785 and second indicator value "3" implies the display constant "Superseded in part by:". Such display constants are not carried in the data, but may be supplied for display by the processing system.

4.5. Although any explicitly-identified data element may be retrieved, certain fields are primarily descriptive in function (e.g., field 500) and are not designed for structured access.

4.6. The US/MARC formats support the sorting of data only to a limited extent. In general, sorting must be accomplished through the application of external algorithms to the data.

5. Organization of the Record

5.1. A MARC record consists of three main

sections: (1) the Leader, (2) the Directory, and (3) the Variable Fields.

5.2. The Leader contains coded values, identified by relative character positions, which define parameters for processing the record.

5.3. The Directory contains the field identifier ("tag"), starting location and length of each field within the record. The order of fields in the record does not necessarily correspond to the order of directory entries. Duplicate tags are distinguished only by location of the respective fields within the record.

5.4. The data content of a MARC record is divided into variable fields. The US/MARC Formats distinguish two types of variable fields: control fields and data fields. The term "fixed fields" is occasionally used in MARC documentation, referring either to control fields generally or only to coded-data fields such as 007 or 008.

5.4.1. Variable control fields contain parametric or other data required for identifying or processing the record.

5.4.2. Variable data fields contain information not intended to supply parameters for processing the record.

6. Variable Fields and Tags

6.1. The data in a MARC record is organized into variable fields, each identified by a 3-character tag.

6.2. The tag is stored in the directory entry for the field, not in the field itself.

6.3. Variable fields are grouped into functional blocks according to the first digit of the tag. These blocks organize the data in a MARC record according to its bibliographic function in a traditional catalog record, not analytically, according to the type of information. Thus blocks are provided for main, added, subject and series entries, not for personal, corporate and title entries.

6.3.1. For bibliographic records, the blocks are:

0XX = Variable control fields
1XX = Main entry
2XX = Titles and title paragraph (title, edition, imprint)
3XX = Physical description
4XX = Series statements
5XX = Notes
6XX = Subject added entries
7XX = Added entries other than subject, series
8XX = Series added entries
9XX = Reserved for local implementation

6.3.2. For authority records, the blocks are:

0XX = Variable control fields
1XX = Heading
2XX = General see references
3XX = General see also references
4XX = See from tracings
5XX = See also from tracings
6XX = Treatment decisions; Notes; Cataloger-generated references
7XX = Not defined
8XX = Not defined
9XX = Reserved for local implementation

6.4. Tags are defined independently within each block. However, whenever possible, parallel meanings for tens and hundreds digits have been preserved.

6.5. According to ANSI Z39.2–1979, the tag must consist of alphabetic or numeric basic characters (i.e., decimal integers 0–9 or lower-case letters a–z). To date, the US/MARC Formats have used only numeric tags.

6.6. Certain tags have been reserved for local implementation. Except as noted below, the US/MARC Formats specify no structure or meaning for local fields. Communication of such fields between systems should be governed by mutual agreements on the content and content designation of the fields communicated.

6.6.1. The 9XX block is reserved for local implementation.

6.6.2. In general, any tag containing the digit "9" is reserved for local implementation within the block structure (see section 6.3 above).

6.6.3. The historical development of the US/MARC Formats has left some exceptions to this general principle. These are:

009 Physical description fixed field for archival collections
039 Level of bibliographic control and coding detail
09X Local call number(s)
359 Rental price

490 Series untraced or traced differently
590 Local note
690 Local subject added entry—Topical heading
691 Local subject added entry—Geographic name

7. Variable Control Fields

7.1. 00X fields in the US/MARC Formats are variable control fields.

7.2. Variable control fields consist of data and a field terminator. They do not contain indicators or subfield codes (see section 8.1 below).

7.3. Variable control fields contain either a single data element or a series of fixed-length data elements identified by relative character position.

8. Variable Data Fields

8.1. Three levels of content designation are provided for variable data fields in ANSI Z39.2–1979:

(1) a three-character tag, stored in the directory entry;
(2) indicators stored at the beginning of each variable data field, the number of indicators being reflected in the leader, byte 10; and
(3) subfield codes preceding each data element, the length of the code being reflected in the leader, byte 11.

8.2. All tags except 00X identify variable data fields.

8.3. Indicators

8.3.1. Indicators contain codes conveying information which interprets or supplements the data found in the field.

8.3.2. The US/MARC Formats specify two indicator positions at the beginning of each variable field.

8.3.3. Indicators are independently defined for each field. However, parallel meanings will be preserved when possible.

8.3.4. Indicator values are interpreted independently—i.e., meaning is not ascribed to the two indicators taken together.

8.3.5. Indicators may be any basic-ASCII character. (The basic-ASCII character set includes numbers, lower-case alphabetic characters, certain punctuation marks, and the blank.) Numeric values will be assigned first. Blank is used in an undefined indicator position, or to mean "no information supplied" in a defined indicator position.

8.4. Subfield Codes

8.4.1. Subfield codes distinguish data elements within a field which do (or might) require separate manipulation.

8.4.2. Subfield codes in the US/MARC Formats consist of two characters—a delimiter, followed by a data element identifier (a single basic-ASCII character, not including blank).

8.4.2.1. In general, numeric identifiers are defined for parametric data used to process the field, or coded data needed to interpret the field. (Note that all numeric identifiers defined in the past have in fact identified parametric data.)

8.4.2.2. Alphabetic identifiers are defined for the separate elements which constitute the data content of the field.

8.4.2.3. Identifiers "9" and non-alphanumeric basic characters are reserved for locally-defined subfield codes.

8.4.3. Subfield codes are defined independently for each field. However, parallel meanings will be preserved when possible.

8.4.4. Subfield codes are defined for purposes of identification, not arrangement. The order of subfields is specified by content standards, such as the cataloging rules. In some cases, such specifications may be incorporated in the format documentation.

9. Coded Data

9.1. In addition to content designation, the US/MARC Formats include specifications for the content of certain data elements, particularly those which provide for the representation of data by coded values.

9.2. Coded values consist of fixed-length character strings. Individual elements within a coded-data field or subfield are identified by relative character position.

9.3. Although coded data occurs most frequently in the Leader, Directory and Control Fields, any field or subfield may be defined as a coded-data element.

9.4. Certain common values have been defined:

b —Undefined
n —Not applicable

u —Unknown
z —Other
l —No information provided
Historical exceptions do occur in the formats. In particular, the blank (b) has often been defined as "not applicable," or has been assigned a meaning when a previously undefined element is defined. ■■

Statement on the Telecommunications Act of 1981

Ronald E. Diener: OHIONET

Leaders in the telecommunication field are concerned because negotiations are being conducted between AT&T and the U.S. Justice Department concerning AT&T's divestiture and the "new world" of less regulated telecommunication in America. The Telecommunication Act of 1934 is woefully out of date. Rather than closed-door negotiations between the company and the lawyers, it is time for the U.S. Congress to act. The issues are vitally important public issues, not questions of legality or technical feasibility. Librarians might also want to have the issues aired, laws written, policies enacted, and new futures opened.

Statement of Ronald E. Diener,
Executive Director, OHIONET
for the American Library Association
before the House Committee
on Energy and Commerce
Subcommittee on Telecommunications,
Consumer Protection, and Finance
on HR 5158
Telecommunications Act of 1981
February 24, 1982

My name is Ronald Diener, and I am the Executive Director of OHIONET. OHIONET is a nonprofit corporation, a regional library network, member-owned and member-governed, with over one hundred sixty libraries of all types on its roster. In 1982–1983, OHIONET will manage about $2,750,000 worth of services and products on behalf of its membership, which in turn serve almost 90 percent of the citizens of Ohio. I am testifying today on behalf of the American Library Association, a nonprofit educational organization of almost 40,000 librarians, educators, trustees, information scientists, communicators, and other friends of libraries.

OHIONET is one of twenty regional library networks throughout the United States that contract with OCLC (the Online Computer, Library Center), the world's largest bibliographic system, on behalf of member libraries. Like the regional networks, OCLC is a non-profit corporation, the creation of America's libraries who support this massive system with use charges and fees. Unlike similar developments elsewhere in the world, the operations of OCLC and its contracting regional networks are supported by membership charges and fees, not by governmental subventions or by foundation grants.

Since the latter 1960s, libraries have managed their own technical revolution. They have done so in such unobtrusive and effective ways that most Americans do not realize the scale or dimension of what has been accomplished. Libraries are communicating with each other, sharing information and materials, to improve services to all.

There are estimated to be over 10,000 computer terminals installed in libraries. One-third of these are used for remote data base searching, one-third to access bibliographic utilities, and one-third to connect local automated systems to local phone systems. The current rate of growth in installation of terminals is 28 percent per year. Libraries are moving away from dumb to intelligent terminals and microcomputers in order to be able to manipulate data.

The communication that these libraries use is of two types. There is a vast network of leased lines, connecting libraries with a large bibliographic system, which in turn connects the libraries to each other. The leased-line network uses a technique called polling, where each terminal on the system has a "name" and thus many terminals can be attached to a single line. The accompanying chart (Chart A) gives some indication of the dimension of that network in the past

OCLC (Online Computer Library Center) Participating Libraries
Telecommunication Costs 1980 January—1981 December

			Libraries			Terminals		
	Telco $ (1)	Average per Month	Libraries with Terminals (2)	Avg. No. of Libraries on for 3 Months	Telco $ Cost per Lib. per Month	No. of CRTs (2)	Avg. No. of CRTs on for 3 Months	Telco $ per CRT per Month
Jan. 1980	$288,800							
Feb.	294,137							
March	295,496	$292,811	1,405	1,383	$212	2,838	2,812	$104
April	302,379							
May	304,569							
June	324,819	310,589	1,450	1,428	217	2,934	2,891	107
July	330,892							
Aug.	342,025							
Sept.	342,278	338,398	1,498	1,474	230	3,065	3,000	113
Oct.	342,702							
Nov.	344,017							
Dec.	347,580	344,766	1,552	1,525	226	3,228	3,147	110
Jan. 1981	349,394							
Feb.	370,970							
March	354,979	358,448	1,597	1,575	228	3,356	3,292	109
Apr.	358,469							
May	410,929							
June	460,378	409,925	1,651	1,624	252	3,475	3,416	120
July	500,420							
Aug.	527,589							
Sept.	591,252	539,754	1,869	1,735	294	3,917	3,672	147
Oct.	616,222							
Nov.	645,673							
Dec.	615,055	625,650	1,925	1,863	336	4,093	4,005	156

(1) Includes IXC, Station termination, data set
(2) Excludes SUNY
Excludes FEDLINK through August 1981
(Financial and statistical information by Thomson Little of OCLC.)

Chart A.

two years. There is an increase in the number of installed terminals of 42.4 percent in twenty-four months. More alarming, however, is the increase in telecommunication cost per terminal of about 50 percent, the result of three increases awarded to AT&T. The rate increases of almost 40 percent were assessed on facilities in place and services in use.

The other type of communication is afforded by the so-called VANs, the value added networks. A VAN purchases equipment and leases facilities for the transmission of data, then markets that functionality to many users, charging fees for connect time. Libraries use this type of network to communicate with each other, and to get services from vendors who sell what we call "on-line reference services." Telecommunication costs constitute only 7 percent to 13 percent of information service billings to the end user (Chart B). To the vendor, however, about half of the connect charges are associated with telecommunication facilities and services. (Estimate by Jan Eglund of BRS, Inc.)

Librarians have been able to improve services with new communication and bibliographic systems. The transmission of interlibrary loan requests was formerly handled with forms sent through the mail; now more than 90,000 requests per month are communicated instantaneously through the OCLC system. Through the services of federal libraries, many members of Congress are beneficiaries of this service, both directly and indirectly. In addition, catalog information is standardized and shared among members in forms that are reusable and modifiable for virtually every type and size of library.

On-Line Reference Services 1980–1981

Libraries using the "Affiliated On-Line Services" program of OCLC charted the following usages:

	BRS	DIALOG
Connect Charges	40%)	63%
Royalty Charges	27%	
Prints	13%	24%
Telecommunication	13%	7%
Training	3%	2%
Documentation	1%	2%
Other	1%	2%

(Statistical information from Elizabeth St. Pierre, OCLC)

Chart B.

These new systems make libraries dependent on the availability and utility of telecommunication circuits. Telecommunication costs are a major factor in the supporting infrastructure of modern library organizations. Statistics for one network, favorably situated near OCLC, might help highlight the present economics of networking. The cost of telecommunications amounts to 13 to 15 percent of the bill for OHIONET. The accompanying chart (Chart C) shows the effect of recent increases in telecommunication rates awarded to AT&T. The ratio of telecommunication cost to total cost of services has not changed, because OHIONET is offering more and different kinds of service, and because unit charges for some products and services have also increased. The problem is that this network's members, chiefly tax-supported institutions, are having to weather increases on facilities in place and services in use.

OCLC has, as part of its governance, a council of users representing 6,000 libraries (the vast majority of them tax supported) who met recently (9 February 1982). Five resolutions were passed at that meeting [Appendix 1]. All are supportive of HR 5158, the Telecommunications Act of 1981. The five resolutions deserve entry into the record, together with the rationale for producing them, and the sections of HR 5158 to which they refer.

"Resolved, (1) That AT&T and the Bell System Operating Companies continue to provide installations, maintenance, service, and billings that are direct, simple, and straightforward; and at the same time, that AT&T offer interconnect services to Bell System Operating Companies' competitors." After the recent Justice Department settlement, executives of the Bell system said that a split between AT&T and the BSOCs would cause considerable confusion—even chaos—in the installation, maintenance, service, and billing of interconnect services. Some executives of the Bell system have continued to push for noncompetitive and anticompetitive arrangements among and between operating

OHIONET
Charges for Telecommunications in 1980 and 1981

Month	No. of Modems 1980	No. of Modems 1981	No. of Terminals 1980	No. of Terminals 1981	Telco Cost 1980	Telco Cost 1981	Total Cost of Service 1980	Total Cost of Service 1981
January	160	173	249	273	$24,456	$24,683	$159,290	$250,093
February	161	174	251	274	25,224	28,266	165,936	252,421
March	163	176	256	277	24,808	26,593	171,656	253,809
April	165	178	258	280	25,211	27,108	180,427	253,903
May	166	179	258	281	24,139	30,546	172,296	228,718
June	167	180	258	284	26,903	35,323	162,972	230,879
July	168	181	263	289	26,021	36,645	196,495	272,247
August	169	175	266	279	26,072	36,597	179,657	228,520
September	170	174	265	279	26,230	35,403	222,620	225,860
October	170	176	271	284	25,903	40,477	225,258	251,000
November	169	174	269	284	24,221	35,566	201,231	224,533
December	172	175	272	288	22,778	38,148	193,853	228,300

A Modem prepares signals from the Terminals to be sent down the wire (the modulator, or "mo" of Modem) and on the other hand prepares signals for the Terminals coming from the other end of the wire (the demodulator, or "dem" of Modem). More than one Terminal can be attached to a single Modem. And more than one Modem can be attached to a single leased line. The number of Modems and Terminals on a single line affect service or response time. The network engineers try to achieve the optimum network by trade-offs. There are also plateau effects: a new line can cause a large temporary increase, until more Modems are requested for that line, as per-Modem costs are computed. Because of variations, it is good to average costs per-Modem over a quarter.

Month	Cost/Modem/Month 1980	Cost/Modem/Month 1981	Quarter	Average Cost per Modem 1980	Average Cost per Modem 1981	Percent Increase/Decrease
January	$153	$143				
February	157	162	1st Quarter	$154	$152	−01.3%
March	152	151				
April	153	152				
May	145	171	2nd Quarter	153	173	+13.1%
June	161	196				
July	155	202				
August	154	209	3rd Quarter	154	205	+33.1%
September	154	203				
October	152	230				
November	143	204	4th Quarter	142	217	+52.8%
December	132	218				

Chart C.

companies. The threats require early response, lest the confusion become a matter of operating policy. Section 201(c), p. 6 and Section 214(a), p. 12.

"Resolved, (2) That 'basic' common carrier service be protected and retained at economic and efficient performance levels." AT&T has been preparing, for a long time, to introduce "advanced" or "enhanced" services; and they would like to supersede present arrangements with new modes of service wherever possible. The incentive at their immediate disposal is pricing. "Enhanced" services can be priced in such a way, and "basic" services can likewise be priced in such a way, that the only logical conclusion would be to pay more for "better" service. That would be good and true in a competitive marketplace. In a controlled monopoly, the user needs to have true choices, based on true costs. Section 228, pages 22–23.

"Resolved, (3) That AT&T continue to be restrained from selling 'information' as such, whether combined with common carrier service or not, and that the medium and content of telecommunication be regulated and controlled separately." With an organization of the size and dimension of AT&T, the entry into the "information" market would be easy—and could readily become almost total. AT&T should be restrained from selling "information," because of the potential abuses in such a scheme of things, where company policy can determine what is available and what

is not. The telecommunication industry has, in the past, developed and determined political policies, witness ITT in Chile. Section 263(b), pages 57–60.

"Resolved, (4) That AT&T continue to be restrained from anti-competitive business practices in the field of telecommunication and computer equipment, software and service." Again, with a firm of AT&T's size and dimension, the industry could be overwhelmed with new businesses that fed from the profits of regulated services. The recently announced profits of AT&T give some indication of what the scale would be. There is no easy way to insulate the regulated businesses from the unregulated businesses, such that American business could be protected from predatory practices that use the resources of regulated monopoly profits. Section 252(m), pages 47–48.

"Resolved, (5) That rates be established for general public and non-profit institutions using criteria other than size for discounts on telecommunications to ensure public access and delivery of information." If discounts are going to be allowed for volume purchases (i.e., criteria of size), then discounts should also be allowed for institutions whose mission and purpose is to ensure public access and delivery of information. Section 223(b), page 17.

Concerning the vending of information (Section 263(h)(2), page 60 of HR 5158), there are additional concerns among librarians. "Information publishing service" uses the term "publishing" in at least a metaphorical sense, if not in a wholly new definition. As large conglomerates move into digital, online "publishing," librarians are wary of interruption and censorship by these large organizations. Access to computerized publishing is metered by time or resource consumed. One pays to read each "page" of information each time it is used, unlike book or newspaper publishing where one purchases the information and the total medium. Thus, the ALA recently resolved:

> . . . that the American Library Association support the intent of Rep. Wirth and members of the Subcommittee to encourage competition and a wide variety of information sources on telecommunications channels . . . (full text attached [Appendix 2]).

Access to information and delivery of information to the citizens of the United States have never been total, complete, and perfect. These goals remain before us as mighty challenges. And we would hope to come closer to fulfilling them with the use of advanced technologies of the processor, the mass storage device, and telecommunication. In order to come closer to reaching that goal, libraries need to have access to regulated telecommunication facilities that are reliable, dependable, and efficient. ■■

APPENDIX 1. OCLC USERS COUNCIL RESOLUTION ON FEDERAL TELECOMMUNICATIONS POLICY

RESOLVED, that AT&T and the Bell System operating companies continue to provide installations, maintenance, service and billings that are direct, simple, and straightforward; and at the same time, that AT&T offer interconnect services to Bell System operating company competitors.

RESOLVED, that "basic" common carrier service be protected and retained at economic and efficient performance levels.

RESOLVED, that AT&T continue to be restrained from selling "information" as such, whether combined with common carrier service or not, and that the medium and content of telecommunication be regulated and controlled (fairness doctrine) separately.

RESOLVED, that AT&T continue to be restrained from anti-competitive business practice in the field of telecommunication and computer equipment, software and service.

RESOLVED, that rates be established for the general public (pro bono) and nonprofit institutions using criteria other than size for discounts on telecommunications to ensure public access and delivery of information.

(The position statement was adopted at the winter Online Computer Library Center Users Council meeting in Columbus, on February 8–9, 1982.)

APPENDIX 2. RESOLUTION ON THE TELECOMMUNICATIONS ACT OF 1981

WHEREAS, H.R. 5158, the Telecommunications Act of 1981, affirms the need for a wide variety of information sources and unimpeded flow of information; and

WHEREAS, hearings will be held in the near future on H.R. 5158 before the House Subcom-

mittee on Telecommunications, Consumer Protection, and Finance, chaired by Rep. Timothy E. Wirth, sponsor of H.R. 5158; and

WHEREAS, Rep. Wirth and members of the House Subcommittee have made clear their intent to deal with first amendment issues, the need for a wide diversity of information sources, the need for encouraging competition in the telecommunications industry, and the need for protecting the telecommunications consumer; now, therefore be it

RESOLVED, that the American Library Association participate in and support public hearings on H.R. 5158 and urge its members to make their views known at such hearings in order to support and strengthen the proposed legislation; and be it

FURTHER RESOLVED, that the American Library Association support the intent of Rep. Wirth and members of the Subcommittee to encourage competition and a wide variety of information sources on telecommunications channels; and be it

FURTHER RESOLVED, that the American Library Association commend Rep. Wirth and members of the Subcommittee for their efforts on behalf of the American telecommunications consumer.

(Adopted by the Council of the American Library Association, Denver, Colorado, January 27, 1982 [Council Document #23.4].)

News and Announcements

LITA Calls for Video Entries

The Video and Cable Communications Section of the Library and Information Technology Association (LITA) is seeking library-produced videotapes for screening at the annual "Video Showcase." This year the section asks libraries to submit tapes that feature new or unusual uses of video and cable technology in libraries.

The showcase will be held two evenings, 8 to 10 p.m., Monday, July 12, and Tuesday, July 13, in Philadelphia during the American Library Association Annual Conference. LITA is a division of ALA.

The "Video Showcase" allows ALA members interested in video and cable communications to see how librarians across the country are using this technology. The showcase will be in the LITA suite to provide an informal atmosphere for sharing ideas. The suite's location will be announced at the conference.

The second night of the showcase will feature Kate Stutzman, executive director of Berks Community Television (BCT), Reading, Pennsylvania. BCT is the pioneer in using two-way interactive cable television. Librarians will be able to view some interactive programming as well as discuss the success of BCT.

Videotape entries should be in ¾-inch U-matic format and no longer than ten minutes. Submit tapes to Bob Katz, Albany Public Library, 161 Washington Ave., Albany, NY 12210.

Highlights from the videotapes may be edited together and made available as a VCCS video sampler. For more information write or call: Annette Salo, St. Paul Public Library, 90 W. Fourth St., St. Paul, MN 55102; (612) 292-6336. ■■

Television News Guide

The Television News Study Center of the Gelman Library, George Washington University, has compiled *Television News Resources: A Guide to Collections*, as part of the center's education program, to acquaint researchers with accessible television news resources. Updated to spring 1981, the *Guide* describes collections of television news available in the United States, listing the playback facility, published finding aids housed in the collection, and access policy and borrowing policy, if any, for each collection.

The center at George Washington University is a combination of research library, video study area, and referral service for scholars involved in television news analysis. The program facilitates and promotes research that utilizes television news broadcasts. Although the center does contribute to the Vanderbilt Television News Archive, it is not an archival facility. Its staff and resources serve as an information center, referring researchers to the appropriate archive.

Copies of *Television News Resources: A Guide to Collections* are available from the Office of the University Librarian, Gelman Library, George Washington University, Washington, DC 20052. The price is $3.50 each, prepaid orders only. ■■

Chinese Bibliographical Automation

The Conference on International Cooperation in Chinese Bibliographical Automation, August 29–September 1, 1982, is being organized by representatives of the Australian National University Library, the National Library of Australia, and the University of Hong Kong, in recognition of the continuing need for discussion at an international level on developments in this field. Independent research and development in Chinese bibliographical automation has been taking place in the People's Republic of China, Taiwan, Japan, and other countries, and it is hoped that the

conference will facilitate progress toward uniformity in character sets, MARC format, and computer technology, and that some continuing mechanisms for future cooperative development will be established.

Conference sessions will be held in the Asian Studies/Law Lecture Theatre at the Australian National University. The conference fee is $85.

Single rooms are available on campus at Ursula College. Bed and breakfast is $20 per day; full board, $28 per day. Meals are available at Students' Union and University House. Accommodations are also available off campus at several hotels and motels in the area. Ask for further information if required.

The official language of the conference is English, but papers may be presented in Chinese if an English translation is provided in advance.

The provisional program is:

Sunday, August 29
- 2–5 p.m.: Registration
- 6:30 p.m.: Reception

Monday, August 30
- 9:30–10 a.m.: Official opening
- 10 a.m.–12 noon, 2–5 p.m.: Session I: "Towards an International Chinese Character Code for Information Interchange"
- 8 p.m.: Film evening

Tuesday, August 31
- 9 a.m.–12 noon: Session II: "Developments in Technology for Chinese Bibliographical Data Processing"
- 2–5 p.m. Session III: "Developments in Chinese MARC"
- 7 p.m.: Conference Dinner

Wednesday, September 1
- 9 a.m.–12 noon: Session IV: "Mechanisms for Future International Cooperation"
- 2–5 p.m. Inspection tour of automated bibliographical facilities at ANU Library and National Library of Australia
- Close

Requests for registration forms and further information should be sent to: The Secretary, CICCBA, c/o The Library (A.S. Div.), Australian National University, P.O. Box 4, Canberra, ACT 2600, Australia. ■■

ITAL Editor

The Library and Information Technology Association is seeking qualified applicants for the position of editor of its journal, *Information Technology and Libraries* (*ITAL*). The successful candidate will serve as associate editor for the last three issues of the 1983 volume and assume full editorial responsibility with the first issue of 1984, at the expiration of the current editor's term of office. The editor of *ITAL* serves a three-year term with the possibility of reappointment.

Applications should demonstrate the candidate's experience in writing, editing, and/or publications management as well as familiarity with topics. Each candidate should include with the application a statement of no more than 300 words outlining goals and objectives for the journal and reasons for seeking the editorship.

Send applications no later than November 1, 1982, to: Michael J. Gorman, Director of General Services, 246A Library, 1408 W. Gregory, University of Illinois Urbana, IL 61801.

Questions about the editorship should be directed to the present editor: Brian H. Aveney, Blackwell North America, 6024 S.W. Jean Road, Bldg. G, Lake Oswego, OR 97034; (503) 684-1140.

Candidate interviews will be scheduled for the American Library Association Midwinter Meeting in San Antonio, January 1983, with selection to be completed before the end of that month. ■■

Online Catalog Workshop

On July 26–30, 1982, a workshop offered by the Library Media Education Department on online catalog access systems will be held at the Mankato State University Library. Topics to be covered include planning, development, implementation, and evaluation of online catalogs, as well as discussion of the critical issues and perspectives of online public access. Public service, technical service, and administrative viewpoints will be provided by the workshop staff. A special feature will be ample opportunity for hands-on experience with a state-of-the-art online catalog and demonstra-

tion and comparison of several catalog access systems. Further information and registration forms may be obtained from the workshop director, Dale Carrison, Dean of the Library, or the Library Media Education Department, Mankato State University, Mankato, MN 56001; (507) 389-6201 or 389-1965. Two quarter-hour credits, graduate or undergraduate, may be earned. For housing information, contact Office of Residential Life, Box 30, Mankato State University, Mankato, MN 56001. ■■

Library Teleconference Center Is Subject of LITA Preconference

The Library and Information Technology Association of the American Library Association will sponsor a preconference on establishing teleconference centers in libraries. The workshop, titled "The Teleconference Center: A New Service Opportunity for Libraries," will be on July 8 and 9, 1982, in Philadelphia, prior to ALA's Annual Conference.

This preconference will show library administrators, media librarians, and cable/video people how to establish a teleconference center in the library so that the library can become a communications center for the community or institution it serves. The first day will be an all-day tutorial in a downtown hotel, with equipment demonstrations for hands-on experience. During the second day, participants will tour one or two exemplary operational teleconference centers in Philadelphia.

The scope of the workshop will include audio teleconferencing, telefax, electronic mail, computer conferencing via terminal, and slow-scan television. All of the above use regular telephone lines and are relatively inexpensive and practical for most libraries. Although satellite (broadband video) teleconferencing will be covered in the workshop, the emphasis will be on what is affordable and easy to install. Institutional cable networks, videotext systems, and "personal earth terminals" also will be presented.

The preconference will be tied into the LITA educational/consultative exhibit, "The Teleconference Center in the Library," that will be among the ALA conference exhibits, July 10–13, in the Philadelphia Civic Center.

For more information and a registration brochure, write or call ALA, LITA, 50 E. Huron St., Chicago, IL 60611; (312) 944-6780. ■■

Arthur D. Parker Appointed CEO of UTLAS

On February 9, 1982, Mr. Arthur D. Parker was appointed the chief executive officer of the University of Toronto Library Automation Systems (UTLAS), succeeding the former director, Everet E. Minett. Parker brings to UTLAS some thirty years of broad management experience in a variety of fields.

During his sixteen years as a data processing executive, he held various positions with data service centers operating across Canada and was actively involved in developing many new computer applications and procedures.

Parkers's background also includes eleven years as an executive in the graphic arts field. In this capacity, he pioneered the application in Canada of advanced electronic typesetting equipment to commercial printing requirements and introduced to Canadian publishers the concepts of online text entry and editing and database publishing. Among the database publishing ventures in which he has participated, several have involved library-oriented materials.

Other executive positions which Mr. Parker has held have been in the areas of residential construction, investments, real estate consultancy, and management consultancy for data processing businesses.

In addition to this wide range of management experience, his interests in automation have led him to seek many new business applications for computer technology and at the same time to develop creative solutions to the human problems caused by massive adjustments to this technology. He has made his ideas known through numerous seminars and workshops.

Parker is a member of the Board of Trade of Metropolitan Toronto, the Art Gallery of

Ontario, and is past president and a director of the Graphic Communications Computer Association.

His immediate objectives at UTLAS are to improve the organization's responsiveness to clients' needs, to enhance its fiscal position, and to seek new market opportunities. To achieve these goals he intends to build on the skills and capabilities already present at UTLAS and to mobilize staff in new directions. ■■

Information Science Grants

The System Development Foundation, formerly chief stockholder in the System Development Corporation (SDC), has an asset base of more than $60,000,000 resulting from the sale of SDC to Burroughs Corporation. This sale severed all legal connection between the foundation and SDC.

Trustees of the foundation have released the following program statement:

The System Development Foundation presently seeks to advance the information sciences. The Foundation initially will make grants for *basic research* in this field. Grants will be made for a duration appropriate to the research problem, normally more than one year. Applications should be very brief (not to exceed two pages) straightforward statements of the problem, the plan for studying it, and an estimate of the cost. The Foundation may request additional information.

The Foundation is focusing presently on the following specific research areas:

(a) Principles of information science, including spatial and content information theory, classification, and information structures;
(b) Principles of representation in biological and machine information processing, as exemplified by neurobiology, the cognitive sciences, non-Von Neuman computer architectures, and robotics;
(c) Principles underlying the man-machine interface, including engineering and cognitive approaches to human factors in individuals and groups;
(d) The interface between the computer and artistic endeavor.

Applications, on institutional letterhead, should be directed to Charles S. Smith, Director of Programs, System Development Foundation, 181 Lytton Ave., Suite 210, Palo Alto, CA 94301. ■■

Philadelphia Meeting Planned for Vendor/User Discussion Group

A group composed of vendors of automated services and library users of those services has formed under LITA sponsorship. The Vendor/User Discussion Group will concentrate on mutual concerns such as adoption of standards, development of interfaces between systems, shared development potentials, and the user and vendor community communications process itself. During the first meeting at Midwinter ALA, Richard Rowe of F. W. Faxon was elected ad hoc chair and a steering group was formed to make plans for the Philadelphia meeting.

The second meeting of the Vendor/User Discussion Group is scheduled for Saturday, July 10, from 9:30 to 11:00 a.m. during the ALA Annual Conference. Discussion at the July meeting will concentrate on current problems and responses concerning the standardization of automated library services. Larry Wood of Purdue University will present a users perspective. Sandra Paul of SKP Associates will provide a background on ALA's procedures and past activities in the development of standards affecting libraries. Ernie Muro of Baker & Taylor will discuss in detail the proposed BISAC standard for transmission of orders. The presentations will be followed by an open discussion on problems and issues in standardization of automated services. ■■

Video-Teleconferencing Workshops

The Public Service Satellite Consortium (PSSC) is offering workshops on "How to Video-Teleconference Successfully." The intensive two-day workshops are designed for individuals with and without prior teleconferencing experience. All aspects of the communications technique will be covered, from budgeting and selecting a network to choosing a producer and on-camera talent, in nine informative, action-packed segments.

Individual sessions will address elements making up a successful video-teleconference, including program development, interaction, promotion and audience preparation, networking, and available

ground stations. The simulated video-teleconference, transmitted via closed-circuit television, will feature on-camera talent discussing costs and budgeting for an event.

Sessions will be conducted by various PSSC staff members, including Helen Lauck, director of PSSC's National Satellite Network; Polly Rash, director of marketing; Mary Roybal, manager, operations support; and Lee Lindbloom, networking specialist.

The cosponsors, locations, and dates of summer workshops are: American Hospital Association, Chicago, Illinois, June 2–4; Association for Higher Education of North Texas, Dallas, Texas, June 30–July 2; and the UCLA Graduate School of Management, July 21–23.

Hotel reservations must be made separately, but PSSC has arranged for hotel facilities in each city. Each workshop will cost $375 per person, with a $25 discount for PSSC members. Those who wish to register or obtain more information about the workshops should contact Polly Rash at PSSC's headquarters in Washington, D.C.; (202) 331-1154. ■■

Source on Cable

SOURCECABLE, a consumer information service that will soon be available for purchase over cable television, is now being included in the community packages being offered by four national cable system operators. Cox Cable Communications, Cross Country Cable, Storer Cable Communications, and United Cable Television all will offer SOURCECABLE to viewers in communities where they have won cable franchises, and they will include the service in bids for future franchises.

Services on SOURCECABLE are to include regularly updated general, sports, and business news; educational exercises; home shopping; a library of home and consumer information including health, emergency, energy, gardening, food, and home-maintenance data; and electronic games. Viewers choose the service they want by pressing the appropriate buttons on a hand-held television controller.

SOURCECABLE is available to new and existing franchises in both one-way and two-way modes. The SOURCECABLE product can be tailored to fit the specifications of the system operator and the information needs of the community.

New franchise awards that include SOURCECABLE have been made in Omaha, New Orleans, Tucson, and Vancouver through Cox Cable; in Glendale, Arizona, northwest Minneapolis, and Washington County, Oregon, through Storer; and in Scottsdale, Arizona, with United Cable. Refranchising awards granted to Cox Cable in San Diego and Santa Barbara, California, and Macon, Georgia, also will offer SOURCECABLE. Altogether, these communities represent more than 1.2 million prospective viewers for the new home information service. The first active marketing of the service will take place in Omaha this spring.

The four system operators also have made bids that include SOURCECABLE to communities representing another 1.6 million prospective viewers. ■■

Online Catalog Software

The Minnesota State University System Project for Automated Library Systems (MSUS/PALS) is now making its online catalog access system software available for sale. The system, which operates on UNIVAC 1100 series hardware and utilizes OCLC archival tapes for data input, is a comprehensive, integrated bibliographic access system with provision for keyword and Boolean searching; format, date, and language delimiters; truncation; bibliographic control number searching; choice of record displays; multiple institution holdings and displays; printout capability; and online user help and statistics modules, as well as COM catalog and offline special listing capability. Additional software for circulation, acquisition, and other library operations will be available. Further information and a licensure agreement form may be obtained from Dale Carrison, Dean of the Library, Mankato State University, Mankato, MN 56001; (507) 389-6201. ■■

Recent Publications

Reviews

Comparative Information for Automated Circulation Systems: Turnkey & Other Systems, by Joseph R. Mathews. 2d ed. Grass Valley, Calif.: J. Matthews and Associates, Inc., 1981. 74p. $20.00 prepaid, $22.50 billed. Distributed by CLASS, 1415 Koll Circle, Suite 101, San Jose, CA 95112.

In the fast-changing, competitive world of automated circulation systems, it is often difficult for libraries and librarians to obtain comparative data upon which to base decisions. *Comparative Information for Automated Circulation Systems* does much to remedy this situation. In the second edition of this report, Matthews provides accurate, up-to-date (as of May 1981) data on ten turnkey systems and six software packages. The turnkey vendors include Cincinnati Electronics, CL Systems, Inc., Computer Translation, Inc., DataPhase Systems, Inc., GEAC, ICL, Plessey, Systems Control, Inc., Universal Library Systems, Ltd., and Gaylord Library Systems. The six software packages include IBM-Dobis/Leuven, Library Software Systems, Sigma Data, the NLM Integrated Library System, Maggie's Place, and the Virginia Tech Library System.

The major portion of the report is devoted to a tabular presentation of data in order to facilitate comparison of the different systems. As a result, the report will be most useful to those with some understanding of automated circulation. This report complements narrative descriptions of automated circulation such as those found in Boss "Circulation Systems: The Options," *Library Technology Reports* 15(1):7–105 [1979]) and Bahr (*Automated Circulation Systems, 1979–1980*, Knowledge Industry Publications, 1979). Eight matrices are provided, one each for the following topics: general vendor information, available functions, patron notices and management reports, access to the database, search identifiers, data stored in the database, hardware options, and other factors. In addition Matthews provides a list of the libraries that have installed each vendor's system. By using the various tables, readers can easily compare systems at a very detailed level.

While the categories of data presented in the second edition are the same as those presented in the first edition, two turnkey vendors and five software systems have been added. Matthews has done a superb job of organizing a wealth of data and presenting it in such a way as to maximize its utility. Any library contemplating acquisition of a circulation system would be well advised to obtain a copy of this report. Those libraries embarking on the development of specifications will find the organization of the tables useful in identifying desirable features. Those libraries who have already settled on specifications will be able to compare the data for the different vendors with their own specifications. *Comparative Information for Automated Circulation Systems* should significantly aid libraries in identifying and acquiring the system that best meets local circulation needs.—*David R. McDonald, Stanford University Libraries, Stanford, California.*

The Context of Interconnection for a Nation-Wide Bibliographic Network, by Edwin J. Buchinski and Mazharul Islam. (Canadian Network Papers, ISSN 0226-8760; no.1) Title on added title page: Le contexte de l'interconnexion dans le cadre de l'élaboration d'un réseau bibliographique national. Text in English and French, each with special title page and separate paging. Ottawa: National Library of Canada, 1980. 33p. English + 36p. French. NLC: C81-090016-5E. ISBN: 0-662-51085-2.

In 1979 the National Librarian of Canada recommended to his government that the National Library of Canada "develop, in cooperation with other institutions managing computerized bibliographic centres, a decentralized bibliographic network with a view to ensuring the fullest sharing of in-

formation and library materials in the most cost-effective manner . . ." Since this ambitious undertaking will not be accomplished easily or quickly, we can expect to see a number of publications emerging from the National Library's Office for Network Development, of which this is the first.

The purpose of this publication is to discuss the major technical issues of systems interconnection. It seems to take a very broad view of what will constitute the bibliographic data interchange network, pointing out that "while the development of a 'closed' library bibliographic network is possible, and could entail less developmental effort than that of an 'open' one, such a strategy would be counterproductive both economically and administratively as it would be overtaken by technical advances before it was completed. . . ." Thus the prevailing view of this publication is that the proposed bibliographic network will encompass such developments as trade information systems, book industry ordering and distribution networks, home information systems such as Telidon, computer-to-computer data interchange experiments, and so on, as well as the fullest possible range of library and abstracting and indexing systems. Moreover, it recognizes the tendency of national boundaries to disappear within electronic networks, and addresses itself to developments in the United States as well as in Canada. The major service that this publication provides is its discussion in one place of all of these various developments, though as the total length of the document indicates, these discussions are necessarily superficial.

The report is divided into three parts, of which the first two occupy the majority. The first describes the existing environment in which bibliographic data interchange takes place, pointing out that the exchange of bibliographic data is no longer the concern solely of the library community. This section offers nothing that is new to *ITAL* readers, and offers what might best be termed an introductory overview of current practice and recent experiments.

The second section deals specifically with the interconnection of systems. Communication between incompatible systems is often reduced to an exchange of magnetic tapes, with a conversion program to change data formats. The products of Innovative Interfaces, Inc., have brought this mode of systems interconnection online, but currently the problem still is solved on an individual basis. The authors describe here a number of recent developments in telecommunications technology which they believe to be typical of the trends and issues which are evolving in intersystem communication. Chief among these is Open Systems Interconnection (OSI), a generalized model for systems interconnection developed by a subcommittee of the International Organization for Standardization (ISO). The OSI model avoids any reference to specific technologies, systems implementation, or means of interconnection; in fact, it deliberately avoids dealing with the internal functioning of individual systems. Instead, it aims at describing the external behavior of systems. Each system is viewed as being logically composed of an ordered set of subsystems or layers, a view that is, we are told, "entirely consistent with the structure of all computer systems."

The separation of computer-to-computer communication into these layers permits standard protocols for each layer to be developed (and, as the technology continues to change, to be improved) independent of the others. Some layers are concerned purely with telecommunications, while others relate specifically to data processing. Some of the standard protocols already exist (such as ISO's X.25 terminal-to-computer standard and X.75 network-to-network standard), some are under active development, and others remain to be determined in the future. In fact, the very design and therefore also the feasibility of the OSI model remains to be determined, although the general approach of a layered architecture seems to have been widely accepted by computer hardware manufacturers.

The third and final section of the report focuses on the problems and issues of interconnection, both technical and nontechnical, and concludes with a list of the areas where development work needs to be done before a nationwide bibliographic network becomes technically feasible. American readers will be pleased to see that political

problems have not been addressed here; rather, the report confines itself to the technical issues that are of equal importance on both sides of the U.S.-Canadian border.

The report is recommended for its well-written, straightforward approach to complex technical problems, which are explained in a concise yet intelligible manner. It hardly requires pointing out that the solution of the problems described here will bring substantial benefit to bibliographic systems in North America and to the users they serve.—*Peter Simmons, School of Librarianship, University of British Columbia, Vancouver.*

Field, Subfield, and Indicator Statistics in OCLC Bibliographic Records, by Thomas B. Hickey. (OCLC Research Report Series, OCLC/OPR/RR-81/1) Dublin, Ohio: OCLC Office of Planning and Research, 1981. 146p. paperback. ED202-484.

This report is an analysis of a 1 percent sample (58,375 records) of the MARC records contained in the OCLC (Online Computer Library Center) Union Catalog as of January 1980. Statistics covered here include field and subfield lengths and occurrences, indicator-use frequencies, and field co-occurrences. In each chapter of the report, statistics on overall records precede those categorized by various formats—monographs, serials, audio/visuals, sound recordings, music scores, maps, and manuscripts.

In chapter one the author suggests a few uses for these statistics—"estimating file growth, selecting subsets of records for local catalogs, and for any design of bibliographic record data bases." The information on average field and subfield lengths enables one to calculate the average size of a bibliographic record. The product of the estimated number of items cataloged and the average record size will, in turn, provide information on file growth. On printed or COM catalogs, space is limited and it is impossible to display all fields and subfields appearing in a MARC record. In this case, Hickey's statistics can help determine what lengthy fields and/or subfields to skip as long as they are not necessary for information access.

An example of the application of indicator-use statistics is to find out the frequency of 245 (title statement) fields traced as added entries. Information on co-occurrences of fields can be very useful, too. For instance, the co-occurrence of 490 (series untraced or traced differently) and 800–840 (series added entries) fields indicates the percentage of series not traced (the presence of 490 without 800–840 implies that the particular series is not traced). This data is useful to calculate "explosion ratios," or the number of entries a given number of records should produce in a catalog.

Since bibliographic records prior to February 1980 were analyzed in Hickey's research, the statistics reveal the characteristics of pre-AACR2 cataloging records only. It would be extremely useful to have a similar study on AACR2 records. With numerous deletions and additions of fields and subfields in the MARC format as required by AACR2, the characteristics of field and subfield lengths must have changed considerably.

To fully understand the statistics in this report, one must be familiar with cataloging rules and OCLC-MARC formats. OCLC documents such as *OCLC-MARC Subscription Service Documentation, OCLC Books Format,* and materials on other formats in the same series can be consulted for the definitions and uses of OCLC fields and subfields.—*Frances Lau, Blackwell North America, Lake Oswego, Oregon.*

Hierarchical Relationships in Bibliographic Descriptions. Edited by Ahmed H. Helal and Joachim J. Weiss. (INTERMARC Software-Subgroup Seminar, ISSN 0106-3375; no.4, March 25–27, 1981) (Library Systems Seminar, Essen, 1981) (Publications of Essen University Library, ISSN 0721-0469; no.2) Essen, West Germany: Gesamthochschulbibliotek Essen, 1981. 424p. ISBN: 3-922602-00-2. Free from the library.

The title, the provenance, and the length of this book will, no doubt, be daunting to many readers. I hope that they will overcome their reluctance and give time to consider a major work in the admittedly sparse field of important contributions to the systematic and detailed study of machine-

readable bibliographic records.

This book is a record of the proceedings of an INTERMARC Software Subgroup held in Essen in March 1981. INTERMARC is a group that is less than a household name in the United States but deserves more notice because of two features. First, it has come up with some of the most innovative and interesting ideas on the creation, content, and handling of machine-readable records since the heady early days of the U.S. MARC project. These ideas can be found in the INTERMARC format and the various proceedings and publications of the group and its subcommittees. The second point of interest is that INTERMARC is a collaborative effort of national and quasi-national libraries and cataloging institutions across Western Europe (including France, the Netherlands, Belgium, West Germany, the United Kingdom, Norway, Sweden, and Denmark). This continent-wide cooperation should be a matter of envy to us when we consider, for example, the divergences between the U.S. and the Canadian MARC systems.

INTERMARC has investigated all aspects of machine-readable bibliographic formats and their use. Their ideas on nonfiling characters, on the definition of leaders and fixed fields, and on the tagging and coding of variable length fields are all worthy of study. However, I believe the most interesting and prophetic work done in the INTERMARC group centers on a concept that includes the content of this book. That is, the concept known variously as "levels" of machine-readable records, as complex links between records, and as authority control in developed machine systems. The very title of this book contains a term—"hierarchical relationships"—that contains an assumption about the fundamental structure of the developed system. There are those who argue for a kind of free association between machine-readable records that does not admit the idea of hierarchies of linked records.

The most dramatic way to contrast the different approach called for by INTERMARC and that of the "traditional" MARC system is that the former deals with simple records linked in a variety of complex relationships, whereas the latter is based on complex multilayered records with few or no links to others.

The major contribution made by this book is to be found in the paper "Hierarchical Relationships in Bibliographic Descriptions: Problem Analysis" by Paula Scherer-Goossens of the Belgian Royal Library. This paper is essential (though not always easy) reading for anyone interested in the future of machine-readable bibliographic formats. It is comprehensive, analytical, and profound.

Goossens begins by excluding one major set of records/subrecords and their relationships. She excludes authority records of all kinds and confines herself to descriptive bibliographic information. She further limits the scope of this paper to one set of relationships between bibliographic descriptions—the hierarchical. By this she excludes chronological relationships (typically those between serials) and horizontal relationships (as between different language or different format editions of the same publication). It is worth noting that Goossens does not mention, even to exclude, freer forms of linkage between records. In other words, the idea of "levels" of bibliographic information is integral to her thought and that of the INTERMARC group. Figure 1 is a typical diagram of a "level"-based structure.

In this simple example, *A* indicates hierarchical relationships, *B* indicates a chronological relationship, and *C* indicates a horizontal relationship. A further set of records relating to subject and name authorities could be added to this diagram to complete a comprehensive cluster of bibliographic records.

Goossens maintains that all such examples of what she calls "complex publication forms" can be reduced conceptually to a tree diagram—either of a simple kind (as in figure 1) or by a superimposition of different "trees" to handle the more complex cases. She relates this tree structure to the display of bibliographic information in offline catalogs and to the "multilevel" descriptions first put forward in the ISBDs. Beyond the display of information in hard-copy forms, Goossens also deals exhaustively with the structure of complex descriptions in online computer systems and their manipulation

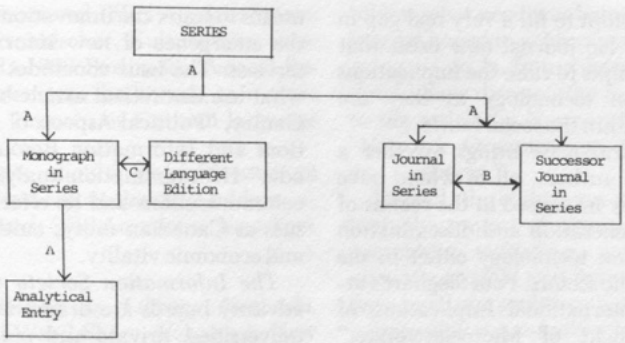

Fig. 1. Diagram of Level-Based Structure.

and use. Goossens' arguments and analyses are too dense to be summarized, and the range and thoroughness of this paper cannot easily be conveyed. The paper is accompanied by numerous informative diagrams and relevant examples.

Goossens, whose native language is Dutch, writes fluent if sometimes slightly off key English. The clarity and compression of the paper are not affected by this, and anyone who has a real interest in this topic cannot fail to profit from studying her work.

The rest of the volume consists principally of descriptions of the treatment of machine-readable records in the DOBIS, IBAS, and EASY systems in various libraries in West Germany and the BIBSYS system in Norway, with particular emphasis on the problems of complex records. The volume also contains summaries of workshops held at the seminar and one or two other papers on subjects not central to the overall topic.

The publication under review, the second in a new series, is available free of charge from: Gesamthochschulbibliotek Essen, Postfach 10 14 54, 4300 Essen 1, West Germany.—*Michael Gorman, Technical Services Departments, University of Illinois Library, Urbana.*

The Information Society: An International Journal. Edited by Joseph Becker. V.1, no.1. New York: Crane Russak, 1981. Coden: INSCDS. ISSN: 0197-2243. V.1 (four issues): $48.

While there is little doubt that societal problems and the need for information to solve those problems will most likely be approached via technological means, most observers would contend that alterations in social structures, values, and perceptions of these problems are also quite necessary. Scientists, both social and physical, recognize that more comprehensive and well-conceived strategies are necessary if we are to contend with complex problems that include social, moral, and political dimensions, in addition to the solely technical. As an ever-increasing number within the technological community are succinctly observing, questions of the use of information technology are necessarily moral and political and not simply technical in nature. Further, it is being recognized, increasingly, that an information society is inevitably accompanied by costs and deprivations, as well as new opportunities. Distributions of costs and benefits vary from one set to another, but one thing is clear: information is never socially neutral. The wide diversity of interest groups in the United States as well as within the Western world ensures that each new development in the enhancement of information flow becomes a political issue.

The Information Society: An International Journal is intended, as a new journal, to provide a forum for the sharing of thoughtful commentary on these and other information issues facing society. The journal accepts papers and analytical studies on various aspects of technological change that have social implications for an information-based society. It would appear, from the initial issue, that we have an

important attempt to fill a very real gap in the literature. No journal now exists that explicitly attempts to raise the implications of information technology as they are worked out within the social fabric.

The inaugural issue brings together a wide range of authors, all of whom have been intimately immersed in the realms of information generation and dissemination and information technology either in the private or public sectors. Paul Sieghart's article, "The International Implications of the Development of Microelectronics," deals, in part, with the social implications of the development of microelectronics. He asks simply, yet pointedly: "What will happen to the world as more and more information of all kinds becomes accessible to more and more people?" He candidly suggests that deeper questions exist that have little to do with the microelectronics revolution; rather, they are the timeless questions of politics, the nature of society, and human values and rights. In "Regulation of International Information Flows," J. G. Maisonrouge raises some important societal concerns relative to international information flows. In the third article, "Telecommunications Technologies: New Approaches to Consumer Information Dissemination," Mary Gardiner Jones addresses the critical importance of information in service of human needs. Her contention is that citizens must be active participants in society, shirking "information poverty," in order that information technologies might be harnessed to pressing human and economic plights. She voices the notion that knowledge is a vital national resource without which we cannot hope to reverse current feelings of alienation and cynicism.

Former CIA director William Colby's piece, "Intelligence in the 1980s," suggests that intelligence in the information age will become a public function and not simply a Secret Service function. His analysis is timely and extremely well written. In "Information Services and Economic Growth," Edwin B. Parker asserts that the economic opportunities of an information-laden society make it feasible to have strong and continued economic growth. For Parker, the key issue is the isolation of means to foster the innovation necessary for the emergence of new information-based services. The issue concludes with a somewhat less theoretical article by Oswald H. Ganley, "Political Aspects of Communications and Information Resources in Canada." His examination analyzes Canadian communications and its effects on such issues as Canadian unity, cultural identity, and economic vitality.

The Information Society editorial and advisory boards are drawn from a host of universities, private and public agencies, and major corporations. Crane Russak's inaugural issue is impressive, but librarians and information specialists will naturally want to monitor future issues with care to assure themselves of a continuing level of quality in an area that sorely needs a journal of this caliber.—*Edward D. Garten, Tennessee Tech University Libraries, Cookeville.*

ISBN Review. no.4 (1980/81) Berlin: International ISBN Agency. ISSN: 0342-4634. DM 24.

As described in the publisher's note, "The 'ISBN review' is the annually published official information about the world-wide development of the ISBN system, issued and distributed by the International ISBN Agency." The journal is now published in June of each year in anticipation of the annual meeting of the Advisory Panel to the International ISBN Agency, which takes place in Berlin each October.

The journal contains reports from the international and national ISBN agencies, as well as articles covering aspects of implementing the ISBN in various countries and/or on theoretical concerns relating to the ISBN. For example, in addition to ISBN agency addresses and reports, the 1980/81 volume included articles on machine-readable coding of the ISBN in the United Kingdom and Germany; tele-ordering in the United Kingdom; an information/book ordering system in Holland; the Southern African Joint Catalogue of Monographs; the possibility of chaining ISBNs; and their possible use as bibliographical numbers.

Subscriptions are available for DM 24 plus postage. Checks should be made payable to Staatsbibliothek Tit. 990003573 and

sent to International ISBN Agency, Staatsbibliothek Preubischer, Kulturbesitz, Postfach 1407, D-1000 Berlin 30, Federal Republic of Germany. Be certain to request the English, French, or German language edition.

Manuscripts should be addressed to Klaus D. Wawersig at the same address.—*Sandra K. Paul, SKP Associates, New York City.*

Resource Sharing & Library Networks. Edited by Ward Shaw. V.1, no.1. New York: Haworth Press, 1981. ISSN: 0270-3173. Published quarterly, $35 to individuals; $45 to libraries and other institutions.

We live in a very specialized age and resource sharing and library networks are important parts of the library world; so there is a good chance that there is an audience for a library journal entitled *Resource Sharing & Library Networks.* The Haworth Press and Ward Shaw have published a magazine with just that title. What they may have overlooked is the fact that *Library Resources & Technical Services, Information Technology & Libraries,* and other journals may already be reaching their intended audience. If that is so, there may not be enough quality articles available for another journal. Judging from the first issue of *Resource Sharing & Library Networks,* there was a paucity of material available to Shaw.

It is ironic that in his overly long and inconclusive editorial, Shaw has this to say about the information explosion: "Actually, I have always secretly believed that it's at least partly an information dissemination explosion—that is, the same stuff is endlessly repeated and rehashed rather than more new information being created, but it doesn't really matter as far as libraries are concerned—we still have to have access to it all."

The irony is that Shaw's editorial and three of the six articles in the magazine being reviewed are more of "the same stuff . . . endlessly repeated and rehashed. . . ." And Shaw is wrong, we don't have to have access to it all. What should have been said in the editorial was, Why another magazine and why this one? Shaw should have told us what need was being met, what the journal hoped to achieve, and where it was going to go in future issues. Then Shaw should have directed the reader's attention to the article by Norman Stevens entitled "Network Organization: Current Status and Concerns."

Instead, the editor uses nine pages to rehash the impact of the microchip, home computers, videodiscs, and cable television. We are told that networks are the answer to all our problems if only those in the information community work with those in the network community. He is full of insights such as, "Most known information organizations, of any size, are complex because they don't really know what they do, or at least are not easily able to articulate what they do." "A library is one component in a network, which will inevitably contain a number of equally complex components and will be complex itself." The essay abounds with other equally senseless statements and fails because it leads us nowhere and fails to convince us of anything.

You may not agree with Norman Stevens' narrow definition of a network, but he does tell us what he means by the word and uses his definition as the basis of his article on network organization. What he has to say is important and in no way restricts others from defining networks differently and then addressing some of the same crucial issues such as independence and governance.

In fact, and probably fortuitously, there are two good articles in this issue that make good companion pieces to the article by Stevens, "Plans For an On-line Catalog at the University of Illinois," by William Gray Potter, and "LCS: Automated Resource Sharing in Illinois," by Bernard J. Hurley. The two papers describe a system that uses two of the three networks discussed by Stevens, OCLC and WLN, and an independent circulation system, LCS (Library Computer System). These articles are important because they document the planning that produced this state network, suggest research that needs to be done (predicting the number of terminals needed for an online catalog, for example), and provide footnotes for those that want to investigate further.

It would take more space than I have to address all the problems with the articles by Pope, Hatvany, and Simpson. At best, they are rehashes, to use the editor's word, of what has been said before and better and do not add new information.

Pope fails to tell us what he means when he writes about "future networks." He also tells us that "services offered now are not the final objectives [of networks]," but he doesn't tell us what the final objectives are, only that we need to automate to take advantage of them. There are better guides to library automation in the literature. This article neither adds to that literature nor acknowledges its existence.

The article by Bela Hatvany can speak for itself: "This paper focuses on computer networks in libraries for the library profession. Let us look at networks, computers, and the library profession."

In the next paragraph we are told, "Networks grow. Like all growing things, they come into the world utterly incapable and utterly dependent on others. They are formed by the age-old process of the need for beating a path to a source of supply. Nothing will prevent this from happening."

The article concludes with, "But let us spend one moment congratulating ourselves on the amazing successes of the last 10 years and then realize our vigor and get on with wrestling with tomorrow's opportunities."

Simpson is the third author in this issue with little new to say. He accuses librarians of being uncooperative and ineffective and conveniently ignores the cooperative programs that have been working well for years. He mentions MINITEX and the Pacific Northwest Bibliographic Center as regional document delivery systems and tells us there is nothing comprehensive across the country. He totally ignores OCLC's interlibrary loan system, the Universal Serials & Book Exchange, and his own Center for Research Libraries (he is director).

There must be a marked improvement in volume 1, number 2, if this journal is not to become an imposition on already strained serials budgets. Librarians who have already paid for this magazine can only hope for improvement. Those who have not subscribed should wait and see if Haworth Press and Shaw last a full year. Back issues will be available should *Resource Sharing & Library Networks* improve and succeed.—*Thomas W. Leonhardt, Technical Services, University of Oregon, Eugene.*

The Video Source Book. 3d ed. National Video Clearinghouse, Inc. Syosset, N.Y.: National Video Clearinghouse, 1981. 1,529p. ISBN: 0-935478-10-8. $95.

The Video Tape & Disc Guide to Home Entertainment. National Video Clearinghouse, Inc. New York: New American Library, 1981. 414p. ISBN: 0-452253-19-5. $9.95.

Feature Films on 8mm, 16mm, and Videotape. Compiled and edited by James L. Limbacher. 7th ed. New York: Bowker, 1982. 481p. LC: 68-58279. ISBN: 0-8352-1486-9. ISSN: 0071-4100. $65.

The audiovisual librarian may dream of someday having a single, comprehensive reference source that will satisfy all film and video booking needs. Unhappily, none of the three reference books reviewed here will fulfill that dream. Happily, all three will make the location of video and film programs an easier job and will be valuable additions to reference collections that purchase, rent, or lease these materials.

The Video Source Book is the most ambitious (and the most expensive) of the three. Its stated purpose is to present information on every type of prerecorded video program available. Though a spot comparison of video programs covered in *The Video Source Book* and *Feature Films* found some listed in the latter that were not covered in the former, it is the most complete compilation available at this time. Its publishers began collecting video program data in 1979, and their computerized database now includes nearly 35,000 titles. The third edition lists approximately 10,000 new programs not included in the second edition (1979). More than 15,000 additions, deletions, and changes are said to have been incorporated into this new edition, and a free update will be issued May 1, 1982.

Program categories range from movies and entertainment to educational, how-to, business and industry, fine arts, children and juvenile, general interest, sports and recreation, and health and science. Many programs are aimed at the professional, such as the dentist, doctor, educator, nurse,

veterinarian, and librarian. Clearly, this work is intended for the large consumer of video programs or one seeking to satisfy users with a diversity of interests.

One of the nicest features of this work is the amount of data packed succinctly into each entry. The main body of the work is a listing of video programs arranged alphabetically by title. In addition to the title, each entry contains up to twenty-five pieces of information about the program: a program category (from the above list); subcategories; principal cast members and director; brief annotation; length; Motion Picture Association of America rating (*G*, *PG*, *R*, or *X*); intended audience; purpose (instruction, entertainment, etc.); black and white or color; language (if foreign); video format; awards received; and producer and distributor. An easy-to-use key is provided in the introductory pages. Prices, which are subject to frequent change, are not given.

New to this edition is a separate index to videodiscs. There are three additional indexes: a program category index; a subject index; and a sources index. The latter is a directory of company names, addresses, telephone numbers, types of video format handled, and methods of distribution (rental, lease, or purchase) of listed programs. The only real disappointment in this well-designed reference book is the broadness of the subject indexing. If large topics like "Business," "Ecology and the Environment," and "Occupations" were subdivided, it would aid the user looking for programming on specific subjects. The inclusion of an index of persons who are the subject of programs would also be of much value to the user, as would a cast index like that included in *The Video Tape and Disc Guide to Home Entertainment*. Nevertheless, as is, *The Video Source Book* is highly recommended for those libraries, educational systems, and companies who have a need for current video program data on a wide range of topics.

The Video Tape and Disc Guide to Home Entertainment is a spin-off publication of the National Video Clearinghouse database and, as the title implies, is aimed principally at the home video user. It contains more than 4,200 program listings, predominantly in the category of "Movies and Entertainment." An examination of 439 titles revealed 355, or 82 percent, that fell into this category. The remainder fell into the same program categories listed above for the *The Video Source Book*. The program entries contain exactly the same pieces of information as those in its "parent" book. It lacks a program category index but has a cast index, most useful for locating video programs of one's favorite performers. Another plus is the informative and readable introductory material, which capsules the state of the art, previews technological advances, and provides a clear explanation of the different video formats. There is also a subject index, which suffers from the same lack of specificity as that of *The Video Source Book*, and a sources index, similar to that of the larger work. Public libraries as well as the individual home video user will find this guide well worth its reasonable price.

Feature Films has both a broader and a narrower scope than the two above. It is broader in that its coverage includes 8mm and 16mm films as well as videotape. It is narrower in that coverage is limited to feature films, which are defined as "any film[s] over one reel long or running 48 minutes or more." A few classic films of slightly shorter length are included. Separate videotape entries are listed only for companies with exclusive rights to a video version of a feature film. The editor states that a videotape or videodisc version is available for nearly every film listed in this work, and the user is referred to *The Video Source Book*, *The Videolog: Programs for General Interest and Entertainment* (Esselte Video, Box 978, Edison, NJ 08817), or to a video dealer for specific sources. My spot comparison of twenty-six films found in *Feature Films* revealed only a 23 percent overlap with those in *The Video Source Book*. Additionally, a few well-known ones like *A Man and a Woman*, *All the King's Men*, and *Zorro* were listed in *Feature Films* with a video version, but were not found in *The Video Source Book*. One suspects that a more thorough comparison would turn up additional entries unique to each work. For this reason, the user should be aware that neither reference book completely covers its designated field.

Feature Films, now in its seventh edi-

tion, claims to include approximately 95 percent of all feature films generally available in the U.S. and from major Canadian sources. The edition contains 23,000 titles, of which 3,000 are new. All old entries have been revised. The entries, briefer than those in *The Video Source Book*, are arranged alphabetically by title and include the name of the releasing company or country of origin, the year released, running time, the distributor's code, names of the director and major performers, whether black and white or color, format, availability, and additional information where applicable. A separate listing of serials is included. There is an index of directors and one to foreign-language films, but, alas, *no* subject index. A bibliography of film reference works is also included.

Feature Films will be of greater value to the institutional user of feature films in 8mm and 16mm and of only marginal use to the user of video. On the other hand, users of video formats will be better served by *The Video Source Book*. The volume user of both film and video will want to have both of these works. The library or individual interested primarily in entertainment video programming will find *The Video Tape & Disc Guide to Home Entertainment* the best choice.—*Faye Powell, Pacific University Library, Forest Grove, Oregon.*

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.

Archives and Manuscripts: An Introduction to Automated Access. By H. Thomas Hickerson. (Basic Manual Series) Chicago: Society of American Archivists, 1981. 60p. LC: 81-52113. ISBN: 0-931828-29-5. $5 members, $7 others. Order from the Society of American Archivists, 330 S. Wells St., Suite 810, Chicago, IL 60606.

Developing Computer-Based Library Systems. By John Corbin. (A Neal-Schuman professional book) Phoenix, Ariz.: Oryx Press, 1981. 226p. LC: 81-1232. ISBN: 0-912700-10-6. $22.50.

Developments in Optical Disc Technology and the Implications for Information Storage and Retrieval. By R. Barrett. (British Library Research & Development Reports, ISSN 0308-2385; no.5623) Boston Spa, England: The British Library, 1981. 72p. ISBN: 0-905984-71-4. U.K. £45.00. Order from Publications Section, British Library Lending Division, Boston Spa, Wetherby, West Yorkshire LS23 7BQ, England. (Foreign orders: Add £3.00 to checks, credit transfers, or bank transfers from foreign banks to cover bank charges.)

Illustrative Computer Programming for Libraries: Selected Examples for Information Specialists. 2d ed. By Charles H. Davis and Gerald W. Lundeen. (Contributions in Librarianship and Information Science, ISSN 0084-9243; no.39) Westport, Conn.: Greenwood, 1981. 129p. LC: 81-1128. ISBN: 0-313-22151-0. $15.

Management of Library Networks: Policy Analysis, Implementation, and Control. By William B. Rouse and Sandra H. Rouse. (Information Science Series) New York: Interscience/Wiley, 1980. 288p. LC: 80-12644. ISBN: 0-471-05534-4. $25.95.

On-Line Information in Public Libraries: A Review of Recent British Research. Nick Moore, editor. (British Library Research & Development Report, ISSN 0308-2385; no.5648) Boston Spa, England: The British Library, 1981. 64p. ISBN: 0-905984-76-5.

The Teaching of Computer Appreciation and Library Automation. By A. J. Oulton and others. (British Library Research & Development Report, ISSN 0308-2385; no.5647) Boston Spa, England: The British Library, 1981. 118p. ISBN: 9-905984-75-7. ■■

Highlights of LITA Board Meetings

1982 ALA Midwinter Meeting, Denver

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

FIRST SESSION JANUARY 23, 1982

Board members present: Brigitte L. Kenney, Carolyn M. Gray, S. Michael Malinconico, Nancy L. Eaton, Bonnie K. Juergens, Hugh C. Atkinson, Anne T. Meyer, Jay B. Clark, Arlene Farber Sirkin, Heike Kordish, Donald P. Hammer.

ALA Operating Agreement. President Kenney reviewed the background history of the ALA Operating Agreement and discussed some of the issues she and Hammer have identified in a document they drew up to outline LITA's special concerns. Among those issues were the effects of motions passed by ALA Council without consulting the divisions, overlap in activities and units between the various divisions, charges made by ALA Administrative Offices against the divisions' budgets without the knowledge of the divisions, and an interdivisional presidents' forum to facilitate communication between the divisions' officers.

Motion made and passed that:

> the Lita Board endorse the Reaction Statement to the Proposed Operating Agreement Between ALA and Its Divisions.

ANSI X3 Standards Committee. LITA has been invited to send a representative to an X3 meeting in Phoenix, Arizona, on February 24 and 25, 1982. Hammer asked approval of the board to send a representative and asked for suggestions on who should be sent.

A motion was made and passed that:

> LITA support a technical representative to go to ANSI X3 in Phoenix in February 1982.

Electronic Library MIG. Kenney reviewed the background concerning the Electronic Library Membership Initiative Group (ELMIG) and stated that the matter now has reached the point when the LITA Board should decide whether or not it should put in formal writing the invitation made verbally by the LITA Board in San Francisco to the ELMIG to become a part of LITA.

A motion was made and passed that:

> LITA Board confirm in writing our previous invitation to the Electronic Library Membership Initiative Group (ELMIG) to become a part of LITA.

Catalog Form, Function, and Use Interdivisional Committee. This is a new committee being established by a group of ALA divisions as an interdivisional committee somewhat like the MARBI Committee. LITA has agreed to support it. Michael Gorman will represent LITA.

Telecommunications Act of 1981. Representative Timothy Wirth (D-Colo.), the Chair of the House Subcommittee on Telecommunications, Consumer Protection, and Finance, held a meeting in Colorado on his concerns. Kenney has drawn up a resolution in an effort to support his efforts "trying to protect the integrity of the network under the recent divestiture decree of AT&T. He is trying to arrange it in such a way that there will be local incentives to maintain and improve local networks."

A motion was made and passed that:

> the resolution on the Telecommunications Act of 1981 be approved and forwarded to the Legislation Committee.

Electronic Mail System. The LITA Board has been using two electronic mail systems since May 1981. The Source is one system and ONTYME is the other. ONTYME has been used heavily, but The

Source has not been used very much. The board decided by consensus to continue ONTYME, but to discontinue The Source.

ISAS International Mechanization Consultation Committee. This committee is an ad hoc committee that has now completed its work. The committee's recommendations are as follows:

1. That there should be established a LC/ALA Bibliographic Mechanization Standardization Liaison Committee to consist of representatives of relevant areas of LC, LITA, and RTSD.

2. That ALA should form an interdivisional committee which will be charged with the monitoring of all kinds of ALA participation in bibliographic mechanization activities at the international level.

3.a. That the ALA staff compile a list of persons involved in current bibliographic mechanization activities at the international level.

3.b. That ALA request those persons to supply reports on their activity for dissemination to the library community, and that this reporting be encouraged by ALA making small monetary grants to individuals to help with their travel expenses, these grants being conditional upon their report.

3.c. That ALA request each international body (or its affiliated U.S. national bodies) engaged in bibliographic mechanization activities to accept recommendations on individual participation from ALA. Further, that any standard resulting from individual participation which ALA has neither recommended nor approved may not be recommended as a standard by ALA.

3.d. That the two committees called for in the previous recommendations be involved directly with the process recommended below.

4. That the committee called for in our second recommendation be charged specifically with liaison between ALA and other bodies in the field of international bibliographic mechanization standards.

5. That the IMCC be dissolved and that the committee called for in our second recommendation be recognized as the pivotal ALA body in this matter.

A motion was made and passed that:

the LITA Board accept the report and endorse the recommendations with the following modifications:

a) merge recommendations #1 & 2

b) invite the participation of the ALA International Relations Committee

MARBI Committee. Gretchen Redfield reported that she felt that the two extra meetings held each year with the Library of Congress have been extremely beneficial. Redfield requested a total of $1200 for the MARBI Committee for the next year; $900 for travel to the two meetings at LC and $300 for electronic mail.

A motion was made and passed that:

the LITA Board continue to support MARBI and that a maximum of $900 for travel and $300 for electronic mail be approved as a one-year budget, dependent upon actual expenses incurred.

MARBI Resolution. The MARBI Committee passed a motion commending Eleanor Montague for her excellent service as chair of the MARBI Committee. The committee then asked each of the MARBI-represented divisional boards to also pass the motion. The board agreed by consensus.

LITA-Wide Standards Committee. The only standards committee in LITA has been the TESLA Committee in ISAS. Some officers in LITA have felt that there should be a general standards committee within LITA to be concerned with standards policy and also the establishment of standards in areas other than computer use. After discussion, the board asked the chair of the ISAS Executive Committee to return to that committee and ask for their agreement to make TESLA a LITA-wide committee.

Oral History Project. Malinconico, the chair of the committee, reported that he was forming the committee and would coordinate activities with the Library History Round Table and with the RASD History Section. He will report further activity at the Philadelphia Conference board meetings.

SECOND SESSION
JANUARY 27, 1982

Board members present: Brigitte L. Kenney, Carolyn M. Gray, S. Michael Malinconico, Nancy L. Eaton, Bonnie K.

Juergens, Hugh C. Atkinson, Jay B. Clark, Arlene Farber Sirkin, Heike Kordish, Donald P. Hammer.

LITA-Wide Standards Committee. Paul Lagueux reported that the members of the ISAS TESLA Committee have decided that they do not object to having the committee changed to a division-wide committee. A discussion took place on expanding the appointments to the committee to include a representative from VCCS and AVS. It was decided that such appointments can be made anytime a person is found who is interested in standards in those fields.

National Conference Steering Committee. The National Conference Steering Committee is now complete and functioning. A written report will be submitted to the board later which will include a roster of the committee, a list of possible speakers, likely topics, etc.

Goals and Long-Range Planning Committee. Several meetings have been held by the committee to date, and each member of the committee submitted a paper on their thoughts about LITA and where it is going. Those papers were then discussed at their first Denver meeting and a list of contradictory statements that were intended to generate thinking were drawn up. The committee also held hearings at which many individuals submitted their ideas. The committee expects to meet again at Philadelphia and also hold additional hearings.

LITA Policy Concerning Payment of Expenses & Honoraria at Institutes and ALA Conferences. A motion was made and passed that:

> the LITA Board direct the Executive Director of LITA to enforce ALA policy on expenses for appearances to conferences.

After discussion, a motion was made and passed that:

> the president's expenses paid by LITA be limited to the sleeping room attached to parlor provided for LITA meetings.

LITA 1982/83 Budget. A motion was made and passed that:

> the Board approve the tentative 1982/83 LITA budget as it was last year (1981/82).

Telecommunications Committee. Joan Maier McKean reported that the Telecommunications Committee would sponsor a preconference at Philadelphia and a LITA technology exhibit in the ALA exhibit area. The two activities are planned to be financially self-liquidating.

The committee intends to have two exhibit booths at two different points in the exhibit area which will make it possible to teleconference across the exhibit floor. Demonstrations of teleconferencing will be held and conference attendees will actually be able to take part in teleconferencing. McKean hopes to demonstrate, among other things, the new Misar equipment, which is voice-activated video teleconferencing equipment.

Library & Information Technology Discussion Group. Pat Earnest brought up several concerns about the administration of LITDG. The length of the meeting time of three and a half hours is excessive. That time was used previously by both the LITDG and the MARC Users Discussion Group before they merged. LITDG would now like to retain two hours of that time and release the rest of the time to VCCS and/or AVS for their purposes, if they are interested. Earnest and Arlene Farber Sirkin, the chair of VCCS, were instructed to make their own arrangements to divide the time slot between them.

Jay Clark, Chair of ISAS, informed the board that the ISAS Executive Committee is interested in having LITDG transferred to ISAS rather than remaining a LITA-wide discussion group mixed with A-V and video.

A motion was made and passed that:

> the Library & Information Technology Discussion Group be moved to the ISAS Section. This is understood that it would be subject to future reevaluation.

Program Planning Committee. Sue Tyner reported that LITA/ISAS will cosponsor a program in Philadelphia with LAMA dealing with automated circulation systems. LITA was asked to cosponsor a program in L.A. with the RTSD/RLMS Technology Committee dealing with communications and how it relates to interlibrary loan and other functions in the library.

After discussion, Tyner moved that the LITA Board send a letter to RTSD and RASD to explain the confusion coordinating the attempt to incorporate parts of the online preconference as a subject for the teleconference program.

A motion was made and passed that:

> the LITA president write a letter to the other two cosponsoring ALA divisions to stress the need for better coordination between divisions in the future.

LITA has received a request for a preconference in communications that would try to define what is involved in things like microwave, what is involved in satellite transmission, and alternatives to Ma Bell. This preconference is just in the planning stages now.

Tyner spoke about an institute on microcomputers being planned. It will include what microcomputers can do and can't do, evaluations of hardware, capabilities of specific models, remote capabilities, case studies, cost models, available software, and other topics. Exhibits will be included. The dates will be November 8 and 9 in Milwaukee, subject to final approval of the board.

A discussion took place on the lack of guidelines concerning the steps to be taken in co-sponsorship of programs and institutes among ALA units.

A motion was made and passed that:

> the Board accept the Program Planning Committee report excepting the plans for an AVS program until further information is available.

Nominations Committee. Richard Akeroyd gave the Nominating Committee report.

For vice-president/president-elect: Kenneth Dowlin, Pikes Peak Library District, Colorado Springs, Colorado; Patricia Mackey, Monroe County Library System, Rochester, N.Y.

Member-at-Large: Emma Cohn, Library/Media Consultant, Bronx, N.Y.; SaraJean Marks, Video Librarian, Tucson Public Library, Tucson, Arizona.

Publications Committee. Charles Husbands reported that the VCCS Distribution and Exchange Committee presented a proposal to create a videotaped sampler of library-produced programs. The committee supports the proposal which calls for production and distribution to be handled by the Library Video Network. Costs would be recovered through sales and rentals. It further recommends that the board appropriate $500 to underwrite production costs in case LVN encounters unanticipated difficulties. The committee's recommendation concerning the $500 allocation was accepted by consensus.

Sally McCallum from the Library of Congress volunteered to prepare a draft paper concerning the LITA monograph series that will give the first steps toward defining monograph policies and procedures for the division.

On *LITA Newsletter* frequency, the editor is prepared to produce a fourth newsletter this year. The additional issue would follow this Midwinter conference. The cost will be about $2000 and Husbands asked the board for authorization to proceed. The board gave its approval by consensus.

The three-year term of the present editor of the *LITA Newsletter*, Pat Barkalow, ends after the 1982 Annual Conference. She does not wish to continue, and the committee has asked the vice-president, Carolyn Gray, to appoint Carol Parkhurst as editor.

Brian Avery, editor of *ITAL*, does not wish to continue as editor beyond the end of his three-year term, which terminates at

VOTE TALLY FROM THE ELECTRONIC MAIL SYSTEM

Approve Budget	5 Yes 3 Abstain
LITA-Wide Standards Committee	5 Yes 3 Abstain
ANSI X-3	5 Yes 1 No 2 Abstain
Vendor/User Group	5 Yes 1 No 2 Abstain
ALA Priorities	8 Abstain

The above tally is a record of votes made by the Board of Directors of the Library and Information Technology Association prior to the 1982 Midwinter Meeting, Denver, Colorado.

the end of the 1983 volume. The committee proposes that an announcement to seek applicants be made in the June 1982 *ITAL* and the Pre–Annual Conference newsletter.

Legislation & Regulation Committee. Lynne Bradley briefly reported on legislative action items for the board.

Related to government information published in electronic format, the committee recommends that LITA establish a formal liaison with GODORT to monitor events in this area.

The Legislation Committee recommends that two discussion groups be established. One, on cable franchising to start Midwinter 1983. Two, on off-air recording which could expand into other copyright problems.

Bradley advocated that the LITA Legislation Committee be overhauled to make it an active and responsive committee. ■■

LITA BOARD OF DIRECTORS MEETINGS
RECORD OF VOTES—1982 MIDWINTER

	Motions (In order of appearance in the "Highlights")											
Board Member	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Brigitte L. Kenney	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Carolyn M. Gray	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
S. Michael Malinconico	O	O	O	O	O	Y	Y	Y	Y	Y	Y	Y
Nancy L. Eaton	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bonnie K. Juergens	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hugh C. Atkinson	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Anne T. Meyer	Y	Y	Y	Y	Y	Y	O	O	O	O	O	O
Jay B. Clark	O	O	O	O	Y	Y	Y	Y	Y	Y	Y	Y
Arlene Farber Sirkin	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

KEY: Y = Yes A = Abstain O = Absent

Letters

To the Editor:

In conjunction with Jim Dwyer's guest editorial in the current [Sept. 1981] *JOLA*, you may be interested in the consolidation of *AACR2* decisions which the Canadian Library Association published last September. I am asking CLA to send you a copy.

This is not quite the *AACR½* which he suggests, but probably comes very close to it.—*C. Donald Cook, Associate Professor, University of Toronto, Toronto, Ontario.*

Editor's Note: AACR2 Decisions and Rule Interpretations *is a consolidation of the decisions and rule interpretations for the* Anglo-American Cataloguing Rules, Second Edition, *made by the Library of Congress, the National Library of Canada, the British Library, and the National Library of Australia, compiled by C. Donald Cook. Ottawa: Canadian Library Association, 1981. 572p. ISBN: 0-88802-157-7. $25. Published in loose-leaf format for interleaving into copies of* AACR2, *it includes decisions and rule interpretations through April 30, 1981. A supplement covering decisions and interpretations through December 31, 1981, will be available by summer 1982. Continuing annual supplements are anticipated.*

To the Editor:

In "Revisions to Contributed Cataloging in a Cooperative Cataloging Database" (*JOLA*, June 1981) Judith Hudson confirms suspicions that errors and omissions in contributed copy continue to hamper the efficient and effective sharing of bibliographic data. It is no more realistic to expect OCLC or any other network to take full responsibility for quality control than it is to expect LC to provide cataloging for all current publications. Cooperation is the key.

One hopes that Hudson's suggestion that selected member libraries with consistently high quality control standards be allowed to make database corrections online will be widely supported. If these libraries were also allowed to complete CIP records online for systemwide use, all member libraries will benefit through a major reduction of duplication of effort and some pressure might be removed from LC.

Hudson should be thanked for her efforts and *JOLA* for the timely sharing of information and ideas in "Communications" and "Reports and Working Papers."—*James R. Dwyer, Assistant Professor, University of Oregon, Eugene.* ■■

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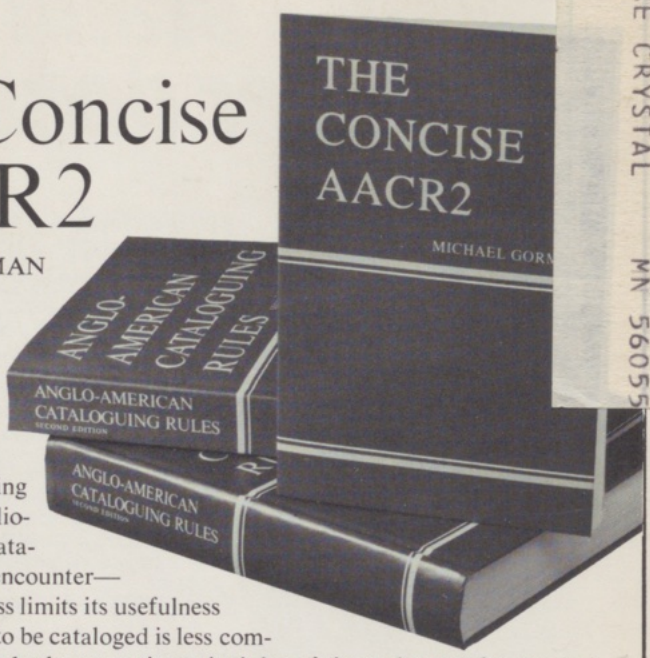

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