


Information Technology and Libraries

September 1986

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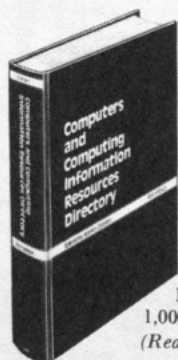
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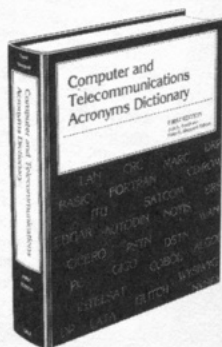
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Library of Congress Classification as an Online Retrieval Tool: Potentials and Limitations

Lois Mai Chan

This paper is based on a presentation given at the Conference on Classification as Subject Enhancement in Online Catalogs, sponsored by OCLC and the Council on Library Resources, held at OCLC, Dublin, Ohio, January 27-28, 1986.

INTRODUCTION

The inadequacy of current provisions for subject access to library materials has been amply demonstrated by recent online catalog studies; the same studies reveal considerable user dissatisfaction with subject access.¹ The profession has responded with increased attention to the problem; many recent writings and reports of experiments document the search for enhanced subject access.²

One of more interest, in terms of potential, is the report of a 1984-85 study conducted under the joint auspices of OCLC, Forest Press, and the Council on Library Resources.³ The purpose of the study was to explore the effectiveness of the Dewey Decimal Classification (DDC) as a searcher's tool for online subject access. Two test catalogs were prepared for the project: one offered access to subject headings and keywords in titles, series, notes, and call numbers; the other offered access through various features of the Dewey classification scheme in addition to the keyword approach. Two categories of users carried out searches in the two catalogs: regular library users who pursued their own queries and li-

brarians who searched on assigned topics. Test results for the DDC-enhanced test catalog were revealing, particularly in terms of how many unique subject-rich terms were generated. The study as a whole indicates that incorporating a classification scheme in the online catalog can provide enhanced subject access that is not possible through the alphabetical approach alone.

Since even more of the bibliographic records in MARC databases such as LC-MARC, OCLC, and RLIN carry Library of Congress Classification (LCC) numbers than carry DDC numbers, it is logical to explore the feasibility of using LCC as an online searchers' tool. That is the purpose of this paper. It addresses the following questions: Can the Library of Congress Classification, a system that was primarily designed as a shelf-arrangement tool, also be a viable tool in online retrieval? If so, in what ways could it best contribute? What stands in the way of online incorporation of its potentially useful features? In answering these questions, we first point out some of the unique features of LCC and note their implications for online retrieval and experimentation. Then, in more detail, we examine the potentials and limitations of LCC

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with respect to three areas of online subject searching: enhanced vocabulary, subject browsing, and class number searching. A caveat is needed here: the feasibility of the DDC project, with its real-time retrieval tests, was contingent on the availability of the DDC schedules and index in machine-readable form. No such file yet exists for LCC, and, indeed, the prospect of converting more than forty volumes of LCC schedules is mind-boggling. Under current circumstances, therefore, examination of LCC's potential in online retrieval must be limited to primarily theoretical analysis.

CLASSIFICATION FACTORS AFFECTING ONLINE RETRIEVAL

There are several general features of classification systems that influence their potential usefulness in online subject retrieval. For any one system, some of these features are intrinsic to the classification itself: whether it is enumerative or hierarchical, what its pattern of notation is, whether or how it uses tables, how extensive and effective its indexing is. Other features are extrinsic: how often and how frequently the system is revised, how uniformly it is used from library to library, the level of document content that is classed. These features are discussed below, as they affect the question of incorporating features of the Library of Congress Classification in an online retrieval system.

Pros and Cons of an Enumerative Classification

The Library of Congress Classification is the most enumerative of currently used library classification schemes. As such, its schedules are enormously large; its twenty-one main classes are detailed in more than forty volumes. This large size is in itself an impediment to LCC's efficient incorporation in a machine-based system. On the other hand, there is an advantage in LCC's size and enumerative nature: it offers very specific numbers for certain categories of subject. For example, in literature, unique call numbers are provided for individual authors and in some cases even for individual works. Geographic aspects of many subjects are pinpointed to the city level

(and in some cases, even to city districts, e.g., maps and atlases). Such specificity could be very beneficial in online retrieval.

Tables

Although LCC is basically enumerative, it incorporates a number of auxiliary tables, particularly in classes B (Religion and Philosophy), H (Social Sciences), K (Law), and P (Languages and Literatures). Furthermore, throughout the schedule and tables, Cutter numbers are often used for subdivision. These tables were designed primarily for the purpose of saving space in the schedules rather than providing greater possibilities for synthesis. With the exception of the Cutter tables, values from LCC's numeric tables are added to base numbers in the numeric sense, not concatenated as is the usual case in the Dewey Decimal Classification. Thus, mounting LCC tables in an online catalog will be a considerable challenge to system designers; algorithms and software quite different from those proposed for use with DDC tables⁴ will have to be developed.

Notation

LCC uses a mixed notation of capital letters and arabic numerals with minimal decimal expansion. The notation is not hierarchical, and therefore, the class numbers tend to be relatively short. While the short numbers are an advantage in shelving, the nonhierarchical nature of the notation will have implications in online searching in terms of subject outline browsing and class number searching. These implications will be discussed in detail later in this paper.

Indexes

Each individual LCC schedule has its own index, but the Library of Congress has never issued a unified index to the schedules as a whole. There are two general lists available commercially: the Canadian index⁵ that represents a merging of the individual indexes and the combined indexes compiled by Nancy Olson.⁶ Unfortunately, neither of these has been updated and both are now some twelve years out of date.

In a 1971 study of vocabulary control in the Library of Congress systems,⁷ John

Phillip Immroth made the following observation:

The indexes of the individual Library of Congress classification schedules are very inconsistent and are not in general representative of full indexes. The tendency of these indexes to favor specific subject subdivisions is a further weakness. The major lack of vocabulary control is still another weakness. . . . The classifier who must transfer from schedule to schedule and possibly from index to index will immediately experience the results of these inconsistencies and imperfections.⁸

Immroth concluded that the LCC indexes "are inconsistent and incomplete."⁹ He found that only "about half of the class numbers in LC classification schedules are indexed. Less than half of the schedule terms are indexed and just over a third of the Cutter numbers appearing in the schedules are indexed."¹⁰ As a matter of fact, seven of the nine schedules in class P have no indexes at all. Needless to say, the current incompleteness and inconsistencies of LCC's indexes would have an adverse effect on online retrieval—to the extent that justifies the claim that preparing indexes to schedules that lack them should be one of the early steps in an LCC automation effort. Compiling a unified index to the whole classification should of course be another. In the meantime, there is an advantage in the current situation. The availability of stand-alone indexes to some of the individual schedules facilitates experimentation: studies can be carried out on a particular class or classes without waiting for conversion of the schedules and indexes as a whole.

Changed Numbers and Relocated Subjects

Although class numbers in LCC are relatively stable, relocations do take place occasionally, particularly in the social sciences. In order to insure the effectiveness of direct class number searching, therefore, proper linkages between old and new numbers must be provided. The need for linkages is, of course, not a problem that is unique to LCC, and, indeed, is more pressing in systems that are kept up-to-date more closely. LCC has been criticized for its slow rate of change; still, its relative stability gives it an advantage in the current context.

Call Number Integrity

There are several reasons why LC call numbers, as assigned by the Library of Congress and as they appear on MARC records, can be especially effective search vehicles in a cooperative online catalog. One is that they are complete call numbers, not just class numbers as is the usual case for the DDC numbers that appear on LC records. As such, they are unique to particular works and should facilitate known item searching.

Another is that local libraries are less likely to change LCC numbers than they are DDC numbers. The reasons are: (1) the LC numbers are relatively short to begin with and (2) because of the nonhierarchical nature of the notation, shortening LC numbers can have disastrous effects (i.e., misrepresentation of subject contents). One of the problems identified in the DDC project with regard to Dewey class numbers in online searching is generic posting (i.e., listing of material under a more general number than is appropriate) as a result of truncating numbers on local cataloging records.¹¹ Because LC numbers are normally left intact on local records, generic posting is less of a problem with LCC; it occurs only when the system itself does not provide a number specific enough for the content of the document.

The effect of these two factors is that LC call numbers show little local variation from catalog to catalog or from database to database; thus, a given work is not likely to be listed under several different class numbers in a large union or cooperative database.

The Library of Congress' Classification Policies

Because LCC was originally designed and is still primarily used as a device for shelf arrangement, an individual item is assigned only one call number, even if it is multitopical. For example, a document that discusses both Kentucky and Tennessee is assigned a class number representing one or the other, but not both. (In a few cases that involve analytics, additional call numbers representing alternative locations may also be assigned; these cases, however,

are a very small percentage of the whole.) This means that part of the contents of many multitopical bibliographic items are not represented by class numbers at all. This is the major difference between a shelflist and a true classed catalog in which each item is represented by as many class numbers as appropriate in order to cover the total content of the item. This difference must be kept in mind in considering the benefits to be gained from adding "classed catalog access" to current online catalogs. The current one-call-number-per-item policy will have an adverse effect on recall in online searching.

PARTICULAR STRENGTHS AND WEAKNESSES OF LCC IN ONLINE RETRIEVAL

LCC as Enhanced Vocabulary

Analysis of the findings of the DDC project suggests that much of the increased effectiveness of the DDC-enhanced catalog was due to its enlarged entry vocabulary—searchers could get into the system through terms from DDC's *Relative Index* and from its schedule captions and notes. With some overlap, different records were retrieved with classification-based terms than with keyword or alphabetical subject approaches.¹² This conclusion leads one to ask whether mounting LCC schedule captions and index entries in the online catalog could also increase search effectiveness and to what degree. Several aspects of LCC's vocabulary are worth exploring in this regard.

Terminology

Looking at the Library of Congress's subject apparatus as a whole, we see an enormous variety in terminology. In the 1971 study mentioned earlier, Immroth deplored the diversity of the sets of vocabulary used in *Library of Congress Subject Headings* (LCSH) and in the LCC schedules and indexes: "There is the vocabulary of the classification schedules, a different vocabulary of the subject headings, and even a third vocabulary of the classification index."¹³ He proposed melding the three vocabularies into one by means of chain-indexing. Such a unification would no doubt have great value for classifiers and catalogers, making their work easier. On

the other hand, were classification and subject heading terms the same, there would be nothing gained from mounting the former in the online catalog. It is the diversity and richness of terminology that holds promise in improving online retrieval.

A study that Phyllis A. Richmond carried out in 1974 is relevant here. She selected terms related to *computer* and *computers* from LCSH and from the indexes and schedule captions of both LCC and DDC—and found "surprisingly little overlap among the various sources."¹⁴ If such a large diversity exists among terms for a relatively new and unambiguous topic like computers, the range may be considerably greater for older, less well-defined areas.

The reports on almost all recent online catalog studies have noted a great need for more entry points to subject access systems. The rich variety among terms from the LCC schedules and indexes suggests that LC classification tools have high potential as sources for enriching entry vocabulary.

Nature and Number of Terms

The LCC captions and index entries include a great number of proper names—particularly personal, corporate, and geographic names—in addition to subject terms. And, as was noted earlier, the sheer number of terms in the schedules and indexes is very large. In 1961, Leo LaMontagne estimated that "a combined index would constitute a volume of approximately 1,000 pages containing 100,000 entries, excluding the law index entries."¹⁵ Twenty-five years and seven law schedules later, it would not be surprising if the number of index entries had doubled. When these entries are incorporated into the online catalog and linked to the LC numbers on MARC records, the access points to individual records should be greatly enhanced. Studies are of course needed to determine the degree of improvement that can be expected from such an enhancement, but simple extrapolation indicated that it should be considerable.

Syntax of Schedule and Index Entries

The captions and index entries of a classification scheme are necessarily different in syntactical structure from descriptors or subject headings. The main difference is that, implicitly or explicitly, individual en-

tries in classification schedules and indexes contain broader terms in addition to terms that denote the specific topic at issue. Many individual schedule captions and index entries are meaningless or ambiguous unless understood in conjunction with supervening captions that provide proper context for individual terms. This can be seen from the following list of merged index entries (from several LCC schedules) for the subject *Gold*, where the names of disciplines or broader subjects are given as contextual terms:

Gold:

Assaying: TN580.G6
 Chemical technology: TP245.G6
 Ethnology: GN436.3
 Inorganic chemistry: QD181.A9
 Metallurgy: TN760-769
 Milling: TN762
 Mining: TN410-429
 Prehistoric archaeology: GN799.G6
 Prospecting: TN271.G6
 Standards of fineness: HD9747
 Therapeutics: RM666.G7
 Toxicology: RA1231.G6

Furthermore, many LCC index entries are qualified by a broader term for the purpose of distinguishing between homographs or defining the scope or perspective of the specific subject. A list of examples showing these bilevel LCC index entries with their closest corresponding LC subject headings is given in figure 1.

Online catalog studies have repeatedly found that users often enter terms that are broader than the subject they have in mind.¹⁶ The bilevel entries in LCC's indexes may be just what is needed to help these users.

Links Between Subject Headings and Class Numbers

It has often been suggested that LCSH could serve as a substitute for a general LCC index because it gives LCC numbers after many subject headings. These numbers, which are included in LCSH as an aid to catalogers, could also have some value for searchers. Particularly, when a given heading is followed by several class num-

<i>LCC Indexes</i>	<i>LCSH</i>
Macadamia nut (Gardening): Z5996.M3	Macadamia nut
Locking up (Printing): Z255	Locking up (Typography) See Printing, Practical—Imposition, etc.
Perceptron theory (Cybernetics): Q327	Perceptrons
Phosphorescence (Radiation physics): QC477.8-478	Phosphorescence
Periods, Sunspot (Geomagnetism): QC836	Sun-spots
Obligations (Conflict of laws): KF418.C6	Conflict of laws—Obligations
Oath (Witnesses): KF8954	Oaths
Rigging (Field engineering): UG390	Rigging See subdivision Rigging under subjects, e.g., Airplanes—Rigging
Ordnance tests (Artillery): UF890	Ordnance testing
Block and tackle (Field engineering): UG390	???
Tracklaying tractors (Gun carriages): UF652	Tracklaying tractors See Crawler tractors
Amulets (Folklore): GR600 +	Amulets
Albinism (Human variation): GN199	Albinos and albinism
All Soul's Day (Manners and customs): GT4995.A4	All Soul's Day
Geysers (Groundwater): GB1198.5 +	Geysers
Megalithic monuments (Prehistoric archaeology): GN790	Megalithic monuments
Tundras (National landforms): GB571 +	Tundras

Figure 1. Bilevel Index Entries

bers to indicate different perspectives, it can act as a relative index entry that brings distributed relatives together. But under current conditions, not much can be expected from depending on LCSH as an LCC index-substitute. Only a small proportion of LC subject headings carry class numbers, and even these are not routinely updated in the case of changed numbers. How useful LCSH/LCC links could be were the connections more nearly complete, and if they were fully maintained, is a question that deserves attention.

LCC in Online Subject Browsing

There are several different modes of online subject browsing through classification. One is shelf-order browsing. That sort of browsing is already a reality in any online system that can display bibliographic records in call number order. Most current systems can do so. Shelf-order browsing enables the display of bibliographic items in classified order, an advantage not provided by the manual, alphabetical subject catalog.

Another way is full-schedule browsing. This is, of course, only possible for schedules that exist in machine-readable form. It was noted earlier that machine conversion of the LC classification schedules would be a major undertaking because of the sheer size of the schedules. There are, however, no conceptual nor technical problems to be faced.

The third kind of browsing is the subject outline browsing that was implemented in the DDC project. There, searchers could see arrays of coordinate subjects without their intermediate breakdowns. The programming that made this possible was based on manipulating the digits in DDC's hierarchical notation. Were the total conversion of the LCC schedules a reality, the capability of viewing them online would still only enable browsing of chains (i.e. superordinate and subordinate subjects as laid out in the printed schedules) but not arrays of coordinate subjects. Because of LCC's nonhierarchical notation, a quite different approach will be needed to generate outlines of coordinate subjects for browsing. Pauline A. Cochrane and Karen

Markey proposed the device of nesting classification records.¹⁷ This method requires that, for each class number, all class numbers and captions broader than the number in question be extracted from the schedule and then recorded and encoded on the class number record.

There is another possibility for subject outline browsing in LCC that has not been explored before. The topic/subtopic breakdowns in LCC schedules—in other words, hierarchical breakdowns—are indicated by indentation of the schedule captions. These indentation levels could be coded numerically, as shown in figure 2, with the codes recorded on the classification authority record for each class number. With such codes, each level of the hierarchy could then be collocated and displayed in subject outline form.

A general point about class number browsing and searching is appropriate here. Often, the way a particular classification scheme organizes knowledge is important in how easily a given search requirement may be met. One example comes from the field of literature, which can be scanned by genre in DDC or by author in LCC but not the other way around. Correspondingly, LCC organizes law by jurisdiction while DDC (in its preferred treatment) collocates law first by legal topics. In either case, one or the other scheme is preferable depending on what is wanted. Such differences in approach mean that it could be a great advantage to users of an online catalog with records that carry both DDC and LCC numbers; they have the option of browsing cataloging records collocated in a way different from that in which materials are organized on the shelves of their particular library. Searchers would have the equivalent of two classed catalogs in one.

LCC in Call Number Searching

Searching by call number or class number is already a reality in online catalogs. We noted earlier that LC call numbers are especially effective in known item searching because they are unique to particular works and are uniform across databases. In contrast, LCC is a fairly weak base for

R	① MEDICINE	RM
	② THERAPEUTICS. PHARMACOLOGY	
	Administration of drugs and other therapeutic agents	
	For therapy for specific diseases, <i>see</i> the disease	
147	③ General works	
149	④ Parenteral medication	
	Cf. RM224, Parenteral feeding	
151	④ External medication	
	Cf. RM819 + , Balneotherapy	
	RM884, Iontophoresis	
161	④ Inhalatory medication	
	Cf. RA975.5.15, Inhalation therapy services in hospitals	
	RC735.15, Inhalation therapy	
	RJ 53.15, Pediatrics	
162	④ Oral medication	
163	④ Rectal medication. Enemas	
169	④ Hypodermic, intradermal, and intramuscular medication	
	Infusion. Transfusion	
	Including intravenous therapy	
170	④ General works	
	⑤ { Blood transfusion	
	Cf. RB45 + , Examination of the blood	
171	General works	
.5	⑥ Blood coagulation factors	
172	⑥ Blood banks	
.5	⑥ Bloodmobiles	
175	⑤ Plasma transfusion	
	General works	
176	⑥ Plasma banks	
178	⑤ Infusion of glucose, saline solution, amino acids, etc.	
180	⑤ Peritoneal transfusion	
	[3] Other therapeutic procedures	
182	④ Blood letting. Leeching. Venipuncture	
184	④ Cupping. Acupuncture. Artificial hyperemia.	
	Mustard plasters	
	Cf. RM 723.A27, Acupressure	
186	④ Pneumatic aspiration	
188	④ Spinal puncture. Cisternal puncture. Ventricular puncture	
190	④ Pericardial puncture	

Figure 2. Coding of Hierarchical Levels¹⁸

open-ended subject searching. In some cases useful groups of items may be retrieved by searching on class number alone or on class number plus first Cutter number, but LC class numbers cannot be used to broaden or narrow a search by adding or deleting digits as can be done with DDC.

DDC's hierarchical notation allows for this sort of manipulation. For example, in searching by geographical subdivision, an area notation such as -77156 (Franklin County, Ohio) may be manipulated to different levels. In LCC, the closest thing to this sort of capability are the Cutter num-

bers used for geographical subdivision. Unfortunately, these numbers are not hierarchical or even constant (for instance, *United States* may be represented by U5 or U6 or any number in between) and therefore cannot be used effectively for searching hierarchically.

LCC as a Complementary Tool

It has been amply demonstrated that free-text (keyword) searching alone, with all its power, is not fully effective as a retrieval mechanism: false drops and "information overload" (too many records being retrieved) are all too common. Controlled vocabularies are accepted as the key to improved precision and in some cases improved recall. Through combination, keywords and the vocabularies of DDC, LCC, and LCSH should offer far greater possibilities in search strategies than any one of them can provide alone. Because classification collocates related material in ways different from those provided by the alphabetical (keyword or subject heading) approach, it has been demonstrated in the DDC project that different records on a particular subject could be retrieved by using the classified approach from those retrieved by the alphabetical approach.¹⁹ Table 1 shows a test search for titles on the subject of sports medicine related to running performed on the LCMARC database in WILSONLINE using keywords, subject headings, and LC class numbers. The results indicate that, indeed, different search parameters yield different citations because keywords, subject headings, and class numbers collocate titles (or slice the file) in different ways.

Search success must be considered in both recall and precision, each of which may be affected in a quite different way by any one search approach. It is instructive to consider how these measures might vary, if class number searching were an available search option.

Recall

During the early days of the LC automated program, John C. Rather conducted a study comparing the relative efficiency of

DDC and LCC numbers for machine retrieval in broad subject areas.²⁰ He found DDC to be much more efficient: in one case it took 241 LCC numbers to get documents equivalent to those that were retrieved on only five DDC numbers. Thus, both Rather's study and the recent DDC project showed DDC to be particularly effective in broad searches. But there are some instances in which LCC would be efficient for broad searches also—the situations, discussed above, in which LCC's organization of topics is particularly suited to the need at hand. The field of law is a case in point. The columns shown in table 2 record a search for material on the laws of Ohio, which was performed on the LCMARC database through WILSONLINE. The records shown were retrieved using the range of LC class numbers KFO 0-599. Subject headings for those records are included to show their topical range.

Among end users, the need for broad searches is apparently not very high. One finding of the DDC project, for instance, is that few users asked to display records when they learned that the retrieved set exceeded 200 titles.²¹ However, in SDI (Selected Dissemination of Information) services and in downloading subsets of large databases, it is important to be able to retrieve a large number of related records efficiently. For those purposes, class number search may be much more efficient than either keyword or subject heading searches. In databases that carry both DDC and LCC numbers and perhaps numbers from other classification systems as well, searchers have a wide choice of search parameters. They may use any one of them, or more than one in combination or complementary to each other, according to their individual search requirements.

Precision

In many subject areas, LCC may be especially effective as a precision device. Speaking at a program for the Library of Congress staff, Cochrane made the following observations:

Experience has demonstrated . . . that a combination of subject terms can only pull out information on those topics specified by the user, it can-

Table 1. Sports Medicine with Regard to Running

Title	Search statement (posting)	sports AND medicine AND runn: (10)	sports medicine (SH) AND runn: (7)	running— physiologi- cal: (SH) (15)	running— accidents: (SH) (16)	RC1220.R8: [sports medi- cine—running] (12)	RC1220.M35 [sports medicine— marathon running] (2)
1. <i>The Encyclopedia of Athletic Medicine</i>		x	x	x	x	x	
2. <i>The Physician and Sportsmedicine Guide to Running</i>		x	x	x	x	x	
3. <i>Running without Pain</i>		x	x	x	x	x	
4. <i>The Runner's Complete Medical Guide</i>		x	x	x	x	x	
5. <i>How to Prevent and Heal Running and Other Sports Injuries</i>		x	x	x	x	x	
6. <i>Health Aspects of Endurance Training</i>		x	x	x	x	x	
7. <i>Dr. George Sheehan's Medical Advice for Runners</i>		x	x	x	x	x	
8. <i>The Runner: Energy and Endurance</i>							
9. <i>Cures for Common Running Injuries</i> . 1979							
10. <i>Running Healthy</i>		x		x	x	x	
11. <i>Conditioning for Distance Running</i>							
12. <i>Diet of Runners</i>							
13. <i>The Runner's Handbook</i> . 1978							
14. <i>Running into Trouble</i>							
15. <i>Symposium on the Foot and Leg in Running Sports</i>							
16. <i>Running without Fear</i>							
17. <i>Keep Running</i>							
18. <i>Science and Sporting Performance</i>		x					
19. <i>Marathon Running</i>		x					
20. <i>Cures for Common Running Injuries</i> . 1984							
21. <i>The Runner's Handbook</i> . 1985							
22. <i>The Injured Runner's Training Handbook</i>							
23. <i>The Runner's World Knee Book</i>							
24. <i>Running</i>							
25. <i>Prevention and Treatment of Running Injuries</i>							
26. <i>The Runner's Repair Manual</i>							
27. <i>Jogging</i>							
28. <i>Hidden Causes of Injury, Prevention and Correction for Running</i>							
29. <i>A Scientific Approach to Distance Running</i>							x

Table 2. *Titles on the Laws of Ohio Retrieved by Using LC Class Numbers*

Title	Law of Ohio (KFO 0-599)	Subject Headings
1. <i>Ohio Landlord Tenant Law</i>		1. Landlord and tenant—Ohio.
2. <i>Real Estate V: Ohio Legal Center Institute</i>		1. Real property—Ohio—Compendis.
3. <i>Real Estate VI</i>		1. Real property—Ohio—Compendis.
4. <i>The New Ohio Parentage Act</i>		1. Paternity—Ohio. 2. Acknowledgment of children—Ohio. 3. Paternity—Ohio—Forms. 4. Paternity testing.
5. <i>Ohio Divorce, Annulment, Alimony, Dissolution, and Child Custody</i>		1. Divorce—Law and legislation—Ohio. 2. Separation (Law)—Ohio. 3. Alimony—Ohio. 4. Custody of children—Ohio.
6. <i>McDermott's Handbook of Ohio Real Estate Law</i>		1. Real property—Ohio.
7. <i>Ohio Real Estate</i>		1. Real property—Ohio. 2. Vendors and purchasers—Ohio. 3. Real property—Ohio—Forms. 4. Vendors and purchasers—Ohio—Forms.
8. <i>Report of the Ohio Land Use Review Committee to the Ohio General Assembly</i>		1. Regional planning—Law and legislation—Ohio. 2. City planning and redevelopment law—Ohio. 3. Zoning law—Ohio. 4. Land use—Ohio.

not provide an organized list of citations to works on integrally related topics that have not been specified by the user, nor can it eliminate all works that do not treat the subject from the desired perspective.²²

On the same occasion, John Comaromi remarked:

A catalog arranged by subject headings brings together in alphabetical order works on a particular topic without regard to the perspective from which the works are written. Books on frogs will be found in the subject catalog under that term whether they concern the anatomy or physiology of frogs, the culinary preparation of them, or their enjoyment as pets. The traditional subject catalog also scatters related works on tadpoles and toads alphabetically so that they will appear far away from "frogs" with completely unrelated works whose subjects begin with "t" such as "tanks" or "tobacco."²³

Elaine Svenonius made a similar point in her paper "Use of Classification in Online Retrieval." She observed that through the use of classification, "by contextualizing vague words, such as *freedom*, within perspective hierarchies, the computer might guide a user from an ineptly or imprecisely articulated search request to one that is quite specific."²⁴ The DDC project has con-

firmed these claims; in its retrieval experiments, precision was improved when searchers focused on a particular perspective through the use of class numbers.

It appears that LCC offers an advantage over most other classification systems for certain narrow searches. This is due to the same characteristic that is a detriment in using LCC for broad subject searches: in some subject areas, LCC has many more discrete class numbers than are found in other systems. These numbers all designate different aspects or perspectives that may serve as an element for refining a search. Such a capability can be particularly useful in dealing with common topics. For example, consider the topic "*gold*." In keyword searching, *gold* will retrieve an enormously large set of records including many false drops. Use of the subject heading *gold* will eliminate many irrelevant records but will still retain a relatively sizeable set. But by using appropriate class numbers, a searcher will be able to retrieve records on the subject *gold* treated from a specific perspective, such as *gold* in investment, *gold* as jewelry, or *gold* as a chemical element.

In respect to precision, then, the use of LC class number searches may be effective

in many search situations. Their potential is highest for common subjects that are likely to have very high postings or be treated from different perspectives.

IMPLEMENTATION

Throughout, the above discussion has called attention to problems likely to arise in incorporating LCC features as search options in today's online catalogs. It was noted that some of them are conceptual but that most are straightforward, with resources the major stumbling block to their solution. What must happen, and in what order, if LCC-based search options are to become a reality in online catalogs?

Naturally, any plan for such incorporation must rest on a thorough course of research and experimentation; that is the first step. A second step—assuming that such research confirms the conjectures put forward in this paper—is to prepare a full index to LCC's set of schedules. This step has two parts: preparing indexes to those schedules that lack them and correlating the separate indexes to form a whole. A third is to get all of LCC, schedules and full index both, into machine-readable form. A fourth is to write the programs to make LCC's most promising features available to online searchers.

There is no doubt that bringing LCC search options online would require enormous resources. Even the essentially clerical step of putting existing LCC material into machine-readable form would be costly, because of the sheer volume of material involved. The other steps pose considerable intellectual demands as well. Much of what needs to be done, however, falls into the category of "things we already know how to do." Furthermore, completing and integrating LCC's index apparatus, and getting the system into machine-readable form to facilitate maintenance, are both steps that would also greatly improve LCC as a cataloging tool—in other words, would make it more efficient in its current use.

CONCLUSION

Online searching is essentially a process of extracting a subfile of useful documents

from a large file. Searchers submit terms or term strings as search statements in the hope of retrieving documents that meet their search requirements, documents whose contents are relevant to their subject interests. Their search statements determine the parameters of the sets they retrieve; in most cases, a sequence of search statements is required for even minimally satisfactory retrieval. Overall, success rates are not very high; online catalog use studies bear witness to the fact that our subject access arrangements fall far short of fulfilling the potential of the online catalog. Improvement is needed, urgently needed, in the light of how fast the MARC database is growing.

Supplementing current subject retrieval provisions with access points derived from classification schemes offers great promise here. Apparently, our most pressing need is not simply for more or even better access points of the same kind—more keywords from text, revised subject headings. Rather, we need additional *kinds* of access points, additional *ways* of approaching knowledge. Classification schemes can provide a fresh approach. Making use of them would be tantamount to reintroducing the advantages of the classed catalog into information retrieval.

The DDC project provides experimental evidence that at least one classification scheme, the Dewey Decimal Classification, can enhance retrieval. This paper has focused on the Library of Congress classification system's potential for online retrieval. Armchair analysis of LCC—all that is possible until at least selected segments of LCC are in machine-readable form—indicates that it has many possibilities in this context. Furthermore, in many respects, LCC and DDC act as complements, each filling lacunae in the other.

One of the great advantages of the online catalog environment is that access provisions need no longer be either/or propositions. The question now is, how can we make the best use of our full battery of bibliographical access tools, with classification and the alphabetical approach used together to complement one another?

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Policies for Microcomputers in Libraries: An Administrative Model

John K. Duke and Arnold Hirshon

The introduction of microcomputers should be accompanied by sufficient planning or guidelines. Microcomputer policies, which are becoming prevalent in the corporate world, are not widespread in libraries, but are clearly needed. This article examines the need for microcomputer policies in medium-size to large academic libraries. Key issues that should be covered in such a policy are set forth, including the establishment of rules for acquisition and use, compatibility of hardware and software, and the need to prevent redundancy of effort. A model policy that reflects these decisions is presented in appendix A.

INTRODUCTION

Although microcomputers are being used increasingly in libraries to accomplish a variety of administrative and bibliographic functions, all too often their introduction is not accompanied by proper planning and policy development. A 1984 SPEC Kit survey indicated that 87 percent of the Association of Research Libraries (ARL) members responding did *not* have a central library policy for staff use of microcomputers.¹ The corporate world, more accustomed to dealing with large data-processing environments, has already moved aggressively toward the management of microcomputers and the data stored through them.²

For libraries, there can be two types of policies. One type articulates guidelines for patron use of microcomputers, while the other covers internal systems that assist staff in completing their work, such as word processing, use of the microcomputer for database searching, or the maintenance

of statistical data. Only policies for latter staff or administrative use are covered in this article.

To a large extent, what should be included in a policy on microcomputers will be determined by the circumstances of the individual library. A microcomputer policy should establish rules for acquisition and use, ensure compatibility of hardware and software, prevent redundant efforts, and allow the library to manage the systems rather than be managed by them. Size of institution, organizational complexity, budgeting restrictions, traditional patterns of the hierarchy, and individual temperament of the staff will all have an effect on how a library structures its policy.

In this article, we explore the need for medium-sized or large academic libraries to develop a staff microcomputer policy. Following this discussion, we examine only the major concepts that a library should consider before developing its own policy. Finally, based upon the authors' experience

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in managing the installation and operation of a large number of microcomputers, we present, in appendix A, a model policy appropriate for medium-sized to large academic libraries. This model incorporates the concepts elucidated in the article, as well as other more specific issues.

Small or nonacademic libraries may find that many of the issues addressed are applicable. The policy is "model" not in the sense that it is the ideal or perfect, but that it provides a general structure for decisions from which a library can begin its own policy. The level of detail and types of solutions may vary among institutions.

Even if an institution already has acquired significant numbers of microcomputers, it is still in its best interest to develop a policy to control use. With the quickening pace of technology and increasing demands on the library, most institutions will continue to acquire microcomputers; having a policy in place will ensure their orderly procurement and application.

POLICY DEVELOPMENT: NEEDS AND BENEFITS

The bedrock of any strategy for personal computers is a policy statement. It clarifies the issues of who does what and defines an active role for both [the systems department] and users. . . . Lack of policy from the top too often produces short-term gains at the cost of long-term fragmentation. . . . The key issue is to clarify responsibilities and establish incentives for all parties.³

Although they are writing in the context of the corporate world, Keen and Woodman provide four main principles that are applicable to libraries. First, the management of microcomputers requires coordination, not control: "Innovation without discipline almost guarantees future problems."⁴ Second, management must recognize that microcomputers are only one part of the computer resources of the organization, and that they must be integrated to provide the optimum solution to problems. Third, the systems and procedures for larger computers can be applied to microcomputers, with appropriate allowances made for the difference in use patterns and technology. Finally, Keen and Woodman suggest that microcomputer applications

be evaluated rigorously to guarantee that the effort justifies the expense.

Several librarians have stressed the need for written microcomputer policies. Walton states that written policies should be developed to manage scheduling, logging, problem resolution, and personal use guidelines. In part the policy is designed to curb the worst excesses of the "positive/ultraistic" type of individual who finds in the microcomputer the solution to every library problem.⁵ Because an application *can* be developed on the microcomputer does not mean it *should* be. The policy should clearly outline the appropriate uses of the microcomputers and give guidelines for their development and application.

Mason speaks of "two levels of management: *policies* that govern the acquisition and use of the micros and *procedures* that regulate the day-to-day operation of the micros."⁶ For example, policy is concerned with the broader issues of procurement, training, and implementation, while procedures focus on matters such as scheduling, access, data backup procedures, and file-naming conventions.

A policy may be developed from several sources within the library. It may be a delegated task to an individual who has the necessary expertise, or it may be developed by the library director, by a committee, or by a department. Regardless of the source, the library should strive for consensus on the key issues. To guarantee the success of the policy, the library administration first must be in solid agreement, and then provide the necessary enforcement.

The purpose and goals of the policy should be clearly articulated to avoid having the policy become restrictive. The resulting goals statements may be different depending upon the library. For example, a large library may require a stricter accounting of the projects to be mounted on a microcomputer because of the number of people that may be involved. A library with numerous microcomputers will probably be very concerned with establishing protocols for the interchange of data. If the microcomputers are connected in a network, the library may need to concentrate on developing policies for maintaining equipment and data. A highly decentralized li-

brary system with autonomous branches may decide there is less need for shared data, and therefore may grant the units more flexibility regarding purchases.

The type and extent of training available to the staff may affect decisions about the policy. Good training, or limiting the number of staff who may use the microcomputers, may eliminate the need for some explicit procedures. A staff that is encouraged to use the microcomputers will need a policy that is loose and flexible, while a staff that has restricted access to the machines will need tighter controls.

The automated environment in which the microcomputers operate will have a tremendous impact on the structure of the policy. A library with some bibliographic functions provided, or soon to be provided, on a large centralized system should make certain that these functions are not subverted by mounting redundant systems on the microcomputer. If a library has an automated system for cataloging materials, for example, it should resist the demand to allow material to be "temporarily" cataloged on the microcomputer, even if this is done in the name of a bibliography, listing or inventory of library materials. If data redundancy is allowed, it will likely lead to problems of data incompatibility, storage and updating, and lack of centralized control.

The level of knowledge of microcomputers in the library will affect the decisions a library makes. An established systems department should provide a central source for decision making and control. The systems department may be able to provide the support necessary for local programming, whereas a small library may want to eliminate programming altogether and rely solely on packaged programs.

A well-developed policy should cover all the areas that would be covered in any policy, such as the goals, scope, and principles of the policy, a description of the sources of authority and paths for making decisions, and requirements for expanding the policy. After the policy is adopted there should be a regular mechanism and timetable for review.

After the library has determined the goals and principles it will follow in con-

structing its policy and has identified the environment in which the computers will operate, it should address how it will manage the equipment and software and what will be the responsibilities of the users. In the policy, some issues will be "non-negotiable." An example would involve the copyright restrictions on software. There should be a strongly worded statement that it is the library's policy not to infringe on copyrighted software. This is both a matter of institutional practice (i.e., the library should not purchase one copy of a software product and then distribute multiple copies to reduce costs) and of individual behavior (there should be a clear understanding on the part of the users that infringement of copyright will lead to disciplinary action).

In most matters of policy, however, there is far more freedom for local decision making. What follows in the next section is an examination of the broad issues to be covered by a policy, divided into two categories. "Procurement and implementation" issues include the purchase of hardware and software, training, commercial programs and local programming, and hardware and software maintenance and support. "Organizational and data issues" include allocating microcomputers, use of microcomputers versus other data systems, and data administration. The model policy in appendix A reflects the choices that a library made as a result of its consideration of these issues.

PROCUREMENT AND IMPLEMENTATION ISSUES

Purchase of Hardware and Software

Before purchasing any hardware or software, a policy should be in effect that requires standardization of hardware and software within the library. For example, a library should choose to purchase only IBM PCs or Apples, Word Perfect or Multimate. The only exception should be when it is clear that the microcomputing industry as a whole has shifted to another standard. This may sound inflexible, but it is not. Standardization eliminates the need to learn each new microcomputer or software package. Further, sharing data on disk among staff members is enhanced by not having to go through cumbersome conversion routines from one data format to another. Fi-

nally, the library will not have to maintain supplies for different hardware or have peripherals that do not work with all hardware.

After the initial purchases, there will be many requests for upgrades and additions, from optical disks to the latest version of software. The decision-making path for such purchases should be clearly articulated before the requests start. Purchasing microcomputer equipment is a complicated and time-consuming process best centralized within one department or with an individual. Those who bear central responsibility should have some authority to determine whether the request is necessary, desirable, or frivolous and to place valid requests into an appropriate purchasing queue. This authority may not be final; however, the policy should specify both the role of the reviewing body and who makes the final decision.

The dynamic nature of the computing marketplace creates a situation where few can stay abreast of the latest developments. By centralizing purchasing responsibilities, the library will avoid having to build redundant technical competence wherever microcomputers are housed. Proper interfacing of equipment will also be assured. Centralization should also help minimize the intrusion into staff time that university or state regulations will require. In addition, as Straube notes, "A centralized approval process ensures that users only purchase equipment which adheres to the standards set by MIS [management information systems department]."⁷

Different steps may be necessary for purchasing hardware, software, or supplies. The specialized nature of microcomputer supplies, as well as the opportunities for bulk discounts, will probably warrant centralized purchase and distribution. This also allows for monitoring the consumption of the supplies (and therefore the use of the microcomputers themselves). If, for example, one department is asking for an inordinate number of diskettes each week, the central depot may begin to ask whether the requesting department knows how to organize and maintain files on diskettes.

Training

The general philosophy of microcom-

puter training within the library should be developed as early in the process as possible, and the policy should articulate the library's philosophy on training (both the initial and continuing education). There is some value to providing many people in the library with some basic understanding of microcomputers, but it also must be recognized that this takes time, especially for new employees. Supervisors should coordinate who will be trained and not allow employees to decide for themselves.

The library should require staff as a matter of policy to have some proficiency before being allowed to use the microcomputers. This certification is necessary because there is too much potential for damaged hardware or software, such as diskettes being inserted backward or software diskettes being erased by inadequately informed operators. Training may not prevent all problems, but it should still be advocated as the best way to help avoid them.

The relationship needs to be explored between initial training when the microcomputers are first introduced and the need for periodic training or review sessions. There are multiple ways of disseminating training information, such as a library microcomputer user group or a column about microcomputers in the staff newsletter. Through the policy, a library should not only ensure that new employees receive training, but should also identify the persons or departments that it believes are best able to handle this responsibility.

A library should decide whether it wants to have a very formal in-house training program, whether the training philosophy will be do-it-yourself for each user, or whether the library will sponsor attendance at on- or off-campus microcomputer workshops. When the pressure comes to purchase expensive online tutorials or videotapes, or to attend two-day workshops on Lotus 1-2-3 for \$695, the library should have a policy to call upon to note what the training mechanisms will be for all library staff.

Commercial Programs and Local Programming

A software review mechanism should be provided to evaluate requests for new or updated commercial software or for re-

quests for local programming. Local programming requests in particular must be balanced against an objective review of what is available in the marketplace.

Before mounting any new function on a microcomputer, the normal steps of systems analysis should be followed, even when there is software already owned by the library to perform the function. This analysis should include the nature of the problem, the data elements (input and output) required, recommended hardware or software, any alternatives available and why they were not recommended, and the possible use of the hardware or software by other library departments.

Evaluation criteria should include whether the microcomputer is the best method for accomplishing the goal, and if so, whether there is existing software that accomplishes the function properly. In addition, the cost and expected benefit of the software and the degree of compatibility with existing hardware and software should be considered. Above all, the evaluator should concentrate on the *problem*, even when the requester proposes a specific software *solution*.

Local programming on microcomputers has its place, but libraries must be careful not to reinvent the wheel when a servicable package is available. Forty-one percent of the ARL libraries responded that someone in the library had designed software.⁸ Programs should be written because there is nothing worthwhile out in the marketplace, not because a staff member says he can or she wants to write a program. The microcomputer has brought with it the "weekend BASIC programming jockey." Suddenly everyone is an expert programmer. The problem is that when the "expert" leaves the library, the specifications for the program will probably go with the employee and maintenance may become impossible. If local programming is to be performed, the policy should require that the program cannot be implemented until it conforms to library programming standards. As Keen and Woodman have noted:

The presence of amateurs who don't know what they don't know poses further problems. Financial analysts, for instance, who have successfully used simple software packages may try to write more complex programs without understanding

the niceties of system definition, design, testing, operation, documentation, and maintenance—all this when information systems departments have backlogs. . . . As a result, they cannot divert resources to pick up the pieces.⁹

Requests for programming might be handled in one of two ways. If there is an in-house systems department, it might be desirable to limit programming to that department. If there is not a separate department, or if there is a strong need or desire from staff outside the department to perform programming, the policy should make clear that the programming must conform to prescribed standards of testing and documentation. If the expertise to develop such standards does not exist within the library, seek outside assistance, such as from the university computation center.

Hardware and Software Maintenance and Support

Purchase of hardware and software brings with it the obligation to provide ongoing maintenance and support. Staff should not be made to fend for themselves; some staff will do well, but others will not. The library policy should articulate who bears the responsibility for providing assistance when necessary and seeing that the necessary maintenance for the machines is provided.

ORGANIZATIONAL AND DATA ISSUES

Allocation of Microcomputers

With the introduction of microcomputers into the library, every department will clamor to have one (or more) of its own. Organizational politics and territoriality often take precedence over logical decision making, and microcomputers will be no exception. Unfortunately, libraries are not like Fortune 500 companies, which have long had more microcomputers than they could reasonably even count.¹⁰ It is imperative, therefore, that the microcomputers receive as much use as possible and that the policy requires a mechanism to evaluate periodically whether the microcomputers are receiving their maximum effective use.

The policy should address how the microcomputers initially will be allocated and then provide a periodic review so maxi-

mum use will be made of the probably scarce resource. The review should be based upon objective, clear, and predetermined criteria. This review mechanism may be either part of the main policy, or the main policy may simply refer to a separate guideline.

Microcomputer Versus Other Data Systems

Stand-alone microcomputers likely are not the only computers or computer-related hardware in the library. There will be terminals for bibliographic utilities, in-house minicomputers, or links to the university computers. Some staff may unknowingly seek to mount applications on the microcomputer inappropriately because the microcomputer is available or easy to use. If the application is not carefully considered, there may be problems of databases that are too large to mount on a microcomputer, data that does not integrate with a larger system, or data that must be manually rekeyed into another system.

Data Administration

An effective policy should take special note of microcomputer databases. Here we draw a distinction between "databases" and "documents" (or "files"). A document is created through a word processing or a standard spreadsheet program and is not easily amenable to manipulation in more than one way. A database is a specialized type of file that can be manipulated automatically to yield various types of online and printed outputs. Databases are powerful tools that are easily misapplied if they are misunderstood. The microcomputer policy should provide for a review mechanism for projects so that dBase III will not be gerry-rigged into a departmental online catalog or Lotus 1-2-3 into an acquisitions system. As Durell has noted, "If physical database systems are built without regard to an overall plan, the databases will reflect the same data incompatibilities, inconsistencies, and redundancies of the data structures they are replacing."¹¹

Only recently have the creation, storage, and retention of data on magnetic medium

received much attention. Joel Zimmerman notes that:

1. We are losing critical data because of the lack of proper backups.
2. We are disclosing sensitive data because they are being left exposed and unprotected from theft.
3. We are subjected to invalid and unreliable information because we fail to install quality-control mechanisms.¹²

When floppy disks are used for storage, it is common for staff members to hold their own disks; however, if this is done, files on those disks may not be available when needed, such as when the staff member is on vacation or leaves the employment of the library. Collective storage of floppies, on the other hand, raises fears about data confidentiality. The confusion that ensues when each staff member adopts a different scheme for organizing files is also a problem; sloppy floppy files are just as bad (or worse) than the traditional filing cabinet packed with unnecessary paper.

While floppy diskettes are still a dominant medium for storage, the cost of mass storage has plummeted over the past year and will soon become prevalent in libraries. If floppy disks are trees, hard disks are forests. Shared hard-disk storage brings its own set of problems, including disk organization, the need for backup, archiving and purging of data files, maintenance of confidentiality of data, scheduling, and system response time. Zimmerman writes that "the most overwhelming pc security problem is loss of critical data because of inadequate backups. The major culprit is the internal hard disk."¹³

As may be seen from the data administration section of the model policy in appendix A, data administration gets to the intellectual heart of how and why the microcomputers are used. Staff are likely to feel that the library should not impose policies that state what may be placed into a computer file. Such policies, however, become more important the longer the microcomputers are in use because the size and number of data files throughout the library will grow at a staggering rate. Like a checkbook that has not been balanced for a few years, unresolved data problems left alone

will rapidly lead to an unmanageable situation where the only option will be to start over.

CONCLUSION

Whenever a new technology is introduced, a reasonable period of experimentation should be allowed before standardization is imposed. In the case of microcomputers for staff use in large and medium-sized academic libraries, we have gone from experiment to establishment in a very short period of time. With this transition comes the responsibility of the organization to impose some order as to how the technology will be employed, and by whom. By coming to a policy agreement, the library will undoubtedly avoid misunderstandings about appropriate use and will also ensure that necessary tasks are accomplished by those who are best able to accomplish them.

Once the library has agreed that a policy is needed, it must decide what should be in-

cluded. Although there are many topics that might be considered for inclusion, there are some broad topics that a successful comprehensive policy should encompass. These topics include purchase and allocation decisions, training, software and programming, maintenance, acceptable use, and data administration. In appendix A we present a model policy that reflects the choices that a library has made after it has fully considered these issues.

When purchasing microcomputers, the library should bear in mind that the cost of the hardware is often only a small portion of the total cost. The machines must be supported with adequate software packages, updates, supplies, and training. Microcomputers will change the work force and their work habits. A microcomputer policy should predict this and project forward thinking. Ultimately, the policy should not simply reflect the way things are, but rather, what should be the preferred organizational practice.

REFERENCES

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APPENDIX A. MODEL POLICY ON MICROCOMPUTERS

I. Scope.

This document is a policy for use of microcomputers by library staff to support their work responsibilities and to improve administrative efficiency and effectiveness. This includes use for professional projects (such as preparing articles for publication, use for research and experiments, work for professional associations, etc.).

The policy is not intended to affect use of microcomputers by library patrons in public areas or for use of bibliographic utility smart terminals.

II. Goals

To provide access to microcomputers for authorized staff to better enable them to dispatch their work effectively, the following are the goals of this policy:

- A. To have operational responsibility rest as closely as practical to the users.
- B. To vest in an administrative unit the responsibility to purchase equipment and programs, train users on newly acquired systems or packages, establish continuing education activities, and monitor the entire use of the microcomputers.
- C. To provide an open environment for the use of the microcomputers, while providing safeguards to avoid unnecessary duplication of effort, abuse of the system, or other unwarranted expenditures of money or effort.

III. Principles

A. *Training.* Staff must be properly trained before using the microcomputers.

B. *Use of Microcomputers.*

1. Personal use, or use for non-work related functions (e.g., games), is permitted only when it does not interfere with the accomplishment of library related tasks.
2. Software usage must always conform to the various licensing agreements and the copyright laws. [This will normally require the library to purchase (*not copy*) separate copies of the software for each microcomputer for which the software will be used concurrently.]
3. Published software is preferred over local programming for new applications.
4. All local programming must meet the Library Systems Department's specifications for planning, documentation, and testing.

C. *Data Administration*

1. No data should be created or maintained in any way that would jeopardize the legal or ethical standing of the library.
2. No one should view, or in any way intentionally harm or alter data created by another without the permission of the other party.

D. *Purchases.* Standardization of hardware and software is desirable. The Library Systems Department evaluates and makes final decisions concerning all new hardware or software that is requested.

IV. Policies.

A. *Training*

1. *Departmental Training.* Training of new staff is the responsibility of each department. To this end, each department is responsible for identifying contact people to work with the Library Systems Department for the technical assistance, training, and continuing education of the staff. Each department is also responsible for certifying staff of that department to use the system.

2. *Library Systems Department Training.* The Library Systems Department provides training, technical assistance and continuing education to contact people from each of the departments.

B. *Use of Microcomputers.*

1. *Departmental Responsibilities.* The department to which the microcomputer has been assigned administers the daily use, including:
 - a. the security of the machines. [Whenever possible, microcomputers should

- b. the allocation of departmental resources and establishment of schedules. (Other departments may use an underutilized computer on a temporary basis with the approval of the appropriate department heads).
 - 2. *Priority for Use.* The accomplishment of library duties on the microcomputer is given preference to personal or non-work related use. Projects that involve the library microcomputers in campus or outside applications should be sent to the Library Systems Department for review.
 - 3. *Relationship to Other Systems.* Other, more efficient or useful approaches or systems (e.g., the integrated library bibliographic system) are preferred when microcomputers would be unable to provide the maximum benefits or where system redundancy might occur.
 - 4. *Use of Software: Copying*
 - a. It is unacceptable to capture or to use data or programs in any way that violates copyright laws, including the duplication of copyrighted software to run on more than a single machine without the manufacturer's permission.
 - b. Whenever possible, backup copies of software will be distributed to the departments. Master copies will be retained by the Library Systems Department.
 - c. Software for which only a single copy has been purchased will be available for use from the Library Systems Department, unless that software is specifically assigned to another department.
 - 5. *Use of Software: Customization of Software.*
 - a. It is unacceptable to make changes or to customize packaged software (other than manufacturer approved changes to default settings, etc.) without prior approval.
 - b. The Library Systems Department will undertake approved customization and programming projects for the library departments.
 - c. Customization of software or development of programs that might affect the operations of more than one library unit should be reviewed and approved by all affected units.
 - 6. *Conduct.* Eating, drinking and smoking near the microcomputers are strictly prohibited.
- C. *Data Storage and Administration.*
- 1. *Monitoring.* Within each department, an individual should be delegated to monitor and coordinate data administration.
 - 2. *Responsibilities of Individuals.* Each individual who creates data is responsible for:
 - a. any data that is stored by that individual;
 - b. the care and security of the data in his or her possession.
 - 3. *Ownership of Data.* The library retains possession of data created as a part of any job-related functions. Copies of such data may be made available upon the approval of the department head.
 - 4. *Confidentiality of Data.*
 - a. It is against library policy to view or alter another employee's file without that person's permission.
 - b. Any files relating to personnel or other confidential matters should be stored in a locked area. If these files are retained on a shared mass storage device, they should be protected by a password or encryption scheme to prevent unauthorized access.
 - 5. *Backup and Archiving of Files.*
 - a. Backup copies on a second diskette or storage medium is required for all active key documents. Each department head is responsible for identifying key documents.

- b. Instead of being stored for long periods on the fixed (hard) disk, ephemeral, little used, or obsolete files should be erased or transferred to floppy diskettes or tape.
6. *Databases.*
- a. Prior approval should be granted before developing databases that duplicate existing or planned use of other library computer systems.
 - b. To ensure proper coordination of database building, all databases should be reported to the Library Systems Department, including a short statement as to structure, size and purpose.
- D. *Evaluation and Expansion of Hardware and Software.*
1. *Allocation and Use of Existing Equipment.* The Library Systems Department is responsible for tracking the use of the microcomputers, including maintaining an equipment inventory and determining if reallocation of equipment is desirable. The Department will annually report on the use of the computers.
 2. *Purchase Requests for New Hardware or Software.*
 - a. Requests to purchase additional hardware or software should be forwarded to the Library Systems Department, which bears final authority and responsibility for all purchases. Requests must be accompanied by a brief statement that includes:
 1. the problem to be solved;
 2. how the task is accomplished at present;
 3. the data elements (input and output) required to solve the problem;
 4. any recommended hardware or software and its intended use;
 5. any alternatives that were considered and the reasons why they were not recommended;
 6. the applicability of the hardware or software to other departments within the library.
 - b. In evaluating requests, the evaluator will concentrate on the *problem*, even when the requestor proposes a specific software *solution*. Evaluation criteria to be considered by the Library Systems Department in its evaluation will include (but not necessarily be limited to): whether the microcomputer is the best method for accomplishing the goal, whether there is existing software that accomplishes this function properly, the cost and expected benefit of the hardware or software, and the degree of compatibility with existing hardware and software.
 - c. *Software Updates.* A separate policy applies to the purchase of updates to software that is already owned by the library. When there is a demonstrable improvement in software, updates will be procured for all copies of software that the library owns (unless the physical limitations of some of the equipment prevent use of the new software). [This should be done where standardization of software across the library is desirable, and when purchase of later updates is contingent upon continuous purchase updates.]
 3. *Local Programming.*
 - a. Library Systems Department. The Library Systems Department will undertake programming projects for the library departments providing the projects meet the established criteria. Criteria for approval of programming projects include the time and effort needed (including the time for data input), any additional costs to the library, the expected benefit to the library, the amount of time the project will demand when it is operating, the intended programming language, and the project's potential for creating redundant or incompatible systems within the library. A cost/benefit analysis should be performed by the requester and submitted to the Library Systems Department for review. Approval for original programming projects will be based in part on the availability of commercial or other prewrit-

ten software. The priority for programming may be affected by the usefulness of the program to more than one department of the library.

- b. Other Staff. Library staff members outside of Library Systems may perform original programming providing: there has been prior approval for the project from the Library Systems Department; all programs are adequately tested and documented; and provisions have been made for maintenance of the programs.

E. *Review.* This policy will be reviewed annually, based upon the original date of implementation. The Library Systems Department is responsible for recommending changes to proposed policies and procedures. ■■

Answerman, the Expert Information Specialist: An Expert System for Retrieval of Information from Library Reference Books

Samuel T. Waters

The National Agricultural Library has undertaken a project to develop a microcomputer-based expert system that will help users obtain answers to ready reference questions. A small system pointing to reference books likely to contain the answer to specific kinds of questions was created using a software shell. The system was expanded and linked to external programs providing online access to databases of bibliographic citations and to full-text files that can furnish the answer to a question, rather than just providing the name of a relevant reference book. Cooperative efforts in developing such systems are encouraged.

The National Agricultural Library (NAL) is attempting to develop an "expert system" that will help users obtain answers to questions on agricultural topics. Computerized expert systems mimic the advisory work done by human experts, in this case, reference librarians. However, no single librarian is capable of remembering the best sources for locating answers to all the questions asked at a typical library reference desk. Tools are needed to assist reference librarians in their work. These tools could aid end users themselves in locating either appropriate information sources or the specific answers to their questions without professional assistance. An expert system that serves as such a tool could free librarians to handle complex queries requiring in-depth effort and relieve them of the more routine ready reference and directional questions. It could also be used to stem "brain drain" by acquiring and making available the special and local knowl-

edge of reference librarians who are leaving the library.

In developing expert or knowledge-based advisory systems, librarians should think big but start small. The ultimate goal should be to enable anyone and everyone to obtain ready access to the entire universe of knowledge. The short-term objective at NAL is to create a microcomputer-based system that will guide an inquirer to a reference book likely to contain the answer to a question in a relatively narrow subfield of agriculture. Since expertise consists of knowing a lot about a narrow field, this seems to be a reasonable way to begin on the long trail of expert system development that might lead eventually to the grail of universal information service.

EXPERT SYSTEM SHELLS

Prerequisite to this development was locating an expert system shell that could be used by persons without expert systems ex-

perience. A shell is a software package that facilitates the creation of specific expert systems. To meet criteria for initial development and subsequent expansion, the shell would have to be relatively inexpensive and easy to use, but at the same time quite powerful and capable of handling a large number of rules. (Many such systems are rule based: they contain strings of statements in "if . . . then" form; e.g., if X is true and Y is true, then Z is also true. Others use examples in lieu of rules.) Ease of use would be essential if reference librarians were to be able to create their own systems; power was desirable if the system were to be expanded beyond its narrow initial domain. Significantly early work on an expert reference system done by Karen Smith, Stuart Shapiro, and Sandra Peters at SUNY-Buffalo under a Council of Library Resources grant focused on reference work in government documents units. However, as interesting as that project was, the system required computer programming in LISP, an artificial intelligence programming language known to relatively few, and could not be extended easily.¹ (Since the development of the NAL system described below, it has

been announced that the SUNY software has been rewritten in BASIC, so that adapting the program would be much simpler now than in the original LISP version.)²

After surveying the literature and examining demonstration disks and documentation for a number of shells, a new one that exceeded expectations was located. "1st-CLASS" is an example-based program that allows unsophisticated users to create systems while using a framework much like a spreadsheet. It runs on IBM PCs and clones that have at least 256K of RAM. This program can be obtained from Programs in Motion, 10 Sycamore Rd., Wayland, MA 01778. The current version, with a license to distribute expert systems developed using the shell, is \$495.

"1st-CLASS" requires the system developers to use four screens. The Filing System screen shows which files have been built and can be accessed within the program. The Definitions screen allows the user to define the end results of the program, the factors that influence what the result would be, and the different possible values for each factor that would, in combination, determine the outcome. Figure 1 illustrates

```

new_Factor, new_Value, edit_Text, Change, Activate, Move, Delete, Print
[F1=Help]          Definitions of 3 Factors          [F9=Filer] [F10=Examples]

#infotype  topic      occup_org  Refbook
atlas      aflatoxin  Association @agstats
bibliogrp  agriculture Congressman agstatp301
calendar   aquaculture Congstaff  agstatp30
dictionary biomass    Fedstaff  stathdbk
directory  biotech    organizatio Congdirect
encyclopdia botany     projects  Agexworkers
handbook   cattle     researcher Extgoathdbk
history    corn       conventions newspaper
how_to_book dairy    Encyc_Assoc
legal_code food      porkindhdbk
newspaper  goats     dairyherd
review     oysters   homecanning
statistics politics  natcornhdbk
thesaurus  pork      foodcomp
textbook   science  congstaffdir
yearbook   wood     Fedstaffdir
           extension AmMenScienc
           biotechdir

```

What general type of information are you looking for?

Fig. 1. A Sample Definitions Screen.

the layout of a definition screen. Textual data to substitute for any abbreviated item in the spreadsheet-like format on this screen can be added easily. Figure 2 shows both the brief entries and the actual text that will appear while using the system.

The Examples screen, also in spreadsheet format, permits the developer to create combinations of values under different factors that will lead to different outcomes or answers. These can be thought of as "if . . . then" rules expressed as individual examples. For each example, one may assign a number representing the degree of confidence an expert would have that the response will provide a useful answer. Figure 3 illustrates the layout of an example

screen.

Finally, the Solution screen has a menu of commands, one of which will create a rule to order the questions asked of a user so that the minimum number are required to arrive at a given result. The query command then generates screens for system users containing these questions, using any text added earlier with the Definitions screen. Beneath the question on the screen, which concerns one of the factors bearing on the outcome, is a list of the values relating to that factor. From this list the user makes a choice. Then the next question is presented. This procedure is repeated until the expert system's answer is furnished. Figure 4 illustrates the layout of a query

```

Refbook      Perhaps the information you're looking for may be found in the source(s)
.....listed below:
@agstats     {command.com /c basic b:square}
agstatp301   Agricultural Statistics 1985, p. 301      1Ag84 YAS
agstatp30    Agricultural Statistics 1985, p. 30      1Ag84 YAS
stathdbk     Statistical Abstracts of the U.S.
Congdirect   Congressional Directory JK 1011.A3
Agexworkers  Directory of Professional Workers in State Ag Exp Stations 1Ag84 AH 305
Extgoathdbk  Extension Goat Handbook SF 383.G58
newspaper
Encyc_Assoc  Encyclopedia of Associations 225 EN12
porkindhdbk  Pork Industry Handbook SF 395.P62 (Also on Videodisk)
dairyherd    Dairy Herd Improvement Handbook To be released 4/86
homecanning  Home Canning Handbook 1Ag84 HG
natcornhdbk  National Corn Handbook
foodcomp     Composition of Foods 1Ag84 AH 8-11
congstaftdir Congressional Staff Directory JK 1012.C6
Fedstaftdir  Federal Staff Directory JK 723.E9845
AmMenScienc  American Men and Women of Science Q145.A42
biotechdir   International Biotechnology Directory TP 248.3.C66
WrldAlmP205  World Almanac 1985, p.205 AY 67.N5W7
AquaResDir   Aquaculture Research: a directory of USDA and State projects in CRIS.
.....      S 408.A3
Aqua&Hydro   Aquaculture and Hydroculture; a bibliography
CornProt     The Protection of Corn,1980-Nov. 1984, p. 19 "Aflatoxin in corn
.....before harvest" E. B. Lillehof et al. Crop Science, Nov/Dec 1980, v. 20 (6)
.....p. 731-734. 13 ref. (NAL call no.: 64.8 C883).
DisResOyst   Aquaculture Research: a directory of USDA and State projects in CRIS, p. 64.
.....CRIS0028024. Disease-resistant oysters [Research project] by H.H. Haskin, Rutgers
.....University. Proj. No. NJ32504. Objective: Verify the relative high
.....resistance of Delaware Bay oyster stocks to MSX.
US_Code
AtlasAmAg    Atlas of American Agriculture
FactbkUS_Ag  1985 Fact Book of U.S. Agriculture, p. 28. 13. Farms and land in farms.
.....The United States had 2,332,600 farms in 1984, a slight decrease from
.....1983. This decline continues the downward trend that started in 1936.
SciMeetings  Scientific Meetings (periodical) 239 Sp3
#diction     Dictionary of Botany
@ThesForPro  Thesaurus of Forest Products Terms {command.com /c basic b:root}
YrbkForProd  Yearbook of forest products
RvwExtResch  Review of Extension Research
ProgBotany   Progress in Botany

```

Fig. 2. Brief entries and corresponding text that will actually appear on screen during system use.

screen. The above is, of course, only the barest outline of the capabilities of this software.

BUILDING A SYSTEM

Using these straightforward procedures a small sample file of reference books was generated using as factors the type of information needed and the topic of the question. For example, if the type of information needed was statistical, and the topic was agriculture in general, a relevant reference book would be *Agricultural Statistics*; for how-to information on raising pigs, the *Pork Industry Handbook* would be appropriate. The bad news is that the maximum capacity of a single file is thirty-one different results—not nearly enough for even a small ready reference collection in the agricultural field.

The good news is that "1st-CLASS" has techniques for expanding its capacity. Chaining allows one to create separate programs automatically linked to each other. Thus, it was possible to create a number of small programs, joined in a hierarchy, to guide a user through a series of questions to the answer.

A small demonstration system called Answerman was developed. The system leads a user to identify a subject field of interest by selection from a list of very broad fields in agriculture, proceeding down through several successively more specific levels to a discipline such as remote sensing. After clarifying the topic, the user defines the type of information needed, again choosing from menus served up by linked programs, and is then led to a response that lists one or more relevant ready reference titles with their call numbers. This automatic file linkage technique permits one to guide users to any of a very large number of reference books that might contain answers to their questions. On the down side, it might condemn the poor user to answering "Twenty Questions" in the search, although the program does limit the questions asked to those relevant to a particular inquiry. However, this branching technique places a much higher premium on initial analysis and design of the system, as well as on documentation, than does a simple system built on a single example file.

The design strategy for the single file ini-

tially built had elicited responses about the type of information needed before focusing on the subject. In designing the linked files, it seemed advisable to reverse this order, resolving the factor with the greatest number of "values" first. In a broader system, other kinds of questions might also be asked, reflecting query-negotiation strategies and contextual information. For instance, if the inquirer wanted background information for a high school term paper, he or she might be referred to a different reference tool than a scientist wanting background information about a related discipline.

At this point, it was clear that, in principle, it would be simple to create an advisory system guiding users to an appropriate reference book. The system acted in a manner somewhat similar to the database selection portion of a user-friendly "front-end" software package, such as In-Search, by the Menlo Corporation. In fact, the Answerman advisory system could also point to appropriate online databases just by adding them to the list of reference information sources that might contain the answer to a given question. The beauty of the shell approach is that it allows librarians to create their own user-friendly system to select appropriate reference tools in any specialized field easily and quickly.

LINKING TO EXTERNAL PROGRAMS AND SYSTEMS

The shell also enabled the demonstration system to encourage and collect feedback. Any system response can be linked to an external program if a simple procedure is used. A member of the NAL staff wrote a very brief program in BASIC, which asked the user to type in what the specific question actually was, whether the answer was found in the reference book(s) recommended by the system, and what suggestions the user might have for improving the system. The expert system responses suggesting specific reference books were then linked to this BASIC program, so that Answerman's questions are asked automatically after the expert system suggests an appropriate book. User answers to these questions are stored in a microcomputer file that can be read or copied later and used as feedback to focus, augment, and improve the expert system.

After this feedback program was installed, the demonstration system was expanded to include a number of references to specific pages in books that contained the answers to questions, e.g., a particular table in a statistical handbook. To do this throughout even a small system, however, would have meant increasing the content of the system by several orders of magnitude. Pointing to the exact page containing an answer might be desirable, but it would entail a tremendous effort for the system developer. Fortunately, it was possible to use the external program capability in another way, to extend the reach of the system and even to alter its nature. Another staff member wrote script files for the Crosstalk telecommunications program, which automatically dialed up either the DIALOG or BRS online systems and logged-on to a selected database. Certain expert system responses were then linked to database-specific Crosstalk script files.

One online database linked to the expert system through a Crosstalk script was Superindex, in the BRS system, which has computerized several million back-of-the-book index entries and page references from more than two thousand reference books. Thus, an inquirer with the ability to search this database could be directed not only to a particular reference book but also to a specific page in it. Next, the expert system was linked to NAL's own AGRICOLA database, which is online in both the BRS and DIALOG systems. When an individual needed citations in a given field of agriculture, the option of an automatic link to our AGRICOLA database online was provided, as was the name and call number of an appropriate bibliography. Once in the online system, of course, the inquirer must use the DIALOG or BRS command language to retrieve citations. To overcome that difficulty, it would probably be possible to link the expert system used for selecting appropriate databases to a commercial gateway package that featured a single, simple menu-driven approach to online searching in various systems.³

One additional step was taken, linking a few responses in Answerman to a BRS database containing the full text of eighteen American Chemical Society journals. This would permit a user to see the complete text

or selected portions of the text of an article, rather than just a citation or abstract. Finally, courtesy of the Microcomputer Center at the Federal Library and Information Center Committee, Answerman was linked to a CD-ROM player containing a bibliographic file searchable by a DOS-based program. CD-ROM (compact disk-read only memory) is the digital data storage and retrieval version of the compact audio digital disk that is now beginning to replace the phonograph record and tape cassette. Using laser technology, one CD-ROM disk can hold more than five hundred megabytes of data, the equivalent of several hundred thousand bibliographic records, or the full text of "three 21-volume encyclopedias,"⁴ searchable to the very paragraph or sentence containing the words describing the topic of your search.

An expert system front end would still be needed to direct the information retrieval software to specific reference books in order to minimize the number of false drops—irrelevant paragraph and sentence references—likely to be retrieved from large numbers of reference books searchable at one time. Connected to a laser disk, an expert system could begin the process of answering a question by pointing to an appropriate reference book or books, automatically transfer the user to the information retrieval system used on the full text disk, and display the actual text or table containing the answer to the question. A carousel of ten disks might offer access to one thousand reference books; a hundred disks, access to ten thousand books. While *large* carousels for compact disks are not yet commercially available, the goal of universal access no longer seems as impossible. With expert systems complementing friendly, menu-driven information retrieval systems and operating on large full-text files in mass memory devices, ready reference question-answering systems for specialized fields are almost here. All this, it should be noted, would not permit untrained users to incur online connect-time charges as they would in the scenario outlined earlier for accessing commercial online systems.

In summary, such a system can be developed by using an expert system linked to a mass-storage device. The expert system,

utilizing forward chaining, would ask questions that lead the user progressively to define his or her search and arrive at the name of a reference book likely to contain the answer. The expert system would then automatically transfer the inquiry to a mass storage system, with user-friendly menus for a full-text information retrieval system. Use of that system would lead to display of paragraphs, tables, etc., from the previously identified reference work(s) likely to contain the answer.

NEXT STEPS

NAL has already experimented with loading and searching online the full text of a basic reference work in one field of agriculture, i.e., the *Pork Industry Handbook*. The library has also prepared an experimental laser videodisc containing 200,000 searchable records from our AGRICOLA database as well as the searchable full text of the same *Pork Industry Handbook* used in the online file.⁵ A contract has been let to prepare a new videodisc with the searchable full text of twelve additional reference books in different fields of agriculture. Now that NAL has demonstrated the potential of an expert system, it would seem desirable to test the new videodisc in conjunction with an expert system. However, the microcomputer operating system used by our contractor was PCIX. It may be difficult if not impossible to link "1st-CLASS" to the full-text videodisc, since "1st-CLASS" operates under DOS, even though the previous experiment at FLICC proved that linkage to a mass-storage device is simple when both that device and the expert system software work with a common operating system.

Meanwhile, the coordinators of NAL's Aquaculture Information Center are moving ahead rapidly in developing an expert system in the field of aquaculture. NAL will be seeking funding to generate a full-text file of aquaculture reference books on a mass-storage device linkable to the expert system. In any case, the AGRICOLA database will be available this fall on CD-ROM disks; the Aquatic Sciences and Fisheries Abstracts database already is. NAL plans to link both of these citation databases to the Aquaculture expert system. Shortly, the

Aquaculture expert system on a floppy disk alone could be made available at low cost to other institutions doing extensive reference work in this field. The Aquaculture system can then serve as a paradigm that other information centers at NAL and elsewhere could use in building their own specialized subject systems. At the same time, NAL may experiment with other systems based on specific types of reference books, e.g., statistical data sources, as was done with government documents in the project at SUNY-Buffalo that was mentioned earlier.

As we work, we are seeing the development and commercialization of new shells. The discipline of artificial intelligence, of which expert systems is a part, has other fields in its armamentarium that are rapidly increasing the capabilities of inexpensive expert system shells. Among these are voice recognition by microcomputers and the important field of natural language studies. As the ability of a microcomputer to accept natural language input increases, the need for hierarchical menus and the "Twenty Questions" game will decrease. One will be able to type or talk a question into the microcomputer, which automatically will recognize key words, and step through the system rules to identify the appropriate reference book and display the textual answer to the question. The Kurzweil AI voice recognition system can now recognize a thousand separate words. Kurzweil's videotape presentation shows how the system can be used to give instructions and input data to CLOUT, a natural language software package used as a front end to a powerful database management system. IBM has demonstrated software that recognizes five thousand words.⁶ NAL is beginning to explore some of these capabilities. The technologies are rapidly improving, and systems integration is already under way. An expensive new integrated software package named GURU combines an expert systems shell with a natural language interface and database management, word processing, graphics, spreadsheet and telecommunications software in a single package.⁷

We live in exciting times. The simultaneous development of artificial intelligence, mass memory, and systems for auto-

matically converting hard copy to electronic form provides librarians with an unparalleled opportunity to assist in making the world's factual knowledge readily accessible to all. We are at just the right point in the development curve of these complementary technologies for librarians to make a significant contribution in their application. Librarians are already beginning to construct expert ready reference systems. Soon, many fields of knowledge and special types of information such as directories, statistics, etc., will be addressed.

"The Next Knowledge Medium," a recent thought-provoking article, notes that artificial intelligence research has focused on building independent, isolated products, rather than on building a process—an active medium for generating and communicating knowledge. "The knowledge medium requires a change of goal focus. . . . Important questions need to be asked: As a project evolves, where will the knowledge come from? How will it be distributed? . . . How will multiple experts interact? . . ."⁸

Eventually, reference librarians and information specialists will have to consider how the bits and pieces of expert information systems now or soon to be developed can be put together in a total information system, not only for agriculture but also for the world of knowledge. We will have to consider the organizing principles and structures by which these systems can be related and made accessible to all—a challenge worthy of any Dewey among us.

Who will help organize cooperative efforts in expert system building? Could the Federal Library and Information Center Committee do this for federal libraries and/or federal publications? Would a bibliographic utility, such as OCLC, with its own R&D unit, be interested in hosting

such a project? If librarians fail to take this opportunity soon, it may vanish.

The commercial sector has already seen some of the possibilities. Borland is the company responsible for creating *Turbo Lightning*, a microcomputer software package combining a memory-resident spelling checker and a thesaurus. Borland has already acquired rights to put *Bartlett's Quotations* and the *Columbia Encyclopedia* in memory-resident form.⁹ Another important software developer, Microsoft Corporation, has just acquired a smaller firm, Cytation, which "had originally been planning to offer CD-ROM products on three levels—a general reference level for large text databases, a professional library product comprised of databases from different sources packaged for a vertical market, and a complex retrieval system that would include features of expert systems."¹⁰ The same issue of the newsletter containing that quote also noted CD-ROM publication of the *Grolier Electronic Encyclopedia*, as well as Bowker's intent to put *Books in Print* and *Ulrich's International Periodical Directory* onto CD-ROM disks.

My concern is that this process may produce thousands of building blocks of different sizes and shapes—but never a cathedral of learning.

Vannevar Bush introduced the notion of a "memex," a "mechanized private file and memory," in a landmark article entitled "As We May Think" some forty years ago. With impressive prescience, he predicted "a new profession of trail-blazers, those who find delight in the task of establishing useful trails through the enormous mass of the common record."¹¹ I hope *our* profession will continue its leading role in this function.

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Integrating Subject Pathfinders into a GEAC ILS: A MARC-Formatted Record Approach

William E. Jarvis and Victoria E. Dow

I. Introduction to General Aspects of Using Pseudobibliographic MARC Record Formats for Subject Pathfinders Online.

Library handouts serving as subject guides to specific topics are a staple in virtually every library serving a campus or other public. Known variously as guides, pathfinders, or LC Science Tracer Bullets, these finding aids are a standard resource for ongoing reference work and bibliographic instruction. We have devised one way to put some of the essential features of pathfinders into an online library catalog without resorting to reprogramming and using only everyday cataloging skills. A previous article on subject pathfinders online proposed a novel approach to providing "guideware" for integrated library systems but offered no actual system-installed specimens.¹ In this article we provide such specimen entries, using a MARC record format. Both the GEAC MARC record management system (MRMS) format, with MARC field tags visible, and the transparent-to-the-user public catalog pathfinder display formats are illustrated here.

By pathfinders, we mean a guide to finding bibliographic citations on a specific subject. Its aim is to direct the user to a starting point or points in doing bibliographic research. For online public access catalog purposes pathfinders should probably not take the approach of exhaustively listing recommended titles, but instead concentrate on a more concise subject/key-

word access to bibliographic records in an online system. Paging through extensive screens of a single pathfinder may confuse rather than guide a searcher. Mention of key monograph or serial titles can be made as required, as in many traditional offline paper pathfinders, library guides, and LC Science Tracer Bullets.

We have trimmed the traditional offline subject pathfinder down to a concise subject pathfinder record. Such a pseudobibliographic record-formatted subject pathfinder is essentially a type of local subject authority record, since the online syndetics requirements of authority records and subject pathfinders are similar. Although each system might require different processing procedures, the online pathfinder record screen display and cross-reference structures would be essentially the same in different systems. Similarly, the content of an online pathfinder would vary from library to library. Linked authority records in an integrated library system may obviate the need for subject heading lists. However, the online pathfinder would retain its value as a guide to introductory materials, specific monographs, and serials on a given topic.

While the need for some narrower-scope subject pathfinders online may be somewhat lessened by the precoordinated subject heading, keyword, and Boolean access provided by an ILS, extensive cross-references for the broader-scope, more complex, interdisciplinary or fuzzy topics

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can still be provided by subject pathfinders online. Our biotechnology pathfinder is a shorter example of such a pathfinder. Another on flexible manufacturing systems has eighteen subject fields instead of biotechnology's five. The FMS pathfinder online also provides referral to specific titles via its Notes field, while the biotechnology pathfinder just gives a brief scope note without recommending specific titles. We have added a non-LCSH, local subject 690 field to each pathfinder.

Typically, nonreference librarians have some difficulty defining the purpose or function of a subject pathfinder online. Catalogers will appreciate the similarity of pathfinders online to authority records, although large numbers of the cross-references' explanatory scope notes and specific title recommendations distinguish online pathfinders from standard authority records. The use of pseudobibliographic MARC format online records for purposes other than bibliographic cataloging is not unique to our pathfinder scheme. OCLC system status reports, for example, are housed online as pseudobibliographic records, although they are not subject pathfinders, and OCLC system status reports are not, of course, KWOC keyword accessible.²

II. Accommodating MARC Record Subject Pathfinders to a GEAC Integrated Library System

Undoubtedly each online library catalog system will present its own specific puzzles in implementing pathfinders online as pseudobibliographic records. Our screen illustrations are GEAC-type displays, but such pathfinders could conceivably be done on other vendors' library systems as well. All such systems have their own peculiarities, both in processing MARC format data and in having differing screen displays. Here are two features that we encountered with Lehigh University Libraries' GEAC online catalog, dubbed "ASA."³

A. *Necessity of a Short Entry Reference to Full Entry via Use of Imprint Field for a Cross-Reference Message*

Since the initial display of a pseudobibliographic record is a short entry, it was

necessary to use the 260 imprint field as a cross-reference to prompt the user to go on to see the full record with its notes and subject fields. Figure 5 indicates this situation, with the display in figure 6 being the resulting record. This cross-reference information is redisplayed in the full record format since it is contained in the 260 field. This may be somewhat confusing to users, though not overwhelmingly so. If the instructions (to enter "FUL" for the complete record) were entered again, the whole display would be seen again, presumably a self-correcting situation for any user experiencing any confusion from seeing a repeat of earlier instructions.

B. *OCLC Numbers on GEAC Records*

Although it is desirable for GEAC MARC authorization tables to require an OCLC catalog number, this requirement can be an obstacle when a pseudobibliographic record, such as a subject pathfinder online, is entered into the online catalog. A new authorization table should be created for this new pathfinder material type, one that does not require the OCLC number tag for a MARC to CIRC pass.⁴

III. Ways to Implement Pathfinder Records Online

There are several conceivable ways to install pathfinders into an online integrated library system:

1. Reprogramming of the system to do so, i.e., by contract with a vendor to supply new software or (vendor-sponsored) local site manipulation of existing software features i.e., modify help screen work forms to display pathfinder information or perhaps program access to special news items that could supply pathfinder information.
2. Fill in an already provided pathfinder work form, if a system provides such an option. We would appreciate word on any such use—we know of none, although local authority records could conceivably be used for this purpose. The provision of a locally devised scope note and advice about key titles would provide more help than would a bare-bones subject heading authority file.

3. Use a MARC bibliographic record work form such as in GEAC's MARC Record Management System to enter records that can function as subject pathfinders online. Our biotechnology and FMS examples use this approach. Currently this is the most accessible way to do pathfinders online.

These online pathfinders can be used as initial guides in searching or might be retrieved in the in the course of a search already under way, the aid function being the *raison d'être* of these pathfinder records. While these records display in an online library system catalog, they are not fully automated—they do not provide dynamically linked, automatic cross-referencing. In our ASA GEAC scheme, the user must manually key in the listed subject headings found in each pathfinder record instead of directly receiving a menu display of all appropriate bibliographic records that contain authorized subject headings. The pseudobibliographic pathfinders displayed in these ASA examples are an intermediate form that could be supplanted by a fully automated, direct, transparent cross-referencing of all subject headings listed in a pathfinder. But unless the integrated library system is programmed to provide subject pathfinder record work forms, which is in theory the simplest option, pathfinder installers will have to follow our more expedient "quick fix."

IV. Conclusion: Feasibility, Desirability, and Inevitability of Installing Subject Pathfinders Online in MARC Format

Our MARC-based pseudobibliographic format provides a convenient method for mounting pathfinders on current integrated library systems, both GEAC and non-GEAC. We have demonstrated the *feasibility* of putting pathfinders online as ILS records in MARC format, but the *desirability* of having such subject access online can only be evaluated after a period of ILS use in a number of library systems in comparison with other subject access schemes, such as Dewey Decimal Classification searching, etc.

We do think, however, that there will inevitably be a strong impetus to install pathfinders online, an imperative to maximize library system integration and eliminate the scatter of stand-alone paper-based aids whenever possible. Also, given the current use of word processing to produce and database management to organize print-form subject pathfinders, it seems an obvious next step to put everything into one integrated library system, rather than continue the parallel operation of divorced computer systems. Certainly, the online subject pathfinder concept should be evaluated in comparison with other online synthetic/help features and also with traditional offline subject pathfinders.

002	Lehigh University Lib.	—GEAC LIBRARY SYSTEM—	*MARC RECORD DISPLAY
049	\$aLYUU		
092	\$aPATHFINDER		
099	\$aSEE "FUL" RECORD		
110	00 \$aLehigh University Libraries		
245	1 \$aBiotechnology Pathfinder Online		
260	0 \$aType "FUL" to see complete record of this guide.		
300	\$aTHIS IS AN ELECTRONIC GUIDE TO ASA BOOKS ON BIOTECHNOLOGY.		
440	\$aLehigh Pathfinders Online		
500	\$aFERMENTATION BIOTECHNOLOGY (sometimes called "Fermentation and Bioindustrial Chemistry") is distinct from GENETIC ENGINEERING (sometimes called "Biochemical Genetics"). BIOMATERIALS and BIOMECHANICS are not		
500	\$aFERMENTATION BIOTECHNOLOGY (sometimes called "Fermentation and Bioindustrial Chemistry") is distinct from GENETIC ENGINEERING (sometimes called "Biochemical Genetics"). BIOMATERIALS AND BIOMECHANICS are not covered here.		

Fig. 1. A short biotechnology pathfinder online. MARC Record Management System format input is shown.

590 \$aThis is a guide to BIOTECHNOLOGY books, but this entry is not a record of any one book—it's only a guide. For a complete list of pathfinders online, search under TITLE for "Lehigh Pathfinders Online."
 590 \$aYou will not find many biotechnology books by searching the term BIOTECHNOLOGY, but if you do a KEYWORD title search of BIOTECHNOLOGY, you will find some additional books; HOWEVER, search the subject headings LISTED BELOW for better search results:
 650 0 \$aBiochemical Engineering
 650 0 \$aIndustrial Microbiology
 650 0 \$aFermentation
 650 0 \$aEnzymes—Industrial Applications
 690 \$aBiotechnology
 966 \$1F-REF\$mNOCIRC\$sSEE "FUL" RECORD
 002 00 \$199243

Fig. 1. *Continued.*

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *MARC RECORD DISPLAY

049 \$aLYUU
 092 \$aPATHFINDER
 099 \$aSEE "FUL" RECORD
 110 00 \$aLehigh University Libraries
 245 1 \$aFlexible Manufacturing Systems FMS Pathfinder Online
 260 0 \$aType "FUL" to see complete record of this guide.
 300 \$aTHIS IS AN ELECTRONIC GUIDE TO ASA BOOKS ON FLEXIBLE MANUFACTURING SYSTEMS.
 440 \$aLehigh Pathfinders Online
 500 \$aFMS/MSE includes a wide variety of disciplines—engineering, electronics, management, computer science. Two subject headings listed
 500 \$aFMS/MSE includes a wide variety of disciplines—engineering, electronics, management, computer science. Two subject headings listed below specifically cover FMS/MSE: AUTOMATION and MACHINE TOOLS—NUMERICAL CONTROL. Journals to scan: FMS Magazine and Robomatrix Reporter. Also search NUM/CAL "670.427 F6191" for a good introduction to this subject.
 590 \$aThis is a guide to FLEXIBLE MANUFACTURING SYSTEMS, but this entry is not a record of any one book—it's only a guide. For a complete list of Pathfinders Online, search under TITLE "Lehigh Pathfinders Online." SEARCH THE SUBJECT HEADINGS LISTED BELOW FOR BOOKS AND JOURNALS ON FMS/MSE:
 650 0\$aAutomatic Control
 650 0\$aAutomation
 650 0\$aComputer Aided Design
 650 0\$aComputer Aided Engineering
 650 0\$aComputer Aided Manufacturing
 650 0\$aEngineering Design—Data Processing
 650 0\$aGroup Technology
 650 0\$aIndustrial Productivity
 650 0\$aMachine Tools—Numerical Control
 650 0\$aManufacturing Processes
 650 0\$aProduction Control
 650 0\$aProduction Engineering
 650 0\$aProduction Management
 650 0\$aProduction Planning
 650 0\$aRobot Industry

Fig. 2. A somewhat more complex "Flexible Manufacturing Systems" pathfinder online. Note both the recommendation of titles in the Notes fields and the large number of subject headings.

```

650      0$aRobotics
650      0$aRobots, Industrial
690      $aFlexible Manufacturing Systems
740      0$aManufacturing Systems Engineering MSE Pathfinder Online
966      $1F-REF$mNOCIRC$sSEE "FUL" RECORD
002 0    0199245

```

Fig. 2. Continued.

```

002 Lehigh University Lib.      —GEAC LIBRARY SYSTEM—      *CHOOSE SEARCH

```

What type of search do you wish to do?

1. TIL—Title, journal title, series title, etc.
2. AUT—Author, illustrator, editor, organization, conference, etc.
3. A-T—Combination of author and title.
4. SUB—Subject heading assigned by library.
5. NUM—Call number, ISBN, ISSN, etc.
6. KEY—One word taken from a title, author, or subject.

Enter number or code, then press CARRIAGE RETURN
TIL/BIO TECHNOLOGY

Fig. 3. Title access to the biotechnology topic using stacked GEAC commands for title field search input and "biotechnology" as input term for this public catalog search.

```

002 Lehigh University Lib.      —GEAC LIBRARY SYSTEM—      *TITLE SEARCH

```

- 1 Biotechnology
- 2 Biotechnology: a comprehensive treatise in 8 volumes /
- 3 Biotechnology advances.
- 4 Biotechnology and bioengineering
- 5 Biotechnology and bioengineering symposium,
- 6 Biotechnology and bioengineering symposium, no.10, 1980
- 7 Biotechnology and bioengineering symposium, no.11, 1981
- 8 Biotechnology and bioengineering symposium, no.2, 1971
- 9 Biotechnology and bioengineering symposium, no.3
- 10 Biotechnology and bioengineering symposium, no.5, 1975
- 11 Biotechnology and bioengineering symposium, no.6, 1976
- 12 Biotechnology and fungal differentiation /
- 13 Biotechnology: concepts and applications.
- 14 Biotechnology in energy production and conservation.

Type a number to see more information —OR—

- FOR—move forward in this list BAC—move backward in this list
CAT—begin a new search

Enter number or code, then press CARRIAGE RETURN
FOR

[screen 2]

```

002 Lehigh University Lib.      —GEAC LIBRARY SYSTEM—      *TITLE SEARCH

```

- 1 Biotechnology in energy production and conservation : Proceedings of t >

Fig. 4. Two screens of title output for "biotechnology" input, including second screen's Biotechnology Pathfinder Online.

- 2 Biotechnology, international trends and perspectives /
- 3 Biotechnology letters.
- 4 Biotechnology news.
- 5 Biotechnology news' Directory of biotechnology companies
- 6 Biotechnology Pathfinder Online
- 7 Bipolar and MOS analog integrated circuit design /
- 8 bipolar junction transistor /
- 9 bipolar theory of living processes,
- 10 Biproportional matrices & input-output change.
- 11 Bira et les peuplades limitrophes.
- 12 Biracial politics; conflict and coalition in the Metropolitan South.
- 13 Birational geometry of degenerations /
- 14 Birch's views of Philadelphia : a reduced facsimile of the City of Phi >

Type a number to see more information —OR—

FOR—move forward in this list BAC — move backward in this list

CAT—begin a new search

Enter number or code, then press CARRIAGE RETURN

6

Fig. 4. Continued.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

AUTHOR: Lehigh University Libraries

TITLE: Biotechnology Pathfinder Online

IMPRINT: Type "FUL" to see complete record of this guide.

Location	Loan Type	Call Number	Status
F—REF	NOCIRC	SEE "FUL" RECORD	

FUL—see complete citation

IND—see list of headings

CAT—begin a new search

PRI—print record

Enter code then press CARRIAGE RETURN

FUL

Fig. 5. Menu item 6 from second screen Biotechnology Pathfinder Online (see fig. 4) is selected and brief record format is displayed.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

AUTHOR: Lehigh University Libraries

TITLE: Biotechnology Pathfinder Online

IMPRINT: Type "FUL" to see complete record of this guide.

PHYSICAL FEATURES: THIS IS AN ELECTRONIC GUIDE TO ASA BOOKS ON BIOTECH-
NOLOGY.

SERIES: Lehigh Pathfinders Online

Fig. 6. Following the instructions displayed by imprint field, "FUL" screen record is displayed.

NOTES: FERMENTATION BIOTECHNOLOGY (sometimes called "Fermentation and Bioindustrial Chemistry") is distinct from GENETIC ENGINEERING (sometimes called "Biochemical Genetics"). BIOMATERIALS and BIOMECHANICS are not covered here. * This is a guide to BIOTECHNOLOGY books, but this entry is not a record of any one book—it's only a guide. For a complete list of pathfinders online, search under TITLE for "Lehigh Pathfinders Online." * You will not find many biotechnology books by searching the term BIOTECHNOLOGY, but if you do a KEYword title search of BIOTECHNOLOGY, you will find some additional books; HOWEVER, search the subject headings LISTED BELOW

BRF — see locations and call numbers

IND — see list of headings

CON — see next screen

CAT — begin a new search

PRI — print record

Enter code or CON (continuation), then press CARRIAGE RETURN

CON

[screen 2]

002 Lehigh University Lib.

—GEAC LIBRARY SYSTEM—

*TITLE SEARCH

CONTINUED FROM PREVIOUS SCREEN

NOTES: FERMENTATION BIOTECHNOLOGY (sometimes called "Fermentation and Bioindustrial Chemistry") is distinct from GENETIC ENGINEERING (sometimes called "Biochemical Genetics"). BIOMATERIALS and BIOMECHANICS are not covered here. * This is a guide to BIOTECHNOLOGY books, but this entry is not a record of any one book—it's only a guide. For a complete list of pathfinders online, search under TITLE for "Lehigh Pathfinders Online." * You will not find many biotechnology books by searching the term BIOTECHNOLOGY, but if you do a KEYword title search of BIOTECHNOLOGY, you will find some additional books; HOWEVER, search the subject headings LISTED BELOW for better search results:

SUBJECTS: Biochemical Engineering * Industrial Microbiology * Fermentation * Enzymes—Industrial Applications * Biotechnology

BRF— see locations and call numbers

IND — see list of headings

CAT— begin a new search

PRI — print record

Enter code then press CARRIAGE RETURN

MAR

Fig. 6. *Continued.*

002 Lehigh University Lib.

—GEAC LIBRARY SYSTEM—

*CHOOSE SEARCH

What type of search do you wish to do?

1. TIL — Title, journal title, series title, etc.
2. AUT — Author, illustrator, editor, organization, conference, etc.
3. A-T — Combination of author and title.
4. SUB — Subject heading assigned by library.
5. NUM — Call number, ISBN, ISSN, etc.
6. KEY — One word taken from a title, author, or subject.

Enter number or code, then press CARRIAGE RETURN

TIL/LEHIGH PATHFINDERS ONLINE

Fig. 7. "Lehigh Pathfinder," a series title search, again, with stacked GEAC commands; a search for all pathfinders online in Lehigh's ILS.

Author Search: CAT/AUT/LEHIGH UNIVERSITY LIBRARIES
 002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *AUTHOR SEARCH
 YourAuthor: matches 2 citations
 (All in this library)

matches: Lehigh University Libraries

Ref#	Author	Title	Date
1	Lehigh University Librarie >	Biotechnology Pathfinder Online	
2	Lehigh University Librarie >	Flexible Manufacturing Systems FMS >	

Type a number to see associated information —OR—
 IND—see list of headings CAT—begin a new search

Enter number or code, then press CARRIAGE RETURN
 2

Fig. 11. "Lehigh University Libraries," an author search, yields menu of same two pathfinders.

-
1. TIL — Title, journal title, series title, etc.
 2. AUT — Author, illustrator, editor, organization, conference, etc.
 3. A-T — Combination of author and title.
 4. SUB — Subject heading assigned by library.
 5. NUM — Call number, ISBN, ISSN, etc.
 6. KEY — One word taken from a title, author, or subject.

Enter number or code, then press CARRIAGE RETURN
 SUB/BIOTECHNOLOGY

Fig. 12. Subject access to the "biotechnology" topic using stacked GEAC commands for subject field search input and "biotechnology" as input term.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH
 matches 2 subjects

	No. of citations in entire catalog
1 Biotechnology	1
2 Biotechnology Periodicals.	2

Type a number to see more information —OR—
 FOR — move forward in this list BAC — move backward in this list
 CAT — begin a new search

Enter number or code, then press CARRIAGE RETURN
 1

Fig. 13. Subject menu output of "biotechnology" search.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

AUTHOR: Lehigh University Libraries

TITLE: Biotechnology Pathfinder Online

IMPRINT: Type "FUL" to see complete record of this guide.

Location	Loan Type	Call Number	Status
F—REF	NOCIRC	SEE "FUL" RECORD	

FUL —see complete citation IND —see list of headings

CAT —begin a new search PRI —print record

Enter code then press CARRIAGE RETURN

CAT/SUB/FERMENTATION#

Fig. 14. Biotechnology Pathfinder Online is selected from menu options and brief record displayed. Note the 690 local subject field use (see fig. 1) since "biotechnology" is not a valid LCSH.

Subject search: CAT/SUB/FERMENTATION

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

Your Subject:

Matches 9 subjects

No. of citations
in entire catalog

1 Fermentation.	34
2 Fermentation Apparatus and supplies.	1
3 Fermentation Bibliography.	1
4 Fermentation Collected works.	3
5 Fermentation Congresses.	9
6 Fermentation Data processing Congresses.	1
7 Fermentation instrumentation.	1
8 Fermentation Laboratory manuals.	1
9 Fermentation Periodicals.	1

Type a number to see more information —OR—

FOR—move forward in this list BAC—move backward in this list

CAT—begin a new search

Enter number or code, then press CARRIAGE RETURN

1

Fig. 15. Subject search: "fermentation" term in input—a valid LCSH.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH

matches 34 citations
(All in this library)

Date

Ref#	Author	Title
1	Aiba, Shuichi,	Biochemical engineering

Fig. 16. Subject search: menu of "fermentation" titles displayed as output. Only first 24 of 34 possible citations are reproduced here.

Ref#	Author	Title
2	Aiba, Shuichi,	Biochemical engineering,
3	Allen, Paul William,	Industrial fermentations /
4	Atkinson, B. (Bernard),	Biochemical reactors /
5	Barker, Horace Albert,	Bacterial fermentations.
6	Blakebrough, Norman.	Biochemical and biological engineer >
7	Charles Pfizer and Company >	Our smallest servants; the story of >
8	Fulmer, Ellis Ingham,	index to the chemical action of mic >
9	Gilardi, Gerald L.,	Glucose nonfermenting gram—negative >
10	Gray, William Dudley,	use of fungi as food and in food pr >
11	Harden, Arthur,	Alcoholic fermentation /
12	Hesseltine, C. William,	Sources and management of micro—org >

Type a number to see associated information —OR—

IND—see list of headings

FOR—move forward in this list

CAT—begin a new search

Enter number or code, then press CARRIAGE RETURN

FOR

[screen 2]

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH
 matches 34 citations
 (All in this library)
 Date

Ref#	Author	Title
13	Italy. Istituto Superiore >	Pilot plant techniques of submerged >
14	Jorgensen, Alfred Peter Ca >	Die mikroorganismen der garungsindu >
15	Jrgensen, Alfred Peter Car >	Micro—organisms and fermentation,
16	Jrgensen, Alfred Peter Car >	Mikroorganismen der Garungsindustri >
17	Lehigh University Librarie >	Biotechnology Pathfinder Online
18	Nord, Friedrich Franz,	Mechanism of enzyme action and asso >
19	Pasteur, Louis,	Etudes sur le vinaigre, sa fabricat >
20	Pasteur, Louis,	Oeuvres de Pasteur
21	Pasteur, Louis,	Studies on fermentation. The diseas >
22	Pederson, Carl Severin,	Microbiology of food fermentations >
23	Peppler, Henry J.	Microbial technology /
24	Peppler, Henry J.	Microbial technology,

Type a number to see associated information —OR—

IND — see list of headings

FOR — move forward in this list

BAC — move backward in this list

CAT — begin a new search

Enter number or code, then press CARRIAGE RETURN

17

Fig. 16. Continued.

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH

AUTHOR: Lehigh University Libraries

TITLE: Biotechnology Pathfinders Online

IMPRINT: Type "FUL" to see complete record of this guide.

Location	Loan Type	Call Number	Status
F—REF	NOCIRC	SEE "FUL" RECORD	

Fig. 17. Biotechnology Pathfinder Online brief record is selected from menu, brief display format.

Enter code or CON (continuation), then press CARRIAGE RETURN
CON

[screen 2]

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH

CONTINUED FROM PREVIOUS SCREEN

NOTES: FMS/MSE includes a wide variety of disciplines—engineering, electronics, management, computer science. Two subject headings listed below specifically cover FMS/MSE: AUTOMATION and MACHINE TOOLS—NUMERICAL CONTROL. Journals to scan: FMS Magazine and Robomatix Reporter. Also search NUM/CAL "670.427 F6191" for a good introduction to this subject. * This is a guide to FLEXIBLE MANUFACTURING SYSTEMS, but this entry is not a record of any one book—it's only a guide. For a complete list of Pathfinders Online, search under TITLE "Lehigh Pathfinders Online." SEARCH THE SUBJECT HEADINGS LISTED BELOW FOR BOOKS AND JOURNALS ON FMS/MSE:

OTHER TITLES: Manufacturing Systems Engineering MSE Pathfinder Online
SUBJECTS: Automatic Control * Automation * Computer Aided Design * Computer Aided Engineering * Computer Aided Manufacturing * Engineering

BRF — see locations and call numbers IND — see list of headings
CON— see next screen CAT — begin a new search
PRI — print record

Enter code or CON (continuation), then press CARRIAGE RETURN
CON

[screen 3]

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH

CONTINUED FROM PREVIOUS SCREEN

SUBJECTS: Automatic Control * Automation * Computer Aided Design * Computer Aided Engineering * Computer Aided Manufacturing * Engineering Design—Data Processing * Group Technology * Industrial Productivity * Machine Tools—Numerical Control * Manufacturing Processes * Production Control * Production Engineering * Production Management * Production Planning * Robot Industry * Robotics * Robots, Industrial * Flexible Manufacturing Systems

BRF — see locations and call numbers IND — see list of headings
CAT — begin a new search PRI — print record

Enter code then press CARRIAGE RETURN
CAT

Fig. 19. Continued.

Subject Search—CAT/SUB/MACHINE TOOLS—NUMERICAL CONTROL

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *SUBJECT SEARCH

Your Subject:	Matches 2 subjects
	No. of citations
	in entire catalog
1 Machine-tools Numerical control.	16
2 Machine-tools Numerical control Congresses.	11

Fig. 20. Subject search: "Machine Tools—Numerical Control."

Type a number to see more information —OR—
 FOR —move forward in this list BAC —move backward in this list
 CAT —begin a new search
 Enter number or code, then press CARRIAGE RETURN
 1

Fig. 20. *Continued.*

Title Search—CAT/TIL/ROBOMATIX REPORTER

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH
 matches 2 citations
 (All in this library)
 YourTitle:
 matches: Robomatix reporter.

Ref#	Author	Title	Date
1		Robomatix reporter.	
2		Robomatix reporter.	

Type a number to see associated information —OR—
 IND —see list of headings CAT —begin a new search
 Enter number or code, then press CARRIAGE RETURN
 1

Fig. 21. *A titles search is done following the notes field recommendation of specific title and the title Robomatix Reporter is input.*

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

TITLE: Robomatix reporter.
 IMPRINT: New York, N.Y.: EIC/Intelligence, [1983-

Location	Loan Type	Call Number	Status
F—IND	NOCIRC	6	

FUL —see complete citation CIT —return to your citation list
 IND —see list of headings FOR —see next citation in list
 CAT —begin a new search PRI —print record

Enter code then press CARRIAGE RETURN
 FOR

Fig. 22. *Brief Record of Robomatix Reporter is displayed.*

002 Lehigh University Lib. —GEAC LIBRARY SYSTEM— *TITLE SEARCH

TITLE: Robomatix reporter.
 IMPRINT: New York, N.Y.: EIC/Intelligence, [1983-
 PHYSICAL FEATURES: v. ; 28 cm.
 NOTES: Call Number: 6 * Vol. 1, no.1 (Apr. 1983)- * For what library has, see Serials Catalog. * Includes an annual index called: Robomatix reporter, annual index

Fig. 23. . . . followed by a "FUL" record.

OTHER TITLES: Robomatix reporter
 SUBJECTS: Robots, Industrial—Periodicals.
 LC CARD: 84645265 * sn 84010986
 ISBN: 0748-1624

BRF — see locations and call numbers CIT — return to your citation list
 IND — see list of headings FOR — see next citation in list
 CAT — begin a new search PRI — print record

Enter code then press CARRIAGE RETURN
 CAT

Fig. 23. Continued.

REFERENCES AND NOTES

1. William E. Jarvis, "Integrating Subject Pathfinders into Online Catalogs," *Database*, 8:65-67 (Feb. 1985).
2. OCLC has used the bibliographic record format in test records with MARC tag descriptions following MARC fields. See OCLC: 3031574, an OCLC test record accessed serendipitously by P. A. Metzger, Lehigh University Libraries on December 27, 1985.
3. ASA (for Automated System Access) is named after Lehigh University's Founder and is Lehigh University Libraries' GEAC Computer International online library catalog. MARC Record Management System input was keyed in with the assistance of Susan Cady, associate director for technical services at Lehigh University Libraries, who also provided input-display suggestions at several points.
4. Consultation with J. Lucia, Lehigh University Libraries' integrated systems manager.
5. See the above-cited Jarvis article, where *guideware* is used to characterize the pathfinder online concept. This term might also be used to characterize other features such as authority records, help screens, user friendly prompts, etc., in a wide variety of online systems. ■■

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Communications

New Library Technologies and Physical Problems

Colin Steele

In recent years the staff at a number of Australian libraries and other institutions, particularly those introducing new technology, have been afflicted with injuries that are called, in an all-encompassing and not entirely useful term, repetition strain injury (RSI).

BACKGROUND

The predominant presenting symptom has been myofascial pain affecting the neck, shoulder, and arm, usually on the dominant (i.e., right) side for movement. In general terms the condition may be referred to as occupational shoulder-arm overuse injury. Scandinavian literature describes it as the cervico-brachial disorder, drawing attention to "static work overload of the musculature of the neck and shoulder girdle in the etiology of the condition." The Australian popular term, RSI, is potentially misleading since it focuses on rapid, repetitive movements of forearms and hands as the sole cause of the disorder—movements made, e.g., during data input and editing or catalog inquiry operations.

RSI has a long history, dating from an eighteenth-century account by Ramacotti, and has been well described in persons engaged in static-repetitive occupations, e.g., production-line workers and telegraphists. What is new is the rising epidemic of shoulder-arm pain among Australian workers over the past two or three years, coincident with the widespread introduction of word processors and computer ter-

minals in our postindustrial society. RSI appears to be much more common (or more commonly reported) in Australia than in other industrialized countries, more prevalent in the public service city of Canberra than in other Australian cities, and much commoner at the Australian National University (ANU) than at other universities.

There is no known single cause of occupation-related shoulder-arm pain. Contributory influences appear to include the following: work overload, particularly if associated with lack of control over the work rate; poor posture; inappropriate design of keyboards and workstation furniture; and emotional tension. Whatever may be its cause or causes, RSI at ANU has led to a good deal of personal suffering and disability, disruption of work schedules, and escalating costs for workers' compensation premiums.

AUSTRALIAN COSTS

A prominent Australian surgeon has asserted that RSI is a "complex medical and psycho-social phenomenon." The surgeon's comment to the Insurance Council of Australia indicated that the problem had reached epidemic proportions in Australia. The report stated that although some assumed the cause of RSI was linked with new technology, "there is really no clear proof of this or any other specific cause." It has been reported that there are now more than twenty thousand claims against insurers for RSI-related injuries nationwide. "Conservative estimates" indicate these will cost the industry at least \$100 million. The Victorian State Insurance Office states that the payout of claims over three years, to 1983, rose from \$200,000 to \$5.5 million.

RECOVERY OR "REHABILITATION"

It has been reported that poor posture, often due to poor ergonomics at workstations, and occupational stress were signifi-

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cant contributing factors. A worrying percentage of patients have become embroiled in the workers' compensation system, and the familiar "delayed recovery" phenomenon ensues. This delayed recovery is attributed to several factors: poor ergonomics is certainly one factor, but the attitude of employers, workmates, doctors, and society at large, combined with the patient's inability to cope with a stressful or unfamiliar situation, are far more potent factors.

It has also been reported that the provision of alternative work duties, which must involve useful but not manually repetitive work, is one of the cornerstones in the treatment of RSI. Once a worker has been ordered to stay at home for more than two weeks with no obvious signs of illness or injury, an "invalid status" develops and, consciously or unconsciously, the patient sometimes maintains symptoms to justify this. Some feel that it is important, therefore, to provide alternative duties and keep the patient in the social context of remaining at work. In a library context this is often a problem, however, because books and terminals are constant features. The main deployment so far has been to areas outside of the technical services.

LIBRARIES

In libraries specifically a nationwide survey is currently being undertaken through the auspices of the Committee of Australian University Librarians (CAUL). It is expected that this survey will reveal widespread incidence of RSI with consequent staff absences and modified duty rosters. Despite changes in job design, work flows, daily exercise, etc., RSI constitutes a serious concern for Australian libraries. The incidence principally has focused on technical services divisions. In this area it is noticeable that existing library operations, such as opening parcels, moving books, and using microfiche readers, have become focal points for RSI as well as terminal use.

It would be useful to know, through *Information Technology and Libraries*, if RSI is not simply an Australian problem, as evidenced by some articles (in which writers have used the general term "kangaroo paw"); some Australian commentators have queried the term "cumulative trauma

disorders," used in America. When I visited the United States in 1985, although I was not addressing the problem directly, it was clear from random observations and discussions with a number of library directors that

1. U.S. libraries did not seem overendowed with ergonomic furniture;
2. key strokes per terminal operator/cataloger, etc., seemed higher in the U.S. than in Australia.
3. stress levels and organizational problems seemed just as prevalent in the U.S., if not more so, as in Australia.

If this is so, why Australia is more RSI-afflicted than America remains puzzling. Is it that American preventative measures are more effective? If they are not, is the affliction termed something else in the U.S. or is it effectively suppressed by individuals who do not have such widespread unionization, access to workers' compensation, etc.? The views of readers would be most welcome (contact University Librarian, Australian National University, G.P.O. Box 4, Canberra. A.C.T. 2601, Australia). ■■

Photocopiers in Libraries: A Potential Health Hazard?

Alan K. M. Chun

A 53-year-old librarian had recurrent palpable purpura (a skin lesion caused by hemorrhage into the tissue) on her ankles and legs. The disease was found to be caused by fumes released from three microfilm photocopiers (reader-printers), which were located near her desk and frequently used. The purpura was resolved after one to two weeks of treatment.¹

INTRODUCTION

Libraries are usually considered rela-

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tively clean, safe, and healthy places to work. However, library automation and technological changes, particularly in the electronic storage and retrieval of information, are making the library working environment more hazardous. Video display terminals and photocopiers, which have become common in libraries today, affect the environment and working conditions of library workers. A number of papers have addressed the issue of video display terminals,^{2,5} but little has been reported in the library literature concerning the health and safety of those who use photocopiers.

The benefits of photocopiers are obvious; however, some questions about their safety have gone unanswered. The purpose of this brief research report is to review and summarize some of the important evidence available on the health effects of using a photocopier over a long duration and to provide recommendations for its healthful use.

The technology of photocopiers has been an ongoing process: a breakthrough came with the development of "dry printing" in the 1960s. Photocopiers presently used may employ one of these techniques: xerography (dry printing), liquid toner transfer, dielectric transfer, or zinc oxide-treated paper. Since xerography is widely used in libraries today, this discussion will focus mainly on the dry printing process, in which small particles are attracted by static electricity onto a photoconductive surface. Most of the substances used in the photocopying process, such as selenium, arsenic, carbon black, and iron oxide, are primarily airway irritants; moreover, because of the ultraviolet radiation and high-voltage discharges during the process, ozone can be produced. All of these chemical substances have an irritative effect on the mucous membranes and respiratory system.

POTENTIAL PROBLEMS

1. Ozone is a highly toxic, irritant gas produced by high-voltage electrical equipment. Photocopying machines utilize relatively high voltages and have been identified as an indoor source of ozone, a recognized potential health hazard.⁶ Ozone can cause irritation of the eyes, nose, and

throat and chest cramps, headaches, dizziness, and fatigue; it impairs the sense of smell and reduces the ability to think.⁷ In the event of severe exposure, it produces pulmonary edema, hemorrhage, and death.⁸ Kleinfeld and others⁹ mentioned severe pulmonary symptoms (edema, bronchopneumonia) along with persistent headaches, fatigue, and exertional dyspnea in workers exposed to ozone. Farrell and others¹⁰ studied the effects of inhaled ozone in humans: their results showed that all subjects complained of chest discomfort and dry cough.

In 1981 the National Institute for Occupational Safety and Health (NIOSH) evaluated the chemical emissions associated with the use of a Minolta electrographic tabletop photocopier in a commercial art studio.¹¹ The machine had previously been situated at the reception area, in which the exhaust discharge blew across the top of an employee's desk; the employee reported symptoms of dry cough, wheezing, substernal pain, and severe headache after the machine was first used in September 1978.

Area air samples were taken at the photocopier for measurement of potential photocopier emissions: ozone, oxides of nitrogen, selenium, and total hydrocarbons. Ozone was the only contaminant present at the photocopier exhaust grill at a level significantly above those found in the art studio area. Bronchoscopy of the affected employee showed acute and chronic bronchitis, but since the affected employee was a cigarette smoker, it was not possible to determine the relative contributions, if any, of chronic-level ozone exposure.

Based on the data obtained during this evaluation study, NIOSH determined that no health hazard exists due to emissions generated during the noncontinuous operation of the office photocopier in its present location. However, it was recommended that the machine should not be operated on a continuous basis (i.e., several hours) in a confined area without adequate ventilation.

In the animal studies, long exposure to a high level of ozone caused inflammation of lung tissue and ultimately, scar tissue formation;¹²⁻¹⁴ however, the long-term effects

of very low ozone levels on humans or animals are not known. Moreover, there is no evidence to suggest that ozone may cause cancer or birth defects.

In many libraries today, especially academic libraries, there are photocopying rooms available for users. The rooms are usually small; and because of the noise created by the machine while operating, the doors are usually closed; it is rather uncomfortable (hot, stuffy, etc.) operating the machine in a small, closed room for an extended period of time. Therefore, it is obviously unwise to locate photocopiers in small, poorly ventilated rooms (unfortunately, some libraries do), particularly if library staff or users have to work in the room or spend several hours each day at the copier.

2. Toners, used by most photocopiers, usually consist of polymer resin and carbon black. Toxicity testing of polymer resin in animal studies indicated that they are essentially nontoxic by inhalation, skin contact, or ingestion.¹⁵ Under normal copier operations, users should not be exposed to the polymer resin. No evidence of cancer production or unusual death rates has been found in the worker populations exposed to carbon black. Nevertheless, when inhaled, the toner may cause respiratory-tract irritation resulting in coughing and sneezing. Therefore, "dry-toner machines should operate on a completely containerized system so that new toner is not spilled when refilling the machine. An automatic machine shut-off system when the waste toner compartment fills is also a desirable feature of a dry copier."¹⁶

3. Ultraviolet light emitted from copiers may cause inflammation of the cornea and skin rashes when there is exposure to radiation with wavelengths in the range of 200–300 nanometers.¹⁷ Operators of photocopiers will seldom be exposed to this radiation range unless the glass plate is removed; nevertheless, with persistent staring, the light may cause some eye discomfort.

4. Copiers generate both noise and heat—some high-speed copiers are very noisy and may generate a considerable amount of heat. Excessive noise and heat

exposure are fatiguing, distracting, and stressful to employees.

RECOMMENDATIONS

1. Servicing and cleaning reduces ozone emissions from photocopiers to an undetectable level.¹⁸

2. A desirable design for a dry copier includes a containerized toner-filling system that activates an automatic shutoff mode when the toner waste container is full.

3. Used toner from a serviced copier should be placed in sealed bags or completely containerized if it is left for in-house disposal.

4. The machine should not be operated for extended periods of time (i.e., several hours) in a confined area without adequate ventilation.

5. Always close the glass-plate cover while copying to avoid eye discomfort.

6. Careful attention should be given to the location of photocopiers in relation to employee work areas, in order to prevent unnecessary stress from the heat or noise of the machine. A good ventilation and air-conditioning system in the library will definitely help to disperse the heat.

7. Ultraviolet light should not emit from the copier.

8. Material-safety data sheets from suppliers would allow users to become aware of the manufacturers' precautions (e.g., use with adequate ventilation, avoid skin contact with toners, etc.).

9. Any increase in complaints from users or staff should be noted and investigated.

RECENT NEW TECHNOLOGY

There is a small range of electronic printers in the market; a laser beam is used to read and re-create the original documents. Laser electronic copiers may produce retinal injury if an operator stares at the beam for a long period.¹⁹

Some public libraries are beginning to install copiers that have a color photocopying capability. This means new dyes will be added to the toner, and careful attention should be given to any toxic properties that these newly included compounds may have.

CONCLUSIONS

Photocopiers are valuable tools for reproduction and dissemination of information in libraries. However, they must be used and constructed in a way that ensures safe and healthy working conditions. Under normal operation (not continuous operation for several hours), when the machine is located in a well-designed area or room with adequate ventilation and is regularly serviced and cleaned, the potential hazards will be greatly reduced. Libraries have been and should always be relatively clean, safe, and healthy places to work.

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The Halo Effect: Psychological Deterrence of Electronic Security Systems

Mary Jane Scherdin

Libraries lack sufficient information on the problems of theft. Not only is greater awareness of the amount of loss needed but

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also effective policies and procedures for dealing with collection security.¹

Libraries large and small are turning toward more sophisticated security programs. In 1984 the total number of electronic security systems in the U.S. was more than thirty-five hundred. However, in a special issue of *Library Trends* on protecting the library, Richard Boss asks, "Are the collections protected by such systems truly secure from theft, or do the librarians have a false sense of security?"²

Even a cautious estimate of library collection loss nationwide indicates that replacement would cost more than 10 percent of a library's annual budget.³ The cost may be even higher when the loss involves not only books but audiovisual materials. Videocassettes, microcomputer diskettes, and audiocassettes are popular targets for thieves. For example, in 1979 Tucson Public Library (Arizona) reported a loss of 54 percent of the nonprint materials at the Woods branch and 52 percent (3,590 items) at the Wilmot branch.⁴

Replacement and reprocessing of materials represent a drain of budget and staff time, and items are increasingly found to be out of print. In addition, inconvenience to users and potential loss of good will when materials cannot be found are even more difficult to measure.

It has been estimated that if a library annually loses 1 percent of a collection containing forty thousand books, an electronic security system can pay for itself in one year. This cost-benefit figure includes putting detector strips in 20 percent of the collection.⁵ However, sensitizing large collections is a fairly expensive procedure. Is it wise to save money by placing detection strips only in selected materials? A study by Sheridan and Martin at Levittown, New York, concluded that the greater the sensitized portion of the collection, the lower the loss rate.⁶ In contrast it has been stated that "the presence of the detection equipment alone would be sufficient to decrease the theft rate significantly."⁷ In an article on bookstore security, John Boscoe of Checkpoint Systems emphasizes that those who are determined to pilfer will always find a way around every system. However, Boscoe adds that the major advantage of

electronic security systems is that the technology intimidates most people, including legions of casual shoplifters. "There's no question that 80% of the effectiveness of these systems is in deterring those who might otherwise be tempted. They'll see the setup and figure, 'Why bother?'"⁸

A study done at the University of Wisconsin-Whitewater attempted to determine if there was a significant difference in the rate of loss before and after installation of an electronic security system. An even more burning question for the author was the psychological deterrent factor of the security system.

Located approximately halfway between Madison and Milwaukee, UW-Whitewater is part of the University of Wisconsin system. Its campus includes more than eleven thousand students and six hundred faculty and academic staff. This study was conducted in the Learning Materials Center (LMC), which has dual functions: a curriculum center for the College of Education and a media center for the entire university.

Because approximately one-third of the LMC collection is made up of audiovisual materials, a decision had to be made regarding the securing of these materials when an electronic security system was purchased. Since the contents of audiocassettes, videocassettes, and microcomputer diskettes are lost if they come into contact with the activator/deactivator unit of a security system, these materials must be treated differently from books. If detector strips were placed in them, they could not be deactivated and would have to be "bypassed" or passed around the sensing screens by hand each time someone left the LMC. If the materials were carried into the main library, located in the same building, the "bypassing" would have to be repeated. College students are more apt to go in and out of the building with their materials than public library patrons who check out materials and do not come back until they have finished using them. Furthermore if some audiovisual materials were stripped and other weren't, student assistants would have to remember to only deactivate materials that wouldn't be damaged by the deactivator.

Since the staff believed that a great part of the success of security systems is due to psychological deterrence, it was decided to protect book materials with detector strips but not to put strips in the audiovisual materials. It was hypothesized that theft of all materials would be reduced, anticipating that students would not realize that audiovisual materials were not "stripped" and would not notice that they were not deactivated at checkout.

Data for this study are taken from yearly inventories of the LMC collection, whose size grew at a very healthy rate from 1980 to 1985. As of February 1985, there were 14,289 print titles and 9,140 audiovisual titles. The print materials that were inventoried included the children's literature collection, the professional methods books for prospective teachers, and the reference collection. Inventoried audiovisual materials were audiocassettes, videocassettes, filmstrips, charts, study prints, film loops, games, kits, models, maps, globes, records, slides, and transparencies. Microcomputer diskettes were not included as they are shelved with reserve materials rather than on open shelves with all other materials.

The security system was installed in the summer of 1982, and loss figures from two years before and two years after the installation will be used (see table 1). It should be noted that library hours and checkout periods remained virtually the same during these years. Inventories were taken in the summer of each year, and searches for missing items were made several times during the following year. Circulation data for these years will also be shown, since it is be-

lieved that book loss and book use are directly correlated.⁹

It was shown that although circulation data between 1981 and 1984 showed an increase of 8 percent for audiovisual materials and 24.9 percent for print materials, loss rates went down 80.6 percent for audiovisual and 83.2 percent for print materials.

In 1981 the first thorough inventory in several years was taken, which accounts for the particularly high rate of loss for that year. In terms of total numbers, the children's books showed the highest rate of loss before the security system was installed: 232 books were unavailable in the 1981 inventory, 108 in 1982; but with the security system, only 18 were missing in both 1983 and 1984.

Professional methods books had the greatest loss rate in proportion to collection size. This collection of "idea books" that are used to plan activities for the classroom was begun in 1979 and contained 201 titles in August, 1980. The 1981 inventory revealed 36 losses, or 18 percent of the collection; 1982 losses were 46, but dropped to only 12 in 1983. In February 1985, the collection had grown to 1,630 titles; the 1984 inventory showed losses of 27, or .06 percent. This was the highest number of losses in any of the print or audiovisual categories during 1984. The professional methods books have a very high circulation rate: in 1983-84 while only 7 percent of the collection comprised these books, they accounted for 14 percent of the circulation. Neither the collection size nor the circulation rate accounts for the high loss rate—39 percent of the total losses in 1984. One student

Table 1.

	Effect of Security System on Losses					
	1980-81	Before		1982-83	After	1983-84
Print	268		154	31		45
Audiovisual	124		94	33		24
Total	392		248	64		69

Comparison of Theft and Circulation						
Year	Theft	Print Circ.	%	Theft	Audiovisual Circ.	%
1980-81	268	10,043	2.67	124	4,884	2.54
1981-82	154	10,766	1.43	94	6,173	1.52

pointed out that not only are these books valuable and full of practical ideas but also contain materials that cannot easily be found elsewhere. These, then, might be an example of materials that people are "determined to pilfer."

Each year the largest losses in the audiovisual collection were in audiocassettes. These are high-risk items that can easily be put in someone's pocket; furthermore, the LMC collects some popular music on cassettes. The losses were 44 in 1981 and 55 in 1982, dropping to 6 in 1983 and 7 in 1984. The deterrent effect of the security system was demonstrated when it was discovered that 5 musical-theater recordings were missing, but their empty cases were still on the shelf. The assumption was probably that there was a detector strip in the case.

Previously, there were no videocassette losses. However, since 1/2-inch VHS tapes have been added to the collection, a few videocassettes have begun to disappear. (This, of course, is the format used in most homes.)

The final inventory in 1984 showed a total of 69 losses from a collection of 23,429—less than 1/3 of 1 percent (.29 percent). A dramatic decline in the loss of both print and audiovisual materials resulted after installation of the security system, especially when growth and circulation figures are considered.

No system is 100 percent effective, but the staff at the UW-Whitewater LMC believes that the theft rate has been brought down to more manageable levels in both the print and audiovisual areas. This can be attributed to the psychological deterrence of the security system.

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Cooperative Cataloging Quality Control in the OCLC Pacific Network

V. Louise Saylor

Note: This paper is based on a presentation given to the Minnesota Interlibrary Network Workshop on Quality Control of the Database, May 2-3, 1985. Although the material has been gathered from various documents written and supplied by Bruce Preslan (assistant director for the Pacific Northwest) and by DiAnn Iverson (senior coordinator in the Claremont office), the arrangement and commentary are strictly my own. V.L.S.

INTRODUCTION

Quality control is the key to achieving optimum cost effectiveness for a library using a bibliographic utility. That is one reason that interest in promoting standards in a shared cataloging environment appears to continue unabated. Therefore, this over-

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view of what one OCLC network has done in this area should be helpful.

With the establishment of a California office at Claremont Colleges in 1975, OCLC Western became a service area. In early 1983 the name was changed to OCLC Pacific Network (hereafter PACNET). The headquarters remains in Claremont, with additional offices in San Francisco, Portland, and Seattle. The staff of ten librarians markets and maintains OCLC services and products in California, Oregon, Washington, Idaho, British Columbia, Alberta, Alaska, and Hawaii.

OCLC member libraries represent the entire spectrum from research to special, while the cataloging personnel manifest all possible varieties of use, expectations, and cataloging education and experience. Dissemination of quality control information and promotion and/or reinforcement of cataloging standards are not easily accomplished with such broad geographical and personal/professional spans. However, over the years, PACNET coordinators and members have devised and implemented many strategies, some of which are unique to this OCLC network.

OCLC PACIFIC NETWORK PEER COUNCIL

The peer council, which includes seven elected catalogers representing different types of PACNET libraries and regions, is a major force for quality control.* Formed in 1979 to focus on such matters, the council usually meets twice a year; its major decisions and actions have included the following:

1. The error rate for individual libraries has concerned the council from the beginning. At each meeting, the group reviews

the institutional error statistics compiled by the coordinator responsible for the peer council. If an institution exceeds the allowable error rate (double the system error rate) in any given quarter, a council member analyzes the type of errors and, usually, writes or phones the head of the catalog department at that institution. Frequently, the council member will cite the OCLC record number for the cataloging copy that has caused problems or will attach copies of the change requests and note the problems with the cataloging. In addition to explaining why these errors cause retrieval and/or use problems, the council member refers the cataloger to the appropriate documentation for guidance and in some cases, recommends that the cataloger(s) attend a pertinent forthcoming workshop.

2. Early on, the council felt that a positive reinforcing element was needed to balance the unavoidably negative aspects of the error reports and the accompanying change requests. So, included with each quarter's error statistics report is an attachment listing institutions that have reduced their error rates to zero from the preceding quarter. The word "CONGRATULATIONS!" replaces "errors reported" statistics. In addition, the council recently strengthened the affirmative approach with a different strategy. In the June 1985 issue of *Pac-News*, the PACNET libraries who in 1984 remained below the annual average allowable error rate while entering a high volume of original input into the on-line union catalog were listed and congratulated. Other libraries without this volume of original input, but qualifying with low error rates, received letters of commendation.

3. Sensing that a cataloger who needs some assistance may hesitate to call a PACNET office for help or even to obtain the name of someone who could help, the council compiled a list of persons willing to answer OCLC tagging or cataloging questions. Through the council's maintenance and distribution of this resource list, an "expert" is only a phone call away.

4. A few years ago, the council members felt that libraries were not using change requests as frequently as they might. Also,

*A former OCLC coordinator, Jeanette Mosey was instrumental in the organization of the council; Bruce Preslan oversaw the council's activities from 1981 through 1985; currently, the peer council is the responsibility of DiAnn Iverson. In an effort to facilitate communication on cataloging-related matters, the OCLC Cataloging Advisory Committee representative frequently makes reports to the council and, in turn, relays its cataloging concerns to Dublin.

there was evidence that submitted requests were not always completed in a manner that facilitated the Online Data Quality Control Section's remedial action. To encourage library staff to use (and to use correctly) the change request form, the council compiled a "change request exercise." This form was distributed widely throughout PACNET.

5. One of the council's most far-reaching quality control actions occurred in November 1982, when the decision was made to develop and implement a buddy system. Nearly two years were spent in fine-tuning the concept and in implementing this unique support system. Details of the buddy system include the following:

- The council compiled a list of experienced catalogers who would be willing to assist either new OCLC members or catalogers with consistently high error rates.

- A cooperative spirit is emphasized throughout.

- The senior buddy has only one buddy at a time.

- The assistance can cover both tagging and cataloging matters.

- The service is voluntary, although some format specialists have been asked to participate.

- Junior buddies pick senior buddies from a list offered during the start-up training. The council felt that the teaming might be more successful if the junior buddy was allowed to choose the partner.

- Senior buddies should have at least one year of OCLC experience, have input at least thirty records a year, and not have exceeded the allowable error rate for the previous four quarters.

- Buddies are paired for a minimum of six months. However, the pairing could last for a year if the junior buddy does not need to do original input during the first few months with OCLC.

- This is not a permanent arrangement—buddies are not forever.

- A senior buddy is not to do the work for the other library—just review it.

- A senior buddy indicates when a certificate of proficiency should be awarded—the peer council awards it.

- The maintenance of the senior buddy

list is an ongoing project for the council.

- The evaluation of the buddy system is ongoing.

In September 1984 pairing for the PACNET buddy system began—with a total of three pairs. The number increased to fourteen pairs by the middle of 1985.

In early 1985, Bruce Preslan sent evaluations to the original pairs. Four responses were received.

One pair (research/small academic) responded that a system that worked for them had evolved. The senior buddy reviewed fifty online records, talked directly to the junior partner for a total of about three hours via the phone, and sent letters, copies of technical bulletins, etc. The senior buddy kept a tally of the errors found during the online review: 72 percent were cataloging errors, while 28 percent were tagging errors. The new-to-OCLC library took the opportunity to enter materials requiring more than basic cataloging knowledge, e.g., German, biblical, and micro materials. The junior buddy noted the assistance with entering data and did not take personally the negative aspects of the contacts with the senior buddy.

Only one person from each of the other pairs responded. One, a cataloger at a new-to-OCLC library, said that the hit rate had been so high that no original input had been required.

The fourth response, from a reviewing librarian, indicated that there had just been initial contacts and that the pairing should continue (presumably through the junior's first input records, whenever that would occur).

Limited though the responses were, one positive factor is clear. The online union catalog now has fifty records that might otherwise not have been there. In addition, the cataloging is of a higher quality than it might have been without experienced guidance. Other conclusions cannot be drawn at this time; yet, the responses (or lack thereof) do suggest that the assignment of buddies in the first few months of OCLC membership may be too soon. The peer council will be examining the survey results and taking further action.

6. During the last meeting in 1984 the

peer council took action to target the inputting of duplicate records. To that purpose a short checklist, "To Avoid Entering a Duplicate," was compiled and distributed via a 1985 *News Update*, a PACNET cataloging newsletter.

OCLC PACIFIC NETWORK STAFF

A second major force for quality control in PACNET is the network staff. From the outset, the administration and coordinators wanted to make the workshops and informational sessions accessible to as many OCLC members as possible. Thus, the decision was made to offer the varied continuing education/workshop activities at no charge to OCLC members attending those sessions. This is probably the single most important element in the promotion of cataloging standards and knowledge throughout the network.

A number of those workshops are provided on a continuing basis by the network staff each year. Information is supplied by the coordinators and local and/or "imported" experts. A total of thirty-seven continuing education workshops was offered in fiscal year 1983-84, with about 1,000 persons in attendance. Twenty-nine workshops were attended by 754 participants in 1984-85.

Even though the workshops are provided free of charge, not every institution can send a staff member, let alone all staff members for whom any given session would be useful. To address this problem and to maximize the dissemination of information, the format training workshops are videotaped. Tapes are available for viewing or for copying from either the Portland or Claremont office. Worth noting is that while the sessions are not produced for videotape, the content is so important that the books-format workshop tape available from the Portland office has a waiting list.

Additionally, the Oregon and Washington users' groups each meet two or three times a year to hear reports from Advisory Committee representatives, to learn what is new at OCLC, and to share information.

Yet, the recurring evidence of the minor, but lingering, lack of complete cataloging

competencies in the field is obvious to the PACNET coordinators and the peer council though feedback from the buddy system, from the analyses of the type of errors reported on the change request forms, and from questions that are raised in workshops and training sessions. In response to that perceived need, DiAnn Iverson, senior coordinator, has proposed, and received approval for, a project that will provide cataloging training with an OCLC influence. In a departure from the tradition, a fee will be charged for these workshops. However, some type of scholarship may be provided for libraries that exhibit a special need for the training. The objectives for the two-day seminar include the following:

- The inexperienced cataloger will learn the basics of classification, AACR2 description, and AACR2 choice of entry for library materials.
- The provision of the training will show OCLC's concern for continuing education on all levels.
- The training should relieve OCLC trainers from having to teach AACR2 basics.

Iverson has established a steering committee to guide the development and execution of the workshop. The committee, with advice from the peer council, will establish a budget, select and meet with workshop instructors, develop workshop materials, find sources of funding, and advertise the workshop. Efforts will be made to make the fall 1986 seminars cosponsored events in order to promote OCLC/local cooperation.

CONCLUSION

These new and long-standing strategies—used by coordinators and the peer council to provide continuing enlightenment to PACNET catalogers—evidently have borne some results. Since the fourth quarter of 1979, the total PACNET error rate has never exceeded the allowable error rate and has usually been very close—either side—to the system error rate. This is in light of the fact that both yardsticks have continued to drop; the last being .94 for the 1984 fourth-quarter system error rate. In that quarter, PACNET was at .91. Also worth noting is the fact that statistics show PAC-

NET libraries, while never less than fifth in quantity of originals input and usually among the top three inputters, in second place throughout 1984 with a total of 121,622 original records input.

Broadly based support for quality control prevails in PACNET. Statistics show that the varied, and continuing, efforts that promote cataloging standards are having an impact. Also supporting that perception are the many ways in which PACNET catalogers are willing to devote time and expertise, from serving as a resource person or senior buddy to participating in a number of quality control projects offered by OCLC Dublin. ■■

The Welch Medical Library Services Billing System

Gary Moore

The William H. Welch Medical Library, which serves the Johns Hopkins Medical Institutions (JHMI) through a central library and several satellite service centers located throughout the JHMI complex, has developed an automated billing system for the library's fee-based services. Benefits derived from the system include more accurate and timely invoicing and fund accounting, improved management information on collection and services use, and a significant labor reduction from the manual systems it replaces.

Designed and programmed by Welch systems staff, the services billing system is written in standard MIIS and runs on the same Digital Equipment PDP 11/44 computer as the library's version of the public domain Integrated Library System (ILS), developed at the National Library of Medicine. Several ILS programs and features are incorporated in the system, including the

ILS terminal handling subsystem and user-interface conventions for screen displays and data entry. In addition, appropriate links to ILS data files are made as required by billing system programs.

At the heart of the system, which employs a modular design, is the billing subsystem to which application-specific point-of-service subsystems, such as photocopy services, interface. Interdepartmental billing statements, invoices, and appropriate fund accounting updates are then generated at operator-determined, usually monthly, intervals for all point-of-service transactions placed in billing subsystem files through this interface. All subsystems employ menu-driven user interfaces when online data entry and retrieval are required.

The core billing subsystem and a photocopy services application for the library's self-service copy center were implemented in November 1985. Currently in final testing is a document delivery subsystem that will automate the library's service for locating, photocopying, and delivering materials from the library's collection to JHMI patrons. Additionally, online search services and interlibrary loan subsystems, both of which will automate internal record-keeping for these two services, are in preliminary design. Implementation of all three applications will be completed shortly after the library's conversion from the PDP 11/44 to a new Data General MV-8000 computer in April 1986.

BILLING SUBSYSTEM

Major files in this subsystem include the master account file, active billing transactions, receivables, payments, and a master dictionary containing operating parameters for each subsystem. Through a menu-driven online interface, operators with proper system authorization may add and/or edit account information, enter credits and debits to an account, generate statements and invoices, and obtain various reports on the status of an account.

When a user establishes a services account with the library, information on billing address, users authorized to charge against the account, billing type (direct or

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charged to an internal JHMI account), and service types authorized for an account (e.g., photocopy, document delivery) are entered into the master account file under a unique account-identifier number. Individuals authorized to use an account must also be registered library borrowers, thus establishing a link between the billing system and patron data in the library's ILS circulation files. Currently there are approximately 750 accounts in the system with 2,900 individual users authorized to use these accounts.

As charges are entered against an account from a point-of-service application program, each is time-stamped and entered into the active billing file. Records in this file contain the account number charged, service type, total amount charged, the ILS ID of the user making the charge, and, if applicable, the number of units and unit cost for the transaction. In addition, the account's receivables file record is updated to reflect the dollar amount accrued since the last billing date.

Invoices and statements are batch-produced when requested by an operator. This task is completed off hours during the evening after the request is made. For each account, a statement or invoice is printed on a two-part form for mailing to account holders and/or JHMI accounting departments. Each form provides an itemized list of transactions charged against an account as well as a summary statement indicating total amounts credited and charged to accounts and any past due amounts. The receivables file is also updated at this time to indicate that an account has been billed for the total amount of charges against it for the period. After all accounts in the active transactions file have been billed, the file is copied to a permanent transaction log and a new active file is initialized. As invoice payments or funds transfer notices are received for an account, operators update the payments and receivables files through the subsystem's user-interface menu.

Authorized operators may obtain online reports on general account status, payment histories, and current balances. A number of printed reports providing various patron and account use breakdowns are also avail-

able for production at regular intervals.

PHOTOCOPY SERVICES SUBSYSTEM

Welch Library operates a self-service copy center in which approximately 2.5 million copies are produced annually on eight photocopy machines. To make copies, a user check out an auditoron, a device that plugs into a machine and records the number of copies produced on a six-digit meter. When finished, the user checks in the auditoron. In the manual system, a photocopy clerk would record the auditoron's reading at the time of the check out on a 5-by-8-inch account card, along with the user's name. At check-in, the clerk would record the auditoron's new reading on the account card. Billing was performed by a clerk who would tally the account cards every eight weeks and type statements to be sent to account holders. For cash payments, the auditoron's readings were recorded on a cash transaction log that was used in balancing the cash drawer at the end of each work shift.

The photocopy services subsystem essentially emulates the manual system but with the much greater speed, control, and accuracy generally derived from replacing several boxes of 5-by-8-inch account cards with an online CRT. For example, the time required to prepare and send account invoices and statements has been reduced from five days to three hours. The subsystem is designed for multiple-site operation, thus making it available for use by satellite libraries.

Auditoron check-in and checkout are controlled from a file containing the latest meter readings for each uniquely numbered auditoron registered to a site. This record will also indicate whether an auditoron is in use. Latest reading data is obtained from operator input when the auditoron is checked in.

After selecting "checkout" from the subsystem's main menu, the photocopy clerk is asked to specify the number of the auditoron he or she is checking out. If the specified auditoron is "checked out," the clerk is automatically taken to the check-in function. The clerk may also change an auditoron's

checkout reading, but any such change is noted in a special exception file as a check on unauthorized tampering with auditron readings. For charge transactions, the clerk next wands the barcode label on the user's library card. If a user is authorized to use more than one account, the clerk must select the one that is to be charged. If the user is not authorized to use any account in the system, the transaction is aborted. For cash transactions, the clerk simply signals a "cash" function rather than a user name or barcode to complete an auditron checkout. A complete cash-drawer function is included in the subsystem for handling such transactions.

To check in an auditron, the clerk selects "check in" from the main menu and is then asked to enter the desired auditron number and its meter reading. The subsystem first calculates the number of copies produced by subtracting the auditron's checkout reading as stored in its "charge out" file from the check-in reading as entered by the clerk. The number of copies is then multiplied by the unit cost in effect for the account and/or type of transaction, i.e., charge or cash, to derive the total amount due. For charge transactions, a record is then entered in the billing subsystem active transaction file. In the case of cash transactions, a printed receipt for the user is produced, and the total cash amount is time stamped and filed in a cash-transaction log. This log serves as the basis for cash-drawer closeout reports generated at each shift and day's end.

The photocopy subsystem was implemented in conjunction with the billing subsystem over a three-month period in late 1985. A memo was sent to all account holders in mid-September, advising them of the pending changeover and asking them to return a form updating any and all information for their accounts. The memo also reminded account holders that the new system, unlike the manual one, required all individuals authorized to charge against an account to be registered library borrowers. Account information was then keyed into the master account file as the forms were returned.

The photocopy subsystem went into op-

eration in the Welch photocopy center on November 4. A paper log of all transactions was kept concurrent with the subsystem transactions for approximately one month after start up. This log was used to audit the first batch of invoices produced from the system on December 4. No major program bugs were found during this period, although some minor modifications were made to several programs. The principal problems that did occur stemmed primarily from users wishing to charge who were not entered into the master account file either because they were not registered library borrowers or had not returned account update forms.

During the first four weeks after the subsystem's start-up, more than five hundred new borrowers, more than three times the normal registration rate, were added to the ILS patron file. This would seem to indicate that a significant number of the library's users are what might be called "photocopy only" patrons. Previous to automation, the library had very limited information on these individuals since they need not have been registered borrowers in order to charge photocopies. One of the subsystem's major benefits, however, is that extensive data is now available on photocopy users through linkage to ILS registered borrower data.

DOCUMENT DELIVERY SUBSYSTEM

Welch Library's document delivery service provides convenient access to Welch and satellite library holdings. Users complete a request form at a requesting site library, usually a satellite service center in the JHMI complex. Requests are then forwarded to a filling site library, most often the Welch central library, whose staff then locates, photocopies, and, in some cases, delivers the requested materials to the user. The document delivery subsystem automates the extensive record-keeping and billing logs previously maintained by Welch and satellite library staff for the twenty thousand requests processed annually.

Upon receipt of a request, staff at the requesting site library enters a transaction record by selecting the add-record function

from the subsystem's main menu. Each record contains the requestor's ILS patron ID, the account against which the request is to be charged if any, filling site library and requesting site library codes, and a free-text notes field. In addition, if the requested item is a journal article, the journal's ISSN is included (the subsystem is linked to the library's ILS serials check-in system for journal title and ISSN verification). If the request is for photocopies from a monograph, identifying information is entered in the notes field. All information is validated, time stamped, assigned a unique transaction number, and entered into a document delivery transaction file. The paper request form completed by the user is then forwarded to the filling site library for processing.

Filling site staff may update the status of a transaction, e.g., "not on the shelf," "not owned," etc., as required during processing by selecting the update function from the subsystem's main menu. Transaction records may be retrieved either by unique number or by requesting user's name.

When a request is completed, filling site staff retrieves the transaction record using the update function and enters the number of pages copied along with any additional charges that might be added to a request. The total amount due is then calculated, based on the per-page charges in effect for the filling site library, and an appropriate record is placed in either the billing subsystem's active transactions file or the cash-transaction log file.

Reports available in the subsystem include use breakdowns by patron status, affiliation, and department, by requesting and filling site libraries, and by journal title. All reports are available for any time period specified by the operator.

FUTURE DEVELOPMENTS

The interlibrary loan and online search

service applications now in the preliminary design stage will function in a manner similar to the document delivery subsystem described above. That is, both will provide statistical reporting and billing functions for Welch's forty-two hundred annual online searches and seventy-five hundred interlibrary loans annually.

The services billing system is also designed to serve the library's needs well into the future. The system's modular design, along with the rapid application development capabilities of the MIIS language, will permit easy addition of new point-of-service subsystems as the number of local database systems and services offered to the JHMI community by the Welch Library increases over the next few years. Additionally, the system provides a sound fiscal management tool needed for the effective implementation and use of these systems.

The point-of-service subsystems designed to date are intended primarily for internal record keeping. But, the system also represents a step toward realizing the library's ongoing aim of making Welch systems and services available to users from their homes or offices since these subsystems could also, with moderate programming effort, provide end-user interfaces to Welch services. For example, in the case of the document delivery subsystem a researcher might dial into the ILS computer from his or her office, complete an online request form for materials found in the library's online holdings, and then transmit the request to library staff for processing. Staff would then keep the researcher apprised as to the status of the request through online updating of the record as it is processed. When successfully filled, an appropriate record would be placed in the billing system and the researcher notified accordingly along with delivery, either in electronic or paper form, of the requested materials. ■■

News and Announcements

Drexel Library Quarterly to Cease Publication

The College of Information Studies, Drexel University, has announced plans to discontinue publishing *Drexel Library Quarterly* upon completion of volume 21, which is currently in press.

In explaining the decision, Dean Guy Garrison, chairman of the editorial board, stated, "We are justifiably proud of the contribution that *DLQ* has made to the literature of library and information science. But after 21 years and 84 issues, the time has come for us to focus our attention in other areas."

These areas, he added, include an increased emphasis on curriculum diversification and enrollment building. "With the recent shortage of librarians in certain segments of the job market, and the continuing strong demand for information personnel in the business world, the time is ripe for a renewed public relations and recruitment campaign."

Garrison also mentioned that the addition in 1984 of a highly successful undergraduate program in information systems created new demands on faculty and staff time and caused the college to rethink its priorities.

Although *Drexel Library Quarterly* will no longer publish any new issues after volume 21, number 4, back issues will be available for sale as long as the supply lasts. Out-of-print issues and reprints of single articles will continue to be supplied by University Microfilms (formerly University Microfilms International). ■■

Western Library Network Receives Grant for Optical Disk Products

The Western Library Network has been awarded a \$268,000 grant for bringing laser disk technology to libraries in the Northwest. The grant from the Portland, Ore-

gon-based Fred Meyer Charitable Trust is designed to make the WLN database available to libraries through the use of CD-ROM (Compact Disk-Read Only Memory). On three CD-ROM disks, the network will place listings of more than 8.5 million items held by more than two hundred libraries throughout the WLN service area.

The CD-ROM product, called "LaserCat," will be available to libraries in early 1987. Subscribers will receive quarterly cumulative updates. Each three-disk update will be a total revision, completely replacing all previous issues of the CD-ROM database. "LaserCat" will provide virtually the same data retrieval power as WLN's online system but without telecommunications and inquiry charges. Unique scoping capabilities will allow "LaserCat" users to search just the holdings of their own library, a selected group of libraries, or all libraries with holdings in the database.

The "LaserCat" system, which features easy-to-use and flexible retrieval software, will run on WLN PCs and IBM PCs. Tests are underway to determine further compatibility.

Under terms of the grant, Fred Meyer Trust will fund development and first year production of the CD-ROM project. The grant includes \$60,000 for subsidizing subscribing libraries and emphasizes assistance to smaller libraries. The trust began operation in 1982 and has awarded more than two hundred grants totaling more than \$22 million. Its current assets are valued at more than \$200 million. ■■

Automation at LC

For everyone everywhere who has ever wondered why and how LC created its automated systems, *Automation at the Library of Congress: Inside Views* offers the inside scoop. Written by current and former employees from different LC departments, the publication is the creation

of the LC Professional Association. The collection of articles describes in detail the part automation plays in bibliographic control, collection delivery, and reference and research. Explaining the failures along with the successes, it covers LC automation past, present, and future.

All orders must be prepaid, \$10. With foreign orders please make payment in U.S. dollars and payable through a U.S. bank; with overseas orders please add \$3 additional postage. Order from Library of Congress Professional Association, Library of Congress, Washington, DC 20540. ■■

Twelve University of North Carolina Campuses Acquire LS/2000 System

The University of North Carolina—a system of sixteen public universities—has agreed to acquire LS/2000 for twelve of its campuses. The stand-alone, minicomputer-based local library system will serve more than twenty-seven thousand students, faculty, and staff.

Installation has already begun at Appalachian State University for the Western North Carolina Library Network (including the University of North Carolina at Asheville and Western Carolina University in Cullowhee); Elizabeth City State University; Pembroke State University; and the University of North Carolina at Wilmington.

Installation will begin before 1987 at Fayetteville State University, North Carolina A&T State University, North Carolina Central University, the University of North Carolina at Greensboro, and Winston-Salem State University, which includes the North Carolina School of the Arts.

OCLC will supply hardware, software, terminals, printers, training, and documentation for all of the sites. The twelve campuses join their sister institution, East Carolina University, in utilizing the LS/2000 system and will be linked through a telecommunications network known as LINCNET, which is operated by the University of North Carolina Educational Computer System. The linkage will provide the faculty, staff, and students with access to the resources of their sister institu-

tions as well as those within their own library. ■■

MELVYL and MEDLINE

University of California health researchers will soon have direct access to articles indexed in approximately three thousand health sciences journals, thanks to a three-year, \$521,000 grant from the National Library of Medicine. The Medical Library Resource Grant Project will add the national library MEDLINE database to UC's MELVYL online library catalog. MEDLINE is a primary source of information in the life and health sciences for research, teaching, and patient care.

The UC library system will provide MELVYL/MEDLINE as an educational resource to be shared among more than one hundred libraries in the nine-campus system. UC faculty and students will have unrestricted access. The MELVYL/MEDLINE project will be accomplished as a joint effort of the Division of Library Automation at the Office of the President and UC health sciences libraries. ■■

MicroLinx Serials Management Inaugurated at Many Sites

More than thirty libraries have begun implementing serials management with Faxon's MicroLinx Check-in since its release earlier this year. The module is the first of Faxon's new series of microcomputer software that permits local control of many operations that could previously be performed only through mainframe time-sharing. Automated serials check-in is the central function of the package, with the electronic transfer of claims for processing an added feature. Built-in routing, binding, and financial operations may be enhanced with additional modules.

Academic, medical, business, and federal libraries are among the institutions already transferring their serials data to the new system. Among these initial users are Montana State University, New York State College of Veterinary Medicine, University of Southern California's Norris Medical Library, Seton Hall University, University of Idaho, University of Minnesota-Duluth.

and Westinghouse Electric Corporation.

MicroLinx Check-in performs both single- and multicopy check-in, using the keyboard or a bar code reader and stores detailed bibliographic data, holdings statements, and other pertinent serials information. In addition to electronic claims transfer, the system can generate individual claim letters, routing and binding slips, and a selection of printed reports. It is designed for an IBM PC, XT, or AT. Faxon can provide automatic downloading of titles to create an individual library's database. Also available is software that automatically converts MARC serial records stored on compact disk into MicroLinx format on the PC.

Two pricing options are offered, one with subscription terms geared to the size of a collection. Future releases in the MicroLinx series will include more sophisticated routing, binding, and fund accounting modules, as well as standard interfaces to online catalogs and acquisitions systems. ■■

EBSCO and CLASS

EBSCO Subscription Services and CLASS have announced that EBSCO will provide selected data for the Checkmate II software offered by CLASS, bringing together two suppliers of services and products to the library community to meet the needs of their shared customers.

In this service, bibliographic information from the customer's EBSCO subscription records can be downloaded into the master bibliographic record of CLASS' serials control software, Checkmate II. From the fields supplied by EBSCO, the librarian may develop a profile of selected fields to add to the library's database, bypassing manual input of basic bibliographic data into Checkmate II. Local information, such as holdings, route lists, and local notes are then keyed in. ■■

Vanderbilt Receives Grant to Extend Library Automation

Vanderbilt University's Jean and Alexander Heard Library has received a grant from the Pew Memorial Trust to extend the

electronic information services provided by the library beyond the present implementation of Acorn, the library's NOTIS-based integrated library system.

To support the research and teaching program of the university, the library will use new technologies to make large electronic information files readily accessible. At first, citations to articles will be available, supported by author, title, subject, and keyword searching. In future years, Vanderbilt's campuswide data communication network will distribute electronic information directly to faculty offices and dormitory rooms. The trust grant is for \$750,000 over two years, and the library will seek vendor proposals to support these objectives.

Malcolm Getz, associate provost for Information Services and Technology and director of Heard Library, announced the grant: "We are very excited about the possibility of extending the scope of electronic library services. We have an opportunity to implement systems not commonly found in research libraries, to learn about the difficulties and expense of implementation, and to learn about the usefulness and value placed on the new services by faculty and students. Lessons learned at Vanderbilt should be helpful to other research libraries as they plan new information systems."

Heard Library consists of seven divisional libraries serving the university's schools and programs, including those in medicine and law. These anticipated enhancements build on the library's successful installation of Acorn, an integrated online local book catalog and circulation system. By June 1986, Acorn will support 120 terminals across the libraries. Based on Northwestern University's NOTIS software, Acorn will soon provide keyword and Boolean searching capability using BRS software. The NOTIS office will enhance this software in a variety of ways in the years ahead. ■■

Libraries Network Serials Holdings

Three New York City libraries have initiated a sharing agreement allowing each to access online serials holdings information of the others.

The law libraries of Columbia University, New York University, and the Association of the Bar of the City of New York will be linking their Innovacq library systems. Each library will continue to perform serials check in on its own Innovacq system and will have direct, automatic read access to all three files. Because Innovacq updates check-in records the holdings information provided will be extremely timely. "By having this capability we can more fully utilize the collection strengths of each of our libraries," says Jim Hoover, director of the Columbia University Law Library.

The Innovacq library system is a multi-processor turnkey system developed by Innovative Interfaces of Berkeley, California. There are more than fifty Innovacq installations throughout North America. ■■

Geac Accomplishes ISO/OSI Link with Research Libraries Information Network

Geac Computer Corporation and the Research Libraries Group (RLG) have accomplished what they believe to be the first transfer of bibliographic records between a library information network and a local library processing system using the communications protocols developed by the Linked Systems Project.

RLG has sent cataloging records from its Research Libraries Information Network (RLIN) host computer, an Amdahl 5880 in Palo Alto, California, to a Geac Concept 9000 system in Geac's Markham, Ontario, facility. These records were in the MARC communications format. After the records' transfer, Geac's standard MARC loader software successfully processed them.

The Linked Systems Project (LSP) is a joint multiyear activity of several major bibliographic utilities, including RLG and the Library of Congress, to develop computer-to-computer links between their otherwise incompatible library systems. The resulting communications protocols, called Standard Network Interconnection (SNI), are based on the International Organization for Standardization's Open Systems Interconnection model (ISO/OSI).

Among RLG's members, several—such as Princeton, New York, and Yale

universities—are Geac as well as RLIN users. In response to their requests, RLG and Geac have defined a phased program to implement LSP/SNI together.

The first phase provides the ability to transfer bibliographic records from the RLG's RLIN database to a local Geac system, as additions to the online public access catalog installed in Geac-user libraries, and to transfer records from these sites back to the RLIN database. The development for this phase is finished and testing is under way. New York University will be the "beta test" installation site in spring 1986.

Subsequent phases of the RLG-Geac project will address the development of a broad range of intersystem searching capabilities, based on ISO/OSI and LSP/SNI protocols.

The Geac Concept 9000-based ISO/OSI software package will complement Geac's existing System 8000-based ISO/OSI file transfer software products developed in cooperation with the National Library of Canada. ■■

Sydney Library System Software

Sydney has announced the release of their Sydney Library System software in a version to run on the entire DEC VAX series (VMS operating system).

The Sydney Library System software automates all library functions in five integrated modules and was designed for the small and medium-sized special library. The package is well established in a large number of libraries of all types worldwide in its mini- and microcomputer versions. The new DEC VAX version is designed to address the automation needs of the many libraries whose requirements include DEC hardware. ■■

"Optical Disk Technology at OCLC" Video Now Available

The latest release in the OCLC Video Communications Program, "Optical Disk Technology at OCLC," is now available. In this video, six OCLC staff members describe their research activities in optical disk technology and explore the features, advantages, and disadvantages of the three

types of optical disks: read-only, write-once, and updateable.

The following is a summary of what OCLC staff members who appear in this video program have to say about optical disk technology:

Howard Turtle, director of Office of Technical Planning, briefly describes the three classes of optical disks; discusses their density and practical applications; addresses specific optical disk-related research activities undertaken by OCLC staff, including performance and reliability tests on disk drives and software retrieval packages; and mentions the development of high-level standards to ensure the widespread use of compact disks in library applications.

Terry Noreault, senior research scientist, addresses some of the unique challenges optical disk technology presents software developers; describes major differences between optical and magnetic disks; and discusses the importance of working with the National Information Standards Organization (NISO) to establish necessary standards.

Thomas Hickey, senior research scientist, describes GraphText, an OCLC research project to develop a prototype electronic document delivery system, and

identifies the basic equipment a user will need for the GraphText system.

Mary Marshall, manager of New Services, reviews two special projects designed to make available to libraries optical disk-related products and services: reference applications—this project will concentrate OCLC developmental efforts on reference applications of optical disk storage for library patrons and reference librarians; and cataloging applications—this project addresses the use of optical disks in cataloging applications. Optical disk technology may be an effective means of reducing or eliminating telecommunications costs and enabling libraries to exercise greater local control of cataloging work flows.

Mary Crook, manager, Operations Technical Support, discusses using write-once optical disk drives for archival and mass storage; describes various aspects of write-once drives, including equipment, costs, and performance characteristics; and addresses the application of write-once drives for archival storage at OCLC.

Mike Oskins, associate research scientist, discusses the two types of updateable optical disk units under development—phase-change and magneto-optic—describing how they work in brief detail. ■■

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Information Technology and Libraries

Information Technology and Libraries is the official quarterly journal of LITA, the Library and Information Technology Association.

Information Technology and Libraries publishes material related to all aspects of library and information technology. Some special topics of interest are automated bibliographic control, communications technology, storage and retrieval systems, systems analysis, and video technologies.

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Recent Publications

Book Reviews

Clark, Philip M. *Microcomputer Spreadsheet Models for Libraries: Preparing Documents, Budgets, and Statistical Reports*. Chicago: American Library Assn., 1985. 118p. ISBN: 0-8389-0403-3, soft-cover, \$24.95.

Books in Print lists many titles dealing with electronic spreadsheets. None, however, is primarily concerned with library applications. This is the only volume I have seen that takes the generic microcomputer software of electronic spreadsheets and develops specific models applicable to all libraries.

The book is divided into three sections: "An Introduction to Electronic Spreadsheets," "Organization, Approach, and Conventions," and "Warm-Up Exercises for the Occasional Spreadsheet User." While helpful, the first and last sections are not meant to provide a spreadsheet tutorial. The ninety-seven pages that make up the middle section of the book are most valuable. This section contains twenty-seven formula work sheets and thirty example work sheets. An example work sheet has "the appearance of the completed spreadsheet after you have entered both the formulas and your data." A formula work sheet "resembles a regular worksheet, except the formulas appear where there would be numbers were you using (rather than creating) a spreadsheet." It shows all the formulas that were used to create the example work sheets. Text is also included to describe each figure. To illustrate, there is an example work sheet of a yearly library activity summary report. The example work sheet shows actual monthly figures for circulation activity and information activity plus subtotals, yearly totals, and per capita totals. The corresponding formula work sheet replaces certain figures with the formula entries that were used to create the

spreadsheet. The accompanying text gives specific information concerning column width, text justification, and formula replication. This information is very useful when trying to duplicate the illustrated spreadsheet. Clark uses a generic command language that is very easy to translate into your favorite spreadsheet conventions.

The example spreadsheets and the formula spreadsheets are grouped by application. The groupings are tools for budgets, expenditures, library activities, and collection evaluation; tools for conducting special output measures studies; an introduction to statistical analysis tools, using an electronic spreadsheet; and accessing data from different spreadsheet models. I have used several of the spreadsheets as given and used others as a framework from which I built spreadsheets particular to my own application. The payroll distribution record example and formula spreadsheets were used to develop a payroll spreadsheet for keeping track of student employee pay and hours. The series of examples dealing with output measures should be very helpful to public libraries. Clark has constructed spreadsheets to handle in-library materials use, library visits, program attendance, reference transactions, and materials availability. The statistical analysis spreadsheets cover both simple and complex applications. Descriptive statistics, correlation and regression, frequency distribution, and cross tabulation are some of the statistical tools for which there are models. Librarians involved in empirical research will find the model for calculating sample size useful.

Some examples use the advanced functions that are available in first-generation spreadsheets. AND statements, LOOKUP tables, and IF statements are included in Clark's book. The description of these func-

tions is clear, and their use in context should make it easier for novices to grasp the essential points of the commands. The quality of printing is excellent, considering the large number of figures and tables in the book. In some instances I would have liked the corresponding example spreadsheet and the formula spreadsheet to be on facing pages, so that they could be more easily compared.

The book is easy to use and has wide applicability. I strongly recommend it for both novice microcomputer users who are curious about this thing called an electronic spreadsheet and for experienced spreadsheet users who are looking for additional library applications.—*Pamela Snelson, Drew University, Madison, New Jersey.* ■■

Katz, Bill, ed. *Reference and Online Services Handbook: Guidelines, Policies, and Procedures for Libraries. Vol. II.* New York: Neal-Schuman, 1986, 602p. ISBN 0-918212-49-9, hardcover, \$39.95.

This volume, edited by Bill Katz, is not quite the handbook or compendium of useful and wide-ranging information on managing reference and online services that one might expect from the title. Instead, it is a collection of rather traditional policies on reference collection development, online services, and public access microcomputer use in academic and public libraries. The volume is a supplement to the author's 1982 *Reference and Online Service Handbook*. Although none of the policies duplicate those in the earlier edition, there is not a great deal here to justify the \$39.95 expense.

The bulk of the volume is made up of thirty-nine reference collection policies—twenty-nine from academic libraries and ten from public libraries—and thirty-five online services policies and user aids. Most of the documents are reprinted in full; however, some of the lengthier policies have been excerpted. Surprisingly, some libraries are represented by policies consisting of only a paragraph or two. The policies themselves have obvious use as models for practitioners attempting to develop policies of their own. Unfortunately, despite the book's 1986 publication date, the policies

were collected in 1983. Consequently, many of the contemporary reference department's most challenging policy issues go untreated here. Several of the policies allude to a connection between the print collection and acquisition of online databases. None of the policies seriously addresses this connection, and newer information storage media such as CD-ROM are never mentioned at all.

The online and public access microcomputer policies are also limited by their lack of timeliness. Despite this, libraries that are just now introducing these services will find assistance here in developing policies for basic services. Most of the policies are well written and complete, although one should be aware that all of the online services policies assume that searching will be handled exclusively by librarians. Policies for end-user searching are not represented. The online policies are supplemented by a handful of user aids for database searching and online catalogs.

In addition to the policies and user aids, the volume includes six articles on collection development issues. Four of the articles discuss reference collection policies in academic libraries with the remaining two focusing on the public library. The academic library articles provide practical, useful information on the benefits of reference collection development policies, as well as offering examples and suggestions on how to develop such policies. With four articles on a single subject there is some inevitable duplication.

The two articles on public libraries take a broader perspective than those on academic reference collections. Nathan Josel reviews the development of goals, objectives, and priority structures in public libraries and offers suggestions on how to go about using the information gathered during the goals and objectives process to assure that the reference collection meets the community needs. The second public library article discusses the development of a collection development policy for the Pikes Peak Library District. The reference collection is never specifically mentioned here. The editor explains the inclusion of this article as a means to "give some necessary perspective on collection development

policies and as a reminder that the reference policy statement is part of a larger, broader plan."

Librarians who are in the process of developing reference collection or online service policies may find some useful examples here. However, most libraries that already hold the 1982 *Reference and Online Services Handbook* will find no reason to purchase this volume.—*Patricia Tegler, Kirkland & Ellis, Chicago, Illinois.* ■■

Key Issues in the Networking Field Today.

Network Planning Paper, no. 12. Washington, D.C.: Network Development and MARC Standards Office, Library of Congress, 1985. 88p. ISBN: 0-8444-0518-3, softcover. ISSN: 0160-9742. "Proceedings of the Library of Congress Network Advisory Committee Meeting, May 6-8, 1985."

Maruyama, Lenore S. *The Library of Congress Network Advisory Committee: Its First Decade.* Network Planning Paper, no. 11. Washington, D.C.: Network Development and MARC Standards Office, Library of Congress, 1985. 48p. ISBN: 0-8444-0511-6, softcover. ISSN: 0160-9742.

The Library of Congress Network Advisory Committee was established in 1976 by LC shortly after the creation of the (later named) Network Development Office and the appointment of Henriette Avram as its head and a decade after its MARC1 format experiments, those essential precursors to library networking. By 1976, OCLC was established with a handful of regions contracting with it, the Washington State Library was well under way with its WLN development, the earlier RLG (Columbia, Harvard, NYPL, and Yale) was established, and major individual libraries (Stanford, Northwestern, University of Chicago, for example), had developed significant systems based on the MARC format and, indeed, the MARC tapes.

Clearly, LC felt the need to maintain contact, if not initiative, in these developments. After a meeting with invited representatives of some of the major players, the group formalized as the Network Advisory Committee (NAC). Maruyama's report re-

views the decade of NAC during which the first ten planning papers were issued, a period during which she was associated with the work as an LC staff member.

It is a valuable record, clearly accurate as to the facts of who, what, and when. But it suffers from being almost an "official" history. Sentences such as the closing one on the topic of nationwide network governance—"[NAC] decided to drop this topic from its agenda since the library and information service community had not indicated a strong desire to pursue this issue further"—barely hint at the struggle between the competing philosophies of "bottom-up" versus "top down" planning embodied in that decision. On the whole the report is rather bland and homogenized, quite in keeping with its pretty aqua blue cover.

Bonaparte Dijon Mustard (with seeds) with strong brown ink is the cover color of the twelfth planning paper, "Key Issues," and rightly so. It contains four good, thoughtful, papers presented to NAC at a May 1985 meeting. The papers are by Barbara Evans Markuson with an overview of "Issues in National Library Network Development," Susan K. Martin on "Networks: Changing Roles," Ron Miller on "The Impact of Technology on Library Networks and Related Organizations," and Noel Hanf on "Library Networks and the Law." There is also Henriette Avram's perceptive introduction, which reports on the meeting itself, identifying a handful—a giant's handful, one fears—of major issues in networking and action recommendations.

Three of the writers (Markuson, Martin, and Miller) are (if they will forgive the adjective) veteran network doers and watchers, and their papers show it. Hanf discusses the legal environment and legal processes within which networks operate and sometimes create situations in advance of the law's ability to deal with them (a not uncommon condition in an era of rapid technological development). Unsurprisingly, Markuson, an intellectual force in networking for twenty years, contributes the strongest paper, in which she not only states issues but also traces through the last decade how we got to where we are. One may not agree with everything she writes,

but there is a wonderful whiff of cordite about it, a real sense of people struggling to move the intermediate goal of networking, as well as the final goal of improved information access, forward. Covering some of the same ground, it is a fine counterpoint to Maruyama.

This reviewer has always had a problem with the series title *Network Planning Papers*. Perhaps planning was the initial intention, but over time the NAC meetings, to judge from the papers at least, have become centers of discussion—maybe even a neutral center, which would not be all bad—of serious, often intangible, intractable, problems. There is little evidence that any network has seriously changed its program because of a NAC decision; heaven forbid that NAC should move into active mode. Their discussions are contribution enough. A change of title may *not* be the “Most Unnecessary Serial Title Change of the Year” contender.

Out of curiosity, I looked at the OCLC database for holdings of the planning papers. The merest handful of libraries report holdings, especially considering the number of libraries in networks. Maybe they are in staff collections, uncataloged—fine. Maybe the papers are being passed from hand to hand and read avidly—better. For these books (not just the two under review) are important contributions to shaping one of the major forces that touches our professional lives.—*Glyn T. Evans, Office of the Vice Chancellor for Academic Programs, Policy and Planning, State University of New York, Albany.* ■■

Lambert, Steve, and Suzanne Ropiequet.

CD ROM, the New Papyrus: The Current and Future State of the Art. Redmond, Wash.: Microsoft Pr., 1986. 619p. ISBN: 0-914845-74-8, softcover, \$21.95.

A new technology is emerging. Optical disk data storage allows enormous volumes of textual, visual, and/or audio data to be stored in a very small, highly-resistant-to-damage piece of hardware. The CD/ROM (Compact Disc—Read Only Memory) can store 550 megabytes of data and can be ac-

cessed by a relatively inexpensive reader attached to a personal computer. Like microfiche, after the first disk is created, the cost of subsequent copies can be only a few dollars but, unlike microfiche, CD/ROM data can be searched in an interactive mode using most available information retrieval techniques. All of these bits of information (plus a few demonstrations at library conferences) combine to boggle the mind with possibilities for library applications. However, if this technology is so wonderful, where are all of those wonderful applications?

Normally, when a new technology is developed, it takes many years before an accessible and thoroughly written presentation of the topic is available. Frustrating searches, tantalizing journal articles, sales pitches, phone calls, and a significant time investment can be necessary in order to be prepared to make quality planning decisions regarding the use of new hardware or software. *CD ROM: The New Papyrus* changes all of this. Within the covers of this book are historical, technical, operational, and future visions of this new medium. The introductory section begins with a reprint of a wonderfully anticipatory article published in 1945 by computer pioneer Vannevar Bush. Two additional articles in this section provide a good perspective for consideration of the possibilities and the problems of using CD/ROM. The technical sections begin with a description of the CD system: hardware, system software, retrieval software. Production of CD/ROM is detailed both for straight data preparation and for multimedia possibilities. The following section discusses the elements of design for effectively presenting information via CD/ROM with its special problems for the human interface, for authoring and development, and for project management. There is a section about CD/ROM publishing. Marketing implications for CD/ROM applications are considered, and then library, medical, legal, cartographic, archival, and research applications are reviewed. The appendixes include names and addresses of the 107 contributors and nineteen pages of names, addresses, and telephone numbers of people and organiza-

tions that are valuable CD-ROM resources. The book is well indexed. The softbound book is well constructed and very well designed.

This review comes as the result of a personal investment and not due to the normal book review process: I volunteered to write the review because I am so impressed with the book that I want as many people as possible to know about it. As one might imagine for a book with so many contributors, it does have a few weak articles. However, these are more than balanced by the many brilliant chapters. On the whole it is an excellent, clearly written book. It has both depth and breadth. It provides good insight into limitations associated with the technology and gives good background for the development of appropriate applications. It suggests many applications for libraries and for nonlibrary information sources. I heartily recommend it to anyone who wants to become knowledgeable about CD-ROM possibilities. This book should be in any library science library and is also appropriate for computer science and engineering collections.—*R. Bruce Miller, Indiana University Libraries, Bloomington.* ■■

Mount, Ellis, and Wilda B. Newman. *Top Secret/Trade Secret: Accessing and Safeguarding Restricted Information*. New York and London: Neal-Schuman, 1985. 214p. ISBN: 0-918212-90-1, softcover, \$39.95.

Given the trends of tightening control of access to government information and treatment of information as a commodity, librarians increasingly must be aware of the need to integrate the handling of restricted information into our base of information skills and services. This book provides a useful overview of the considerations in both protecting and retrieving restricted information—with special regard to classified military information and proprietary commercial information.

Part one introduces the concept of restricted information and touches on the problem of balancing the legitimate need to

protect certain government information with the need to uphold the fundamental principle of freedom of access to government information in a democratic society. The laws promoting and limiting access to government information are outlined, and the role of the information professional in preserving the public's rights of access to government information is mentioned.

The scant discussion (in part one and throughout) of the social and political issues surrounding the general topic of the book is disappointing. While the importance of the issues (such as the implications for information transfer of increasing industry-funded research in universities, the dangers of privatizing government information activity, and the difficulties of corporate espionage in an information center) is acknowledged, the discussion is shallow, and the footnotes are frequently inadequate. The omission of substantial theoretical context for so much procedure and the paucity of real-life examples of problems and ethical issues faced in accessing and protecting sensitive data make for reading that is, for long stretches, as dry as a government procedure manual.

The second part of the book concerns the requirements and systems for safeguarding military information. Eighteen different laws, executive orders, and regulations underpinning the U.S. security program are summarized, and the structure and administration of the program are explained. The *Industrial Security Manual for Safeguarding Classified Information* (U.S. Dept. of Defense, 1984) establishes uniform security practices and specifies security requirements. Chapter 4 consists largely of slightly edited excerpts from the *Industrial Security Manual* detailing procedures for obtaining facility and personnel security clearances, considerations in establishing document control systems, and the defining levels of security classification.

Part three is about protecting commercial information, such as corporate financial data, confidential client and legal information, trade secrets, scientific and technical data, marketing data, and strategic plans. A general strategy is laid out for developing a commercial information secu-

urity program, and some specific policy and procedural suggestions are offered. The weakness is in its failure to supply more detail on the process of establishing a corporate information security program. For example, the importance of conducting a thorough security audit is stressed, but no list of sample audit questions is provided, and no reference is given to sources that detail the process.

Systems of protecting restricted information that is stored and manipulated in machine readable form are treated in part four. One chapter treats computer technology and commercial information, with helpful sections on how to conduct an asset protection overview survey and on the common defects of computer security programs. The chapter on security requirements for military computer systems consists mainly of excerpts from the *Industrial Security Manual*. Included are specifications for personnel security and physical security, transmission controls, and procedures for gaining computer system security approval.

Much of the last section, which covers sources and means of obtaining restricted government information, is superfluous. The notion of an eleven-page chapter summarizing sources of government information seems ludicrous for information professionals. The final chapter includes a clear description of how to use the Freedom of Information Act and the Privacy Act to obtain government information that is not readily available. The book concludes with a forty-page appendix providing the text of key legislation governing the handling of restricted information.

The technical and procedural material of the book is already well covered in the computer and security management literature. Government contractors are provided with the *Industrial Security Manual* and receive ample guidance from contracting agencies in complying with government security requirements. Nevertheless, the volume does fill a gap in the library literature by bringing together in a convenient package a great deal of practical information on handling restricted information. One only wishes this compilation had been more richly imbued with the unique perspective

that librarians bring to the many interesting issues that are raised. The book may interest librarians who consult in the construction of small specialized databases and specialists in business information. Corporate information professionals establishing an information security program will find the book a good starting point, and it might prove suitable as a library school text. It is certainly priced for those markets, at \$39.95 for a 214-page paperback. —Samuel Demas, A. R. Mann Library, Cornell University, Ithaca, New York. ■■

Murr, Lawrence E., and others. *Information Highways: Mapping Information Delivery Networks in the Pacific Northwest*. Portland, Oreg.: Hypermap, 1985. 77p. softcover, \$25.

Information Highways is an atlas of information delivery networks in the Pacific Northwest states of Alaska, Washington, Oregon, Idaho, and Montana and is clearly an experiment. In the foreword, Douglas Ferguson, of the Fred Meyer Charitable Trust, which sponsored the work, writes "in making this atlas of current information available before it is flawless or complete, we intend it to be used as a working document not as a reference work" and "this is a work-in-progress."

The preface, by the authors, is somewhat more hopeful: "*Information Highways* is intended as a tool for those who need to get information from one place to another in the region. At its most basic level, it is an Atlas. . . . Finally, it is a Learning Tool—describing the basic essentials of information transmission and retrieval." They also describe the work as a planning tool, helpful in developing "a capability in your organization for sending information electronically" or "to join or help form an information exchange network."

This is a difficult work to review. On the one hand, it is a rich and provocative presentation of a new and potentially radically productive view of information transfer and societal mechanisms. On the other, it is so flawed in the specific that one is seriously diverted from comprehension of its organization, its use, and its stated objectives.

The book is sort of an atlas: it looks like

one from the outside, and it has maps. It also has lists, tables, and a good deal of expository text. The latter is organized into brief nuggets, and relationships between them are supposed to be manifest in their physical juxtapositions and through a series of arrows and lines providing, one hopes, pathways to follow that will create for the reader new ways of looking at things. A fine idea, but this reader ended up more confused than illuminated. Connections are often obscure and misleading, and simple factual errors of both commission and omission are frequent, sometimes merely arresting, but occasionally dangerously misleading. For example, the table of contents consists of a greatly reduced picture of each page, which because layout is so important, helps in suggesting overall logic; a box for each with a topic name; and arrows connecting related boxes. The trouble is that the arrows do not consistently close sets (see, for example, the connection between the entries for page fourteen and page fifteen). Another example: "A database is bibliographic in contrast to a databank which is numeric" (p.17). Clean, but not usually accepted taxonomy and certainly an incomplete division—the more one thinks about it the more misleading it becomes.

The languages of telecommunications and networking are among the most jargon ridden. Some of the information nuggets presented help in reducing the babble, but others create more, as in the example above. Further, a new jargon is introduced. Threaded throughout are terms like *metamap* and *hypermap* which, though no doubt important to cartography, are obscure to most of us. What is worse, the authors have decided that users need to know these things, and so throughout, have included items like "this metamap is a summary form of a hypermap, a combination of network and technology mapping. This network form transcends connectivity mapping, and includes connected concepts and delivery system technologies" (p.35). No doubt there is an important idea in there, but one wonders whether wrestling with it serves the user's purpose. To borrow from the language of systems design, the authors need to do a lot of work on their user interface.

In the preface are examples of how to use the book as an atlas, as a planning tool, and as a learning tool. The examples are seductively fruitful and properly encourage the reader to try his or her own. Unhappily, the organization of the work is not, for this reader, intuitively at hand, and attempts to comprehend it were frustrated by complexity, jargon, and inconsistencies of the sort discussed above. That may be a failing in the reader, who nevertheless suggests that the work is probably not ready for general use for its stated purposes. Rather, it is a first if imperfect try at a new tool, with great potential. It is frustrating that the authors presented it before it was ready and is recommended, as Ferguson disclaims, only as a "work-in-progress" with, one hopes, a productive future in considerably reworked subsequent editions.—*Ward Shaw, Colorado Alliance of Research Libraries, Denver.* ■■

Neway, Julie M. *Information Specialist as Team Player in the Research Process.* New Directions in Librarianship, no. 9. Westport, Conn., and London: Greenwood, 1985. 194p. ISBN: 0-313-24508-8, hardcover, \$29.95.

Never before in the history of our profession have the roles of librarians undergone such dramatic redefinition and reevaluation due to the combined impact of the rapid technological advancements and the problems associated with the sheer amount of information available for consumption.

Julie Neway's message to librarians or information specialists whose job it is to meet the information needs of researchers is fairly clear and straightforward. Information specialists need to seriously rethink and redefine their roles. They need to be more proactive, work in the "natural environment" of their user groups, interact on a one-to-one basis with the researcher, and strengthen their subject expertise relevant to the researchers' area.

Neway fervently promotes the need for information specialists to work "independent of the library as an institution. Libraries will still be used as sources of information, but only one of a variety of possible sources. The emphasis is on being part of

the research team rather than being part of the library as an institution." However, in promoting this position, there tends to be an unnecessary devaluing of the role of the library as an institution.

It is highly debatable whether information specialists need to affiliate more closely with the research user group they service than with their own library institutions. The evidence presented to support Neway's position is weak.

These themes build and expand upon Neway's 1982 dissertation, in which she had investigated the role of the information specialist in an academic research setting. There is some carryover of the thesis writing style, which, while appropriate for a dissertation, does not translate well or smoothly to a book.

The author traces historically the evolutionary roles of subject specialists, clinical librarians, community/team librarians, information officers, and information brokers—all types of information specialists whose primary service groups are researchers. The emphasis is on how these professionals work within a team approach.

Recognizing that researchers vary in their information needs, a significant portion of the book provides the reader with an overview of the research habits and information use patterns of researchers in the social sciences and humanities, as well as in the medical, scientific, and business areas.

Also included in these chapters the reader will find case studies of actual programs that focus on the role of the information specialist as a research team player. The case studies represented are international in scope, with a heavy emphasis on U.S. and British library practices. Many of the cases cited review programs that appeared to be experimental and did not have sustained funding to keep them operational on a long-term basis.

Although the case studies as presented do an adequate job of describing and summarizing user studies attached to these projects, they lack any substantial degree of critical analysis by the author. There does not appear to be any overwhelming evidence in the case studies presented that there is a great surge of information special-

ists who are successful in moving in the role directions that are suggested.

The concluding chapters provide the information specialist with guidelines and how-to tips on what it takes to become a player on the research team as well as offer a brief glimpse into the likely future of librarians as "integrated information specialists."

In writing about the future there is always an opportunity to be creative and imaginative. Unfortunately, the author takes a more reserved approach and focuses on how others view the future of the integrated information specialist.

It is suggested that information specialists will assume a variety of roles including functioning as "electronic librarians," trainers, educators, and as intermediaries between information producers and consumers. It should be noted that many librarians have already moved into these new roles, and this trend already far exceeds the group of librarians who work directly with researchers.

This book, as part of the *New Directions in Librarianship* series, should appeal to those interested in reviewing the past roles and investigating the new roles information specialists will assume as they meet the information needs of the research community.—*Elizabeth A. Titus, Northern Illinois University, DeKalb.* ■■

Rowley, J. E. *Computers for Libraries*. 2d ed. London: Bingley, 1985. 195p. ISBN: 0-85157-388-6, hardcover, \$22.50 from Shoe String, Hamden, Conn.

The second edition of Jennifer Rowley's *Computers for Libraries* covers a wide range of interesting and useful topics. This book has both the strengths and some of the weaknesses of its 1980 predecessor. It provides a brief overview of a complex area—the hardware, software, and uses of computers in libraries—but it is much better in concept than in execution. Cumbersome syntax, inconsistent depth of coverage, lack of focus, and, to some extent, lack of currency mar the final product.

Intended as a "brief overview . . . primarily for students of librarianship and information science," the text treats its broad

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topic in outline. The first two chapters introduce the uses and benefits of computers in libraries and sketch a typical planning process for computerizing a library operation. The next three chapters acquaint the reader with some basic vocabulary and concepts of computing in general. The remainder of the volume is devoted to library applications. Chapters 6 through 9 discuss information retrieval and dissemination: online database searching, current awareness services, and types of printed indexes (e.g., PRECIS, KWIC). The final three chapters focus on what are called house-keeping functions: acquisitions, cataloging, circulation control, serials control, and document delivery. A typical chapter gives an overview to its topic, elaborating on its history or development, citing examples, cases, important points to consider, and references for further reading.

As an example, the chapter entitled "Current Awareness Services" defines these services, emphasizing SDI programs and describing typical current awareness sources. It then explains how SDI systems work, describes in some detail the construction of user-interest profiles, and examines types of SDI output and several SDI hosts. The chapter concludes with new material on use of the electronic journal as a current awareness tool. Four titles are suggested for further reading.

The juxtaposition of overview and specific example in each chapter and the broad range of topics covered are perhaps this book's greatest strengths. However, its important goals are obscured by a number of flaws. Principal among these are lack of focus, organization, clear style, and precise vocabulary. In addition, depth of coverage is inconsistent. For example, types of printed indexes are described in a separate thirteen-page chapter; networks and telecommunications receive a scant four pages. Acquisitions, ordering, and cataloging systems are treated together in a single seventeen-page chapter—several fewer pages than the full-chapter coverage of current awareness services.

Other factors reinforce the general impression of lack of organization and clear focus. Because the material is typically not evaluative, the reader is left with no clear

way to determine what is important in the great number of definitions and topics. The presentation is sometimes laborious, with list after list of decision criteria, procedures to be followed, and characteristics to be considered. The impression is often that these are complete lists, including all points to be considered. (For example: "All searches involve the following steps . . ." or, "Here is a checklist of selection criteria for storage media and memory devices. . .".) This approach tends to understate the ambiguities and the enormously complex and rapidly changing criteria librarians face in choosing and designing computer-based systems.

At least some of the problems with clarity and organization are attributable to the author's choosing to make this edition "essentially an updating" and to retain the basic structure of the first edition. There are surprisingly few changes in some chapters. New topics are sometimes merely appended to, not integrated with, material from the first edition. This technique unduly emphasizes older technology and confuses the reader. In addition, some of the updating is too brief and lacking in fact. For example, the discussion of local area networks is covered in eight lines, four of which are devoted to the author's comment that LANs offer "interesting possibilities [which are] beginning to be exploited."

Criticism of the first edition noted sketchy indexing, poorly laid-out diagrams, poor typography, out-of-date references, and lack of a glossary. On some of these points the book is improved. The index has been revised and expanded. Diagrams and charts are more frequent and more complete. The typography is also better. Some sections have been well revised. The lists of references concluding each chapter are expanded and updated; however, there are still a number of older citations that should have been dropped or replaced. The continuing lack of a glossary is particularly noticeable because of the confusing overall organization.

It may be difficult to write brief books on computers or brief books on libraries; it is considerably harder to combine the two. It is clearly very challenging to cover the topic in some two hundred pages. While the in-

tent of this volume is good, its weaknesses prevent it from providing a solid base of understanding. I would not recommend *Computers for Libraries* for practicing librarians. It has some value as an addition to library science collections, but it is most likely to be useful in conjunction with a more evenly balanced standard text, not as a solid, basic outline for the students of library and information science to whom it is directed. In addition, U.S. readers may have a problem with the heavy use of European examples and the strongly British viewpoint.—*Joan Rapp, San Diego State University, San Diego, California.* ■■

Smith, John W. T., and Zinat Merali. *Optical Character Recognition: The Technology and Its Application in Information Units and Libraries.* Library and Information Research Report, 33. London: British Library, 1985. 125p. ISBN: 0-7123-3047-X, softcover, £17. Distributed in the U.S. by Longwood Publishing Group, Dover, N. H.

Optical Character Recognition is a Library and Information Research Report published by the British Library. The authors state that the report "is intended to be of interest to anyone who is considering optical character recognition (OCR) in an information or library context." A minimal knowledge of OCR and some knowledge of computing is assumed. Many of the details of this work, such as prices and information about specific firms, will be of interest only to libraries in the United Kingdom. In spite of this drawback, *Optical Character Recognition* is thoughtfully arranged, well researched, and, as promised, should be of interest to anyone considering an OCR application.

The report begins with a clear description of how OCR is similar to and different from the related technologies of facsimile and OMR. Various OCR machines, e.g., page scanners, hand-held readers, and slot readers, are then covered in detail. Applications of this technology stressed throughout the text are database input, catalog conversion, and issue systems. A short presentation of the history of OCR describes

the differences between multifont and omnifont machines and is helpful toward understanding the technology.

The authors surveyed OCR users and nonusers in December 1983. Data from thirty-three respondents suggest why 6 percent of the libraries surveyed are OCR users and why the remaining 94 percent are not. The survey is of passing interest and provided the authors with interesting case studies to present in a later chapter.

The four case studies presented give examples of full text database input in a government and public agency, hiring a "bureau" (machines and people) for retrospective input of a bibliographic database and the use of an OCR issue system in a large county library. Each case study describes the background of the organization and project, why OCR was an appropriate solution for a given problem, how the organization selected a particular machine or "bureau," the work flow of the project, and a discussion of what kind, if any, problems were encountered.

The largest section of this work (forty-five pages) is devoted to a survey of OCR equipment. The specifications that accompany this kind of equipment are defined, and three types of machine are covered: page readers, hand-held readers, and slot readers. The drawback for Americans is that the price and vendor information presented are limited to the United Kingdom. Nine of the thirteen manufacturing companies listed, however, have plants in the United States, and this section, at the least, provides a good starting point for locating manufacturers who may be of interest.

The authors determined that "during discussions with many current and past OCR users, it was found that much 're-invention' of the wheel had taken place, i.e., the same mistakes had been made, the same problems had been encountered and solved in the same way." Smith and Merali provide basic guidelines for OCR implementation, hopeful of sparing someone those mistakes. They conclude by looking at the future of specific machines, standards, and OCR technology generally.

Because OCR technology is changing rapidly, the information presented is current to 1984 and will need to be updated by

libraries considering OCR applications. For example, one limitation stressed by this text—that OCR machines can only read typewritten text—is being overcome. At least one library with handwritten catalog cards is considering OCR technology to assist with retrospective conversion.

The book is written in expanded outline form, and as the authors point out, need not be read serially. There is an abstract summarizing the contents of each chapter and a very detailed table of contents. There are five appendixes, which include a list of OCR standards, a glossary of technical terms, a functional description of an OCR page reader, and a bibliography.

As one of the few introductory works on OCR available, this work is recommended for anyone wishing to get a feel for the history, scope, and applications of OCR.—*Victoria Ann Reich, National Agricultural Library, Beltsville, Maryland.* ■ ■

Spreitzer, Francis, ed. *Microforms in Libraries: A Manual for Evaluation and Management.* Chicago: American Library Assn., 1985. 63p. ISBN: 0-8389-3310-6, softcover, \$8.95.

Microforms in Libraries reads remarkably well, a pleasant contrast to many academic works, especially those written for scholars or collected by editors, or both. I think that I would have preferred that the subtitle actually follow common practice in libraries, in which the management questions precede those of evaluation. It makes somewhat greater sense to consider how to go about making the right decisions about where to house and otherwise care for microforms and then get to the means of getting them, and finally, know what to do when they arrive.

These considerations, however, are unnecessarily captious. Francis Spreitzer and his colleagues in the Resources and Technical Services Division have done us all an extraordinary service in bringing together, in a coherent whole, information, recommendations, and tips that have been accessible from out-of-print documents, or by word of mouth and chance.

The work begins with a summary of basic information about microforms. The differing advantages and disadvantages of dif-

ferent types of microforms are clearly and unambiguously reviewed. We are then taken through a detailed outline of procedures that should be followed in the acquisition process. Even if the very nature of the micropublishing market results in there frequently not being a choice—either the library wants the work or it does not—it is important for the ongoing development and cultivation of micropublishers if the consumer knows what a well-filmed and packaged microform really is. The librarian may also someday be in a more decisive position with regard to the development of a microform project, and it is desirable that we know that filming involves more than simply putting a book under a camera—and even that process, of course, is not so simple—in order to be able to influence decisions in-process in ways that favor the eventual user.

Spreitzer's work next takes us through a detailed review of reading, printing, and storage equipment, including maintenance and repair. We also learn about inspection, physical environment, and facilities. Finally, and in many ways, most importantly, perhaps because it is the most easily neglected, we come to considerations bearing on microforms and public services. The problem, of course, is that microforms are, relatively, not only passive but also inconspicuous. Thousands of dollars in purchases can be stored in a single cabinet, and the sudden burden of providing catalog records for the likely hundreds of titles involved may produce headaches in technical services and brief or no records in the public catalogs. Moreover, as Spreitzer and his committee know, patrons are loath to acknowledge inexperience and lack of competence in using microform readers and printers, and it takes not only a direct personal relationship but also the positive attitude to which the manual refers in the opening paragraph in this section to result in successful experiences that produce similarly positive attitudes on the part of patrons using our collections.

I wish also to acknowledge the even-handed approach that is taken in this work, wherein issues and concerns about which there are strong feelings, e.g., silver versus nonsilver film, are handled in ways that both appropriately reveal the position of

the editor and his committee and usefully outline the alternatives in a way that lets the reader make an informed rather than a biased judgment.

On very good days, there may be two collections in the country in which the standards that are set out or implicit in the manual are routinely and thoroughly followed. This should not, however, leave only despair for the rest of us. It is important that we, too, have goals toward which to work; that we, too, have some sense beyond intuition of why some microforms are excellent and why some should be admitted to a collection with great reluctance; and that we, too, have a basis for setting priorities within our library's policy-making bodies. This manual, slim though it is, provides the resources for all of this and more. It should be required reading not only for the evaluators and managers of microforms in libraries, who will praise it without prompting, but also for library directors who would seek to be better informed about this underground area.—Louis Charles Willard, Princeton Theological Seminary, Princeton, New Jersey. ■■

Van Young, Sayre. *MicroSource: Where to Find Answers to Questions about Microcomputers.* Littleton, Colo.: Libraries Unlimited, 1986. 220p. ISBN: 0-87287-527-X, softcover, \$22.50 in U.S. and \$27 elsewhere.

Librarians are inundated with books, articles, and workshops on how to implement microcomputers into their daily work routines. Few, if any, books or articles address the other side of the question of libraries and microcomputers—how do libraries serve the microcomputer information needs of their patrons? *MicroSource: Where to Find Answers to Questions about Microcomputers* addresses that part of the question.

MicroSource is packed full of useful citations and advice. It is a reference book of reference sources (as its subtitle states, it is a source for items that have answers to questions about microcomputers, not a source of the answers themselves) and is a most readable book, covering many microcomputer-related topics. But therein lies its greatest drawback—so many topics have

been divided into so many chapters and subsections that finding all useful information about a topic forces the reader to scan more than one chapter. This book deserves the attention of its reader, and its scope is fully appreciated only after thorough browsing.

As stated in its introduction, *MicroSource* is a practical book for practicing librarians. Real questions from patrons were gathered from a variety of libraries of all types, and the focus throughout is on patron needs and day-to-day library situations. Books, serials, and pamphlets are included in the bibliographies, and consideration is given to binding, general layout, and intended age level of materials. An effort is made throughout the book to note low-cost or free sources of information suitable for vertical files. Although the primary focus is medium-size school or public library collections, specific suggestions for academic and special libraries are included where appropriate. There are author/title and subject indexes.

Chapters are arranged by subject, and many chapters have subsections that focus on more specific aspects of the larger topic. The selection of the individual subjects, or more importantly the division of the subjects, is a bit too narrow. Many subjects overlap more than their chapter arrangement suggests. Few aspects of microcomputer use are independent of other aspects, and consultation of two or three related chapters and their subsections is necessary to get a complete picture of information available on a particular subject. For example, software selection and use are described in three chapters. To find a complete listing of sources for questions on word processing software, each of these chapters should be consulted, as many of the titles in one chapter contain complementary or supplemental information for titles in the others.

Each chapter begins with a general explanation of the concept addressed in the chapter. Individual citations are listed alphabetically, followed by an annotation and "Pluses," "Minuses," and "Recommendation" summaries. The annotations and summaries are candid and straightforward. While an alphabetic listing is useful, acquisitions librarians might find it more

helpful to have the titles listed in a most-recommended-first order. This suggested preference listing is accomplished in the last chapter, which recommends titles for a core microcomputer collection. Following the annotated titles are sections on additional titles, which are recommendations for circulating or supplemental reference titles, and a section on pamphlets.

In addition to the expected chapters of hardware and software description, selection, and use, *MicroSource* includes chapters such as "Laws and Outlaws," "VDT's, Ergonomics, and the Human Factor," "Software Publishing Guides and Documentation," and "History and Biography." This reviewer was sorry to see that *The Soul of a New Machine*, by Tracy Kidder, was not included in this list, but the other titles cover the subject well.

Throughout the volume, caution is voiced about the time sensitivity of many microcomputer-related publications. An example of the down-to-earth advice contained in *MicroSource* is the recommendation to buy hardware user guides only for those machines that are still being produced and that have a large installed user base.

MicroSource should be used as a collection development tool. Each library should evaluate the particular needs and interests of its patrons, based on reference questions and current collection use, and then identify titles that will fill the unmet needs. Because *MicroSource* includes titles both broad and narrow in scope, in all price ranges, and in a variety of published formats, identification of titles to start or to round out a microcomputer collection should be a matter of relative ease.

MicroSource provides a much-needed service to librarians who are overwhelmed by the volume of microcomputer-related titles available. *MicroSource* is recommended, with the advice to go through it at least once from beginning to end to get a feel for how and where its information is presented.—Anne S. Hudson, PALINET, Philadelphia, Pennsylvania. ■■

Wood, M. Sandra, ed. *Cost Analysis, Cost Recovery, Marketing, and Fee-Based Services: A Guide for the Health Sciences*

Librarian. New York: Haworth, 1985. 268p. ISBN: 0-86656-353-9, hardcover, \$29.95. "A monographic supplement to the journal *Medical Reference Services Quarterly*, Volume 4, 1985."

An editor of any collection of essays must perform a delicate balancing act in order to integrate theory and practice, giving both their proper weight. M. Sandra Wood has performed such a feat in the book at hand. On the surface it appears that this supplement to *Medical Reference Services Quarterly* is directed solely to health sciences librarians. That is wrong. Readers approaching this book should be on the lookout for much broader applications beyond its intended primary audience. Potential users of this book include academic, public, and special librarians as well as health science librarians. The layout, a curious symmetry of sixteen articles and an annotated bibliography, goes beyond appealing to biomedical librarians and deserves a broader audience.

This book examines the many aspects of financial management. In particular, the collection contains practical articles, as the title implies, on cost analysis and marketing reference services. It also treats the establishment of a fee-based information service. The four *Ps*—product, place, promotion, and price—are given due attention. Most of the articles discuss concepts that are germane to all library operations. What is essential to remember when dealing with marketing and selling the library and its services is that it is not necessary to reinvent the wheel.

One might well ask why it is becoming crucial for librarians to have such a thorough understanding of cost recovery programs. Most large public, academic, and medical libraries need vast sums of money to operate. Automation efforts accelerate those expenditures. Now that automation and the high costs associated with it have passed from novelty to reality in most libraries, cost recovery, marketing, and fee-based services will assume greater importance as a managerial necessity. Unquestionably, efforts at recovering costs promise to emerge as one of the most significant trends in library management. Now it is, or ought to be, conventional wisdom that strategic planning shares the spotlight with cost

recovery as a crucial issue in the profession. Most large libraries currently employ some cost recovery schemes as a matter of course. Charging for photocopy services and online searching helps diminish the high price of doing business for many libraries.

The increased infatuation with cost recovery illustrates that some libraries are grasping the benefits to their operations. However, for too many librarians, two false assumptions are commonly prevalent. The first is that the budgeting will remain constant. In fact, in times of fiscal restraint libraries are the first to get the ax. The second mistaken assumption is that cost analysis need only be done on an administrative level. This is also untrue. Revenue-generating projects are the responsibility of all sections of a library. It should be noted that a department's condition often mirrors that of the parent organization. If a library's discrete units fail to recover costs, the whole library will continue to be perceived as a "bottomless pit" into which administrators pour ever-increasing amounts of money. The smaller constituent units within a library must be made to understand that they cannot take funds without attempting to return at least part of the money. To do this requires creativity, the sort that is partly revealed in this book.

It is with this in mind this Haworth publication was reviewed. Cost analysis is the first topic treated. Of particular merit is the Allgood-Martin article on cost analysis of online search services at the University of Virginia Medical and Nursing Schools library. Another study worthy of mention is a detailed look at the document delivery photocopy service at the Hershey Medical Center, by Partin and Wood.

Section two covers cost recovery for reference services. The articles in this section seem to equate cost recovery efforts with retrieving payment for online searches. Jacqueline Bastille's piece, "Entrepreneurial Hospital Library," deserves special praise for pointing out the business aspects of libraries. The Acari article on the evolution of a library operation from grant funding to a cost recovery basis may be of value to special libraries.

The marketing of reference services constitutes the third part. Jo Ann Bell shares her marketing experience in an exception-

ally revealing article. The two other articles are a good follow-up to the Bell article.

Fee-for-service is the last section of the book. All four articles have something to offer, but the Stefanacci-Martin article on information brokering deserves close scrutiny.

The book is not without faults. Many librarians will object to the business approach to running libraries, fearing that service may suffer. Others will find some of the articles too specific and will be unable to extrapolate the lessons from the biomedical library setting. These are justifiable criticisms, but minor in the long run. In this book the four concepts treated become more than "buzz words." The editor points out that cost accounting and cost analysis have yet to be an identifiable activity in all libraries. As for cost recovery and marketing, they still remain fairly new concepts. Fee-for-service efforts are still the object of acrimonious debate within the profession. Wood should be commended for making the work as readable as it is. This book is highly recommended.—Tom Smith, *Paul Himmelfarb Health Sciences Library, George Washington University, Washington, D.C.* ■■

Other Recent Receipts

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

Armstrong, Chris, and Stella Keenan. *Information Technology in the Library/Information School Curriculum: An International Conference*. Brookfield, Vt., and Aldershot, England: Gower, 1985. 266p. ISBN: 0-566-03526-X, hardcover, \$53.95. "Proceedings of the International Conference on Information Technology in the Library/Information School Curriculum, London, 8-10 December 1983."

Auster, Ethel, ed. *Managing Online Reference Services*. New York and London: Neal-Schuman, 1986. 408p. ISBN: 0-918212-93-6, softcover, \$35.

Buchan, Ronald L. *Integrated Library Systems Bibliography*. Linthicum, Md.: NASA Scientific and Technical Information Facility, 1985. 72p. spiral-bound.

Carberry, M. Sanra, A. Toni Cohen, and Hatem M. Khalil. *Principles of Computer Science: Concepts, Algorithms, Data Structures, and Applications*. Rockville, Md.: Computer Science Pr., 1986. 636p. ISBN: 0-914894-79-X, hardcover, \$34.95.

Cook, Michael. *The Management of Information from Archives*. Brookfield, Vt., and Aldershot, England: Gower, 1986. 234p. ISBN: 0-566-03504-9, hardcover, \$41.50.

Dailey, Jay E. *Staff Personality Problems in the Library Automation Process: A Case in Point*. Littleton, Colo.: Libraries Unlimited, 1985. 147p. ISBN: 0-87287-505-9, hardcover, \$28.50 in U.S. and \$34 elsewhere.

Edelman, Hendrik, ed. *Libraries and Information Science in the Electronic Age*. The Samuel Lazerow Memorial Lectures: 1983-85. Philadelphia: ISI Pr., 1986. 177p. ISBN: 0-89495-058-4, hardcover, \$39.95.

Garfield, Eugene. *Ghostwriting and Other Essays*. Essays of an Information Scientist, V.8. Philadelphia: ISI Pr., 1986. 540p. ISBN: 0-89495-057-6, hardcover, \$35. "Originally published in *Current Contents*."

Gellatly, Peter, ed. *Serials Librarianship in Transition: Issues and Developments*. New York and London: Haworth, 1986. 305p. ISBN: 0-86656-497-7, hardcover, \$38.95. "Has also been published as *The Serials Librarian*, Volume 10, Numbers 1/2, Fall 1985/Winter 1985-86."

Gordon, M., A. Singleton, and C. Rickards. *Dictionary of New Information Technology Acronyms*. 2d ed. Detroit: Gale, 1986. 243p. ISBN: 0-8103-4315-0, hardcover, \$68. "First published in Great Britain in 1984 by Kogan Page."

Grants Thesaurus. Phoenix: Oryx, 1986. 60p. ISBN: 0-89774-335-0, softcover, \$15. "To aid online searchers of the GRANTS Database."

Haftner, Ruth. *Academic Librarians and Cataloging Networks: Visibility, Quality Control, and Professional Status*. Contributions in Librarianship and Information Science, no. 57. Westport, Conn., and London: Greenwood, 1986. 153p. ISBN: 0-313-24821-4, hardcover, \$29.95.

Holzberlein, Deanne. *Computer Software Cataloging: Techniques and Examples*. New York and London: Haworth, 1986. 83p. ISBN: 0-86656-477-2, hardcover, \$22.95. "Has also been published as *Cataloging & Classification Quarterly*, Volume 6, Number 2, Winter 1985/86."

Langman, Larry. *An Illustrated Dictionary of Word Processing*. Phoenix: Oryx, 1986. 289p. ISBN: 0-89774-286-9, softcover, \$29.50.

Luquire, Wilson, ed. *Coordinating Cooperative Collection Development: A National Perspective*. New York and London: Haworth, 1986. 253p. ISBN: 0-86656-543-4, hardcover, \$39.95. "Has also been published as *Resource Sharing and Information Networks*, Volume 2, Numbers 3/4, Spring/Summer 1985."

Manheimer, Martha L. *OCLC: An Introduction to Searching and Input*. 2d ed. New York: Neal-Schuman, 1986. 84p. ISBN: 0-918212-97-9, softcover, \$17.95 or \$12.95 for five or more students.

Markey, Karen, and Anh N. Demeyer. *Dewey Decimal Classification Online Project: Evaluation of a Library Schedule and Index Integrated into the Subject Searching Capabilities of an Online Catalog*. Research Report OCLC/OPR/RR-86/1. Dublin, Ohio: OCLC Online Computer Library Center, 1986. 382p. plus appendixes. Spiral-bound, \$25. "Final Report to the Council on Library Resources."

Middleton, Michael. *Analysis of Inquiry Functions in Online Systems*. Kensington, Australia: School of Librarianship, The University of New South Wales, 1986. 120p. ISBN: 0-85823-527-7, softcover, A \$10.

Roth, Judith Paris, ed. *Essential Guide to CD-ROM*. Westport, Conn., and London: Meckler, 1985. 189p. ISBN: 0-88736-045-9, softcover, \$29.95.

Saffady, William. *Smart Modems for Personal Computer Communications*. Westport, Conn., and London: Meckler, 1986. 84p. ISBN: 0-88736-081-5, softcover, \$19.95 prepaid or \$25.95 with invoicing.

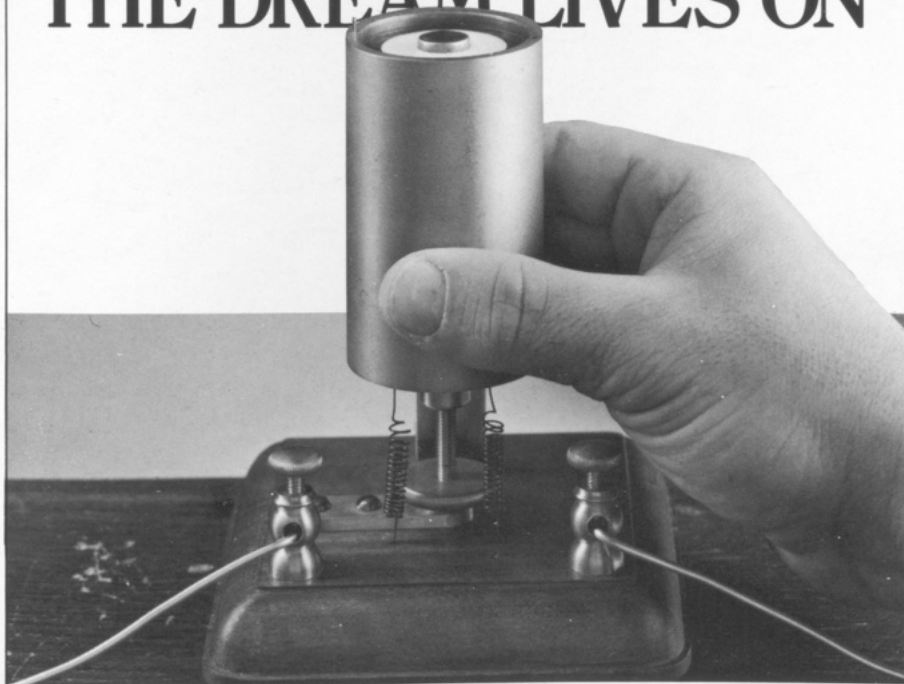
Shapiro, Stuart C. *LISP: An Interactive Approach*. Rockville, Md.: Computer Science Pr., 1986. 150p. ISBN: 0-88175-069-7, spiral-bound, \$19.95.

Stevens, Norman D. *Archives of Library Research from the Molesworth Institute*. New York and London: Haworth, 1985. 109p. ISBN: 0-86656-466-7, hardcover, \$22.95. "A monographic supplement to the journal *Technical Services Quarterly*, Volume 3, 1985."

Thorin, Suzanne E., ed. *Automation at the Library of Congress: Inside Views*. Washington, D.C.: Library of Congress Professional Association, 1986. 57p. Softcover, \$10 prepaid.

Tracy, Joan I. *Library Automation for Library Technicians: An Introduction*. Metuchen, N.J., and London: Scarecrow, 1986. 163p. ISBN: 0-8108-1865-5, hardcover, \$16. ■■

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