ARTICLES

Hong Xu 9 The Impact of Automation on Job Requirements and Qualifications for Catalogers and Reference Librarians in Academic Libraries

Edie Tibbits 33 Binding Conventions for Music Materials

Margaret Mering and Pamela Simpson 41 The Worst of the Worst: Celebrating Twenty Years of the Worst Serial Title Change of the Year Award

Loanne Snavely and Katie Clark 49 What Users Really Think: How They See and Find Serials in the Arts and Sciences

NOTES ON OPERATIONS

Peter Zhou 62 Acquisitions of Hard-to-Find Backfiles of Chinese Periodicals from the People's Republic of China

Paul Conway 67 Selecting Microfilm for Digital Preservation: A Case Study from Project Open Book

Janet Gertz 78 Selection for Preservation: A Digital Solution for Illustrated Texts

Susan Cook Summer 84 Ergonomics Programs and Activities in Research Libraries

FEATURES

Gregory H. Leazer, Editor 93 Book Reviews

102 Letters

103 Instructions to Authors

101 Index to Advertisers

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The Impact of Automation on Job Requirements and Qualifications for Catalogers and Reference Librarians in Academic Libraries

Hong Xu

The purpose of this study is to trace the impact of automation on job requirements and qualifications of catalogers and reference librarians in academic libraries by comparing and analyzing job advertisements from 1971 to 1990. Four periods were identified to reflect the influence of each important library automation development on job descriptions. Chi-square tests were used to see whether there are significant differences between catalog librarians and reference librarians with regard to duties and qualifications in each period; and whether there are significant differences in professional duties and qualifications for catalog librarians and reference librarians over the periods. With the development of automation in libraries, the requirements of previous work experiences for catalogers and reference librarians have become more similar, increasing needs for computer skills can be found in both groups, and a shortage of catalogers and greater demand for reference librarians have led to more entry-level positions being posted in both groups. There still remain differences between catalogers and reference librarians in major responsibilities and knowledge or skills needed.

While the cataloging unit of a library has traditionally been responsible for describing and classifying the library's holdings, thus providing bibliographic access to the collections, the reference unit has been more concerned with the retrieval and transfer of information required by the library user. It is sometimes said that catalogers "like to work with books" while reference librarians "like to work with people." Because of this basic split, the two specialties have tended to become more isolated than integrated over the years, although Miller once noted that "the catalog and reference departments have been called the 'Siamese twins' of library work" (1931, p. 169).

Since the 1970s, as more and more

Hong Xu is a Ph.D. candidate at the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign (hongxu@alexia.lis.uiuc.edu). The critical and very valuable comments of Professor Brett Sutton are gratefully acknowledged. Professor F. W. Lancaster guided and encouraged me throughout this research. Manuscript received April 29, 1995; revised August 21, 1995; accepted for publication September 11, 1995.
technological innovations have been introduced in libraries, more and more members of the library staff have been required to participate in library automation activities. For example, catalogers and reference librarians have been involved in designing, organizing, and using online catalogs. With the implementation of user-friendly online catalogs and the availability of information in CD-ROM format, the roles of reference librarians and catalogers have been changing. Most recently, the development of the Internet, which offers new methods of delivering information to researchers, presents new opportunities and challenges for academic librarians.

There is a general agreement that bibliographic utilities and computer databases have allowed duties once performed by professional catalogers and reference librarians (such as copy cataloging and ready reference) to be executed at a lower organizational level. The new technology has also led to an increasing need for catalogers and reference librarians to have both computer skills and administrative experience.

An analysis of job descriptions for catalogers and reference librarians over several years might indicate the pace of library automation. Job advertisements reflect current priorities and the desires of employers at certain times under certain social conditions. A typical advertisement describes the position and enumerates the required qualifications. Some notices also include preferred or desirable requirements. Therefore, such advertisements might be an indicator of changing duties and responsibilities in the profession.

However, there is a time gap from the implementation of new technology in libraries to the corresponding changes in library professional duties and responsibilities. "Cultural lag," as proposed by American sociologist William Ogburn in his influential book *Social Change with Respect to Culture and Original Nature* (1922), might be the major reason. Ogburn stated that normative and social relationship changes cannot occur instantaneously to keep pace with technological innovations; in fact they might change very slowly. Because technological change results from new combinations of existing technology, the larger the technical knowledge-base of society, the greater the possibility for new combinations, or technological innovations. Therefore technological change (material cultural change) tends to grow exponentially. Nonmaterial culture adapts to material culture, which means that methods, processes, and organizational structures for using and controlling new technology are developed after the acceptance of any new technique. In librarianship, budget limitations and the limited human capacity to absorb and adapt to change (Shreeves 1994) further frustrate the timely evolution of requirements and duties of professionals.

One might find, for instance, that end user online searching and the introduction of CD-ROM systems in academic libraries during the 1980s not only changed user expectations for reference services but also changed the way reference librarians perform their jobs. However, requirements concerning the knowledge of such relevant skills did not immediately appear in job advertisements. Similarly, the advent of the Internet in the 1990s will certainly challenge academic library services and other aspects of librarians' roles. However, because "there is a fundamental difference in the nature of the networked information retrieval tools and the automated systems that have been designed for library use" (Summerhill 1994, 143), reference services for Internet resources have not yet been provided by academic libraries, leading one to expect that job advertisements would not yet show the influence of the Internet.

This study, then, is an attempt to trace the impact of automation on the job requirements and qualifications of catalogers and reference librarians in academic libraries by comparing and analyzing job advertisements from 1971 to 1990.

**BACKGROUND**

Many writers have described and predicted the shifts in library organizational structure, personnel duties, collection de-
velopment expenditures, and user expectations for library services (Nofisinger and Bosch 1994) that have been brought about by automation. A lively discussion of the impact of automation on cataloging and reference work in academic libraries has appeared in library literature since the 1970s, and can be described under three subheadings: (1) impact on catalog librarians; (2) impact on reference librarians; and (3) the relationship between catalog and reference librarians in a continuously changing environment.

**IMPACT ON CATALOG LIBRARIANS**

Cataloging departments began to employ bibliographic utilities such as the OCLC Online Computer Library Center, Inc., to process materials during the early 1970s. Automation of cataloging has had a major impact on technical services staff and jobs. There is a general perception that “original” cataloging departments have shrunk; thus automation has brought about a change in both staff size and composition.

The earliest studies on the impact of bibliographic utilities date from the mid-1970s. Hewitt (1976, 274) found that 63% of the 47 charter OCLC member libraries had reduced cataloging staff, with a total of 76.83 net positions dropped. He concluded that “the majority of libraries adequately staffed prior to use of the system should find it possible to decrease the size of cataloging [departments].”

Since their introduction in the 1970s, bibliographic utilities such as OCLC and the Research Libraries Information Network (RLIN) have played a major role in providing various kinds of automated support for the processing activities required by libraries. Spyers-Duran (1979, 35) showed that, in many libraries, 80% to 90% of all cataloging was performed by nonprofessional staff with the aid of automation. An obvious conclusion was that shared cataloging had reduced the need for professional cataloging in a given library.

In many research libraries, there is now much less original cataloging activity taking place. For example, Mandel (1992) showed that only 20% of the total cataloging output of an Association of Research Libraries (ARL) member university library in 1989 was original cataloging.

However, Hill (1985) and Callahan and MacLeod (1994) both pointed out that pessimistic writings and negative attitudes on the future of cataloging and other factors conveyed the impression that cataloging was an unattractive occupation and that this created a major problem in finding well-qualified catalogers. By 1985 there was a cataloger crisis, which led to the formation of a task force within the Cataloging and Classification Section (CCS) of the Association for Library Collections and Technical Services (ALCTS). After surveying 83 institutions that had advertised 94 positions with cataloging components, the task force found that 64% had reposted positions; 51% reported a disappointing applicant pool; and 77% considered recruitment of catalogers more difficult than it had been three to four years earlier. The cataloger crisis brought about a decline in the quality of catalogers by increasing the number of cataloging positions filled as entry-level positions (Sanders 1986). According to Hoerman (1990), the short supply of catalogers still exists.

The shift from original cataloging to copy cataloging might reduce the need for original catalogers, but new responsibilities for catalogers can also emerge. With the increasing use of local integrated library systems for cataloging, authority control, and online catalogs, there is a need for database maintenance routines within a catalog department. The implementation of online catalogs in libraries requires that catalogers work closely with systems and public service librarians to determine specifications for the cataloging and authority subsystems and the online catalog. The demand for expertise and knowledge of how to organize, retrieve, and display information has grown (Eaton 1989, 331). McCombs (1986) predicted that the cataloger of the future is more likely to be a database manager, with varying responsibilities within the library’s bibliographic control system. In addition to the traditional cataloging knowledge, staff training, and supervisory skills cata-
logers need, they will also need knowledge of planning, designing, coordinating, and systems analysis and relevant computer applications (Hill 1988, 97–98; Bishoff 1989, 41–42).

**Impact on Reference Librarians**

One of the most critical trends in libraries has been the shift from the library-centered organization (with public, technical, and administration services as the basic structural divisions) to organizational structures based upon client-centered divisions aimed at language, subject, or audience groups (Intner 1991). This change implies an increasing demand for reference librarians because reference service has become a major and essential part of public service. Traditionally, circulation and interlibrary loan also belonged to public service, but computer and telecommunication technologies have brought those two activities into the area of more technically oriented services performed by paraprofessionals. On the other hand, every time that the library increases accessibility to information, new constituencies are created along with new demands for public service staffing (Atkinson 1984; Williams 1991).

The first significant move toward automation in reference service can be traced to the introduction of online searching of commercial databases through vendors like DIALOG and BRS. In academic reference work, widespread use occurred in the late 1970s and early 1980s. Most academic reference librarians have been accessing bibliographic databases via OCLC, DIALOG, and BRS for a period of about twenty years. Other databases that were developed later (for example, on CD-ROM) offer different information and require different use protocols or have unique features that must be understood to maximize effective use. Moreover, new databases are emerging each month. Hallman (1990) and Crane (1990) have pointed out that, as a result, reference librarians now need a thorough understanding of electronic information technology.

Constant change in technologies also means that demand for instruction in the use of library resources and services will continue to grow (Lewis 1994, 448). The implementation of user-friendly online catalogs in the early 1980s brought about an increased need for user training and support. The real breakthrough in end user searching came in the mid-1980s with the introduction of optical disc technology into the searching environment—CD-ROM searching. In 1988 OCLC surveyed its participating members and found that seven out of eight academic libraries (84%) had at least one CD-ROM product (Morrison 1990). Reese (1990) pointed out that implementing CD-ROM meant a change in the focus of reference service. Many libraries have made end user instruction an integral part of library services.

With the increasing use of optical disc and other new technologies, a major role of the reference librarian is as teacher, consultant, and organizer (Boss 1987; Reese 1990; Faries 1994). Because answering routine reference questions and other traditional work will often be done by paraprofessionals, reference work will require more than traditional directional and informational assistance. Reference librarians not only have to learn the new printed reference sources, they must also become technological experts in order to stay on top of the constantly changing developments in the field (Huang 1990). Crane (1990) pointed out that reference librarians should have strong backgrounds in information resource management as well as broad general academic credentials. Lewis (1994) stated that subject expertise and liaison with a wide range of clients will become the unifying thread of reference work.

**The Relationship Between Catalog and Reference Librarians**

With the involvement of new technologies in reference services as well as in cataloging, the assimilation of reference and catalog librarians was highlighted.
Arret (1979) was among the first to emphasize the importance of integrating cataloging and reference services. He suggested the need for a flexible and integrated staffing pattern to match the capabilities of an automation system. If reference librarians cannot understand the tools of catalogers (e.g., Anglo-American Cataloguing Rules, second edition [AACR2], Machine-Readable Cataloging [MARC], or Library of Congress Subject Headings [LCSH]) or if catalogers do not understand the “real-world” requests and problems of users, then the online catalog cannot serve users effectively (Walbridge 1991). With libraries changing from library-centered organizations to client-centered divisions, and with the change in attitude from ownership to access, the distinction between technical services and public services is blurring (McCombs 1986) and a new kind of librarian—the holistic librarian—is evolving, with the roles of cataloging and reference services merged.

According to Gorman (1983), the term “holistic librarian” refers to librarians who will carry out the whole range of professional duties, including selection and collection development, reference service, original cataloging, and bibliographic services. The holistic model provides the opportunity to increase the number of librarians who work directly with patrons (Clark and Bingham 1989). Although truly holistic librarians might not be suitable for all kinds of academic libraries, this idea typifies the integration of catalog and reference librarians.

**Methodology**

Several studies based on job advertisements have been conducted in recent years. The major purpose or focus of these, however, has been an analysis of the job market and predictions of possible recruitment trends in the library and information field.

Block (1980) conducted an academic library job market study using a positions announcement file maintained by the Graduate School of Library and Information Science of the University of Texas at Austin. Block examined the characteristics of library positions based upon advertised requirements, providing some data relevant to making career decisions, to hiring, and to designing curricula. Block found that the academic library job market was dominated by rather traditional personnel functions and position offerings (with cataloging and reference comprising nearly half of the total).

In another academic library job content analysis, Reser and Schuneman (1992) compared public and technical services, with regard to computer skills, foreign-language requirements, previous work experience, educational requirements, and minimum salary offered to reflect the situation of the job market in 1988. They concluded that technical services position advertisements required more computer skills and previous work experience and were more than twice as likely to require foreign-language skills. Public services candidates, on the other hand, were expected to have more advanced degrees. It should be noted, however, that one can obtain only limited data from this study because very rough categories were used (e.g., computer skills were divided into “not stated,” “preferred,” and “required”) and because advertisements for only one year were analyzed.

The impact of automation on professional catalogers in different types of libraries was examined by Furuta (1990),
who analyzed job advertisements from 1970 to 1989. Based on pure descriptive statistics about the number of catalogers posted each year, the percentage of jobs requiring automation, nonadministrative jobs with supervisory responsibilities, and nonadministrative jobs with noncataloging duties, Furuta reached the following conclusions: the data neither supported nor rejected the assertion that automation had reduced the need for catalogers; the majority of advertisements mentioned automation; the future of professional catalogers might not lie in an administrative role; and the “holistic” librarian might not constitute a trend in libraries. Because the data the author chose to present represented different types of libraries, and because only descriptive statistics were used, the conclusions might not be accurate for academic libraries.

The data used in the present study were drawn from American Libraries. This journal was chosen because it has a wide circulation and appears to be the traditional place to advertise academic library job openings. Job advertisements about catalogers and reference librarians in academic libraries from 1971 to 1990 were the raw material for analysis. This range of years was selected in order to account for the impact of bibliographic utilities in cataloging departments, as well as the impact of the CD-ROM end user searching service on reference departments.

A random sample of forty issues (two random issues per year) was drawn from 1971 to 1990. Due to seasonal fluctuations, certain issues had more job postings and other issues had fewer. However, this should not have affected the statistical results of the study because random sampling should maximize the information obtained or minimize the bound on the error of estimation (Scheaffer et al. 1986, 79–80). Only full-time positions were recorded, including temporary positions if the contract period was at least nine months. The type of job could sometimes be discerned by its title (catalog librarian, assistant reference librarian, for example), but when the title was vague a type was identified by examining the responsibilities or duties listed.

The sample was stratified by dividing it into four periods in order to trace the influence of each important library automation development on job requirements: 1971–1975, 1976–1980, 1981–1985, 1986–1990. The periods chosen were evenly spaced to reflect fluctuations in the job market and to indicate when certain changes began to appear. Extensive use of OCLC from the mid-1970s might have been the first indicator to distinguish traditional cataloging activity from computer-supported bibliographic activity; online catalogs from the beginning of the 1980s might have been another important movement to bring about changes in technical and public services; and, then, CD-ROM has had a major impact on library services since 1985. The following components (or variables) were grouped: subject knowledge in other academic disciplines, work experience, computer skills, administrative responsibilities, and other skills. After all of the data were accumulated, they were coded so that the Statistical Analysis System (SAS) could be used to analyze the coded data and to provide the descriptive and inferential statistics.

Based on previous studies on catalogers and reference librarians and on the contents of advertisements, the following specific research questions were formulated:

1. Are there any significant differences between catalog librarians and reference librarians with regard to subject knowledge, work experience, computer skills, administrative responsibilities, and other skills in each period?

2. Are there any significant differences in subject knowledge, work experience, computer skills, administrative responsibilities, and other skills for catalog or reference librarians over the periods?

Accordingly, two major hypotheses were to be tested:

1. There are significant differences between catalog librarians and reference librarians with regard to duties (responsibilities) and qualifications (or requirements) in each period.
2. There are significant differences in professional duties (or responsibilities) and qualifications (or requirements) for catalog or reference librarians over the periods.

**Results and Analysis**

The number of positions for catalog and reference librarians over the twenty years and the number of listings that asked for different requirements and responsibilities are shown in tables 1 and 2. As can be seen, 574 postings were announced in forty issues. The overall demand for reference librarians was slightly higher than that for catalogers (over 54% of the total postings were for reference). The number of postings for catalog librarians was somewhat higher than the number for reference librarians in the first period, but after 1976 the demand for the latter jumped from five in 1976 to twenty-five in 1980. Since 1988 the demand for reference librarians has been steady, while the demand for catalogers has continued to rise. However, the absolute number is still lower than that for reference librarians.

While the wide implementation of OCLC and, later, RLIN and other utilities might have caused a temporary surplus of catalogers, online catalogs have created the need for cooperation between catalogers and reference librarians. Thus the number of cataloger postings increased immediately after 1981. The application of CD-ROM, on the other hand, might create an increasing demand for reference librarians.

According to Bishoff (1989, 40–42), there were dramatic increases in the number of libraries during the mid-1970s, which resulted in an increasing need for catalogers. By 1975, because of economic and technical factors, libraries required fewer catalogers. The adoption of bibliographic services such as OCLC, WLN, and RLIN, together with the influence of economic factors, reduced the demand for professional catalog librarians. This might not be consistent with the present findings but, as Furuta (1990) pointed out, the relative lack of advertisements during the 1970s makes it difficult to track the real picture at that time. The example given by Furuta shows that there were 3,467 known placements for all kinds of libraries, of which 2,344 were professional positions. However, the data from her study result in only 102 nonadministrative postings. It is obvious that there were many more vacant positions in the 1970s than the data would suggest (Furuta 1990, 245).

The Library Statistics for Colleges and Universities by the National Center for Educational Statistics (NCES) from 1970–71 to 1987–88 show that the number of librarians increased very slightly over the years, remaining relatively steady until 1984–85, when there was a large drop in the total number of librarians followed by a great upward trend in 1987–88. Cooper (1984, 345) claims that replacement demand, which is the number of jobs that will be created as a result of individuals retiring or leaving their present positions, is the dominant source of new jobs, while expansion demand, which is the number of jobs created as a result of growth in the field, is a small fraction of the total. If automation leads to the reduction of cataloging positions, a large proportion of the postings for catalogers would be for replacement rather than expansion purposes. More expansion positions might occur in reference and other public services. The data collected here do not show the recruitment type. However, based on the sample data, there seem to be slightly fewer cataloging positions advertised than reference positions. There has been an increase in both, although the functions and responsibilities of each job might have changed with the development of automation in academic libraries. This trend is reflected more clearly in figures 1 and 2.

**Subject Knowledge in Other Academic Disciplines**

Since the Association of College and Research Libraries’ (ACRL) board of directors set it as the basic educational requirement for academic librarians, the American Library Association–accredited Master of Library Science (M.L.S.) has gradually become the universal standard
### TABLE 1

**POSITIONS ADVERTISED FROM 1971 TO 1990: CATALOG LIBRARIANS**

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Total: 262 (71-75:25; 76-80:43; 81-85:77; 86-90:120)

**Other biblio. utilities**: CLIS/INNOVACQ/NOTIS/WLN and other specific bibliographic utilities.

†For this subgroup, numbers after “*” represent catalog librarians in administrative positions such as "head of department" or "assistant/associate) director."
### Table 2

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<td></td>
<td></td>
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<tr>
<td>BI</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3</td>
<td>1</td>
<td>8</td>
<td>3</td>
<td>1</td>
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<td>16</td>
<td>3</td>
<td>11</td>
<td>10</td>
<td>19</td>
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</tr>
<tr>
<td>Coll. development</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<td>5</td>
<td>1</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cir/ILL</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
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<td>—</td>
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<td>—</td>
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<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Cataloging/technical</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>6</td>
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<tr>
<td>Communication skills</td>
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<td>—</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*“Online searching (gen.)*: online database searching generally stated.
†"Other dbase searching": CLIO/DELI/GEAC/ISI/LOCKHE/MEDLINE/SDC/STN and other specific databases searching.
For this subgroup, numbers after ": represent reference librarians in administrative positions such as "head of department" or "(assistant/associate) director."
requirement for librarian positions. Therefore, it is not useful to analyze the professional education requirements for catalog and reference librarians. However, subject background knowledge was considered an important element to use to compare the requirements for catalog and reference librarians. Subject background knowledge was grouped into the following categories: second masters de-

Figure 2. Statistics of academic libraries (1970/71-87/88)
degree required; general background knowledge stated (such as subject background knowledge or bachelor's degree in a subject field); and no subject background needed (or none mentioned).

From the advertisements, it is evident that many more reference services positions include a component of book selection or collection development in a specific subject area. Statistically significant differences between catalog and reference librarians in the first period (at p level) and in the other three periods (at p level) were found when considering requirement or preference for subject background (see tables 3A-3D). Over half of the reference positions required subject specializations, whereas very few cataloger postings asked for subject background. During the 1971-1975 period, nearly 67% of positions for reference librarians required or preferred subject knowledge, but only 23% of cataloging positions did; in the second period, the figures are 70% for reference and 27% for cataloging. Since that period, however, there has been a trend to decrease the requirement of subject background for both: 69% in the third period and 54% in the fourth period for reference librarians, and 20% in the third period and 14% in the fourth period for catalog librarians, although no statistically significant differences were found within either group over the four periods (see tables 4A-4B). Increasing demand for reference librarians

### TABLE 3A

**SUBJECT BACKGROUND REQUIRED DURING 1971–75**

<table>
<thead>
<tr>
<th>Type</th>
<th>2nd Master</th>
<th>General Stated</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog librarians</td>
<td>3</td>
<td>2</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>8</td>
<td>24</td>
<td>43</td>
</tr>
</tbody>
</table>

\[X^2=8.421, \text{df}=2, p=0.015\]

### TABLE 3B

**SUBJECT BACKGROUND REQUIRED DURING 1976–80**

<table>
<thead>
<tr>
<th>Type</th>
<th>2nd Master</th>
<th>General Stated</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog librarians</td>
<td>6</td>
<td>6</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>32</td>
<td>13</td>
<td>19</td>
<td>64</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>19</td>
<td>50</td>
<td>107</td>
</tr>
</tbody>
</table>

\[X^2=19.893, \text{df}=2, p=0.000\]

### TABLE 3C

**SUBJECT BACKGROUND REQUIRED DURING 1981–85**

<table>
<thead>
<tr>
<th>Type</th>
<th>2nd Master</th>
<th>General Stated</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog librarians</td>
<td>10</td>
<td>6</td>
<td>61</td>
<td>77</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>34</td>
<td>16</td>
<td>22</td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>22</td>
<td>83</td>
<td>149</td>
</tr>
</tbody>
</table>

\[X^2=35.834, \text{df}=2, p=0.000\]
TABLE 3D

<table>
<thead>
<tr>
<th>Type</th>
<th>2nd Master</th>
<th>General Stated</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Catalog librarians</td>
<td>9</td>
<td>7.50</td>
<td>8</td>
<td>6.67</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>55</td>
<td>35.48</td>
<td>29</td>
<td>18.71</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>23.27</td>
<td>37</td>
<td>13.45</td>
</tr>
</tbody>
</table>

$\chi^2=47.176, df=2, p=0.000$

and the shortage of catalogers, which brought about more entry-level position openings, might be the major reason.

WORK EXPERIENCE

Each advertisement was analyzed to determine whether previous work experience was needed or preferred. Five levels were identified according to the contents of the advertisements: not stated or preferred or desired; work experience required; at least one year or more; at least three years or more; at least five years or more. Because some of the descriptions specified the type of experience required or preferred (e.g., with management experience) and some did not, no attempt was made to distinguish the type of experience when coding for this study.

Although there were no significant differences within either group over the various periods with regard to work experience (tables 5A–5B), cataloging positions with work experience “not stated or preferred or desired” increased from about

---

**TABLE 4A**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>2nd master</td>
<td>3</td>
<td>13.64</td>
<td>6</td>
<td>13.95</td>
<td>10</td>
</tr>
<tr>
<td>General stated</td>
<td>2</td>
<td>9.09</td>
<td>6</td>
<td>13.95</td>
<td>7</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>17</td>
<td>77.27</td>
<td>31</td>
<td>72.09</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>8.40</td>
<td>43</td>
<td>16.41</td>
<td>77</td>
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</table>

$\chi^2=5.021, df=6, p=0.541$

**TABLE 4B**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>2nd master</td>
<td>8</td>
<td>38.10</td>
<td>32</td>
<td>50.00</td>
<td>34</td>
</tr>
<tr>
<td>General stated</td>
<td>6</td>
<td>28.57</td>
<td>13</td>
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<td>16</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>7</td>
<td>33.33</td>
<td>19</td>
<td>29.69</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>6.73</td>
<td>64</td>
<td>20.51</td>
<td>72</td>
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</table>

$\chi^2=8.917, df=6, p=0.178$
TABLE 5A

<table>
<thead>
<tr>
<th>Work Experience Required for Catalog Librarians over Four Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Not stated/prefer</td>
</tr>
<tr>
<td>Required</td>
</tr>
<tr>
<td>1 year or more</td>
</tr>
<tr>
<td>3 years or more</td>
</tr>
<tr>
<td>5 years or more</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

\[X^2=17.801, df=12, p=0.122\]

TABLE 5B

<table>
<thead>
<tr>
<th>Work Experience Required for Reference Librarians over Four Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Not stated/prefer</td>
</tr>
<tr>
<td>Required</td>
</tr>
<tr>
<td>1 year or more</td>
</tr>
<tr>
<td>3 years or more</td>
</tr>
<tr>
<td>5 years or more</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

\[X^2=19.297, df=12, p=0.082\]

32% in the first period to 52% in the fourth period; the comparable increase for reference positions was 48% to 54%. The percentage of jobs requiring or preferring longer work experience (e.g., "three years or more," "five years or more") has decreased. The fact that more entry-level positions were available over the years shows an increasing demand in both areas.

In tables 6A, 6C, and 6D we find that there are no significant differences between catalog and reference librarians in work experience during the first, third, and fourth periods. The frequency distributions indicate, however, that positions for catalog librarians were more likely to require or prefer previous work experience. Reser and Schuneman (1992) explained that the complex rules involved in cataloging require that more time be spent training a cataloger than training a beginning reference librarian. It is economic and effective to seek catalogers with solid work experience. In the second period under study, the reference positions were more likely than the cataloging positions to require five years or more of experience, and the differences are significant at the p level (table 6B). This is probably due to the fact that more of the reference librarian positions in the second period involved administrative responsibilities.

**Computer Skills**

As automation is becoming more pervasive in library services, the degree to which institutions advertise for librarians
TABLE 6A
WORK EXPERIENCE REQUIRED DURING 1971–75

<table>
<thead>
<tr>
<th>Type</th>
<th>Not Stated or Prefer</th>
<th>Required</th>
<th>1 Year or More</th>
<th>3 Years or More</th>
<th>5 Years or More</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Cat. librarians</td>
<td>7</td>
<td>31.82</td>
<td>6</td>
<td>27.27</td>
<td>2</td>
<td>9.09</td>
</tr>
<tr>
<td>Ref. librarians</td>
<td>10</td>
<td>47.62</td>
<td>4</td>
<td>19.05</td>
<td>2</td>
<td>9.52</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>39.53</td>
<td>10</td>
<td>23.26</td>
<td>4</td>
<td>9.30</td>
</tr>
</tbody>
</table>

$X^2 = 1.250, df = 4, p = 0.870$

TABLE 6B
WORK EXPERIENCE REQUIRED DURING 1976–80

<table>
<thead>
<tr>
<th>Type</th>
<th>Not Stated or Prefer</th>
<th>Required</th>
<th>1 Year or More</th>
<th>3 Years or More</th>
<th>5 Years or More</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Cat. librarians</td>
<td>16</td>
<td>37.21</td>
<td>8</td>
<td>18.60</td>
<td>10</td>
<td>23.26</td>
</tr>
<tr>
<td>Ref. librarians</td>
<td>31</td>
<td>48.44</td>
<td>4</td>
<td>6.25</td>
<td>6</td>
<td>9.38</td>
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<tr>
<td>Total</td>
<td>47</td>
<td>49.93</td>
<td>12</td>
<td>11.21</td>
<td>16</td>
<td>14.95</td>
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</tbody>
</table>

$X^2 = 10.538, df = 4, p = 0.032$

TABLE 6C
WORK EXPERIENCE REQUIRED DURING 1981–85

<table>
<thead>
<tr>
<th>Type</th>
<th>Not Stated or Prefer</th>
<th>Required</th>
<th>1 Year or More</th>
<th>3 Years or More</th>
<th>5 Years or More</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Cat. librarians</td>
<td>38</td>
<td>49.35</td>
<td>6</td>
<td>7.79</td>
<td>14</td>
<td>18.18</td>
</tr>
<tr>
<td>Ref. librarians</td>
<td>39</td>
<td>54.17</td>
<td>4</td>
<td>5.56</td>
<td>13</td>
<td>18.06</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>51.68</td>
<td>10</td>
<td>6.71</td>
<td>27</td>
<td>18.12</td>
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</tbody>
</table>

$X^2 = 1.102, df = 4, p = 0.894$

with computer knowledge and skills is an important concern. Does the rapid expansion of computer applications in libraries coincide with the required computer knowledge for a particular job?

In this study, "computer skills" was defined broadly to include knowledge of or experience with any of a wide variety of computer applications, including bibliographic utilities, online database searching, CD-ROM, and other end user searching cases. There is no evidence from the data that catalog and reference librarians require the same computer skills. Advertisements for catalogers always ask for knowledge about OCLC, RLIN, or other bibliographic utilities, while those for reference librarians mainly require experience in searching DIALOG, BRS, or other online services. A job listing might include more than one computer skill for a particular position. No cross-tabulations were made for between-group and within-group analyses.

Computer skills for catalog librarians were divided into the following groups: computer applications, automated cataloging, OCLC, RLIN, and other bibli-
TABLE 6D

<table>
<thead>
<tr>
<th>Type</th>
<th>Not Stated or Prefer</th>
<th>Required</th>
<th>1 Year or More</th>
<th>3 Years or More</th>
<th>5 Years or More</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. librarians</td>
<td>62 51.67</td>
<td>12 10.00</td>
<td>29 24.17</td>
<td>11 9.17</td>
<td>6 5.00</td>
<td>120</td>
</tr>
<tr>
<td>Ref. librarians</td>
<td>84 54.19</td>
<td>15 9.68</td>
<td>32 20.65</td>
<td>16 10.32</td>
<td>8 5.16</td>
<td>155</td>
</tr>
<tr>
<td>Total</td>
<td>146 53.09</td>
<td>27 9.82</td>
<td>61 22.18</td>
<td>27 9.82</td>
<td>14 5.09</td>
<td>275</td>
</tr>
</tbody>
</table>

$X^2=0.562, df=4, p=0.967$

graphic utilities (computer online searching was included although only one listing in 1980 and one listing in 1986 mentioned it). Computer skills for reference librarians were divided into these groups: computer applications, online database searching in general, DIALOG, BRS, other specific online database searching, CD-ROM searching, OCLC, and RLIN.

Since the 1970s, probably the single most significant impact in the area of academic library automation has been the emergence of OCLC and other online bibliographic utilities. Matthews (1980) reflects that only the OCLC utility existed in 1973, at which time it supported only about 80 terminals. By April 1979, approximately 28% of the academic libraries in the United States and Canada had access to a utility: OCLC (26%), RLIN (0.2%), UTLAS (1%), or WLN (0.4%). By 1985, OCLC had grown to cover 6,584 academic libraries (Bourdon 1986). The speed with which libraries have adopted online bibliographic services has been impressive. From table 1 one can see that only one advertisement for catalogers mentioned knowledge of computer applications in 1975. Many more advertisements requiring OCLC experience for catalog librarians and computer online database searching skills for reference librarians have occurred since 1977. Because the impact of automation in recruiting did not take effect until the mid-1970s, the analysis focused on the later three periods.

In figure 3 we find that knowledge of OCLC is most required or preferred for cataloging positions. It accounts for over half of automation systems or computer skills listed in each of the last three periods; although, with the innovations and adoption of other bibliographic utilities, the percentage has decreased after the third period (from about 65% to 58%). RLIN experience was not asked for until 1981 (table 1). Adoption of other bibliographic utilities in the fourth period led to the increased requirement for knowledge of these. Experience in "automated cataloging" was first asked for in the second period (about 11%), rose to 18% in the third period, and since then has declined as the need for specific skills related to bibliographic utilities has gone up.

For reference librarians, experience of computer database searching has been the most important component of job qualifications since 1980 (table 2). A survey of online searching in U.S. colleges and universities conducted by McKinney and Mosby (1986) shows that 41.8% of academic libraries offered in-house searching in 1984. In ten years, the percentage approximately doubled. The survey also showed that the leading vendor for academic libraries was DIALOG (in 87% of the libraries). The other leading vendors were BRS (50%) and SDC (15%). DIALOG and BRS were the two services most widely adopted (see figure 4) in academic libraries during the third period (over 30% of advertisements asked for knowledge of DIALOG or BRS). “Online database searching” experience (service unspecified) applied to 36% of the advertisements in the second period, 43% in the third period, and 47% in the fourth period. A huge increase in the availability of databases, especially on CD-ROM, in aca-
Figure 3. Computer skills required for catalog librarians

Figure 4. Computer skills required for reference librarians

demic libraries during the third period brought about increasing need for skills and knowledge about these databases. The need for CD-ROM experience has increased over the years since 1986 (table 2). General knowledge about computer applications has been given much more attention in the period 1986–1990. Since 1986, also, reference duties have expanded to include familiarity with sources formerly associated with technical services. For example, several positions have asked for OCLC and RLIN experience (table 2).
According to a survey by ARL, over 1,500 commercially available CD-ROM products have been introduced over the past few years to offer patrons the opportunity to obtain information through inexpensive, user-friendly formats since the mid-1980s (Clark 1990). CD-ROM products and databases have become an integral part of research library services and operations. The availability of CD-ROM databases has created a large demand for instruction and demonstration of the searching capabilities of this new technology. Knowledge and skill in using CD-ROM has therefore become essential for reference librarians. However, the job advertisements do not fully reflect this practical requirement. Not until 1987 was CD-ROM experience mentioned. During the period 1986–1990 only 17 of 155 advertisements required CD-ROM experience (table 2). Probably most CD-ROM training (classes, workshops, and seminars) was on-the-job training provided by libraries themselves. Clark (1990) has predicted that demands for instruction, publicity, and technical expertise relating to CD-ROM are likely to continue to grow.

Administrative Responsibilities and Other Skills

Job titles that include the term “head,” “director,” “assistant or associate head or director,” or “coordinator,” and job duties that include the term “supervision,” “management,” or “coordination” were considered as positions that have administrative responsibilities.

Chi-square tests were performed to see whether there were any differences among the periods for cataloging or reference services, and whether catalogers tended to have more management responsibilities than reference librarians with the development of library automation.

In both categories, although the absolute number of jobs requiring supervising, administrative, or coordinating responsibilities increased from period to period, as percentages of total jobs, the management requirements have actually decreased. A job listing that had both supervisory or administrative and coordinating duties was counted once in the “supervision or administration” group. Statistically significant differences were not found for either type over the four periods (tables 7A–7B). From tables 1 and 2 one can see that coordinating did not become one of the job duties throughout the periods studied, ranging from 0 to 11%.

Chi-square tests show that during the first two periods there were no significant differences between catalog and reference librarians with regard to administrative responsibilities (see tables 8A–8B); from the third period, statistically significant differences (at p level) were found (see tables 8C–8D). Obviously, catalog librarians tend to have more administrative responsibilities than reference librarians. During the period 1981 to 1985, catalog librarian postings with supervisory or administrative (44%) and coordinating responsibilities (8%) accounted for 52% of the total of 77 advertisements; whereas reference postings with supervisory or administrative (17%) and coordinating (8%) responsibilities only accounted for about 25% of the total of 72 advertisements. In the fourth period, catalog postings with administrative responsibilities decreased slightly to 47% of the total of 120, and reference postings decreased to 20% of the total of 155. This might be consistent with the views that catalogers tend to have more managerial responsibilities than reference librarians with the development of library automation.

Distinguishing titles with managerial responsibilities from nonadministrative catalog or reference librarian postings, the conclusion that catalogers tend to have more administrative responsibilities than reference librarians can be more strongly supported. Since the first period (tables 1 and 2) the percentage of the advertisements for nonadministrative catalogers requiring supervisory or administrative duties has increased from about 8% to 37%. On the other hand, less than 13% of the advertisements for nonadministrative reference librarians required supervisory or administrative duties, except in the second period, where the figure was 26%. The fourth period decreased to the lowest, about 9%.
TABLE 7A
ADMINISTRATIVE RESPONSIBILITIES FOR CATALOG LIBRARIANS OVER FOUR PERIODS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Super/adminis.</td>
<td>11</td>
<td>50.00</td>
<td>12</td>
<td>27.91</td>
<td>34</td>
</tr>
<tr>
<td>Coordination</td>
<td>0</td>
<td>0.00</td>
<td>4</td>
<td>9.30</td>
<td>6</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>11</td>
<td>50.00</td>
<td>27</td>
<td>62.79</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>8.40</td>
<td>43</td>
<td>16.41</td>
<td>77</td>
</tr>
</tbody>
</table>

χ² = 5.606, df = 6, p = 0.469

TABLE 7B
ADMINISTRATIVE RESPONSIBILITIES FOR REFERENCE LIBRARIANS OVER FOUR PERIODS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Super/adminis.</td>
<td>7</td>
<td>33.33</td>
<td>18</td>
<td>28.13</td>
<td>12</td>
</tr>
<tr>
<td>Coordination</td>
<td>1</td>
<td>4.76</td>
<td>7</td>
<td>10.94</td>
<td>6</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>13</td>
<td>61.90</td>
<td>39</td>
<td>60.94</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>6.73</td>
<td>64</td>
<td>20.51</td>
<td>72</td>
</tr>
</tbody>
</table>

χ² = 11.934, df = 6, p = 0.063

Communication ability, which includes both oral and written skills, is important in management and coordination activities. Communication skills were first mentioned in the second period (tables 1 and 2) for both categories. Since then, the proportion that listed the skills increased to one-fourth for catalog librarians and one-third for reference librarians.

HOLISTIC LIBRARIANS

One view on the future of librarianship is that librarians will become increasingly "holistic." This can be tested by tracking the percentage of catalog postings that include noncataloging duties such as reference, bibliographic instruction, collection development, circulation, and interlibrary loan, and by tracking the percentage of reference postings requiring nonreference duties such as cataloging, collection development, circulation, interlibrary loan, and bibliographic instruction. The data indicate that there are still few catalogers involved in noncataloging duties, although reference duties were included in a cataloger position as early as 1979.

There is no evidence from the sample that catalog librarians were required to have bibliographic instruction, collection development, circulation, and interlibrary loan duties. The major qualification for catalog librarians has been special knowledge of AACR2, LCSH, Library of Congress Classification (LCC), Dewey Decimal Classification (DDC), or the Machine-Readable Cataloging (MARC) format since 1976 (see table 1 and figure 5). One might conclude that overwhelming numbers of positions for catalog librarians asked for knowledge of LCC rather than DDC; with the implementation of online bibliographic systems, the development of cooperative cataloging, AACR2 as cataloging rules, and the MARC format as the standard for coding data for all of bibliographic systems, there is an increasing need for knowledge of LCSH, AACR2, and the MARC format.

Cataloging and other technical services are still not part of the reference
TABLE 8A

**Administrative Responsibilities during 1971–75**

<table>
<thead>
<tr>
<th>Type</th>
<th>Super/Adminis.</th>
<th>Coordination</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Catalog librarians</td>
<td>11</td>
<td>50.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>7</td>
<td>33.33</td>
<td>1</td>
<td>4.76</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>41.86</td>
<td>1</td>
<td>2.33</td>
</tr>
</tbody>
</table>

\[X^2=2.033, df=2, p=0.362\]

TABLE 8B

**Administrative Responsibilities during 1976–80**

<table>
<thead>
<tr>
<th>Type</th>
<th>Super/Adminis.</th>
<th>Coordination</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Catalog librarians</td>
<td>12</td>
<td>27.91</td>
<td>4</td>
<td>9.30</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>18</td>
<td>28.13</td>
<td>7</td>
<td>10.94</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>28.04</td>
<td>11</td>
<td>10.28</td>
</tr>
</tbody>
</table>

\[X^2=0.082, df=2, p=0.960\]

TABLE 8C

**Administrative Responsibilities during 1981–85**

<table>
<thead>
<tr>
<th>Type</th>
<th>Super/Adminis.</th>
<th>Coordination</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Catalog librarians</td>
<td>34</td>
<td>44.16</td>
<td>6</td>
<td>7.79</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>12</td>
<td>16.67</td>
<td>6</td>
<td>8.33</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>30.87</td>
<td>12</td>
<td>8.05</td>
</tr>
</tbody>
</table>

\[X^2=13.545, df=2, p=0.001\]

TABLE 8D

**Administrative Responsibilities during 1986–90**

<table>
<thead>
<tr>
<th>Type</th>
<th>Super/Adminis.</th>
<th>Coordination</th>
<th>Not Mentioned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Catalog librarians</td>
<td>48</td>
<td>40.00</td>
<td>8</td>
<td>6.67</td>
</tr>
<tr>
<td>Reference librarians</td>
<td>24</td>
<td>15.48</td>
<td>7</td>
<td>4.52</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>26.18</td>
<td>15</td>
<td>5.45</td>
</tr>
</tbody>
</table>

\[X^2=23.136, df=2, p=0.000\]

librarian’s job duties. Knowledge of classification, subject headings, or the MARC format was not mentioned in any advertisement for reference librarians, although a few listings have asked for OCLC or RLIN experience since 1986 (see table 2). This suggests that few changes have occurred with regard to integrating the roles of public and technical services librarians since Busch’s survey in 1985. That is, the use of technical services personnel for online searching of refer-
Figure 5. Special knowledge needed by catalog librarians

Bibliographic instruction (BI) was not a firmly entrenched element in academic libraries until 1975, when an ACRL task force provided guidelines for bibliographic instruction in academic libraries. They recognized that the primary role of bibliographic instruction is to provide students with the specific skills needed to successfully use the bibliographic structure housed in the library. Bibliographic instruction has been strongly influenced by changes in library technology. With the development of online catalogs, more and more of a reference librarian's time is likely to be spent providing instruction in the use of electronic sources (Crane 1990). The availability of end user searching (mainly CD-ROM database searching) might mean a further change in the focus of reference service. End user searching will increase greatly the demand and need for user instruction.

In table 2, we see that bibliographic instruction responsibility was specified in advertisements for reference librarians as early as 1978. Since then, more and more have been expected to have bibliographic instruction duties. By 1990, over half of the reference positions specified bibliographic instruction duties (19 of 35 positions), although independent bibliographic instruction departments already existed in some academic libraries and many advertisements for “BI instructor,” “BI coordinator,” or “BI librarian” were seen.

Public services librarians, especially reference librarians who are in daily contact with library users, know the strengths and weaknesses of the collection best. They are in the best position to evaluate the collection in terms of user needs (Bone 1983). Checking table 2 and figure 6, one might find a steadily increasing need for reference librarians to have collection development responsibilities. Figure 6 reflects the trend of increasing bibliographic instruction and collection development duties for reference librarians over the four periods.

Few reference librarians are involved in circulation or interlibrary loan duties because these services are more often performed by paraprofessionals and other support staff. This is primarily because these services have become more routine with the development of automation.
CONCLUSION

Content analysis of job advertisements does indicate that, with the development of automation in libraries: the requirements of previous work experience for catalog and reference librarians are becoming more similar; increasing needs for computer skills can be found in both categories, although the skills requested are quite different; and the shortage of catalogers and the greater demand for reference librarians have led to more entry-level positions being listed in both areas. However, the differences in major responsibilities and knowledge or skills needed reveal that the completely holistic librarian, as Gorman (1983) has described, might be some time in arriving. The theory of Ogburn's "cultural lag" is also well supported by the study.

Although the effect of automation on qualifications and responsibilities of catalog and reference librarians can be traced through the analysis of job advertisements, there are too many uncontrollable variables to support far-reaching conclusions. First, a brief job description cannot fully embody the complete requirements and responsibilities of a particular librarian. Second, there are differences in requirements between postings and the real applicants. Genaway (1978) demonstrated that a large number of job applicants in his sample did not fit the originally advertised requirement. A survey by the Cataloging and Classification Section (CCS) of ALCTS also reflects the gap between advertisements and the real world: in 94 positions advertised with cataloging components, the task force found that 51% reported a disappointing applicant pool; 37% interviewed more than four candidates, but no institution found more than three potentially appointable candidates in a pool. Third, once certain sorts of requirements or responsibilities have become relatively commonplace, they might not always be mentioned in job descriptions. For example, whereas some advertisements in the earlier period might have required knowledge of LCC for catalogers or skill in using different kinds of printed reference tools for reference librarians, during the later period such skills might have been ignored because familiarity with classifications or reference tools is now considered a "given" for a qualified cataloger or reference librarian. Moreover, the wording
of advertisements often reflects compromises among members of the search committee. Finally, because the study was limited to catalogers and reference librarians, one cannot find evidence of technological impact on the whole organization and professional structure of academic libraries. For example, with the development of automation, other job titles such as "subject librarian," "systems librarian," or "access librarian" might multiply and reflect an increasing trend toward holistic librarians.

With the accelerating development of the computer network and its extensive application in academic libraries, impact on job requirements and qualifications for catalogers and reference librarians will be more tremendous and instantaneous. This is something that needs to be explored by further study.

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Binding Conventions for Music Materials

Edie Tibbits

Many procedures common in the binding of books are not feasible for use with music scores. A small sample of academic libraries was surveyed about many of the special considerations required in the establishment of local binding procedures for music scores. Strictly from a preservation standpoint, many practices of the libraries in this survey sample are not sound. There is a growing level of communication among music publishers and music librarians about the "preservability" of published music. Carefully established binding practices are of paramount importance if a music collection is to serve the public of the music library for an extended length of time.

Libraries today are faced with declining budgets, increased service demands, and the fact that materials rapidly become out-of-print. Because the preservation and conservation of materials is recognized by library administrators as an area of growing importance, library planning necessarily includes an awareness of the preservation needs of an institution's many and varied collections. Preservation in any library collection includes components such as climate control, light exposure, shelving, pest control, disaster preparedness plans, and binding and shelving practices. Few, if any, libraries can afford the provision of "optimum care" for all materials in their collection (Godden 1991, 222). Binding materials and practices have a clear impact on the shelf life of library materials. Various materials in most collections are bound in different styles based on their age, value, and intended use (Johnson 1978, 7). In library budgets, binding has traditionally been given low priority in relation to other budget items (Bloomberg 1985, 28). As replacement costs of materials continue to increase, priorities for binding and preservation are being reevaluated in the cost-cutting environment of today's institutions.

Because of their printed formats and use, music materials require special attention when considering binding options. Music binding must accommodate the special needs of both the practicing musician and the music scholar. The finished volume should be flexible, able to stand open on a stand or music rack, and lay flat on any surface (Roberts 1976, 752). It must also be able to withstand repeated openings and closings. As the cost of paper continues to escalate, the margins of all printed materials are becoming more narrow (Roberts 1976, 761). This is an especially crucial point for music materials, where the margins are already quite small. Innovations by music publishers, such as plastic or wire spiral bindings, exacerbate the problems of narrow margins. Most
Music is published in limited editions and goes out-of-print very quickly. Gottlieb (1994, 30) points out that, while reprint editions are common, it can be difficult to determine which particular edition is being reprinted. Because musicians are frequently concerned with the particular edition of a score to be used for study or performance, the identification of reprints is vital for some music library patrons.

**BACKGROUND**

The binding of music scores with parts presents other problems as well. As music librarians know, scores are frequently very thin. A score is often accompanied by parts that are to be kept with the score as a unit. Parts might be printed so that they have two open pages on a single leaf, which is to be turned completely over for the next two pages. This does not allow binding to be attached. Scores issued with parts are difficult to preserve as sets. Older scores and some foreign scores are printed on very poor quality paper. Scores often are made in odd sizes (frequently over thirty-six centimeters or, conversely, less than twenty centimeters high). Finally, scores frequently receive very heavy use by music library patrons.

Music, because it requires special treatment, has become a major exception to ordinary binding techniques. As an exception, music binding generally is more expensive than ordinary book binding (Miller 1966, 60). However, it should be noted that binding extends the shelf life of a score by a factor of four or five (Falconer 1973, 335). Binding is a major expense in the operation of a music library, but it is difficult to assess the impact of binding costs on music library budgets because few academic libraries have a music binding budget that is maintained separately from that of the library as a whole. (In the sample for this paper, only one library could provide a binding budget figure that was exclusively for music materials.)

**STANDARDS**

To date, there have been no official standards adopted by the American Library Association (ALA), the Music Library Association, or the Library Binding Institute for the binding of music materials. The eighth edition of the *Library Binding Institute Standard for Library Binding* makes no special provisions for printed music, but has several sections that are relevant. Sections 6.2 (Sewing through the fold), 6.2.2.1 (Sewing through the fold by hand), 10 (Thread), and 19 (Sewing types) all relate to music binding. Even when there are accepted standards, library binding decisions will still need to be based on the type of library collection and the objectives of the institution (Honea 1989, 144).

**FORMATTING PROBLEMS**

There has been an increasing reliance by music publishers on plastic or wire spiral binding in recent years. These scores are usually printed with very small margins that make adhesive binding difficult because musical symbols cannot be sacrificed to the binding. Although some professional binderies will sew them or use adhesive binding, the results might not stand up to heavy use. Spiral binders present a major challenge in the music library.

Classic procedures for the pamphlet binding of music materials are detailed in Falconer's article "A Handicue to Do-It-Yourself Music Binding" (Falconer 1973). She indicates that leaves must be sewn through the fold. All staples should be removed because they rust rapidly, break away, and result in detached and weakened pages contaminated with rust (Honea 1989, 148). Staples might also fail to grip all of a signature and are difficult to drive straight through the center fold. Off-center staples can result in tears the first time a score is opened (Miller 1966, 59). Loose leaves must be tipped in or stubbed with paper and sewn in with the other pages. Enclosures need to be provided for thin scores and parts. Care must be taken to bind neither performance parts in with the score nor parts displaying two consecutive pages on one side of a folded sheet of paper. Solid cover binders require additional labeling with composer...
and title. All parts must be labeled. Binders should also be marked for contents (i.e., 1 score + 4 parts). There should be a notation on the binder as to how many parts are included (i.e., Includes x no. parts) to allow the staff at the circulation desk to verify that the complete set is sent out and returned. Music binding requires extra time and training for the library staff doing the work. When deciding which scores are to be sent out for professional binding, basing part of the decision on the thickness and weight of the score is certainly appropriate. Each score must be considered individually and attentively before any decision about binding can be made.

SHELVING PROBLEMS

Shelving music scores presents additional headaches for the librarian. The physical size of the piece alone can be problematic. Contemporary music is often printed on very large sheets that are sometimes published as a set of single-sided leaves. Because so many scores are published in a format larger than thirty-one centimeters (the traditional breaking point for most oversize book collections), it makes sense to allow a larger figure for the height or breadth of a score to determine the spacing of general shelving in the music library.

Ideally, special shelving can be purchased for these oversize materials, but there are occasions when oversize scores must be shelved with the rest of the collection. Often, scores with plastic spiral bindings are large and sometimes include separate unbound parts, presenting enormous problems for shelving in the music library. They cannot stand on the shelf without reinforcement. If they are held in place only by smaller neighboring volumes, they might warp or curl (Honea 1989, 147-48).

Difficulties are also presented by the size of miniature scores. (A miniature score is one created for study purposes and in which the notation is too small to be used for performance.) Miniature scores come in many sizes. Some measure eighteen centimeters, while others are thirty-six centimeters in height. Shelving the small scores with taller materials means that some miniatures will inevitably end up inside the binding of larger scores or pushed to the very back of the shelf where they might fall between the shelves. A decision to shelve miniature scores with larger scores or to shelve them separately must be carefully considered.

Music libraries have particular shelving problems beyond the height and bulk elements discussed above. The binding boards on music materials might be thicker than the score within the binding. Thus, it is necessary to allow extra linear feet for these materials in shelving plans. Because so many scores are very thin, there are few spine labels to be read from the front of the shelf. Thick or professionally bound scores can easily hide thin pamphlet bound ones. It is possible to put only the call number on each separate piece, and with clear-covered binders that might be sufficient. But if solid cover binders are used, most patrons would agree that some sort of additional labeling is needed. Very often, the most helpful label information is the composer and title or the title alone. Depending on the placement of this information, the library patron must pull each volume off the shelf for identification until the correct score is located. The additional pulling and pushing of scores on the shelves aggravates the problem of miniature scores falling behind the shelves and increases the risk of torn pages.

No matter what labeling is applied, maintenance of a range of scores can be tedious at best. Anyone working with a curriculum or children’s collection will easily identify with the situation. Hundreds of very thin pieces of varying sizes fit in a short section of a range. Shelf reading can be a nightmare!

CIRCULATION PROBLEMS

The circulation of music scores presents additional complications. If the score comes with performance parts, are these parts going to be circulated separately or with the score? Will each separate piece be barcoded? How will the complete score and all of its parts be kept together?
If the parts are kept in the binding of the score, how is the circulation record going to be maintained? Will the parts be counted by staff each time they are returned by the library patron? Will the library staff understand the importance of that additional task in the circulation of music materials? If the parts are circulated separately, how will they be protected? Many contemporary pieces are printed on single leaves of paper with one page per leaf. How are the leaves of each part to be kept together and yet separate from the other parts? How is the integrity of the score and parts going to be maintained?

**Literature Review**

A review of the literature on music binding policies revealed only nine articles or chapters dealing specifically with the binding of music materials. Another ten titles relating to general pamphlet binding practices used in libraries were identified as potentially relevant to music binding policies. The complexities of preservation cannot be addressed within the limits of this paper. *Knowing the Score: Preserving Collections of Music* (Roosa 1994) is just one source of information concerning preservation issues for paper music materials.

**Methodology**

A survey was made of a carefully selected sample of academic libraries for which in-house pamphlet binding of scores is done. Questionnaires were sent out by e-mail to people involved with music binding decisions and the circulation of music scores at twenty libraries. The libraries chosen for comparison are all accredited by the National Association of Schools of Music and are similar in three variables: the number of music majors registered at the school, the size of the teaching faculty, and the number of music scores in the library collection. Based on these variables the following schools were contacted for comparison purposes: Brigham Young University, City University of New York at Queens, East Carolina University, Ithaca College, James Madison University, Kent State University, Michigan State University, Shenandoah College & Conservatory, Southern Methodist University, State University of New York-Potsdam, Temple University, the University of Akron, the University of Houston, the University of Kansas, the University of North Carolina at Greensboro, the University of Northern Colorado, the University of Utah, the University of Wisconsin-Milwaukee, West Virginia University, and Westminster Choir College. These schools all have 250–400 declared music majors, at least forty music faculty members, and collections containing 10,000–26,000 scores. Libraries not responding to the e-mail survey were contacted by telephone. Southern Methodist University was dropped from the sample because their score collection is larger than reference sources had indicated. No contact could be established with the City University of New York at Queens; thus that library was also dropped from the sample.

The survey was conducted over a period of five months between May and September 1994. The survey of twenty libraries achieved a 90% response rate. Binding practices among these libraries vary widely as will be described below.

**Results**

Seven of the libraries consulted for this paper have bound 50%–75% of their score collection in-house. Five libraries bind 10%–40% of their scores themselves. For only two library collections are all scores currently being sent out for professional binding. Conversely, one library binds 90% in-house. For another, a percentage figure could not be determined.

One institution reported that over $11,000 was spent in one year for the binding of music. This figure does not include other binding sent by the library to a professional binder. Of all the libraries considered for this paper, this was the only one with a binding budget for music materials that is separate from the total library binding budget. If more library administrators were aware of the actual costs of binding music, it is safe to assume that
pam-binders and supplies might achieve a higher priority in the supply budgets of many institutions.

Decisions as to the appropriate binding to be used for scores almost always involve the music librarian, an assistant in the music library, or the music cataloger.

A library might have formalized binding procedures that prescribe a specific type of binding for standing orders, approval plan materials, and firm orders, or that define other clear parameters for the decision based on the size, cost, or paper quality of the score. These procedures might allow someone in the general library technical processing, preservation, or bindery area to make the binding decision following strict guidelines.

Two of the libraries involved in this study have in-house binding done by preservation departments or someone specifically identified outside the music library to do the work. In these two instances, binding decisions are made by these specialists in consultation with the music librarian or cataloger. There was only one instance reported where the decision is made without the participation of the music librarian. In this library, binding decisions are made by the head of the acquisitions department.

Decisions as to the type of binding to use for scores (pam-binder, portfolio, box, or professional binding) involve many variables. In this survey, the size of the score was the most common element cited for this decision. The number of signatures contained in the cover is used by two libraries in the sample, and the cost of the original score is used in another. The thickness (or bulk) of the volume was cited as a factor in the decision process by six libraries. The quality of the paper, which has some impact on the way the material sits on a music stand, is taken into consideration by two libraries. Some scores from east European and Asian publishers are printed on very thin paper with little or no bulk. This helps cut the costs of shipping these scores overseas, but can result in large pages not sitting well on the music stand for performance.

The use to which the score will be put was mentioned as an important factor in the decision by two of the libraries consulted. Is it going to lay on a flat surface as a study score would, or is it going to be placed on the music rack of a piano or organ or on a music stand?

Pam-binding can be a very labor-intensive task. Half of the institutions use student workers to actually perform the binding work. In one of these libraries, the binding is done by students while they cover a public service desk. One library requires that students go through rigorous training sessions to learn the basics of binding and the use of a book press. One librarian reported that his library no longer uses pam-binders, but prefers "class A binders," which was a term used in earlier binding specifications issued by the Library Binding Institute, and refers to hard, library-bound materials. In another library, the binding unit is part of the acquisitions department and is supervised by the head of acquisitions.

The method of attachment of the score to the binding has very strong implications for the life of a musical score. One library tapes or pastes scores to the binder. Another glues the signature if it is too thick to be sewn. Two libraries use the adhesive strips in the center of the pam-binders they purchase to hold the score in place. One of these institutions sometimes reinforces this adhesive with staples. Staples are used by two libraries in the work of binding. One of these libraries mentioned that scores bound in earlier times had been sewn.

The remaining eight libraries doing in-house binding hand sew the signatures to the binder. (Only one respondent indicated specifically that staples are removed before the score is hand sewn.) Generally, there is little reinforcement of the page under the sewing or stapling. One library reinforces with cloth and another routinely uses tape to reinforce the innermost signature. One library with two special collections within its music library reinforces signatures under the sewing of only the scores added to those collections. Another provides reinforcement only if the score is very fragile.

There seem to be conflicting ideas about the placement of the score within a
binder. One idea is to place the score flush with the bottom of the binder in order to keep the weight of the score from pulling it away from the binding. The other school of thought is to allow a bottom margin in the binding that would keep the piano rack or items on the music stand from tearing the pages each time they are turned. One-quarter of the libraries surveyed make the bottom of the score flush with the bottom of the binder. Sixty-three percent raise the score in the binder, but the distance varies. Some libraries raise it only one-eighth of an inch, others one-quarter of an inch. Some prefer to raise it one-half an inch or more. Two of the libraries in this survey let the size of the binder dictate the placement of the score by simply centering it within the binder. One prefers to always center the score in the binding, while another keeps a variety of pam-binder sizes on hand and never cuts the boards to fit the size of a score.

Respondents agreed that parts should be kept on the shelf with the score as a bibliographic unit whenever possible. In three of the libraries consulted, the parts might be bound separately in a lightweight paper cover before being placed in a pocket at the back of the binding. Two libraries indicated that they sometimes pam-bind a cover when the parts are single leaves or are printed as four pages on a single sheet, and then place all the parts in a pocket.

Varying methods of linking the parts to the score are employed by the libraries in this survey. Most indicated that the call number of the score is written in pencil on each part. At one institution, the OCLC bibliographic record number is written on each part as well. One library barcodes each separate part and keeps them all in a pocket with the score. Each part must be checked out individually.

Most libraries have devised some method of alerting the person at the circulation desk about the presence of parts or loose leaves in a score binding. Stamps are put on the binder, pocket, or date-due slip that give the number of parts that are supposed to be present. Two libraries are planning to have a feature in their online system that will allow a note to appear on the circulation item record reminding staff to check for a specified number of parts. One library includes the instrumentation of the parts as part of the book label.

The need for special labeling on the binding of scores has been eliminated in some libraries by the use of pam-binders with clear covers. However, some preservation librarians are not yet convinced that the plastic of these covers will not do damage to the score after long use. When solid board covers are used to bind scores, labeling becomes extremely important. Only one library in this survey does not provide composer and title information in some form on the front of a solid cover binder.

At least two librarians contacted expressed concern about the patron having to pull the entire score off the shelf to read a label. Both of their institutions provide labeling along the spine or lengthwise on the binder, very close to the spine. In some institutions, extra labeling is done by the staff of the music library while the actual binding is done in a location central for the whole library. One music library photo-reduces the cover of the published work and glues this copy to the cover of the binder. Another library makes an effort to keep all the composer and title labels at a uniform height throughout the collection regardless of the height of the binder on which they appear.

Portfolios (a stiff case with four flap enclosures) or boxes are sometimes made in-house for music materials. One library has all portfolios made outside the library and does not use boxes. All rare material is removed from that music library and is added to the special collections department. Some libraries use a combination of boxes and portfolios made by a professional bindery and made in-house. Five of the libraries contacted make a concerted effort not to use portfolios or boxes. When such methods are needed, use is dictated by the type of protection required by the format or the condition of the materials. In three of the eighteen libraries in this study, both portfolios and boxes made in-house are used for rare or brittle items, or for scores that are accompanied by parts that are much larger than the score or for
which the parts are very thick. The labeling on the outside of all these containers in the libraries surveyed is the same as that done for scores.

Certain music publishers are showing an increased reliance on spiral binding for twentieth century music. These scores are often large in dimension, but cover a wide range in terms of pagination, from very thin to fifty or seventy-five pages. As was mentioned earlier, these scores present a major problem for music libraries. In this sample, six libraries shelve spiral-bound scores “as is” with some provision for sending them to a professional bindery when it becomes necessary. One library tapes the “very thin” ones in a pambinder. Another sends those that are expensive to a binder if the margins are wide enough to be trimmed. If the margins are too narrow to allow professional binding, one library keeps expensive spiral-bound scores in a closed stack area on a “permanent reserve” basis. Most of the other libraries in this survey reinforce the covers with lamination or pressboard. One of these institutions also reinforces the spiral binding itself with plastic tape that is then attached to the strengthened covers. Two libraries place spiral bindings in a pocket in a pambinder when possible. One library routinely places spiral-bound scores in boxes when they cannot be trimmed for binding. Another has devised a method of “lacing” these scores and then using a pambinder. It was not clear what was meant by “lacing,” but it seemed that the procedure was not the same as “lace-backing” a book. Three libraries mentioned that they try to avoid the problem by not buying spiral-bound scores for their collections.

A final consideration in the binding of music scores is the shelving of the items. There has been a discussion on the Internet recently of the idea of shelving the entire library collection in one call number run, intershelfing oversize, miniature, videorecordings, sound recordings, computer software, and so on. No one in this survey follows that practice within the music library. Only one library intershelves both miniature scores and oversize with “regular” materials. Another library shelves all sizes of print materials together with the exclusion of oversize materials. Half of the libraries in the survey maintain three call number sequences for scores: one for “regular” materials, one for oversize, and one for miniature scores. One library has one sequence each for “regular,” oversize, and folio. Two libraries further divide this organization by distinguishing oversize as either quarto- or folio-. The remaining four libraries have only two divisions, “regular” and oversize. As a point of interest, the size of “oversize” varies from thirty-six to forty centimeters.

CONCLUSIONS

Strictly from a preservation standpoint, many practices of the libraries in this survey sample are not sound. To achieve any sort of preservation function, binders, pockets, labels, and tape must all be acid-free. Staples must be removed. Adhesive must be pH neutral PVA (polyvinyl acetate adhesive) to ensure long-time stability. Much research has been done on the preservation of books and paper. Much of this work can be applied directly to music materials. Scores at least look like a book and are generally made of paper.

However, music materials add a few variables not at issue for the preservation of books. Scores sold for performance purposes are frequently stapled into paper covers when published. They very often are published with a loose leaf in the center. The presence or absence of parts becomes an issue, because if each part is not to be bound separately, it must be linked in some way to the score. This usually means introducing glue or tape or extra covers that might influence the acid content of the item.

Musicians have traditionally been taught to “write it in” when given performance instructions. Most have learned to use pencil, but when a pencil is not at hand, anything will do! These markings can be seen as mutilation or, on occasion, they can add to the historical value of the score itself. Annotations in performance parts can create a problem for school, college, or university libraries trying to balance their attention between perform-
ing and research functions (clean editions or containing the markings of a significant performer or conductor for research use versus heavily marked performance parts) (Honea 1989, 154).

There is a growing level of communication among music publishers and music librarians about the "preservability" of published music. The Music Library Association has an active Preservation Committee, which has presented workshops and preconferences in conjunction with the association's annual meetings and for meetings of the ALA, the Association of Recorded Sound Collections (ARSC), and the International Association of Music Libraries, Archives, and Documentation Centres (IAML).

Because professional binding costs are climbing rapidly, the proportion of items treated locally will certainly continue to grow. Music librarians need to be sure that their collections are adequately preserved and maintained. Besides providing a stable and acceptable environment in terms of heat, humidity, and lighting, preservation must involve careful control of the binding policies applied to all items in these collections. Because music scores go out-of-print so quickly, it is essential to begin preservation efforts immediately upon the receipt of the item in the library.

Attention must be given to the quality of the supplies used and to the training of the staff actually doing the work of binding. Carefully established binding practices are of paramount importance if a music collection is to serve the public of the music library for an extended length of time.

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The Worst of the Worst: Celebrating Twenty Years of the Worst Serial Title Change of the Year Award

Margaret Mering and Pamela Simpson

Serials librarians untangle some of the most complicated bibliographic control problems. The year 1994 marked the twentieth anniversary of the best known attempt at consciousness raising: the Worst Serial Title Change of the Year Award. Among significant efforts to lower the number of possible title changes was the implementation of the second edition of the Anglo-American Cataloguing Rules. Librarians continue to work on initiatives to improve communication with publishers and to increase awareness of problems caused by title changes. While much work has been done to decrease the number of new bibliographic records for title changes, there remains room for improvement and further streamlining. We propose that the United States Newspaper Program's cataloging guideline—which specifies that if a title change lasts for less than one year and then reverts back to the previous title, the change does not require a new record—be extended to all serials. In addition to the changes proposed above, more empirical research is needed to aid serial catalogers in handling title changes.

Serials librarians have the job of untangling some of the most complicated bibliographic control problems in the library world. Their work requires analyzing new publications and answering many difficult questions: Is this a monograph or a serial? Should the supplement have its own record? Should each supplement be treated as a monograph? Is this a minor variation in title or an actual title change? Serials librarians are justifiably proud of their expertise, and most of them do in fact enjoy problem solving. Occasionally, however, they wonder whether all these changes are necessary. At times it seems that publishers are united in a conspiracy against them, or, at the very least, that title changes like the one from Animal Nutrition & Health to Animal Health & Nutrition are capricious and arbitrary. Historically, serials librarians have tried to modify catalog rules to avoid title changes and to communicate with publishers about the effect title changes have on work in libraries. The year 1994 marked the twentieth anniversary of the best known attempt at...
consciousness raising: the Worst Serial Title Change of the Year Award.

Librarians United to Fight Costly, Silly, Unnecessary Serial Title Changes (LUTFCSUSTC), pronounced loot-fi-sus-tic (*Title Varies*, Dec. 1973, 3), began the tradition of giving this award. At the fall 1973 Michigan Library Association Conference, LUTFCSUSTC was formed with the goal of educating publishers in a humorous way about the processing costs and other problems associated with title changes. They soon rallied serial librarians across the United States to join their cause. Under the leadership of David C. Taylor, serials librarian at Michigan State University and later undergraduate librarian at the University of North Carolina at Chapel Hill, the group published its newsletter, *Title Varies*, from 1973 to 1980. It alerted its readers to “awful” title changes, revisions to catalog rules affecting title changes, ways of educating publishers about title changes, and other problems associated with the handling of serial publications.

In July 1974, at the business meeting of the American Library Association’s (ALA) Resources & Technical Services Division (now known as ALCTS, the Association for Library Collections & Technical Services), LUTFCSUSTC began the tradition of awarding Worst Serial Title Change of the Year Awards. Since 1983, a committee of the association’s Serials Section has presented these awards. According to this twenty-year-old tradition, approximately ten publishers are recognized for title changes they have made during the past year. Awards often go to publishers whose serials have changed for no apparent reason or that have simply shuffled the order of the words in the title. Serials that repeatedly change their titles are also good candidates for awards. A special category known as the Snake in the Grass award is reserved for library science publishers. One of the ten nominated publishers receives the dubious honor of having the very worst title change of the year (see appendix A).

Each year, calls for nominations appear in the *ALCTS Newsletter, Cataloging & Classification Quarterly, the NASIG Newsletter, Serials Review, and Technical Trends*. Several times a year requests for nominations are sent to the electronic discussion groups AUTOCAT and SERIALST. The deadline for submitting nominations is a month or two before the ALA’s Annual Conference. The Worst Serial Title Change of the Year Committee evaluates the nominations and assigns awards to worthy title changes. The awards are presented at the annual meeting of the Association of Library Collections & Technical Services (ALCTS), and notices are published in several library science publications.

Publishers are not normally notified of their awards. However, in 1990, ALCTS executive director Karen Muller personally accepted an award for the title change *RTSD Newsletter* to *ALCTS Newsletter*. Also that year, the award notices were published for the first and only time in a nonlibrary publication, the *Chronicle of Higher Education*.

Since the formation of LUTFCSUSTC, one of the most significant efforts in lowering the number of possible title changes was the implementation of the second edition of the Anglo-American Cataloguing Rules (AACR2) rule 21.1B2. According to this rule, serials are entered under corporate body only if the work is about the corporate body itself or its activities (AACR2 1978, 285–86). This rule greatly limits the number of titles that can be entered under corporate body. When a corporate body changes its name, only those serials actually entered under the body and those whose uniform titles have been qualified by the name of the body require a new bibliographic record.

Another attempt to reduce the number of title changes was a 1983 change in the interpretation of rule 25.5B. Place of publication became the first choice of qualifier for serial uniform titles rather than corporate body. When a place of publication is used as the uniform title qualifier and the place of publication changes, a new record is not created. Opponents of this rule interpretation argue that place of publication is often not as meaningful or useful as a corporate body might be to patrons or staff attempting to find serials in library catalogs (Turtiz 1990, 86–87).
What does not constitute a title change has been clarified and expanded over the past twenty years. The wider use of the OCLC Online Computer Library Center, Inc., and other bibliographic utilities brought a need for more cooperative, standardized cataloging and thus the increased need for interpreting and revising cataloging rules. The first edition of the AACR states that changes in title “so slight that they do not affect the location of the title in an alphabetical file, or conceal the identification of the parts” are noted in a general statement such as “Title varies slightly” or “Subtitle varies” (AACR 1967, 239). Later rule interpretations and cataloging codes have included the following much more specific instances of what will not be considered a title change (AACR2R 1988, 314–15):

- Changes in the representation of words;
- Additions, deletions, or changes after the fifth word that do not change the meaning of a title;
- Addition or deletion of articles, prepositions, or conjunctions;
- Addition or deletion of the issuing body at the end of the title; and
- Changes in the punctuation of the title.

Full-length articles about serial title changes first appeared in library literature in the 1970s and have continued to appear during the last twenty years. Several of these articles expressed support for David Taylor and his work. Their authors attempted to persuade publishers of the trouble and expense title changes cause for libraries. Kuhns, writing in 1976, pleaded with publishers to think long and hard before changing a title, and asked at the very least that publishers notify subscribers if they must make a change (Kuhns 1976–77). She mentioned Title Varies, as did Gorman in an article the previous year, as being one of the few publications in the library field attempting to tackle these problems (Gorman 1975, 305). Robertson set out to enlighten publishers about the complex record keeping required for serials and the havoc wreaked by title changes. He offered examples of silly title changes, citing a letter to Title Varies as evidence that LUTFCSTUSTC was making an impact on the publishing community (Robertson 1979, 418).

Foggin, on the other hand, argued that title changes are usually justified, at least for the publisher, and that the costs for libraries are not really as high as others have claimed. She portrayed librarians as suppliers to the readers, who are the real customers, suggesting that we should perhaps not presume to tell publishers how to manage their product (Foggin 1992). It could also be argued, however, that librarians are themselves important customers for publishers, and that librarians have more opportunities to work with readers as they search for and use serial publications than do most publishers.

Several authors describe studies in which they examined the rate and impact of title changes. Charbonneau looked at OCLC records for about 1,250 titles. He divided the number of title changes he found in these records by the number of years the serials had been published and came up with an approximate rate of change for all serials. This formula proved relatively accurate for the science journals in his sample as well as those in other fields of study. He christened his formula Taylor’s Constant, in honor of David Taylor (Charbonneau 1982). A few years later, Khosh-khui took a smaller sample of OCLC serial records and correlated the rate of change with other variables, such as language, place of publication, and subject matter. He found that serials published by governmental bodies, those in French or Polish, and those in the sciences changed more often than others (Khosh-khui 1986, 91). Roberts, Vidor, and Bailey determined cost and time required for recording title changes in their library (Roberts, Vidor, and Bailey 1986–87). Akes and Wrynn carried out a two-part study of biomedical titles that was designed to establish the effect of title changes on medical libraries and the percentage of title changes that appeared to be justified. They found that two-thirds of their sample had changed title due to a change in scope or in the terminology used in the field. They were unable to ascertain a clear reason for the remaining title changes.
Another hot topic in the literature continues to be the suitability of using successive entry cataloging in an online integrated library environment. Successive entry cataloging is the current standard for handling title changes. It calls for a separate bibliographic record for each title change of a serial. In the late 1980s, technical services librarians at Northwestern University Library became well known for departing from using successive entry cataloging exclusively. They established guidelines for specific categories of title changes to be handled by latest entry cataloging, the convention of recording the latest title as the main entry and listing earlier titles in a note field (Case et al. 1988, 41). Cole suggests the alternative of having the earliest title as the main entry and listing later titles in a note field (Cole 1986, 5). Those advocating the use of earliest or latest entry cataloging believe these methods provide more efficient and economical means of handling title changes than does successive entry cataloging. They point out that these methods keep all bibliographic, order-holding, and circulation information for a serial and its title changes available with one search. In other words, either convention eliminates the need to consult two or more records to gather information on each title change. The use of one record also saves computer storage space, as well as searching and retrieval time. These advantages benefit libraries, their personnel, and patrons (André et al. 1986, 42–43).

Today, librarians continue to work on several initiatives to improve communication with publishers and to increase awareness of problems caused by title changes. One example is the North American Serials Interest Group’s Cataloging Discussion Group, which offers a forum for serials librarians, vendors, and publishers to discuss issues surrounding title changes and other related issues. Also, the ALCTS Serials Section has published a 1995 brochure called “What’s in a Name?” It provides guidelines for periodical publications based on ANSI Standard Z39.1, American National Standard for Periodicals Format and Arrangement. The brochure includes information on what constitutes a title change and the problems that such changes cause for libraries, as well as instructions for obtaining an International Standard Serial Number (ISSN). Publishers often contact a national ISSN center before a new serial appears, or before a title change occurs. More than fifty-five of these centers exist worldwide, and they make an effort to communicate with publishers about the importance of stable titles and coherent numbering, and about the problems that nonstandard practices cause for libraries. Of course, some publishers do not contact ISSN centers, and they are often the ones who are unaware of the consequences their decisions have for libraries.

Another excellent example of librarians working directly with publishers to reduce unnecessary title changes is the recent development of title guidelines by the Institute of Electrical and Electronic Engineers (IEEE). IEEE conducted a survey of librarians and found that IEEE publications were notoriously difficult to catalog and retrieve. An internal IEEE task force worked with Peter Graham of Rutgers University, Ilona Bicsak of Columbia University, Regina Reynolds of the Library of Congress, and other librarians to develop guidelines for the various groups within IEEE who publish proceedings (IEEE 1995).

While much work has been done to decrease the number of new bibliographic records for title changes, there remains room for improvement and further streamlining. Crystal Graham has said that, while the Worst Serial Title Change of the Year Award is often deserved, “in other instances, the award should probably go to AACR2 for requiring silly, costly, unnecessary, confusing successive records” (Graham 1995, 10). She cites the example of the Atlantic Monthly changing its title back and forth between Atlantic and Atlantic Monthly, and asks whether better bibliographic access is provided by the existence of five separate records for this serial.

Although AACR2 reflects attempts to improve the situation as mentioned earlier, in some cases the insistence on suc-
cessive entry for most changes has resulted in databases that are cluttered with unnecessary successive records. Cataloging rules do not currently provide enough instruction to delineate between trivial title changes and more significant ones. The authors believe that guidelines should be developed and concur with Graham's suggestion that catalogers treat minor changes as variant titles and make added entries for them instead of creating new records. The definition of a trivial change versus a significant one should allow room for catalogers' judgment. However, such changes as adding or deleting words denoting frequency, adding or deleting generic words such as magazine or journal, and simply changing the order of words within a title are all changes that could be added to the list of what is not considered a title change.

We propose that the United States Newspaper Program's cataloging guideline—which specifies that if a title change lasts for less than one year and then reverts back to the previous title, the change does not require a new record—be extended to all serials (Butler 1990, 160). The authors further suggest a Library of Congress Rule Interpretation to reverse the dictum of rule 21.1B3, "if in doubt, consider the title proper to have changed." Another area the authors would like reviewed is the choice of qualifiers for uniform titles. Havens believes uniform titles should be eliminated altogether, and offers several alternatives for providing access to generic titles (Havens 1987, 68). Turitz feels that users are not well served by the use of place of publication as the first choice of qualifier. He points out that corporate bodies as qualifier of uniform titles are often more meaningful to users (Turitz 1990, 87). Havens and Turitz suggest that instead of creating a new successive record when a corporate body qualifier of a uniform title changes, catalogers could change the heading to the new form and add an issuing body note and an added entry for the old form of heading.

In addition to the changes proposed above, more empirical research is needed to aid serial catalogers in handling title changes. For instance, what effect does successive entry cataloging have on library catalog users? Has the rate of title changes changed in the past twenty years? How does the rate differ by discipline, and what are the implications for different types of libraries? As library budgets continue to decrease and as user expectations rise, librarians need to look at all cataloging practices with a critical eye. They need to verify that the practices are efficient, practical, and serve users well. They should continue to work with the publishing community to ensure their understanding of the implications of title changes. Nevertheless, as long as serials are published, title changes will continue to occur, as will a desire to alleviate frustrations by laughing at those changes that are costly, silly, and unnecessary. Hopefully, the Worst Serial Title Change of the Year Award will be around to fill that need.

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New On The INTERNET
THE AAUP ON-LINE CATALOG AND BOOKSTORE
A COMPREHENSIVE ELECTRONIC RESOURCE of scholarly publications from the members of the Association of American University Presses
FREE ACCESS to bibliographic information on more than 65,000 titles
USER-FRIENDLY PROCEDURES using author, title, keywords, subject category, or publisher name
EASY ORDERING INFORMATION Using customized order forms from participating presses

The Catalog contains fully searchable bibliographic data and descriptive text from more than 50 scholarly publishers.

Cole, Jim E. 1986. The first shall be last: Earliest entry cataloging. Serials librarian 11, no. 1: 5–13
APPENDIX A

Below is a list of the winners of the Worst Serial Title Change of the Year Awards over the past twenty years, together with excerpts of the accompanying citation.


1975—and the winner is, Martin Psychiatric Research, Inc., for the change: Corrective and Social Psychiatry to Journal of Applied Behavior Technology, Method, and Therapy (Title Varies, July 1975, 28)!

1976—The contest was fierce, but in the end the library profession's own worst title change prevailed as the champion worst. The Mountain/Plain Library Association Quarterly became the MPLA Newsletter in 1975 and continued to demonstrate that no one is more insensitive to library problems than librarians (Title Varies, Sept. 1976, 36).

1977—This lovely engraved silver platter is awarded, emblematic of the second worst serial title change award for 1976, to the Economist Intelligence Unit, Ltd. of London, for its changes of the QER.... to Quarterly Economic Review of.... This is a set of approximately one hundred related titles, each a separate periodical with the title originally, Quarterly Economic Review: Italy, Quarterly Economic Review: Spain, and so on. In 1975, they changed to QER: Italy, QER: Spain, etc. In 1976, they all changed, every last one of them, to Quarterly Economic Review of Italy, Quarterly Economic Review of Spain and so forth. In recognition of the cost to libraries and the total uselessness of these changes, we are naming QER not only second worst, but third worst and fourth worst—in fact one hundred title change awards, including worst of all (Title Varies, Nov. 1976 [published July 1977], 44).

1978—The title change of the year—and the South-Will-Rise-Again-Suh Award is given to The Southern Conference Educational Fund for the change from Southern Patriot to Southern Struggle (Title Varies, July–Nov. 1977 [published 1978], 44). 1979—... was awarded to Justus Liebig's Annalen der Chemie, which has been around since 1832 (with only three other title changes) and finally decided to start over in 1979 (with no. 1) as Liebig's Annalen der Chemie (Title Varies, May–Sept. 1979, 28)!

1980—The Great Award, Worst of the Worst, also known as the Grand Turkey, goes to a publisher who should have known better: to the United Nations' Educational Scientific and Cultural Organization for changing the UNESCO Bulletin for Libraries to the UNESCO Journal of Information Science, Librarianship, and Archives Administration (Title Varies, Dec. 1980, 38).

1981—... went to the American Association for the Advancement of Science, in recognition of their help and concern for the cause of universal bibliographic control, and their deliberately stupid, aggressively, militantly, and reliably dumb editorial decision to fly in the face of all reason, and to rename their magazine each year. The award goes to Science 79, to Science 80, and to Science 81, and no doubt next year Science 82 (RTSD 1981).

1982—... presented to the U.S. Department of the Interior's Bureau of Land Management for changing Our Public Lands to Your Public Lands. Also known as the This Land is Your Land, This Land is My Land award.*

1983—... presented to the American Society of Civil Engineers for changing sixteen titles all at once. For example, its Construction Division's Journal of the Construction Division changed to Journal of Construction Engineering and Management.*

1984—... as well as the Most Fantastic Title Change Award is presented to the Division of Continuing Education at Florida Atlantic University, for the changes that a single publication has gone through since January of this year. Fantasy Newsletter changed in January 1984 to Fantasy Review. It changed again in March to SF and Fantasy Review, when it absorbed Science Fiction and Fantasy Book Review. In April, it changed again to simply Fantasy. Each issue also uses several of these variations in various positions on the publication.†

*Supplied by Frank E. Sadowski, Jr., University of Rochester, a past presenter of the Worst Serial Title Change of Year Award
†From the archives of the Worst Serial Title Change of the Year Committee
1985—also the Incitement to Violence Award to the Center for Women's Policy Studies for: *Response to Violence in the Family & Sexual Assault*, [which] changed to *Response to the Victimization of Women and Children*. Since its birth in 1976, it has had four other titles.

1986—also the Why Bother to Change the Title Award goes to the Watt Publishing Company for retitling *Animal Nutrition & Health* as *Animal Health & Nutrition*.

1987—or the Multiple Disaster Award, has been earned to John Wiley for again changing the names of all parts of the *Journal of Polymer Science*, and to add to the disaster, also playing musical chairs with the letter designation of each part.

1988—as well as, the Globe Trotter's Award is presented to North American Publishing Co., who decided to go globe trotting after thirty years of stability. Called *American Import & Export Bulletin* from 1934 to 1974, it has had seven title changes since then, six within three years, three of them occurring in 1987 (RTSD 1988, 53).

1989—goes to PSC Publications, which merged the basic and deluxe editions of *American Home Arts Needlecraft for Today* to form *Needle & Craft*. The committee wonders [whether] they were trying to return to their roots since they started as *Needle & Thread* (RTSD 1989, 46).


1991—is presented to the Foundation Center for Grants for International and Foreign Programs, which flip-flopped to Grants for Foreign and International Programs for no other reason than to make it impossible to shelve for those of [us] who shelve alphabetically (ALCTS 1991, 64).

1992—goes to Rohrich Press of Akron, Ohio, for changing the *Blue Book of Sr. College, University and Junior & Community Athletics* to *Blue Book of College Athletics for Senior, Junior & Community Colleges*, its third title change in four years. All of the changes have simply stir-fried the same seven or eight words...into new and different “winning” combinations (ALCTS 1992).

1993—goes to *Broadcasting and Cable Yearbook*. Bowker has had the title for two years and has already published it under two different titles: the [aforementioned] and *Broadcasting and Cable Marketplace*.

For a publication that has had more title changes than we care to discuss, we ask Bowker to pick one and stick with it, please (O’Neill 1993)!

1994—is presented to *Barron's* for returning to its original title after a brief 52-year experiment as *Barron’s National Business and Financial Weekly*. After 52 years couldn’t they have waited for a new volume to make the change (Gordon 1994)? [Author’s note: The original title was simply *Barron’s*. In 1994, the title changed from *Barron’s National Business and Financial Weekly* back to *Barron’s*.]
What Users Really Think: How They See and Find Serials in the Arts and Sciences

Loanne Snavely and Katie Clark

New users encounter numerous stumbling blocks in their search for serials. Beginning with the index, understanding the citation, searching the online catalog for the serial record, interpreting the holdings, and finally locating the item on the shelf are all steps that must be negotiated. Each step presents a variety of problems that users bring to the reference desk. The authors suggest user-oriented solutions relating to cataloging practices, screen design, and linking local holdings to periodical databases. Increased collaboration between librarians on the front lines and those creating the records and providing the access is essential for meeting end user needs.

The motivation for this article came from a colleague, a serials cataloger, who changed jobs and came to work at a reference desk, and was surprised at how much trouble users had finding serials. As a cataloger, her idea of a typical user was a much more sophisticated one than she met at the desk. As reference librarians who are on the front lines and are constantly answering very basic questions from first-time users, we were just as surprised to find out that she was unaware of these difficulties. We were further encouraged to pursue this topic by this message from another serials cataloger: “When I was a student in cataloging class, our professor [Elizabeth R. Baughman] highly encouraged us as catalogers to serve part time on the public services desk. There we would gain insight into how people actually use the catalog records we spend so much time creating, whether the records really provide the help catalogers think they do, where exactly the records fall down on the job, etc.” (Riemer 1994).

The truth is that for many library patrons, in particular undergraduates and other first-time users, finding a journal is a mysterious and often frustrating process that starts long before they actually have a serial record displayed on the online catalog. These users are often familiar with small school or public libraries and are frequently accustomed to a short printed serials list. They are encountering not only a major academic library for the first time, but also a new way of finding serials. We will focus on bibliographic records for serials found through an integrated online catalog as opposed to a catalog, database, or list specifically devoted to serials.

Loanne Snavely is Head, Arts Library (lbs@psulias.psu.edu) and Katie Clark is Head, Life Sciences Library (kec@psulias.psu.edu) at Pennsylvania State University. This report is based on a presentation made at the Association for Library Collections & Technical Services, Serials Section, Research Libraries Discussion Group, Miami, Fla., June 1994. Manuscript received July 7, 1995; accepted for publication September 26, 1995.
The authors have each worked at reference desks at several different libraries. Thus, the problems and situations we will discuss are not unique to libraries at institutions large or small, or private or public; nor are they unique to any one online catalog. It is our experience that at any reference desk many of the questions are about finding journals and interpreting serial records. Users must negotiate at least five steps to locate a journal: from (1) index to (2) citation to (3) serial record to (4) holdings statement to (5) shelf. The purpose of this article is to describe the stumbling blocks people encounter while negotiating these steps. Of course, not all users encounter all of the problems we describe, but each is a regular problem at the service desk.

**STEP 1**

**FROM INDEX TO CITATION OR "HOW DO I FIND ARTICLES ON GLOBAL WARMING?"

While patrons may come to the reference desk with a citation in hand, far more are in a position of looking for articles on a topic. This would normally involve looking in a periodical index, something unfamiliar to many undergraduates and almost all first-time users. Such users are frequently surprised to learn that they will not find periodical articles in the online catalog. They need instruction on selection of an appropriate database, choice of keywords, use of Boolean logic, and so on. These problems have been dealt with fairly extensively in the bibliographic instruction and database-searching literature. Once a user has identified the appropriate index and performed a relevant search, he or she must interpret the citations received. While the citations from some periodical databases are simple and clearly marked, many are more complex and do not have labeled displays. Even for those that do, the terminology is often confusing to the nonlibrarian. For example, the journal title is often labeled “source,” a term familiar to all librarians but rarely to users, particularly undergraduates.

**STEP 2**

**FROM CITATION TO ONLINE CATALOG RECORD, OR "YOU MEAN I HAVE TO DO MORE?!"

The rest of the process, from having the citation in hand to having the article in hand, has been largely overlooked in the literature. This is possibly due to its being considered mechanical, in contrast to the intellectual issues of topic definition and search strategy. Users, however, find it a complex and time-consuming process. After spending more time than they had allotted for the whole project on sorting and printing a list of citations—chosen because of the promising wording of the article titles—they are stunned that they now have to go to another database. Often this means use of another terminal and looking each citation up again to see first whether the journal is owned and then to find its location. The idea that the library does not own every title indexed astonishes many new users. Like hiking at high altitudes, it gets harder rather than easier the further you go.

**WHICH TITLE DO I TYPE IN?**

Getting from the database printout to the serial record in the online catalog is not intuitive, understandable, or easy for first-time users. This very first step, figuring out what to type into the online catalog, is a big stumbling block. Unfortunately, many users will come dragging to the desk after lengthy searching, very discouraged because they cannot find a single article. Why? Because they have been diligently typing in the title or author of the article, rather than the title of the journal.

Once a user is shown where to find the journal title on the screen or printout, it is often abbreviated, and abbreviations normally cannot be searched in an online catalog. Users are seldom aware of the availability of serial abbreviation books and even when they do know about them they rarely, if ever, use them. Users will often guess at the title. Entering the abbreviation or a wrong guess for the journal abbreviation into the online catalog can mean the difference between finding the
journal (or at least finding the record) and going away thinking the library does not own the journal. For example, a user might reasonably guess that the title abbreviated J Am Soc Hort Sci is Journal of the American Society of Horticulture Science, but it is not. The correct title is Journal of the American Society for Horticulture Science. In a large research library, there are so many entries that start with “Journal of the American Society,” that the two would not be near enough for someone to find them when an exact title search is conducted. A single preposition can cause retrieval of a wrong record or none at all.

Other common problems include the incorrect guess that does produce a result, such as interpreting the abbreviation Am J Phys as American Journal of Physiology instead of the correct title, American Journal of Physics. In this instance users may actually get to the shelf before recognizing the mistake. Another is that some journals use a “catchy” title, containing a little trick that the user does not perceive. For a title such as Artforum, a search in some online catalogs will not retrieve the title when entered as two words rather than one, unless a second entry has been added. While this seems like a minor point, many users will not find that the library owns the journal unless both forms are searchable.

**STEP 3**
**FROM CITATION TO SERIAL RECORD, OR “WHAT DOES THIS MEAN?”**

Once the patron has successfully identified the journal title and translated from abbreviated to full title, the battle is over. Right? Wrong! An army of confusion confronts the unsuspecting user. For example, if we trace the steps an undergraduate goes through when looking for one of the most popular journal titles found in the Life Sciences Library, Science, it will illustrate the possible pitfalls awaiting the unsuspecting student. Because the word “science” is so common, the patron is first confronted with dozens of entries. At this screen (see figure 1) users have to be able to discern the journal Science from among monographs either entitled Science or indexed with Science as a related-title added entry. Various online catalogs handle this differently, but in every case the index screen produces an overwhelming number of confusing entries.

In a NOTIS catalog, the user must first recognize the word “serial,” a term that is often unfamiliar to new users, as the term...
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that identifies the record they are looking for. They must then know the publisher's location to select the correct entry. This can be especially difficult for a title like Science, which has changed place of publication several times. In the screen shown in figure 1, the user must select the second entry even though Science has not been published in Cambridge for over a century. In an online catalog where the index screen distinguishes entries by date, the user must distinguish a serial by the punctuation after the date (see figure 2). The monograph citations, of course, end in a date-period and serial records end in a date-dash period. The difference comes down to a single character of punctuation. This is extremely difficult to see on an online catalog screen filled with text. A further problem is that, when scanning the entries, many users will see Science in the list and, noting the date 1883, will assume that is not the entry they want to choose because they are looking for a 1994 article. Thus, patrons who identify the title and perform the search correctly may still not find the entry sought.

When they have finally gone from the index screen to the individual record screen, new problems arise. Users are far more accustomed to the information given on a monographic record screen than a serials screen. Not only is the information in serials records different, it is lengthier and more complex. The more information included in the record, such as the three places of publication for Science, name changes, and mergers, the longer it is and the more difficultly people have in finding the specific piece of information they need. Thus, screen design may be more important for serials records than for any other type of material in the online catalog. Research on screen design has resulted in a 30 percent rule. “This rule says that no more than 30 percent of the screen should be filled with characters; in other words, the density of information should be 30 percent or less. The ideal, supposedly, is 15 percent. Effective displays are open displays, with lots of empty space used to clarify the important information” (Crawford 1992, 68). The brief record used in NOTIS catalogs, with the option to view more detailed information, constitutes one effective solution to this problem.

STEP 4

**Holdings Information, or “Do You Have This Article or Not?”**

At last the poor, exhausted user arrives at the correct bibliographic record. The next step is to determine whether the library owns the issue sought. We know our user is looking for the holdings information,
but does the user? The term "holdings" may be meaningless as an indication of ownership. In addition it may not be apparent where to look for that information. For very long records the novice cannot distinguish the critical information, specifically the holdings information, from the unneeded information.

When the records are very long, the holdings information can be many screens removed from the first screen of the record. Some libraries have solved this problem by using a brief record display, which has the advantage of giving the most pertinent information on the first screen. However, many of these online catalogs, such as NOTIS, require the user to take a second step and consult an additional screen for holdings information, no matter how short the bibliographic record is. The ideal from the patron’s point of view would be a brief citation plus a brief holdings statement on the first screen, with more detailed information available on request.

Interpreting the publication date versus the holdings dates is a common problem. In catalogs with summary holdings displays, patrons often do not understand that only the starting date is indicated and that the open date or dash indicates that all issues since that initial date have been received. For example, users looking at a record will assume that the library only owns the first volume and nothing else.

The second frequent misinterpretation occurs when the publication date and holdings date differ. For example, at Penn State the entry for The Journal of Biological Physics shows publication date 1973—at the top of the screen (see figure 3). The user assumes that the library owns everything since that date, even though the holdings statement at the bottom of the screen indicates that only issues from 1989 to date are owned. Users cannot imagine why a library would put 1973 on the top of this record when they do not own 1973–1989. Many consider it tantamount to false advertising. They are offended that the library is making it look like they have the early issues when they do not. This problem is compounded when the bibliographic record is separated from the holdings information by one or more screens.

Many, if not most, libraries use the phrase "current issues" to describe their unbound holdings. However, very few undergraduates know the library’s definition of this phrase. Such terminology is commonly misinterpreted in two different ways. Some think "current issue" means the most recent issue. Others, who have been told in class to locate "current information," think "current issues" means the past five years or so.
Patrons are surprised to find that what a library considers a current issue could be anything from the most recent issue to one that is several years old, and what falls into this category varies from title to title. Because what remains unbound varies with the length of the issues and the frequency of the publication, current issues vary enormously. Thus, it is understandable that few users know what is meant by an unbound journal without an explanation. Ideally the catalog should provide information for each title on which issues are considered “current.”

**STEP 5**
**The Shelf, or “Where Do I Look Now?”**

Because the current issues, bound issues, or a certain range of years are often shelved in different locations, it is essential that the online catalog make it clear where a patron is to go for the issue sought. An examination of online catalogs shows that many do not provide information on exactly which volumes are shelved where. Therefore, the patron frequently is in the frustrating position of having arrived at the given location only to find the desired issue is elsewhere. In some libraries all issues are either arranged alphabetically by title or by call number, while in others the current issues may be arranged alphabetically by title and the bound volumes classified by call number. The catalog records do not specify how the issues are arranged on the shelf. The call number is usually given whether or not it is needed, leaving users to figure out on their own when to search alphabetically by title or when to search by call number.

**Discussion of Thornier Problems**

Above we have described problems patrons typically encounter with finding the routine journal article. Now we will enumerate some of the thornier types of problems that are familiar to serials librarians and catalogers, but that can bewilder even experienced users. A sampling of these problems are discussed below.

**Corporation Body and Main Entry Problems**

The concept of corporate body entry is foreign and difficult for most patrons. Novice users typically expect entry to be under “author,” and think of an author as a person who has written a novel, short story, or poem—identification of authors is rarely emphasized beyond literature classes in high school. The idea of an author being a corporation or association is out of their realm of experience and therefore difficult to include in their framework of authorship.

Add to this the difficulty of identifying the title of many corporate publications such as “report,” “bulletin,” or “miscellaneous publication,” which appear to the user to be categories or types of publication rather than titles. This is further compounded by the way these serials are cited in the literature. In addition to confusing abbreviations such as “mp” for miscellaneous publications, the wording of the serial title in the citation may appear to be completely different from the main entry and title in the catalog record.

Benson (1990) has outlined a discussion of the extensive problems users once had in determining main entry for serials. Fortunately, with the advent of the online catalog, knowledge of the exact main entry is not critical to locate a title. Keyword and Boolean searching have aided users immensely by eliminating the need to understand the cataloging rules. However, the problem remains that, when a user finds a citation in the *Art Index to Record of the Art Museum* (Princeton University), they will not find the entry using a title search if the journal was cataloged before the implementation of the *Anglo-American Cataloguing Rules*, 2d ed. (AACKR 1978) and the title entry is “Record” and the main entry is “Princeton University. Art Museum.” We expect patrons to realize that the library may still own this serial even though a title search produces no results. A patron who goes on to perform a keyword and Boolean search, such as “record and princeton,” will locate the title. We know, however, that patrons often
give up when a title search produces no results.

Two problems arise with this example. The first is pre-AACR2 cataloging that has not been changed and continues to present problems for users. The second is that a simple added entry for forms of titles used in citations, especially major indexing sources, would go a long way towards helping the user and making collections more accessible. Because catalogers work with the item in hand, this additional information gleaned from citation sources and users has to come from outside the cataloging source.

Another main entry problem that confuses users is the standard practice of foreign-language uniform title headings for journals published in English cover-to-cover translations. Of course, users cannot understand why there is a foreign language spine title and catalog record when the publication is in English! An English main entry with a foreign-language title added entry in the record would be more useful from the patron's point of view. Libraries could also opt for a little-used MARC tag (765 Original Language Entry), so that the foreign title displays in a note as: "Translation of . . . ."

**MONOGRAPHS VS. SERIES VS. PERIODICAL**

Publications issued in multiple, nonidentical formats cause multiple problems. For example, Architectural Design is published first as a periodical, with most of the issue consisting of a numbered profile series called Architectural Design Profile. Each number contains articles on a particular topic and has a distinctive title. Each profile is also issued separately as a monograph, without the introductory material from the periodical issue. Every serials cataloger can see the problems presented in such a publication. The problems are compounded from a user's point of view because he or she may variously find: (1) a citation to an article in the profile through an index, such as Art Index or Avery Index to Architectural Periodicals, or to the periodical Architectural Design, with a volume, issue, and date; (2) a citation in the literature that refers only to Architectural Design Profile; or (3) a reference to an apparent chapter or essay in a book with the title Free Space Architecture.

Serials catalogers are discouraged, by workload-induced expediency, institutional policy, or other considerations, from providing access through the catalog for all three of these potential searches. Either the items are cataloged separately, so that individual titles may be found, or they are entered under the serial title, but normally not both. A series tracing is normally available for the Profile whether the material is cataloged as a monograph or a serial. Thus, only two out of the three search avenues are covered in the catalog.

In such situations we are dependent upon staff who are alert to the problem and can direct patrons to the article they seek when asked. But how many patrons who feel competent using the catalog, and are confident they have determined the library does not own it, would go to the trouble of confirming this with library staff? The end result is that patrons may erroneously conclude the library does not own materials that it does.

**PUBLISHER BLOOPERS**

Local decisions on how to resolve changes made by publishers should take into account how the material is indexed, and therefore how the user is likely to be searching for it. Different users may be served better by different resolutions, so the librarian may be faced with a decision that must take into account convenience, logic, library policy, and different groups of users.

A good example of such a maddening situation is the case of American Choral Review and The Voice of Chorus America, two publications of the American Choral Foundation. Or, they were two separate publications until the foundation decided, perhaps to save postage, to issue them together. Had the two titles been combined into one, the solution would be evident; or, if the two titles were just mailed together there would be no problem. Instead, the American Choral Review was inserted and stapled inside The Voice of
Chorus America. The obvious solution is for libraries to detach the inner volume (the cover says "pull out to separate") and continue to bind each separately, and patrons are none the wiser that there has been a change. However, two complicating factors must be taken into account. The first is that the foundation has begun printing on the cover of The Voice of Chorus America not only its own title, volume, number and date, but also American Choral Review, with its volume and number. They have also added the subtitle "Incorporating the publication of the American Choral Foundation," leading the new user to expect to find in that issue both titles. The second factor is that the main indexing source, Music Index, cites articles as if the two were together. For example, if we are looking for an article by Chris White, we find the entry:


Clearly the new user will interpret this citation to mean they should search for Voice of Chorus America. So while the initial response to the foundation's decision to staple one publication inside the other may have been to separate them and maintain the status quo, an examination of the ways users are likely to find them indicates that keeping them together is now preferable. Long-term users may be inconvenienced initially, but can be alerted to the change.

Finding Title Changes from the User's Point of View

The serials literature is full of debate over which method is preferable for serials that have changed title—successive, first, or latest entry. Each has its advantages and disadvantages from the user's point of view. Successive entry requires the user to search separately for each version of the title. Each of these individual records may be shorter than latest entry records would be, a distinct advantage from the user's point of view. However, users must search each title—often three, four, or more—for complete retrieval. In addition they have to interpret the often confusing terminology used to connect the varying titles, such as "continues," "continued by," or "absorbed by."

Earliest entry cataloging may be easier for the serials cataloger but is probably the most confusing for the user, because the title at the top of the record retrieved will seldom be the one he or she sought. That title may be buried deep in a note, which can be hard to pick out of a screen full of text. A title such as Metals Technology, which began as Journal/Institute of Metals became Metals Technology and merged with Metal Science to form Materials Sciences and Technology. MST is a nightmare for the user no matter how it is cataloged. Whether single or successive entry cataloging provides clearest access to serial records from the patron's point of view is an issue that needs to be examined through empirical research.

Conclusions and Directions for Future Research

We have pointed out many problems that could benefit from further research on user needs in locating journal articles. Reference librarians get a sense of the questions frequently asked, as well as the more occasional thorny problem. However, we have no idea how many more users are smoothly finding things themselves, leaving empty-handed, giving up in frustration, or assuming the library does not own something that it actually does.

Interlibrary loan may be a source of data on the frequency with which items are requested that in fact are owned. However, these figures are far from complete because not all patrons have access to interlibrary loan, and those who do, frequently do not have the time or motivation to pursue that avenue. In addition, we have not examined empirically what effect cataloging rules have on the user's successful retrieval. Thus, while we are able to identify the types of problems encountered, we do not know what percentage of users experience these problems, or how frequently they experience them. We also do not know how often links in serial citation databases, from "source" fields to serial bibliographic records in catalogs, via ISSNs common to both,
correctly take users to the records they need.

Studies such as Wildemuth and O’Neill (1995) begin to explore ways of incorporating user-oriented perspectives into online catalogs. However, studies with a much narrower focus will be needed to explore the complex nature of serial retrieval.

Many undergraduates come to the library with very little understanding of the research process, in particular finding and using the journal literature. They are frankly overwhelmed by the complexity of large systems. Even in the best of all possible worlds it is a difficult, time-consuming, complex process. The user must go through a minimum of five steps for each serial, any one of which may result in a problem. While further research will help identify specific problem areas, we see three areas where changes can be made now to help users.

The first is to link holdings from periodical databases to serial holding records. Examples are the multi-database access system (MDAS) product from NOTIS and other in-house efforts such as Penn State Libraries’ Table of Contents (TOC) database. In these cases database citations are linked directly to serial records. This eliminates the need for the user to identify the title and search the online catalog properly but still does not resolve the holdings and locations issues. Ideally, patrons would like to be able to type in the volume number of the issue they need and have the system respond with the exact location and shelving arrangement.

The second area is screen design and record information such as holdings that may be influenced by vendor decisions on online catalog design as well as local policy. Wallace (1993, 249) recommends that “successful screen designs and search engines should focus first and foremost on meeting the quick-searching needs of the majority of users.” A short record that is clear and easy to understand meets the needs of most users. Extensive notes and other information needed for clarification should be available at the user’s request.

In addition, careful attention must be given to wording used. The meaning of words such as source, citation, holdings, current issues, continuing series, serial, periodical, and index may not be clear to the user.

The third area where changes could be useful are cataloging rules and practices. Rule-making bodies must take user needs into consideration (these are really library needs, too). Because the decisions made about how titles will be cataloged, how holdings will be displayed, and so on have enormous, long-term implications for users, we need to work together on solutions.

We, the entire library profession, need to refocus our attention on the users. How do they look for serials? How do they interpret information on the screen? For example, simple title-added entries for commonly cited forms of the titles, including abbreviations, would solve many users’ and public service librarians’ headaches. While rules may allow for adding these entries, local policies and communication barriers may often prevent them. Also, English main entries and titles should be used for English translations of serials originally published in another language. Complicated titles, such as Architectural Design, require innovative solutions to ensure that the user can find the title from all possible citation formats. When patrons cannot find something the library owns because there is no entry for it in the catalog, the library has failed them. In an era of declining budgets, it is ever more critical that material the library owns can be located by library users. In cases where the rules do not serve the best interest of the users, the rules should be changed. In cases where local policy is the issue, those policies should be given reconsideration in light of user needs.

We have come a long way in addressing user needs, but a review of problems indicates that there are still many areas where we could improve. Meeting customer service needs will provide us with a challenge in the decade to come. If libraries are to compete in the information age, they must take the lead in meeting this challenge.
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Notes on Operations

Acquisitions of Hard-to-Find Backfiles of Chinese Periodicals from the People’s Republic of China

Peter Zhou

This paper describes the University of Iowa Libraries’ experience in purchasing hard-to-find backfiles of Chinese periodicals from China. It sheds light on how small foreign-language collections in North America can be greatly enhanced by using a novel acquisition strategy and by understanding the different book market conditions in third-world countries. The experience summarized here is unique in some aspects and can be used by other libraries in similar cooperative projects in the future.

A good Chinese collection must have a strong serials component of journals, periodicals, government publications, and conference proceedings that are classified in the following three categories:

1. National publications: those published by major academic publishers, national universities, national research institutions, and government agencies. Such publications are distributed nationwide in China.

2. Provincial-level publications: those published by research institutions at the provincial level, colleges and universities of various provinces, and provincial government agencies, which are usually circulated within provinces in China.

3. Local publications: those published at the municipal or county level, usually with a limited circulation, such as county gazetteers or municipal statistical reports.

Due to historical reasons and the condition of publishing in the People’s Republic of China, backfiles of such serial publications in Chinese are mostly out-of-print today. Microfilms of Chinese periodical backfiles are usually limited to only a few titles with limited spans. The rampage of China’s Cultural Revolution was also a cause for the rarity of such materials, as it took a toll on all Chinese periodicals published from the mid-1960s to the late 1970s and earlier. It is almost impossible today to get complete backruns of Chinese periodicals in large quantities through the commercial book market.

From 1993 to 1995, the University of Iowa Libraries successfully acquired complete backruns of more than four hundred hard-to-find Chinese periodicals in more than seven thousand volumes with the help of four major Chinese libraries. With China’s open-door policy and broadening economic reform, libraries in China today
are more independent, entrepreneurial, and accessible to the outside world. This has created an opportunity for cooperation between U.S. and Chinese libraries.

In this article, the University of Iowa Libraries' experience in purchasing hard-to-find backfiles of Chinese periodicals from China is described. Our experience sheds light on how small foreign-language collections in North America can be greatly enhanced by using a novel acquisition strategy and by understanding the different book market conditions in third-world countries. The experience summarized here is unique in some aspects and can be used by other libraries in similar cooperative projects in the future.

**BACKGROUND**

From 1992 to 1995, the University of Iowa Libraries received two U.S. Department of Education Title VI grants for foreign periodicals, with a total funding of nearly a quarter of a million dollars, earmarked for the purchase and processing of hard-to-find Chinese and African periodicals including current titles and their backruns. With this funding, the University of Iowa Libraries planned to add more than four hundred current Chinese periodicals and their complete backruns in humanities, social sciences, and Chinese health sciences. Many of the backruns of those Chinese periodicals dated back to the 1950s.

We first contacted the three largest commercial book vendors in China—China National Publishing Industry Trading Corporation, China International Book Trading Corporation, and China National Publications Import and Export Corporation—and solicited their help in getting these materials for us. We learned that they could get us only small segments of backruns from used book stores in Beijing. Those Chinese vendors indicated that it was impossible to acquire the complete backruns of all four hundred-plus periodicals we wanted, because such materials were not available on the Chinese book market. It was obvious that the limited fragments of Chinese journals that vendors could provide us were of little help, because our plan was to systematically enlarge and enhance our Chinese periodicals collection by acquiring the complete backruns of all four hundred-plus titles, which at that time could only be found in major Chinese libraries such as the Chinese National Library (Beijing Library), Shanghai Municipal Library, and some national Chinese university libraries in China.

Cost was another factor. One commercial vendor offered to microfilm the Chinese backfiles for us from the collections of the Chinese research libraries, but the cost for microfilming far exceeded the funding we received for Chinese periodicals, and the time required for a microfilming project would have been much longer than our grant period.

Given these factors, we believed that the most cost-effective way of obtaining the Chinese backfiles was to acquire them directly from the existing collections of some major Chinese libraries. We learned that Chinese libraries have a tradition of buying and storing multiple copies of Chinese periodicals: one for circulation, one for back-up of circulation, and one for permanent preservation. It would be most desirable if we could purchase some of those duplicate collections from Chinese libraries.

We searched library literature, but could not identify from existing literature any citations for similar projects, as this model of acquisition perhaps had not been previously reported. Thus, we had to design the mechanisms of acquisition by ourselves from scratch.

**METHODOLOGY**

We made a proposal to ten Chinese libraries, in which we stated our interest in purchasing their duplicate periodicals at a price reasonable to both sides. Those ten Chinese libraries were:

- The Chinese National Library (Beijing Library)
- Beijing University Library
- Fudan University Library
- Wuhan University Library
- Zhongshan University Library
- Jilin University Library

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- Fudan University Library
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- Zhongshan University Library
- Jilin University Library
Northwest University Library  
Hubei University of Medical Sciences Library  
Beijing Xiehe University of Medical Sciences Library  
Beijing Medical University Library  
Most of the libraries responded positively to our proposal and expressed their willingness to participate in the project. We then sent them our “shopping-list” of Chinese periodicals, requesting them to search it against their holdings and report the search results to us. This bibliographic checking revealed that most of the ten libraries had the materials we wanted. We then selected four of the ten libraries as our partners, based on how complete their duplicate collections were. The four libraries were: Beijing University Library, Fudan University Library, Wuhan University Library, and Hubei University of Medical Sciences Library. By inviting these four libraries to participate in this project, we created a competition among them to help lower the cost through a bidding process. We also made it clear from the beginning that we would only be interested in purchasing their duplicates, not their single master copies, and that the prices for those materials would be fair to them.

During the summers of 1993 and 1994, the University of Iowa Libraries sent its representative to the four libraries to meet with their administrators, negotiate terms of the contracts and prices, inspect the physical conditions of their backfiles, and sign the contracts.

The “shopping-list” from the University of Iowa Libraries was divided into four portions, and each of the four libraries took up one portion through competitive bidding and negotiation. The contract contained a list of titles and years of the backruns, together with a block price for the materials, labor, and shipping. We required that all periodicals be hardbound before they were sold to us. Cost of reproducing missing issues found in the collection was included in the block price. We also set a six-month deadline for delivery, and agreed to make a payment upon receipt of the materials. In the end, all materials arrived on time.

RESULTS

Altogether in the project, we acquired over seven thousand volumes, which comprised complete backruns of over four hundred Chinese periodicals. The following is a cost analysis.

As shown in table 1, by buying directly from the Chinese libraries, we achieved an average savings of $15 per bound volume, compared with the conventional purchase of such materials through book vendors. That amounts to more than $105,000 for over seven thousand volumes of Chinese periodicals, not to mention the fact that those out-of-print materials could only be found in the existing collections of a few Chinese libraries. On the other hand, to the Chinese libraries who were our partners, though their unit

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>COMPARISON OF COSTS AND TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purchase through Vendors</td>
</tr>
<tr>
<td>Acquisitions rate</td>
<td>30%</td>
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<tr>
<td>Time required for completing the project</td>
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<tr>
<td>Price per volume/year</td>
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<td>Binding cost per volume/year</td>
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<td>Shipping and handling per volume/year</td>
<td>$2</td>
</tr>
<tr>
<td>Total: (cost per volume)</td>
<td>$27</td>
</tr>
</tbody>
</table>
price per volume was low, the total proceeds for these voluminous backfiles were large and profitable because journal subscriptions for research libraries in China from the 1950s to the 1980s were cheap. They could easily offset the cost of acquiring and maintaining those materials over the years and still come out with a large profit margin.

This retrospective acquisition project was unconventional in several ways. It bypassed vendors and directly accessed the sources of such materials. By buying duplicate collections directly from Chinese libraries, we not only saved money and labor, but time. In addition, we developed a good working relationship with our sister libraries in China. Our Chinese partners all expressed their satisfaction in this mutually beneficial project. They made hard cash by weeding and selling us their duplicate collections, and, in turn, used the proceeds to buy some much-needed Western language publications for their collections. Furthermore, by weeding duplicates, they reduced their storage and preservation costs. They also used the proceeds to send their staff abroad for training and upgraded their library facilities by adding much-needed equipment such as photocopiers, fax machines, and computers.

The University of Iowa Libraries plan to make backfiles of Chinese periodicals available to scholars and researchers in the United States by entering bibliographic information for them into the national databases of the Research Libraries Information Network and the OCLC Online Computer Library Center, Inc., including complete holdings information. In addition, we plan to digitize the tables of contents of some of the rare Chinese journals, such as those in Chinese health sciences, and put them on the World Wide Web through the homepage of the East Asian Collection at the University of Iowa Libraries (http://www.lib.uiowa.edu/eac/).

Building a strong serials collection for area studies is costly, and it usually takes a long time. We found a quick and efficient way to retrospectively build a solid Chinese periodicals collection within a short period of time. In this case, improved understanding of the libraries and book markets in a third-world country led to an innovative collection development strategy.
Successful Cybrarians Connect to the Future with ALA Editions

Building the Service-Based Library Web Site: A Step-by-Step Guide to Design & Options
Kristen L. Garlock & Sherry Plontek
Meets the unique needs of the library profession! Focuses on universal home-page design principles and the necessary content that make up useful and informative library home pages. Any cybrarian who wants to be a player in the planning and creation of library home pages needs this valuable, user-friendly guide.
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Ahmed M. Fehmi
This essential, easy-to-read guide gives you the information you need to make confident networking decisions. Authoritative and comprehensive, the handbook includes: a Local Area Network Primer; 29 diagrams illustrating CD-ROM networking solutions; succinct descriptions of necessary products for most network configurations—even MAC-PC connections; vital facts on memory management and network security; and much more!
S$50.00pbk.  Approx. 420p.  1996  ALA Order #0670-2-2035

303 CD-ROMs to Use in Your Library: Descriptions, Evaluations, and Practical Advice
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Patrick R. Dewey
Presents succinct descriptions of 263 CD-ROM packages—and reference to dozens more—all suitable for libraries. Organized by subject for easy reference, categories range from Art to U.S. government information. Each entry offers brief, evaluative comments on searching features, content, and level of user sophistication as well as platform/hardware requirements and vendor and pricing information.
S$30.00pbk.  Approx. 385p.  1995  ALA Order #0666-4-2035

FROM THE ASSOCIATION FOR LIBRARY COLLECTIONS & TECHNICAL SERVICES

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Association for Library Collections & Technical Services
Christopher O. G. Coleman, compiler
This handy directory lists library schools offering preservation courses. Each entry includes the library school’s address, telephone number, a brief description of each preservation course and its prerequisites, and listings for other courses having a preservation component. Entries also give information about continuing education programs.
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Selecting Microfilm for Digital Preservation: A Case Study from Project Open Book

Paul Conway

Project Open Book is Yale University Library's multiyear, multifaceted study exploring the feasibility of converting preservation microfilm to digital imagery and enhancing both physical and intellectual access to the resulting collection of digital files. Selection is the central intellectual challenge; challenges are outlined from Yale's case study that will also have bearing on content-oriented selection for digital conversion of books that have been microfilmed in the nation's Brittle Books Program. The approach outlined here for building a digital library from microfilm of the nation's most important brittle books places collection managers under the same umbrella with the other parties interested in creating and then preserving the availability of digital resources. The lessons from Project Open Book about selection of microfilm point to very concrete and achievable solutions for everyone involved in preservation microfilming and the digital conversion of that film.

Project Open Book is Yale University Library's multiyear, multifaceted study exploring the feasibility of converting preservation microfilm to digital imagery and enhancing both physical and intellectual access to the resulting collection of digital files (Waters 1991; Waters and Weaver 1992; Conway and Weaver 1994). Over the past four years, the library and archives community has discovered through this project the complexities of many aspects of digital imaging technology. In particular, the project served as a catalyst for finding ways to establish meaningful partnerships with the commercial sector, to maximize the quality and minimize the cost of digital conversion of microfilm, and, most recently, to make large and complex digital files available on the Internet.

Selection is the central intellectual challenge of any program that has a goal of creating a corpus of useful and meaningful digital research materials. Selection for digital conversion is like a coin. One face is the set of technical constraints that limits the usefulness of the technology for preservation and access. The other face is the set of issues relating to the content of the materials selected for conversion. To ignore either face of the coin in the selection process shortchanges our patrons.

Paul Conway is Head, Preservation Department, Yale University Library (peonway@yaleynn.cis.yale.edu). This article is based on a presentation to a joint program meeting of the Collection Management and Development Section and Preservation and Reformatting Section, Association for Library Collections & Technical Services, at the ALA Annual Conference, Chicago, Illinois, June 26, 1995. Manuscript received September 1, 1995; accepted for publication October 17, 1995.
My purpose is to outline the challenges Yale faced, and that other libraries will face, in content-oriented selection for digital conversion of books that have been microfilmed in the nation’s Brittle Books Program. A complex of ideas and theories together forms the context within which selection from a large collection of preservation microfilm must take place. The selection process for Project Open Book had to involve reconciliation of a theory of what ought to be done with the realities of the scope of the actual microfilm collection. I conclude with a series of recommendations, ranging from the mundane to the complex, for building a meaningful digital library from previously microfilmed materials. A forthcoming report on the latest phase of Project Open Book will review image quality, including a full discussion of technical limitations of microfilm conversion, and the costs of digital conversion from microfilm, including recommendations on controlling or reducing those costs.

NEH Brittle Books Program

The point of departure for Project Open Book is the ongoing federal government program administered by the National Endowment for the Humanities (NEH) known as the Brittle Books Program. The goal of the program is to preserve on microfilm three million crumbling books selected from high-quality research collections (Farr 1992). In the mid 1980s, the Commission on Preservation and Access arrived at the figure of three million endangered volumes through a complex and partly arbitrary process. First, they estimate the total number of unique volumes of possible enduring value to scholars. Finding the resulting ten million figure too daunting, the commission suggested a project goal of saving one-third. The U.S. Congress agreed to support a twenty-year effort to accomplish this goal and charged NEH with overseeing the selection and preservation process.

The overall selection strategy of the Brittle Books Program calls for participating libraries to identify large, significant subject-oriented humanities research collections rich with publications from the nineteenth and early twentieth centuries. Collection subject areas run the gamut of humanities disciplines—art, literature, history, and social studies—across time and geography. In most cases the collections are recognized by scholars and by the library community as having extraordinary past, present, and future research value (Gwinn and Mosher 1983). Additionally, these collections are in extremely poor shape due to the acidic nature of nineteenth-century paper, continuous poor storage conditions, and, in many cases, decade upon decade of heavy research use.

In a brittle books project, library preservation staff make title-by-title selection decisions based upon criteria that vary across projects and over time. The tendency in the beginning was to select volumes so fragile that their preservation on film most likely would be their last use. The trend today is more comprehensive selection in recognition that books on highly acidic but not-yet-brittle paper will someday need microfilming. Following filming, more and more volumes are now being returned to the shelves after some cleaning and repair, not simply because we know patrons dislike using microfilm but also because, for a given collection, books that are filmed and then discarded reside in one location (microfilm reading room storage cabinets), while those that were not filmed are browseable on the shelf or in online catalogs. These trends reflect the commitment on the part of participating libraries to balance the needs of local scholars with the demands of the national program (Child 1990). Most recently, preservation librarians have stepped up their calls for use-based microfilming as a component of the national brittle books effort (De Stefano 1995).

A central tenet of the Brittle Books Program is that no book shall be filmed twice. This rule is based upon the sound logic of economics at the national level. The need to avoid duplication has given rise to sophisticated national bibliographic control mechanisms—queuing in the Research Libraries Information Net-
work (RLIN) and prospective cataloging in the OCLC Online Computer Library Center, Inc.'s database—that give libraries a tool for declaring their intention to create film and the time to complete the job at their own pace. The NEH requires that a bibliographic record for the master negative of each title preserved in a brittle books project be located in either RLIN or OCLC, which exchange master microfilm records on a regular basis. At least one subject heading must be included in the record.

The accomplishments of this program to date are profound and the implications are far-reaching. When the sequence of NEH grants awarded in 1995 are finished, at least 700,000 brittle volumes will have been preserved from the collections of seventy libraries throughout the nation. The present worth of this program to the taxpayers is at least $70 million, owing to the fact that it costs roughly $100 today to complete the microfilm reformating of a single volume. The value of this collection will continue to grow with time as the per-volume costs of creating it increase and the availability of hard-copy duplicates decreases.

Yale University Library has been an active participant in this program since its inception; it has contributed about 10% of the total, some 72,000 volumes, counting the latest project. Beyond this contribution, the preservation surveys that laid the groundwork for the program were carried out first at Yale and then replicated across the country (Walker 1985). Gay Walker, who built the preservation program at Yale, pioneered the development of the processing procedures that are common practice today (Walker 1983). The program continues to explore ways to improve the efficiency of large-scale preservation projects—especially in the new project to preserve the content and context of the entire British History collection in the Yale library.

THE INTELLECTUAL CONTEXT OF SELECTION AND SUBJECT ACCESS

Certifying the centrality and cooperative nature of selection is practically a requirement for anyone who wishes to focus on the professional collection management responsibility of librarians and archivists. Stam (1993, p. 304), for instance, begins his excellent essay on preservation by declaring that:

Our essential purpose in preservation is to ensure the survival of evidence, incomplete and selective as it may be. The problem is one of priorities; it requires comprehensive coordination and cooperation among a broad range of institutions throughout a nation and beyond.

Practical methodologies for acting on this responsibility, however, have eluded us. A decade ago, Atkinson (1986) proposed a typology that distinguished between selection for near-term local needs and selection for long-term national purposes. "The clientele for whom this material is being preserved has not yet, for the most part, arrived on the scene," he suggested (p. 347). Cox (1989) extended and updated this typology for use in selecting archival collections for microfilming by emphasizing value and use. Child (1992) provided a handy summary of the evolution of approaches for large-scale preservation microfilming projects and pointed optimistically to the solutions expected from the ongoing work of a Commission on Preservation and Access dual task force on archival selection. Even though the task forces were unable to provide any new concrete guidance on setting specific, long-term selection priorities, the methodology for assessing collections has developed a grassroots popularity in a tremendous variety of programs nationwide (Commission 1993).

The difficulty of modeling the process of selection for preservation dogs us as we now approach the issue of selecting library materials for conversion to digital imagery. There is yet precious little discussion of the large issues; what focus there is tends toward reports on the nongeneralizable experiences of individual digital scanning projects. In pilot projects around the country, the choice of system content is largely driven by the methodology for testing the technical capabilities of conversion systems, rather than as part of a local or national strategy for converting a
body of material for research use. This avoidance of the issue of the use and usefulness of digital imaging systems for scholarship, research, and teaching seems to be endemic to libraries. In the world of business and industry, where mission-oriented, large-scale imaging system applications originated, system design, system content, and system use go hand in hand as a matter of principle. The essential client focus and the bottom-line costs of service to these clients force this union of content and function—a union that is not so easily obtained in libraries and archives.

For us, therefore, the two essential elements of intelligent, subject-oriented selection for digital conversion from a very large corpus of literature are knowledge of the scope of the collection’s content and understanding of the value of the collection (or its components) for scholarship and teaching. Beyond these essential facts, a mechanism must exist for identifying individual items within a broader topical context (Riecken 1990). Atkinson (1986, p. 350) has argued that the only practical way to accomplish large-scale cooperative preservation is to “build the program not around subjects but rather exclusively around subject collections in place.” Ideally, descriptive and subject cataloging practices support these needs by facilitating both known-item retrieval and broad or narrow subject analysis, including the contextual relationships among items.

Bibliographic control of microfilm has been a challenge for the library community for decades and there is no need to recount this history (Gwinn 1987). Guidelines that have evolved since the mid-1980s have codified descriptive cataloging practices and specified the mechanisms for sharing catalog data (Johnson 1995; ARL 1990). In these guidelines, discrete original items are the point of departure for cataloging microfilm masters. The assumption of all these guidelines seems to be that access to microfilm is via a known-item search derived from information about the original item. Furthermore, present microfilm guidelines make little or no recognition of the intellectual and physical relationships within a collection and have not specified or resolved subject cataloging practice.

We know about the intense need by the scholarly community for research materials on film (Gould 1989). A recent national survey of historians found that only 7% of the entire population do not use microfilm in their work (Gordon 1992). This same population of scholars also decries the limitations on access to microfilm. Inadequate subject access is a major source of the continuing challenges associated with identifying and retrieving microfilm for purposes of digital conversion. Now, as we move toward the creation of a full-scale digital library created from a wide variety of source documents, some critics of traditional cataloging practice are beginning to suggest that we downplay full cataloging of electronic resources precisely at the point at which the Machine-Readable Cataloging (MARC) record is beginning to fulfill its potential as a universal data exchange format (Davis 1995). This would be a mistake.

If, indeed, a microreproduction is a surrogate of an original item, why should we be concerned about subject access to microfilm collections? One answer is that we know that humanities scholars are guided less by sources and more by problems and questions that lead them to particular sources (Case 1991). In their recent study of the nature of “known-item” searching, Wildemuth and O’Neill (1995) reviewed much of the literature on access points and found that between 33 and 67% of all patrons search by broad subject. Yee (1991), in an equally comprehensive review, suggests it is safe to conclude that subject searching is desired and used by our patrons, that they would make best use of a bibliographic tool that provides both controlled vocabulary and keyword text searches, and that researchers need to have online information about broader and narrower search terms, as well as information on the relationships among these terms. Markey’s (1987) research on the use of classification as an access tool shows the power of preserving and displaying conceptual relationships among seemingly autonomous items. A concrete test of subject-based retrieval of a core
topical literature from a large database also demonstrated how recall (accuracy and relevance) could be improved if researchers had ready online access to other closely related subject headings and access to other parts of the bibliographic record for subject searching (Lancaster 1991).

But what does the concept of "subject" really mean in a humanities research context? A decade of systematic research sheds light on this question, too. Bates, Wilde, and Siegfried (1993) have focused on the vocabulary of humanities research with striking results. Building on the pathbreaking work of Wiberley (1983) on historians' use of dictionaries and encyclopedias, they showed that a majority of researchers start with broad subject concepts. More importantly, humanities scholars also typically consider individual proper names to be subjects (45%), as well as geographic terms (22%), chronological eras (16%), and disciplines (21%). In their sophisticated evaluation of natural-language inquiries as well as formal, structured queries of online systems, they found that fully half of the study group combined general subject terms with more specific qualifiers. In yet another important study on what humanities scholars needed in the way of abstracting services, Tibbo (1993, p. 185) concluded that "facets of time, place, and specific topic are used by historians to define their search, classify their literatures, and organize college curricula."

Together, these and many related studies of search and retrieval behavior of scholars and students in the humanities suggest not only the importance of subject access, but also point toward a clear set of solutions that make full use of the bibliographic record to enhance access and support individual research (Bates 1979; 1989). None of the techniques identified will work, however, unless rich bibliographic information exists for all materials of interest to humanities researchers.

A Case Study on Selection

It was only logical, it seems now, that Yale looked to its large collection of preservation microfilm as a possibly ideal source for large-scale conversion to digital imagery. The material had already been selected for long-term preservation through an extensive local process, which was then validated at the national level; the film met the best standards of quality; and bibliographic records for each title resided in the RLIN and OCLC databases, assuring national access. As the library approached selection for digital conversion, the only questions were: What subjects were filmed and which subjects should be converted?

It is quite simple to paint an overall picture of our filming activity. In a nutshell, over the past ten years, Yale preserved on microfilm roughly fifteen thousand volumes from the American History Collection (1983–93), twenty-three thousand volumes from the European History Collection (1988–93), and nineteen thousand volumes from the History of Economics and Political Science Collection (1992–95). The Yale preservation survey team identified each of these collections as a top preservation priority. At one time, the collections were ordered on the shelf according to the "Old Yale" classification system. The classification system has a rich subject orientation and provides for subclassification by geography, historical era, and genre (Hitchcock 1953).

The selection theory was straightforward and emphasized content cohesion over the technical limitations of the digital imaging system. It called for staff to identify significant "Old Yale" subject clusters of film from each of the three major collections of interest to Yale's faculty and students in the humanities. By connecting selection with expected use, a known population of scholars could help evaluate the end product and its usefulness for scholarship. Quality control procedures worked out in earlier phases of the project (Conway and Weaver 1994) would require benchmark comparisons of digital scans from a sample of the original books (when available) with scans from the microfilm reproduction. Bibliographic records for the image version of the books would be added to our online catalog, Orbis, where they would be fully integrated with other versions of the same title and, more importantly, retrievable by scholars working...
on related or similar materials for a variety of research topics.

In the interests of project efficiency and productivity, the production plan called for converting all of the titles on entire reels of film within a given “Old Yale” subject cluster. An explicit decision was made not to “de-select” a particular title from a chosen subject cluster simply because it could not be converted easily with the equipment configuration installed at Yale. We were curious to discover the frequency and nature of “problem” books and wanted to measure the impact of these books on the conversion process. Challenges to implementing our plan fell into two broad categories: content-related issues and bibliographic control issues.

**CONTENT ISSUES**

Given the national mandate to avoid duplication, Yale did not film any volume in its collection that already had been preserved on film at another institution. Hit rates for “found film” varied within these collections from 3% to over 50%. Not surprisingly, heavily used portions of a collection tend to have the highest rates of preservation film. Beyond the found film problem is the fact that many volumes in a collection were not filmed because they fell out of the date scope of the project or are modern reprints or have a lot of color content.

One partial solution to the found film challenge could be to obtain film titles for image conversion. The two options, interlibrary loan and direct purchase, require a significant investment of time and money and yield mixed results. Using “Other People’s Film” takes all of the intellectual energy invested in reformatting the volume in the first place: searching for the existing film, matching records and then content, concerns about quality and completeness, and the reluctance of some libraries to loan film containing multiple titles on varying topics. More significantly, the most effective conversion of microfilm is obtained from duplicate negatives, which few libraries and archives are willing to loan.

Through most of Yale’s projects, reel programming has been left to the vendor. Reel programming is the process of grouping volumes with similar characteristics, such as size and paper tone, on a reel of film that will contain about one thousand frames (as many as two thousand book pages). The admirable goals of most reel programming activity, reinforced by guidelines provided in the *RLG Preservation Microfilming Handbook* (Elkington 1992), are to minimize film wastage, fill frames consistently, and improve the consistency of the film density across the reel. Even when programming is handled in-house, meaningful arrangement by topic is usually not a goal, and the result is intellectual chaos from reel to reel. Volumes on many different topics can and do appear on any given roll in the materials selected for Project Open Book.

In table I I summarize the scope of the four major brittle books microfilming projects at Yale in the past decade and describe the distribution of the preserved titles by topic on project reels. In only one project (French History) do a majority of the reels contain books on a single topic. The American History projects show the greatest dispersion of books by topic, owing in large measure to the long duration of the program and the evolution of processing procedures during the past decade.

For some key collections in a single library, most of the brittle books are now gone. As a pioneer in the nation’s preservation microfilming program, Yale’s procedures for handling the original book have evolved in the past decade. The discard rate for books filmed in certain areas of the European History Collection exceeds 80%. The rate is partly a factor of the physical condition of the item selected for microfilming and partly determined by the overall approach taken by the bibliographer or curator responsible for preservation decision making on the collections. When filmed books are discarded, while the content is preserved, our ability to undertake quality benchmarking or to calibrate the accuracy of the scanning equipment is severely hampered. This
calibration becomes necessary when, for whatever reason, the reduction ratio of the filmed volume is not known or seems to be inaccurately recorded. In such situations the only recourse in setting up the scanning equipment accurately is to measure the original volume, which is, of course, impossible if the original volume is in a landfill.

The end result of these four procedural matters associated with routine brittle books filming projects is a film collection at Yale with little intellectual cohesion and a devastated book collection lacking both context and comprehensiveness. Possibilities for browsing and the integrity of the original collection are lost.

Four clusters of titles in the "Old Yale" classification system were identified that contained a critical mass of microfilmed titles from the original collection and that were of interest to Yale faculty and students. These four clusters are:

- Civil War History
- Native American History
- History of Spain Before the Civil War
- History of Communism, Socialism, and Fascism

These clusters were chosen following a significant effort to reconstruct the intellectual structure of the original book collection and then identify substantial "Old Yale" subclassifications concentrated on microfilm reels with little or no extraneous material. Yale library bibliography staff played a key role in reviewing this work, assessing several years' worth of course offerings at the graduate and undergraduate level, contacting faculty in three disciplines by phone and letter, and obtaining commitments from faculty and students to use the project's digital image files for research and teaching.

### Bibliographic Control

The process by which the project staff actually found the items in these subject clusters, however, raises the issue of bibliographic control of microfilm collections. When they tried to use our online catalog to undertake a comprehensive, subject-oriented analysis of microfilm holdings created in a decade of systematic filming, they encountered a number of difficulties.

Yale's earliest preservation microfilming projects made use of student assistants to undertake minimum conversion of historic card files. If no subject tracings appeared on the card, none were added and no authority control was undertaken on the converted records. During the intervening decade cataloging quality has improved but overall there remains a high level of inconsistency in the bibliographic records for preservation microfilm. Additionally, a single subject heading, whether controlled or uncontrolled, is barely sufficient to provide the kind and level of sub-

### TABLE 1

<table>
<thead>
<tr>
<th>Yale University Library Microfilming Projects</th>
<th>American</th>
<th>European</th>
<th>French</th>
<th>Social Science</th>
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<td>19,645</td>
<td>3,027</td>
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<tr>
<td>Average volumes per reel</td>
<td>7.2</td>
<td>5.9</td>
<td>4.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Total titles filmed (est.)</td>
<td>11,548</td>
<td>15,148</td>
<td>2,298</td>
<td>14,600</td>
</tr>
<tr>
<td>Average titles per reel</td>
<td>5.6</td>
<td>4.5</td>
<td>3.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Total number of reels</td>
<td>2,062</td>
<td>3,366</td>
<td>638</td>
<td>2,028</td>
</tr>
</tbody>
</table>

*Topical distribution of titles on reels*

- All titles on a single topic (%) 20 10 60 12
- Majority of titles on a topic (%) 36 75 29 44
- Too mixed to classify (%) 46 15 11 42
ject access expected by today's research patrons.

When the "Old Yale" call number for the original book is included in the bibliographic record, it is located in an unsearchable local notes field (939). Each version of the microfilm itself is given one of three possible "dummy" numbers that has no intellectual value, unlike the original classification system for the brittle materials.

Without a separate, known-item search, there is no straightforward mechanism in either RLIN or Orbis to determine from the microfilm record whether the original book was returned to the shelf following filming. This fact makes it quite challenging to reconstruct the structure of the original collection without recourse to the historic shellflist, which has not been completely converted to machine-readable form and no longer contains cards for items withdrawn from the collection following filming. For better or for worse, the shellflist remains for us, along with the paperwork generated by the microfilming projects, a vital resource until retrospective conversion is complete and until Yale's microfilm cataloging procedures have been updated to make them consistent with the most enlightened cataloging practice.

Yale's challenge in finding a secondary use for microfilm collections (digital image conversion) that was not initially envisioned are emblematic of the issues that other libraries surely face. At a minimum, it is fair to assume that the library procedures followed over the years have resulted in extraordinary inconsistencies in cataloging practice that, for all intents and purposes, make the corpus of preservation microfilm in this country all but unretrievable by subject. This last statement is only the latest in a half-century string of complaints about the bibliographic control of microfilm (Gwinn 1987).

**RECOMMENDATIONS TO IMPROVE SUBJECT ACCESS AT THE LOCAL INSTITUTION**

Librarians engaged in comprehensive preservation microfilming projects can take a number of concrete steps immediately to make sure that the end product of their work is manageable as a discrete, meaningful collection and that the structure and content of the original collection is preserved and at least minimally retrievable by topical concepts.

1. Undertake broad and comprehensive subject cataloging of microfilm masters using as many fields of the USMARC record as are appropriate to capture rich information about each item's content in terms of time, space, and topic. Multiple controlled subject terms, including broad and narrow related terms, are a must.

2. Record format information in fully searchable fields in the local catalog, as well as in national bibliographic utilities.

3. Record standardized information on brittle books projects in a fully searchable field. The unique identifier assigned by NEH to the project might be an appropriate place to begin.

4. Record information about the existence of microfilm of books created by other research libraries in a fully searchable field in the local catalog. This is the present practice at Harvard University Library for all grant-funded projects.

5. Record identifying information about the existence of the original item in the bibliographic record for the microfilm, if the book was returned to the shelf after preservation processing.

6. Program entire reels of microfilm by narrowly defined topic, to improve the possibilities for browsing of the microfilm collection.

With comprehensive bibliographic control and creative reel programming, a local collection of microfilmed books could be made as readily accessible and as amenable to browsing as a collection of books. These recommendations (as well as some forthcoming ones relating to the technical characteristics of preservation film) ought to become standard preservation processing procedures.
RECOMMENDATIONS FOR BUILDING THE DIGITAL LIBRARY WITH MICROFILM

The Brittle Books Program is creating the first "virtual library" in the world that also happens to be a vital source for digital conversion. This library is largely underground and exists as an "entity" only in national bibliographic databases; yet, when completed, its size and scope will rival the collections of many major research libraries in this country. We owe it to present and future scholars (to say nothing of the taxpayers who foot the bill) to make it fully accessible to patrons as a complex collection with many facets, many uses, and many points of access. Thus, selecting from this national collection of microfilm to help create part of the new national digital library becomes, by nature of the conditions of its creation, a responsibility that transcends the collection development and preservation policies of any of the libraries that have participated in the Brittle Books Program to date. Here is a set of recommendations for making broad, subject-oriented selections from one virtual library to create another.

1. Approach the selection process as a discipline-based, multi-institution, multi-format collection development program (Hazen 1995).

2. Identify the core literature in the target discipline using techniques used at Cornell University in the ongoing agricultural literature project (De mas 1994).

3. Use the core literature as the seed for "growing the pearl," which is far more extensive than the core and far more varied than published sources on paper or film (Bates 1979).

It is important to emphasize that neither a core collection in electronic form nor a demand-driven digital conversion program is a sufficient model for building the digital library. The weaknesses of each approach can only be overcome by developing a richer process that retains the intellectual cohesiveness of the core collection concept and the value validation that patterns of patron use provide. The criterion for initially enlarging the digital collection around the core literature should be recent use of either a microfilmed book in one library or the paper original in another library, as determined by circulation, refiling, and loan statistics from participating institutions. The criterion for adding books beyond those that have recently circulated should be topical relevance, as determined by broad-based subject analysis of already-preserved materials. Finally, the criterion for adding special collections material, especially unpublished archives and manuscripts, to this enlarged kernel of digital resources should be scholarly demand for access to microfilmed collections, as determined by reproduction and loan requests.

The approach outlined here for building a digital library from microfilm of the nation's most important brittle books places collection managers under the same umbrella with other parties interested in creating and then preserving the availability of digital resources. At the heart of this comprehensive selection strategy is a richer understanding of the use of research materials than we have known in the past. And yet this understanding is absolutely essential because without factoring our patrons into the decision-making process, the risk of failure is simply too high. The approach is present-tense oriented but recognizes that digital preservation involves nearly continual reappraisal of the value of the electronic collection (Conway 1994). The bottom line for all of us, however, may well be that, without improvements in intellectual access to microfilm collections that support subject-oriented retrieval, digital conversion of these collections may prove to be quite feasible technically and quite untenable intellectually.

The lessons from Project Open Book about selection of microfilm point to very concrete and achievable solutions for everyone involved in preservation microfilming and the digital conversion of that film. Other findings from Project Open Book demonstrate the extraordinary quality of digital imagery that can be achieved by converting second-generation micro-
film. This conclusion reaffirms the general accuracy of the technical standards that govern preservation microfilm and the value of the guidelines that interpret these standards. More significantly, the findings on conversion quality also will establish the fundamental place of microfilm for both preservation and access. This is a liberating notion for the digital library we are just beginning to build and should allow us now to concentrate our energies on preserving this new “virtual” library, confident that microfilm could serve as a viable backup source.

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Selection for Preservation: A Digital Solution for Illustrated Texts

Janet Gertz

The point of selection for preservation is to identify endangered library and archival materials that have long-term intellectual value and are therefore worth the effort and cost of long-term preservation. Technical issues cannot be separated from selection for preservation, because the limits of preservation technologies can influence decisions. At least for the present, we need to combine digitization with analog preservation methods. This “hybrid approach” operates on an assumption that we can in fact make a digital version of the original, and that the digital version will be able to serve the needs that justified selecting the item for preservation in the first place. Columbia University Libraries’ Preservation Division has been experimenting with the hybrid digital approach, selecting digitization as the preservation method for materials that previously had to be rejected because our reformatting technologies could not copy them in a way that made the contents accessible to users. In 1994 Columbia undertook a project funded by the Commission on Preservation and Access to combine film with digitization and test the hybrid approach on illustrated materials. We have demonstrated that scanning the microfiche can, in fact, produce digital images with legibility equal to the images made directly from the original printed maps. While legibility was quite successfully achieved during the project, questions remain about the quality of the color that can be delivered to the viewer. Capture is one side of the coin, delivery is the other.

The point of selection for preservation is to identify endangered library and archival materials that have long-term intellectual value and are therefore worth the effort and cost of long-term preservation. The goal of preservation reformatting is to produce a copy of a brittle or damaged original that captures as much as possible of the intellectual content. That copy must be long-lasting and at the same time fully usable by scholars. A long-lasting copy that cannot be used is not much improvement over the brittle original. This includes digital images. The potential for enhanced uses of digitized materials is almost unlimited. But if the digital image

Janet Gertz is Director for Preservation, Columbia University Libraries, New York (gerzt@columbia.edu). This article is based on a presentation to a joint program meeting of the Collection Management and Development Section and Preservation and Reformatting Section, Association for Library Collections & Technical Services, at the ALA Annual Conference, Chicago, Illinois, June 26, 1995. Manuscript received September 1, 1995; accepted for publication October 17, 1995.
is illegible or badly indexed, then preservation and access both fail.

Determining what is usable rests on the selector's analysis of research patterns in the disciplines that use the materials. How will the materials be used—for a careful reading of the full text, for quick reference consultation, to collect data, or to be examined in close combination with other items, as when an art historian compares tens or hundreds of images? Will use be frequent or infrequent over time? Heavy in the short term? Low in the long term? Must the materials be immediately available or can scholars tolerate a slower retrieval rate?

Technical issues cannot be separated from selection for preservation, because the limits of preservation technologies can influence decisions. Is there a way to return the item itself to continued use? Is there a workable reformatting method for replacing the item with a copy that can serve the same uses as the original? How much of the information contained in the original can be transferred to the copy? If we are talking about reformatting via microfilm, is the item one whose content can be captured and reasonably used on film? If we are talking about reformatting through digital imaging, the same questions apply: Can the item be scanned successfully? Can we achieve image quality that will serve the desired uses? Funds are always limited and neither digital nor analog preservation methods are cheap. It is important to choose the preservation and access methods that can really serve scholarship.

**DIGITAL PRESERVATION TECHNOLOGY**

Digital technology offers us the potential to broaden preservation because of its ability to enhance access to endangered materials. But at the same time the validity of digitization as a source of long-term preservation is very much an open question. We know that digital storage media have a short life relative to microfilm, or even relative to acid paper. We know that software and hardware change with almost frightening speed, leaving older iterations behind and often unreadable. It is too soon to rest secure that repeated refreshment and migration will not somehow alter the content of the digital files.

At least for the present, therefore, we need to combine digitization with analog preservation methods. For true long-term security, we must assure that we have the most permanent analog version we can achieve—this might be the original item itself, properly repaired and housed, or a reformatted version on film or other stable medium. Microfilm in long-term archival storage can continue to serve for centuries. After all, longevity and stability are the hallmarks of properly made and stored film.

In parallel to this archival-quality analog version, we might also want to make what could be called a "digital preservation" version. In doing so, the original is scanned at the highest resolution needed to produce full legibility; gray scale or color are used when the original requires it, and are carefully matched to the original; and the master copy is maintained in a lossless format. The digital preservation version presents an accurate record of the original for scholarly purposes, without further enhancement. Certainly digitization offers us tools to enhance images; a manuscript with text obscured by coffee stains can be digitally altered to be much more legible, but this changes the facts of what the original really was at the time of scanning. Authenticity and accuracy in representing the original are particularly at issue where the original will be discarded after scanning.

**PRODUCING VIRTUAL COPIES FROM DIGITAL VERSIONS**

From the digital preservation version scholars can then derive as many copies as they wish, and it is these use copies that can be enhanced and manipulated at will. The point is both to facilitate multiple possibilities of use without compromising the authenticity of the digital preservation version, and to maintain the analog version for those who will need to consult it and, of course, in case of accidental loss or change to the digital preservation version.
Should it ever be needed or desired, we will have the analog version to rescan.

This model, which has been called the "hybrid approach" (Willis 1992), assumes that we can in fact make a digital version of the original, and that the digital version will be able to serve the needs that justified selecting the item for preservation in the first place. In trying to decide whether digitization is appropriate in preserving a specific item, it seems to me that we must go back to the basic question: Can the applications and type of access required by users best be served by paper, film, or an online version? How might scholars use a digital version? Would it provide anything the analog version cannot?

If we think digital technology is the answer, then we must determine what levels of resolution and accessing mechanisms are appropriate. If we want full access online to high resolution images to serve as surrogates for rare or fragile materials, or as replacements of originals to be discarded after scanning, the question is whether current technology is capable of capturing, transmitting, and displaying the needed information.

Selection decisions must be made with an understanding of where we run up against the limitations of the technology, and where we reach the point that digitization offers little or no improvement over analog preservation, or does so only at great cost. Determining how selection for preservation will work in a digital environment is a moving target because technology changes so rapidly. We can talk about selection for what is technically possible now, but we must also identify how we want to use digitization in the future, and then push the technology in those directions. As what is available on the technological side continues to change, we will broaden the range of materials appropriate to select for preservation through digitization.

**CASE STUDY:**

**COLOR OVERSIZE MAPS**

Columbia University Libraries' Preservation Division has been experimenting with the hybrid digital approach, selecting digitization as the preservation method for materials that previously had to be rejected because our reformatting technologies could not copy them in a way that made the contents accessible to users.

**BACKGROUND: PRESERVATION REFORMATTING METHODS**

Traditional preservation reformatting methods can lead to negative selection when we decide not to select an item because we have no satisfactory preservation and access method. Illustrated materials characterized by color and large size are prime examples, especially art and architecture publications and those of geology and geography, with their maps and charts. These genres present a particular preservation challenge. It is essential that scholars be able to view illustrations while they read the accompanying text. Further, they need to see the illustration as a whole, to follow information across the breadth of its surface, and they must also be able to read the finest details at every point. Color and pattern are important for aesthetic reasons and as coding devices on maps and charts (Commission on Preservation and Access 1989; Joint Task Force 1992).

Preserving illustrated materials is not easy. Oversize illustrations in brittle volumes suffer particular physical stress. Publishers combine text with illustrations by folding oversize items into the binding or pockets. While the pages of the volumes follow the usual course of slow chemical degradation, self-destruction of the oversize foldouts moves swiftly because the brittle folded edges break off and information is irretrievably lost.

This is not an insignificant problem. In a random sample of brittle architecture monographs, the Preservation Division found that 68% of the collection contains a mixture of illustrations not suitable for filming; 17% have oversize foldouts. Similarly, the University of Chicago Preservation Department reports that between 10% and 20% of their collections in the sciences contain oversize graphic materials (Preservation Department 1989).
Black-and-white microfilm certainly is not a successful method for preserving print materials that are heavily illustrated with color and oversize elements. Not only is the color lost; the oversize illustrations must be filmed in sections in order to keep them legible, and the result is a major loss of functionality. Sectioned illustrations are often genuinely unusable.

Even torn and crumbling original illustrations can be preferable to poor reproductions. At Columbia, art and architecture faculty rejected microfilm of illustrated originals. Because microfilming did not preserve the content of the volumes and because hand conservation was not feasible, selection for preservation of brittle illustrated books in essence became selection for indefinite residence in the “sick bay” instead of selection to reformat the books and return their content to scholars for research.

Finding a new way to preserve text plus illustration thus ranks very high among Columbia’s preservation priorities. Collection development specialists are extremely conscious of the collection’s preservation needs (many of the older materials are brittle), but are also extremely frustrated by the technical limitations of preservation that have prevented them from making successful preservation decisions on these very important conspectus level 4 and 5 collections, which would otherwise be among the first selected for preservation.

METHODOLOGY

In 1994 Columbia undertook a project funded by the Commission on Preservation and Access to combine film with digitization and test the hybrid approach on illustrated materials. An important question for the project was whether scanning a film intermediary would produce results comparable to scanning the original. The other area for investigation was to experiment with a means for integrating the digital files of the text and illustrations into an online whole. The goal was for the scholar to view the text and the illustrations in juxtaposition, as was possible with the original paper volume.

In phase one of the project, we addressed the scanning of oversize color illustrations, specifically maps. Capture was equally successful from film or from the original. We also have found, not surprisingly, that Internet access and delivery have definite limits at present and that printouts can serve as a stopgap in the interim. A detailed final report of the project and over three hundred digital images can be accessed over the Internet at http://www.cc.columbia.edu/imaging/html/largemaps/.

Moving through film to digital was our preferred option for a number of reasons. For instance, several of the vendors working on the project prefer scanning a film intermediary rather than the original, claiming that they can achieve a better scan from the film version. In practical terms, when the original is very fragile, handling needs to be minimized. Many scanners cannot accommodate oversize materials, whether fragile or not. There is also the fact that many scholars are still limited in their ability to access digital files (especially the very large files needed for pictorial materials) and might still choose to access the volumes in the film version.

During the project we worked with five turn-of-the-century brittle maps from the New York State Museum Bulletin. We compared digital images made directly from the paper originals with digital images made from single-frame color microfiche of those same maps. Single-frame microfiche use the entire field (normally 105 x 145 mm) to carry just one image. The microfiche had been produced during an earlier Commission on Preservation and Access project, which proved that such microfiche could successfully capture and preserve an oversize illustration’s content in fine detail at a low reduction ratio (Klimley 1993).

We have demonstrated that scanning the microfiche can, in fact, produce digital images with legibility equal to the images made directly from the original printed maps. The smallest print on the original maps is one millimeter high and can be read equally well in the online versions produced by scanning the microfiche and in the versions made by scanning the origi-
nal maps. When scanned at a pixel depth of 24-bit color, a resolution level of 200 dots per inch (dpi) on the original map produced full legibility of the smallest type.

We are used to hearing that 600 dpi is needed for preservation, but that is in the context of black-and-white (binary) scanning. The use of 24-bit color adds a great deal of visual information to the image. Higher pixel depth (that is, use of gray scale or color rather than black and white) allows use of lower resolution, so that 200 dpi in 24-bit color gives legibility approximately equivalent to 600 dpi binary (Ester 1991). What this means for oversize images is that a map twenty inches across requires 4,000 dots (20 inches x 200 dots) across its surface in order to reproduce the finest one millimeter print legibly in full color. The microfiche of that same map also needs 4,000 dots across the surface of the map image to capture the same degree of detail as the original. On the microfiche the map image is perhaps only four inches wide, so that what is needed is four inches at 1,000 dpi when scanning the microfiche in order to reach 4,000 dots across the map surface.

While achieving legibility was quite successful during the project, questions remain about the quality of the color that can be delivered to the viewer. We can capture color with 24 bits of information per dot, which translates to a potential for sixteen million different hues. Capture can be very accurate if scanners are carefully calibrated using standard color charts, but it is also true that certain scanners are biased toward certain color ranges, just as some films are “cooler” in tone and others are “warmer.”

Monitors normally display only 256 colors. No two printers or monitors can be guaranteed to output exactly the same shades unless they have also been carefully calibrated. All of this means that the color we see online is not terribly true to the original maps. However, in the case of maps, color is primarily used for coding, so that most scholars are satisfied as long as all the codes remain distinct and the color approximates the original. But scholars who need full color accuracy (for instance, art historians) might well find digital copies less than satisfactory. The degree to which the color of the film intermediary does or does not match the paper original is also relevant.

**Conclusions**

Our conclusions, then, hold only for genres like modern printed maps, where the information is partly textual (place names, labels, numbers), partly linear (roads, borders), and partly codes made up of a limited number of colors and patterns. There is a definable resolution at which we can say all information has been captured and is fully legible, just as we can for a printed page. There is no particular gain in using yet higher resolution because there is nothing further to capture. This contrasts with the situation in scanning works of art or historical artifacts with many subtle color tones, and where important information content may be contained in the very fibers of the paper.

Capture is one side of the coin, delivery is the other. We can currently capture more information than can readily be transmitted or displayed on an average monitor. The files of the scanned maps at high resolution and 24-bit color can run as large as twenty megabytes when uncompressed. What Columbia has mounted on its Web site for Internet access are lossless GIF versions of the files with 256 colors and lossy JPEG versions with 16 million colors. The resolution is cut back to about 150 dpi. These files run up to about six megabytes. Unfortunately, these lower-resolution files that are more easily transmitted and viewed carry too little detail for the largest maps to be fully legible online. We can hope that this situation is temporary and that it will be corrected as hardware and Internet delivery times improve. Meanwhile, we also produced full-size, fully legible paper printouts from the high-resolution files as a use medium.

Phase two of the project is now underway, with a goal of assembling the text and illustrations online. We will scan the microfilm of the text of four volumes of the Museum Bulletin at 600 dpi in black and white, and will scan single-frame color microfiche of the illustrations in 24-
digit color at 200 dpi. This will produce a series of digital files, one for each page and one for each illustration. We will use indexing and document structure software to integrate the files of pages and illustrations so that users can move easily from one to another online. The result will be the full preservation of the four sample volumes. Long-lasting microfilm and microfiche will be created for all the text and illustrations, along with a digital version that maintains the author's juxtaposition of words and illustrations online, and through paper printouts.

Obviously, many questions remain. To what extent will the existence of these digital images satisfy the scholarly community's needs? Will they affect how scholars do their research? What role will they play for scholars interested in detailed analysis of the maps? Will they serve as pointers to the originals that must then be consulted, or to requests for printouts, or will some scholars be able to do their work with the digital images alone? Will the quality of the color images be satisfactory? Will a bit-mapped version of the text suffice?

Finally, what does all of this mean for selection for preservation? It appears to offer potential for a new option for selectors faced with trying to preserve one very difficult class of materials. And it offers one criterion to justify selecting digitization as a preservation method: to employ digital imaging on the grounds that a digital version can solve preservation problems that cannot be handled through analog means. Digitization broadens our ability to capture information from a wider range of media, so that more preservation decisions can be made based on the condition and content of the item instead of on the limited range of traditional technical options for preservation.

**Works Cited**


Ergonomics Programs and Activities in Research Libraries

Susan Cook Summer

A survey of ergonomics activities and programs in research libraries produced evidence of the degree to which libraries are creating formal organizational structures to address ergonomics. Data were gathered that describe whether libraries are providing ergonomics equipment and accessories, whether libraries are offering ergonomics training sessions, whether ergonomics training and activities are focused on technical services departments, and whether concerns about ergonomics have had an impact on job descriptions or office design. An overview of current awareness and trends is given and some promising ideas for addressing ergonomics issues are identified through a closer look at a few very active programs.

An epidemic of work-related hand and arm injuries in computer users has propelled the field of ergonomics onto center stage. The increasing number of musculoskeletal injuries suffered stems primarily from vast increases in computer use in offices, schools, and homes, where people perform thousands of repetitive motions for hours at a stretch, often sitting at badly arranged workstations. Other people have been plagued by back, shoulder, and neck strains from poor materials-handling techniques in the lifting and transporting of books, computer equipment, and heavy boxes.

These injuries affect many types of office workers, including journalists, telephone operators, data entry staff, word processors, and dozens of others. The injuries come in a variety of degrees, forms, nomenclatures, and acronyms, including several types of repetitive stress injuries (RSI), repetitive motion injuries, and cumulative trauma disorders (CTD), such as tendinitis and carpal tunnel syndrome. While such injuries have long been known to musicians, factory workers, and employees in the food industry, they are now afflicting what is currently the nation’s largest occupational group: computer users. Although most injuries can be prevented or caught and treated at an early stage, others are much more serious.

This “epidemic” has raised public consciousness about ergonomics, the study of how we interact with our physical work

Susan Cook Summer is Slavic Cataloger and NACO Coordinator, Columbia University Libraries, New York (summer@columbia.edu). The author thanks all those who responded to the survey and particularly acknowledges the extensive materials and comments supplied by: Carmel Bush, assistant director for Technical Services, Colorado State University Libraries; Judith A. Mansfield, Workplace Ergonomics Program Coordinating Committee, Library of Congress; and Nancy Lucas, head, Periodical Reading Room/Microforms, and member of the Ergonomics Awareness Committee, Michigan State University Libraries. The author also thanks Veronica Ghetie, Office of Environmental Health and Safety, Columbia University. Manuscript received February 9, 1995; revised and accepted for publication August 4, 1995.
environment. It has spawned a large amount of literature, training, occupational therapy, networking, and legislation aimed at its prevention and cure. For instance, the United States Occupational Safety and Health Administration (OSHA) has drafted proposed regulations for federal ergonomics standards that would require companies to assess ergonomic risks and take steps to reduce the possibility of repetitive stress injuries. If and when adopted, the regulations would cover approximately 120 million workers nationwide (Thyfault 1994, 20). While these complex regulations will take time to finalize and adopt, some states have already drafted or ratified similar legislation.

Newspapers, popular magazines, and television have all given ergonomics broad press coverage. A 1992 two-part New York Times article, "Epidemic at the Computer: Hand and Arm Injuries," outlined the problem and offered a list of ways to reduce the risk of injury (Brody 1992). Hundreds of more specialized articles, journals, and books have focused on specific aspects of working at computers. Many of these, such as OSHA's 1991 publication Working Safety with Video Display Terminals (U.S. Dept. of Labor 1991), include diagrams of recommended workstation set-up, exercises, and checklists for computer operators. Dozens of newsletters, RSI support groups, and listservs have sprung up during the past few years. (Electronic resources include Sorehand and RSINET: Repetitive Strain Injury Newsletter.) Unions and labor relations boards have organized seminars on ergonomics to discuss the prevention of RSI, the proposed federal legislation, and workers' compensation.

In response to the great number of injuries, some hospitals have established clinics to treat patients suffering from RSI. The Miller Health Care Institute at St. Luke's-Roosevelt Medical Center in New York, established in 1985 to treat musicians with injuries, now treats a growing number of computer operators. Its director, Dr. Emil Pascarelli, coauthored a book entitled Repetitive Strain Injury: A Computer User's Guide (Pascarelli and Quilter 1994), which offers a seven-point program for the prevention and treatment of RSI.

Computer supplies and product design likewise reflect the increased concern with ergonomics. In addition to adjustable office chairs and computer tables, equipment catalogs now include a large assortment of wrist rests, antiglare screens, telephone headsets, foot rests, and online programs that periodically remind users to refocus their eyes, exercise, or take a quick stretch break. One example is ExerciseBreak, a program of pop-up windows with stretch and relaxation exercises.

Keyboard design is under new scrutiny as companies experiment with models designed to encourage typing with hands and wrists in a more neutral position, reduce overuse of the right hand, and channel some keying away from the weakest fingers. This includes a whole slew of "ergonomic" keyboards featuring variations on conventional key arrangement, tilt, or the shape and contour of the keyboard itself. Apple Computer was the first to develop a keyboard that splits into two pieces. Microsoft introduced the "Natural Keyboard," and many other companies have likewise experimented in this area (Manes 1994). Advertising has adopted ergonomics as a catchword, using it in descriptions of not only office equipment, but of car and airplane seats, cameras, scissors, and many other tools used in workshops, kitchens, and gardens.

Concerns about ergonomics have engendered a brand new area of fitness, with a wealth of publications, videos, and online programs devoted to well-being at the office. These include exercise routines for the hands and arms, eye exercises, and guidelines for seated and standing posture. For example, Eyercize is a software program that interrupts the operator at periodic intervals and leads eye exercises. Articles on ergonomics report handouts, training, and exercise programs sprouting up in settings as diverse as the offices of Microsoft, Lawrence Livermore National Laboratory, the clothing manufacturer OshKosh B'Gosh, and LSG/Sky Chefs, the airline caterer (Ubols 1992; Fefer 1994).
Increased Awareness of Ergonomics in Libraries

Libraries have become increasingly automated during the last decade. In addition to building and maintaining online catalogs, staff members in circulation, reference, collection development, binding preparation, serials control, interlibrary loan, personnel, and administration are all spending more time at their computer keyboards. In addition, nearly all related tasks are likewise computer-dependent: word processing for correspondence, reports, memos, and procedural documentation; statistics compilation; electronic mail; and use of the Internet for dozens of applications. Increasing numbers of newsletters and journals are also changing to online formats. And, the movement in libraries away from the card catalog, the typewriter, and paper files has greatly decreased formerly built-in physical activities like rolling in typewriter paper, pulling out catalog drawers, and walking across the office to consult manual files. In short, in many institutions streamlined workflows combined with reduced staff have resulted in staff members being increasingly tied to their computers with less offline work to mix into their daily routines.

This new environment has resulted in an increase in RSIs and in a growing awareness of ergonomic issues in libraries. There is now a rich literature on ergonomics and libraries in monographs, journal articles, and electronic resources. The majority of these publications focus on ergonomically sound principles of workstation arrangement, posture, and work habits. Others discuss ergonomics as an aspect of library management, including its relation to automation, organizational change, space planning, equipment budgets, and personnel issues. While many authors are concerned with computer-dependent technical services departments, more attention is being given to reference and circulation service points, as well as to patron workstations.

Ergonomics has also been discussed in a number of postings on the AUTOCAT discussion list, where librarians have reported recent increases in carpal tunnel injuries and staff members out for surgery or on disability. Some postings have mentioned the establishment of staff training in ergonomics and the purchase of adjustable furniture and computer accessories such as wrist rests. Others have discussed job restructuring or job sharing intended to provide staff with more noncomputer work and thereby reduce RSIs.

The Library of Congress (LC) gopher, MARVEL, includes a series of articles on ergonomics written by Barbara Bryant. The first of these estimated that “eight out of every 100 LC employees suffer work-related injuries” caused by repeated physical stresses and “outdated workstation design and poor materials-handling techniques, along with the lack of employee training programs” (Bryant 1993). Subsequent articles reported significant improvements due to ergonomics training through a library-wide Workplace Ergonomics Program, workstation evaluations, and the purchase of improved furnishings. The program trained literally hundreds of LC staff members. Some of LC’s training is based on courses given by the Joyce Institute, a Seattle-based firm specializing in ergonomics. In 1991 and 1992 this included the institute’s “Datahealth Ergonomics Seminars” and “Practical Office Ergonomics,” attended by several hundred people, as well as the certification of a number of LC staff members as key trainers. In 1991 LC’s Collections Services Visual Display Terminal (VDT) Ergonomics Committee produced a laminated handout called “Ergonomics and VDT Use,” which was distributed to LC staff, with another 7,500 copies later sent to more than five hundred libraries around the country. The broadside was reissued in 1992. Many libraries distributed copies or based local ergonomics handouts on LC’s publication.

Ergonomics has been the discussion topic at several library conference sessions, including the meeting of the Association for Library Collections & Technical Services LITA Serials Automation Interest Group at the ALA Midwinter
Conference in January 1993 (Ten Have 1993). Approximately fifty out of about sixty attendees reported work-related injuries at their institutions. Reports from Michigan State University Libraries and the University of Chicago Library both stressed the importance of increased staff awareness of ergonomics and RSI, training programs, the purchase of fully adjustable furniture, and the provision of computer accessories including foot rests, antiglare screens, and wrist rests. The fall 1994 NOTIS Users’ Group Meeting (NUGM) also featured a session on ergonomics. Attendees received copies of the LC ergonomics handout, a checklist for posture and work habits, recommended exercises, a bibliography, and information on related electronic resources.

Earliest Survey

A few years ago, Elizabeth N. Steinhagen and Carolyn J. Mueller, both from Humboldt State University Library, conducted a survey of ergonomics activities at 185 medium-sized academic libraries and published their results in a 1992 issue of Technical Services Quarterly (Steinhagen and Mueller 1992). The ninety-eight usable responses they received indicated that “in spite of the fact that the majority (81%) of the libraries represented have online public access catalogs, and thus would be expected to provide reduced opportunities for work away from a VDT, at this time there is no apparent imbalance in online and non-VDT responsibilities” (Steinhagen and Mueller 1992, 34). The noncomputer tasks listed in the survey returns included off-terminal editing and cataloging, shelflist/card catalog maintenance, processing activities, filing/revision, and authority work. Steinhagen and Mueller also found that ergonomic furniture (other than adjustable chairs) and accessories were not widely used in the libraries surveyed. The most common items reported were pneumatically adjustable chairs (50%), window blinds (42%), and antiglare screens (41%). Responses about what the respondents would like if funding were available included fully ergonomic workstations (79%) and computers at individual desks (63%).

Summary of Results of This Survey

The present survey was designed to assess the current state of ergonomics programs and activities in research libraries in terms of factors including: (1) whether libraries are establishing formal ergonomics committees or programs; (2) whether libraries are buying much ergonomics equipment and accessories; (3) how much libraries are incorporating ergonomics concerns into the design or renovation of offices and departments; (4) what libraries are offering in terms of ergonomics training programs; (5) whether job descriptions or union negotiations are reflecting concerns about ergonomics; (6) how many libraries have experienced work-related ergonomic injuries; (7) whether staff members have raised questions and concerns about ergonomics; and (8) where innovative or “model” programs are in place.

A questionnaire was sent to 104 heads of technical services at ARL libraries, and fifty-four responses were returned. In addition, five people responded to an AUTOCAT posting asking for descriptions of ergonomics programs at libraries that had not received the questionnaire. The results clearly show that ergonomics has become an important topic in libraries and that ergonomics training, equipment, and accessories are now widespread.

The first section asked whether librarians had established formal ergonomics committees or programs and, if so, what categories and levels of staff were involved. Seventeen reported they had formed ergonomics committees or programs, while thirty-seven had not. A number of respondents noted that their committees were formed during the past three years, while others said they were actively planning to appoint such a group because of the increasing need and concern for ergonomics. Committee members primarily include professional librarians and paraprofessional staff, with some also re-
porting involvement by administrators and others, including facility designers and consultants from university health services. Nearly all committees reported working in conjunction with other departments, including library personnel (13), library systems offices (7), and the university office of health and safety (15). In addition, some committees reported working with the university labor relations department, the facility design department, and the training and development office. One mentioned working with the university-wide ergonomics officer, who provides workstation evaluation, cost estimates for upgrade and design, training programs and literature, and eye exams for computer users.

These committees’ major areas of activity are workstation design, training programs, and literature distribution. Two completed questionnaires listed conducting exercise sessions, while three listed activities like acquiring ergonomic accessories and publishing lists of recommendations. Not a single committee or program reported limiting its activities to technical services units.

The second section of the questionnaire asked what ergonomic equipment and supplies libraries are purchasing. The replies showed that virtually all libraries are buying some ergonomic equipment and that many are supplying a wide variety of different items. These results show a marked increase over the findings by Steinhausen and Mueller (1992).

Adjustable chairs topped the list, with fifty-two libraries (96%) reporting. This was followed by wrists rests (50 libraries, or 93%), antiglare screens and document holders (49 libraries, or 91% each), foot rests (44 libraries, or 81%), adjustable tables or workstations (39 libraries, or 72%), and acoustic printer pads or covers (22 libraries, or 41%). Other items listed included humidifiers or dehumidifiers, adjustable monitor arms, split keyboards, keyboard/mouse trays, mechanical lifting devices, sorting stools, and back supports for staff who do shelving.

In response to whether such items were available for all staff or only when requested, twenty-two respondents checked “for all staff,” while forty-three checked “only when requested.” This section elicited numerous comments, many of which were common to several libraries. A number of respondents said that, while such equipment is theoretically available to all staff, general practice has been to provide things upon request when someone has noticed a particular problem through a workstation review. Several others reported that adjustable furniture and ergonomic equipment and accessories were being introduced on a gradual or piecemeal basis, often tied into office renovations, the introduction of new equipment, or annual equipment budgets. Some respondents said that small items (e.g., antiglare screens, wrist rests, and foot rests) were available throughout the year, with larger purchases (furniture) purchased annually. One respondent mentioned that even when staff have adjustable chairs and workstations, “they seldom seem to take advantage of those features.” A few said they were only beginning to move in the direction of supplying ergonomic equipment and accessories. Some of these reported that their institution was coordinating the purchase of these items with the selection of integrated systems that will put computers on all staff desks, while others reported that they were hampered by budgetary constraints.

Ergonomics concerns are being incorporated into office renovation and design. For example, eighteen reported the use of sound-absorbent flooring, walls, and ceiling tiles. Fourteen reported the use of recessed lighting, eleven reported using nonreflective paint, nine reported tinted window glass, and three listed other items, such as reduced lighting.

While only seventeen reported formal ergonomics committees or programs, ergonomics education and training have become widespread. Thirty-two distribute handouts or articles, thirty-one offer seminars or workshops for computer users, twenty-four listed workstation evaluations, nineteen offer seminars or workshops to avoid lower-back injuries, and thirteen show training videos. A few offer eye exams for computer users, exercise
sessions, and other training sessions, such as "wellness programs" that include ergonomics among other topics.

Ergonomics is also beginning to factor into the design of job descriptions. Thirteen reported that jobs have been revised or redesigned to take ergonomics into account, while forty-one reported that no such changes have been made. Ten reported that union negotiations have included concerns or stipulations about ergonomics or ergonomic equipment, while thirty reported that they have not. A number of respondents noted that unions are currently pursuing issues related to ergonomics. While many have not incorporated ergonomics into job descriptions, there is clearly a trend to take such factors into consideration. One respondent added in the margin: "They should!" Some questionnaires listed informal changes to daily routines, such as identifying "non-workstation activities to vary staff assignments" and other similar practices. Many libraries do not have unionized staff, and therefore skipped the question.

The last section of the survey focused on whether staff members have had work-related ergonomic injuries and whether they have raised questions or concerns about ergonomics. Eighty-three percent reported injuries. Many of those reporting injuries said multiple staff members at their libraries had experienced carpal tunnel syndrome and other types of repetitive stress injuries, some of which required physical therapy, splints, or surgery. Fifty-three reported that staff members had raised concerns about ergonomics, and forty-five reported that the provision of ergonomics training or equipment seems to improve staff morale and effectiveness.

**Some Model Programs**

In addition to providing an overall picture of ergonomics activities in libraries, the survey results—along with the literature and handouts some respondents enclosed—also identified a few institutions with extremely active, broad, and innovative programs. Some brief examples follow.

**Colorado State University Libraries**

Initiated in 1990, the ergonomics program at Colorado State University Libraries is coordinated by the personnel librarian, who works in conjunction with a consultant from University Health Services. Additional input is provided by the Assistive Technology Resource Center of the Department of Occupational Therapy and the library building proctor.

The program includes a number of "standard features," such as conducting ergonomic evaluations for all staff members and acquiring ergonomics accessories and equipment based on the results of the evaluations. In addition, the program organizes seminars for computer users, seminars about avoiding lower-back injuries, video showings, a checklist for comfort at the computer, and extensive handouts and literature. The activities are available both to paraprofessional staff (who spend approximately 44% of their time at computers) and to professional staff (who spend approximately 28%).

The Colorado program has also incorporated ergonomics into performance appraisals, which have a section called "Emergency, security, safety and ergonomics." This includes evaluation in terms of: advocacy for safety and ergonomics; making suggestions for improvements; serving as a role model; and "observing ergonomic principles in the handling of materials and in appropriate adjustments to the workstation" (Bush 1994). Among the factors listed in the appraisal form are: observing ergonomic practices prescribed during the review; performing required exercises; taking breaks from the computer as recommended; reporting ergonomic problems; and using proper body mechanics for lifting and transporting materials. Supervisors are responsible for seeing that the practices are positively reinforced and for monitoring the ergonomic situation within the unit. The appraisal is tied into a policy statement issued by the Colorado State University Libraries that specifies the ergonomics responsibilities of the administration, per-
sonnel department, supervisors, employees, and building proctors.

LIBRARY OF CONGRESS

The Library of Congress Workplace Ergonomics Program covers all positions throughout the enormous LC system, including both staff who work at computers and staff who perform various types of materials-handling, such as using booktrucks to transport books, manuscripts, and motion pictures. Approximately 40% of both professional and paraprofessional staff spend more than six hours per day at the computer, with another 22% using the computer for more than four hours per day.

The program's main component is "formal surveillance and job analysis and design using tools, including survey instruments, as specified in the 1990 OSHA draft for an ergonomics program" (Mansfield 1994). This includes looking for risk factors through videotaping, completing checklists, and workflow analysis. The committee works with the Office of Health and Safety, the Facility Design and Construction Office, and the Staff Training and Development Office. In addition to many "standard" ergonomics accessories (e.g., adjustable furniture, antiglare screens, wrist rests and foot rests, etc.), staff members receive, as needed, book holders and mechanical lifting devices to deal with the more than thirty-one thousand items received daily. The committee issued a poster series on proper VDT work habits, a broadside on VDT exercises, and the nationally distributed broadside on proper VDT workstation configuration. The articles posted on MARVEL give additional information about this large program.

COLUMBIA UNIVERSITY LIBRARIES

Columbia's program began in early 1992 with a six-member Glare Screen Task Force, appointed to evaluate and select antiglare screens for technical services departments when a major workflow reorganization was putting computers on every desk for the first time. The work of the task force identified many related questions, leading to the appointment of a permanent group with a broader focus. The group now includes a six-member committee working with a group of "coordinators," representing a total of twenty-two library units or departments. The group works very closely with the Office of Environmental Health and Safety and has developed a multifaceted program of training and activities.

The Environmental Health and Safety Office provides expertise in the form of: (1) periodic workshops and extensive handouts on working safely with VDTs and on avoiding lower-back injuries in materials handling; (2) personal audits of individual workstations and the training of committee members and coordinators to conduct such audits; (3) the loan of training videos; and (4) special problem resolution as needed, such as measuring light levels and evaluating the materials-handling techniques of staff who do large amounts of lifting or reshelving.

The committee and coordinators serve as "local experts" or resource people in their units. Their responsibilities include: (1) maintaining and distributing articles and handouts, many of which have been compiled into standardized "Ergonomics Literature Notebooks"; (2) performing workstation reviews, including the recommendation of accessories such as wrist rests, foot rests, task lamps, copy stands, and antiglare screens, as needed; (3) testing and evaluating new equipment and accessories; (4) serving as liaisons to the committee chair and the Office of Environmental Health and Safety to help identify problems and develop solutions; and (5) planning training events.

The configuration of the committee and coordinators and their ties to the Environmental Health and Safety Office have spread ergonomics awareness and training throughout the libraries and have created a framework for broad and systematic staff orientation, training, and problem resolution.

MICHIGAN STATE UNIVERSITY

A particularly active and comprehensive program is sponsored by the Ergonomics Awareness Committee of Michigan State
University Libraries. Known as the “Ergobusters,” this group includes administrators, professional staff, and paraprofessionals. They assist both professional staff, who spend varying amounts of time at the computer, and paraprofessional staff, who spend between 75% and 80% of their time at the computer. The group’s activities include workstation design, training, publicity, and extensive follow-up evaluation. Its work is closely tied to the university’s comprehensive ergonomics policy, implemented in response to a sharp increase in cumulative trauma disorders. This policy recommends “routine and widespread consideration of ergonomics issues” and includes mandates for training, workstation design, job design, medical management, and individual compliance. The libraries’ own Ergonomic Statement of Responsibility builds on this, particularly emphasizing the importance of staff morale and safety. The committee’s work has resulted in a significant drop in workers’ compensation claims and a boost in morale.

A major component of the committee’s activity involves workstation evaluation, for which they have developed a series of checklists: (1) background surveys (e.g., staff member’s height, vision problems, work habits, physical discomforts noticed); (2) chair evaluation forms used to compare and contrast sixteen points about three different chair models; and (3) a four-page worksite evaluation form with sections on chairs and seating, keyboards and arm positioning, VDTs, comments made both before and after evaluations and corrective actions, and sections for both individual and shared workstations. They also put together a number of handouts, workstation checklists, recommended exercises, and bibliographies. The Ergobusters are authorized to order inexpensive items (such as wrist rests and monitor stands) as part of their evaluations. The Ergobusters have also assisted with improving the larger working environment. They have, for instance, ordered partitions to reduce noise in the technical services division and ordered curtains and changes in lighting to reduce glare in the business library.

In addition to working with full-time staff members, the Ergobusters are collaborating with the Student Advisory Committee to give ergonomics training to the libraries’ six hundred student employees. They have also given “Supervisor Ergonomic Awareness” seminars in which they suggest ways for supervisors to prevent work-related injuries and ways supervisors can help injured workers return to work.

**Summary and Conclusions**

The results of this survey indicate a growing availability of ergonomics training, equipment, and accessories in research libraries. This is true of libraries both with and without formal ergonomics programs. Some of this activity has been driven by increasing numbers of work-related ergonomic injuries such as carpal tunnel syndrome. Furthermore, some libraries are incorporating ergonomics concerns into job descriptions, union negotiations, and office design and renovation.

There is a definite increase in the number of libraries establishing formal ergonomics committees or programs, although this number is still relatively small. For libraries that do have such programs, the committee structure and mandate have enabled participants to organize and provide standardized training in ergonomics and materials-handling to large numbers of staff. In addition, these committees provide a forum and network for problem identification and resolution, as well as an official channel to relevant services in departments such as personnel, library systems, and campus health and safety.

**Works Cited**


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**STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION**

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**EXTENT AND NATURE OF CIRCULATION**

(Average figures denote the average number of copies printed each issue during the preceding twelve months; actual figures denote actual number of copies of single issue published nearest to filing date: July 1995 issue.) Total number of copies printed: average 7,450; actual 7,400. Sales through dealers, carriers, street vendors, and counter sales: none. Mail subscription: average 6,843; actual 6,873. Free distribution: average 75; actual 61. Total distribution: average 6,918; actual 6,934. Office use, leftover, unaccounted, spoiled after printing: average 532; actual 466. Total: average 7,450; actual 7,400. Percentage paid: average 98.82; actual 99.12.

Book Reviews

Gregory H. Leazer, Editor


This book is an important, if not quirky, addition to the meager literature of slide librarianship. The author takes a broadly inclusive view of an oft-ignored specialization and gives it resonance. Although the title suggests a work that aims to be a definitive manual of practice, in fact Sutcliffe has produced something different—a discourse, an essay on the state of the art, covering its literature and practices across a variety of subject fields. He also discusses the possible impact of imaging technologies on pictorial information. Not what it at first appears to be, this book is a thoughtful and important, albeit unusual, addition to the field.

With the exception of the important and regular output of the two periodicals of the Visual Resources Association, *Visual Resources, an International Journal of Documentation* and *VRA Bulletin*, the slide librarians' professional bookshelf demands little space. The literature of slide collection management is, as Sutcliffe notes, "incomplete and fragmented" (p. 34). (Throughout this review I use the terms "slide collection management" and "slide librarianship" interchangeably. The former and more inclusive term covers the literature of slide management regardless of professional training). That literature, in addition to falling outside of mainstream librarianship, is largely out of date, predating image databases, networked images, and the World Wide Web.

There are just thirty-two monographs with the subject heading “Libraries—Special collections—Slides” in the OCLC Online Computer Library Center Inc.'s FirstSearch database. Ranging in date from 1967 to 1995, these monographs include second editions and duplicate records, and consist primarily of how-to manuals and spiral-bound pamphlets, all based on first-hand experience or surveys of practice.

Slide librarians are generally aware years in advance of forthcoming books in their field. Betty Jo Irvine's standard text, *Slide Libraries*, galvanized the community of academic slide librarians and slide curators during the late 1960s, and Nancy Schuller's lengthy manual, *Management for Visual Resources Collections*, was long awaited in the mid-1980s.

Sutcliffe's book comes to us from a very different impetus. Sutcliffe is the audio-visual librarian at the Learning Resources Center, Calderdale College, Halifax, U.K., where the neglected slide sets and slide/tape programs led him to concentrate on medical slide management for his library degree (“The Management and Exploitation of Photographic Slide Collections in University Teaching Hospitals.” M.Phil. thesis, Aberystwyth, University of Wales, 1989). Sutcliffe's goal is to make a "coordinating contribution in a fragmented area of information work which is likely to benefit from a sharper profile and...pooling of the expertise which exists in many different but loosely related areas” (p. 21). He brings together the literature of the collections management practices of the established visual arts and medical illustration communities, finding little published literature on practices in public libraries, museums, and photographic rights and reproduction houses. He looks at the field with a broad
perspective and a critical eye, and includes the “true” slide library, smaller and less-structured slide collections, as well as slide sets and slide/tape programs in media centers.

Given the underdeveloped literature of this field, the breadth of his goals, the variety of institutions and academic fields with slide collections, the ongoing disagreement over the proper training for slide professionals, the marginalization of the specialization, and the rapidity of technological changes in imaging capabilities, it is no wonder that Sutcliffe’s book is both fascinating and uneven. Where Sutcliffe succeeds admirably is in his placement of a multitude of factors in a historical context, bringing these into the present, and making them intelligible and interesting. This is true even when he goes too far in one direction or not enough in another: for instance, his full discussion of visual orientation contrasts with the brevity of his discussion on the complex issue of copyright of images, when one wishes those priorities had been reversed. This suggests that the book is the product not of practice, but of thought; not the slide librarian but the armchair scholar. For example, in his introductory chapter, “Background and Trends in Slide Collection Management,” he covers the slide as a library item, the interrelationship of the slide with other picture-making technologies, preconceptions about slides by traditional librarians, the problems with integrating slides with other audiovisual materials in media centers, detrimental packaging of slide sets to look like books, and the value of the “unitary” slide library over slide/tape programs and slide sets.

In a pure sense the true slide library is that which has been referred to by one primary source as made up of “unitary images”. This distinction is important since… whereas the tape/slide sequence and the slide set can be successfully integrated in conventional library shelving arrangements the collection of single images by its very nature requires segregated treatment. Clearly, almost any body of slides can be grouped into subsections to form sets in fixed sequences and it is a crucial management decision to choose to do this or to make the basic unit of the collection the single image. This has a fundamental effect on the amount of processing work which is required in identifying, labeling, classifying, cataloguing and indexing. There is no escape from the fact that the collection of unitary images requires considerably more labour to establish, administer and maintain than does a collection of slide sets, but it is also inescapable that such work is an absolute necessity to fulfill the specific needs that such a collection is constructed to meet (p. 26).

In his second chapter, “The Literature of Slide Collection Management,” he examines the literature from several different historical perspectives. Discussing issues such as the marginalization of slide librarians and divisions within the field itself between slide librarians and slide curators (professional managers not trained as librarians), Sutcliffe’s long British sentences read almost as asides, but are right on mark.

Laterly a conscious shift in library education has been made away from the concept of the librarian being a book manager towards being an information manager. This has been reflected strongly in the content of degree courses offered and has extended to the renaming of university departments to emphasize information management rather than traditional librarianship. It can no longer be in doubt that pictorial information in all its forms is firmly within the ambit of modern librarianship or professional information work and that the continuing integration of text and illustrations, in image databases for example, is likely to confirm and consolidate this. It was not until the late 1980s though, that this trend reached an openly and fully acknowledged conclusion (p. 48).

Where most slide management literature surveys arrange the literature according to practice (copyright, production, physical facilities, etc.), Sutcliffe’s historical approach divides the literature into three periods based on developments in computing technology: from the earliest mention of slides in the seventeenth century up to 1983, 1983–1989, and 1989 to date.
Sutcliffe also positions the literature in terms of the debates over professional training, acknowledging the strengths that both slide librarians and slide curators have brought to the field, and the impact that this division has had on the literature.

However, other chapters are less successful, such as "The Technical Preparation of Slides as Stock Items" and "Commercially Available Slide Management and Retrieval Packages." His chapter "Slide Retrieval" falls somewhere between the practical and the analytical, with an awkward result. Here he tackles the still contentious debate over whether to classify or not, curiously but sensibly combining it with a prosaic discussion of slide storage systems.

Sutcliffe admits to seeing some value in adapting book classification schemes for slides, at first a shocking confession. However, his view makes more sense after reading the chapter on "Medical Slide Collections," where the practice is common. (It is not common in art and architecture collections in the United States.) Because Sutcliffe takes an integrated approach to issues in slide management throughout the book, implications of imaging technologies are addressed throughout and are not confined to his chapter "Optical Disc Systems and the Slide."

Sutcliffe's book would have benefited by any one of several factors. His description of slide storage systems is one of the areas in which British practice differs from American, and the same is true in the areas of copyright and preference for analog technology. These could have been compared explicitly and more fully. Indeed, comparison of British and American practice throughout the book would have broadened his information base. The appendices are entirely British and would have benefited from American equivalents, as well as an additional month's worth of concentrated information gathering to bring them fully up to date. Products like Kodak's Picture Exchange software and Digital Collections, Inc.'s EmbARK, the successor to AXS Art Access image database software, are serious omissions. Footnoting could have been more specific, pointing more often to exact pages or authors. As a state-of-the-art review, either an annotated bibliography or a classified bibliography would have been more useful than one long alphabetical listing. Nevertheless, the book contains a wealth of factual information not readily found elsewhere, and it achieved its goals. It made for productive, stimulating, and provocative reading, and makes a valuable contribution to the literature of the field.—By Maryly Snow, Architecture Slide Library, University of California, Berkeley.

WORKS CITED


Collection Management and Development: Issues in an Electronic Era contains the papers given at the first Advanced Collection Management and Development Institute in Chicago in 1993. The institute grew out of a series of successful regional institutes on the basics of collection development that have been a popular Association for Library Collections and Technical Services (ALCTS) continuing education initiative since the first offering in 1981 in Stanford, California. The book is not for beginners because it assumes a fundamental knowledge of collection development. For accuracy in title keyword indexing, the phrase “Academic Research Libraries” should have appeared somewhere because each of the speakers
comes from and addresses issues important to this subset of libraries.

The list of contributors includes some of the best known names in the academic library world, confirming that the institute participants certainly got their money's worth. For the most part, the quality of the presentations matches their reputations. After an introduction and overview, the papers are grouped around three themes: “Administrative Aspects,” “Impact of New Technologies,” and “Financial Issues.”

In his introduction, Joseph J. Branin summarizes the themes and emphasizes the changes in collection development since the 1981 Stanford institute. Paul Mosher, vice provost and director of libraries at the University of Pennsylvania, provides the “Overview,” in which he speaks of the “shattering of the knowledge paradigm and book culture” (p. 8). Research libraries are finding that their financial resources are not increasing as rapidly as the volume and cost of new information. In his words, “we are moving from the age of the library as an ordered and ordering institution to the library as a situational or virtual one, an adaptive culture characterized by change” (p. 10).

The section on “Financial Issues” is the most traditional. Eugene L. Wiemers discusses “Financial Issues for Collection Managers in the 1990s.” His main point is that the inflation rate for library materials is so much higher than the consumer price index that it would be a “national crisis” like auto insurance and health care if it did not apply only to the restricted research library community. Two success stories follow: Bonnie MacEwan tells how the Pennsylvania State University Libraries use accurate budget projections to get maintenance funding for library acquisitions, and Gay Dannelly reports on the same process at Ohio State University, where collection development experts met with university budget administrators to develop a library materials price index acceptable to both parties. Finally, in “Fundraising for Collection Development Librarians,” David Farrell argues that fundraising should concentrate on major donors as the best source for collection development dollars.

In the section on “Administrative Aspects,” Nancy M. Cline begins with “Staffing: The Art of Managing Change.” Her premise is that “people are the most important element in libraries” (p. 13). While she defines a long list of competencies for collection development specialists, she does not believe that any single organizational model can fit all libraries. Tony Ferguson, in “Collection Development Politics: The Art of the Possible,” examines how funding decisions are made within the academic environment. He argues that to succeed, collection development officers must persuade their directors to share their vision. Kathleen Zar breaks no new ground in “Politics and Policy from the Trenches.” In her list of major activities, she assumes that the collection developer provides public services, including reference and bibliographic instruction, a point that some would find restrictive. She concludes that both the generals and the foot soldiers should share the same objectives by mutually exchanging their perspectives and perceptions.

The first paper in the section on the “Impact of New Technologies” is the most lucid discussion of copyright that I have ever read. In “Moving Copyright to Librarians’ Action Agenda,” Gloriana St. Clair avoids technical details to concentrate on the rationale behind copyright—“the societally determined maximum production of knowledge” (p. 52). She sees a fundamental difference between copyright as a means to protect commercial interests and its function within the scholarly communication system. For her, “a vision of the future in which scholars retain the right for nonprofit organizations to copy their articles would be most beneficial to society” (p. 61). Next, I worried that a 1993 paper on “Collection Development and the Internet” would be obsolete because of rapid developments, but Peggy Johnson avoids becoming immediately out-of-date by approaching the subject with a strong conceptual focus. Her organizing metaphor is the Internet as a
Nintendo game that needs the equivalent of a Nintendo strategy guide with "tools of the trade," "best friends," and "enemies and foes" (p. 67). In "Computing Resources: Opportunities and Challenges in Institutional Cooperation," Nancy L. Eaton deals with cooperation within the library itself, within the parent organization, and at the state, regional, and national levels. These technical issues are important for collection development because they "determine the final outcome of how information is provided to our patrons" (p. 91).

Ross Atkinson provides a brilliant piece on "Access, Ownership, and the Future of Collection Development." From a tightly reasoned argument that cannot be summarized in a brief review, he concludes that "collection development as a separate library operation probably will not survive the eventual disappearance of paper as the primary and preferred medium of scholarly information exchange" (p. 102). Selection for a specific physical collection will no longer be required because the user will have instant access to the world of electronic documents. He believes that libraries should still provide mediation services (cataloging and reference) to help users determine the value of electronic information. During the transition, collection development specialists should protect disciplines that continue to rely on paper, evaluate paper documents for digital conversion, work with acquisitions to design budgetary procedures for online access, and prepare for the fusion of selection with cataloging and reference.

I believe that this volume largely avoids several possible pitfalls. The speakers are practitioners, but they mostly transcend their local situations to deal with principles pertinent to research libraries in general. Save for a few lapses, I did not feel as if I were reading case studies of narrow applicability where limited experience had blinded the writer to other possibilities. Furthermore, the general conceptual bent keeps the papers fresh, even with a two-year delay between delivery and publication. I also believe that the papers come together to form a coherent whole. Too often conference proceedings include contributions that fail to add anything to the general theme. Finally, the authors are concise. The papers range from nine to eighteen pages in length; the better papers generally have more space. The book is short, but it is reasonably priced. I prefer this option to high-priced proceedings with large quantities of irrelevant filler.

I attended the first collection development institute in 1981 and could see from this volume just how much the field has changed in its particularities while still retaining its basic purpose—efficiently getting the most and best information to the user community at the lowest possible cost. The electronic age might end collection development as we know it, but research libraries are not there yet. Collection development experts will bring past expertise to bear on future technologies within the context of a commitment to excellence. I recommend this volume highly to those who, like me, have an interest in collection development in research libraries. I plan to assign several papers to my students when I next teach collection development.—Robert P. Holley, Library and Information Science Program, Wayne State University.


For many, the concept of an annual review of library automation and networking will seem anachronistic. In a field characterized by sudden and discontinuous change, the inevitable delays associated with assembling, editing, and publishing papers in book form would appear to diminish the currency and usefulness of contributions. While this work partly substantiates this concern, it also proves that such a collection can provide lasting contributions to our understanding of computing in libraries.

For readers concerned with up-to-date summations of the year's developments, this work begins with a handicap.
As the editor points out, a series of circumstances beyond the control of the authors delayed publication and, in fact, the papers contained in this collection were written in 1992 (p. x). As a result, the collection makes scant or no mention of topics such as Microsoft Windows, the World Wide Web (WWW), or WWW browsers such as Mosaic and Netscape. However, although this collection can disappoint when it addresses specific technologies, it succeeds when it deals with larger policy and service issues.

In asking "What Can The Internet Do for Libraries?" Mark H. Kibbey and Geri R. Bunker exemplify the strengths and weaknesses of this collection. Several problems cited by the authors at the time of writing, such as the paucity of commercially available graphic user interfaces, have since been resolved. However, Kibbey and Bunker avoid dating their effort by concentrating on policy and service issues. They also provide a sketch of the development of the Internet that remains accurate and useful for anyone interested in understanding the spectacular success of this network. Their vision of the Internet's development contains valuable insights. They describe, for example, the effect of e-mail in leveling hierarchical organizational structures and in altering the nature of work to accept group-centered research (p. 88). In addition, they hint at the competitive challenges posed by Internet-based services to the monopoly on information services enjoyed by libraries in the past. The capacity of electronic services to sell directly to customers, they note, has the effect of bypassing libraries. To their credit, Kibbey and Bunker avoid the temptation to state that the service models represented by print-based libraries and by the Internet will necessarily coexist smoothly. They recognize that the Internet reflects a "culture clash" that might affect library organizations in deep and possibly problematic ways (p. 93).

For librarians considering the acquisition of a library automation system, Carolyn O. Frost's "Next Generation Online Public Access Catalogs: Redefining Territory and Roles" is an excellent primer on the changing nature of the catalog. Frost's use of language is appropriate and precise. She observes that the effect of the expansion of digitized information is to redefine the "territory," or boundaries, of the catalog. Traditional catalogs describe and provide locations for materials owned by libraries. Online catalogs perform this function, but also act as gateways to other resources. This transition blurs our understanding of ownership and presents librarians with a host of challenges. Existing technology and standards fail to support multimedia resources, searching across different databases, and assisting users in navigating new terrain. Frost describes a number of experiments that respond to these challenges. It would be interesting to see a revised version of this paper that tested these problems against the tools now available on the Internet and the World Wide Web in order to evaluate what, if any, progress has been made since the publication of this collection.

Carol Tenopir focuses on a specific area contained in Frost's article in "Full Text Retrieval: Systems and Files." Tenopir recognizes that, until the mid-1980s, library catalogs, whether manual or computerized, served primarily as finding tools. After that time, cheaper storage media permitted the loading and retrieval of full-text documents. Tenopir provides a taxonomy of full-text sources, describes technologies used to access them, and sketches three levels of searching that might be built into systems supporting full-text. Although Tenopir succeeds in characterizing full-text services, she might have done more to draw out the implications of full text on user expectations and the demands placed on libraries and library computer systems. The paper also lacks a discussion of the technical standards that might be applied in libraries to the management of full text such as the Standard Generalized Markup Language (SGML).

Although focused on specific projects, John Ulmschneider and Tracy M. Casorso's overview of electronic documents delivery systems for agricultural information, and Judy Hallman's examination of campus-wide information systems, make use-
ful general points. Ulmschneider and Casorso, after describing in detail the National Agricultural Text Digitizing Project (NATDP) and its successors, extrapolate the effect of document delivery systems on library workflow, particularly in interlibrary loan departments, and consider administrative, technical, and legal issues. Similarly, Hallman reviews various implementations of campus-wide information systems (CWISs). Although CWISs are now fading in importance as WWW resources proliferate, many of the technical and administrative issues that they engendered remain. CWISs suddenly shifted the focus of campus users from unintegrated computer services, such as online public access catalogs and departmental servers, to a more integrated system linking different databases. For libraries that decided to include their catalogs under a CWIS umbrella, the reality of competing information sources became apparent. As Hallman notes, the new services beg questions about ownership, the authenticity of information, and maintenance. They also position the operator of the CWIS as a publisher. For librarians, this new role fits uncomfortably into past practices and training. Hallman asserts that “Librarians should have a central role in expanding CWISs” and that the “task of overseeing CWISs belongs in campus libraries” (p. 169). In light of the competition posed by computer centers and by private companies on many campuses, these assertions seem rather optimistic.

Many of the papers contained in this collection help librarians involved in the procurement of library automation systems. One contribution is must reading for any librarian compiling a request for proposal (RFP). In “Use of a General Concept Paper as RFP for a Library System: A New Model for Library System Procurement,” Mona Couts, Charles Gilreath, Joe A. Hewitt, and John Ulmschneider share work done at the Triangle Libraries Research Network in North Carolina. For any librarian who has compiled a massive RFP, and for any vendor who has had to suffer through reading one, this paper comes as sweet relief. The authors recognize that the RFP should not be viewed as a shopping list of specific, detailed functions, but rather as an expression of a library's vision of how technology will serve its long-term strategies. Too often libraries “fight the last war” in RFPs, attempting to fix the defects of their present systems in the new product. Rather than asking for creative solutions, librarians end up micromanaging the solutions themselves. As a result, library automation vendors all too often produce safe, pedestrian products designed to appeal to an overly cautious clientele. The authors of this paper propose that libraries express their vision of the future and ask vendors to become partners in realizing it.

Although somewhat dated, this collection contains papers that transcend specific products and services and that address issues of continuing concern. Particularly for librarians involved in system procurement processes, it provides invaluable guidance.—Robert Renaud, University of Arizona Library


“The work of practical library classification, in its essence, is to find the appropriate place for a document in the overall scheme of the classification system being used, and to assign the appropriate notation from the classification schedules to the document. Therefore, the work of classification requires knowledge of both the contents of the book and the structure and mechanism of the classification system” (Chan, p. 35). The construction of lengthy classification numbers is among the difficulties in employing the Dewey Decimal Classification (DDC) scheme.
Long numbers are needed more often as the body of literature within disciplines, as well as the amount of interdisciplinary literature, increases. Construction of class numbers can indeed be confusing, even to seasoned catalogers, as the schedules themselves expand to accommodate shifts in knowledge. In *Dewey Decimal Classification: A Practical Guide*, Lois Mai Chan, John P. Comaromi, and Mohinder P. Satija have attempted to provide a practical manual for understanding "the proper methods of applying the DDC schedules; of locating and assigning the appropriate class number; and of synthesizing a class number if need be" (preface). This text succeeds admirably as both an explanation of the principles of classification and as a functional guidebook to the various methods of number building using the DDC.

The authors have created a guide that functions better as a reference work than as a textbook. This guide might serve well as a supplementary text for a classroom situation. As a reference work, however, this guide would be useful for cataloging staff at all levels, as well as for those managers who have implemented a cataloging training program. It is logically composed, highly readable, and easily intelligible to those with even a minimal understanding of the DDC. Indeed, the cataloger at a one-person library would find the self-directed study of the guide to be fruitful. In order to be most effective, it is necessary to use this work in conjunction with the classification scheme itself; this is certainly vital in regards to the extensive number building exercises that cover the full range of subject disciplines. The set of compiled answers appears at the back of the book. The exercises are a handy resource from which educators, workshop leaders, and in-house trainers might profitably draw.

The overall architecture of the work is from the general to the specific, and from the simple to the complex. Each chapter provides a set of objectives, as well as an overview outline of major topics in textbook fashion. These topics are subarranged decimally for efficient navigation of chapter contents. Throughout the work the authors relate the particular topic concerning the classification to its philosophical base, so as to illustrate its broader context. For example, in chapter 6, "Synthesis of Class Numbers or Practical Number Building," the authors discuss "the importance of building the right number in the context of providing access to what has been written" (p. 77). These types of associations are welcome reminders of the true functions of a cataloger.

Major topics are apportioned over the book's twelve chapters. The first three chapters cover the philosophy and history of the DDC along with its structure and organization. Chapter 1, "Introduction to the Dewey Decimal Classification," attempts to put DDC in context with the development of other general classification systems by describing the unique features of the system. Recognition is also given to those individuals who provided major contributions or enhancements through each subsequent edition. A brief, but useful explanation of the revision process via the DDC Editorial Policy Committee is included as further background information. Of particular help is chapter 3, "Structure and Organization of the Schedules: Notes and Instructions," which delineates the functions and applications of the various types of notes found in the schedules and tables. Chapter 4, "Subject Analysis and Classification of a Document," describes in explicit, incremental steps the principles of subject analysis and their application to and use with the DDC. Chapter 5, "Using the Relative Index," is a well-written explanation as to the structure, function, and appropriate use of this important feature. After chapter 5, the major portion of the text is then given over to explanations covering the various types of number building within the schedules themselves and also utilizing the auxiliary tables. The guide includes a selected bibliography as well as a helpful cross-referenced index. The brief glossary functions as a supplement to the glossary found in the first volume of *DDC 20*.

No other guide with such a practical focus on number building is as extensive or elaborate in its detailed explanations. It
is a most compact yet functional guide. Given the current enthusiasms for metadatabases on the Internet, it is fitting for such a text to appear that deals with the heart of a library: the organization of documents for access through an explanation of such a fundamental component of bibliographic control as the construction of classification numbers. Chan, Comaromi, and Satija have provided a most useful service to library users across the globe.

Guide to the Use of UDC: An Introductory Guide to the Use and Application of the Universal Decimal Classification, by I. C. McIlwaine, with participation from A. Buxton, "is intended as a purely practical aid to those who are studying the UDC or who are using it on a day to day basis for an information system of some kind" (p. 5). The text intentionally does not deal with the theory of classification in general, but with only the UDC in particular. Given this scope, the authors have put together a most worthwhile introductory text for both those individuals and institutions employing or considering utilizing the UDC system. The text begins with a rudimentary historical and theoretical examination of the UDC, which is followed by an understandable and informed description of the structure of the UDC, as well as an outline summary of the arrangement of disciplines and subdisciplines found in the UDC. The majority of the text is concerned with a detailed explanation of the practical application of the scheme. The text is replete with concrete examples that illustrate the concepts. The final chapters, "Uses of the UDC" and "Online Applications," provide excellent clarification on the functionality of UDC as a universal system and on the multiple tasks this system can undertake, adding tremendous value to the text. A brief glossary of relevant terms concludes the work.

As with the DDC guide, this text functions best as a reference guide. Explanations of complex concepts are quite intelligible and readable as an introduction to the system.

Both of these texts are very useful as reference tools for all individuals and organizations interested in and involved with providing bibliographic control at whatever level, both now, and in the foreseeable future.—Stephen J. Smith, University of Illinois at Urbana-Champaign.
Letters

From Birdie MacLennan, SERIALST Listowner/Moderator (Serials Coordinator, University of Vermont); Marcia Tuttle, SERIALST Associate Moderator (Head, Serials Department, University of North Carolina, Chapel Hill); and Ann Ercelawn, SERIALST Associate Moderator (Original Cataloger, Vanderbilt University):


The SERIALST moderators wanted to take this opportunity to respond to the SERIALST reviewer’s comments regarding the “controversy over moderated lists when discussion of the FAXON company and news about its sale negotiations were stifled” in the summer of 1994 (p. 311).

For what it’s worth: What the review doesn’t say—and what most people probably don’t know—is that the moderators worked with each individual who sent a message that didn’t get printed to put them in contact with others who had also sent messages and were facing the same dilemmas. Additionally, permission was obtained from serials professionals at various institutions who had done recent vendor evaluations and made decisions to give their addresses to those few people who submitted questions. In other words, there was a strong effort to put people who requested information in touch with each other so that they would have an avenue to discuss issues privately. The rationale in calling for the moratorium is documented in the SERIALST archives of July 27, 1994; the rationale for calling an end to it is noted in the August 9, 1994 archives. List discussion about this topic resumed after August 9—i.e., after the first round of sale negotiations had been completed, but before the Dawson press release that was to come in early September.

This is not intended to allay an old controversy nor to vindicate or admonish our actions as moderators. Indeed, the reviewer’s perspective in describing the events of that time brings to light much about the professional responsibilities and ethical dilemmas of list moderating—especially during a time of high stakes. The choices aren’t always easy or clear-cut, but we live with them, nonetheless.
Instructions for Authors

Manuscript Submission

Manuscripts of articles should be sent to the editor, Richard P. Smiraglia, Palmer School of Library and Information Science, Long Island University, Brookville, NY 11548; (516)299-2174; fax (516)299-4168; e-mail smiragl@hornet.liunet.edu.

In general, the editorial staff follows the Guidelines for Authors, Editors, and Publishers of Literature in the Library and Information Field adopted by the American Library Association Council in 1983 and available from the ALA Executive Offices. Information about copyright policies also is available from ALA headquarters.

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Verify the spelling and accuracy of all names in an appropriate source. Consult The Chicago Manual of Style, 14th ed. (Chicago: Univ. of Chicago Pr., 1993) for capitalization, abbreviations, usage of numbers, etc.

4. Give the article a brief title; if the title does not fully describe the content of the article, add a brief subtitle. On the first page of the manuscript give the article title, the name(s) of the author(s), and the position title, institutional affiliation, and address of each author.

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9. Be prepared to supply camera-ready copy for all illustrations. Accompany the manuscript with a photocopy of each, and a brief, meaningful caption noted on the verso.

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LRTS is the official journal of the Association for Library Collections & Technical
Services (ALCTS), a division of the American Library Association. The following statement of editorial policy was adopted by the ALCTS Board of Directors, July 1, 1991.

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The purpose of *LRTS* is to support the theoretical, intellectual, practical, and scholarly aspects of the profession of collection management and development, acquisitions, and technical services by publishing articles (subject to double-blind peer review) and book reviews, and editorials and correspondence in response to the same.

**AUDIENCE**

The audience for *LRTS* is practitioners, students, researchers, and other scholars with an interest in collection development and technical services and related activities in all types of libraries.

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**SCOPE**

The editor of *LRTS*, with the assistance of an editorial board, strives to achieve a balance among the articles published in the journal so that over the volume each of the sections of ALCTS (Acquisitions, Cataloging & Classification, Collection Management and Development, Preservation of Library Materials, Reproduction of Library Materials, and Serials) is represented in the journal. Articles on technology, management, and education are appropriate to the journal when the application of these is to issues of interest to practitioners and researchers working in collection development and technical services. The scope of the articles published in *LRTS* is also guided by the “Mission and Priorities Statement” adopted by the ALCTS Board of Directors in 1990.

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