LIBRARY RESOURCES & TECHNICAL SERVICES

Vol. 25, No. 1 *January/March 1981*

CONTENTS

	Page
For Our 25th Anniversary . . .	3
In Memoriam: Maurice F. Tauber, 1908–1980	8
From Problems Perceived to Programs in Practice: The Preservation of Library Resources in the U.S.A., 1956–1980. *Pamela W. Darling* and *Sherelyn Ogden*	9
Patterns in the Use of OCLC by Academic Library Cataloging Departments. *Barbara Moore*	30
Quality Control and the OCLC Data Base: A Report on Error Reporting. *Judith J. Johnson* and *Clair S. Josel*	40
Quality Issues in Retrospective Conversion Projects. *Linda F. Crismond*	48
Cataloging Contributed to OCLC: A Look One Year Later. *William J. Crowe*	56
Library of Congress Subject Heading Patterns in OCLC Monographic Records. *Edward T. O'Neill* and *Rao Aluri*	63
Barcoding a Collection—Why, When, and How. *Ann de Klerk*	81
Directions for Research in Indexing, Classification, and Cataloging. *Elaine Svenonius*	88
The Bibliotaphic Libraries of the Year 2000. *Harold Wooster*	104
RTSD Annual Reports, 1979/80	110
For the Record (Annual Report of the Decimal Classification Editorial Policy Committee)	123
Instructions to Authors	125

AMERICAN LIBRARY ASSOCIATION

RESOURCES AND TECHNICAL SERVICES DIVISION

EDITORIAL BOARD

Editor, and Chairperson of the Editorial Board .....ELIZABETH L. TATE

Assistant Editors:

PHYLLIS A. RICHMOND
EDWARD SWANSON } .....for Cataloging and Classification Section

CAROLYN C. MORROW....for Preservation of Library Materials Section

FRANCIS F. SPREITZER...for Reproduction of Library Materials Section

J. MICHAEL BRUER .....for Resources Section

DOROTHY J. GLASBY .....for Serials Section

Editorial Adviser:

DAVID G. REMINGTON (for Regional Groups)

Liaison with RTSD Newsletter:

Arnold Hirshon, *RTSD Newsletter* Editor

Library Resources & Technical Services, the quarterly official publication of the Resources and Technical Services Division of the American Library Association, is published at 50 E. Huron St., Chicago, IL 60611. *Editorial Office:* American Library Association, 50 E. Huron St., Chicago, IL 60611. *Advertising Traffic Coordinator:* Leona Swiech, Advertising Office, ALA Headquarters, 50 E. Huron St., Chicago, IL 60611. *Circulation and Business Office:* Central Production Unit/Journals, ALA Headquarters, 50 E. Huron St., Chicago, IL 60611. *Subscription price:* to members of the ALA Resources and Technical Services Division, $7.50 per year, included in the membership dues; to nonmembers, $15.00 per year; single copies $4.00.

Second-class postage paid at Chicago, Illinois, and at additional mailing offices (ISSN 0024-2527).

Library Resources & Technical Services is indexed in *Library Literature, Library & Information Science Abstracts, Current Index to Journals in Education, Science Citation Index,* and *Hospital Literature Index.* Contents are listed in *CALL (Current Awareness—Library Literature).* Its reviews are included in *Book Review Digest, Book Review Index,* and *Review of Reviews.*

Instructions for authors appear on p.125 of the January/March 1981 issue of *Library Resources & Technical Services.* Copies of books for review should be addressed to Arnold Hirshon, Editor, *RTSD Newsletter,* Duke University, Box 9184—Duke Station, Durham, NC 27706. Do not send journal issues or journal articles for review.

The contents of this journal, unless otherwise indicated, are copyrighted by the Association. All material in this journal copyrighted by the American Library Association may be photocopied for the noncommercial purpose of scientific or educational advancement.

©American Library Association 1981

Publication in *Library Resources & Technical Services* does not imply official endorsement by the Resources and Technical Services Division nor by ALA, and the assumption of editorial responsibility is not to be construed necessarily as endorsement of the opinions expressed by individual contributors.

For Our 25th Anniversary . . .

Since *Library Resources & Technical Services* has never lost track of its volume numbering, this issue can safely be described as the first of our silver anniversary issues. For each of the four numbers of the twenty-fifth volume the editorial board has planned special features. To welcome the new Preservation of Library Materials Section to RTSD, we invited Pamela Darling and Sherelyn Ogden to prepare a quarter-century retrospective on the preservation of library resources in the United States, which appears as the first article in this issue. The next five papers give emphasis to the fact that for technical services librarians one of the most important developments of the past twenty-five years has been the genesis and growth of OCLC, Inc. These articles, read together, have much to say about the dream and the reality and reaffirm the old adage that a chain is no stronger than its weakest link. A look ahead at the next quarter-century can be glimpsed in de Klerk's article on barcoding, in Svenonius' paper on directions for research, and in Wooster's bit of whimsy on libraries in the year 2000. In future issues we hope to bring you papers on the changing role of the technical services librarian, the changing philosophy of bibliographic control, some guidelines to assist catalogers with entries for court reports, and papers from the ALA San Francisco Conference. A review article comparing the numerous AACR2 handbooks and manuals will implement our new policy of announcing books in the *RTSD Newsletter* and publishing only substantive review articles in *LRTS*. In the October/December issue the winning papers in the *LRTS* Silver Anniversary Competition will be featured, assuming some entries are received, and a twenty-five-year cumulative index will complete the silver anniversary volume.

Few editors, on the occasion of a silver anniversary, can resist the temptation to look backward. In yielding to that temptation, this editor decided to contribute a minuscule bit to research. Olsgaard and Olsgaard, in a paper published in *College & Research Libraries*, compared "Authorship in Five Library Periodicals."[1] *LRTS* was not one of the five selected for the study, but in this editor's opinion—which may be prejudiced—*LRTS* meets the criteria, namely, "the journal must have been in existence for at least ten years, use an article format, and be recognized as a nationally known journal of library science."[2] The journals selected "were also considered to have a major impact on librarianship and exhibit common trends in publishing."[3] Olsgaard and Olsgaard examined all authored articles in the journals they selected to ascertain the sex, occupation, and geographical location of each author. The data in tables 1–3, compiled from the twenty-four

published volumes, give the same information about *LRTS*, as was given in their tables 1, 4, and 5. Their procedures, described in admirable detail in the article, have been followed with two exceptions. Excluded from their study were book reviews and letters; in addition to the book reviews and letters, annual reports signed by the chairperson have been excluded from this compilation. They excluded Missouri from the list of geographical locations. Perhaps the editors of the five journals they surveyed decline a paper if the author is from Missouri, but *LRTS* does not. The time period the Olsgaards selected covered the calendar years 1968–77. To make the data for *LRTS* comparable, that decade has been isolated in the compilations. Their arti-

TABLE 1

GENDER FOR ALL ENTRIES

Journal	Women (Percent)	Men (Percent)	N =	d = *	$N - d$ =
LRTS					
1957–67	36.7	63.3	604	24	580
1968–77	38.6	61.4	463	35	428
1978–80	45.0	55.0	115	6	109
National average†	84.0	16.0			

*d is the number of entries for which data could not be determined.
†Quoted from "Authorship in Five Library Periodicals."

cle provides the pattern for the tables. It's doubtful that these data can even be accurately summarized by quoting Paul Dunkin's short end to a long discourse:

"But, my dear," said the Hatter with a frown, "Was there progress?"
"Well," said Alice earnestly, "There was change."[4]

In their suggestions for follow-up research, the Olsgaards saw the need for an examination of the totality of manuscripts submitted to a journal rather than just those accepted for publication. Table 4 is offered as a beginning.

No editor worthy of the title would select a paper on the basis of the author's sex, geographical location, or occupation, unless some one of these categories was being specially featured. How then are papers selected? The practices currently followed for the selection of papers offered for publication in *LRTS* are these. If, on first reading, the editor concludes that the subject matter is relevant to the interests of technical services librarians and that the paper will not require an inordinate amount of editorial attention, the paper is sent to a referee for evaluation. The referee is not informed of the identity of the author, nor is the author informed of the identity of the referee. The referee is asked to evaluate the paper in terms of its quality, readability, timeliness, and potential interest and value for *LRTS* readers and to recommend for or against publication in this journal. If, as occasionally happens, the referee's opinion differs from that previously reached by the editor (and unknown to the referee), a third opinion may be requested. The decision to accept or not to accept a paper for

TABLE 2

OCCUPATIONS OF AUTHORS

Journal	Academic Librarian (Percent)	Public Librarian (Percent)	Other Librarian (Percent)	Library Science Faculty (Percent)	Library Science Student (Percent)	Other Faculty (Percent)	Nonlibrarian Nonacademic (Percent)	N =	d = *	$N - d$ =
LRTS										
1957–67	46.4	13.0	16.9	14.1	1.0	0.9	8.5	604	29	575
1968–77	54.8	3.1	16.3	16.5	1.3	1.8	6.9	463	16	447
1978–80	54.6	3.7	9.2	21.3	0.0	0.9	10.2	115	7	108

**d* is the number of entries for which data could not be determined.

TABLE 3

GEOGRAPHIC DISTRIBUTION: ALL ENTRIES

Journal	Northeast (Percent)	Southeast (Percent)	Midwest (Percent)	Southwest (Percent)	West (Percent)	N =	d = *	$N - d$ =
LRTS								
1957–67	49.5	7.9	22.3	1.7	18.5	604	75	529
1968–77	40.8	8.2	20.0	6.9	24.0	464‡	60	404
1978–80	37.1	12.4	28.6	5.7	16.2	115	10	105
Regional average†	26.9	17.9	28.1	11.9	15.2			

**d* is the number of entries for which data could not be determined and includes contributions from librarians outside the U.S.A.
†Quoted from "Authorship in Five Library Periodicals."
‡The fact that one author, a visiting lecturer, gave two geographic locations, accounts for the discrepancy in the number of observations between this table and tables 1 and 2.

TABLE 4

PAPERS SUBMITTED, JULY 1979–JUNE 1980, FOR PUBLICATION IN *LRTS*

	Accepted				Not Accepted			
	(Percent)	N =	d = *	$N - d$ =	(Percent)	N =	d = *	$N - d$ =
Gender of authors		33	0	33		49	0	49
Women	51.5				42.9			
Men	48.5				57.1			
Occupational distribution		33	1	32		49	7	42
Academic librarians	37.5				73.8			
Public librarians	3.1				2.4			
Other librarians	15.6				4.8			
Library science faculty	25.0				9.5			
Library science students	0.0				0.0			
Other faculty	0.0				0.0			
Nonlibrarian, nonacademic	18.8				9.5			
Geographic distribution		33	1	32		49	3	46
Northeast	40.6				34.8			
Southeast	18.8				17.4			
Midwest	18.8				19.6			
Southwest	0.0				4.3			
West	21.9				23.9			

*d is the number of entries for which data could not be determined. For "Geographic distribution" it includes contributions from outside the U.S.A.

publication is based on these independent evaluations. The importance of the referee in the selection process is obvious. There is no more appropriate beginning to the silver anniversary issues than a word of deep appreciation to the assistant editors and referees for their contributions; and especially to one assistant editor, Edward Swanson, for his work in compiling the *LRTS* indexes.—*Elizabeth L. Tate.*

References

1. John N. Olsgaard and Jane Kinch Olsgaard, "Authorship in Five Library Periodicals," *College & Research Libraries* 41:49–53 (Jan. 1980).
2. Ibid., p.49.
3. Ibid.
4. Paul S. Dunkin, "Cataloging and CCS: 1957–1966," *Library Resources & Technical Services* 11:288 (Summer 1967).

IN MEMORIAM: MAURICE F. TAUBER, 1908–1980

Maurice F. Tauber, an internationally known authority in library and information science and for thirty-two years a Columbia University professor, died on September 21, 1980, after a brief illness. He is survived by two sons, Frederic, of Fort Lee, New Jersey, and Robert, of Pleasantville, New York, and by two granddaughters, Sharon and Robin.

Maurice Tauber came to Columbia in 1944 as an assistant director of the University Libraries and assistant professor in the School of Library Service. He became full professor in 1949, was appointed to the Melvil Dewey professorship in 1955, and was named Melvil Dewey professor emeritus upon his retirement in 1976.

Dr. Tauber—Maury to his many friends and colleagues—was a true leader of the profession: an educator, librarian, administrator, critic, and a partner in learning to untold numbers of librarians. He was a prolific writer; a bibliography, published in 1974, lists more than five hundred works by or about him. Among his best known works internationally is *Technical Services in Libraries,* a scholarly synthesis of the state of the art. Another important contribution is *The University Library,* written with Louis Round Wilson, which is one of the first works to identify and integrate the role, the organization, and the management of libraries into institutions of higher learning.

Maurice Tauber was one of the pioneers in applying the tools of scientific management to the administration of libraries. His library surveys made his name known around the world. As a Fulbright scholar he was invited to survey all Australian library resources, and he surveyed more than one hundred libraries of all types in the United States and other parts of the world.

For eighteen years he served as editor of *College & Research Libraries.* He was a member of the editorial advisory boards of several journals in the field of library science and for many years he was the editorial adviser for technical services for *Library Resources & Technical Services.*

He was an authority on the LC classification and very early recognized the potential role of the Library of Congress in furthering library cooperation. A pioneer in information science, he was a founding member of the American Society of Indexers and a leading expert on standards and standardization.

Among his numerous awards were the Margaret Mann, the Melvil Dewey, and the Beta Phi Mu awards.

His influence as an educator during thirty-two years at Columbia University can be measured by the thousands of students who are now librarians, educators, deans of library schools, and library administrators throughout the world. By his peers Maury Tauber was looked upon as the ideal scholar-teacher. His students remember him for his kindness, his fairness, his dedication, his humanity, and for his sense of humor.—*Nasser Sharify, Dean, Pratt Institute Graduate School of Library and Information Science.*

Editor's Note: To plan an appropriate memorial to honor Dr. Tauber, a committee has been organized and will meet on February 3, 1981, during the ALA Midwinter Meeting. Contributions may be sent to: Maurice F. Tauber Memorial Committee, P.O. Box 2943, Brooklyn, NY 11202.

From Problems Perceived to Programs in Practice: The Preservation of Library Resources in the U.S.A., 1956–1980

Pamela W. Darling and Sherelyn Ogden

Twenty-five years ago preservation was largely a neglected area. This historical review focuses on major events, activities, and publications that have contributed to the emergence of preservation as a vital specialty within librarianship.

In 1946 Pelham Barr wrote, "Silence, rarely broken, seems to surround the subject of book conservation. . . . Conservation, as responsible custody, is the only library function which should be continuously at work twenty-four hours a day . . . concerned with every piece of material in the library from the moment the selector becomes aware of its existence to the day it is discarded. The reason this sounds so exaggerated is that it is a forgotten platitude. . . . There was a time when library administration was simpler, when these platitudes were living, activating principles. But, with the increasing complexity of universities and their libraries, the custodial function of the library—the 'care and custody of the collection'—has deteriorated through neglect. . . . It became harder and harder to develop a program and procedures for book conservation, and therefore it was more and more neglected."[1]

Barr's experience as a founding member and first executive director of the Library Binding Institute brought him into close contact with the results of this neglect, and his analysis of the causes and outline of administrative remedies are astute and still remarkably valid. But he was ahead of his time, and the silence about conservation deepened in the following decade.

What then of the quarter-century to be reviewed in this paper? How has conservation, or preservation, fared? (The reader will here note

Pamela W. Darling is preservation specialist, Office of Management Studies, Association of Research Libraries. Sherelyn Ogden is book conservator and associate, New England Document Conservation Center. This article is an extension of work done in 1978 for Ogden's master's thesis at the Graduate Library School, University of Chicago. Invitational paper received and accepted September 1980.

that the terms *conservation* and *preservation* are used interchangeably. Despite numerous efforts to define and distinguish between them, no working consensus has yet emerged within the library profession, and rather than attempt to impose our own versions—the authors don't altogether agree either!—we shall flow fuzzily with the crowd on this point.) Since Barr's time, the silence about conservation has ended. These twenty-five years just past have been increasingly noisy. Indeed, at the risk of irritating proper historians, we shall here suggest that the modern field of library preservation was born in 1956, for two events occurred in that year that can be considered the beginning of our profession's serious and sustained attention to preservation.

First Steps

The first of these events was the publication in January 1956 of a *Library Trends* issue entitled "Conservation of Library Materials."[2] Edited by the late Maurice F. Tauber, the issue included articles on the conservation of old and rare books, stack problems, lamination, binding, discarding, and personnel for preservation functions. Tauber's introduction to the issue was titled "Conservation Comes of Age," a premature assertion as we can now see, but the infant was definitely alive and growing.

Tauber had reported that committees of the Association of Research Libraries (ARL) and the Council of National Library Associations had considered plans for the protection and preservation of library materials in 1954 and 1955, apparently motivated chiefly by wartime and cold war fears of military attack and the threat of nuclear devastation. The seeds of several "national plans" can be found in these deliberations. Although these seeds have germinated (if not flourished) in the years since, in 1956 many critical ingredients were still missing. As Tauber's introduction concluded: "The reader may not find in these pages as many guideposts for a conservation theory as he might like . . . the major usefulness of the papers, however, is in pointing up the many areas which are still in need of basic investigations."[3]

Who was to carry out these investigations? A potent new force, for preservation as for most other areas of librarianship, emerged through the other major event of 1956, the establishment of the Council on Library Resources (CLR). Funded by the Ford Foundation and guided through its first fifteen years by the extraordinary Verner W. Clapp, CLR from the start recognized preservation as an urgent problem and set in motion the "basic investigations" necessary for its solution. A full history of the Council's role in preservation is well beyond the scope of this review, but the Council's significance as a guiding hand will appear throughout the account that follows.

Repeatedly associated with the names of Clapp and the Council during these early years is that of William J. Barrow. A document restorer at the Virginia State Library, Barrow became fascinated by the problems of aging paper. In the late 1930s he developed the cellulose acetate and tissue method of lamination that bears his name, and,

in the mid-1940s, the first of his deacidification processes. His work first became known to the larger library community through the 1956 *Library Trends* issue.[4] Perhaps sensing that the time was now ripe, the Virginia state librarian, Randolph W. Church, approached CLR with a proposal that Barrow be supported in an extensive study of the "paper problem." Clapp agreed, and on June 1, 1957, Barrow began his first study on the physical strength of the paper used for nonfiction book publishing between 1900 and 1949. The shocking results, suggesting that only 3 percent of the volumes studied had paper which could be expected to last more than fifty years, led to a second study on the stabilization of modern book papers. A report of these two studies appeared in 1959,[5] and in March of that year, again with CLR support, Barrow began a year-long investigation of the feasibility of manufacturing durable paper.

That same year, CLR provided support to the American Library Association (ALA) for the establishment of the Library Technology Project (LTP), brainchild of Clapp and CLR vice-president Ruggles. LTP came into being with Frazer G. Poole as director, and although LTP's activities have by no means been confined to preservation, its role and Poole's were nonetheless significant, as we shall see.

Following publication of the report for Barrow's second Council-funded project on the manufacture of stable paper,[6] a one-day conference was held on September 16, 1960, "to explore the potential benefits for the users of books offered by the new chemical wood pulp paper recently developed under the auspices of the Virginia State Library by W. J. Barrow. . . ."[7] Cosponsored by the Virginia State Library and ALA, the meeting in Washington's Cosmos Club brought together a group of librarians, publishers, paper manufacturers, and CLR staff for a general review of the situation and of the effects Barrow's findings might be expected to have on future publishing. The final recommendation was that ALA establish a committee to "continue some discussion of this problem, looking toward mutually agreeable solutions."[8]

Two other events of 1960 moved forward the cause of preservation—one directly, and the other indirectly but, in the long run, as significantly. In June 1960, after a discussion of Barrow's findings at a meeting of the Association of Research Libraries, a standing Committee on Preservation of Research Library Materials was appointed.[9] Since the formation of the committee led in the next twelve years to the articulation of a broad-scale cooperative approach to the nation's preservation problems, this action was evidence of the trend Tauber had earlier identified—"that a problem of national significance is receiving earnest attention from library leaders."[10]

The other event, virtually unnoticed within the library world, was the formal recognition of the profession of art conservation in the United States by the establishment of the American Group of the International Institute for Conservation of Historic and Artistic Works, and by the admission of the first class to the country's first graduate training program for art conservators at the Institute of Fine Arts of

New York University. The development of professional educational programs in this area, with its obvious parallels and areas of overlap with library preservation, is now strongly influencing the pattern of professional development for the latter. And it is worth noting that the first graduate of NYU's program, art-on-paper conservator Mary Todd Glaser, became senior conservator of the New England Document Conservation Center, the first cooperative regional center with a special focus on library materials. But we are getting ahead of our story.

In 1961 the search for answers to technical problems was accelerated when CLR funded the W. J. Barrow Research Laboratory, a permanent facility located in the new Virginia Historical Society building. Here Barrow and a small staff of scientists pursued investigations on permanence and durability of the book.[11]

Early National Planning

In 1962 the first published report from the ARL preservation committee sought to establish, through a CLR-funded sampling study, a framework for national planning by assessing the "magnitude of the paper-deterioration problem."[12] The findings—that nonserial titles listed in the National Union Catalog in 1961 contained just under three billion pages, of which nearly 60 percent were probably printed on paper that was rapidly deteriorating—were perhaps more stunning than stimulating to specific action. But by the end of the year CLR had provided new funds for a major project to determine potential solutions to the paper-deterioration problem.

This study was conducted by Gordon Williams, director of the Center for Research Libraries. His report, *The Preservation of Deteriorating Books: An Examination of the Problem with Recommendations for a Solution*,[13] was unanimously adopted by ARL in January 1965 and has been called "the most significant single document on the subject."[14] Williams concluded that the best way to deal with the problem of the deterioration of library materials would be to establish a centralized federal agency to preserve a physical copy of every significant written record and make copies available to all libraries. Microfilming of materials as an adjunct to physical preservation, to preserve the text and reduce wear on the original, was also an important element of the proposal, and Williams commended the Library of Congress' work toward a central listing of microform masters. The first issue of the *National Register of Microform Masters* appeared in September 1965[15] and has since become an essential tool in all preservation microfilming activities.

At its June 1965 meeting, ARL recommended that the Library of Congress take responsibility for implementing a program based on the Williams report, and LC accepted the challenge.[16] At a meeting on December 6, 1965, among senior staff at the Library of Congress and the ARL Preservation Committee, the Librarian of Congress "stated that the Library of Congress will assume responsibility for a national program for the preservation of deteriorating books in accordance

with the principles set forth in the Report . . . by Gordon R. Williams."[17]

Seeing a need to discover in practice the administrative and technical problems that would be involved in formation of a national preservation collection, the ARL committee next sought and received from the Council a grant to finance the Pilot Preservation Project at the Library of Congress. Norman Shaffer was named to direct the project, and it appeared that a national program had truly been set in motion.

Basic Investigations

Meanwhile, the Library Technology Project had been at work on a variety of projects related to preservation—studying adhesives and pressure-sensitive tapes; developing the Se-Lin system for safe, durable call number labels; undertaking an extended project with the Barrow Laboratory for the development of performance standards for library binding; sponsoring Hawken's work on reprographic techniques, including his landmark *Copying Methods Manual*;[18] supporting Barrow's work on permanent/durable catalog cards. In 1965 a special CLR grant supported an LTP project intended to produce a series of manuals on conservation practices. In fact, LTP engaged in a whole range of projects relating to the physical quality of library materials and methods.[19]

In a related development, the first report on Richard D. Smith's experiments in search of a deacidification treatment for whole books appeared in 1966.[20] Thus during this period the Library Technology Project and the Barrow Research Laboratory, supported by the Council and often working together, and Smith (soon to be supported by CLR), were carrying out "basic investigations" and developing technical tools for building library preservation programs, while the deliberations and projects of ARL and LC, also Council-supported, were setting up the policy framework for those programs. Much had occurred in the ten years since the *Library Trends* issue on conservation.

Local Developments—The Newberry Example

To what extent was all this activity affecting operations on the local level? Librarians have been caring for materials, in some fashion, since libraries began, but the intensity and effectiveness of the care has varied considerably. Although binding and mending sections and stack maintenance units have been common for generations, and the microfilming of deteriorating materials to preserve their intellectual content began in the early 1930s,[21] programs encompassing the full range of preservation activities as we now define them are of very recent origin. For most libraries in the fifties and sixties, a wide range of problems was arrayed under the rubric of *preservation* or *conservation*. Many of the technical solutions to these problems were still experimental and problematic at best. Further, the organizational complexities implicit in any attempt to assign responsibility for programs addressing all these problems to a single administrative unit prevented the development of a unified program.

One institution particularly suited to the task of developing a program through the happy coincidence of place and personality quietly moved ahead during the first decade of our review. The Newberry Library, private and scholarly, is free of heavy patron pressures from faculty and student body, Congress, or a taxpaying citizenry, and has a specialized collection interest in the history of the book. One Newberry board president, Everett D. Graff, brought a special concern for preservation to his duties, and by 1961 air conditioning was installed in the dignified old Chicago building to retard deterioration of its contents. The next year, Lawrence W. Towner was appointed librarian and began working to extend Graff's concern to the total care of the collections. In 1964 Towner appointed Paul N. Banks as the Newberry's first "conservator," giving him broad responsibilities for reshaping the in-house bindery operations and developing a library-wide conservation program.[22] With scientific research and the resulting technical tools, broad national policies backed up by a steady flow of funds through CLR, and the development of local procedures for adaptation elsewhere, the stage seemed set. Surely development of preservation as a discipline within librarianship would be rapid from then on.

THE FLORENCE INTERLUDE

Nature has a way of interfering in the affairs of humankind, however, and on the night of November 4, 1966, the waters of the Arno swirled through Florence, Italy, leaving a trail of mud and destruction throughout homes, businesses, churches, museums—and libraries. Conservation activities in the rest of the world virtually came to a halt as binders, restorers, and conservators joined a massive international salvage effort. Much has been written about Florence, the salvage operation, and its effects on the conservation field which we shall not repeat here.[23] It is appropriate for this review, however, to observe that although the Florence "event" temporarily interrupted developments in the United States, both the focusing of public attention on the subject of conservation and the techniques and professional relationships established through the salvage effort stimulated and influenced subsequent activities here to an extraordinary degree.

This is not to say that nothing else happened while the mud was being cleaned up in Florence. In May of 1967 the American Group of the International Institute for Conservation of Historic and Artistic Works adopted the first code of ethics for art conservators, a companion document to its 1963 standards of practice, the latter of which is often referred to as the "Murray Pease Report" after the chairman of the committee that prepared it.[24] In June the Library of Congress appointed Frazer G. Poole as LC's first preservation officer, and he began a long series of reorganizations and expansions of LC's preservation activities. In the fall of that year, LTP published the first edition of Carolyn Horton's now classic *Cleaning and Preserving Bindings and Related Materials;*[25] the New York Library Association held a symposium on preservation during its annual conference; and the first

edition of the Cunha work, *Conservation of Library Materials,* appeared.[26]

The Pilot Preservation Project (which became known as the Brittle Books Project) was conducted at the Library of Congress during this period. This study concluded that establishment of a national preservation collection was administratively feasible in terms of identification of material, that compilation of a register of best copies would present few difficulties, and that problems still to be resolved included development of a more efficient and economical method of deacidification, determination of optimal storage conditions, and choice of a secure site.[27]

By 1969, most everybody was back from Florence and the pace began to increase. A second edition of Horton's manual, revised and expanded and in great demand, appeared from LTP. The New York Library Association established an ad hoc committee on preservation. Binder-restorer Laura Young was commissioned to do a preservation survey for the library of the New York Botanical Garden, and in August a conference was held at the University of Chicago.

The Chicago Conference and Subsequent Developments

The Thirty-fourth Annual Conference of the Graduate Library School, a three-day event entitled "Deterioration and Preservation of Library Materials," included formal papers and discussions covering the scholarly needs for preservation, the nature of library materials, and the physical requirements for insuring their survival, organizational considerations, and personnel needs. The conference organizers "hoped that the wide representation here of various parties concerned with the problems of preservation may contribute to a wider communication of knowledge and cross-fertilization of ideas so important in scientific advance."[28] They succeeded in their aims, for the conference served to summarize what was then the state of the art and to stimulate renewed activity, while the proceedings remain one of the most frequently cited documents of the field.

In the next year, Poole's labors at the Library of Congress began to bear fruit, as CLR provided funds to establish a laboratory, and Peter Waters—a major organizer of salvage operations at the Biblioteca Nazionale Centrale di Firenze and prominent English binder-restorer—was brought in as consultant to guide the laboratory development. Also under Poole's leadership, the Bookbinding Committee of ALA's Resources and Technical Services Division expanded its functions and changed its name to the Committee on Preservation of Library Materials. At the Newberry Library, Banks' operation was expanded through the establishment of a conservation laboratory. The New York Public Library, actively concerned about preservation since at least the days of Lydenberg, moved closer toward a formal program with the publication of Henderson's *Memorandum on Conservation of the Collections,*[29] an amplification of the paper he and Robert Krupp had prepared for the Chicago conference.

Attention was also focusing again on the need for a national program. The LC Pilot Preservation Project had pointed up the wide array of technical and organizational questions surrounding the "national collection" idea, and the ARL Preservation Committee pressed forward the effort to answer those questions. With a grant, this time from the U.S. Office of Education (the first significant federal funding for library preservation), the ARL committee, under the chairmanship of Warren J. Haas, launched a new effort that culminated in the publication of *Preparation of Detailed Specifications for a National System for the Preservation of Library Materials.* Originally the project was aimed at establishing the operational details necessary for implementation of the Williams proposals of 1964, but as work progressed the purpose was modified. Noting that "the objective . . . of suggesting specific steps that seem necessary to help move the research library community towards the preservation goals it has set for itself remains unchanged,"[30] the Haas report takes the Williams report as its starting point but moves considerably beyond it in making recommendations for future action.

While the Haas report was still in preparation, important steps were being taken. Waters was appointed restoration officer of the Library of Congress. Yale University Library began a Preservation Office, first under Susan Swartzburg, who was succeeded by Gay Walker; the New York Public Library established its Conservation Division under John P. Baker; the Boston Athenaeum sponsored a major conference on library and archives conservation;[31] Jean Gunner was appointed conservator/bookbinder at the Hunt Botanical Institute Library; and Paul Banks began teaching conservation of library materials for the University of Illinois.

Information was becoming much more available. The second edition of *Conservation of Library Materials* appeared; Clapp produced his remarkable "Story of Permanent/Durable Book Paper, 1115–1970";[32] LTP brought out the second volume in its conservation series, Middleton's *Restoration of Leather Bindings;*[33] LC published the first edition of Peter Waters' pamphlet on salvaging water-damaged materials;[34] the Library Binding Institute published Tauber's *Library Binding Manual*;[35] and a major treatment of deterioration, by Carl J. Wessel, appeared in the new *Encyclopedia of Library and Information Science.*[36]

As techniques for physical treatment expanded and improved, the professional structure grew. The American Group of the International Institute for Conservation of Historic and Artistic Works reorganized as the American Institute for the Conservation of Historic and Artistic Works (AIC). This small but vigorous group, including conservators of library materials, grew dramatically in the following years, stimulating the development of improved techniques, educational programs, and an increasingly scientific approach to vexing technical problems.

THE SEVENTIES

It is relatively easy to discern the patterns and trace the trends within events of a decade or more ago. Analyzing the more immediate

past is perilous, especially when the analysts themselves have been immersed in the activities, developing particular viewpoints and, no doubt, biases. The task is rendered the more difficult in this case, for the scope of activities, the variety of projects, the number of involved people, and the range of local, cooperative, and governmental programs directly related to the preservation of library materials multiplied steadily during the 1970s.

In 1972 Haas wrote that "the complexity of the subject and the sheer quantity of the material with which we are concerned are such that, despite real progress in specific instances, the core of the problem—the deterioration of a huge number of volumes in general and research library collections—is untouched . . . there seems to be no prospect for a single and absolute solution."[37] Haas identified four major areas of needed activity which provide a convenient framework for analyzing the recent past: research, education and training, preservation and conservation efforts in individual libraries, and collective action. We shall consider each in turn.

Research

Research related to the preservation of library materials has been conducted in several places and has addressed a variety of topics. The Barrow Research Laboratory was a major center for a decade and a half. Barrow himself died in 1967, but the work was carried on for another ten years by Bernard Walker. Termination of CLR funding brought the laboratory to an end in July 1977. During that period, reports on paper characteristics, adhesives, and testing procedures were issued, and extensive investigations were carried out on a "mass" technique for the deacidification of whole books, the much sought-after treatment for retarding deterioration in large collections. Sometimes referred to as the "Barrow morpholine process,"[38] the one-hour treatment, tested extensively in the Virginia State Library, can handle up to a hundred volumes in a small vacuum chamber. When the laboratory closed, CLR negotiated an arrangement with Research Corporation (a nonprofit foundation that encourages the useful application of scientific and technical discoveries) whereby Research Corporation handles the patent, licensing, and marketing of the morpholine process. The Vacudyne Altair Corporation was licensed to manufacture the necessary equipment, and further field testing was in process at the end of the decade.[39]

Research on deacidification processes was also being continued by Richard D. Smith, whose doctoral work at the University of Chicago was partly funded by CLR.[40] Smith developed a nonaqueous deacidification solution designed for application by immersion, spraying, or brushing. The solution is patented and marketed under the name of Wei T'o. Since 1974 Smith has been working with the Public Archives of Canada on a pilot test of a mass application of his process, involving the use of a liquified gas solution in a vacuum process tank that will hold up to thirty books per one-hour batch.[41]

In 1972 the Library of Congress established a research laboratory

devoted to preservation, directed by John C. Williams. With a small staff of scientists and technicians, the LC Preservation Research and Testing Office conducted a wide variety of basic and applied research projects, working in close cooperation with the Restoration Office to establish priorities and compare laboratory findings with workshop experience. Like the Barrow Laboratory, the LC research office also became heavily involved in deacidification research, receiving patents for various processes in 1975, 1976, and 1977. The technique patented in 1977, generally known as the diethyl zinc process, is LC's entry into the mass deacidification race and involves use of a volatile, toxic compound in a large vacuum chamber. By 1980, testing had progressed to include several production-scale runs treating several thousand volumes in a single one-week cycle.[42]

In August 1976, the Cellulose, Paper and Textile Division of the American Chemical Society sponsored a symposium on the "Preservation of Paper and Textiles of Historical and Artistic Value." This welcome evidence of interdisciplinary attention directed toward preservation produced an important volume of proceedings, edited by LC's John C. Williams,[43] and was followed in September 1979 by a second symposium. Of similar value have been sessions during the annual meetings of the American Institute for Conservation, which over the years have included presentations on the treatment of paper and books as well as other types of materials.

A wide variety of laboratory investigations on materials used in books has also been carried out by faculty and advanced students in the art conservation programs, and by the Center on the Materials of the Artist and Conservator, Carnegie-Mellon Institute of Research, under the direction of Robert Feller. Research and testing of book structures and bindings has been done since 1976 at the Book Testing Laboratory of the Rochester Institute of Technology, supported by the Library Binding Institute and directed by Werner Rebsamen. Several commercial interests have competed in the development of improved reproduction techniques, including the possibility of compact videodisc text storage, which may prove more economical than large-scale microfilming for preserving the intellectual content of deteriorating materials.

The disciplined, experimental approach to problem solving common to the laboratory sciences, often requiring extended periods of analysis and testing, sometimes generated impatience from a library community anxiously awaiting technological aids for the daily administration of disintegrating collections. A degree of skepticism, even despair, was creeping into the literature by the late seventies as major breakthroughs in the mass treatment area continued not to take place.[44] Nonetheless, by 1980 the results of much applied research and development in the area of adhesives, paper, boards, and other materials used in the physical care and repair of library materials were evident in the growing archival sections of major library supply catalogs, as well as in the offerings of several firms specializing in conservation supplies.

Education and Training

Writing in 1956, Edward C. Lathem made the wry statement: "There is surely no necessity of providing a profusely footnoted exposition of the obvious and widely-recognized fact that persons particularly well qualified to oversee and direct conservation activities, especially in their broadest context, are not by any means the profession's most embarrassingly over-abundant commodity."[45] He went on to suggest, "If, as is hoped, we are entering upon a period in which greater and greater attention will be directed toward conservation, it seems likely that we can expect librarians to be increasingly mindful of these needs and to think in terms of adding conservation specialists to their library's staff. The emergence of this 'age of enlightenment,' coupled with the demand for qualified personnel, may well stimulate the library schools to give more curricular emphasis to this area and its problems and students to take a more interested view of conservation matters. Hopefully, professional library organizations will become interested and play important roles in stimulating attention to training in conservation."[46]

There was little immediate response, but a generation later Lathem's hopes are being fulfilled. In 1968 Hannah Friedman surveyed library school bulletins and found not a single course devoted to the subject of conservation.[47] By 1976, however, the ALA/RTSD Preservation Committee issued its first *Preservation Education Flyer,* which identified nine accredited library school programs offering a regular course in the area. The third flier, in 1979, listed a dozen schools with regular courses and thirty-five more reporting that study of preservation was included in other courses.[48]

The proliferation of programs and workshops was even more dramatic following the New York Library Association symposium in 1968. Sponsors included library schools, libraries, professional associations on the local, state, and national level, and organizations such as the New England Document Conservation Center and the Library Binding Institute. Topics included basic introductions to the subject, administrative considerations, care and maintenance, details of binding and repair programs, replacement and preservation microfilming, and disaster recovery, in presentations varying from an hour or two to several days in length. Though no central inventory exists, it is reasonable to estimate that during the 1970s at least a hundred such events took place throughout the country, with several thousand librarians benefiting from exposure to preservation information.

Workshops and single courses are only a beginning, and in the late seventies efforts to provide more extensive educational opportunities developed. In 1977 the University of California at Santa Cruz began a series of summer programs taught by staff from LC's preservation and restoration offices. In 1978, with support from the U.S. Office of Education, the Columbia University School of Library Service offered an intensive four-week program for preservation administrators, and in 1979 the library school of the University of Maryland introduced a

workshop called "Conservation and Collection Management" within its summer program on archival and special collections.

As a follow-up to the 1978 institute, the dean, Richard L. Darling, sought and received funds from the National Endowment for the Humanities for a planning study to design graduate programs for library conservators and preservation administrators. Banks, who had taught in the institute, directed the study, which resulted in a detailed plan covering curriculum, facilities, staffing, and other requirements. As this is being written, fund raising is in progress, and Columbia hopes to admit the first class in the fall of 1981. Fittingly, portions of the proposed curriculum for library conservators will be taught in conjunction with the Conservation Center of New York University, home of the first program for art conservators, insuring continued cross-fertilization between these two closely related fields.

As the educational opportunities in preservation have multiplied, so too have sources of published information, from brief technical leaflets to book-length treatises. Among major works appearing in the latter part of our review period are several library association journal issues devoted in whole or part to preservation;[49] an extensive volume on the preservation of film and tape-based materials;[50] another on the care of photographic materials[51] and one on sound recordings;[52] encyclopedia and yearbook treatments;[53] a reader of major articles on the topic;[54] a model policy statement;[55] a major bibliography;[56] a basic manual aimed at smaller libraries;[57] and a number of technical leaflets.[58]

Articles on preservation topics have also found their way more and more frequently into the general library press, with *Library Journal* most notable for the space it has devoted to the subject.[59] Specialized periodical publications have also appeared,[60] and a large "underground" press has been at work as people involved in developing programs have shared internal documents.[61] Twenty-five years ago, Tauber could point to few published "guideposts for a conservation theory."[62] We will leave it to later historians to judge when the definitive work appeared, but by 1980 the territory had been mapped and a common intellectual approach was rapidly emerging.

Activities in Individual Libraries

Accompanying the acceleration of research activities and the growth of educational opportunities was a slow but steady movement toward the establishment of preservation programs within individual libraries. We have noted already the beginnings at the Newberry Library in 1964, the Library of Congress in 1967, Yale in 1971, and New York Public Library in 1972. In 1973, Harvard designated Doris Frietag consultant on conservation for the whole library system, and Yale's program was expanded with the addition of a Conservation Laboratory under the direction of Jane Greenfield. In 1974, Columbia University established a Preservation Department under Pamela W. Darling.

In each of these libraries, the expressed intention was to address

the preservation needs of the entire library and the initiative for program development came from the highest level of the library administration. Actual organizational patterns varied considerably, but in every case, except that of Harvard, the person charged with responsibility for the program was placed in a line rather than staff position and given specific authority to develop and implement programs.

By 1975, studies, surveys, and needs assessments were becoming popular managerial tools. The associate university librarian for technical services at the University of California at Berkeley assigned Jo Ann Brock to conduct a planning study for a conservation program at Berkeley. Her report, which reviewed the causes of deterioration and current condition of the collections and presented detailed recommendations for a series of conservation program elements, received wide distribution and served as a model for similar planning documents in many other libraries.[63]

During the next few years planning documents and policy statements, some produced by individuals and some by committees or task forces, appeared in a number of libraries, including the University of Wisconsin–Madison, the University of California (a joint task force from all nine campuses), Harvard, Duke, Union Theological Seminary, Stanford, Cornell, and the University of Chicago. The libraries participating in the Collection Analysis Project of the ARL Office of Management Studies, including Arizona, MIT, UC-Berkeley, UC-San Diego, and Brigham Young, also addressed their preservation needs through a special module in that project. Such planning efforts served an important function in educating a broad spectrum of staff about preservation and created an environment in which actual program development subsequently could take place.

During this period, federal funding became an important stimulus for local program development. The National Endowment for the Humanities provided support for preservation at several institutions, including the Schomburg Center of the New York Public Library, Case Western Reserve, Southern Illinois University at Carbondale, Yale, and Princeton. Yale's three-year project, which began in 1979, is of particular significance since it includes an intern component through which staff from other institutions spend six to twelve months working with the Yale preservation and conservation staff. Interns study principles of conservation, carry out a condition survey of the stacks, and participate in other components of Yale's preservation program, gaining knowledge and skills to be employed when they return to their home institutions. Since 1978, federal funds available under Title II-C of the Higher Education Act have enabled a number of research libraries to carry out specific preservation projects, often involving microfilming or professional restoration of scarce and vulnerable resources.

By the end of 1980, conservation or preservation departments had been established at several more research libraries, including the University of Utah, headed by Paul Foulger; Southern Illinois University, headed by Carolyn Clark Morrow; Stanford University, headed by

Sally Buchanan; the University of California at Berkeley, headed by Barclay Ogden; and the Humanities Research Center at the University of Texas, headed by Donald C. Etherington. Ogden had been at the Newberry, and Etherington in LC's Restoration Office, so the benefits of early development in a few places were spreading; but most libraries were still grappling with the problem of how to get started.

The approach that became common in the later seventies, involving the appointment of planning committees, task forces, or preservation "officers" whose roles were chiefly advisory rather than managerial, stands in marked contrast to the earlier pattern of creating an operating unit responsible for developing and implementing programs. The first "conservation administrators" were forced to be pioneers, dreaming up procedures and devising systems for carrying out their broad responsibilities. Different areas were emphasized within each of those first programs, in response to local conditions and the background and expertise of the individuals involved. The net result of that early development was the evolution of a broad spectrum of procedures and programs, and the ideas and experiences arising from this process were shared through personal contacts, workshops and speeches, and publications. Thus program planners in the later seventies were able to build upon the work at Newberry, Yale, New York Public, or Columbia. It became possible to short-cut the frustratingly slow, trial-and-error process of initial development to some extent, but a great deal of effort was still required within each institution to discover what was being done in other places.

In 1979, the National Endowment for the Humanities awarded a grant to ARL's Office of Management Studies (OMS) for a project which should accelerate this local development. Directed by Pamela W. Darling, the project is to codify current practices, producing procedural and technical manuals together with a guided self-study planning process. If the project is successful, it will be an important step toward the development of common standards and traditions of practice, those professional tools critical to progress in any field.

Collective Action

The ARL/OMS project is one among many examples of collective action supporting the efforts of individual institutions. These collective activities may be grouped under three major headings: program support from professional organizations and associations, cooperative efforts within a regional or network framework, and progress toward a "national program."

Within the American Library Association, preservation activities grew rapidly in the years following the transformation of the RTSD Bookbinding Committee into the division-level Committee on Preservation of Library Materials. While continuing its interest in binding, the committee was also actively concerned with the availability of permanent/durable paper and sponsored a series of tours, programs, and exhibits during ALA conferences on a variety of preservation topics. As interest within the profession grew, committee meetings

often were crowded with observers hoping to pick up useful information, and by 1976 there was sufficient support for the establishment of a Preservation Discussion Group to provide a structured channel for the exchange of news, views, and developments. The following year the committee set up a subcommittee on library/binders relations to work on specifications and other areas of mutual concern, and an ad hoc group undertook the creation and periodic updating of the *Preservation Education Flyer*. In 1979, the RTSD Board approved the recommendation of the preservation committee that it be reorganized and given full section status within the division. The new section numbered approximately fifteen hundred members in the first year, with its first elected officers taking over in the summer of 1980. Such formal recognition of the importance of preservation by the nation's largest library association did much to encourage preservation developments and stimulate leadership in the field.

During the same period, the role of library conservation within the American Institute for Conservation grew in significance. Perhaps the single most important factor in this process was the activity of Paul Banks, whose service as treasurer, vice-president, and then president, in 1978–80, kept the particular preservation problems of libraries clearly in focus within this organization of art and object conservators. By 1980, many librarians were members of AIC, and when specialty groups emerged the book-and-paper group was among the largest and most active.

In 1973, the National Conservation Advisory Council was established to "identify and offer recommendations for the solution of conservation problems" and to "serve as a forum for cooperation and planning among institutions and programs concerned with the conservation of cultural property."[64] Its Study Committee on Libraries and Archives, chaired by Banks, published an excellent summary of "national needs" in 1978,[65] a policy document expected to influence funding and program initiatives in the future.

The Society of American Archivists and the American Association for State and Local History were also increasingly active in preservation, conducting workshops and producing publications to support the work of their constituencies. In 1980, the National Endowment for the Humanities awarded a major grant to the former for the development of manuals and an extensive series of workshops. Communication between librarians and other groups was limited, but as the sheer numbers of preservation-conscious professionals in various fields increased, the opportunity for cooperative development also grew.

The need for institutional cooperation in coping with the massive problems of preservation has long been recognized, but the development of actual mechanisms has been slow and painful. One major cooperative approach, borrowed from the art conservation field, is the concept of the regional center, which can provide consultation and conservation treatment services and perform some educational and training functions for many institutions that could not afford to support such programs individually.

In 1973, the Council on Library Resources provided start-up funds for the New England Document Conservation Center, the first regional center established primarily to meet the conservation needs of libraries.[66] Governed by the New England Library Board, which continues to provide limited operating support, the nonprofit center offers a wide range of conservation services to libraries, historical societies, archives, and town record offices on a fee-for-service basis. In its early years the center was directed by George M. Cunha, former conservator of the Boston Athenaeum. At his retirement in 1977, the center was reorganized to allow for the appointment of a full-time administrator, Ann Russell, and a full-time senior conservator, Mary Todd Glaser. In 1980, the professional staff also included a book conservator, an assistant conservator with a specialty in photographs, and a records specialist who directed the preservation microfilming service. The center had experienced serious financial difficulties, and in its early years had trouble finding enough people with appropriate training to provide the full range of services; but by 1980 both staff and budget were well balanced and the center had received an NEH grant to expand its field service program.

The New England Document Conservation Center has provided a valuable test of the regional center approach, but as 1980 ended, although it was still the only full-service center devoted primarily to library materials, a significant portion of its income derived from the conservation of art on paper for museums and other nonlibrary customers. The continued scarcity of trained book conservators, together with the inability or unwillingness of libraries to allocate substantial funds for what is a very expensive process, probably accounts for this imbalance.

Another approach to the provision of conservation services on a regional basis took shape in New York. In 1979, with initial funding from the H. W. Wilson Foundation, the New York Botanical Garden Library established a Book Preservation Center to provide advisory services and training in proper care and minor repair of library materials to institutions throughout the metropolitan New York area. This center does not offer treatment services, but assists many small and medium-sized libraries to evaluate their preservation needs and improve their maintenance and repair programs.[67]

Other joint efforts have focused on programs not requiring the immediate establishment and staffing of a center. The Research Libraries Group (RLG) in its first incarnation as a consortium of Harvard, Yale, Columbia, and the New York Public Library had an active preservation committee. This committee established standards for the care of "master copies"—titles that one member agreed to preserve and make available for all other members; developed shipping containers for the safe transport of interlibrary loan volumes among members; recommended pricing policies and operated a pilot project of coordinated preservation microfilming; and prepared a number of reports and recommendations regarding the bibliographic control and joint storage of microform masters. When RLG was restructured and expanded

in 1978, preservation activities temporarily ceased; future efforts will probably focus on exploiting RLG's emerging bibliographic system to coordinate preservation decisions.

The California Library Authority for Systems and Services (CLASS) made preservation an important priority in 1977, sponsoring a colloquium on conservation followed by extensive consultations that resulted in a major planning document for the state.[68] Case Western Reserve, with support from an LSCA grant in 1977, conducted a survey of conservation needs in Ohio, producing a report that recommended establishment of a regional center to serve a six-state area. In 1979, funds from the National Historic Publications and Records Commission enabled the Western Council of State Libraries to conduct a Western States Materials Conservation Project to "form a cadre of conservation advocates," identify needs, develop an action plan, and take preliminary implementation steps. The project concluded with a feasibility colloquium, from which came a Western Conservation Congress, which is to follow through on establishing a conservation information clearinghouse as a first step toward a complete range of services.[69]

Planning studies, reports, and recommendations play an important role in advancing the thinking of a profession on particular topics and can create an environment in which desired change can be accomplished. The process, however, is often a slow and cumbersome one, the more so in relation to the number of people and institutions involved. Nowhere is this more apparent than in the attempts to develop a "national preservation program" for libraries in the United States. We have already mentioned the early ARL studies by Gordon Williams in 1964 and by Warren J. Haas in 1972, and the Library of Congress' Pilot Preservation Project in the late 1960s. In 1976 the Library of Congress made another effort, calling a "Planning Conference for a National Preservation Program." The two-day meeting, supported by CLR, brought together librarians, conservators, publishers, and representatives of funding agencies to review the existing state of affairs and respond to a set of proposals developed by Poole.[70] The conference endorsed the major elements in the proposals, and an ad hoc advisory committee was appointed to work with LC on development. Norman Shaffer, who had directed the Brittle Books Project, was appointed National Preservation Program Officer, and the advisory committee met twice, focusing its attention initially on the need for automated bibliographic control of master microforms as the foundation for a coordinated preservation filming program. However, in 1977 Poole retired, LC was passing through a series of major reorganizations, and Congress began a series of budget slashings that seriously endangered LC's ability to keep up with existing program responsibilities. It became evident that LC would have to dedicate its available preservation resources to coping with the needs of its own collections, and once again prospects for a "national program" dimmed.

From this vantage point it may be appropriate to make several observations. The seemingly sensible recommendation that a national

program be administered by a federal agency may have been a strategic error, in effect passing the buck to a government grappling with inflation and an increasing number of worthy programs seeking funding and creating the illusion for many that the responsibility no longer lay within the profession. In addition, the scope of preservation needs is so vast, the masses of materials affected so overwhelming, and the state of procedural development still so primitive that a national program would probably have been impossible even if staffing and funding problems had not intervened. A great deal more experimentation and development of program elements on a small scale will be necessary before large-scale programs can be implemented. Finally, effective coordination of large-scale programs will not be possible until a fast, accurate, comprehensive bibliographic system exists to support decision making and eliminate costly duplication of effort. We must not conclude, however, that national planning efforts have been wasted. The fundamental theories are still valid, and the very absence of a national program has stimulated local and regional efforts that will form the foundation for a national system.

In this review we have concentrated on the major events and activities that have contributed to the emergence of preservation as a vital specialty within librarianship in the United States, an emphasis that has meant ignoring significant developments in Canada and elsewhere, giving short shrift to the activities of archivists, conservators, and others in related fields, and omitting mention of many U.S. libraries and librarians who have participated in the remarkable growth of preservation activities. For the adequacy of the record these omissions are unfortunate, but for the long life of our collections it bodes well: preservation is no longer the province of the few, and as the rapid multiplying of activities exceeds our ability to recount them all, it enhances our collective capacity to preserve the materials entrusted to our care.

References

1. Pelham Barr, "Book Conservation and University Library Administration," *College & Research Libraries* 7:214, 219 (July 1946).
2. Maurice F. Tauber, ed., "Conservation of Library Materials," *Library Trends* 4:215–334 (Jan. 1956).
3. Maurice F. Tauber, "Conservation Comes of Age," *Library Trends* 4:221 (Jan. 1956).
4. Ray O. Hummel and W. J. Barrow, "Lamination and Other Methods of Preservation," *Library Trends* 4:259–68 (Jan. 1956).
5. Randolph W. Church, ed., *Deterioration of Book Stock: Causes and Remedies: Two Studies on the Permanence of Book Paper Conducted by W. J. Barrow* (Richmond: Virginia State Library, 1959).
6. Randolph W. Church, ed., *The Manufacture and Testing of Durable Book Papers, Based on the Investigations of W. J. Barrow* (Richmond: Virginia State Library, 1960).
7. *Permanent/Durable Book Paper: Summary of a Conference Held in Washington, D.C., September 16, 1960* (Richmond: Virginia State Library, 1960), p.15.
8. Ibid., p.28.
9. Association of Research Libraries, *Minutes of the Fifty-fifth Meeting of the Association of*

Research Libraries, June 18, 1960 (Washington, D.C.: Association of Research Libraries, 1960), p.1–7.
10. Tauber, "Conservation Comes of Age," p.218.
11. *Permanence/Durability of the Book,* 7v. (Richmond: W. J. Barrow Research Laboratory, 1963–74).
12. Edwin E. Williams, "Magnitude of the Paper-Deterioration Problem as Measured by a National Union Catalog Sample," *College & Research Libraries* 23:499, 543 (Nov. 1962).
13. Gordon R. Williams, *The Preservation of Deteriorating Books: An Examination of the Problem with Recommendations for a Solution* (Washington, D.C.: Association of Research Libraries, 1964). Reprinted in revised form in *Library Journal* 91:51–56, 189–94 (Jan. 1 and Jan. 15, 1966).
14. Edwin E. Williams, "Deterioration of Library Collections Today," *Library Quarterly* 40:7 (Jan. 1970).
15. *National Register of Microform Masters* (Washington, D.C.: Cataloging Distribution Service, Library of Congress, 1965–).
16. Paul E. Edlund, "The Continuing Quest: Care of LC's Collections," *Library Journal* 90:3401 (Sept. 1, 1965).
17. Douglas W. Bryant, "Notes on a Conference Held at the Library of Congress . . ." in *Minutes of the Sixty-seventh Meeting of the Association of Research Libraries, January 23, 1966* (Washington, D.C.: Association of Research Libraries, 1966), p.39.
18. William R. Hawken, *Copying Methods Manual* (Chicago: Library Technology Program, American Library Assn., 1966).
19. Verner W. Clapp, "LTP—the Rattle in an Infant's Fist," *American Libraries* 3:795–802 (July–Aug. 1972).
20. Richard D. Smith, "Paper Deacidification: A Preliminary Report," *Library Quarterly* 36:273–92 (Oct. 1966).
21. James W. Henderson and Robert G. Krupp, "The Librarian as Conservator," *Library Quarterly* 40:178–79 (Jan. 1970).
22. Sherelyn Ogden, "The Newberry Library," *Guild of Book Workers Journal* 14, no.1:11–14 (Fall 1975).
23. See, for example, Carolyn Horton, "Saving the Libraries of Florence," *Wilson Library Bulletin* 41:1034–43 (June 1967), and Sherelyn Ogden, "The Impact of the Florence Flood on Library Conservation in the United States of America: A Study of the Literature Published 1956–1976," *Restaurator* 3:1–36 (1979).
24. American Institute for Conservation of Historic and Artistic Works, "Code of Ethics and Standards of Practice." For latest approved version see current *AIC Directory* (Washington, D.C.: American Institute for Conservation, 1980).
25. Carolyn Horton, *Cleaning and Preserving Bindings and Related Materials,* 1st ed., LTP Publication 16 (Chicago: Library Technology Program, American Library Assn., 1967). A second edition, revised, was issued by the same publisher in 1969.
26. George M. Cunha and Dorothy G. Cunha, *Conservation of Library Materials: A Manual and Bibliography on the Care, Repair and Restoration of Library Materials,* 1st ed. (Metuchen, N.J.: Scarecrow, 1967). A second edition was issued by the same publisher in 1971 in two volumes.
27. Norman J. Shaffer, "Library of Congress Pilot Preservation Project," *College & Research Libraries* 30:5–11 (Jan. 1969).
28. Howard W. Winger, ed., "Deterioration and Preservation of Library Materials," *Library Quarterly* 40:2 (Jan. 1970). Note that these proceedings constituted the entire January 1970 issue, and were also published as a separate volume edited by Winger and Richard D. Smith, with the same title (Chicago: University of Chicago Pr., 1970).
29. James W. Henderson, *Memorandum on Conservation of the Collections* (New York: New York Public Library, 1970).
30. Warren J. Haas, *Preparation of Detailed Specifications for a National System for the Preservation of Library Materials* (Washington, D.C.: Association of Research Libraries, 1972), p.2.
31. George M. Cunha and Norman P. Tucker, eds., *Library and Archives Conservation: The Boston Athenaeum's 1971 Seminar on the Application of Chemical and Physical Methods*

to the Conservation of Library and Archival Materials (Boston: Library of the Boston Athenaeum, 1972).
32. Verner W. Clapp, "Story of Permanent/Durable Book Paper, 1115–1970," *Scholarly Publishing* 2:107–24, 229–45, 353–67 (Jan., Apr., July 1971).
33. Bernard C. Middleton, *The Restoration of Leather Bindings,* LTP Publication 18 (Chicago: Library Technology Program, American Library Assn., 1972).
34. Peter Waters, *Emergency Procedures for Salvaging Flood or Water-Damaged Materials* (Washington, D.C.: Library of Congress, 1972). A revised edition was issued by the same publisher in 1975, under the title *Procedures for Salvage of Water-Damaged Materials,* one of the LC Publications on Conservation of Library Materials.
35. Maurice F. Tauber, ed., *Library Binding Manual: A Handbook of Useful Procedures for the Maintenance of Library Volumes* (Boston: Library Binding Institute, 1972).
36. Carl J. Wessel, "Deterioration of Library Materials," in *Encyclopedia of Library and Information Science* (New York: Marcel Dekker, 1972) 7:69–120.
37. Haas, *Preparation of Detailed Specifications,* p.12.
38. Bernard F. Walker, "Morpholine Deacidification of Whole Books," in John C. Williams, ed., *Preservation of Paper and Textiles of Historic and Artistic Value,* Advances in Chemistry, no.164 (Washington, D.C.: American Chemical Society, 1977), p.72–87.
39. "Book and Document Preservation Process," *American Archivist* 43:98–99 (Winter 1980).
40. Richard D. Smith, "Paper Impermanence as a Consequence of pH and Storage Conditions," *Library Quarterly* 39:153–95 (April 1969); and "New Approaches to Preservation," *Library Quarterly* 40:139–71 (Jan. 1970).
41. Richard D. Smith, "Progress in Mass Deacidification at the Public Archives," *Canadian Library Journal* 36:325–32 (Dec. 1979).
42. George B. Kelly, Jr., "Mass Deacidification with Diethyl Zinc," *Library Scene* 9:6–7 (Sept. 1980).
43. John C. Williams, ed., *Preservation of Paper and Textiles of Historic and Artistic Value,* Advances in Chemistry, no.164 (Washington, D.C.: American Chemical Society, 1977).
44. Carolyn Harris, "Mass Deacidification: Science to the Rescue?" *Library Journal* 104:1423–27 (July 1979); Robert H. Patterson, "Preservation of Library Materials," in *The ALA Yearbook 1980* (Chicago: American Library Assn., 1980), p.241.
45. Edward Connery Lathem, "Some Personnel Considerations for Binding and Conservation Services," *Library Trends* 4:321–22 (Jan. 1956).
46. Ibid., p.323.
47. Hannah B. Friedman, "Preservation of Library Materials: The State of the Art," *Special Libraries* 59:612 (Oct. 1968).
48. Susan G. Swartzburg and Susan B. White, *Preservation Education Flyer,* 3d ed. (Chicago: Resources and Technical Services Division, American Library Assn., 1979).
49. *Special Libraries* 59:607–25 (Oct. 1968); *Hawaiian Library Association Journal* 29:3–17 (June 1972); *Pennsylvania Library Association Bulletin* 28:219–51 (Nov. 1973).
50. Ralph N. Sargent, *Preserving the Moving Image* (Washington, D.C.: Corporation for Public Broadcasting and National Endowment for the Arts, 1974).
51. Robert A. Weinstein and Larry Booth, *Collection, Use, and Care of Historical Photographs* (Nashville: American Association for State and Local History, 1977).
52. Jerry McWilliams, *The Preservation and Restoration of Sound Recordings* (Nashville: American Association for State and Local History, 1979).
53. Paul N. Banks, "The Preservation of Library Materials," in *Encyclopedia of Library and Information Science* (New York: Marcel Dekker, 1978) 23:180–220; Pamela W. Darling, "Our Fragile Inheritance: The Challenge of Preserving Library Materials," in *The ALA Yearbook 1978* (Chicago: American Library Assn., 1978) p.xxxi–x1ii; John P. Baker, "Conservation and Preservation of Library Materials," in *ALA World Encyclopedia of Library and Information Services* (Chicago: American Library Assn., 1980), p.160–64.
54. John P. Baker and Marguerite C. Soroka, eds., *Library Conservation: Preservation in Perspective* (Stroudsburg, Pa.: Dowden, Hutchinson & Ross, 1978).
55. Carolyn Clark Morrow, *A Conservation Policy Statement for Research Libraries* (Occasional Paper no.139 [Urbana, Ill.: University of Illinois Graduate School of Library Science, 1979]).

56. Carolyn Clark Morrow and Steven B. Schoenly, *A Conservation Bibliography for Librarians, Archivists and Administrators* (Troy, N.Y.: Whitston, 1979).
57. Susan G. Swartzburg, *Preserving Library Materials: A Manual* (Metuchen, N.J.: Scarecrow, 1980).
58. "LC Publications on Conservation of Library Materials" and "Preservation Leaflets" (Washington, D.C.: Library of Congress, 1975–); and "AASLH Technical Leaflets," issued periodically as inserts in *History News,* some dealing with preservation (Nashville: American Association for State and Local History, 1962–).
59. *Library Journal* 99:339–43, 2803–09 (Feb. 1 and Nov. 1, 1974); 101:2341–51 (Nov. 15, 1976); 102:447–49, 771–75 (Feb. 15 and April 1, 1977); 104:1012–17, 1116–19, 1311–17, 1423–31, 1623–27 (May 1 and 15, June 15, July, Sept. 1, 1979); 105:781–85 (April 1, 1980).
60. *Abbey Newsletter* (New Carrolton, Md.: Ellen McCrady, bimonthly, Aug. 1975–); *Conservation Administration News* (Laramie: University of Wyoming Libraries, quarterly, July 1979–); *Library Scene* (Boston: Library Binding Institute, quarterly, 1972–); *National Preservation Report,* formerly *Newspaper & Gazette Report* (Washington, D.C.: Library of Congress, 3/year, 1979–).
61. Two collections of documents in great demand were issued by the Systems and Procedures Exchange Center, namely, *Preservation of Library Materials,* SPEC Kit 35 (Washington, D.C.: Office of Management Studies, Association of Research Libraries, 1977), and *Planning for Preservation,* SPEC Kit 66, issued by the same organization in 1980.
62. Tauber, "Conservation Comes of Age," p.221.
63. Jo Ann Brock, *A Program for the Conservation and Preservation of Library Materials in the General Library* (Berkeley: University of California at Berkeley Library, 1975).
64. National Conservation Advisory Council, *Conservation of Cultural Property in the United States* (Washington, D.C.: National Conservation Advisory Council, 1976), p.33.
65. Study Committee on Libraries and Archives, *National Needs in Libraries and Archives Conservation* (Washington, D.C.: National Conservation Advisory Council, 1978).
66. Walter T. Brahm, "Regional Approach to Conservation: The New England Document Conservation Center," *American Archivist* 40:421–27 (Oct. 1977).
67. Judith Reed, "A Nucleus of Guidance, a Center for Preservation," *Library Scene* 9:12–13 (Sept. 1980).
68. J. Michael Bruer, *Toward a California Document Conservation Program* (San Jose: California Library Authority for Systems and Services, 1978).
69. Howard P. Lowell, "Conservation Planning in the West," *Library Scene* 9:28–29 (Sept. 1980).
70. Frazer G. Poole, "A National Preservation Program: A Working Paper" (Washington, D.C.: Library of Congress, 1976).

Patterns in the Use of OCLC by Academic Library Cataloging Departments

Barbara Moore

A survey of the cataloging departments of 166 OCLC-member academic libraries showed that libraries did not rely exclusively on OCLC for card production and that a large majority did not accept non–Library of Congress OCLC records without substantial checking. The survey indicated also that libraries that used or planned to use their OCLC-MARC tapes generally were more concerned with the completeness and accuracy of their OCLC-MARC tape records than libraries that did not plan to use their tapes.

IN 1971 WHEN OCLC (formerly Ohio College Library Center) first went public with its on-line shared cataloging system, its bibliographic data base was used only as a source of cataloging information. This cataloging information was designed to be easily adapted by member libraries to conform to local cataloging practices for printed catalog cards. Today, OCLC has expanded the use of its data base through the interlibrary loan and serials control subsystems. While these subsystems are widely used, the shared cataloging subsystem is still the most heavily used.

Needless to say, use of OCLC has changed the way OCLC-member libraries are cataloging. The shared cataloging subsystem, providing cards tailored to individual libraries, has become a major printed card supplier for member libraries. It has reduced the amount of original cataloging required by member libraries since they have access to a large data base composed of bibliographic records from member libraries and the Library of Congress (LC).

However, it is difficult to determine how OCLC is used by member libraries. There have been surveys of the use of OCLC by more than one library,[1] but none have studied in detail the following three questions: 1) Do member libraries use card production systems other than OCLC and if so, what types of materials are cataloged on these systems? 2) Are records used as found in the OCLC data base or do libraries substantially check these records and make extensive changes? 3) Are libraries using or planning to use their OCLC-MARC tapes*

*Magnetic tapes that contain a record of each library's use of bibliographic records in the shared cataloging subsystem in the form of machine-readable records.

Barbara Moore is a systems librarian at the University of Wisconsin–Whitewater. Manuscript received July 1980; accepted for publication September 1980.

and if so, does this factor affect their use of other card production systems or their policies for completing and editing the OCLC records? To study these questions cataloging departments in selected OCLC-member academic libraries were surveyed.

METHOD

Because of the wide variety of cataloging procedures found among various types of libraries, only academic libraries were included in the study. Academic libraries listed in the January 1979 edition of *OCLC Participating Libraries Arranged by Network and Institution* were numbered and selected for the survey, using a random number table.[2] During the summer of 1979, questionnaires were sent to 200 libraries nationwide. One hundred sixty-six, or 83 percent, returned completed questionnaires.

The survey data were analyzed with a computer using the Statistical Package for the Social Sciences. Not all respondents answered every question and some responses were judged invalid; therefore, percentages reported in the findings are based on the number of valid responses for each question.

The cataloging profile of the responding libraries can be visualized from tables 1–4. Most libraries had been on-line with OCLC from one to less than five years. More than 80 percent of the libraries cataloged less than 15,000 titles on OCLC per year. Many libraries reported a small backlog of materials awaiting cataloging. The majority of the libraries used only one OCLC terminal for cataloging. The average numbers of full-time equivalent (FTE) cataloging staff positions were 2.3 professionals, 3.5 nonprofessionals, and 1.5 student assistants.

USE OF CARD PRODUCTION SYSTEMS IN ADDITION TO OCLC

All but 2 of the 166 respondents stated that they used OCLC to produce catalog cards. Seventy-three, or 44.8 percent, of 163 respondents stated that in addition to OCLC another card production system was used. Thirty-seven respondents indicated the most common non-OCLC card production system was a photocopier. Typing complete card sets was listed by 17 respondents while buying LC-printed cards and other commercially printed cards was listed by 15 respondents

TABLE 1

LENGTH OF TIME
LIBRARIES HAVE BEEN ON-LINE WITH OCLC

	Number of Libraries	Percentage of Libraries
Less than 1 year	7	4.2
1 to less than 3 years	70	42.4
3 to less than 5 years	69	41.8
5 to less than 7 years	11	6.7
7 years or more	8	4.8
Total	165	99.9

TABLE 2

TITLES CATALOGED PER YEAR VIA OCLC

Number of Titles	Number of Libraries	Percentage of Libraries
Less than 5,000	69	41.6
5,000–9,999	39	23.5
10,000–14,999	31	18.7
15,000–19,999	9	5.4
20,000–24,999	5	3.0
25,000–29,999	6	3.6
30,000–39,999	4	2.4
40,000–49,999	0	0.0
50,000–59,999	1	0.6
60,000 and over	2	1.2
Total	166	100.0

TABLE 3

BACKLOGGED TITLES AWAITING CATALOGING

Number of Titles	Number of Libraries	Percentage of Libraries
Less than 1,000	125	76.7
1,000–4,999	22	13.5
5,000–9,999	5	3.1
10,000–14,999	2	1.2
15,000–19,999	2	1.2
20,000–24,999	3	1.8
25,000–29,999	1	0.6
30,000–39,999	0	0.0
40,000–49,999	0	0.0
50,000–59,999	2	1.2
60,000 and over	1	0.6
Total	163	99.9

each. In-house presses, stencils, cards accompanying preprocessed materials, or on-line systems were each listed by 5 respondents or less. Twenty-four of the 72 respondents listed more than one non-OCLC card production system.

Of the seventy-three libraries using other card production systems, seventy-one indicated the types of materials for which cards were produced on these systems (see table 5). It should be noted that material in the nonroman alphabet, listed by seventeen respondents, is not included in the OCLC data base because of the special character set required. All other types listed are found there.

The survey did not ask why OCLC was not used to catalog materials for which bibliographic records may have existed in the data base. It is possible that these materials were given a short form of cataloging, making it less expensive for a library to produce cards locally rather than to edit existing OCLC records. Also, for materials that do not exactly match bibliographic records in the OCLC data

TABLE 4

OCLC TERMINALS USED FOR CATALOGING

Number of Terminals	Number of Libraries	Percentage of Libraries
One	104	63.8
Two	36	22.1
Three	8	4.9
Four	9	5.5
Five	1	0.6
Six	3	1.8
Sixteen	1	0.6
Seventeen	1	0.6
Total	163	99.9

TABLE 5

CARD PRODUCTION WITH SYSTEMS OTHER THAN OCLC*

Type of Material	Number of Responses*	Percentage of Libraries*
Audiovisual material	22	31.0
Nonroman alphabet texts	17	23.9
Local ephemera (includes student theses and papers)	15	21.1
Preprocessed materials with catalog cards	8	11.3
Materials for which no bibliographic record was found in OCLC	8	11.3
Microforms	8	11.3
Sound recordings	8	11.3
Serials	7	9.9
Government documents	4	5.6
Monographs	4	5.6
Gifts	3	4.2
Juvenilia	3	4.2
Materials being reclassified	3	4.2
Special collections	3	4.2
Maps	2	2.8
Music scores	2	2.8
Miscellaneous materials receiving only one response each	10	14.1

*Number of responses, including multiple replies = 127; number of libraries responding = 71.

base, catalogers may not wish to invest the time required for the more accurate and detailed cataloging and tagging necessary to input original cataloging. This situation may be especially true when catalogers are not familiar with the cataloging rules or OCLC tags required for special types of materials, i.e., audiovisual, music scores, etc.

Libraries using other card production systems were asked to estimate the number of titles per year for which cards were produced on these systems. The responses from sixty-seven libraries ranged from 10 to 31,200 titles, with a median of 450 titles.

Acceptance of Non–Library of Congress Records

One of the major criticisms of the OCLC data base is the lack of quality control.[3] Many complaints have been voiced concerning the substandard cataloging of some records input by OCLC-member or non-LC libraries. Because of these substandard records, many libraries do not use the records as found in the data base. In most cases, they substantially check and edit the records and do not merely add local holdings information. This nonacceptance of non-LC cataloging is contrary to the philosophy of shared cataloging. A section of the survey was designed to determine to what extent libraries substantially checked non-LC records. For purposes of the survey, "substantially checked" was defined as checking OCLC records for more than typographical and tagging errors and completing the fixed field. Also, an attempt was made to determine the types of records for which cataloging staff substantially checked non-LC records and the circumstances that occasioned it.

A large percentage, 137 of 159 respondents (86.2 percent), stated that some kinds of non-LC records were always substantially checked. Only 22, or 13.8 percent, of the 159 respondents replied that their libraries never substantially checked non-LC records. Of the libraries responding that they substantially checked some non-LC records, 109 listed the circumstances or types of records determining the records to be checked. As table 6 shows, many of the respondents stated that *all* non-LC records were substantially checked.

Another question was designed to categorize the conditions that resulted in the acceptance of non-LC records without substantial checking. Thirty-three, or 20.6 percent, of 160 respondents stated that their

TABLE 6

Conditions Determining Detailed Checking of Non-LC Records*

Type of Records/Circumstances	Number of Responses*	Percentage of Libraries*
All records	75	68.8
Records from certain cataloging libraries	21	19.3
Audiovisual materials	11	10.1
Incomplete records or records with obvious errors	8	7.3
Literature call numbers	5	4.6
Serials	4	3.7
Items needing series decisions	4	3.7
Government publications	3	2.8
Music	3	2.8
Monographs	2	1.8
Sound recordings	2	1.8
Cataloging ability of the terminal operator	2	1.8
Miscellaneous materials receiving only one response each	7	6.4

*Number of responses including multiple replies = 147; number of libraries responding = 109.

libraries produced some non-LC records with only a minimal amount of checking. Almost four times that number, 127, or 79.4 percent, of the respondents stated that under no circumstances and for no type of material were non-LC records produced without substantial checking. The conditions that determined the non-LC records to be produced with only minimal checking are listed in table 7.

TABLE 7

CONDITIONS DETERMINING THE ACCEPTANCE OF NON-LC RECORDS WITH MINIMAL CHECKING*

Type of Records/Circumstances	Number of Responses*	Percentage of Libraries*
Monographs	8	30.8
Cataloging ability of the terminal operator	6	23.1
Records from a "reliable" library	5	19.2
All records	4	15.4
Complete I level records with LC call numbers and subject headings	4	15.4
All records that are not incomplete or of poor quality	2	7.7
Records with LC card numbers or LC call numbers	1	3.8
All records except serials and sound recordings	1	3.8

*Number of responses including multiple replies = 31; number of libraries responding = 26.

It is evident from the answers to these two questions that most libraries are not willing to accept OCLC-member library cataloging, regardless of the type of material or special circumstances, without first checking for more than typographical and tagging errors.

The respondents who answered that their libraries substantially checked non-LC records were asked to indicate the frequency with which specific data categories were checked. Most frequently checked are the descriptive cataloging (i.e., bibliographic description) and the series tracings, followed by call numbers (comparison with shelflist) and subject headings. Comparing the call numbers with the classification schedules and verifying OCLC tags follow in order of frequency, with verification of name entries being the data element least frequently checked.

Several chi-square tests were run to see what, if any, factors accounted for the substantial checking of non-LC records. For example, do libraries with a large backlog of materials awaiting cataloging do less checking of non-LC records, thus speeding the cataloging process? Does either the length of time a library has been on-line with OCLC or the number of professionals on the staff relate to the amount of checking of non-LC records? The results of the chi-square tests indicated no significant differences. The survey did not otherwise attempt to determine why some libraries do more checking of non-LC records than others.

Table 8 displays the percentage of non-LC and LC records, excluding Cataloging-in-Publication (CIP) copy, which libraries changed before producing. Libraries were told not to count changes to the 049 (local holdings), 590 (local note), and 910 (user option data) fields or to the 082 and 092 (Dewey call number) fields, which require cuttering. A higher percentage of non-LC records than LC records was reported changed. However, forty-five of the respondents did report changing 10 percent or more of the LC records they used. It is not known if these changes to both non-LC and LC records were made

TABLE 8

LC AND NON-LC RECORDS CHANGED BEFORE PRODUCING

Percentage of Records	Non-LC Records		LC Records	
	Number of Libraries	Percentage of Libraries	Number of Libraries	Percentage of Libraries
0	2	1.3	14	8.9
1–9	28	17.7	99	62.7
10–24	38	24.1	32	20.3
25–49	30	19.0	7	4.4
50–74	35	22.2	1	0.6
75–99	22	13.9	5	3.2
100	3	1.9	0	0.0
Total	158	100.1	158	100.1

because of errors or disagreement with the cataloging copy or to conform to local cataloging policies. When asked which OCLC fields most frequently were changed, deleted, or augmented, most libraries listed the series fields (400s and 800s OCLC tags). Table 9 gives the complete ranking of fields.

USE OF OCLC-MARC TAPES

A majority of the libraries surveyed were using or planning to use their OCLC-MARC tapes. These tapes may be used for a variety of purposes, such as building local data bases for COM catalogs or online circulation and catalog systems. Of 160 respondents, thirteen, or 8.1 percent, said that their libraries used the OCLC-MARC tapes. Eighty-five, or 53.1 percent, stated that their libraries planned to use the tapes, and sixty-two, or 38.7 percent, of the respondents marked the "do not use" category.

Libraries were asked if they completed the fixed field, which is often incomplete on non-LC records, and if they reflected their holdings (i.e., volumes and copies) in detail in the 049 field. It may be reasoned that these two fields would be more valuable to libraries that used or planned to use their OCLC-MARC tapes, since neither field (except for the location and note information in the 049 field) is printed on OCLC catalog cards. One reason for completing the fixed field is to use it as a means of indexing records. Through the elements in the fixed field, the bibliographic records can be indexed by such items as

TABLE 9

OCLC FIELDS AUGMENTED, DELETED, OR CHANGED*

Fields	Number of Responses*	Percentage of Libraries*
400s (series)	67	65.0
800s (series)	44	42.7
600s (subject headings)	40	38.8
590 (local information)	28	27.2
Call number	26	25.2
245 (title)	15	14.6
500s (general notes)	15	14.6
700s (added entries)	13	12.6
300 (collation)	12	11.7
100s (names)	8	7.8
910 (local note)	7	6.8
260 (imprint)	5	4.9
504 (bibliography note)	4	3.9
505 (content note)	4	3.9
240 (uniform title)	2	1.9
Miscellaneous fields receiving only one response each	7	7.0

*Number of responses including multiple replies = 297; number of libraries responding = 103.

language, type of material, and publication date. However, some librarians may believe that completing the fixed field is not necessary for any library automated system. Also, libraries may be planning to upgrade their OCLC-MARC tape records with more complete records (including complete fixed fields) from another file. The value of completing the 049 field for holding information (except for location designators) is also questionable. The 049 field is a difficult field to complete. Since a library's individual holdings do not appear on-line, it can be time consuming to update OCLC records for added copies. The fact that some on-line circulation vendors do not use the 049 field requires libraries to add holdings manually to each circulation record.

The responses to the two questions regarding completion of the fixed field and the use of the 049 field were compiled in two categories: (A) for respondents who said that their library used or planned to use their OCLC-MARC tapes, and (B) for respondents who did not use or did not plan to use the tapes. The results of both of these compilations were compared to determine if libraries that used or planned to use their tapes were more apt to complete these two fields.

Slightly more than half, or 54.2 percent, of the ninety-six responding libraries in category A stated that they completed the fixed field. In contrast, only 44.1 percent of the fifty-nine nonusers completed this item.

To the question about the method of reflecting holdings in the 049 field, ninety-seven responses were received from libraries in category A, of which 27.8 percent reflected holdings in detail, 51.5 percent in

limited detail, and 20.6 percent did not reflect any holdings. The fifty-six responses of the nonusers indicated that 17.9 percent reflected holdings in detail, 42.9 percent in limited detail, and 39.3 percent did not reflect any holdings.

Correcting OCLC-MARC Tape Records

Errors on cards produced by OCLC will appear on a library's OCLC-MARC tape. A library can correct an error on its tape by updating the record at the OCLC terminal with the option of reproducing another set of catalog cards from the updated record. Survey respondents were asked the percentage of time OCLC records were corrected when errors were found on the cards produced by OCLC. To determine if libraries using or planning to use tapes were more concerned about correcting errors than the other group, the replies were compiled in two categories.

Libraries in category A were more likely than nonusers to correct errors on the tape when following two procedures: (1) manually correcting the cards and updating the OCLC record at the terminal (median percent for category A = 30.3; for category B = 1.5), and (2) reproducing cards on OCLC (median percent for category A = 39.6; for category B = 0.5). Nonusers manually corrected errors on the OCLC cards but did not update the OCLC record at the terminal a median of 25.5 percent of the time, compared to 0.3 percent for category A libraries. Very few libraries failed to correct both cards and tape (with median percents of one-tenth or less for each category), and very few libraries corrected the errors by reproducing cards on other card production systems (median percent of less than one-tenth for each).

Correcting errors does help to ensure cleaner records for any machine-readable data base. Libraries not correcting errors now may, however, plan to do so later, perhaps when the tapes are edited after matching records to an authority file. Or some librarians may be of the opinion that only certain errors, such as errors in searchable fields, are worth correcting.

It is safe to state that for most member libraries OCLC is the only source of machine-readable records. Therefore, it might be assumed that libraries using or planning to use their OCLC-MARC tapes would catalog all nonroman alphabet materials on OCLC. However, in this category, there was still a significant number (forty-three of ninety-six) using other card production systems. For forty-one of these forty-three libraries, the median number of titles for which cards were produced per year on non-OCLC systems was 301, a decrease from the median of 450 titles reported above for all libraries. With the exception of monographs and gifts, these libraries listed the same types of materials for which cards were produced on non-OCLC systems as were listed by all libraries.

Conclusion

While the results of this survey do not provide a complete overview

of academic library use of the OCLC shared cataloging subsystem, some general trends are apparent. OCLC has not completely replaced other systems of card production. Even libraries that use or plan to use their OCLC-MARC tapes are cataloging selected materials on non-OCLC card production systems. Further, libraries are not accepting the concept of shared cataloging in the sense of using records as they appear in the data base. Rather, they are substantially checking non-LC records and making changes in both LC and non-LC records. Also, libraries that use or plan to use their tapes are more apt to have more complete and accurate records on their tapes than libraries not using the OCLC-MARC tapes.

The survey generated a number of questions for further study: Why do libraries use non-OCLC card production systems for materials that can be cataloged on OCLC? Why do libraries substantially check and make changes in non-LC records before producing? Is the cause too many errors on the non-LC records or is it that cataloging policies, including disagreements on how an item should be cataloged, differ among libraries? If the OCLC data base reflected a higher quality of cataloging as a result of higher standards at the cataloging library, better quality control at OCLC, or the ability of OCLC-member libraries to upgrade records in the data base, would libraries then accept non-LC records as they appear in the data base or would libraries still check and change the records to conform to local policies? Do libraries engage in less substantial checking than actually reported, wishing to appear to do the highest possible level of cataloging? Do libraries that substantially check non-LC records have "cleaner" catalog cards and machine-readable records on their OCLC-MARC tapes than libraries that do not check? At what point and to what extent should libraries have complete and accurate records on their OCLC-MARC tapes?

Finally, it is reasonable to state that an ideal goal for OCLC-member libraries is to catalog all material on OCLC and to use the OCLC record as found in the data base with the only addition being local holding information. Further study of the above questions would help to identify possible policy changes for both OCLC and OCLC-member libraries in order to realize this goal.

References

1. Some of the surveys concerning the use of OCLC by more than one library are: Sally Braden, John D. Hall, and Helen H. Britton, "Utilization of Personnel and Bibliographic Resources for Cataloging by OCLC Participating Libraries," *Library Resources & Technical Services* 24:135–54 (Spring 1980); Joe A. Hewitt, "The Impact of OCLC," *American Libraries* 7:368–75 (May 1976); Barbara Evans Markuson, "The Ohio College Library Center: A Study of the Factors Affecting the Adaptation of Libraries to On-Line Networks," *Library Technology Reports* 12 (Jan. 1976); and Joseph R. Matthews, "The Four Online Bibliographic Utilities: A Comparison," *Library Technology Reports* 15 (Nov./Dec. 1979).
2. OCLC, Inc., *OCLC Participating Libraries Arranged by Network and Institution, 1979 January 31* (Columbus, Ohio: OCLC, Inc., 1979).
3. Matthews, "The Four Online Bibliographic Utilities," p.743.

Quality Control and the OCLC Data Base: A Report on Error Reporting

Judith J. Johnson and Clair S. Josel

This study is designed to provide librarians with a practical guide for reaching an informed policy decision on the question of submitting error reports to OCLC for the purpose of data base quality control. It addresses three questions: (1) What types of errors, changes, or additions should be reported? (2) Once reported, will errors be corrected promptly? (3) What is the cost of error reporting? It also reports on ENHANCE, a new approach to quality control under development by OCLC.

THIS STUDY WAS INITIATED to provide a practical guide for libraries to use in reaching an informed policy decision on the question of submitting error reports to OCLC for the purpose of data base quality control. The overriding questions addressed were: (1) What types of errors should be reported? (2) Would the reports be acted upon promptly? (3) What is the cost of error reporting? The last two questions apply also to the problem of duplicate records, a special type of error report also considered for the purposes of this study.

To provide answers to these questions the literature was searched for relevant information. Only one article was retrieved.[1] It does deal with the types of errors found in the OCLC data base, but it does not touch upon the issues raised above related to the error reporting process. Further, the article is limited to consideration of member library records in the book format only, a scope too narrow to provide a basis for decision making in the realm of error reporting. With the intention of providing such a basis, the Memphis State University Catalog Department embarked upon a study of the error reporting system.

A two-month period, May and June 1979, was selected as the test period. During that time it was decided that, minimally, the department would follow SOLINET guidelines for error and duplicate-

Judith J. Johnson is associate professor and department head and Clair S. Josel is assistant professor and cataloger in the Catalog Department, Memphis State University Libraries. An earlier draft of this paper was referred to Richard Greene, manager, Bibliographic Maintenance Section, User Services Division of OCLC, whose helpful suggestions have been incorporated into the present text. Manuscript submitted January 1980; accepted for publication March 1980.

record reporting. Briefly, in regard to duplicate records, SOLINET prescribes that a new record be created if there are differences in the title (245 field), edition (250 field), publisher (260 field), or collation (300 field), or if there is a note (500 field) that indicates a difference in physical form or a difference in edition not noted in any other field.[2]

In March 1980, SOLINET Memorandum 1980-12 superseded the one in effect at the time of our study; however, the basic application is the same. In addition, a new record may be created if the copyright date, series, illustrator, or translator is different, or if there is a different impression date accompanied by textual variations. Currently, in contrast to the period of our study, libraries report duplicate records only for serials, music scores, sound recordings, and serials records cataloged both on books and serials work forms. Duplicate records for books, AV media, manuscripts, and maps are no longer reported. OCLC will eventually rid the data base of all duplication, but funds and staff time are limited. Therefore, OCLC urges all member libraries to carefully search for an existing record before creating a new one.[3] For the present study, these criteria were applied to all records regardless of format or source of input.

According to SOLINET Memorandum 1976-1, errors of cataloging judgment in OCLC records should be reported only if supported by verification.

> Errors of judgement in participating library records should not be reported if the "errors" fall within the realm of legitimate variation between libraries. However such errors should be reported if the report can be accompanied by LC cataloging copy.[4]

For the purposes of this study, catalogers were free to fill out error reports for records in which errors, additions, or changes involved retrieval, as requested by SOLINET, or other areas, provided that the reports were objective rather than judgmental. In other words, any error for which supporting evidence could be found could be reported. Examples of authority that may accompany an error report include a copy of the title page or verso, copy of an LC card, or proof slip. Therefore, for our purposes, the term *error* may refer to a rule interpretation if supporting authority is available or to an objectively determinable mistake.

In late 1979 OCLC published *On-line Systems Cataloging: User Manual* in which section 7, "Quality Assurance," expands and clarifies earlier guidelines for reporting errors. As stipulated by this manual, error reports are now referred to as change requests, and they may be returned to the reporting library for clarification or forwarded to the inputting library for verification. Final disposition of change requests is at OCLC's discretion.[5]

THE DATA

Copies of all error reports filed were retained by the department. In September of 1979, fully two months after the last reports were

filed, the records reported were called up to verify whether or not any changes had been effected. Due to the exceedingly low percentage of corrections found at this date, the process was repeated in November. The following tables summarize the findings.

Table 1 gives an overview of the follow-up on error reports filed with OCLC in May and June of 1979. One error report is equal to one bibliographic record and includes all errors found in that record. Excluding duplicate records, only 16 percent of the errors reported had been corrected within a two- to three-month period, ending September 28, 1979. At that time OCLC had a three-month backlog of error reports which they were slowly beginning to eliminate, as evidenced by the additional sixty-three reports processed by November 9, 1979.[6] Also, error reports are filed through the library's network; in this case the Southeastern Library Network (SOLINET). SOLINET then batches the reports and forwards them to OCLC; this procedure too may account for some of the delay in processing reports.

TABLE 1

ERROR REPORT RESULTS

Number of titles cataloged, May and June 1979	3,428
Error reports filed May and June 1979	
For member library records	136
For MARC records	39
Total	175
Corrections made by OCLC	
As of Sept. 28, 1979	28*
As of Nov. 9, 1979	92†

*In correcting one record, OCLC control number 3928206, an ISBN was incorrectly input. This record is here counted as a correction because it was processed by OCLC.

†Also counted as a correction is OCLC control number 989402, for which a second indicator of 0 rather than 4 was incorrectly added to the 245 field.

During the two-month test period the percentage of error found in member library records was more than triple the percentage of error found in MARC records. The percentage of error is even more revealing, however, when considered from another perspective. Of the 993 member library records used for cataloging during the test period, 136, or 13.7 percent, were found to contain errors. Of the 2,435 MARC records used for cataloging, only 39, or 1.6 percent, contained errors.

Table 2 summarizes errors that would affect retrieval of the records involved from the data base. The majority of these errors were the omission of ISBN or Library of Congress card numbers. Unfortunately, these two types of numbers provide the most specific search keys for retrieving a record. The next most prevalent form of error was concentrated in the title and uniform title fields, which are the next most specific fields for searching.

Errors, changes, or additions that do not affect retrieval, illustrated in table 3, vary in nature among the different formats. For the book

TABLE 2

ERRORS FOUND IN INDEXING FIELDS BY FORMAT AND SOURCE OF INPUT*

	Member Library Records Format				MARC Records Format
Fields	Monograph	Score	Sound Recording	AV	Monograph†
010 (LCCN)	22		2		
020 (ISBN)	31				19
100, etc. (Main entry)	1	1			
240 (Uniform title)		17			
245 (Title)	6	10	1		1
440 (Series)		1			
700, etc. (Added entries)	1				

*All indexing errors were counted in this table, even if there were more than one per report.

†MARC records in the other formats did not appear in the sample.

TABLE 3

REPORTS OF ERRORS THAT DO NOT AFFECT RETRIEVAL

For member library records	
Monographs	6
Scores	35
Sound recordings	2
Audiovisual material	0
For MARC records	
Monographs	38

format the majority of errors or changes reported were obsolete subject headings. For the scores and sound recordings formats there was a significant number of LC updates, that is, LC copy was found to exist for records that had been input as original cataloging by member libraries. Moreover, the LC copy would have been available to member libraries at the time the record was entered into the data base. In all formats there were also many member library records which lacked class numbers and/or subject headings. While LC updates, subject heading updates, and lack of class number and/or subject headings may technically be considered changes rather than errors by OCLC, these changes greatly increase the usefulness of such cataloging records. They must also be reported in exactly the same manner as errors in order to be changed by OCLC. The only effective difference between errors and changes is that errors are counted against the library that input the record when the library's individual error rate is computed. Changes are not counted against a library nor are they reflected in network- or system-wide rates.

Table 4 graphically indicates that serious problems exist with member library records, particularly in specialized formats. For example, a thorough and scholarly job of cataloging scores requires an array of

highly specialized reference tools, such as thematic catalogs, and specialized catalogers able to use such tools. The majority of errors found in the score format were due to lack of appropriate tools and/or specialized expertise. Specifically, most errors found in the score format involved technical errors such as incorrect or missing uniform titles rather than omitted LC card numbers or ISBNs. The percentage of errors for sound recordings is deceptively low in that recordings cataloged without composer/title analytics are technically changes, not errors. For any music library serving a large department or school of music, cataloging copy without such analytics is unusable as is and requires a considerable amount of further research. OCLC will add composer/title analytics to records lacking them. The analytics may be submitted on an error report form without the proof required for errors.[7]

TABLE 4

ERROR RATE BY FORMAT AND SOURCE OF INPUT

	Number of Titles	Number of Error Reports	Percent
Member library records			
For monographs	647	67	10.4
For scores	253	64	25.3
For sound recordings	92	4	4.3
For AV materials	1	1	—*
MARC records			
For monographs	2,435	41	1.7

*Sample too small.

The situation regarding duplicate record reports is far more serious, statistically, than other types of error reports. In the sample, 2 records were found for 84 titles, 3 records for 8 titles, 4 records for 1 title, and 5 records for 1 title, making a total of 201 records for 94 titles. As of November 9, 1979, one had been deleted by OCLC and one had been tagged "Do not use for cataloging." A duplicate record, which is reported on a scratch card citing the OCLC control number and inputting library symbol, is the least costly form of error report from the point of view of the member library. From OCLC's perspective, however, it is the most costly, a fact that may explain why less than 1 percent had been acted upon four months after the test period.

OCLC is presently acting upon very few duplicate record reports because of programming problems.

> OCLC recently initiated a project whereby the system will identify and consolidate several thousand sets of duplicate records. Within the project definition is the provision to permit master mode authorized persons to transfer holdings from one record to another. We presently can transfer holdings only by using each institution's authorization number, thus losing all editing from the tape subscription. The programming will not be implemented for several months.[8]

One possible explanation for the existence of so many duplicate records in the data base may be the fact that when a record in the data base needs extensive editing, all changes to the master record are lost once the library has added its holding symbol to that record. When the same library receives another copy or volume to be added to this same record, it must then repeat the entire editing process in addition to adding the new copy or volume. This situation may be encouraging libraries to enter a duplicate record deliberately rather than to edit and reedit the same existing record each time a new copy or volume is added to that record. While this procedure may seem to some a solution to their immediate problem, the wholesale addition of duplicate records to the data base has created acute difficulties for searchers, catalogers, and interlibrary loan personnel.

Cost of Making Error Reports

Our experience raises the question of whether or not member libraries can afford the expense of making error reports. The cost to Memphis State University Libraries for processing the 175 error reports during this two-month period was estimated at $184.07 for labor only. Additional costs, including photocopying at $7.90, increase this figure slightly as does the cost of mailing and handling, not covered by the cataloging budget and difficult to ascertain. In reviewing the error reports in the preparation of these data, it became apparent that each report should have been proofread before being sent to OCLC. This procedure would further increase the cost of each report.

These figures would be relevant only for libraries that actually report errors to OCLC. We assume that many libraries verify and correct member copy for their own catalogs regardless of whether or not they submit error reports to OCLC; therefore, the time used in making these cost estimates includes only the actual time spent in writing instructions to the clerk who types the reports. It omits the verification time spent by the paraprofessional or professional cataloger. Whereas it is generally accepted that making such reports is the only means of improving the data base, it is both time consuming and costly to the reporting library.

During the fiscal year 1979/80 OCLC received 60,007 error reports, or change requests, as they are now called. In the same time period OCLC made 106,471 changes to records in the data base in response to change requests and as a result of its own internal quality control programs. OCLC also deleted 15,761 duplicate records from the data base last fiscal year.[9]

Although users of the OCLC system (i.e., member libraries) must bear the responsibility for reporting errors, OCLC could relieve this burden in three ways. If OCLC acquired the *National Union Catalog* (*NUC*), member libraries could cite a reference in *NUC* as their authority for the correction in question and would need to provide photocopies only for other authorities. The labor involved in making these photocopies is one of the most expensive, yet expendable, components of the error reporting process. The expense to reporting li-

braries is compounded if several libraries file error reports for the same record. While OCLC's purchase of the *NUC* would not reduce the initial expense of verifying corrections, because OCLC personnel would have to verify citations provided by member libraries, this procedure would equalize the cost by spreading it among all member libraries rather than by placing the burden upon the reporting library. OCLC might also offer cost benefits to member libraries for error reporting. This incentive, at least, would be a rationale for a library's spending time and money making reports that improve the quality of the data base. Finally, the procedure for reporting errors at the present time is highly labor intensive. Ideally, member libraries should be able to correct, or at the very least, report errors on-line.

ENHANCE

ENHANCE, an OCLC program currently under development, will provide some on-line error correction capability for member libraries.[10] Although ENHANCE is still in the planning stages, it perhaps will relieve many of the problems presently encountered. There will be several facets of the program allowing on-line additions, changes, and corrections. Level I corrections will be made only by the Library of Congress, the National Library of Medicine, and other national libraries and their designees. Level II will allow a restricted group of libraries to correct any errors found in member-input records only. Level III will allow any member library to expand a record. The ENHANCE Master Mode will be restricted to OCLC use and will be concerned with deleting records from the data base and making type code changes, as well as making any of the above-mentioned changes.

Conclusions and Implications

The findings of this report cannot be taken as representative of the OCLC data base as a whole. For such a small sample to be statistically sound it must be based on random selection of data, a procedure not feasible for this study due to limitations of time and resources. The results of our study do indicate, however, a significant error rate for our sample. These errors have prevented our department from making the most efficient use of the data base. Furthermore, we found the task of reporting errors, as presently prescribed, to be a time-consuming and expensive manual operation which may easily discourage members from filing error reports. The slowness with which OCLC takes action on reported errors is also a deterrent; according to OCLC this situation is in the process of being remedied. The ENHANCE program, which will allow corrections to be made on-line, is a step toward the solution of these problems. A further step might be the creation of an error reporting unit within each network, operating at ENHANCE Level II, to handle error reports for that network, thus leaving OCLC free to deal with the problem of duplicate records. The ultimate goal might be on-line error reporting to network units.

At Memphis State University the Catalog Department is in the pro-

cess of devising a procedure whereby paraprofessional catalogers can participate in the cataloging of items with member-input copy. The criteria and guidelines for this are irrelevant to this study, but the fact that member-input cataloging contains so very many errors and is often of poor quality is highly pertinent. For the OCLC system to be utilized with the utmost efficiency, paraprofessionals must be able to process the simpler items by using member-input copy. Improving the quality of this cataloging is the only way that member libraries will be able to take full advantage of OCLC services and at the same time maintain high standards for their own cataloging. For this reason Memphis State University's Catalog Department has decided to continue filing error reports despite the burdensome cost. We recognize the fact that member libraries, not OCLC, have entered the substandard records that exist in the data base and only member libraries working cooperatively can raise the level of quality of existing records by reporting errors as they are encountered in the course of cataloging. OCLC shares this responsibility insofar as only OCLC can change the manner in which errors are reported and corrected. It is hoped that OCLC will give high priority to the development of a cost-efficient, equitable error reporting system that will offer libraries some incentive to take an active role in data base quality control.

References

1. Cynthia C. Ryans, "A Study of Errors Found in Non-MARC Cataloging in a Machine-Assisted System," *Journal of Library Automation* 11:125–32 (June 1978).
2. "SOLINET Memorandum 1977-2" (Atlanta: Southeastern Library Network, 1977), p.3–5.
3. "SOLINET Memorandum 1980-12" (Atlanta: Southeastern Library Network, 1980), p.2–3.
4. "SOLINET Memorandum 1976-1" (Atlanta: Southeastern Library Network, 1975), p.7.
5. *On-line Systems Cataloging: User Manual* (Columbus, Ohio: OCLC, Inc., 1979), p.7–11.
6. Richard O. Greene to Judith J. Johnson, Dec. 12, 1979.
7. Ibid.
8. Ibid.
9. Richard O. Greene to Judith J. Johnson, Sept. 25, 1980.
10. Greene to Johnson, Dec. 12, 1979.

Quality Issues in Retrospective Conversion Projects

Linda F. Crismond

Late in December 1979 a questionnaire was sent to 446 members of OCLC, Inc., to ascertain their views on the development of a special minimal standard to be used only for retrospective conversion projects. It was found that 74.5 percent would oppose the creation of a new lower standard. Despite the possibility of extra requirements to upgrade an earlier catalog record to meet current standards, librarians, in general, showed a strong commitment toward quality and compliance with current standards. Their attitude generally was altruistic, often reflecting a greater weighting toward future uses of the data base, a desire not to repeat the past mistakes of minimal records, and a desire to see standards raised.

LIBRARIANS ARE BECOMING INCREASINGLY AWARE of the benefits and flexibility of machine-readable catalog records as the basis for new forms of the catalog, for on-line interlibrary loan transactions, and for automated circulation systems. There is a realization that in the future, cataloging rules may change more frequently than they have in the past to accommodate and to take advantage of the capabilities of a machine-readable record. With the Library of Congress turning to a machine-based catalog in 1981, it is becoming more likely that libraries will be faced with an increasing number of subject heading changes, which could be handled relatively easily through a machine authority system but would be most difficult to make if thousands of cards had to be changed by hand. It is for these reasons and others that many librarians have begun converting or are planning to convert their retrospective catalog records to machine-readable form.

The Internetwork Quality Control Council (IQCC), an advisory group to OCLC, Inc., has as its primary role the promotion of quality control and the adherence to standards in the OCLC on-line union catalog. As the number of libraries converting retrospective records through OCLC, Inc., grew, the question was raised whether these libraries would be willing or able to follow the current cataloging standards required by OCLC.[1] In the scramble for quantity, would quality be sacrificed? Some libraries had already expressed the opinion that they did not need all of the elements in the present minimal level record, since some would be inputting from a shelflist or main entry card

Linda F. Crismond is chief deputy county librarian, County of Los Angeles Public Library. She served as the Western Service Center representative on the OCLC Internetwork Quality Control Council and as Chairperson of its Retrospective Conversion Task Force. Manuscript received April 1980; accepted for publication June 1980.

with incomplete data, and others would be interested only in an abbreviated record for circulation or interlibrary loan purposes. To explore these and other related issues, the IQCC established a Retrospective Conversion Task Force in August 1979.

One solution presented at the IQCC meeting in December 1979 was the creation of a special minimal standard to be used only for retrospective conversion projects. It was anticipated that this would contain fewer data elements than the present OCLC minimal standard (Level K) or the Library of Congress minimal level cataloging (MLC) record.[2] In order to ascertain if there was a need for such a standard and the extent to which these records might pose problems in using the OCLC data base for cataloging, interlibrary loan, and other subsystems, the task force prepared a questionnaire (appendix A).

Four hundred forty-six questionnaires were distributed through the IQCC representative to twenty networks with each receiving a varying number, depending on the size of the network and the number of its members involved with a retrospective conversion project. The distribution instructions requested that 75 percent of the questionnaires be sent to libraries that were conducting or planning retrospective conversion projects. It was also requested that there be representation by different types of libraries as well as a range in size.

Three hundred thirteen responses were received, representing a 70 percent response rate. Of these, 238 were academic libraries, 43 were public libraries, 26 were special libraries, and 6 were school libraries. This mixture of types of libraries reflects that of the nonrespondents as well as that of the total membership of OCLC, Inc., at the time. Two hundred seventy-three libraries, or 87.2 percent of the respondents, were involved in a retrospective conversion project. These libraries represented 40.6 percent of those having received authorization for a retrospective conversion project from OCLC, Inc.

One of the key questions asked was whether the library would support a special minimal standard for retrospectively converted records only with fewer data elements than are presently required by Level K (the OCLC minimum standard). An overwhelming majority, 74.5 percent, responded no. Many of the eighty that replied positively added a qualifier such as "only if upgradable," "don't feel too strongly," and "but it may be needed for other institutions." Of those favoring a lower standard, almost one-half indicated that records having fewer elements than those included in Level K did pose problems in using the on-line union catalog for purposes other than retrospective conversion. They cited the reasons as increased editing time, higher level of staff review, interruptions in work flow, etc.

The task force had thought that many who supported a lower standard would do so because they were using a shelflist or main entry card as their only source for conversion. But 72.5 percent of those respondents said that if the main entry or shelflist card was incomplete, they would consult the book to obtain the rest of the information.

One question asked the purpose of the retrospective conversion project, and respondents were encouraged to check as many answers

as appropriate. For those who favored a lower standard, the most popular reason for retrospective conversion was interlibrary loan, with a machine-based catalog being second. For those who opposed a lower standard, the machine-based catalog was most frequently cited, with interlibrary loan second. The remainder of the answers were cited in the same order for both groups: circulation, resource sharing, union lists, collection development, and other (acquisitions cited most frequently).

Librarians were asked also for the number of records already converted as well as for an estimate for the next five years. The total of the records that have been or will be converted for all respondents was 19,491,780, of which 2,658,335 will be input originally into the data base. Of the latter figure, 795,259 will be input by libraries favoring a lower standard; the average size of project is 86,339 records, of which 14.4 percent (or 12,425 records) would be original input. Libraries favoring a high standard will input 1,863,076 records with an average project size of 118,852 records, of which 9.6 percent (or 11,360 records) would be original input. With these averages it can be projected that all the OCLC libraries involved with a retrospective conversion project as of December 1979 have converted or will have converted 74,064,375 records by the end of 1984. Assuming that an average 10.6 percent will be originally input into the data base, the projects would have added 7,850,824 new records.

Another question asked the respondents to identify any elements of Level K which they thought should not be required in a retrospective conversion project. The current OCLC Level K input standard requires the elements of bibliographic data listed in the outline below. All but the five elements with asterisks received at least one vote. The data elements that received more than ten votes as not being required are followed by the number of votes received in parentheses.

1. LC card numbers (24)
2. National bibliographic number (48)
3. ISBN (41)
4. Cataloging source (11)

*5. Holding information (system required)

*6. Main entry—personal—subfield a name
7. " " " " b numeration
8. " " " " c title and other words assoc. with title
9. " " " " d date

*10. Main entry—corporate—subfield a name
*11. " " " " b subordinate units
12. " " " " k form subheading

*13. Main entry—conference or meeting—subfield a name
14. " " " " " " q second name
15. " " " " " " b number
16. " " " " " " c place
17. " " " " " " d date

18. Main entry—uniform title—subfield a uniform title
19. " " " " " t title
20. " " " " " p part
21. " " " " " f date
22. " " " " " l language

23. Main entry—uniform title—subfield k form subheading
24. " " " " " s version
25. " " " " " h media qualifier
26. Uniform title—subfield a uniform title (17)
27. " " " f date (14)
28. " " " k form subheading (15)
29. " " " l language (14)
30. " " " p part (14)
31. " " " s version (14)
32. " " " m medium (14)
33. " " " n series, opus, or thematic catalog number (12)
34. " " " o arranged statement (13)
35. " " " r key (12)
36. " " " h media qualifier
37. Title statement—subfield a short title
38. " " " b remainder of title
39. " " " c remainder of title page transcription (12)
40. Edition statement—subfield a edition
41. " " " b additional edition information
42. Imprint—subfield a place
43. " " b publisher
44. " " c date
45. " " e place of printing (13)
46. " " f printer (12)
47. Collation—subfield a pagination or volumes or accompanying material

On the other hand, all of the above data elements were cited in another question as causing problems in the efficient use of the data base if they were omitted. Thirty-four respondents indicated that any missing data element would cause problems such as increased editing time, a higher level of staff review required, and interruption in work flow. The elements most frequently cited as creating problems in order of concern were the imprint, subfield a, place; title statement, subfield b, remainder of title; collation, subfield a, pagination; edition statement, subfield a, edition; and title statement, subfield c, remainder of title page.

An opportunity was given to make comments on the issues raised in the questionnaire, and more than half of the respondents took the time to do so. Fifty-two percent of those opposing lower standards chose to make comments while only 26 percent of those supporting lower standards added their concerns. The former group's attitude generally was altruistic, reflecting a strong concern for the quality of the data base, a desire not to repeat the past mistakes of minimal records, a greater weighting toward future uses of the data base, and a desire to see the standards raised. If local libraries could have the ability to upgrade or enhance records directly, some respondents (8.9 percent) said they would consider lower standards. For those supporting lower standards, the main reasons were that the access to the bibliographic information or the piece was difficult and that the cost to gather information was too high. There was a noticeable difference in the strength of the comments between the two groups, with those opposing using words such as "quality control should be strongly

encouraged," "inexcusable," "very shortsighted," "serious problem," "lamentable," etc. On the other hand, those supporting the lower standard often qualified their responses by "certain advantages," "can operate with less," "possibly," etc. A summary of the comments can be found in appendix B.

In light of the above findings, it is clear that the majority feel strongly that no distinction should be made in the quality of a machine-readable record whether it be produced as part of the current cataloging operation or from a retrospective conversion project. The fact that 74.5 percent opposed a minimal standard with fewer data elements than Level K, combined with the many strongly worded comments coming from a large sample of OCLC users, clearly shows that the majority do not favor any lowering of standards. Those elements which might be eliminated are the same ones that cause problems for many users. Since more than 85 percent of the respondents are using the work cataloged or *NUC* copy if their own card is incomplete, it is possible to input at least at the minimal level. The average number of records requiring original input in all of the reported 283 retrospective conversion projects was 10.6 percent. This percentage most likely will go down as the data base grows. But, even at present, it is sufficiently low as to not add a great burden to libraries to upgrade a portion of records to the minimal level standard. In conclusion, libraries are concerned about the quality of cataloging records not only for internal, local, and regional library needs, but also as their contribution to the national data base.

The Retrospective Conversion Task Force recommended to the Internetwork Quality Control Council that the standards remain the same for all types of input, including retrospectively converted records. OCLC, Inc., is still studying the recommendation and has not taken an official position on this issue.

References

1. OCLC, Inc., *OCLC Level I and Level K Input Standards* (Columbus, Ohio: OCLC, Inc., 1977).
2. "Library of Congress to Create Minimal Level Cataloging Records," *Library of Congress Information Bulletin* 38:457–60 (Nov. 2, 1979).

Appendix A

The attached questionnaire is being sent by the Retrospective Conversion Task Force of OCLC's Internetwork Quality Control Council to a selected number of OCLC member libraries. It is the primary role of the IQCC to promote quality control and adherence to standards in the OCLC on-line union catalog.

Questions have been raised as to whether some libraries can or will adhere to the current OCLC I and K level standards when converting retrospective records to machine-readable form. It is the Task Force's intent to identify from your responses the applicability of the elements of bibliographic data prescribed in the K level and to determine the advisability of a new minimal level for retrospective conversion projects. In addition, we would like to have your comments on the usability or unusability to your library of partial records which do not contain all of the elements required in the K level.

Thank you for spending the time in completing this questionnaire.

Retrospective Conversion Questionnaire

1. Type of library: public ___, academic ___, school ___, special _____ (please indicate type), other ___.
2. Do you have or are you planning a retrospective conversion project? ___ yes ___ no. (If no, please skip to question 10).
3. How many records do you intend to convert in 1980 _____, 1981 _____, 1982 _____, 1983 _____, 1984 _____.
4. How many records have been converted? _____.
5. What is the purpose of the project (you may check more than one):
   - ___ machine-based catalog
   - ___ circulation system
   - ___ interlibrary loan
   - ___ union lists
   - ___ collection development
   - ___ resource sharing
   - ___ other, please explain _____
6. For your retrospective conversion project, what is/will be the percentage of original records input into the on-line union catalog _____ %.
7. What source of information do you use or plan to use for those retrospectively converted records which are or will be originally input into the on-line union catalog?
   - ___ main entry card
   - ___ main entry card, but if incomplete, from the book
   - ___ main entry card and the book
   - ___ shelflist card
   - ___ shelflist, but if incomplete, from the book
   - ___ shelflist card and the book
   - ___ other, please explain _____

PLEASE REFER TO THE OCLC LEVEL K STANDARDS LISTED IN THE ADDENDA* TO ANSWER THE FOLLOWING QUESTIONS.

8. From your experience in retrospective conversion, are there any elements of Level K that you feel should not be required? ___ yes ___ no.
9. If yes, which of the element numbers would be considered for exclusion and for what reason:

Number(s)	*Reason*
_____	Information not normally on main entry card
_____	Information not normally on shelflist card
_____	Information not needed in machine file
_____	Limitation of staff line
_____	Other, please explain _____

10. From your experience in using the on-line union catalog for purposes other than retrospective conversion, do records having fewer elements than those included in Level K pose problems with the efficient use of the data base? ___ yes ___ no.
11. If yes, please indicate which of the element numbers have caused problems when they are omitted and for what reason:

Number(s)	
_____	Increases editing time
_____	Requires higher level of staff review
_____	Interrupts work flow
_____	Other, please explain _____

12. Would you support a special minimal standard with fewer data elements than are presently required by Level K to be input into the data base only for retrospectively converted records? ___ yes ___ no.
13. Do you have any general comments on the issues raised in this questionnaire?

December 20, 1979

*Incorporated into text of article.

Appendix B
Summary of Comments from IQCC Retrospective Conversion Task Force Questionnaire
(168 Respondents)

A. No lowering of standards: 107
Shared cataloging demands at least K Level: 26
Should be restricted to Level I: 12
Want individual archive tapes at high level: 11
Takes more editing time: 11
Higher not lower: 6
Allows more duplicate records: 6
Standards aren't being followed now: 4
Quality rather than quantity: 2

"The time it takes to bring the record up to Level K standards negates the value of using a shared cataloging system for all subsequent users."
"Completion of the fixed fields should be a minimum requirement of all input levels."
"This also has generated much of the criticism of the OCLC data base."
"The priority in quality control at this point should be to strongly encourage adherence to Level I. . . ."
"We input complete I Level records when the records needed for conversion are not found on-line, and we expect other libraries to do the same."
"In our rush to convert and to cope with immediate costs and goals, I don't think we can afford to sacrifice our future resources at a potentially greater cost."
"I think it would be very shortsighted to create a dirty file full of incomplete records. We will be using this file for a long time."
"I think lowering the standard . . . would increase the number of duplicate records, already a serious problem to us."
"Anything less than Level I . . . should not even be considered. In doing so, we only postpone building a good data base."
"The OCLC system, as useful as it is, contains enough incomplete records. Let us not institutionalize this lamentable situation."
"Libraries that cannot meet the minimum standards for input of new records should arrange for assistance from their network office or other sources to upgrade substandard records before they are entered into the data base."
"Our library acquired many older titles in the process of collection development. Finding incomplete records for older titles, hurriedly input during a retrospective conversion project, is as frustrating as finding poor records for new titles."
"I believe an effort should be made to reduce the charge for use of a K level record. RLIN charges the inputting library $1.50 for each sub-standard record input."
"We would prefer consideration in just the opposite direction, that is, we strongly urge a level between K and I to be mandatory for retrospective conversion."

B. Lowering of standards *only* with ENHANCE capabilities: 15
"When the enhancement capability is operational we would consider a special minimal standard for retrospectively converted records but not at this time."
"Until then, (Enhance), I think the quality of the data base would be adversely affected."
". . . but only if the next library using the record can input the missing items into the data base."

C. Lower standards OK: 21
Access to bibliographic information or piece difficult: 9
Cost too high: 6
Smaller libraries don't need extensive records: 4
Special code for retro record identification: 3
Our uses demand only skeleton records: 3
Old records probably won't be used by others: 3
Increase size of data base: 2

"Establishing minimal standards for retrospective conversion clearly does not have cer-

tain advantages. Any form of conversion will be costly and simplifying that process would be worthwhile."
"A symbol indicating that the record has been input as part of a retrocon project would be very helpful."
". . . medium and small size public libraries and school libraries can operate with less than K Level cataloging."
". . . if OCLC's standards for conversion input are higher than we can afford, we will not use OCLC. . . ."
"I don't think a library should be expected to recatalog an item. So long as they have information to describe a unique bibliographic element and they are satisfied to put their symbol in the 040. . . ."
"I feel there is a strong need for data base quality control; however, for our library to effectively use the system, we must input some inferior level records."

D. Other comments: 25
   Specific problems: 5
   Waiting to do original input in retrocon: 4
   Incentive for error reports: 2

". . . we do not use the Retrospective Conversion Project but recatalog with the book in hand. . . ."
"Have you considered the minimal level national level bibliographic record. . .?"
"Retrospective conversion is our contribution to interlibrary cooperation."
"Would such records be subject to error report counts?"

Cataloging Contributed to OCLC: A Look One Year Later

William J. Crowe

Research libraries face difficult choices in establishing technical services processing priorities, especially in the selection of items to receive original cataloging. The author designed a study to examine the disposition, one year after input, of a sample of original cataloging contributed to the OCLC data base by the Indiana University, Bloomington, Libraries. Findings indicate that most original cataloging contributed by this library was not superseded or duplicated by Library of Congress cataloging and that many items were not cataloged by any other OCLC member library. Systematic replication of methods similar to those employed in this study should provide information useful both for library management review of cataloging activity and for decisions to be made at the national and/or regional level about designation of centers of cataloging responsibility.

THE CHOICES MADE by large research libraries about *what* categories of library materials receive original cataloging, and *when* items are cataloged, are important not only for that library, but also for the national library community. For the individual library, the needs of local users must be carefully weighed by administrators, with an eye to the cost-efficiencies of overall library technical processing, especially when costly original cataloging is potentially involved. Local interests clearly dictate: process quickly any item urgently requested by a user, no matter the cost, but keep to a minimum the original cataloging of items for which there is any reasonable prospect of obtaining cataloging information from cooperative sources, especially from the Library of Congress or other libraries that share the bibliographic utility we use.[1] For the national library community interest, however, the earliest possible availability of cataloging information *requires* individual research libraries to assume special responsibility for comprehensive and speedy processing (read "original cataloging") of categories of material in which these libraries have especially strong collections.

There is, of course, nothing new about this concern; one need look back only to the Farmington Plan or review today's cooperation be-

William J. Crowe is assistant to the director and assistant professor at the Ohio State University Libraries. At the time of the study he was administrative assistant to the dean at the Indiana University Libraries. Manuscript received August 1980; accepted for publication September 1980.

tween the Library of Congress and several research libraries, among them Northwestern University and the University of Texas at Austin. Yet there remains an inherent conflict for the local library in the making of choices about processing priorities.

This potential conflict in research library processing priorities suggests the need to answer, with some assurance, two fundamental questions:

1. Is it possible for a local library to make informed choices about the categories of items to receive original cataloging, and the order of cataloging priority, based not only on local user demand (and knowledge of processing priorities of the Library of Congress) but also on evidence regarding the probability of its replacement by original cataloging from other network members?
2. Is there evidence that identifies specific libraries as sources of original cataloging of categories of material that are discrete in terms of subject, language of publication, or national imprint—a group of libraries with which formal or informal shared cataloging agreements might be made?

Much of the information necessary to answer these questions has long been available in the national bibliographic record at the National Union Catalog (NUC) and in the machine-readable bibliographic data bases maintained by OCLC, Inc., and other bibliographic utilities.

It is clear that examination of the manual files at the National Union Catalog cannot provide wholly reliable data because of the time lags inherent in NUC operations. However, as proposed by Vondran, "a study to investigate the rate of replacement and the time taken to replace individual library reports with LC records" is possible using the existing shared bibliographic data bases.[2]

Short of such a comprehensive, longitudinal study of the activity of the bibliographic utilities, one that likely would require two or more years and considerable expense, it is possible to undertake studies of shared cataloging experience in a given library. For example, a 1979 study at the University of Illinois at Urbana-Champaign provides a useful look into one library's experience using cataloging records available on OCLC.[3] But how can one discover the fate of catalog records—especially original cataloging—created at a research library and input to an on-line union catalog? A review of the disposition of these records, created and input at some considerable expense, might well provide useful management information, especially some valuable insight into the extent of supersedure of local cataloging by that available from the Library of Congress.

The author undertook such a study in March 1978 at the Indiana University, Bloomington, Libraries (IUL). A description of that study and a report of its findings follow.

Design of the Study

Most of the original cataloging records produced at the Indiana University, Bloomington, Libraries since 1975/76 has been contributed to the OCLC bibliographic data base in conformity with standard net-

work guidelines. Accordingly, not all original cataloging for all types of material (i.e., material in some formats and some languages) has been contributed to the OCLC data base. Nor is it certain that all IUL cataloging records which have been contributed to the data base may subsequently be identified with certainty (without analysis of archival tapes of IUL cataloging) because cataloging work/input sheets are returned to the individual catalogers who prepared them. They are free to retain or dispose of them at their own discretion. Moreover, return of the sheets to each of the catalogers and subsequent variations in their handling of the sheets make it difficult, if not impossible, to obtain more than a representative sample of the sheets retained.

It was in this context that data were collected for this study. Only cataloging records for monographs in roman-alphabet languages contributed by IUL to the OCLC data base during February 1977 were subject to examination. The time period was chosen arbitrarily as being representative of cataloging activity for that year at IUL, as well as to allow the Library of Congress and OCLC member libraries acquiring any of these items reasonable time to catalog them and (in the case of LC) to supplant the IUL record, or (in the case of OCLC-member libraries) to add their holdings symbol to the IUL record. A total of 120 OCLC work/input sheets prepared by six catalogers was gathered by the head of the Cataloging Department. No special instructions were given about the method of collection; twenty sheets were obtained from each cataloger's files, without screening or review, other than to ensure a February 1977 input date. These 120 sheets constitute a representative (nonrandom) sample (approximately 25 percent) of the 485 original cataloging records which OCLC-generated reports indicate were input to OCLC by IUL during February 1977. However, the items represented by these sheets clearly do not reflect overall original cataloging activity at IUL, given the limitations of the study, hence the preponderance of English-language items. Indeed, "other languages" items in the study were primarly in French, with German, Spanish, and Italian items constituting almost all of the remainder.

All of the 120 items represented by the sheets were searched in the OCLC data base by the author between March 20 and 24, 1978, using all possible search keys: (1) OCLC control number, (2) Library of Congress catalog card number, (3) International Standard Book Number, (4) author name/title, and (5) title. (No search by "author name only" was possible because of OCLC limitations.) All records found in the data base for each item represented on the sheets were printed and attached to each work/input sheet.

For each item searched, a comparison was then made between the IUL work/input sheet and the record(s) found in the data base to discover if the IUL record:

1. had been superseded by a Library of Congress MARC record;
2. had been duplicated by a Library of Congress MARC record; or
3. had been duplicated by another OCLC member library; and
4. how many libraries' holding symbols, if any, were involved, what-

ever disposition had been made of the original IUL record.

To characterize the 120 items as a group, each cataloging record was examined to determine if it represented an item:

1. in the English language (76 items), or another language (44 items);
2. a U.S. imprint (42 items), or that of another country (78 items); and
3. issued in 1968 or later (64 items), or prior to 1968 (56 items).

These elements—language, place of publication, imprint date—were chosen because each is typically a factor in the assignment of items to various cataloging priorities.

Characteristics of the Data

Five categories of records (see table 1) were identified:

Group I Nine IUL-input records (7.5 percent) that had been superseded by Library of Congress MARC records. This group consisted exclusively of English-language materials published after 1967.

Group II Fourteen records (11.7 percent) that were duplicated by Library of Congress MARC records. This group consisted almost exclusively of English-language materials published after 1967 and, in most cases, outside the U.S.

Group III Four records (3.3 percent) that were duplicated by another OCLC-member library. This group consisted exclusively of English-language U.S. imprints, predominantly post-1967.

Group IV Twenty-six records (21.7 percent) that had not been duplicated or superseded by other cataloging records and to which other library holding symbols had been added. (Of these twenty-six records, twenty-one had five or fewer libraries' holding symbols.) This group was composed predominantly of English-language, 1968 or later imprints.

Group V Sixty-seven records (55.8 percent) that had not been superseded or duplicated by any other record and that showed no other libraries' holding symbols. This group consisted largely of items in languages other than English (primarily French and German), published before 1968 outside the U.S.

Also worthy of note:

- The Library of Congress had cataloged only twenty-two (28.9 percent) of the seventy-six English-language titles.
- No OCLC-member library holding symbol (other than IUL) was present for thirty-eight (86.3 percent) of the forty-four titles in languages other than English.
- The Library of Congress had cataloged only nine (21.4 percent) of the forty-two U.S. imprints.
- Of the thirty-three U.S. imprints for which IUL, but not LC, had supplied cataloging, eighteen (54.5 percent) showed holding

symbols for other OCLC-member libraries.

- Two-thirds (fifty-two) of the seventy-eight items published outside the U.S. showed no other holding library symbols.
- Almost 84 percent (forty-seven) of the fifty-six items published before 1968 showed no other holding library symbols.

When the number of holding library symbols per record was examined (see table 2), it was found that:

- The largest number of holding library symbols per record (thirty-one or more symbols per record) was found in Groups I and II, i.e., eleven (20.8 percent) of the fifty-three records with holding library symbols.
- The smallest number of holding library symbols per record (five or fewer symbols per record) was found in Group IV, i.e., twenty-one (39.6 percent) of the fifty-three records with holding library symbols.
- Of the total of fifty-three records with holding library symbols, twenty-eight (52.8 percent) showed five or fewer symbols.

A review of library holding symbols represented in the records searched showed only one other library (aside from the Library of Congress) with which IUL shared as many as 5 of the 120 items, i.e., the Yale University Libraries.

Conclusions

The data collected in this study are clearly of limited utility for even the Indiana University, Bloomington, Libraries, not only because of the sampling technique employed but also because the organizational structure of Technical Services, and the material flow within it, have been significantly changed since 1977/78. However, the method of analysis and some of the data clearly are of interest as an indication of the need for further study.

The findings do provide tentative answers, at least for IUL, to the two questions raised at the outset:

1. Almost 81 percent of the material that received original cataloging at IUL and was input to OCLC in February 1977 had not been superseded by Library of Congress cataloging more than one year later.
2. There is no one library or identifiable body of libraries within the OCLC membership that cataloged much or most of the same body of material which had been originally cataloged by IUL in February 1977.

Suggestions for Further Study

A similar study of a large body of the original cataloging performed by several large research libraries over a long period of time, perhaps using information from both the National Union Catalog and national bibliographic data bases, might be attempted, i.e., the longitudinal study suggested by Vondran. The results should provide useful information for the planners of a national bibliographic control structure, especially if selected research libraries throughout the United

TABLE 1

CHARACTERISTICS OF A REPRESENTATIVE SAMPLE OF INDIANA UNIVERSITY, BLOOMINGTON, LIBRARIES ORIGINAL CATALOGING INPUT TO THE OCLC DATA BASE IN FEBRUARY 1977

	Number of Items	Language		Imprint		Date	
		English	Other	U.S.	Other	1968 or Later	Pre-1968
Group I	9	9 (11.8%)	0	4 (9.5%)	5 (6.4%)	9 (14.1%)	0
Group II	14	13 (17.1%)	1 (2.3%)	5 (11.9%)	9 (11.5%)	14 (21.9%)	0
Group III	4	4 (5.3%)	0	4 (9.5%)	0	3 (4.7%)	1 (1.8%)
Group IV	26	21 (27.6%)	5 (11.4%)	14 (33.3%)	12 (15.4%)	18 (28.1%)	8 (14.3%)
Group V	67	29 (38.2%)	38 (86.4%)	15 (35.7%)	52 (66.7%)	20 (31.3%)	47 (83.9%)
Total	120	76 (100%)	44 (100.1%)	42 (99.9%)	78 (100%)	64 (100.1%)	56 (100%)

Group I = IUL record superseded by a Library of Congress MARC record.
Group II = IUL record duplicated by a Library of Congress MARC record.
Group III = IUL record duplicated by another OCLC-member library.
Group IV = IUL record used by another OCLC-member library.
Group V = IUL record not used by any other OCLC-member library.

TABLE 2

NUMBER OF LIBRARIES HOLDING ITEMS IN COMMON WITH INDIANA UNIVERSITY, BLOOMINGTON, LIBRARIES, REPRESENTED BY 53 CATALOGING RECORDS CONTRIBUTED BY IUL TO OCLC IN FEBRUARY 1977

	53 Total Items	Number of Holding Libraries per Record					Range of Number of Libraries per Record	Average Number of Libraries per Record
		1–5	6–10	11–20	21–30	31+		
Group I	9	1 (3.6%)	1 (14.3%)	2 (66.7%)	0	5 (41.7%)	2–217	69.4
Group II	14	3 (10.7%)	3 (42.8%)	0	2 (66.7%)	6 (50%)	2–78	13
Group III	4	3 (10.7%)	1 (14.3%)	0	0	0	2–9	5
Group IV	26	21 (75%)	2 (28.6%)	1 (33.3%)	1 (33.3%)	1 (8.3%)	2–39	6*
Group V	NA	NA	NA	NA	NA	NA	NA	NA
Total	53	28 (100%)	7 (100%)	3 (100%)	3 (100%)	12 (100%)		

Group I = IUL record superseded by a Library of Congress MARC record.
Group II = IUL record duplicated by a Library of Congress MARC record.
Group III = IUL record duplicated by another OCLC-member library.
Group IV = IUL record used by another OCLC-member library.
Group V = IUL record not used by any other OCLC-member library.
*Mode = 2 (14 of 26 records).

States are to be designated as centers of cataloging responsibility. A broader study, especially one that relies on manipulation of machine-readable bibliographic data, should provide information on the elapsed time between the input of local original cataloging and either its supersedure by Library of Congress cataloging or its use by other libraries. With this information, libraries might better be able to review cataloging priorities, and, in the process, derive information about the degree to which local cataloging is consistent with that performed by the Library of Congress and other research libraries.

References

1. See Ryburn M. Ross, "Cost Analysis of Automation in Technical Services," in *The Economics of Library Automation; Proceedings of the 1976 Clinic on Library Applications of Data Processing* (Urbana-Champaign, Ill.: University of Illinois Graduate School of Library Science, 1977), p.10–27.
2. Raymond F. Vondran, *National Union Catalog Experience: Implications for Network Planning*, Network Planning Paper, no.6 (Washington, D.C.: Network Development Office, Library of Congress, 1980), p.49.
3. OCLC, Inc., *OCLC Newsletter*, no.127: 3–4 (March 7, 1980).

Library of Congress Subject Heading Patterns in OCLC Monographic Records

Edward T. O'Neill and Rao Aluri

This investigation examined the characteristics of subject headings found in OCLC cataloging records. The study analyzed a sample of 33,455 monographic records taken from the OCLC data base. The sample contained a total of 50,213 subject headings, 94 percent of which were Library of Congress subject headings. Each record had an average of 1.4 Library of Congress subject headings. However, 18.6 percent of the records had no LC subject headings assigned. Topical subject headings accounted for 71 percent of all LC subject headings, and 62 percent of all records contained at least one LC topical subject heading. Each LC subject heading had an average of 0.78 subdivisions associated with it. Form subdivisions were the most common type found, followed closely by place and topical subdivisions. Period subdivisions were used relatively infrequently.

AN EXTENSIVE BODY of library literature addresses card catalog subject headings in general and Library of Congress (LC) subject headings in particular. Much of this literature deals with the principles and practices of assigning subject headings, their adequacies and inadequacies for information retrieval, and various other related aspects.[1-7] However, despite this widespread interest in the diverse aspects of subject headings, there are few empirical data available which reflect the current practices of subject heading assignment.[8]

Researchers and librarians need such empirical data so they may gain insight into current subject cataloging practices. The availability of large data bases that comprise millions of catalog records makes the task of compiling these data much easier. Once compiled, such data

---

In September 1980 Edward T. O'Neill joined the faculty of Case Western Reserve University as dean and professor of library science, and Rao Aluri joined the faculty of Emory University as assistant professor of library science. This investigation was conducted at OCLC, Inc., Columbus, Ohio, where O'Neill was a visiting distinguished scholar from the faculty for the School of Information and Library Studies, State University of New York at Buffalo, and where Aluri was a research assistant from the School of Information and Library Studies, State University of New York at Buffalo. A detailed report was compiled by the OCLC Research Department and is available from the ERIC Clearinghouse on Information Resources (see reference 13). Manuscript received November 1979; accepted for publication January 1980.

can be put to a variety of uses. There is, for instance, growing debate on the adequacy of LC subject headings, especially in the context of computerized information retrieval. At least two alternatives to LC subject headings have been proposed, both presumably offering better retrieval capabilities.[9-10] Availability of data on the current practices of assigning subject headings would make debate on these alternatives more meaningful. In the same context, it is now feasible to conduct subject searches on large data bases. Subject headings assigned to catalog records are the major means of conducting these subject searches. Consequently, there is a need to know if the present subject cataloging practices, originally designed for card catalogs and manual searching, are adequate under altered conditions.

DESIGN OF THE STUDY

OBJECTIVES

This study seeks to examine the subject headings assigned to monographic records in the OCLC data base in order to obtain detailed data that reflect on current subject cataloging practices. The availability of on-line subject access of the OCLC data base, which currently contains more than five million catalog records, makes it especially necessary to obtain such data to design an effective subject retrieval system. System designers, for instance, need to know how many subject access points are available in the catalog records and what their characteristics are. The information is important because it is conceivable that the retrieval characteristics of different types of subject headings and subdivisions occurring in OCLC records differ when the size of the data base is very large. With this broad objective in mind, the data on the subject headings were examined to answer the following questions:

1. What is the average number of subject headings per record?
2. What is the distribution of various types of subject headings, e.g., topical headings, in the catalog records?
3. What is the distribution of subdivisions in the records?
4. Does the distribution of subject headings and subdivisions vary with LC classes?
5. Is there a difference between LC records and contributed records regarding the distributional characteristics of the subject headings?

Before attempting to answer these questions, it is necessary to describe briefly the sample on which the study was conducted and the format of the subject headings appearing in OCLC records.

CHARACTERISTICS OF THE SAMPLE

This study on subject headings was based on 33,455 catalog records of monographs in the MARC format for books.[11-12] The sample contained every full-level nonjuvenile monographic record with an OCLC control number ending with *96* in the OCLC data base as of September 2, 1978. Microform materials and incomplete catalog records were eliminated so that the information on cataloging practices would be

more reliable and complications would be minimized. Of the 33,455 records in the sample, 7,490 were received from LC through its MARC Cataloging Distribution Service (hereafter, LC records) and 25,965 were cataloged on-line by OCLC-member libraries (hereafter, contributed records). This distinction between LC and contributed records does not reflect the source of the cataloging copy. Contributed records contain original cataloging data as well as the data derived from LC sources such as its proof slips and the National Union Catalog. However, LC data may have been subjected to varying degrees of modification, the extent of which cannot easily be ascertained. Further, there are a number of contributed records whose source of cataloging data is unknown.

Subject Heading Format in OCLC Records

Subject heading entries in OCLC records consist of several elements, including a tag number, two indicators, and a variable number of subfields composed of data elements. A typical subject heading entry in an OCLC record is shown in figure 1.

A three-digit tag preceding each subject heading identifies the heading type. Following the MARC format, there are six types of subject headings in OCLC records. These are personal name (e.g., Pope, Alexander), corporate name (e.g., Cooperative Library Mission to Latin America), conference/meeting (e.g., Conference on Security and Cooperation in Europe), uniform title (e.g., Sermon on the mount), topical (e.g., Endocrinology), and geographic name (e.g., Kankakee Co., Ill.). Each of these six types of subject headings is identified by a unique numeric tag. For instance, personal name and topical subject headings are identified by the tags 600 and 650 respectively. OCLC uses another six tags, using the same types of subject headings, to permit libraries to assign subject headings for local purposes.

Each tag number is followed by two indicators that provide additional information about the subject headings. The first of these two indicators is used only in personal name, corporate name, and conference/meeting subject headings to indicate the structure of the name. The second indicator shows the source of the given subject heading. A value of zero in this indicator position means that the given subject heading is an LC subject heading.

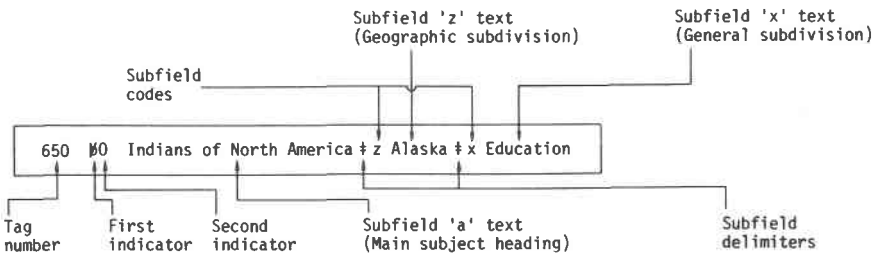


Figure 1
Format of Subject Headings in OCLC Records

The subject heading follows the tag number and the two indicators. The complete subject heading consists of a variable number of subfields, each separated by a subfield delimiter and identified by a subfield code. The first component of the subject heading is identified by the subfield code *a* and usually corresponds to the main subject heading. Subject subdivisions—form, general, period, and place subdivisions—follow the main subject heading and are identified by subfield codes *k*, *x*, *y*, and *z* respectively. In addition, other subfield codes are used to separate various elements of subject headings. For instance, subfield code *d* in the 600 field shows birth and death dates of the person who is the subject of the cataloged work.

Scope of the Study

In the sample of 33,455 records, there was a total of 50,213 subject headings of which 47,036 (93.7 percent) were LC headings. Figure 2 shows the subject headings by source. Since LC subject headings accounted for such a large proportion of the subject headings, the remaining discussion deals with these headings only, excluding the LC children's literature headings. At the time the data were collected, the second indicator for the locally assigned subject headings (i.e., 690–695 fields) was not yet validated. Therefore, the sources of these subject headings are unknown and for the purpose of analysis they are treated as non-LC subject headings. A detailed analysis of the LC subject heading usage pattern and the usage pattern of all subject headings regardless of their source is presented in O'Neill and Aluri.[13]

Data and Interpretation

Table 1 presents data on LC subject headings occurring in both LC and contributed records. Much of the following discussion is based on this table.

Average Number of LC Headings Assigned to OCLC Records

To assess the depth of subject cataloging, it is necessary to know the average number of headings assigned per catalog record. In the sample, there were 47,036 LC subject headings and 33,455 records. Thus, the average number of subject headings per record was 1.41. The number of headings was obtained by counting every occurrence of an LC subject heading separately. There are, however, instances where a record having two or more headings may differ only in subdivisions. In card catalogs, the subject heading cards for such a record would be in close proximity with each other. That is, multiple occurrences of the same main heading within a record does not provide significantly different information. If such multiple occurrences of the main heading within a record are excluded, the average number of unique main headings per record will be less than the average number of headings per record reported above.

In the present sample, there was an average of 1.32 unique main subject headings per record. In computing this number, the first *a* subfield was treated as the main heading. This compares with ten to

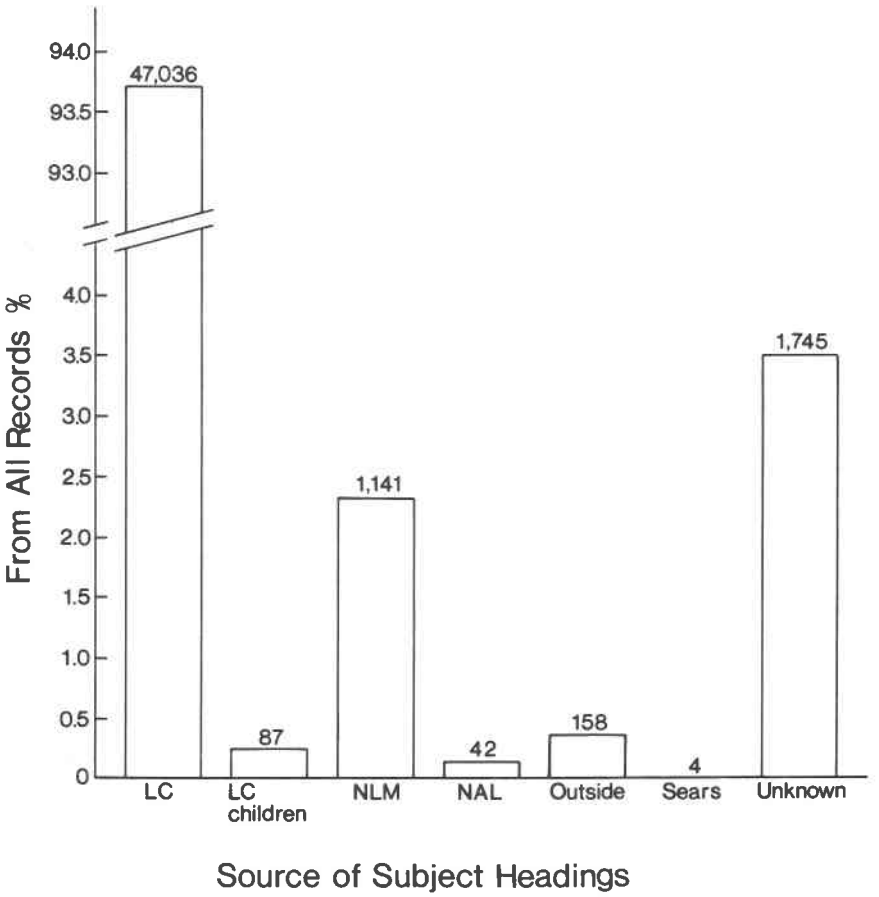


Figure 2
Distribution of Subject Headings by Source

twelve headings assigned to MEDLINE records. McClure pointed out that ERIC documents and journal articles in *Current Index to Journals in Education* (*CIJE*) also assigned a significantly larger number of headings.[14] This vast difference between the number of headings assigned to OCLC records and those assigned to MEDLINE and other records arises because of differing philosophies of subject analysis. MEDLINE records are indexed in depth, with all significant concepts represented regardless of hierarchical interrelationships among them.[15] In contrast, LC procedures require that records be cataloged under a summative philosophy of subject analysis. The summative approach typically prefers only one subject heading, usually corresponding to the class, which "summarizes the total contents of a work."[16]

Haykin contends that "if the subject matter of a book represents a systematic treatment of it [the subject] and can be expressed by a sin-

Retired Librarian of Congress, L. Quincy Mumford answers librarians' questions about the

CUMULATIVE TITLE INDEX TO THE CLASSIFIED COLLECTIONS OF THE LIBRARY OF CONGRESS, 1978

the unique 132 volume, single-alphabet listing of virtually every work classified by LC since 1897.

Background: Librarians have been asking penetrating questions about the *Cumulative Title Index to the Classified Collections of the Library of Congress* (TLC) ever since it was first announced. We distilled what we believed to be the most significant of these questions and discussed them with retired Librarian of Congress Dr. L. Quincy Mumford, whose 21 year regime (1954-1974) witnessed such relevant landmarks as the beginning of MARC and the introduction of the Shared Cataloging Program. Here are some of the questions and his answers.

Carrollton: Dr. Mumford, just why *is* title access so important?

Mumford: Well, in the case of the Title Index to the LC Collections, its greatest value probably lies in its most obvious use. When only titles are known to a searcher, TLC will show: authors' names (and the years of publication), which lead to National Union Catalog entries; precise LC Classification Numbers, which lead to specific card images on the LC Shelflist microforms, and LC Card Numbers for ordering from the Cataloging Distribution Service. In the case of the Shelflist, of course, searches for the precise Class Number should be made in TLC even if the author is known as well as the title.

In addition to this primary use, I should like to comment on the recent trend by acquisitions departments to set up their records by title in order to enjoy faster and more precise access than is provided in main entry catalogs (especially when corporate authors and other problem authors are involved).

The Catalog Management Division of the Library of Congress converted its own Process Information File from a main entry to title arrangement about eight years ago, and I understand that their searching efficiency increased substantially after that change.

In short, librarians have long needed a definitive, single-alphabet title index to the Library's huge retrospective collection of the world's literature, and there is no doubt in my mind that this 132 volume set is going to fill that need.

"Because of the overwhelming size, longevity, and international scope of LC's holdings, the great majority of the 6.5 million records in its Classified Collections have never been included in MARC, OCLC, or any other data base."

Carrollton: Now that we've established the importance of title access, let's explore just how many and what kinds of titles are in the Classified Collections.

Mumford: Essentially, these contain all of the materials (both monographs and serials) which have ever been cataloged and classified by the Library of Congress since the adoption of its Classification System in 1897. As of January 1979, these totaled approximately 6.5 million titles. About one million (or 18 percent) of these records are included in the MARC (MAchine Readable Catalog) data base which was established in 1968.

Carrollton: In view of the fact that access to the MARC data base is already available to libraries in a wide variety of segments and formats — and as it amounts to only one-sixth of the Library's collection — would you describe for us just what records make up the ***non-MARC*** portion of TLC?

Mumford: Yes. The more than 5½ million ***non-MARC*** entries in TLC will include the following:

- English Language works cataloged before 1968,
- French Language works cataloged before 1973,
- German, Spanish and Portugese Language works cataloged before 1975,
- Materials in the other Roman-alphabet languages cataloged before 1976, and
- Transliterated non-Roman alphabet materials cataloged by LC through 1978.

Because of these delays in entering the Roman-alphabet non-English-Language materials, it is estimated that more than half of the one million records prepared during the 12 years of the Library's Shared Cataloging Program have not entered the MARC data base.

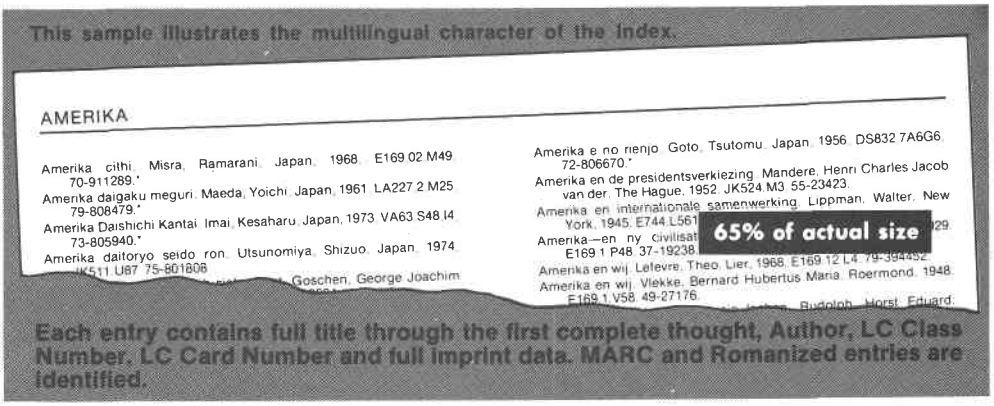
A small number of exceptions to the above listing are represented by the Library's highly selective RECON (REtrospective CONversion) Program which after several years has only just reached its 150,000th record (most of which covered 1968 and 1969 English Language reprints).

Actually, it has been the Library's long range emphasis on collecting and cataloging non-U.S. materials which has led it well beyond the role of a "national library" to its preeminence as a "library to the world". This emphasis is illustrated by the fact that in the last ten years, only 37 percent of the books processed by LC were in English (and, of course, a large number of these were of non-U.S. origin).

Carrollton: Well, that pretty well takes care of TLC's coverage of the non-MARC records. Now let's talk about OCLC. Several librarians have asked what benefits they would get from the Title Index that they would not already be getting as OCLC participants.

Mumford: First, of course, is the matter of coverage. Because of the overwhelming size, longevity and international scope of LC's holdings, the great majority of records in its classified collections have *not* been included in MARC, OCLC, or any other data bases.

Actually, there's no way of knowing exactly how many records are in the LC Classified Collections that are not in OCLC. We know how many records LC has sent to OCLC (over one million MARC records) but we do not know how many non-duplicate retrospective LC records have been put into the data base by OCLC participants. In spite of the large numbers of records cited by OCLC, after one deducts the MARC input, non-print materials, duplicate records, local publications, and other non-LC materials, the number of retrospective non-MARC LC records entered by OCLC participants should be relatively small. Based on conversations with LC catalogers and others, however, my outside guess would be that some 1.5



Mumford (Continued)

million unique non-MARC LC records may have been added by OCLC participating libraries.

This, of course, leaves 4 million non-MARC records in the Classified Collections that are not in the OCLC data base.

The main reasons for the relative lack of OCLC overlap, as indicated above, are the size and international nature of the Library of Congress holdings when compared to those of even the largest of the OCLC participants.

COMPARISONS OF HOLDINGS

The overwhelming relative strengths of the LC collections in specific subject areas are best illustrated in the biennial report, *Titles Classified by the Library of Congress Classification: National Shelflist Count* (published by the University of California at Berkeley under the auspices of the organization of "Chief Collection Development Officers of Large Research Libraries"). This study compares the holdings of LC to those of 27 major U.S. research libraries in individual LC Classification Schedules.

The 1977 edition of this report shows that the Library of Congress' holdings are often two or more times as large as those of second-place libraries in a wide variety of significant subject areas, including: American History (Classes E-F), Social Sciences (H-Hx), Language & Literature (P-Pz), Technology (T-Tx), and Bibliography and Library Science (Z).

As the TLC Index is produced from the REMARC Database, the title entries will be enhanced by the addition of full imprint data. Also, TLC itself can be used to order full REMARC records for retrospective conversion.

In a telephone survey conducted by Carrollton Press during September, 1979, of the 20 largest members of the Association of Research Libraries, it was learned that although 16 of them are currently OCLC participants, none submit significant numbers of retrospective LC records to OCLC. (A possible exception to this is the University of Texas, which has sent OCLC approximately 20,000 retrospective records to date.)

LC CLASSIFICATION NUMBER CHANGES

Tens of thousands of LC Classification-Number changes will have been picked up and printed in TLC. In many cases where participating OCLC libraries derive their cataloging data from old LC printed cards it would be beneficial if they would consult TLC entries before they contribute retrospective cataloging to the OCLC data base.

Access to up-to-date LC Classification numbers, of course, will also be extremely important to libraries converting from Dewey to the LC Classification system. Moreover, OCLC participants can refer to TLC to find LC Class Numbers for those OCLC records which show only Dewey call numbers.

Carrollton: Dr. Mumford, you've demonstrated the usefulness and unique coverage of the *LC Title Index*. But the set is expensive (even with our pre-publication prices and extended payment plans). How can librarians justify its cost?

Mumford: I think the cost effectiveness of the set is best illustrated by the fact that for a one-time expenditure which is less than the year's salary of a cataloger, TLC will go on year after year saving time and money for a library's Reference, Acquisitions and Cataloging Departments — and do so during those future years when inflation will have increased staff salaries and other costs.

Looking at it another way, TLC records cost only $1.78 per thousand at the pre-publication price — and even less if paid in advance. The arguments for ordering the set now and paying in advance also seem impressive to me. Those libraries which ordered Mansell's *Pre-1956 Imprints* edition of the *National Union Catalog* when it was first announced paid less than half of today's price for that set. Also, the 10% prepayment discount on the Title Index amounts to a healthy $1,143. It is therefore obviously advantageous for libraries to get their orders on record now at the pre-publication price. That way, they'll be certain to get the "Z" volumes at the same price they paid for the "A" volumes.

To: Carrollton Press, Inc., 1911 Ft. Myer Drive, Arlington, Virginia 22209

Orders to United Kingdom and Western Europe c/o Mansell Publishing, 3 Bloomsbury Place, London WC1A 2QA England.

☐ Please record our order for the complete *Cumulative Title Index to the Classified Collections of the Library of Congress, 1978* at the Pre-publication, Set-discount Price. 132 hardcover volumes (approximately 100,000 pages) . . . $11,432. Deduct 10% or $1,143 if payment accompanies your order.

☐ Please record our order on a Subscription Basis @366/month (4 volumes) for _____ months (as we prefer not to encumber the total amount at this time). Deduct 10% ($36.80) for each month for which you wish to pay in advance.

☐ First Annual Supplement covering January 1, 1979, through December 31, 1979, five volumes . . . . . $485.

Name _____

Address _____

TABLE 1

DISTRIBUTION OF LC SUBJECT HEADINGS AND SUBDIVISIONS IN OCLC RECORDS—BY LC CLASS

LC Class	No. of Records in Class	Percentage of Records with x Subject Headings				Average No. of Headings	Average No. of Unique Headings	Number of Subdivisions per Subject Heading			
		0	1	2	3+			Form	Topical	Period	Place
A	211	19.9	38.9	24.6	16.6	1.427	1.351	.176	.176	.050	.153
B	2543	6.2	53.5	26.8	13.5	1.523	1.475	.239	.175	.029	.048
C	321	12.1	52.6	22.1	13.1	1.449	1.371	.217	.146	.019	.116
D	2350	2.0	47.3	33.8	16.8	1.726	1.566	.428	.279	.181	.137
E	657	2.9	44.1	32.9	20.1	1.782	1.588	.364	.383	.204	.142
F	982	2.1	40.6	34.0	23.2	1.896	1.687	.445	.272	.137	.172
G	742	0.8	50.9	29.5	18.7	1.751	1.639	.269	.135	.013	.353
H	3321	1.4	42.6	35.1	21.0	1.812	1.690	.192	.269	.032	.408
J	623	2.4	43.7	35.0	18.9	1.778	1.647	.202	.339	.077	.273
K	863	2.2	53.9	30.8	13.1	1.589	1.498	.240	.161	.003	.759
L	1004	4.2	50.6	32.6	12.6	1.575	1.527	.222	.205	.013	.370
M	516	3.5	61.2	22.7	12.6	1.516	1.438	.339	.156	.066	.088
N	1245	8.7	42.8	32.4	16.1	1.629	1.551	.265	.097	.053	.256
P	6649	56.2	27.3	11.6	5.0	0.674	0.632	.429	.176	.107	.063
Q	1959	1.1	47.7	33.4	17.8	1.726	1.647	.211	.109	.020	.205
R	899	20.8	35.8	28.0	15.4	1.412	1.349	.217	.234	.004	.138
S	706	19.4	32.3	32.4	15.9	1.493	1.421	.154	.168	.001	.404
T	1755	3.6	47.7	33.0	15.7	1.654	1.602	.194	.218	.003	.175
U	162	3.1	45.7	32.7	18.5	1.691	1.549	.120	.401	.026	.142
V	74	4.1	44.6	37.8	13.5	1.676	1.608	.250	.258	.000	.089
W	2	100.0	0.0	0.0	0.0	0.000	0.000	.000	.000	.000	.000
X	68	7.4	36.8	33.8	22.1	1.750	1.632	.227	.134	.025	.185
Y	2	50.0	0.0	0.0	50.0	2.000	1.500	.000	.000	.000	.250
Z	713	3.5	48.1	32.8	15.6	1.673	1.575	.814	.137	.025	.163
DDC	2848	34.4	34.2	22.4	9.1	1.089	1.029	.264	.213	.036	.214
XCL	287	23.3	34.8	27.5	14.3	1.362	1.321	.230	.299	.000	.476
THS	736	13.2	28.1	37.0	21.7	1.730	1.655	.090	.243	.027	.163
UCL	1217	26.7	36.9	24.0	12.4	1.276	1.202	.246	.203	.050	.341
	33455	18.6	40.8	26.8	13.8	1.406	1.323	.285	.211	.057	.228

Legend:
DDC = Dewey Decimal Classification. XCL = any classification other than Dewey or LC. THS = unclassified theses. UCL = other unclassified material.

gle term, then one subject heading will cover it adequately."[17] Multiple headings are assigned only under relatively restricted conditions. Similarly, this philosophy of subject analysis forbids the use of a "general heading and a specific one comprehending within it" for the same body of material.[18] As Chan points out, the two subject headings **"Mathematics"** and **"Algebra"** are not assigned to the same record. In any case, the summative approach of subject analysis tends to keep down the number of headings assigned to the catalog records. In fact, the data in the present sample indicated that this approach is followed in practice since more than 50 percent of all records which were assigned subject headings contained only one heading.

The summative approach of subject analysis as presently carried out severely limits the users' ability to retrieve OCLC records by subject. This criticism, however, has to be tempered in view of the presently available computer search capabilities. For instance, the heading **"Agricultural research—Statistics"** provides only one access point in the card catalog. But the fact that this heading consists of two precoordinated concepts and a subdivision raises the number of potential access points to three in a keyword-based computer retrieval system. However, this increase in the number of access points may not surmount the inherent weaknesses of the summative approach.

Subject Heading Types and Their Distribution

Topical headings were the most common type of subject heading in the catalog records. Of the 47,036 LC subject headings in the sample, 33,597 topical headings accounted for 71.4 percent of all headings. On the average there was one topical heading per record. However, the 33,597 topical headings occurred in only 62.4 percent of the records. Similarly, there were 6,826 geographic headings occurring in 14.9 percent of the records. Together, topical and geographical headings accounted for 85.9 percent of all the subject headings. Figure 3 shows the distribution of all types of subject headings in OCLC records. Figure 4 shows the percentages of OCLC records in which the different types of subject headings occur.

Distribution of Subdivisions

The various elements of subject headings and their subdivisions are explicitly identified in OCLC records by means of subfield codes. In the sample, sixteen types of subfields, excluding the first *a* subfield in each subject heading, occurred 42,442 times. This study, however, was primarily interested in the general, period, geographic, and form subdivisions (subfield codes *x*, *y*, *z*, *k* respectively). Of the 42,442 subfields in the sample, the subdivisions accounted for 36,659 subfields. In view of this dominance of subdivisions on the one hand and the relative unimportance of subfields such as *d* in subject retrieval on the other, this section emphasizes subdivisions over other subfields.

General and place subdivisions accounted for more than 90 percent of the subdivisions occurring in the subject headings. However, the general subdivision contains both topical and form subdivisions, the

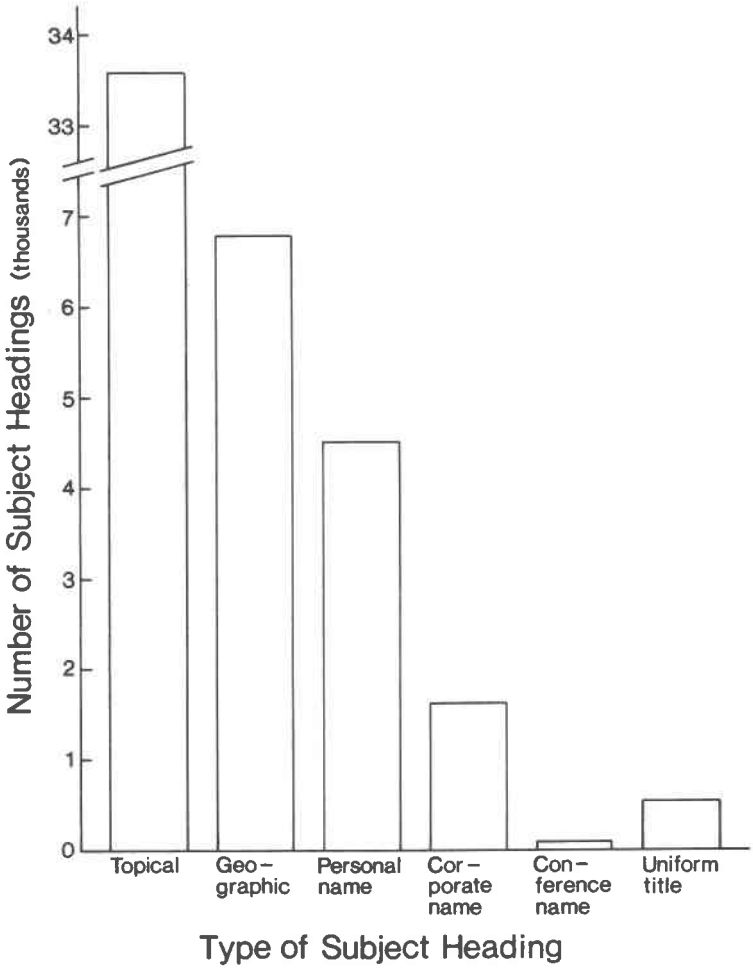


Figure 3
Number of Occurrences of Subject Heading Types

functions of which are dissimilar. The form subdivision represents "what the book is rather than what it is about" and describes "the form or arrangement of the subject matter in the book."[19] Examples within this category include "dictionaries" and "indexes." In contrast, topical subdivisions limit the concept expressed by the main heading to a special subtopic.[20] Examples of headings with topical subdivisions include "**St. Lawrence River—Power utilization**" and "**Alaska—Annexation.**"

In view of this significant difference between these two types of subdivisions, subdivisions listed in the *x* subfield were examined to separate form subdivisions from topical subdivisions. The list of "Most Commonly Used Subdivisions" included in the eighth edition of the *Library of Congress Subject Headings* was used as a guide in selecting

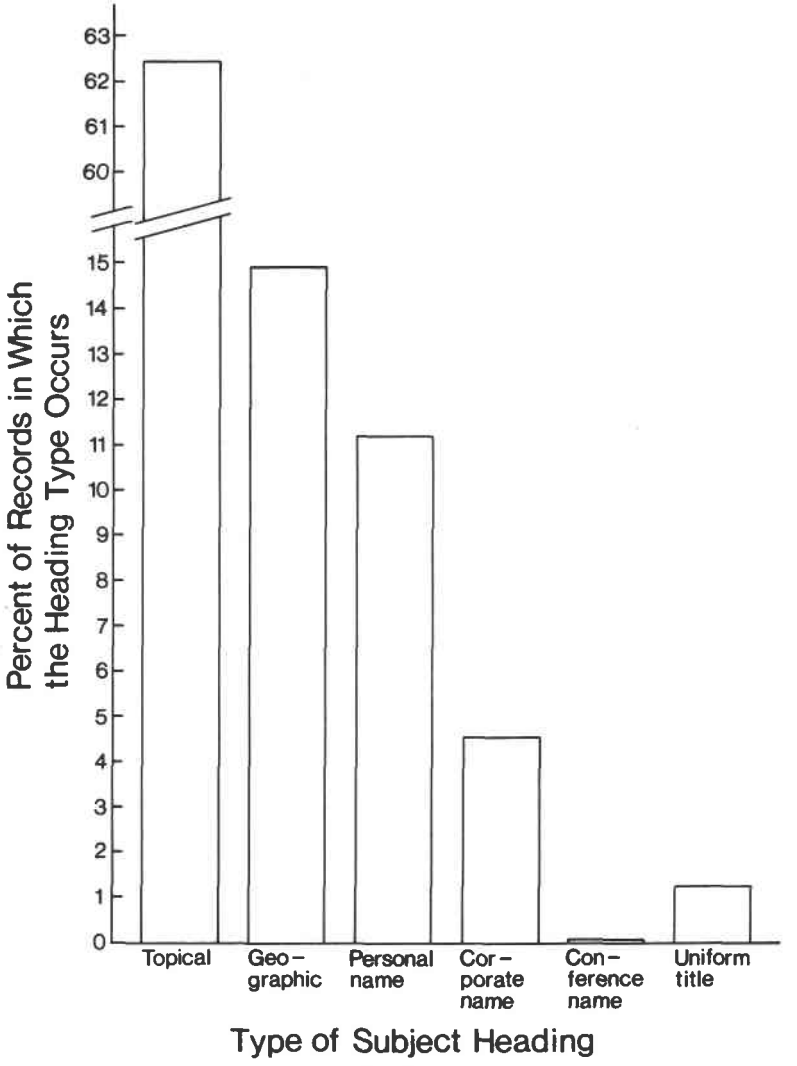


Figure 4
Percentage of Records in Which Subject Heading Types Occur

form subdivisions.[21] Some instances occurred where the subdivisions did not neatly fall into one or the other category. "History" is such an example. It can justifiably be classified both as a form subdivision and a topical subdivision. For example, when "History" subdivides a topical heading, it behaves more like a form subdivision. But when it subdivides a geographic heading, it corresponds to a topical subdivision. However, for the purpose of this study, "History" was treated as a form subdivision. There are several precedents for such a decision. Haykin, who attempted to provide "rationale and basic rules of prac-

tice in the choice and use of subject headings," identifies "History" as a general form subdivision.[22] Chan considers "History" as an example of "inner form" subdivision because it indicates the authors' approaches to their subjects.[23] Atherton, in her subject access project, also treats "History" as a form subdivision.[24] The complete list of the subdivisions treated as form subdivisions can be found in O'Neill and Aluri.[25] This list combines the form subdivisions from *k* subfields with those identified and separated from *x* subfields. Figure 5 presents the distribution of subdivisions taking this separation of form and topical subdivisions into consideration.

More than 70 percent of all subdivisions in the sample were either period, place, or form. This finding is in conformity with Haykin's notions of what subdivisions should be. He believes that subdivisions

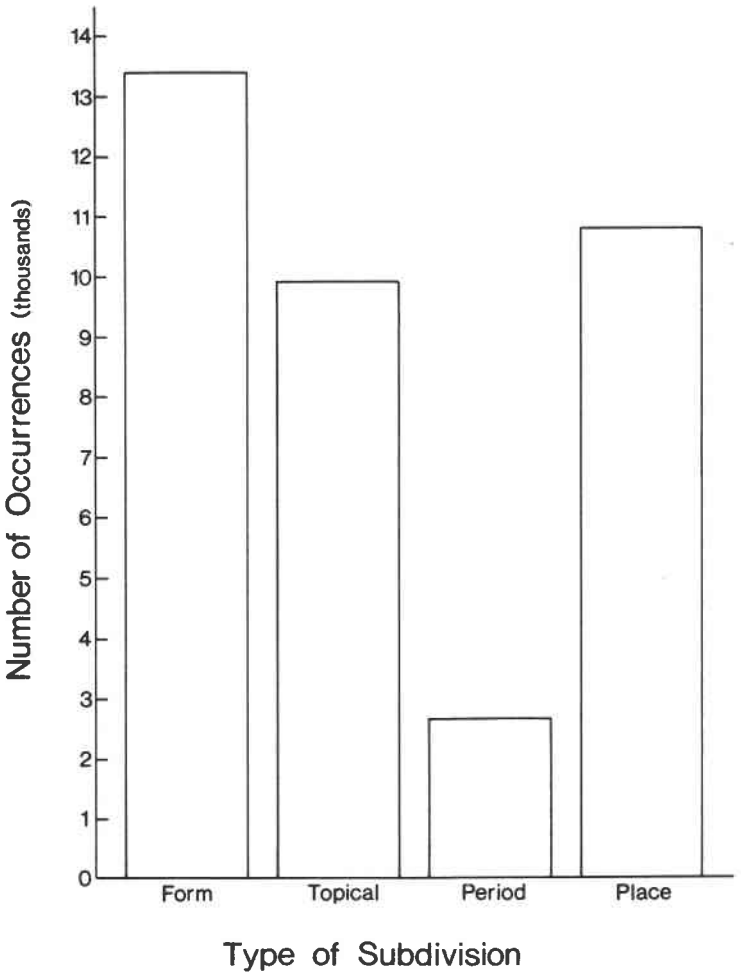


Figure 5
Subdivision Distribution

should be "limited to the form in which the subject matter is presented and the place and time to which it is limited."[26] In contrast, topical subdivisions have to be shunned because they are "contrary to the principle of specific entry" of an alphabetical subject catalog.[27] However, the fact that about 30 percent of the subdivisions in this sample were topical indicates the difficulty of following Haykin's admonition in subject cataloging practice.

The subdivision assignment practices seemed to vary with the type of subject heading. Table 2 shows this variation. For instance, personal name headings had fewer than average topical and place subdivisions. Topical subject headings had fewer topical and period subdivisions per heading than geographic subject headings.

TABLE 2

SUBDIVISION DISTRIBUTION IN DIFFERENT TYPES OF SUBJECT HEADINGS

Type of Subject Heading	Number of Subdivisions per Subject Heading			
	Form	Topical	Period	Place
Topical heading	0.25	0.16	0.03	0.31
Geographic heading	0.56	0.54	0.23	0.05
Personal name heading	0.14	0.07	0.01	0.00
Corporate name heading	0.23	0.15	0.01	0.02
Conference/meeting heading	0.07	0.00	0.00	0.02
Uniform title heading	0.57	0.30	0.00	0.00
All subject headings	0.29	0.21	0.06	0.23

VARIATION OF SUBJECT HEADING ASSIGNMENT PRACTICES WITH LC CLASS

The next question considered was whether or not subject cataloging practices vary with subject areas as defined by LC classes. The variation with the LC class of the following subject heading assignment practices was examined: (1) percent of books with 0, 1, 2, or 3+ subject headings per record; (2) types of subject headings assigned; and (3) distribution of subdivisions.

Table 1 presented the percentages of records with 0, 1, 2, and 3+ headings per record. A few classes, e.g., class P, had a regularly higher percentage of records with zero headings. That is, there was a clear relationship between the LC class and the catalogers' decisions not to assign subject headings. However, it is not certain whether once a cataloger decided to assign subject headings, there was a difference within LC classes as to the number of headings assigned (1, 2, 3+). A chi-square test, however, indicated a statistically significant association between LC class and the number of headings assigned even after excluding those records with zero headings.

Next, the sample was examined to determine if there was a relation between LC class and the type of subject heading assigned. Table 3 presents data on the assignment of topical, geographic, and personal name headings by LC class. Distinct clusters are noticeable in the case

of geographic and personal name headings For instance, classes D, E, F, and J had larger than average percentages of records with geographic headings; classes C, E, and N had a significant percentage of records with personal name headings. In contrast, topical headings dominated in classes such as Q, R, S, and T. The results were not surprising, since personal names are important in areas of art, literature, music, philosophy, and religion. Similarly, in history and political science, geographical names occur more frequently, while in science and technology, topical headings are of greater interest.

TABLE 3

ACCESS TO OCLC RECORDS BY SUBJECT HEADING TYPE

LC Class	Percent of Titles Indexed by Subject Heading Type		
	Topical	Geographic	Personal Name
A	63.5	12.8	9.5
B	68.2	4.6	20.5
C	40.8	18.1	39.9
D	39.0	66.2	18.9
E	52.1	43.2	23.4
F	35.9	77.7	15.6
G	90.2	18.5	5.1
H	86.7	19.0	3.0
J	68.5	35.2	3.0
K	90.3	5.2	3.5
L	87.7	2.1	3.9
M	78.5	0.8	22.5
N	69.9	6.5	24.5
P	29.1	2.4	16.1
Q	96.9	2.1	2.0
R	77.0	1.9	2.9
S	78.9	3.7	0.8
T	93.8	3.6	1.6
U	63.6	30.9	6.8
V	87.8	5.4	2.7
Z	77.8	12.9	11.9

Finally, tests were performed to determine if the use of subdivisions depends on LC classes. Results indicated some dependency, as shown in table 1. Classes D, E, and P had a larger number of period subdivisions per main heading; classes K, G, H, and S had a larger number of place subdivisions; classes D, E, F, M, P, and Z had a larger number of form subdivisions.

SUBJECT HEADING ASSIGNMENT PRACTICES IN LC AND CONTRIBUTED RECORDS

For the purpose of this section, contributed records were defined as only those records with LC class numbers. This exclusion of theses, unclassified materials, etc., made the comparison between LC and contributed records more meaningful since the distribution of non-LC class numbers is not similar between LC and contributed records. For

instance, only 2 out of 7,490 LC records had non-LC class numbers. In contrast, nearly 20 percent of contributed records had such numbers.

The most significant difference between LC and contributed records was that the latter tended to have a larger number of records with no subject headings. About 20 percent of contributed records were not assigned any subject headings while the corresponding figure for LC records was less than 10 percent. Figure 6 shows the distribution pattern of headings within LC and contributed records.

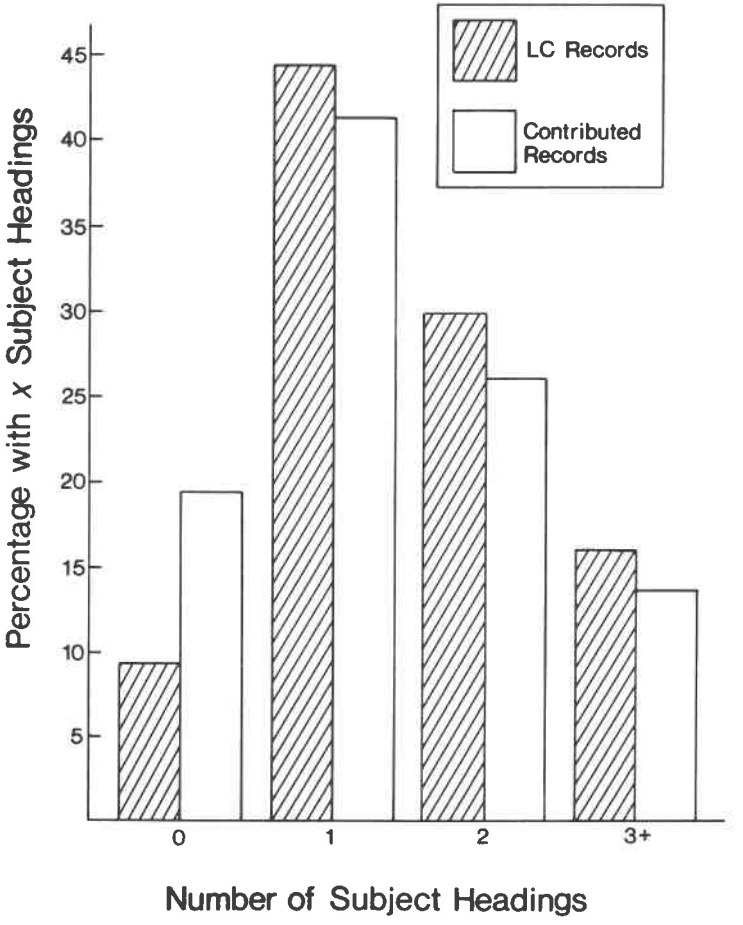


Figure 6
Subject Heading Pattern in LC and Contributed Records

In the same manner, there were statistically significant differences in the way subdivisions were assigned between LC and contributed records. For instance, LC seemed to employ a higher number of subdivisions, as shown in figure 7. While LC assigned 0.93 subdivisions per

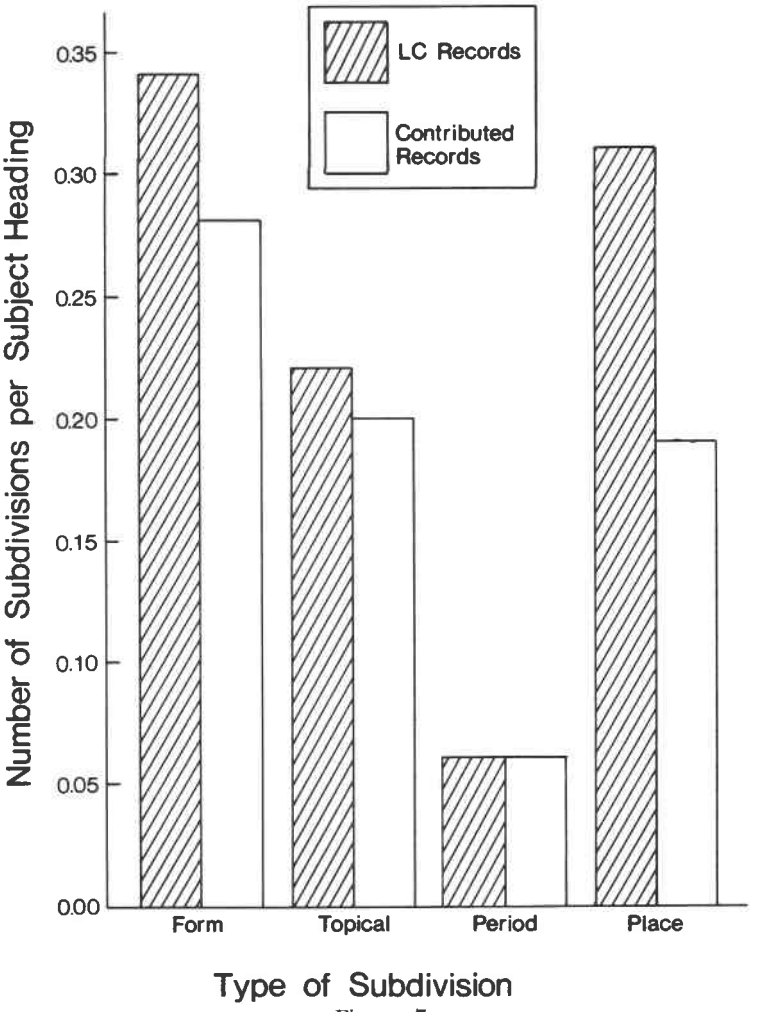


Figure 7
Subdivision Distribution Pattern in LC and Contributed Records

subject heading, member libraries assigned 0.73 subdivisions. This difference might be explained by the size of the LC collection and its greater need to differentiate among the headings.

SUMMARY

Overall, OCLC monographic book records had 1.41 subject headings per record. Once a cataloger decided to assign subject headings to a record, the predominant practice was to assign a maximum of two headings per record. Nearly 85 percent of the records with subject headings had either one or two headings assigned.

Topical headings were the most predominant type of heading

among the subject headings. Geographical and personal name headings also were used frequently. The least-used headings were uniform title, conference/meeting, and corporate name headings. Each OCLC record had an average of 1.1 subdivisions. Form, topical, and place subdivisions occurred with nearly equal frequencies. However, use of period subdivisions was rather infrequent.

There were statistically significant differences in the subject heading assignment pattern among LC classes. A few LC classes had a higher percentage of records with no subject headings. Class P alone accounted for 60 percent of all records that had no subject headings. However, in any given class, approximately 50 percent of the records with headings were assigned one heading, slightly more than 30 percent were assigned two headings, and the remainder were assigned three or more headings. Regarding the types of headings assigned, some classes were more likely to have geographical and personal name headings than others.

LC and contributed records differed in a statistically significant manner in subject heading assignment pattern. The contributed records had a greater percentage of records with no subject headings. LC records, on the other hand, had a slightly higher number of subdivisions than contributed records.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance of OCLC, Inc., and the numerous individuals associated with OCLC whose help was essential to the completion of this paper. Specifically, the authors would like to thank Richard Skopin for his drawings, Peggy Zimbeck for her editorial assistance, and Beckie Purdy for preparing the manuscript.

REFERENCES

1. David Judson Haykin, *Subject Headings: A Practical Guide* (Washington, D.C.: U.S. Govt. Print. Off., 1951), 140p.
2. Lois Mai Chan, *Library of Congress Subject Headings: Principles and Application* (Littleton, Colo: Libraries Unlimited, 1978), 347p.
3. E. J. Coates, *Subject Catalogues: Headings and Structure* (London: The Library Association, 1960), 186p.
4. Sanford Berman, *Prejudices and Antipathies: A Tract on the LC Subject Headings Concerning People* (Metuchen, N.J.: Scarecrow, 1971), 249p.
5. Marcia J. Bates, "Factors Affecting Subject Catalog Search Success," *Journal of the American Society for Information Science* 28:161–69 (May 1977).
6. Charles R. McClure, "Subject and Added Entries as Access to Information," *Journal of Academic Librarianship* 2:9–14 (March 1976).
7. Mary Dykstra, "The Lion That Squeaked," *Library Journal* 103:1570–72 (Sept. 1, 1978).
8. U.S. Library of Congress, *Cumulated MARC Statistics through March 1975* (unpublished, obtained from Automated Systems Office, Library of Congress, Washington, DC 20540).
9. Derek Austin and Jeremy A. Digger, "PRECIS: The Preserved Context Index System," *Library Resources & Technical Services* 21:13–30 (Winter 1977).
10. Pauline Atherton, *Books Are for Use: Final Report of the Subject Access Project to the Council on Library Resources* (Syracuse, N.Y.: Syracuse University, 1978), 172p.
11. U.S. Library of Congress. MARC Development Office, *Books: A MARC Format*, 5th

ed. (Washington, D.C.: U.S. Govt. Print. Off., 1972).
12. OCLC, Inc., *Fixed and Variable Field Tags for Books* (Columbus, Ohio: OCLC, Inc., Nov. 1978), 98p.
13. Edward T. O'Neill and Rao Aluri, *Subject Heading Patterns in OCLC Monographic Records* (OCLC Research Report no. OCLC/RDD/RR-79/1. [Columbus, Ohio: OCLC, Inc., 1979]). Submitted to ERIC, ERIC ED 184 592.
14. McClure, "Subject and Added Entries."
15. U.S. National Library of Medicine. MEDLARS Management Section, *On-line Services Reference Manual,* PB-227 167 (Springfield, Va.: National Technical Information Service, 1978), Section 6.4.1.
16. Chan, *Library of Congress Subject Headings*, p.159.
17. Haykin, *Subject Headings: A Practical Guide*, p.69.
18. Chan, *Library of Congress Subject Headings*, p.162.
19. Haykin, *Subject Headings: A Practical Guide*, p.27.
20. U.S. Library of Congress. Processing Department. Subject Catalog Division, *Library of Congress Subject Headings*, 8th ed. (Washington, D.C.: U.S. Govt. Print. Off., 1975), p.xii.
21. Ibid., p.xviii–lxxii.
22. Haykin, *Subject Headings: A Practical Guide*, p.28, 109.
23. Chan, *Library of Congress Subject Headings*, p.74.
24. Atherton, *Books Are for Use*, p.36.
25. O'Neill and Aluri, *Subject Heading Patterns.*
26. Haykin, *Subject Headings: A Practical Guide*, p.27.
27. Ibid., p.35–36.

Barcoding a Collection—Why, When, and How

Ann de Klerk

As a small to medium-sized library, Carnegie–Mellon University Libraries' approach to library automation was to aim for an integrated system. It was decided to label all items with machine-readable identifiers and enter the unique identifier into the data base at the time each record was created. The rationale for these decisions is discussed. Different types of machine-readable identification systems are reviewed. The type of labels chosen and the procedures used for labeling items and for entering the barcode information into the machine-readable record are discussed.

AN INCREASING NUMBER OF LIBRARIES are considering automation as a means of improving information delivery and operating more cost-effectively. One important factor, which impacts on a library's decision to automate, is its size. Large libraries have been pressured to automate by the repetitive handling of large volumes of records, which has caused the breakdown of their manual circulation systems. For these libraries, the cost of automating a single function can be justified. In smaller libraries manual operation of single functions can be maintained more or less satisfactorily; furthermore, the volume of transactions within a single function, e.g., circulation, cannot justify the purchase of an automated system. For these smaller libraries, one cost-effective approach is to automate multiple library functions in an integrated data base management system. Preparation for the implementation of a data base management system differs from that required to implement a stand-alone circulation system. The Carnegie–Mellon University experience serves as an illustration of the former approach.

Carnegie–Mellon University Libraries, as part of a small, privately supported institution, received a three-year grant in January 1978 to study the feasibility of automation for small and medium-sized academic libraries. For a library of our size (approximately one hundred fifty thousand classified titles or three hundred thirty thousand volumes, excluding periodicals), it was not clear whether separate library functions could be automated cost-effectively. Since many cir-

Ann de Klerk is the associate director of the Carnegie–Mellon University Libraries. Manuscript received November 1979; accepted for publication January 1980.

culation packages are commercially available today, we had, at an early stage, considered automating our circulation system alone. However, our current manual system was handling an annual circulation of approximately one hundred thousand effectively. Further, a Carnegie–Mellon University Libraries' feasibility study, completed in 1979, showed that while costs of introducing an automated circulation system that would, in effect, simply replicate current manual service could not be justified, the cost of an integrated data base management system handling all library functions could be justified over time.

It was necessary to create a machine-readable data base of the entire library collection, to prepare for the integrated system. While it is not the purpose of this paper to discuss the steps Carnegie–Mellon University Libraries took to define the data base management system and to establish the requirements for the data base records, the importance of these fundamental steps cannot be underestimated. It should be noted also, that this paper refers only to classified titles and not to the periodical collection. Machine-readable records, accumulated from OCLC cataloging since 1975, formed the nucleus of the data base. To create machine-readable records for those items cataloged before 1975, we initiated a conversion program in 1978 using the OCLC data base. These records, however, refer to titles only and it is necessary for circulation and inventory control purposes to identify and label each copy and/or volume of a given title. It was for this reason—the need to label and identify each item in the collection—that we undertook the barcoding project.

The first step in the project was to review the available machine-readable identification systems. The two major technologies used for these systems are barcode and optical character recognition (OCR), with barcodes being currently more widely used than OCR. Readers may want to consult the report by Egyhazy and Lovelace for a detailed discussion of both technologies.[1] Literature is also available from the label manufacturers and from automated circulation system vendors. Barcodes are machine-readable only; therefore, the barcode labels include also the eye-readable characters equivalent to the code. This makes them larger than OCR labels, which require only one set of information that can be read both by humans and machines. In addition to their larger size, the "stringent technical requirements for printing" make barcode labels more expensive.[2] Barcodes can be read very reliably with handheld light pens or stationary laser scanners. Unfortunately, the OCR scanning equipment, the handheld OCR gun, does not consistently produce accurate readings. Until more reliable equipment is available for optical character recognition, barcodes can be expected to retain their greater popularity.

Three types of barcodes are currently available: Codabar, Universal Product Code, and Intermec's Code 39. All three are flexible, secure, and highly readable. The Universal Product Code (UPC) encodes numeric characters only. Codabar includes a limited number of alphabetic characters, whereas Intermec can handle the full alphanumeric set. UPC is no longer used in a library automation system.

Codabar is currently used by Cincinnati Electronics, C. L. Systems Inc., Gaylord, and Systems Control. At least two other systems, Dataphase and Universal Library Systems, have the capability of using the Codabar type of label. The Intermec code is used in the ILS system, developed at the Lister Hill National Center for Biomedical Communications.[3]

Factors to be considered in the use of barcodes for library applications include the significance of the code, the physical characteristics of the labels, and their placement on library materials. An important concern is the content of the code: is the code to represent a sequential number, randomly assigned, that serves merely to distinguish one item from another, or is meaningful information to be encoded? As noted by Markuson, "for various technical reasons, these codes do not lend themselves to call number recording."[4] A fourteen-digit random number barcode prefixed by type and library designators has become the de facto standard label because of its wide use. This Codabar label, marketed primarily by Monarch, is used in approximately three hundred fifty libraries automated by C. L. Systems Inc., and in other libraries automated by Systems Control Inc. The first digit indicates to the system the category of barcode that is being read: a barcode for a cataloged item, for instance, a periodical, or a patron. Use of this initial digit as a category designator increases the number of sequential numbers available. The second through fifth digits form a four-digit library identification code, potentially useful in networking and in distinguishing books which belong to other libraries. The next eight digits represent a sequential number that is randomly assigned and unique to each item or person in the category. The last digit is the check digit.

Some libraries, however, have decided to use meaningful, or "intelligent," barcodes. The University of Bath uses accession numbers in encoding the labels for items in its SWALCAP-Telepen circulation system.[5] An example of an intelligent barcode is found in the ILS system, which encodes significant information into the barcodes.

> Item identifiers have the following components:
> Item type/class (locally defined)
> Title identifier (unique for the title)
> Volume/issue/part/supplement, etc.
> Copy number[6]

The use of this intelligent barcode allows the streamlining of system software and can enhance response time. However, it does require local computer-based printing of the barcodes. The application of barcodes, which must match particular library items, is much more time consuming than applying barcodes randomly.[7] Replacement is also more difficult.

The placement of the label or labels varies among libraries. Many libraries place one label inside the book front or back and one outside.[8,9] From the point of view of reading labels on the shelf for inventory purposes with a portable scanner, the most convenient place for the

label is the spine of the book. However, spines are frequently not wide enough to permit this kind of application. The second most convenient place for the label is on the back cover, a location where at least the necessity of opening each book and of completely removing it from the shelf can be avoided. In the early days of barcoding, adhesiveness and legibility were a problem. Today, labels are photocomposed and better adhesives have been developed so that problems of smudged ink, abrasion, and lost labels are rare. Labels appear to be extremely durable although they have not been in use long enough to justify claims that they will last for the life of the item. Although most labels have a wear-resistant surface, some libraries have covered the outside label with transparent tape for protection against abrasion, removal, and possible damage by dampness. Covering the label is discouraged since the resultant surface glare impairs readability.

Librarians considering barcoding, prior to selecting an automated system, will be concerned about compatability of the barcodes with the system they eventually choose, both as regards scanning equipment and system software. Fortunately, "most barcodes scanning devices can, with slight modifications, interpret UPC, CODABAR, Code 39 and other barcode types."[10] Differences in codes can also be accommodated by software modification.[11] At Carnegie–Mellon University, we decided to use the Codabar label supplied by Data Composition, Inc., of Santa Clara, California.

Following our decision to barcode, the next issue we confronted was the scheduling of the project within our plan for establishing an integrated data base management system. We perceived a significant saving of time in entering the barcodes, which identify particular items, at the same time as the machine-readable record describing each title was created. We wanted to enter the barcode information when we cataloged new acquisitions on the OCLC data base and when we converted records retrospectively. This scheduling avoided the necessity of calling up all the records again to enter the barcode numbers. We decided, therefore, to proceed with barcoding monographic items before cataloging and conversion and, in this way, to eliminiate an editing step. We see other advantages in barcoding when creating the data base. Once all records are on-line, a collection can be inventoried frequently, using a portable barcode reader and cassette recorder. The recorded tape can be matched against the machine-readable file of total library holdings and a list of missing items generated. With the use of one student employee, this form of inventory can be performed at a significantly lower cost than by our manual system, which requires two people, one of whom is a regular staff member.

An additional scheduling issue, the order in which the various parts of the collection were to be barcoded, arose from the probability that the circulation module, as part of the data base management system, would be implemented before the total on-line catalog and inventory control modules. Only 50 percent of the records need to be in machine-readable form when the automated circulation module becomes operational.[12] However, these should be records for high-use

materials to ensure that most of the items that will be charged out are already recorded in the data base. It has been shown in the Kent study that titles which have circulated once are more likely to circulate again.[13] Specifically, we planned to start barcoding and conversion in high-use areas that also contained a low proportion of OCLC records. Therefore, to confirm our perception of high-use/low-OCLC areas, for two months, October and February, we checked all book cards for books charged out against the shelflist, in which the OCLC cards are readily distinguishable.

Methods for labeling items with barcodes and reading the barcodes into the machine-readable records were developed. For current acquisitions, single labels are affixed to the upper-left-hand corner of the back cover of the book. For labeling of books already cataloged, a duplicate set of labels is used, one for the item and one for the shelflist. We have monitored the condition of the labels applied during the summer of 1979 and have not observed any deterioration. Should deterioration become evident, we will order labels for future use in sets of three to allow one to be placed inside the book. We may also experiment with covering the label with dull transparent tape.

The single label is attached to current acquisitions before the cataloging information is entered on OCLC and the barcode is read into the record by means of a barcode interface, the TPS-300, marketed by TPS Electronics, Palo Alto, California, which can be readily attached to the OCLC terminal. The barcode is read into the 049, or holdings, field by means of a light pen. This technique avoids the operator error which could result from keying in the data, and saves time. The following example shows the content of the 049 field containing copy and barcode information for three volumes of a title:

6 049 PMCD c 1 v 1 (!38482000617957") v 2
(!38482000617965") v 3 (!38482000617973").

For each of the barcode numbers, enclosed in parentheses, the initial *3* means that the barcode refers to a cataloged item. The code *8482* represents the library, Carnegie–Mellon University Libraries. The final digit (*7* in the first example and *5* in the second) is the check digit. A note, *bc*, is entered into the 910 field, which is printed out only on the shelflist, to indicate that the title has been barcoded. An example of the 910 field that includes local acquisitions notes is shown below:

12 910 Pub., 7/50. bc

For current acquisitions, it is not necessary to enter the barcode numbers themselves on the shelflist. If a new number must be assigned, the old number will be edited out of our own data base and the new number read in from the item, using another barcode interface, a TPS-200, attached to our editing terminal. For information on our edit program readers may consult an article by William R. Pringle.[14]

For converting and entering barcode information on holdings already cataloged, a different method was required since we did not

wish to bring all items from the stacks and planned to convert from the shelflist. Teams of three, consisting of one experienced support staff member and two work-study students, worked for two or three one-hour sessions each day. The sessions were not consecutive to avoid fatigue and to achieve a high degree of accuracy; subsequent spot checks attested to the soundness of this procedure. A barcode label for each copy and volume, with the exception of continuations, was attached to the shelflist. A duplicate barcode label was placed on the corresponding item on the shelf. Procedures for later labeling of items missing from the circulating shelves (reference, reserve, out on loan, etc.) were established. Once labels had been attached to the shelflist card, the barcode number could be read into the corresponding machine-readable record at the time the shelflist record was converted, once again using the TPS-300 barcode interface.

Costs and staffing requirements are reviewed as a guide to others considering barcoding. During the summer of 1979, 765 staff hours were required for the project. Of these, 510 hours were student hours, paid at the work-study rate, at a cost of $281 to the library. The cost for the 255 hours of regular support staff time, at an average hourly rate of $4.50, including fringe benefits, amounted to $1,147.50. An average of 145 items were labeled per hour. About one hundred hours of follow-up work, at a cost of $450, were necessary, for a total labor cost of $1,878.50. The barcodes cost 2.577 cents each, purchased in lots of one hundred thousand. It should be pointed out that 90 percent of the labor cost routinely would have been devoted to inventory, which regularly takes place every summer. The barcoding procedure was simultaneously an inventory, because those items not found after several searches were regarded as missing. In the space of seven weeks during the summer of 1979, more than 75,000 labels were handled and approximately 37,500 items were barcoded, corresponding to approximately 30,000 records, or one-fifth of the titles in the book collection. Our goal was to have enough barcoded shelflist cards to keep the conversion staff supplied until the summer of 1980 when more items (114,000) were barcoded. We converted retrospectively 19,375 titles during the academic year of 1979–80, making a total of 26,973 titles converted. Including current cataloging, the total number of machine-readable records was more than fifty thousand, equivalent to one-third of the titles in the book collection by September 1980.

In summary, this paper has shown generally how small and medium-sized libraries may differ from large libraries in their approach to automation and specifically how one aspect of preparing the complete machine-readable data base can be handled: that of identifying each item. We have shown why we decided to barcode the collection and how scheduling of the barcoding before cataloging new titles and converting records for older material has streamlined the process of creating the data base and will avoid considerable editing

later. The method developed for applying the barcodes has resulted in efficient and accurate labeling. Costs exceeded routine inventory costs by only a small amount. At Carnegie–Mellon University, this approach will result in the accumulation of a sufficient number of machine-readable records to implement the circulation module of the integrated system in the near future and in the development of a total library data base within two years. This data base will make it possible for us to implement an automated inventory control module and to initiate an on-line catalog.

ACKNOWLEDGMENTS

The author wishes to acknowledge valuable discussions with Stephanie Evancho.

REFERENCES

1. C. J. Egyhazy and J. S. Lovelace, *Machine Readable Identification Systems for Library Materials*, Lister Hill Contract Report CR 7701 [on cover: CR 7801] (Bethesda, Md.: Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, 1978).
2. Barbara Evans Markuson, "Granting Amnesty and Other Fascinating Aspects of Automated Circulation; a Review of Recent Developments for Non-Experts," *American Libraries* 9:206 (April 1978).
3. Lister Hill National Center for Biomedical Communications [Computer Technology Branch], "The Integrated Library System: Overview and Status, October 1, 1979" (Attachment to a memorandum to Scientific Review Committee, National Library of Medicine, from Chief, CTB, LHNCBC, Oct. 2, 1979), p.II–8.
4. Markuson, "Granting Amnesty," p.206.
5. Keith Jones, "Bath University Preparing for Telepen," *Vine* 24:15 (Aug. 1978).
6. Lister Hill National Center for Biomedical Communications [Computer Technology Branch], "The Integrated Library System," p.II–8.
7. Jones, "Bath University Preparing for Telepen," p.16.
8. Rob McGee, "The University of Chicago Library's JRL 1000 Circulation Terminal and Bar-Coded Labels," *Journal of Library Automation* 8:24–25 (March 1975).
9. Jones, "Bath University Preparing for Telepen," p.15.
10. Egyhazy and Lovelace, *Machine Readable Identification Systems*, p.51.
11. Lister Hill National Center for Biomedical Communications [Computer Technology Branch], "The Integrated Library System," p.II–9.
12. Paula Dranov, *Automated Library Circulation Systems, 1977–78* (White Plains, N.Y.: Knowledge Industry Publications, c1977), p.73.
13. Allen Kent, *A Cost-Benefit Model of Some Critical Library Operations in Terms of Use of Materials; Final Report* (Pittsburgh, Pa.: University of Pittsburgh, 1978).
14. William R. Pringle and Sally Donahey, "An Interactive Editing Program for OCLC Tapes," in K. L. Montgomery, comp., *The Power of Information; Collected Papers Presented at the ASIS 9th Mid-Year Meeting, May 14–17, 1980, Robert Morris College, Pittsburgh, Pa.* (Washington, D.C.: American Society for Information Science, 1980), abstract, p.21; full paper, fiche no.3.

Directions for Research in Indexing, Classification, and Cataloging

Elaine Svenonius

This paper speculates on directions for research in the field of bibliographical control, where bibliographical control is taken to include indexing, classification, and cataloging. The approach taken is to consider questions in the field that need answering. The position taken is that while concerns of a how-to-do-it nature drive this field's research, which is of an evaluative or developmental nature, there is a strong need for this research to be backed by basic theoretical research.

THIS PAPER SPECULATES on directions for research in the field of bibliographical control. Insofar as the questions asked by a field determine the direction of its research and scholarly growth, the approach taken will be to consider those questions that seem most to need answers.[1] Bibliographical control, as a field, will be taken to include indexing, classification, and cataloging.

While it has scientific foundations, bibliographical control is primarily a technology. The word *technology* derives from the Greek *techné*, meaning "skill" or "art." The skill or art involved in the practice of bibliographical control is that of organizing knowledge (information) for retrieval. Because it is a technology, concerns of a how-to-do-it kind drive research in the field of bibliographical control. These concerns are of two kinds: (1) the need to solve a problem, e.g., how to automate a particular function; and (2) the need to make a decision, e.g., how to choose among alternative ways of performing a function. Research that contributes to decision making is for the most part evaluative research, while problem-solving research is largely developmental research. Research questions of a developmental nature generally relate to the design of new systems. It goes without saying that the results of evaluative research, for instance, the comparison of two systems for bibliographical control, have implications for the design of new systems.

Elaine Svenonius is an associate professor, Graduate School of Librarianship and Information Management, University of Denver. She is a member of the Policy and Research Committee of the Cataloging and Classification Section, which initiated, encouraged, and substantively contributed to this article. Manuscript received May 1980; accepted for publication September 1980.

INDEXING

An obvious evaluative research question in the area of subject indexing is which of several systems for indicating the subject of a text is superior. This question is more than a century old, but what constitutes an acceptable answer to it has undergone radical change. Until the late 1950s comparisons of competing indexing systems tended to be fairly subjective, at times even tinged with emotion. An example of this is the long and apparently still continuing controversy over the respective virtues of the alphabetic and classified approaches to subject indication.[2] So rousing at times was this controversy that Ranganathan was led to plead *pancha sila*, that in the comparing of indexing systems there be no heat or extraneous dogma.[3] A turning point came with the publication of the results of the Cranfield I experiment in 1962.[4] The experiment, though technically faulty, was of landmark significance in that it demonstrated the possibility and desirability of seeking objective procedures for comparing indexing systems. Progress resulted because the question asked was changed. The general question—which subject approach to information was superior—was made specific: which indexing system performs most effectively in retrieval, "effectively" being operationally defined in terms of precision and recall? Changing the question and introducing operational definitions not only resulted in a spurt of progress; it also changed our understanding of what constitutes evidential acceptability in the evaluation of competing indexing systems.

Now, in the 1980s, how do we proceed to compare two indexing systems? For example, how might we compare PRECIS (Preserved Context Indexing System) and LCSH (Library of Congress Subject Headings)? Can we ask which performs better in terms of precision and recall, following the Cranfield model? Today, the question and the model no longer seem productive of insights. Experiments following the Cranfield model still suffer from poor design, exhibiting lack of experimental controls, lack of external validity (due to limited document collections and artificially constructed questions), and lack of validity in the definition of the independent and dependent variables. A few paragraphs will be devoted to the last of these flaws, because it is unlikely any breakthrough can be made until corrective measures are taken.

The difficulties relating to the defining of the dependent variable have been well documented. Insofar as measures of retrieval performance depend upon relevance assessments, they are subject to the twin charges of invalidity and unreliability. They are unreliable insofar as relevance judgments are viewpoint dependent. They are invalid insofar as that which the retrieval measurements (precision and recall) actually measure does not correlate well with what they purport to measure, namely, some benefit to the user. There have been many critical but few constructive approaches to the problem of operationalizing the concept of "benefit to the user." Precision and recall, when they were introduced in the late fifties, had something of a revolution-

ary force; but today they and the derivative measures they spawned have lost some of their credibility. This status suggests it may be time to turn back again to fundamental questions. For instance, to how many users is the recall power of an index of any great significance? Might not other features of an index have more claim as "benefits," for instance, the size of its entry vocabulary or its ease of use, particularly in narrowing a search?

Less attention has been given to defining the independent variable in retrieval experiments. In Cranfield I various indexing systems were compared, that is, "indexing system" was the independent variable manipulated by the researchers. But "indexing system" was never well defined; it was rather like an aggregate variable comprising different components at different times. If we compare PRECIS with LCSH, what are we comparing? Two different indexes? Two different indexing/searching systems? Two different indexing languages? The application or use of two different indexing languages? Two tools for authority control? Assuming we look upon LCSH and PRECIS as two different indexing languages, then to compare them we perforce need a suitable technical vocabulary for describing them. Linguists are skilled in the abstract characterization of languages, but for the most part they deal with natural languages. Indexing languages, being languages designed for special purposes, must be characterized with respect to those purposes. This is a case where developmental research—here the development of a metalanguage in which to talk about index languages—must precede evaluative, empirically based research.

Since Cranfield I, there has been a tendency moving away from the comparison of total systems toward singling out certain individual features of index languages and seeing how variations in these affect user satisfaction. Depth and breadth of indexing are two statistical features of index languages that have been studied thus.[5,6] Often two index languages, such as LCSH and PRECIS, differ in important syntactic features. A constructive approach to comparing index languages might be to evaluate such features, one-by-one. The most obvious difference between PRECIS and LCSH is that the former is mostly synthetic, making use of faceting, whereas the latter is mostly enumerative. Another difference is that with PRECIS it is usually possible to designate the subject of a text by one "coextensive" entry, i.e., the indexing is "single entry specific,"[7] whereas with LCSH often more than one heading is needed to adequately express the subject of a text. A third difference is that the syntax of the PRECIS language is more consistent, thus more predictable, than that of LCSH, and it is also more expressive. Research, then, might be directed toward determining the cost-effectiveness of syntactic index language features such as synthetic capability, degree of coextensivity, consistency, and expressiveness.

Index language semantics also seems a promising area for research. The semantic relations of an index language are of two kinds, the meaning relationships that exist between different index terms and the meaning relationships that index terms bear to the texts they in-

dex. The former type of relationships, e.g., synonymy, inclusion, etc., are discussed in the section of this paper that deals with classification. The latter type of relationships, the relationships index terms bear to the texts they index, is only beginning to claim researchers' attention and it is doing so under the rubric *aboutness*.[8]

It is surprising that aboutness concerns are so recent since they lie at the heart of what makes for good indexing. A reason for this might be that indirectly they were receiving attention in another context, that of relevance. Attempts to explicate relevance have been notably unsuccessful, and perhaps the time has come to abandon them and move to another domain. A move from relevance to aboutness might have the further advantage of attracting help from other disciplines, e.g., philosophy and linguistics, in solving the perplexing problem mentioned earlier, namely, the operationalization of "user satisfaction."

A concept as abstract as aboutness might seem almost too theoretical. However, a stumbling block in the way of developing better means of bibliographical control has been the lack of a general theory of bibliographic description. An instance of this, mentioned earlier, is the lack of a metalanguage suitable for the description and comparison of various indexing languages. Among its other concerns, a general theory of bibliographic description would deal with the relationship index terms bear to the text they index, that is, with aboutness. Aboutness may be regarded as a relationship between a sign (index term) and what is signified (subject content). The relationship is a "meaning" relationship and might be looked at from the view of different theories of meaning. Of particular use (perhaps) might be a naming theory of meaning wherein words are looked upon as names or labels of the things they signify or refer to. While as a general theory of meaning, the naming theory runs into difficulty (e.g., there are many words that do not name things that are physical objects, such as love, truth, and beauty), it might be appropriate when language is used for the special purpose of organizing information.[9] In this use, an index term or subject heading can be seen as naming a set of bibliographic items. For instance, the index term *botany* labels or names the set of all books or documents that are about botany. Can the naming relationship in the context of index languages be construed as the aboutness relationship? Another question: when is a given text about x, y, or z?—that is, when would someone interested in x, y, or z find this text relevant?

Related to studies of aboutness are studies of indexing consistency. Consistency studies were carried out in profusion during the sixties,[10] with the same result repeated again and again that indexers were inconsistent in their judgment as to what a given text was about. Curiosity stopped short of explanation, however. It could be argued that it is not really surprising that indexers are inconsistent. It is more surprising to see as much consistency as there is in the assigning of index terms. It could be asked what common assumptions activated by what textual clues are responsible for the consensus that does exist as to

what a given text is about. Is this the same consensus we find in judgments about the relevance of a text to a retrieval question? Possibly agreement among indexers as to what a given text is about could be increased by specifying certain conditions representing the indexing context. It has been suggested that the apparent inconsistency shown in studies in the sixties resulted from the fact that the concepts selected for indexing were verbalized differently by different indexers at different levels of specificity.[11] Suggestions such as these might be examined in experiments in which consistency is construed as a dependent variable and the independent variables of interest would be the texts indexed, stratified by subject matter or homogeneity of language, or the indexing instructions given, stratified by amount or kind. Inconsistency might be studied under the same experimental conditions.

History has shown that when human labor can be replaced by machine, labor productivity increases. It seems obvious that indexing research should be directed toward improving techniques for machine or machine-assisted indexing. The question is how the automatic extraction of descriptors or keywords from text can be improved, and it relates as much to searching texts as to indexing them. A first step might be to consider how much text beyond a title is needed to obtain a useful set of descriptors. While this question was posed frequently during the sixties, we still know very little about the comparative effectiveness of automatic indexing, particularly in the softer nonscientific disciplines.[12] It would seem that texts in the humanities and the social sciences have to be "treated" in some manner if the automatic indexing of them is to be effective. The present practice of enhancement, that is, supplying additional relevant terms, can be regarded as a form of vocabulary control. Distinguishing homonyms is another form of vocabulary control. A question that might be raised is whether these vocabulary control treatments themselves might be automated, or is there something about humanities and social sciences literature that will forever block development in this direction?

Another approach to the improvement of automatic indexing would be to develop better extraction techniques. Statistical extraction techniques have become much more sophisticated since it was first postulated that good index terms, in the sense of being content-bearing words, were substantive and occurred frequently. Interesting hypotheses have been developed about the distribution of content-bearing words, e.g., that they follow a 2-Poisson model.[13] No doubt more hypotheses will be advanced. Such hypotheses need much testing over texts in different disciplines and texts exhibiting differing degrees of vocabulary homogeneity.

In developing hypotheses for the location of content-bearing words and the testing of them, the very fundamental question "what is a good index term?" should not be forgotten. While an index term's goodness is related to the document it indexes, it must also be related to the indexed collection as a whole and to users of the collection. An index term may be content-bearing and indicate what a document is

about, but it fails if it does not also serve to cluster documents that are like and discriminate documents that are different. (Are "to discriminate" and "to cluster" incompatible desiderata?) And while an index term may satisfy criteria of aboutness, discriminability, and clusterability, it still will fail as a retrieval handle if it is unlikely to be found in most users' vocabularies.

Particularly valuable in developing better extraction techniques would be the devising of extraction methods that go beyond merely selecting single-word descriptors from texts. It seems to be true that indexing methods tend to develop in the direction of achieving more precision. The attempt to extract multiword descriptors from texts might be viewed as a step in this direction. This is a research area where contributions from computational linguistics might prove useful. It might be possible, for instance, to adapt for indexing purposes computer understanding programs that incorporate, in addition to parsing algorithms, procedures for detecting semantically related words. An early use of semantic networks for information retrieval can be seen in the work of Quillian.[14] An interesting, more recent approach is that of Braun and Schwind, which looks at semantic rules for validating word pairs.[15] Within information science, somewhat unorthodox approaches to the problem of multiword machine indexing have been made by Steinacker[16] and Klingbiel.[17] These approaches do not rely on a borrowed linguistics, but for that very reason they may be important as signaling the beginning of a special-purpose linguistics developing within information science.

To conclude this section on indexing, an ultimate kind of question might be asked: with a paperless society in the offing, why do we need to develop indexing techniques at all, automatic or otherwise? Would it not be a better use of research effort to concentrate on developing better search strategies to be used at the time of retrieval? This is an important question, one deserving serious thought. A start would be to consider the assumptions it makes, e.g., that the full texts of documents can be searched on-line, that these texts can be searched in their natural language state, that there will be no further use for printed indexes. Such assumptions are eminently debatable. Take the natural language assumption: opposing it is the speculation that a standardized representation of knowledge (information), one that avoids the anomalies of natural language, will be required for the functioning of artificial intelligence systems, including those designed particularly for the retrieval of information. Take the assumption that full texts will be searched on-line: opposing it is the speculation that this will increase indexing depth, which in turn would have a seriously deleterious effect on precision. However true or false such speculation, research into improving techniques for indexing should sometimes pause and ask if indexing is needed at all.

Classification

Analogous to the questions relating to the choice among competing indexing systems is the question as to which of several classifications is

superior. There are theoretical approaches to the comparative evaluation of classification systems, among them performing retrieval experiments and, more informally, examining to see whether certain system objectives are met. However, looking to decision-making contexts, for instance, where a particular institution has decided to change from one classification to another, seldom do we see much weight given to considerations of a theoretical nature. Research of a theoretical nature is hardly needed to tell American academic and public librarians that they would be wise to adopt either the Dewey Decimal Classification (DDC) or the Library of Congress Classification (LCC). Practical considerations dominate. It is economically sound to use a classification system that conforms to international standards and appears on MARC records. Seldom is there ever really a choice between the mass-produced product and the custom-designed one; particularly is this so for classifications (and thesauri), the updating of which is a highly labor-intensive activity. Actually, it is sad to stand by and watch the gradual demise of certain elegant classifications which, because of lack of funds, cannot continue to be maintained.

To completely eschew questions of a theoretical nature, however, would show lack of foresight. One theoretical question that might be asked is which classification, LCC or DDC, is better fitted for survival, not from an economic point of view but in view of its adaptability. The adaptability of a classification must depend on whether or not it possesses certain features; the identification of such features is a subject for research, possibly simulation research. One such feature might be notation. Ranganathan worried that the LCC might be headed for a notational crash,[18] and frequently one hears dismay expressed at the length of Dewey numbers.[19] Another feature affecting the adaptability of a classification might be hospitality. The degree to which numbers are crowded, the degree to which convenience rather than principle dictates the classing of books, will likely affect a classification's usefulness and possibly its chances of survival. Problems of hospitality are at the root of growing doubt about whether any universal classification can minister adequately to special needs.[20] Still another feature affecting the adaptability of a classification might be the degree of synthesis incorporated. DDC is moving in the direction of assuming more of the synthetic capability that characterizes the Colon Classification. LCC, on the other hand, continues in its enumerative mode. Presumably what is fittest will survive best. The synthetic approach, especially as it involves faceting, is fashionable now. When it comes to the design of schedules, it is space saving and elegant in its conceptual simplicity. When it comes to arranging books on shelves, it seems patently less useful than an enumerative, hierarchical approach. This raises a question analogous to the one asked at the end of the last section, namely, whether we need a classification at all.

The main use for classification, at least in the United States, has been to facilitate browsing of books on shelves. A possible future use might be to facilitate the browsing of machine-readable bibliographic records at a computer terminal. Shelf browsing is an entrenched

American tradition, but an activity about which relatively little is known. What would happen if books were no longer arranged on shelves in a classified order? What if stacks were closed and books were ordered on shelves by accession number? Probably money would be saved, yet users might be seriously disserviced. How would the cost-benefit equation balance? Recently it was found, in a particular academic setting, that books obtained by means of browsing were judged less useful than books obtained by other means.[21] If such a finding could be validated to a reasonable level of generalizability (say, all large research libraries), then it might be asked with real concern why we incur the expense of arranging books on shelves in a classified order. Obviously, there are certain contexts, e.g., the public library, where the idea of dispensing with shelf browsing seems preposterous. We assume there are reasons for shelf browsing other than for the retrieval of books useful for a consciously formulated purpose, reasons that might be lumped under the heading *serendipity*. Still, we might ask, what is the nature of shelf browsing and in what contexts is it useful, important, or necessary?

A further question is to what extent can shelf browsing be replaced by browsing at a computer terminal? It seems inevitable that shelf browsing will at least in part be replaced by computer browsing, since this will allow for a larger browsing territory—the holdings not of one but of a large number of institutions. And thus the question arises, will classificatory structures be used to assist browsing at computer terminals? The survival value of a classification might well be linked to its ability to adapt to a machine environment. Looking at the relative merits of DDC and LCC in an automated environment, it would seem at first sight that the Dewey hierarchical notation gives it an edge over LCC. However, if DDC were to be examined from the point of view of perfect hierarchy, where perfect hierarchy is defined in terms of the mathematical properties associated with the inclusion relation (transitivity, antisymmetry, and reflexivity), it would soon be seen to be shot through with imperfection.[22] Another consideration is that the very expressivity of notation that would seem to recommend DDC might work against the classification's hospitality. Expressivity and hospitality of notation tend to be conflicting desiderata, a predicament that has led to the egregious practice of "classification by attraction," that is, ignoring the discipline to which a book belongs, because it does not appear in sufficient specificity in the schedules, and classing it under some aspect of its subject, which is specific.[23] A consequence of this practice is that where Dewey numbers are truncated, as is done in smaller special libraries, there may be a tendency for unrelated items to cluster on the shelves. A similar unwanted clustering might be expected when searches are "broadened" in on-line retrieval. With some insight Richmond suggested that because LCC, for the most part, is *not* arranged logically or hierarchically, it might be better suited to an automated environment.[24] As early as 1969, she made the further interesting suggestion that a tool could be developed for on-line retrieval that combined the schedules and indexes of several classifications.[25]

Classifications designed for use in machine searching need not be subject to the constraint of linearization that characterizes both LCC and DCC, or any other classification designed primarily for shelf arrangement. Liberated from this constraint, automated information retrieval can make use of faceted and polyhierarchical classifications with their greater descriptive power. Polyhierarchical classifications, except in the arrangement of their headings, exhibit structures similar to thesauri. These structures, viewed as systems, may be defined as the totality of relationships that hold between the headings comprised by the classification. As was indicated earlier, such relationships are semantic relationships; they are primarily of three kinds: the so-called hierarchical relationship, the order relationship, and the syndetic "see" and "see-also" relationships. To analyze classifications in terms of their general structural properties, as a system of relationships, is a kind of basic research. Ranganathan called for it as early as 1964 at the Elsinore conference.[26] Without it we are without the vocabulary for formulating specifications for the design of on-line systems utilizing classificatory structures.

When we come to ask about the usefulness of classificatory structures for machine searching (and admit the possibility of polyhierarchical classifications), we are asking a much broader question: we are asking about the usefulness of vocabulary control. A first principle that has guided the design of classifications, subject heading systems, and thesauri since the time of Cutter is that all information on the same subject should be brought together. Cutter's classic formulation of this principle is to found in his "Objects" of the card catalog.[27] By Haykin's time this principle was referred to as the "Unity Principle,"[28] and it is now called "vocabulary control."[29] For most of the twentieth century, this principle has gone unquestioned, but now it is under attack. First, a number of retrieval experiments have produced the result that, as far as users are concerned, uncontrolled natural language indexing is good enough.[30] Why bother then with a sophisticated system of vocabulary control that recognizes relationships among terms? (As noted earlier, there are serious flaws in the design of past retrieval experiments; it would be rash to rely seriously on their conclusions.) A second challenge comes from the realization that vocabulary control is very expensive. Cost/benefit considerations cannot be ignored. How many users are there who search data bases, happily, without benefit of a tool for vocabulary control? From the point of view of those whose business it is to "organize knowledge," one would hope none, or at least a very few; but certainly this is not the case. The degree to which it is or is not the case is an important research concern, since it affects both development, viz., the design and construction of thesauri, and decision making, viz., whether subject authority control should be incorporated into future data base design. The degree to which subject control could be usefully refined might be examined with respect to different disciplines, e.g., the social sciences and humanities, say, as opposed to the sciences, and with respect to different environments, e.g., in a unilingual as opposed to a bilingual research

community like that existing in Canada, or a multilingual community, if a cross-cultural system or universal application is an ultimate goal.

Another fruitful direction for classification research is toward the machine and machine-aided construction of classifications (thesauri). Machine-aided techniques that use the computer to construct reciprocal relationships and to ensure internal consistency in classificatory structures are well understood, albeit not yet imaginatively used in actual retrieval systems. The completely automatic generation of classificatory structures is more problematical. Considerable effort over the last thirty years has been directed to the development of clustering procedures for automatically classing documents. To date, however, these procedures have not proven themselves in any sizable operating environment. Moreover, they are very costly. Cost concerns might become less serious as progress brings about improved hardware and software, but serious still will be concerns about the actual usefulness of these clustering procedures that have been adapted from the statistical methods of numerical taxonomy.[31] The classic tools for vocabulary control, thesauri, classification schedules, and subject heading lists are by their very nature semantic structures. How can semantic structures be derived by statistical means? That there is a statistic-semantic interface seems plausible, but it has been little mentioned in the literature. Words that tend to cooccur frequently bear an associative relationship to each other, a relationship that may be more or less semantic in nature. The possible semantic dimensions of associative, particularly syntagmatic, relationships need to be investigated. Inasmuch as scientific research is said to begin with description and classification, the study of cooccurrence relationships might begin by constructing a typology of them geared toward identifying those of potential use in thesauri construction. The work of the Linguistic String Project at New York University in analyzing object-verb-object cooccurrence statistics seems to be moving in this direction.[32]

Problems relating to the compatibility, convertability, and translatability of tools for vocabulary control claimed the attention of researchers in the sixties. Recently there has been a resurgence of interest. One indication of this is that within the last few years several international conferences have addressed compatibility questions. One of the largest of these took place in Latvia in September 1977 and hosted fifty-four papers on the subject.[33] Compatibility questions are discussed under various rubrics, such as *multilingual thesauri*, *subject switching*, and *transparent systems*. Three multilingual thesauri projects of interest are the Broad System of Ordering,[34] the endeavor to make PRECIS multilingual,[35] and Eurodicautom, a computerized terminology system designed for users of Euronet.[36] Compatibility questions arise also within the environment of a single natural language, as happens when a user must search multiple data bases to find all material relevant to his request. Translating a request into the several different vocabularies of each of the data bases is an onerous task, in terms of both time and money, and it is also one that is likely to be imperfectly performed if it relies on only the semantic relations perceived by the search-

er at the time of his search. The ideal situation would be to have a transparent system where a search prescription formulated in the user's own (natural) vocabulary is automatically switched into each of the vocabularies of the various data bases.[37] An example of this kind of subject switching has been developed by Niehoff for energy data bases.[38]

While switching mechanisms and conversion tables have been constructed to achieve convertability, there have been few demonstrations of effectiveness and few cost justifications. Also there are some basic theoretical problems still waiting to be addressed. For one, while switching languages generally have relied on broad umbrella classifications, there is an opposing body of opinion maintaining that a switching language must necessarily use a vocabulary more specific than that of any of the languages to be translated, so specific in fact that the feasibility of a true switching language may be conditional upon the possibility of finding a method of semantic factoring.[39] Another theoretical problem is that the construction of a conversion table requires operational criteria for deciding when two terms are "equivalent." Although in earlier work degrees or levels of equivalence have been recognized—e.g., identity, synonymy, and generics—they have not been well defined, nor perhaps have they been sufficiently numerous. Bibliographical control in the face of proliferating bibliographic data bases is a need that calls for invention in the direction of developing better switching mechanisms and conversion tables. Recent developments in linguistics, and particularly in computational linguistics, may prove the means of this invention.

CATALOGING

Ideally, whenever a new cataloging code is being designed each projected change should be viewed in terms of its impact, that is, in terms of the cost of implementing it and the benefits that might be expected to accrue from it. Cost/benefit analyses, however, must be based on a strong conceptual foundation. The establishment of such a foundation involves the asking of fundamental questions, many of which lend themselves to being addressed in a research mode. Some of these are considered in the following.

The act of cataloging can be regarded as providing descriptions for items that belong to a bibliographic universe. A first fundamental question is how this universe is to be delineated, i.e., what are the items that are to be described bibliographically: anything that embodies information? Anything that anyone puts into libraries, including realia? (Why do we catalog books, yet index periodical articles?) In delineating a bibliographic universe, classes and subclasses of items are defined. Thus, in AACR2, a General Material Designation is "a term indicating the broad class of material to which an item belongs"[40] and a Specific Material Designation is "a term indicating the special class of material (usually the class of physical object) to which an item belongs."[41] The defining of classes and subclasses is both art and science. Helpful in class definition are the various canons of classification

that have been established on the basis of logic and experience. Among the most useful of these are those of mutual exclusivity and total exhaustivity. (AACR2 sins with respect to both, particularly in the definitions of designations relating to music.) When defining classes, it is important that the conditions for class membership be explicitly defined. If possible, the characteristics of division should be defined operationally. An instance where this is not done is in the definition of serials, in which the characteristic of "intention" is used to distinguish monographs from serials (a serial is intended to be continued indefinitely, whereas a monograph is not).[42] How does one ascertain or measure intention? The construction of good classifications is the basis and beginning of science. It is research of a fundamental kind and it is essential to developing a theory of description, such as is embodied in a code of cataloging rules.

In designing a theory of bibliographic description, a crucial decision concerns the data elements that should be included in the description of a bibliographic item. Today's machine environment encourages the notion that an item can be given more than one description, that there can be descriptions of varying levels of fullness; so the question generalized becomes what data elements should be included in descriptions at varying fullness levels. It is a question for empirical research. Already there is a fair amount of evidence attesting that most public and academic library users are not interested in more than about five data elements.[43] Probably no more research is needed to confirm this, but research is needed to establish the needs of other users such as librarians: what data elements do they use, why, and how often? It seems obvious that all important user groups should be questioned in this manner prior to designing a theory of description.

Another question of a fundamental nature is whether each item in the bibliographic universe is to be described in the same way, i.e., by the same set of data elements. It is commonly assumed that an integrated catalog wherein materials of differing physical formats are described in terms of similar data elements is a good thing—but it is the business of research to challenge assumptions. Uniform bibliographic descriptions might not be to the liking of catalog users. In a recently published catalog of a large music collection one reads: "The catalogers had to strike a balance between strict adherence to standard cataloging rules and common usage among performing musicians."[44] Similar sentiments might be expressed by government documents' librarians, catalogers of cartographic materials, or organizers of social science data files. It is conceivable, given the objective of user convenience, that different types of items in our bibliographic universe warrant wholly different kinds of descriptions. Some users' studies exist suggesting that this may be the case; other investigations of the question are needed.[45]

A related question has to do with standardization. How much standardization should be required in a bibliographic description? The reconciliation of the British and North American texts of the *Rules* represents a step toward standardized bibliographic descriptions. On the

other hand, the large number of options and interpretations provided by the new *Rules* seems to be a step in the opposite direction. The question of standardization bears on the possibility of cooperative cataloging. It is thus a cost-effectiveness question and it is addressable on both national and local levels. In a given situation, what is the optimal balance between adherence to a standard and freedom to adjust cataloging to meet local needs? In speculating on an answer, it might be recalled that seventy-five years ago Cutter lamented that the golden age of cataloging was over.[46] He was led to this lament when the Library of Congress initiated its printed card distribution service. What he was lamenting was that cataloging had become a lost art, because hereafter it would be performed centrally; interestingly, he rejoiced that this new turn of events would be better for the pockets of the public. How true was Cutter's prophecy? Many libraries still today alter every bibliographic record they receive from an outside source. At what cost? Are there user studies to justify custom tailoring?

The above questions of uniformity and standardization have to do with choice of data elements to be included in bibliographic descriptions. A subsequent question, much aired in the literature, is whether one of these data elements should be designated as "primary" or "main." A popular argument is that the fact that machine retrieval allows a user a variety of access points to bibliographic records obviates the need for unique access points, i.e., main entries. Research and imagination are needed here. Unique access points may be required for purposes other than the simple retrieval of bibliographic records, among them to produce printed single-entry bibliographies, to organize subfiles consistently in a data base, and to link bibliographically connected items.

A related question, and also one much discussed, concerns the validity of the authorship principle. This principle, which has dominated the tradition of Western cataloging, has had the effect, whenever possible, of making the creator of the intellectual content of a bibliographic item the primary data element to be used in its description, no matter whether the item is a book, a journal, a map, a government document, or a popular recording. It is not natural to search for a popular recording, a map, or a serial by author and over the years users' objections have led to a weakening of the authorship principle. How often in the history of indexing and cataloging do we see a conflict between user convenience and systematic methods of description! A manifestation of this conflict was just observed in the discussion of standardized versus custom-tailored bibliographic descriptions. The resolving of such conflicts cannot be done a priori, but must take into consideration user convenience and costs. A balance must be struck.

The above questions have had to do with choice of data elements to be included in a bibliographic description. Once these questions are answered, then questions relating to the tooling of these data elements must be addressed: in other words, how does one decide on form of heading or access point? Again users' preferences should be noted. Is Tolstoy to be preferred to Tolstoi or should the name be written in

Cyrillic script? Is it necessary to have the same conventions for expressing uniform titles and authors' names? Would a user be confused upon seeing the uniform title for *War and Peace* romanized (*Voina i mir*) and the author's name written as Tolstoy? Might not users prefer a consistent usage rather than a guessed-at common usage? In a somewhat different context Cutter observed that following common usage inevitably results in a certain amount of inconsistency in choice and form of heading.[47] This is again a manifestation of the conflict between user convenience and systematic description, and resolving it requires the gathering of evidence. Do catalogers in fact spend much time ascertaining the name by which a person is commonly known? Given that this is possible, is it economically justifiable? Honest answers to these questions should inform catalog code design.

How to link different forms of name is an important design question in the construction of a theory of bibliographic description. Particularly now it is important since it seems plausible that a better handling of linkage information can be achieved in a machine environment than was possible in a manual one. Traditionally one of the functions of the authorship principle has been to invest the main entry with collocating power. The step taken by AACR2 in denying authorship status to corporate bodies represents a dramatic break with the past and, consequently, a diminishing of the power of main entries to link related items, e.g., serials produced by the same corporate bodies will be scattered. But this may not be a fault; it would depend on one's theory of bibliographic description and the role of linkages within it. From the point of view of file design, it might be more efficient to treat uniformly the various types of linkages employed in cataloging practice: linkages between bibliographic items that stand in a part-whole relationship, linkages between items that are connected over time (continues, supersedes, etc.), linkages between different editions or manifestations of a "work," linkages between equivalent names and titles, and linkages of the "see also" types. Other questions of efficient file design need researching, such as how is linkage information to be accessed, should all linkage information be contained in an authority file, and how are authority and bibliographic files to be interfaced? But again, it is necessary to stand back. The fundamental question here is how much authority control is really needed. It may be argued, analogously with the arguments against vocabulary control, that linking related items, "the other side of cataloging," is not cost-effective.[48] This argument is already being tested in the marketplace; a more rational approach would be to test it by research.

This paper began with the observation that research in the field of bibliographical control has a predominantly practical end, and throughout there has been a plea for more cost-effectiveness studies. But there is also a need for theoretical or fundamental research. An equally strong theme throughout the paper has been an insistence that theory should inform and precede the practice of both evaluative and developmental research. To adapt a phrase: theory without practice is empty, but practice without theory is blind.

References

1. Susanne K. Langer, *Philosophy in a New Key* (New York: New Amer. Lib., 1949), p.1–2.
2. Elaine Svenonius, "Good Indexing: A Question of Evidence," *Library Science with a Slant to Documentation* 12:34–35 (June 1975).
3. Shiyali R. Ranganathan, *Prolegomena to Library Classification* (2d ed.; London: Library Assn., 1957), p.402.
4. Cyril W. Cleverdon, *Report on the Testing and Analysis of an Investigation into the Comparative Efficiency of Indexing Systems,* Aslib Cranfield Research Project (Cranfield, Eng., 1962).
5. Don R. Swanson, "On Indexing Depth and Retrieval Effectiveness," in *Second Congress on the Information System Sciences [Papers]* (Washington, D.C.: Spartan Books, 1965), p.311–19.
6. Elaine Svenonius, "The Effect of Indexing Specificity on Retrieval Performance" (Ph.D. dissertation, Univ. of Chicago, 1970).
7. Richard S. Angell, "Library of Congress Subject Headings—Review and Forecast," in *Subject Retrieval in the Seventies; New Directions,* ed. Hans H. Wellisch and Thomas D. Wilson (Westport, Conn.: Greenwood, 1972), p. 153.
8. William J. Hutchins, "The Concept of 'Aboutness' in Subject Indexing," *Aslib Proceedings* 30:172–81 (May 1978).
9. Elaine Svenonius, "Facets as Semantic Categories," in *Klassifikation und Erkenntnis II,* ed. W. Dahlberg, Studien zur Klassifikation, Bd. 5 (Frankfurt: Gesellschaft für Klassifikation, 1979), p.57–79.
10. William S. Cooper, "Is Interindexer Consistency a Hobgoblin?" *American Documentation* 20:268–78 (July 1969).
11. Elaine Svenonius, Dean Harris, and W. Boyd Rayward, "The Testing of Interindexer Consistency at Various Depths," Studies in Indexing Depth and Retrieval Effectiveness, NSF GN 380 (Chicago: Univ. of Chicago, 1966).
12. Gerard Salton, *Automatic Information Organization and Retrieval* (New York: McGraw-Hill, 1968), p.319–21.
13. Stephen P. Harter, "A Probabilistic Approach to Automatic Keyword Indexing," *Journal of the American Society for Information Science,* pt.1, 26:197–206 (July/Aug. 1975); pt.2, 26:280–89 (Sept./Oct. 1975); Abraham Bookstein and Don R. Swanson, "Probabilistic Models for Automatic Indexing," *Journal of the American Society for Information Science* 25:312–18 (Sept./Oct. 1974).
14. Ross Quillian, "The Teachable Language Comprehender: A Simulation Program and Theory of Language," *Communications of the Association for Computing Machinery* 12:459–76 (Aug. 1969).
15. Stephan Braun and Camilla Schwind, "Automatic, Semantics-Based Indexing of Natural Language Texts for Information Retrieval Systems," *Information Processing and Management* 12:147–53 (1976).
16. Ivo Steinacker, "Indexing and Automatic Significance Analysis," *Journal of the American Society for Information Science* 25:237–41 (July/Aug. 1974).
17. Paul H. Klingbiel, "Machine-Aided Indexing of Technical Literature," *Information Storage and Retrieval* 9:79–84 (Feb. 1973).
18. Shiyali R. Ranganathan, *Philosophy of Library Classification,* Library Research Monographs, v.2 (Copenhagen: E. Munksgaard, 1951), p.29–30.
19. Sarah K. Vann, "Dewey Decimal Classification," in *Classification in the 1970s: A Second Look,* ed. Arthur Maltby (rev. ed.; London: Clive Bingley, 1976), p.237–38.
20. Rasmus Mölgaard-Hansen, "On the Problem of Universality in Knowledge Classification," in *Conceptual Basis of the Classification of Knowledge; Proceedings of the Ottawa Conference on the Conceptual Basis of the Classification of Knowledge, Oct. 1–5, 1971,* ed. Jerzy A. Wojciechowski (Pullach/München: Verlag Dokumentation, 1974), p.161–69.
21. R. J. Green, "The Effectiveness of Browsing," *College & Research Libraries* 38:313–16 (July 1977).
22. Elaine Svenonius, "Library Classification Lattices" (Master's thesis, Univ. of Chicago, 1965), chap. 3.

23. Antony C. Foskett, *The Subject Approach to Information* (3d ed.; London: Clive Bingley, 1977), p.284.
24. Phyllis A. Richmond, "A Reconsideration of Enumerative Classification for Current Information Needs," *Ciência da Informação* 3:5–19 (1974).
25. Ibid.
26. Shiyali R. Ranganathan, "Library Classification through a Century," in *Classification Research; Proceedings of the Second International Study Conference [on Classification Research]*, ed. Pauline Atherton (Copenhagen: Munksgaard, 1965), p.33.
27. Charles A. Cutter, *Rules for a Dictionary Catalog* (4th ed., rewritten; Washington, D.C.: Govt. Print. Off., 1904), p.12.
28. David Judson Haykin, *Subject Headings, a Practical Guide* (Washington, D.C.: Govt. Print. Off., 1951), p.7.
29. Frederick W. Lancaster, *Vocabulary Control for Information Retrieval* (Washington, D.C.: Information Resources Press, 1972).
30. Cyril Cleverdon, Jack Mills, and Michael Keen, *Factors Determining the Performance of Indexing Systems*, Aslib Cranfield Research Project, 2v. (Cranfield, Eng., 1966), 2:263b.
31. Wilfrid W. Lancaster and Linda C. Smith, "Associative Processing," *Bulletin of the American Society for Information Science* 5:27–28 (Aug. 1979).
32. Lynette Hirschman, Ralph Grishman, and Naomi Sager, "Gramatically-Based Automatic Word Class Formation," *Information Processing and Management* 11:39–57 (June 1975).
33. *Edinaja Sistema Informacionno-Poickovych Jasykov, Unified System of Information Retrieval Languages*, Summaries of papers presented at an All-Union Conference held in Yurmala, Latvian SSR, 6–8 Sept. 1977 (Riga: Latvia Universitet, 1977), as cited in *International Classification* 5, no.3 (Nov. 1978), Appendix 1A, p.14.
34. International Federation for Documentation, BSO Panel, *Broad System of Ordering; Schedule and Index*, 3d revision, FID publication 564 (The Hague: FID, 1978).
35. Jutta Sørensen, "Multilingual Aspects of PRECIS," in *The PRECIS Index System; Principles, Applications and Prospects; Proceedings of the International PRECIS Workshop*, ed. Hans H. Wellisch (New York: Wilson, 1977), p.94–96.
36. J. Goetschalckx, "Eurodicautom," in *Translating and the Computer*, ed. Barbara M. Snell (Amsterdam: North-Holland, 1979), p. 71–76.
37. M. E. Williams, "Online Retrieval—Today and Tomorrow," *On-line Review* 2:353–66 (1978).
38. Robert T. Niehoff, *Development of an Integrated Energy Vocabulary; Final Report, April 1975 to Feb. 1976* (Columbus: Battelle Columbus Laboratories, 1976).
39. Elaine Svenonius, "Translation between Hierarchical Structures: An Exercise in Abstract Classification," forthcoming in "The Proceedings of the Third International Study Conference on Classification Research."
40. *Anglo-American Cataloguing Rules*, 2d ed., ed. Michael Gorman and Paul W. Winkler (Chicago: American Library Assn., 1978), p.566.
41. Ibid., p.571.
42. Ibid., p.570.
43. James Krikelas, "Catalog Use Studies and Their Implications," in *Advances in Librarianship*, v.3, ed. Melvin J. Voigt (New York: Seminar Press, 1972), p.195–220.
44. Philadelphia, Free Library. Edwin A. Fleisher Music Collection, *Edwin A. Fleisher Collection of Orchestral Music in the Free Library of Philadelphia: A Cumulative Catalog, 1929–1977* (Boston: G. K. Hall, 1979), p.xii.
45. Howard D. White, "Toward a National Information System for Social Science Data Files," *Journal of the American Society for Information Science* 28:313–22 (Nov. 1977).
46. Cutter, *Rules for a Dictionary Catalog*, p.5.
47. Ibid., p.6.
48. Frances Ohmes and J. F. Jones, "The Other Half of Cataloging," *Library Resources & Technical Services* 17:320–29 (Summer 1973).

The Bibliotaphic Libraries of the Year 2000

Harold Wooster

This paper is an unsavory mixture of library automation literature and science fiction. The author attempts to fill the ecological vacuum to be caused by the disappearance of the card catalog by the invention of the ultimate amiable user interface. For lagniappe, the author embeds this dream console in a framework of underground bibliotaphic libraries connected by broadband communication networks and bicycle messengers.

THIS IS MY FOURTH EXERCISE in tampering with the tenses, or futurism, or nonlinear extrapolation from a single point on a curve. In "Machina Versatilis—A Modern Fable" I used a giant Indigenous Defense in Our Time (IDIOT) computer to solve a variety of problems, including the use of coordinate indexing to find suitable playmates for the king.[1] For a Robert A. Fairthorne festschrift I wrote another fable, "Marking and Parking," which told how women had invented Subject Classification and Shelving, Descriptive Cataloging, and the Card Catalog.[2] It was still regarded as sexist; I even got the full hissing and feet-stamping treatment at one library school! By men! Both of these yarns described events at a comfortable distance away in time—I never did say whether they occurred in the past or future. Then ASIS pinned me down for the bicentennial issue of the bulletin, and I wrote "The American Information Science Society—2076."[3] I abolished automobiles and replaced them with bicycles; abolished airplanes and converted airstrips to vegetable gardens—transcontinental travel was done in people-pods in freight trains, and transoceanic travel in sailing ships; populated our skylines with giant windmills; roofed over much of the West with solar cells; and even revived Pasamaquoddy. Most of us stayed home, earning our livings by keypunching, indexing and cross-connecting, and creating hypertext (a concept I borrowed from Ted Nelson's *Computer Lib*).[4] The grand design is for everything written by the peoples of the world to be tied together in

---

Harold Wooster is the special assistant for program development, Lister Hill National Center for Biomedical Communications, National Library of Medicine. Manuscript received August 1979; accepted for publication September 1979. No copyright is claimed on this article, which the author wrote as an employee of the United States Government.

hypertext for, as I concluded, "Putting humanity's entire heritage into one completely interlinked hypertext is going to take a while, but it can and will be done. We must be ready for the Greater Galactic Plenipotentiary when she returns."

The year 2000, the subject of this article, is uncomfortably close. There is at least a probability that I might be still alive by then, although you'd probably have to mix my words with geriatric gruel to make me eat them. So let me start out with a fact with which no reasonable person can disagree, and extrapolate from there. The fact—the first one of the few facts you are going to get in this essay—is that we are going to close our card catalogs. As a user I think that this is terrible; as a would-be entrepreneur I think that it's wonderful. As soon as I can find some inexpensive warehouse space, I plan to start collecting old card catalogs as inexpensively as I can, preferably for the cost of hauling them away in my van. With a sheet of ⅛" Masonite in the bottom of each tray they make great parts storage bins for home workshops; every household needs one for recipes and addresses. The cards I'll start doling out slowly to avoid flooding the market. The sorts of folks who collect beer cans, baseball bubblegum cards, and postage stamps should flip over this exciting new field, collecting catalog cards. Early handwritten cards will be rarities, and priced accordingly.

Why are we closing our catalogs? Not just because the heads of two national libraries have said that we're going to, although that is a pretty good reason. The current crusader for "delenda est" seems to be Michael Gorman, director of technical services at the University of Illinois, Urbana-Champaign. Speaking to a group of Stanford University librarians in February 1979, Gorman is reported as saying that:

> The single search term used for subject searches in these kinds of catalogs (microform and card) that discourages their use is replaced in online catalogs with the ability to do subject searches based on more than one search term. Thus, said Mr. Gorman, online catalogs are more conducive to subject searches, and, in fact, he predicted that catalog use would "increase enormously" because of the effectiveness and ease of use of online systems.
>
> Card catalogs are resistant to change, he said, and when improvements are wanted, they are difficult to implement because of the conflicts arising from former practices.
>
> Mr. Gorman suggested that labor costs will increase more over the years than machine costs will, so that replacing labor with an automated system will lower costs eventually, even though the initial costs of maintaining a paper system and those for starting a machine system may be the same.[5]

Marcia Bates, of the School of Librarianship, University of Washington, reported on a study of "Factors Affecting Subject Catalog Search Success."[6] She found, not unsurprisingly, that "catalog familiarity was found to have a very significant beneficial effect on search matching success, and subject familiarity a slight, but not significant, detrimental effect!"[7] Her summary and conclusions said, in part:

> What about use of the LC system over the long term? To find the (often just one) place where the monographs on a subject are to be found in the catalog,

one must come into the catalog with both the right subject term selection and phrasing, and the precisely correct level of specificity. In addition, there may be few see-also references and there will be no superordinate see-also references.

The current academic library subject catalogs were developed under conditions of severe resource limitations. With more than one or two subject entries per book, card catalogs would have become cumbrously large—hard to use, hard to file in, hard to find room for. In the early days, catalog entries often had to be hand-written. The current subject heading system, therefore, was deliberately developed to be minimally redundant.

But with automation, we have the opportunity to introduce many access points to a given book. We can now use a subject approach—not necessarily coordinate indexing—that allows the naive user, unconscious of and uninterested in the complexities of synonymy and vocabulary control, to blunder on to desired subjects, to be guided, without realizing it, by a redundant but carefully controlled subject access system.

And now is the time to change—indeed, with MARC already so highly developed, past time. If we simply transfer the austerity-based LC subject heading approach to expensive computer systems, then we have used our computers merely to embalm the constraints that were imposed on library systems back before typewriters came into use!"[8]

What happens if we forget previous constraints, instead of embalming them? Let's assume that a very high-resolution (2,000 lines to the inch) visual display, or television screen, is going to be an important part of our future terminals. The problems of reading, for hours on end, visual displays are not dissimilar to those involved in using microform viewers. Ten years ago I did a study for COSATI on what users thought of the microfiche that several federal agencies were then ramming down their collective gullets.[9] A major class of complaints came from those of us of the bifocal generation who found that sitting with our heads racked back to view the screen through the lower segments of bifocals was, literally, a pain in the neck! Viewing angles and distances are important; most of us are well adapted to reading books on our laps or on our desks. *Popular Science* tells me that through the wonders of electroluminescent or plasma displays, home television sets are going to hang on the wall and be no thicker than paintings. I want a viewing screen I can unclip from the terminal and hold in my lap.

In years past the Air Force Office of Scientific Research funded enough research on speech recognition and understanding systems to convince me that such systems, for an unlimited vocabulary or an unlimited number of speakers, are not going to be with us by the year 2000. (There are some limited-vocabulary systems available right now which would be great for reading your shelflists, if any of you did it often enough to invest in the equipment.) We're stuck with keyboard access for the foreseeable future, but what sort of keyboard? Conventional typewriter, I suspect, which is a pity. QWERTYUIOP is not the most efficient keyboard arrangement, but dates back to mechanical typewriters, which jammed when neighboring keys were struck. Better arrangements have been proposed, but were rejected because of the vested capital locked up in the fingers of those who touch-type. If

we're going to train a new generation of keyboard users who never learned a QWERTY keyboard, why not let them hunt and peck on a more efficient keyboard? Or, for that matter, who needs all forty-four keys of a standard keyboard? Doug Englebart, of Stanford Research Institute, once invented a little, handsize five-key keyboard.[10] Each finger of one hand could be used to press (one) or not press (zero) a key. This, in binary notation, gives us 2^5, or thirty-two, combinations of literally digits—enough for twenty-six letters, with enough combinations left over to take care of capitals and numbers. This leaves one hand free to hold the display panel (or your cigarette) while the other is busily keyboarding.

Let's not forget the teleprinter. This device will, of course, be high-speed, noiseless, and produce 8½-by-11-inch sheets (or 3x5 cards, for the traditionalists) instead of unmanageable scrolls. A major difference is that it will be under light-pen control from the video screen. You can selectively edit your printouts, simply by touching the portions you want, instead of having to take everything on the screen.

How does a patron use this system, in the year 2000? First stop is at the Readers' Service Desk, where he or she exchanges a credit card number for a sealed, tamper-proof key/time recorder, needed to turn the console on. (An alternative scheme, which involved buying tokens and inserting them in a lock on the console/carrel, was rejected when it became apparent that this represented an unsavory combination of the French telephone system—"Il faut acheter un jeton"—and the pay toilet!) At the end of the search the reader returns the time recorder to the desk, where the clerk inserts it into a reader that computes the charges and prints them onto a credit card voucher for the patron to sign.

Shall we go on with the patron on the console/carrel? He or she inserts the timer into a slot in the console where it stays, glowing a gentle green throughout the session, indicating as long as it is lit that the system and the charges are up and running. The screen comes to life, welcoming the user, and asking whether the person is new or experienced. The new user gets a short, interactive, computer-assisted session, tactfully probing for areas of ignorance and gently remedying deficiencies. The experienced reader gets a menu of data bases searchable through the system.

All data bases are searchable through the same combination of a structured vocabulary, such as the Penultimate MARC, natural language, authors, publishers, geographical location of author, publisher, or subject of monograph, and any combination of all or none of the foregoing.

Let's assume that the user is in a hurry and wants a book that is on the shelves of the library he is sitting in. There was a time when this could be done by letting a patron go to the appropriate section of the stacks and pick out the book wanted, but since the Unpleasantnesses of the 1990s our libraries have gone underground into sealed, bomb-proof vaults, maintained at a constant temperature of 50° F or lower—a temperature found by scientific studies to double the life span of the

collection, and of the senior staff, if only they'd learn to wear thicker underwear and not try to smuggle those damn electrical heaters under their desks. Only the relatively expendable terminals, patrons, and junior staff will be above ground.

On with the search. The patron touches the light pen to BOOKS on the display menu (remember this is the users' console—the professional console deep underground still says MONOGRAPHS), sets the Geographical Selector Switch to LOCAL, and starts searching. He finds a book he wants and asks if it is on the shelves. It is. (This is, after all, science fiction.) Two choices: press the FETCH button, and the book is delivered to the reader's carrel in five minutes (still science fiction, remember), or press the SCAN key. The book is then placed on an automatic page-turning easel before a high-resolution video camera and the user can browse to his or her heart's content. Pertinent excerpts, probably no more than a paragraph or so, can be transferred to the printer by underlining with a light pen.

But suppose the book wanted isn't at the would-be borrower's library. Set the Geographical Selector Switch to REGIONAL. On the video screen appears a map of the neighboring region with all libraries in the region showing as blue dots. Those that have the book in question appear as pulsing red circles. A touch of the light pen to that circle and the reader is connected to that library. For more distant libraries we recommend the SCAN mode, since interlibrary loans of books are now transported by bicycle messengers. The road network survived the Unpleasantnesses and is completely free of petroleum-driven transport. A low-paid bicycle messenger (senior grade) can cover a hundred miles comfortably in less than eight hours; the Inter-Regional Bicycle Races have become a major sporting event.

Need I go on? The next detent in the Geographical Selector Switch reads U.S., with an outline map of the United States; Global starts off with a North Polar projection of the Earth (South Polar projections are available for our southern neighbors). An unmarked, unused detent to the right of Global is reserved for future, galactic information systems.

The serial (or journal) literature is much easier to see than the book, or monographic literature. Almost routinely, all journals are submitted to the Grand Integral in machine-readable form and transcribed onto videodiscs. These are replicated and distributed to the regions on a monthly basis. The SCAN key gives the user a chance to read as much of the full text as he or she wishes, with selective editing/note taking via the light pen. The FETCH key brings full text, but this is rarely used. Skilled users have found that they can write review articles without ever leaving the console, and leave the library with edited text, ready for the printer, and/or the videodisc.

Touching the light pen to AUDIOVISUALS on the display menu connects the user to another bank of videodiscs. AVLINE (Audiovisuals on Line) has grown from strength to strength. The searching and peer review evaluations have continued. Now, however, you can hear the sound over high-fidelity stereo speakers and see the pictures

in full color. We have had a little difficulty lately in adapting the system to the new holographic, three-dimensional illustrations and even more with solidographs, but our engineers are working on the problem. At the moment we are limited to two-dimensional projections.

Conventional dictionaries and encyclopedias, those massive works of commercial scholarship that became obsolete the moment they were set in type, if not before, have been relegated to the history section, to be replaced by the new, on-line Dictionary/Encyclopedia. Conventional dictionaries were too ponderous to deal with a living language. New words and new instances of the use of the old words multiply faster than 3x5 slips of paper, passed down in unbroken lexicographic tradition from the days of Samuel Johnson, can ever cope with. With on-line reporting—the first submitter of a new word or new use of an old word receives a $5 check by return mail—and on-line editing, the editors guarantee a lag of no more than ten days from an appearance in print to entry into the Provisional Word Bank.

Encyclopedias, which had gone steadily downhill from the ninth edition of the *Britannica*, with its brilliant sections written by known scholars, have been revived by electronic conferencing and the videodisc. Electronic conferencing has enabled groups of scholars at widely separated loci to write, and continuously update, their sections. The videodisc has made it possible, for the first time in the history of "publishing," to use colored illustrations lavishly without regard to the cost of preparing four-color plates.

This is where our libraries may be in the year 2000. By then, many of today's readers will be senior enough to work in the lowest, most radiation-proof depths of your regional libraries, and worrying about whether string knits or Duofold are better for fighting off the pervasive 50° chill. (As director, of course, you will have to set an example and *not* have your own heater tucked away under your desk.)

References

1. Harold Wooster, "Machina Versatilis—A Modern Fable," *Library Journal* 94:725–27 (Feb. 15, 1969).
2. Harold Wooster, "Marking and Parking—A Sexist Fable," *Journal of Documentation* 30:224–27 (June 1974).
3. Harold A. Wooster, "The American Information Science Society—2076," *Bulletin of the American Society for Information Science* 2, no.8:59–60 (March 1976).
4. Theodor H. Nelson, *Computer Lib; You Can and Must Understand Computers Now* (1st ed.; Chicago: Nelson; available from Hugo's Book Service, 1974).
5. Research Libraries Information Network, *RLIN Newsletter* 2:22 (March 1979).
6. Marcia J. Bates, "Factors Affecting Subject Catalog Search Success," *Journal of the American Society for Information Science* 28:161–69 (May 1977).
7. Ibid., p.161.
8. Ibid., p.168.
9. U.S. Federal Council for Science and Technology. Committee on Scientific and Technical Information, "Microfiche 1969: A User Survey," AFOSR-69-1847TR (July 1969).
10. Douglas C. Engelbart, "Augmenting Human Intellect: A Conceptual Framework" (Summary Report, SRI Project 3578, Contract AF49(638)-1024; prepared for the Directorate of Information Sciences, Air Force Office of Scientific Research, by Stanford Research Institute, Menlo Park, Calif., 1962).

RTSD Annual Reports, 1979/80

Report of the President

William A. Gosling

The division continued its extensive commitment to AACR2 training throughout the year with a variety of events. Following the AACR2 preconference at Dallas, Bill Bunnell, RTSD Executive Secretary, Bill Drewett, Program Officer, and Council of Regional Groups Chair Barbara Gates worked closely with the many chapters and other local organizations, presenting informative, relevant training sessions on the application of and planning for AACR2. More than thirty regional meetings have been held throughout the country, many drawing on information learned at the Dallas preconference and the packets of audiovisuals and handouts prepared for that program.

Planning also continued with the Library of Congress staff for the presentation of fourteen regional "road shows" to present LC's interpretations and planned application of the new cataloging rules. The sessions are jointly sponsored by RTSD, its Council of Regional Groups, and LC. Site visits were made by the RTSD headquarters staff to make local arrangements. The first two sessions—in Washington, D.C., and New York City—have been successfully completed, involving about 275 participants each and six staff members from L.C.

The *RTSD Newsletter* and *LRTS* have both been given a new look under their respective new editors this year. Numerous favorable comments have been received from the membership in appreciation of these improvements. A special twenty-fifth-year series of issues is being planned for the 1981 *LRTS* by editor Elizabeth Tate. Arnold Hirshon, editor of the *Newsletter,* continues to present in each issue the latest reports, reactions, and findings about AACR2 implementation studies as well as detailed coverage of divisional activities.

A grant request was submitted to the National Endowment for the Humanities (NEH) for supplemental funding to cover some of the expense of conducting four regional workshops on preventive preservation through improved collection maintenance. The document was written by Nina Root, chair of the Preservation of Library Materials Section, and Bill Drewett, RTSD Program Officer. Word recently was received that the application to NEH was unsuccessful. Efforts will be made to find another funding source. If none can be located, then the workshops will be designed to be fully self-supporting.

A resolution on preventive preservation through improved quality of materials used in book production successfully completed the hierarchial review process, being approved by the Council at the January 1980 Midwinter Meeting after earlier committee and board action. The document was drafted by Helen W. Tuttle and initiated in the AAP/RTSD Joint Committee. The resolution calls for action by requesting LC's Center for the Book staff to call

together specified interested parties to encourage their joining in a cooperative effort with ALA and other library groups to urge "the production of books which will endure as long as they are needed."

The Preservation Section will become a full unit of the division following the conclusion of the New York Conference. More than one thousand members have requested membership in this newest section of the division, a most encouraging response reflecting the tremendous interest in and concern for library preservation activities and needs.

Division membership continues to be strong, with an increase of more than four hundred new members signed up compared with last year's roster at this time. This is encouraging, especially in light of the increase in ALA dues that took effect this reporting period.

Headquarters staffing continues strong and stable under the capable leadership of Bill Bunnell and Bill Drewett. Kathy Brodesser has been joined by Paulette Corner as secretary to assist with the growing volume of paperwork, especially that for the numerous regional activities and for distribution of appropriate Z39 standard drafts and international documents for comment.

The board approved the final draft of the new ALA filing rules presented at the 1980 Midwinter Meeting. Joe Rosenthal, chair of the RTSD Filing Committee, was charged with preparing the text for publication by fall 1980. This will ensure its availability for those libraries beginning new catalogs after January 1, 1981. The rules are already being used at the University of Toronto and University of Illinois libraries.

In addition, the division has supported Rosenthal's attendance at two meetings of the ISO/TC 46, Working Group on Filing Rules, one in Germany, the other in London. The second meeting was in official capacity as the Z39 representative as well as representing ALA and RTSD. It is hoped his presence will ensure that the international standard will be as compatible as possible with the new ALA filing rules. It is also anticipated that these new ALA rules may become the basis for an ANSI Z39 standard on filing rules.

Other international activities include the participation of Fran Hinton as the RTSD member of the Joint Steering Committee. Information on planning for and development of the several AACR2 workshops, the preconference, and regional meetings, together with appropriate handouts, has been sent to the Câmara Brasileira do Livro to be used by Regina Carneiro in São Paulo, Brazil, to aid in planning that country's program for the introduction of AACR2. Information is also shared on this topic with members in many foreign countries through the numerous articles appearing in the division's publications.

The International Cataloging Consultation Committee has revised its draft proposal for improved methods of sharing information on international cataloging developments. This document was presented to the RTSD Board at the New York Conference.

The division has supported the reorganization of the working relationship between LC and MARBI. Funding was provided so that the three divisional members of MARBI were able to attend a meeting at LC in March 1980. It is anticipated that the division will need to support additional meetings outside of ALA conferences to continue to provide RTSD input to the MARC format revision process.

Aware of the need for greater lead time to coordinate cosponsored programs and in response to the tightening preconference schedule, the RTSD Board gave approval for planning to begin on developing an on-line catalog preconference for the 1982 ALA Conference in Philadelphia. Cosponsorship by LITA and RASD was secured at the 1980 Midwinter Meeting. The first

meeting of the joint program planning committee was scheduled for the New York Conference.

Other members of the division, led by Vice-President/President-elect Karen Horny, are actively working on a series of sessions, one to include presentations from each of the sectional interests, for the 1981 conference in San Francisco. Murray Martin, chair, and the other members of the Membership Committee, are equally busy preparing for this conference, which will mark the division's twenty-fifth anniversary. A variety of special programs and events are being planned.

Long-standing vacancies for representatives to the CONSER Advisory Committee and the National Conservation Advisory Council (NCAC) have now been filled. Jean Cook, head of the Serials Department at Iowa State University, has been named ALA representative to CONSER and Paul Koda, rare books librarian at the University of North Carolina at Chapel Hill, has been named ALA's representative to NCAC.

RTSD continues to serve as the clearinghouse for comments for ANSI Z39 standards. Susan Vita, ALA/RTSD Z39 representative, has done an especially effective job of ensuring timely response to the numerous Z39 subcommittees. As voting representative, she has worked diligently to gather input from the appropriate ALA members and units to vote their wishes. It is an area that does require some investigation, however, for with the change in Z39 staffing has come also a need for clarification of what Z39 needs from ALA and through what channels. Communications are in progress with Jasper Schad, chair of the ALA Standards Committee, and President Galvin.

The Committee on Cataloging: Description and Access of the Cataloging and Classification Section is the unit charged with responsibility for ongoing rule revision of AACR2. Chaired by Allen Cohen, the unit appointed a subcommittee to review the cataloging rules applying to microforms. There has been widespread concern over this portion of AACR2, especially with regard to the description of the microform replacing that of the original item filmed as the primary description. Computer conferencing was employed on an experimental basis to enable subcommittee members to interact with the rule text and comments by their colleagues in an on-line mode to ensure that a draft document was available for CCDA and CCS consideration at the New York Conference.

Programming continues to be one of the division's most dynamic ways of meeting the needs of the membership. Without the willing planners, workers, and speakers these programs would not be realized.

Two such hardworking planners are Edna Laughrey (ALA) and Lucille Gordon (AAP), who cochaired the planning committee for the division's one New York preconference, "Acquisitions Preconference 3." The AAP/RTSD Joint Committee and other units sponsored this event. This was the third such program on acquisitions in the past ten years. This program's objective was to project into the 1980s what is coming in terms of materials, costs, and problems for acquisition librarians. Other New York programs included:

1. "Local Preservation Programs," sponsored by the Preservation of Library Materials Section.
2. "The Education of Librarians in the Use of AACR2," sponsored jointly by the Education Committee and CCS.
3. "Can Commercial Processors Help Librarians Cope with AV Cataloging?" sponsored jointly by the Commercial Processing Services Committee and the Audiovisual Committee.
4. "The Rising Cost of Serials: Practical Methods for Coping," cosponsored

by RTSD's Resources and Serials sections and ACRL's University Libraries Section.
5. "Analyzing the Impact of Automation on Technical Services Costs," sponsored by the Technical Services Cost Committee.
6. "Librarians and Publishers Cooperate," sponsored jointly by the AAP/RTSD Joint Committee and the Women's National Book Association, Inc.
7. "Non-Commercial Sources of Micropublications," cosponsored by the Resources Section's Micropublishing Committee and GODORT's Microforms Task Force.
8. "Evaluation of Use and User Studies," sponsored by the Resources Section's Collection Management and Development Committee.
9. Concurrent tours of more than seventy publishing and wholesaling facilities in New York and surrounding areas, cosponsored by Resources Section's Bookdealer–Library Relations Committee and the AAP.

As stated at the end of last year's report, it was hoped that greater cosponsorship could be realized for future meetings; the above listing clearly reflects the division's commitment and efforts to realize this goal. Of ten major programs, only three had a single sponsor. Of the seven cosponsored programs, four were with organizations outside the division. Efforts will be made to continue to work toward greater cosponsorship to be sure that future years of programming are as successful in this regard.

This report and the end of the New York Conference mark the completion of two years as president of RTSD for this writer. This time has provided an opportunity to see large portions of the membership working very hard to realize the goals of the division and its units. To the many whose names should appear here but don't, sincerest thanks for your dedication and hard work on behalf of the division and ALA. Much criticism is leveled at ALA and its divisions for being too large and unresponsive. After two years one must express amazement at the great number of very tangible contributions to the profession and what has been achieved by so many in meetings, publications, and programming. This must be viewed as a concerted attempt to meet the needs of the membership. If the division has fallen short, it is not for want of trying.

This report would not be complete without a word of special appreciation to Past President Norm Dudley. He has served the division for four years, two as past president, and one is sure he looks forward to this writer's assuming that position. His analytical reviews and insightful comments will be sorely missed at the RTSD Board meetings and as chair of the Organization Committee.

As the division prepares for its twenty-fifth-anniversary celebration in San Francisco, it is a pleasure to be able to say that RTSD is dynamically alive and well and looking forward to the next twenty-five years with equal vigor.

Cataloging and Classification Section

Julie Nilson, Chairperson

In this year between the publication of AACR2 and its formal implementation in January 1981, many of the activities of the Cataloging and Classification Section were directed toward communication and education in relation to

the new code. At the New York Conference CCS cosponsored a program with the RTSD Education Committee on the education of librarians in the use of AACR2. The program was entitled "The Employer's Perception of the Level of Detail Which the Student Will Need to Know vs. the Educator's Perception of the Level of Detail Which the Student Needs to Be Taught." Meetings of discussion groups and committees were concerned with code implementation. The committee that drew the most attention was the newly formed Committee on Cataloging: Description and Access.

In an attempt to respond to the ALA-delegated authority and responsibility for code revision and maintenance, the Committee on Cataloging: Description and Access was organized under the chairmanship of Allen Cohen. There was a strong commitment to provide the broadest possible input from ALA sections, divisions, committees, and round tables as well as from other national organizations and special-interest groups. Therefore, the committee was established with a somewhat unusual structure in order to provide a forum for discussion and opinion without hampering the committee's work. At Midwinter, CCDA consisted of forty-one members: nine voting members, two ex-officio members, and thirty nonvoting representatives. Of the nonvoting representatives, thirteen were from other ALA units and seventeen were from outside organizations. Major organizational tasks were undertaken, including the establishment of a procedures document, the development of a press statement informing the library community how to bring matters concerning AACR2 to the committee's attention, and the development of a policy document on CCDA correspondence. The major substantive matter before the committee was the exploration of the issues surrounding imprint data for microform reproductions of previously published works. A CCDA Subcommittee on Microforms was appointed to analyze these issues and develop a set of recommendations for the New York Conference. The subcommitee was authorized to utilize a new computer-conferencing system to carry out its work.

Although the recommendations of the subcommittee were the subject of lengthy discussion, CCDA voted to retain the rules as published until the code had been used for a period of time. Many individuals and organizations have expressed dissatisfaction with CCDA's vote, and there is concern that the preponderance of opinion favors change. It is clear that this committee's recommendations will never be completely satisfactory to everyone, but it should be noted that part of the problem lies with the location of the authority for rule revision and code maintenance at the lowest organizational level of ALA. Normal committee recommendations move up the organizational ladder from committee to section to division, with opportunity for discussion, revision, and referral at each level. CCDA, however, is able to decide ALA position and recommend it directly to the Joint Steering Committee and to the Library of Congress without benefit of that broader expertise. The library community is wise to be concerned with the work of CCDA, and its activities should continue to be monitored closely in order to be certain that the positions developed fairly represent those of the organization for which it speaks.

At Midwinter, the newly established Committee on Cataloging: Asian and African Materials, chaired by Thomas Lee, discussed and voted in favor of retaining Wade-Giles as the standard romanization for Chinese vernacular materials. It also approved a romanization table for the Indian language Santali. In general, ,this committee proposes to provide a forum for generalists and area specialists to discuss the special problems and needs that occur in cataloging materials from Asia and Africa.

The Policy and Research Committee, chaired by Richard Johnson, initiated a proposal for a one-day conference-within-a-conference to be held at the

1982 meeting in Philadelphia. Although the program will be established under the broad topic of research, specific ideas have been suggested, including: research in technical services, research methods, seeking funding to support research, and writing and publishing results. The proposed program was greeted with enthusiasm by the various policy and/or research committees throughout the organization, and it now seems that the proposal will result in the development of a major program under the cosponsorship of a number of ALA committees and divisions. It is expected that the CCS Policy and Research Committee will play an important role in this program.

The Subject Analysis Committee, chaired by Arline Zuckerman, is in the process of completing work on two major reports. The report of the Racism and Sexism in Subject Analysis Subcommittee was endorsed in principle and the subcommittee has been dismissed. It is expected that the report will be forwarded with comments to the CCS Executive Committee at Midwinter 1981. The Subcommittee on Subject Headings for Individual Works of Art, Architecture, and Analogous Artifacts is planning to have a preliminary report ready by Midwinter 1981. Both reports will be widely distributed.

SAC considered issues relating to the treatment of osteopathic medicine in Dewey and forwarded recommendations to the Decimal Classification Editorial Policy Committee that additional guidance be built into the classification tables and index. SAC is planning a hearing on the problems with the application of Dewey 19 at Midwinter. The hearing will provide a forum for the analysis and discussion of the nineteenth edition after it has been used for a year. Experts will be available at the hearing to respond to questions.

The Cataloging of Children's Materials Committee, chaired by Alexander Bloss, has started collecting information about and analyzing current practices in cataloging children's materials. It is planned that a set of guidelines will be written and recommended for use. The committee may have a preliminary document ready for consideration by the time of the San Francisco Conference.

In keeping with the long tradition of honoring an exceptional individual for outstanding professional achievement in the field of cataloging and classification, the Margaret Mann Citation was presented to Peter Lewis, past chairman of the Joint Steering Committee.

Discussion groups continue to provide a popular forum for the interaction of individuals with specific interests and common problems. Two new discussion groups were established: the Heads of Cataloging Departments Discussion Group and the Copy Cataloging Discussion Group. These, along with the already established Cataloging Norms Discussion Group and Catalog Maintenance Discussion Group, met at Midwinter and the Annual Conference. Topics covered ranges from the effect of AACR2 on card catalogs to developing the expertise of copy catalogers to a level that does not require revision. Although there is potential for overlap among these discussion groups, they draw large audiences and encourage grass-roots participation in CCS.

Minna Saxe led the CCS Nominating Committee in developing a slate of six candidates. Kaye Gapen was elected vice-chairperson/chairperson-elect, Marilyn Jones was elected secretary, and Robert Holley was elected member-at-large.

The CCS Executive Committee worked to simplify and streamline the section by centralizing responsibility for scheduling meeting times and by forwarding recommendations for a more cohesive conference planning structure and a more clearly defined set of guidelines for appointing representatives to committees and organizations. It is believed that a revised conference planning structure is needed in order to provide the lead time and continuity

necessary for developing programs more than a year in advance of their presentation. Further, a manual of procedures for committee chairs is being developed by members of the Executive Committee. It is expected that this manual will outline the responsibilites of the committee chairs and will provide general information about housekeeping procedures.

Members of the CCS Executive Committee for 1979–80 were: Frances Hinton, past chair; Julie Nilson, chair; Nancy Williamson, vice-chair; Helen Schmierer, secretary; Arlene Dowell, Barbara Gates, Elizabeth Herman, Pat Oyler, and Arlene Schwartz, members-at-large. Their work contributed substantially to another year of progress for the Cataloging and Classification Section. Particular note should be taken of Helen Schmierer's three years of service as secretary and recounter of the oral tradition. The coming year promises to be one of solid achievement under the capable leadership of Nancy Williamson and Kaye Gapen as they take office as chair and vice-chair of CCS.

Reproduction of Library Materials Section

Jeffrey Heynen, Chairperson

The year was a full and productive one for all the Section's committees and representatives. Acting on the initiative of the member-at-large, Susan Severtson, the Policy and Research Committee proposed and RLMS membership unanimously accepted a change in name and function of the Telefacsimile Committee. The change derives from the section's responsibility to provide librarians with information and assistance regarding new reproduction technologies and techniques during the period of rapid growth in which we are now immersed. The new name is suitably short and direct—Committee on Technology—and the new function statement is likewise clear and to the point: "to study and disseminate information about newer technologies that concern the reproduction of library materials, whether as primary carriers or as intermediary steps in their production, storage, and use. Examples of these technologies include both telefacsimile and video discs."

RLMS established two new ad hoc committees during the year. The first, under the leadership of Margaret Byrnes, has taken on the task of drafting guidelines for the operation of library microform facilities. This group held its first meeting at the Annual Conference and expects to complete work in approximately one year.

The second ad hoc committee has R. Grey Cole, incoming section vice-chair, at its head. The charge given this group—one recommended to the Executive Committee by the executive secretary, William I. Bunnell—is to plan a sequence of regional programs on practical matters in library reprography, perhaps covering photocopying practices and issues as well as microphotography and the functioning of microtext reading rooms. The committee will work by correspondence and telephone so that as much work as possible may be accomplished prior to its first formally scheduled meeting at the 1981 Midwinter Meeting.

Much significant RLMS activity during the year involved cooperative work with other sections. With the Resources and the Serials sections as equal partners, RLMS sponsored a heavily attended and extremely informative program at the Annual Conference. Entitled "The Rising Cost of Serials: Practical Methods for Coping," the program consisted of presentations by four know-

ledgeable and highly articulate experts on various aspects of serials management. Richard W. Boss (Information Systems Consultants, Inc.) was moderator and wrap-up speaker. Hendrik Edelman (Rutgers University), C. Lee Jones (Council on Library Resources), and Vincent E. Giuliano (Arthur D. Little, Inc.) joined Boss in describing current alternatives and future prospects for dealing successfully with spiraling costs and with budgets that at best hardly keep pace with inflation.

Other cooperative RLMS activities included a lengthy and productive series of exchanges between the chairs of the RS Micropublishing and RLMS Standards committees, on the one hand, and the executive hierarchy of a major micropublishing house, Bell and Howell's Micro Photo Division, on the other. Taking place by correspondence, telephone, and face-to-face meetings at Micro Photo headquarters, these discussions were directed at clarifying the publisher's position on the dissemination to its customers of films for which standards of archival permanence do not exist. (The company had given its customers a negative option to receive such films instead of the silver halide films they had been receiving and had done so in a manner that made likely the acceptance of them without due consideration having first been given to their advantages and disadvantages.)

The committee chairs, John Webb and Lawrence Robinson, reported that their efforts had produced the desired results in that Bell and Howell agreed to make the film options both more clearly and more widely known to its customers. Regarding a related concern raised by Webb and Robinson (that the price differential among the different films being offered was prejudicial to the sale of silver halide films), the two chairmen concluded, in the end, that they might justly question this policy but should not apply pressure in any way that might be considered attempted interference in the company's internal finances.

Although the issues that had been raised concerning this attempt of a micropublisher to encourage its customers to accept films for which standards of archival permanence do not exist in substitution for silver halide ones were thus amicably resolved, the larger issue of nonstandard films in library usage remains a particularly serious one. The RLMS Executive Committee decided that it must do whatever can be done to encourage the rapid creation of standards for these films (standards for use copies as well as storage copies) and to provide helpful information to librarians who are faced with difficult choices between films for which archival standards do not exist—albeit at lesser expense—and silver halide films at greater expense. The Executive Committee chair volunteered to work closely with the National Micrographics Association (the home of standardization and technical information activities in the field of microphotography) to accomplish these goals.

A still further joint undertaking between RLMS and other sections was made possible on the part of RLMS by the decision of its Executive Committee to contribute toward the establishment of an intersectional committee on preservation microfilming.

The activities of RLMS representatives to other organizations were highlighted by the outstanding work of Charles Willard, the section's representative of the CCS Committee on Cataloging: Description and Access. He embarked on an ambitious and nearly successful effort to change what has been widely perceived to be a serious flaw in AACR2 cataloging rules. Acting with full support of the section's Executive Committee, he organized and directed the efforts of CCDA subcommittee in providing the issue with a full review and evaluation. Using advanced computer-conferencing techniques, the subcommittee completed its work within the extraordinarily short space of

a few months, producing three distinct proposals for consideration by the full committee at the Annual Conference. This quick action was a necessity if the disputed rule was to be prevented from being implemented—a goal both RLMS and RS had worked toward in the two-year period following the appearance of the rule in final form.

That this last-ditch effort was not successful takes nothing away from the prodigious labor devoted to it. The RLMS Executive Committee was extremely grateful for its representative's careful work, innovative approach, and forceful leadership. The issue itself remains alive and will be taken up again at the 1981 Midwinter Conference. (Note.: at issue is the change of rule that provides for the cataloging of microforms that are reproductions of previously published works as if they were original micropublications and not copies. The rules allow full description of both "original" and copy to be given, but they give precedence to the microform, not the reproduced work, raising the likelihood that significant information—that concerning the reproduced work—will be buried or sacrificed to economy and so not be given at all, while information of dubious value that is often not available to a cataloger—i.e., the place and date of microfilming—will be placed in a position of prominence in catalog entries.)

In a related matter, the Executive Committee proposed to the Cataloging and Classification Section that a committee on microform cataloging be established and suggested that members be drawn from those CCS members who have expertise in micrographics as well as cataloging. The creation of such a committee, which RLMS believes could not sensibly be created within its own sphere and which would not function well as an intersectional committee, should provide a forum not only for working out problems in cataloging rules, such as the one just described, but also for promoting the efforts of the ARL-sponsored microform cataloging investigation that is being directed by Richard W. Boss of Information Systems Consultants, Inc., and of other microform cataloging activities.

There were numerous other RLMS developments worthy of mention, among them the welcome news that Joseph Nitecki will continue his single-handed, voluntary, immensely useful, and unpaid work in editing the *Directory of Library Reprographic Services* (published under RLMS auspices by Microform Review, Inc.). The new edition will be brought out in 1982.

Responsible for other RLMS publishing activities, the chair of the Publication Committee, Douglas Freeman, continued his well-directed publication program by producing a new verison of the RLMS publicity bookmark (distributed free at conferences) and planning works in both the RLMS Circular Series (a new edition of *Microform First Sources*) and Microfile Series (a bibliography on reprography, a manual on maintaining equipment).

All in all the year was fruitful and enjoyable. The section continued its tradition of hard work and good results.

Resources Section

Jean Boyer Hamlin, Chairperson

As outgoing chairperson I am pleased to have the opportunity to record publicly my appreciation to the Executive Committee members and to the committee and discussion group chairpersons who have worked with me dur-

ing this past year. Their hard work and enthusiasm are responsible for keeping the section effective in carrying out its mission of encouraging and promoting activities relating to collection development. Within this broad mission there are dozens of specific activities, ranging from the development of price indexes for library materials, through the resolution of specific difficulties between libraries and vendors, to the development of guidelines on resource-sharing or microform advertising.

Most of the formal work of the section is conducted through its six committees, which are: Bookdealer–Library Relations Committee (Susan Harrison, chairperson), Collection Management and Development Committee (Jutta Reed, chairperson), Library Materials Price Index Committee (Sally Williams, chairperson), Micropublishing Committee (John Webb, chairperson), Policy and Research Committee (John Kaiser, chairperson), Resources Section Publication Award Jury (Marcia Pankake, chairperson). Only some highlights of committee activities can be recorded here.

The Bookdealer–Library Relations Committee continues to encourage greater library and vendor understanding while at the same time responding to the need for a mediator between library and vendor in a host of minor difficulties. Two specific examples: the committee has developed a list of Gille brothers imprints for which libraries are advised to avoid prepayment; the publishing and distribution practices of ALA that cause difficulties to libraries were given special attention this past year. During the 1980 Annual Conference the committee sponsored highly successful half- and full-day book industry tours.

The Collection Management and Development Committee has subcommittees working on drafts of guidelines for resource sharing and for use and user studies. Another subcommittee has drawn up the plans and final draft of a grant proposal to fund a pilot collection development institute at Stanford University following the Annual Conference in 1981. At the 1980 Annual Conference this committee sponsored a program on the evaluation of use and user studies, a follow-up to last year's program, which provided an overview of the subject.

A major accomplishment of the Library Materials Price Index Committee was the completion of arrangements to have the price index summary tables published in the *RTSD Newsletter* as they are completed, thus providing more timely publication than is possible through the annual Bowker volume (which will also continue to publish the indexes). The committee has completed work on the documentation of its methodology, an important project ensuring continuity in the preparation of indexes. It continues to make contacts with producers of other indexes, to persuade vendors to collect and make available useful price information, and to publicize the indexes themselves. A handout describing each price index available was prepared by the committee for the summer 1980 program "The Rising Cost of Serials."

The Micropublishing Committee has devoted much of its attention to the bibliographic control of microforms, to efforts to have changes made in the AACR2 treatment of microforms, and to the development of guidelines for microform quality and microform advertising. The announcement of price increases for silver film and the increased use of nonsilver film by several microform vendors prompted a number of meetings with these vendors and agreement to push for standards for nonsilver film. At the 1980 Annual Conference the committee cosponsored with the GODORT Microforms Task Force a program called "Non-Commercial Sources of Micropublications."

The Policy and Research Committee has begun to place a new emphasis on the "research" part of its responsibilities. The committee has made contacts

with policy and research committees of other sections and divisions and has undertaken to monitor research in progress relevant to collection development, acquisitions, and resource sharing. The *RTSD Newsletter* has agreed to carry a column on research in progress, and the committee is devising a form to be used in reporting. It is hoped that this effort will not only make current research more widely known but also aid the *LRTS* assistant editor for resources in locating articles for publication. To further this latter aim the Resources Section Executive Committee appointed the *LRTS* assistant editor an ex-officio member of the Policy and Research Committee.

I am particularly indebted to Marcia Pankake for accepting the chairmanship of the Resources Section Publication Award Jury late in the year after the previous chairperson resigned because of conflict of interest. The committee made an excellent decision in selecting Charles Osburn for the award for his book *Academic Research and Library Resources: Changing Patterns in America* (Greenwood Press, 1979). It is unfortunate that the award did not carry with it the customary $1,000 scholarship to be given to the library school of the winner's choice. The previous sponsor did not provide funding as expected, and a new sponsor must be sought.

While the committees of the section carry formal charges and a fixed membership in order to conduct the section's business, a most valuable contribution is made by the discussion groups. Because they are free to include as many members as they wish and to discuss any topics of mutual interest and concern, they provide a forum for members' views and a fertile breeding ground for new ideas. This year the four discussion groups addressed a wide variety of issues. The Acquisition of Library Materials Discussion Group (Binnie Braunstein, chairperson) discussed music acquisitions, centralized acquisitions, and, in a joint meeting with the Booksellers Discussion Group, vendor performance studies, publishers, and conglomerates. The Booksellers Discussion Group (John Secor, chairperson) provided an overview of OCLC, WLN, and RLIN systems, which was so successful that a repeat performance has been suggested for 1981. Both the Chief Collection Development Officers of Large Research Libraries (Charles Osburn, chairperson) and of Medium-Sized Academic Libraries (Margaret Jackson, chairperson) discussion groups discussed the matter of indirect costs for sponsored research. Other topics covered by one or another of these groups were friends groups, gift appraisal policies, limitations of cooperative collection development, collection evaluation, serials versus shrinking budgets, the Kent study and the University of Pittsburgh Senate Library Committee response, and use patterns of the Center for Research Libraries. In short, there was something for almost everyone.

Some individuals who had not until this time found a happy home formed during the year a new group called Chief Collection Development Officers of College Libraries. Spearheaded by John Ryland of Hampden-Sydney College and William Hannaford of Middlebury College, this group believes that the considerable differences in organization and scale of operations in their libraries could better be discussed in a separate group. The topic for discussion at the organizational meeting at the June 1980 Annual Conference was fund raising for acquisitions budgets. Although attendance was small, much interest was expressed in letters from people unable to attend at short notice, and another meeting is planned for Midwinter 1982.

While almost every committee report above mentions involvement in a conference program, this was not the only section involvement in conference programs. Two major programs were cosponsored by the section itself: the preconference "Acquisitions for the Eighties" drew heavily on the expertise of Resources Section members; the program "The Rising Cost of Serials" was

cosponsored with two other sections of RTSD (RLMS and SS) and with a section of another division (ACRL University Libraries Section). These, together with the Micropublishing Committee program with GODORT, are excellent examples of joint sponsorship, which will become increasingly necessary as conference scheduling and program planning become tighter.

Members of the Executive Committee for 1980 were: Fred Lynden, past chairperson; Paul Mosher, vice-chairperson; Mona East, secretary; Elaine Sloan, Harriet Rebuldela, Susan Vita, Linda Crismond, Marion Reid, members-at-large. I wish to pay special tribute to Mona East for her three years as secretary. In 1980–81 Paul Mosher takes office as chairperson of the section, William Myrick as vice-chairperson, and Sally Williams as secretary. I know that the section will continue to prosper under such capable leadership.

Serials Section

Marcia Tuttle, Chairperson

During the last several years there has been an increasing awareness of the significance of serials and serials librarianship. Evidence of this is the number of new journals and monographs dealing with serials, the frequency of workshops and meetings about serials, the growing number of guests attending Serials Section committee meetings, the number of qualified members volunteering to serve on committees, and a growth in Serials Section membership to the point where it is the second largest section within the Resources and Technical Services Division, with twenty-five hundred members. Three RTSD sections joined to present a program at the 1980 Annual Conference called "The Rising Costs of Serials," which several hundred persons attended. A serials librarian was elected president of the Resources and Technical Services Division. Last year's annual report referred to the "busy and exciting year" that had ended; that state appears to be the rule for the innovative librarians who participate in the work of the Serials Section.

At Midwinter the Executive Committee approved the formation of the ad hoc Committee on Union Lists of Serials, which is working to fill an immediate need for guidelines to be used in designing, compiling, and maintaining union lists of serials. At the same session the Executive Committee approved a resolution initiated by the Duplicates Exchange Union requesting elevation to the divisional level, since its work concerns more than serials. The RTSD Board of Directors approved the change at the Annual Conference.

Two committees are completing final editing for publications that will be available from the RTSD office. The Regional Serials Workshops Committee will issue a directory of speakers on serial topics, with names, addresses, telephone numbers, and subject and geographical indexes. *The First Annual Bibliography of Articles and Monographs on Serials* was compiled and annotated by the members of the Library School Education Committee. That group also has been working on a study of serials education in accredited U.S. and Canadian library schools, an ALA model serials course syllabus, and a serials instructional materials exchange.

The Committee to Study Serial Records has reexamined its charge and purpose and has begun to look at a broader range of "records." Currently the committee is concentrating on records needed for serials public service and the effect of AACR2 on serial records. The Committee to Study Serials Cata-

loging is exploring questions raised by members' cataloging of specific titles by AACR2 rules and other issues resulting from the new code that affect serials cataloging. This committee has been chaired by Judith Cannan since it was formed in 1976. The section and the division owe Judith a hearty expression of thanks for the work she had done in this capacity during trying times.

The ad hoc Committee to Study the Feasibility of Creating Dynamic Lists of Core Serials is preparing its final report and expects to request that it be made a standing committee to develop core serials lists and to make them available to librarians working with serials collection development. Discussions in the Policy and Research Committee led to resolutions encouraging ANSC Z39 to begin work on a standard for serial holdings in machine-readable form and expressing support for the ARL project "Bibliographic Control of Microforms." Both resolutions were approved unanimously by the Executive Committee.

Both of the section's discussion groups held well-attended meetings at each conference on topics of particular current interest to serials librarians. The Medium-Sized Research Libraries Discussion Group devoted both sessions to serials staffing and varying organizational patterns. Representatives of libraries that have eliminated the traditional serials department first discussed their planning for the change and effects on personnel and production, then participated in lively question periods. The Large Research Libraries Discussion Group concentrated on problems of building national and local serials data bases and of procuring serials. Participants included representatives of the bibliographic utilities and serial suppliers, as well as librarians.

The section is planning future programs. The Committee to Study Serials Cataloging will hold an open forum at Midwinter 1981 on the question of unique serial identifiers. In San Francisco there will be a joint program with CCS on name authority files and a full-day workshop on union lists of serials. This continuing activity is evidence of the Serials Section's commitment to meet the need of its members by presenting relevant programs and sponsoring working committees.

Few officers are able to serve more than one year, but because Dorothy A. Pearson was compelled to resign as chair of the section, I will have a second year in that capacity. For me the past year has been one of particular professional growth as a result of my being forced into an unfamiliar situation and required to respond. It is an ideal time to be part of the leadership of the ALA/RTSD Serials Section, and I am grateful for the responsibility. However, I am pleased to relinquish the vice-chair/chair-elect duties to John James. In the other election Pamela Bluh was chosen member-at-large for 1980–83. Special recognition must go to Judith Kharbas, past chair, and Judith Kuhagen, secretary, for their advice and assurance. RTSD Executive Secretary Bill Bunnell, Program Officer Bill Drewett, and administrative secretary Kathy Brodesser are indispensable.

For the Record

Annual Report of the Decimal Classification Editorial Policy Committee July 1, 1979-June 30, 1980

Margaret E. Cockshutt, Chairperson

The Decimal Classification Editorial Policy Committee (DCEPC) held its seventy-ninth meeting at the Library of Congress April 10–11, 1980. The following members were present: Lizbeth Bishoff, Lois M. Chan, Margaret E. Cockshutt, Betty M. E. Croft, Joel C. Downing, John A. Humphry, Donald J. Lehnus, and Marietta D. Shepard. Others attending were: Barbara Branson (ALA nominee), John P. Comaromi (editor of the *Dewey Decimal Classification*), Margaret J. Warren (assistant editor), Lucia J. Rather (director for cataloging, Library of Congress), and Judith K. Greene (secretary).

The committee acted on the following matters:

1. It recommended to the Forest Press Committee that the 302-307 Sociology schedule in edition 19 of the *Dewey Decimal Classification* (*DDC*) be expanded and refined as an urgent priority. It agreed that announcement of this forthcoming expansion should now be widely disseminated.
2. The committee agreed that it did not favor at this time the assignment of book numbers, to complete the call number, by the Decimal Classification Division (DCD) of the Library of Congress. However, the DCEPC recognized the usefulness of subject cutters to provide an alphabetic arrangement for subjects not adequately represented by the regular notation. It recommended that the DCD prepare a paper on the practicality of assigning such subject cutters for further consideration by the DCEPC.
3. The committee recognized the problem, for libraries in the field and for the DCD, in determing what subject approximates the whole content of a number in the schedules (and thus could receive a standard subdivision) and what subject does not (and thus should not receive a standard subdivision). In anticipation of work on edition 20, the DCEPC recommended to the DCD that if a heading in the schedule includes two or more separate but unequal concepts, the DCD should determine the primary concept on the basis of literary warrant (with this concept able to receive a standard subdivision) and should place the other concept(s) in an "including" note (not to receive a standard subdivision).
4. A resolution was made in thanks to Marietta D. Shepard, who served on the DCEPC with dedication and distinction through the development and publication of editions 17, 18, and 19 and the initial deliberations on edition 20.

There was extensive discussion without action on other matters. (1) The purpose, nature, and frequency of the *Decimal Classification Additions, Notes and*

Decisions (*DC&*) were discussed as a possible means of informing Dewey purchasers about DCEPC decisions, as well as for issuing *DDC* corrections and revisions. (2) The DCEPC began deliberations on the future of the *DDC*: the frequency and publication formats of new editions, the extent of schedule changes and their impact on libraries, the impact of computer technology and networking, and initial identification of some subject areas for possible phoenix development in edition 20. (3) The DCEPC discussed the manual being prepared by John P. Comaromi and Forest Press' plans for its further review and revision. (4) The committee considered reviews of edition 19 and their implication for the DCEPC's future work.

In committee business, Margaret E. Cockshutt was elected as chairperson until October 1981 and Lois M. Chan was elected as vice-chairperson until October 1980. The DCEPC established a subcommittee to revise and update the *Regulations for the Conduct of Committee Business*. The next DCEPC meeting was scheduled for April 9–10, 1981.

INSTRUCTIONS TO AUTHORS

In preparing articles to be submitted for publication in *Library Resources & Technical Services,* please follow these procedures:

1. Submit original, unpublished articles only. Articles of less than 5,000 words are preferred. Write the article in a grammatically correct, simple, readable style. Remember that the author is responsible for the accuracy of the statements in his or her article.
2. Give the article a brief title. On a separate cover page give the title, the name(s) of the author(s), and the title and affiliation of each. Do not repeat this information elsewhere in the manuscript.
3. On a separate page type a brief abstract of the article, double spaced.
4. Consult Merriam-Webster's *New Collegiate Dictionary*, 8th ed. (backed up by Webster's *Third International*), as your authority for spelling and usage; prefer the first spelling if there is a choice. Verify the spelling and accuracy of names in an appropriate reference; don't rely solely on your memory.
5. Consult the University of Chicago Press *A Manual of Style*, 12th ed., rev., as your authority for capitalization, punctuation, quotations, tables, and captions. (ALA style includes a few exceptions, which editors will mark.)
6. Type the manuscript, double spaced, on 8½-by-11-inch nonerasable paper. Type quoted text double spaced also. Use the customary superscript numbers throughout the text for bibliographic references but do not type the reference itself on the same page. Submit all references separately, at the end of the paper. Type the references double spaced.
7. In general follow the practices recommended by *A Manual of Style* with these exceptions:
   Cite journal articles according to this pattern: author's first name or initials, author's surname, title of article, *title of journal* volume:page references (issue date). For example:
   1. John Gardner and Gladys Rowe, "Thinking Small in a Big Way," *College & Research Libraries* 40:533–38 (Nov. 1979).
   Note the punctuation and spacing pattern. Note also that the volume, but not the issue number, is given and that the names of the months are abbreviated and are not separated from the year by a comma.
   Note that the first line is not indented.
   For subsequent references to a previously cited work, the surname(s) of the author(s), a shortened form of the title, and the page reference are enough. Do not use *op. cit.* or *loc. cit.* For example:
   15. Gardner and Rowe, "Thinking Small," p.534.
   If no other reference intervenes, use "Ibid." to take the place of the elements of the previous reference that apply. Do not underline "Ibid."
   Do underline or quote all titles in both references and bibliographies.
   Number items as 1., 2., etc., but do not use superscript numbers.
   Use p.726–30, not pp. 726–730, for citations to a book or journal.
   Abbreviate *volume* as V.2 or 2v. However, it is not necessary to give total number of pages or volumes when a footnote reference cites an entire work.
   VERIFY ALL CITATIONS CAREFULLY.
8. Submit all tables and illustrations at the end of the paper, each on a separate page. Indicate the desired placement in the text by adding an instruction in brackets, e.g., [Insert Table 2]. Provide a brief, meaningful caption for each illustration and for each table. TYPE THE TABLES

DOUBLE SPACED and follow the examples in *A Manual of Style* in constructing them, omitting the vertical lines to indicate columns. Use tables sparingly.

9. Submit camera-ready copy for illustrations. Please protect it with cardboards when mailing your paper. Do not mar it with paper clips, staples, etc.
10. If you have presented your paper at a conference, identify the conference by name and date in your cover letter. Send your original, ribbon copy, and two photocopies to Elizabeth L. Tate, Editor, *LRTS*, 11415 Farmland Dr., Rockville, MD 20852. Please include an addressed envelope, large enough and with sufficient postage to return the manuscript to you during the editorial review.

Statement of Ownership and Management

Library Resources & Technical Services is published quarterly by the American Library Association, 50 E. Huron St., Chicago, IL 60611. American Library Association, owner; Elizabeth L. Tate, editor. Second-class postage paid at Chicago, Illinois. Printed in U.S.A. As a nonprofit organization authorized to mail at special rates (Section 132.122, *Postal Services Manual*), the purposes, function, and nonprofit status of this organization and the exempt status for federal income tax purposes have not changed during the preceding twelve months.

Extent and Nature of Circulation

("Average" figures denote the number of copies printed each issue during the preceding twelve months; "Actual" figures denote number of copies for single issues published nearest to filing date—the Summer 1980 issue.) *Total number of copies printed:* Average: 9,622; Actual, 9,545. *Paid circulation:* not applicable (i.e., no sales through dealers and carriers, street vendors and counter sales). *Mail subscriptions:* Average, 8,180; Actual, 8,007. *Free distribution by mail, carrier or other means, samples, complimentary, and other free copies:* Average, 892; Actual, 875. *Total distribution:* Average, 9,072; Actual, 8,882. *Copies not distributed: office use, leftover, unaccounted, spoiled after printing:* Average, 550; Actual, 663. *Returns from news agents:* not applicable. *Total (sum previous three entries):* Average, 9,622; Actual, 9,545.

Statement of Ownership, Management, and Circulation (PS form 3526, Aug. 1978) for 1980 filed with the United States Post Office Postmaster in Chicago, October 2, 1980.

LC Cataloging

delivered semiannually costs only

$195 per year

including cumulative indexes by both title and main entry to over fifteen years of cataloging data. Optional weekly updates and ISBN, LC Card and Call indexes are also available. For more information about why over fourteen hundred libraries use MARCFICHE, please write or telephone:

MARC APPLIED RESEARCH COMPANY
Post Office Box 40035, Washington, D.C. 20016
A Division of The Library Corporation

(301) 840-1480

faxon

OUR NEW LOOK FOR OUR 100th BIRTHDAY!

Yes, we've changed our look to celebrate our Centennial.

But the fact that Faxon provides you with reliable subscription services for your library will never change, nor should it.

What else is new at Faxon? New state of the art technology. More personal attention. Faster, more accurate services.

One thing remains unchanged. Faxon is your most reliable source for over 115,000 foreign and domestic titles.

F.W. Faxon Company, Inc.
15 Southwest Park, Westwood, Mass. 02090
Tel: 800-225-6055 (toll-free) 617-329-3350
(collect in Mass. and Canada only)

faxon
100 years helping the world communicate

Announcing our OPEN ORDER 20% DISCOUNT SAVING PLAN

to enable you to fill in the G-A-P-S in your files of

BACK ISSUE PERIODICALS SINGLE ISSUES SINGLE VOLUMES

■ TECHNICAL ■ SCIENTIFIC ■ MEDICAL ■ LIBERAL ARTS ■

We have an extensive stock & new material is always coming in. We need space.
Send in your WANT LISTS marked 'OPEN ORDER'—Get a 20% DISCOUNT.

WE BOTH SAVE –

- **TIME** – You will receive faster service as orders can be processed faster than inquiries.
- **PAPER WORK** – Sending quotations to you for your response with FORMAL PURCHASE ORDERS add to the burden of paper work.
- **COST** – You earn 20% DISCOUNT, in addition to the above savings.

GUARANTEE –

PRICES – Every item will be competitively priced. If you are not entirely pleased, use the return privilege, without obligation.

QUALITY – You must be 100% satisfied.

RETURN PRIVILEGE – If any material we supply on your OPEN ORDERS does not meet your requirements you may return it to us within 30 days from invoice date.

SINCE 1925

ZEITLIN PERIODICALS Co., Inc.

817 SOUTH LA BREA • LOS ANGELES, CA 90036

Technical & Scientific ■ American & Foreign ■ Learned Society Publications

WORLD NEWSPAPERS & PERIODICALS on microfilm

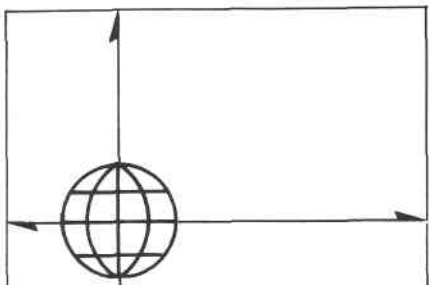
Exclusively From Research Publications, Inc.

NEW

- Financial Times (London or Frankfurt)
- Der Spiegel
- Far Eastern Economic Review
- India Today
- Jewish Chronicle

The Times Literary Supplement Index (1902-1939 Cumulative)

rp Research Publications, Inc.
12 Lunar Drive
Woodbridge, CT 06525
(203) 397-2600



Firm order services

Rush/Reserve Department

University Press Division

Comprehensive and Customized Approval Programs

Continuation/ Standing Order Services

Ballen Booksellers International, Inc.

66 Austin Boulevard,
Commack, New York 11725
Toll-free WATS line:
(800) 645-5237

Regional offices: Atlanta, GA
Palo Alto, CA

New!

. . . and *again,* the most complete catalog of Library and AV Equipment, Furniture & Supplies ever published. Write today for your free copy.

Highsmith

P.O. 25 LR9 Fort Atkinson, WI 53538

The Klip that holds. Plastiklips.

Featherlight! New. Improved. Hold up to 24 sheets. For filing, coding, signals. Will not rust, nor harm papers, copy machines or postal meters. Non-magnetic. 3 Sizes. Many assorted colors. 630 for $6.

At your stationer's or write

Baumgarten's
1190-A North Ave. NE. Atlanta, Ga. 30306

McGREGOR Magazine Agency

PERSONALIZED SUBSCRIPTION SERVICE

Every customer is assigned an experienced "Home Office" representative. You correspond direct; any title needs, changes, cancellations or problems can be handled promptly by letter or phone. This makes your job easier and keeps you abreast of your subscription needs at all times.

With over 45 years experience, McGregor has built a reputation of prompt and courteous service on both domestic and international titles. We prepay subscriptions ahead of time.

Our customers, large and small, like the prompt attention we give them. We think you would too! Ask about McGregor's "Automatic Renewal" plan described in our new brochure. Write today for your free copy.

McGREGOR Magazine Agency OUR 48th YEAR

MOUNT MORRIS, ILLINOIS 61054

AMBASSADOR BOOK SERVICE, INC.
"furnishing books and related services to academic & research libraries"
42 CHASNER STREET • HEMPSTEAD, NY 11550 • (516) 489-4011

NEW!

Reference Books for Small and Medium-Sized Libraries 3d edition

Committee of the Reference and Adult Services Division of ALA

Like its predecessors, this work is designed as a helpful guide for the purchase of adult reference collections for newly established libraries and for improving and adding to existing collections. The third edition has been expanded by one-third to include titles of value to college library collections, updated editions of significant reference tools, and important new works. This broader coverage permits users to choose those reference books that best answer the needs of the community served, while the omission of many titles underscores the value of those selected for inclusion.

Arrangement is by major subject category. Entries give author, title, edition, publisher, date, paging (or volumes), price, and brief annotations that describe the contents, indicate scope, and point out important features and special uses. An author-title index is provided.

216 pages Paper ISBN 0-8389-3227-4 $9.00

Order Department
AMERICAN LIBRARY ASSOCIATION, 50 East Huron Street, Chicago, IL 60611

Midwest Library Service Is Pleased To Announce An Expanded BOOK CONTINUATION AND STANDING ORDER SERVICE

In order to meet the growing needs of the academic library community, Midwest Library Service has recently enlarged its activities in this area of book acquisitions. We invite you to submit your Continuations List to us for prompt, efficient processing. Our publisher base includes approximately 500 selected publishers. We also offer binding services on paperback continuations.

Excellent service is the backbone of any good Continuations Service and we provide exactly that by assigning you a Personal Customer Service Representative and offering you the use of our Toll-Free WATS line: 1-800-325-8833. So for a copy of our new brochure on "CONTINUATION & STANDING ORDER SERVICE" call us right now, using the toll-free number, or else please fill in the reply coupon.

Yes, I would like more information about your Continuation & Standing Order Service:

☐ Please mail me your new Brochure on this subject.

☐ Please have a member of your staff call me.

_____
(Name) (Title)

_____
Address

_____
City State Zip Code

_____
Telephone Number

Please Mail Coupon To:

Mr. Howard Lesser, President
Midwest Library Service
11443 St. Charles Rock Road
Bridgeton, Mo. 63044

"20 Years of Service to College and University Libraries"

MIDWEST LIBRARY SERVICE
11443 St. Charles Rock Road
Bridgeton, Mo. 63044

A practical, step-by-step guide to the Anglo-American Cataloguing Rules, *2d Edition*

Handbook for AACR2

MARGARET MAXWELL

Designed as a companion to *AACR2,* this new work will assist library school students and experienced catalogers in gaining a clearer understanding of how to apply the most commonly used rules for description, choice of access points, and form of heading as set forth in the *Anglo-American Cataloguing Rules,* 2d Edition.

The *Handbook* is easy to use since it follows the now familiar structure of *AACR2.* The organization also has immediacy in its numbering of paragraphs to correspond with specific rules of the code. Explanation and commentary, together with full cataloging examples, are keyed to the brief statements given by *AACR2.*

Rules are elaborated in three ways. First, each chapter highlights basic directions and shows departures from *AACR1* as well as relationships to other rules. Second, the rules are presented more succinctly for better understanding. Third, for almost every rule, a copy of a title page is given to show how the rule is applied in actual practice.

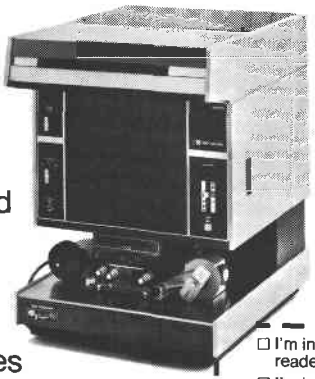
544 pages Paper ISBN 0-8389-0301-0 $20.00

Order Department
AMERICAN LIBRARY ASSOCIATION
50 East Huron Street, Chicago, Illinois 60611

When you switch from microfilm to microfiche do you have to switch reader-printers?

Not if your library has the incredibly versatile Minolta RP 405 or its larger 11" x 17" screen version, the RP 407.

They both handle virtually any microformat made. The quick-change film carriers put 16/35mm roll film, cartridge, jacket, and fiche capability right at your fingertips.



And unlike many other reader-printers, Minolta gives you detailed positive prints from either positive or negative film. What's more, the prints are permanent, and can be written on.

The RP 405 and RP 407 also are amazingly easy to operate, so you won't have to spend a lot of time teaching the public how they work. You can even add the optional coin-op module to save you even more time.

So now you can switch formats to your heart's content. But first, you have to switch to Minolta.

☐ I'm interested in seeing the Minolta reader-printers in action. LT1

☐ I'm interested in more information.

Name_____

Title_____

Library_____

Street_____

City_____

State_____ Zip_____

Phone_____

Mail to: Minolta Corporation, Micrographics Division, 101 Williams Drive, Ramsey, N.J. 07446. (201) 825-4000

minolta MICROGRAPHICS

If you don't insist on a Minolta this time, you will next time.

©1980 Minolta Corporation

Just Published !

Essay and General Literature Index

Volume 9, 1975-1979

Offers You:

- author/subject indexing of 20,125 essays from 1,501 collections
- invaluable analytic cataloging
- rapid subject approach at your Reference Desk
- a comprehensive reference tool

Essay and General Literature Index may be the "best buy" in the entire field of indexes. Subscribers receive, each month, the buying guide to books which will be indexed, the semiannual softbound issue which contains indexing for January-June, and a permanent bound annual issue which is the cumulative index to books selected during the year. In addition, at no extra cost, at the end of each five-year period, subscribers receive the permanent bound five-year cumulation. Annual subscriptions are available at $45 per year, U.S. and Canada, $58 in other countries. The eight previous hardbound permanent cumulations are $115, U.S. and Canada; $155 in other countries, per volume.

The H.W. Wilson Company
950 University Avenue, Bronx, New York 10452

Available for the first time on MICROFICHE

THE LIBRARY OF CONGRESS SUBJECT CATALOG

Current Subscription

An indispensable source for subject searching
(for less than a dollar a day)

ADVANCED LIBRARY SYSTEMS (ALS), a leading supplier of LC publications on microfiche, is now offering the 1981 CURRENT SUBSCRIPTION TO THE LC SUBJECT CATALOG.

The LC SUBJECT CATALOG contains entries for current books, pamphlets, periodicals and other serials, maps, and atlases arranged alphabetically by LC subject headings and alphabetically by author under the subject heading. Entries for belles lettres and imprints earlier than the current year and the two preceding years are included in the annual cumulation.

The subject headings and cross references in the Subject Catalog are taken from or are based on *Library of Congress Subject Headings*, its cumulative supplements, and the subject authority cards filed in the Official Catalog of the Library of Congress.

For complete information, call (617) 470-0610 or use the coupon.

ALS

ADVANCED LIBRARY SYSTEMS INC.
93 Main Street
Andover, Mass 01810
(617) 470-0610

Advanced Library Systems Inc.
93 Main Street, Andover, Mass. 01810

LRTS-80

Please rush me complete information on ALS's Library of Congress Subject Catalog on Microfiche.

Name _____ Title _____

Organization _____

Address _____

_____

DDC DEWEY Decimal Classification®

Numbers you can count on

DEWEY Decimal Classification and Relative Index. 19th Unabridged Edition.

Set: (3 Vols.) 1979. ISBN 0-910608-23-7. **$90.00**

Volume 1 (Tables) ISBN 0-910608-19-9. **$30.00**

Volume 2 (Schedules) ISBN 0-910608-20-2. **$30.00**

Volume 3 (Index) ISBN 0-910608-21-0. **$30.00**

Free distribution of supplements, DC&, to all purchasers of Edition 19 if postcard in Volume 1 of this edition is returned to Forest Press.

A Conversion Table. 1979. 78 pages. ISBN 0-910608-24-5. Paperback: **$3.00.** A table of substantial number of changes from Edition 18 to Edition 19, in Edition 19 order.

11th Abridged Edition. 1979. ISBN 0-910608-22-9 **$24.00**

NEW FROM FOREST PRESS

Proposed Revision of 780 Music. ISBN 0-910608-26-3. Paperbound: **$5.00**

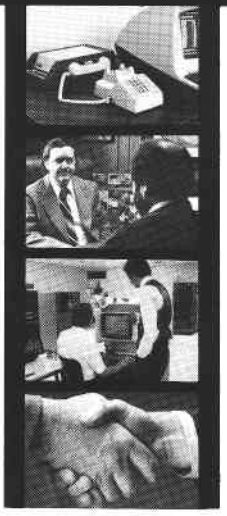
Spanish edition of DDC, in 3 volumes, based on Edition 18 with updating from Edition 19. Due late 1980. **$75.00**

All prices plus postage.

FOREST PRESS, 85 Watervliet Avenue, Albany, NY 12206 U.S.A.

Introducing . . .

EBSCONET



With EBSCONET you can now

1. **Transmit claims**
2. **Transmit Interim Orders**
3. **Access EBSCO's Missing Copy Bank**
4. **Access EBSCO's Title File for Price/ Bibliographic Information**
5. **Review "Summary of Publications Ordered" Report—by Title or by Subscriber**

For a free brochure and details on On-Line Data Communications Direct from your library to EBSCO and its potential—contact your local EBSCO office or:

EBSCO SUBSCRIPTION SERVICES
P.O. Box 2543/Birmingham, AL 35202
(205) 252-9010 Telex: 5-9717

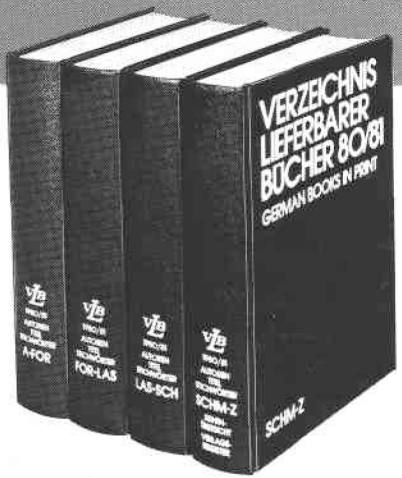
division of
EBSCO
Industries,
Inc.

Gale Research Compan

appointed Exclusive Distributor in the Western Hemisphere for library reference books of

K.G. Saur

of Munich, New York, London, and Paris



Gale Research Co. is pleased to announce that an agreement has been concluded under which Gale has exclusive Western Hemisphere distribution rights to library reference books published by K. G. Saur-Verlag, headquartered in Munich.

Gale Is Now Your Source for Titles of Three Major European Publishers

Since Gale already distributes books from Europa Publications and CBD Research, both of Britain, this latest arrangement with Saur is one more important step toward enabling librarians to consolidate their orders for major reference tools from Europe.

Like Europa and CBD books, Saur books are now stocked in Detroit ready for prompt delivery. New editions will be airfreighted to Detroit in bulk so you will not have to wait for sea mail or pay premiums for air shipment of individual copies.

A partial list of Saur books distributed exclusively by Gale

British Library General Catalogue of Printed Books to 1975. 360 vols. 1979-84. $23,040.00/set.
Catalogue of Printed Music in the British Library. 52 vols. 1980-84. $9,050.00/set.
Directory of Continuing Education Opportunities of Library-Information-Media Personnel. 1979. $30.00. (SO)
German Books in Print 1980-81. 1980. **Authors-Titles-Keywords.** 10th ed. 4 vols. $250.00/set. (SO)
Subject Guide. 3rd ed. 3 vols. $240.00/set. (SO)
ISBN Register. $95.00. (SO)
International Books in Print 1979: English-Language Titles Published Outside the USA and the United Kingdom. 2 vols. 1979. $175.00/set. (SO)
International Directory of Booksellers. 1st ed. 1978. $120.00. (SO)
Publishers' International Directory. 8th ed. 1979. $140.00. (SO)
World Guide to Libraries. 5th ed. 1980. $225.00. (SO)
World Guide to Trade Associations. 2nd ed. 1980. $135.00. (SO)

Write for the checklist of all Saur titles distributed by Gale.

(**SO**) These titles are available at Gale's 5% Standing Order discount. All books published and distributed by Gale are sent on 90-day approval. Customers outside the U.S. and Canada add 10% to prices shown.

Gale Research Co

Book Tower • Detroit, MI 48226