

KATHRYN LUTHER HENDERSON
Associate Professor
Graduate School of Library and Information Science
University of Illinois at Urbana-Champaign

The New Technology and Competencies for “The Most Typical of the Activities of Libraries”: Technical Services

INTRODUCTION

At a library conference in 1940, William M. Randall called technical services the “most typical of the activities of libraries”—“they are...” he said, “the things which librarians do that no one else does—the secrets of the craft.”¹ In those intervening forty-three years much has been written and uttered in defense and derision of these “secrets of the craft.” These most typical of library activities have changed the name Randall used, technical *processes*, to technical *services*. They have moved from being sneeringly derided as “backroom,” “basement” or other dreary location activities to being enthusiastically hailed today as “where the action is.” They are, fortunately, no longer the “secrets” that they were in Randall’s day. They have been moved into, moved around within and even moved out of the organizational charts. Regardless of all these attitudes and activities, the functions of acquiring, organizing and preserving library materials persist and the competencies necessary to carry out these three functions will be the focus of this paper. In the paper, reference will frequently be made to the “technical services librarian” meaning any librarian who works in that aspect of librarianship. The emphasis is on no particular type of library. The term *library* will be used as meaning also information center.

Several means, in addition to relying upon experience, observation and a perusal of the literature, were used to gain insights into how the profession views contemporary and future competencies for technical services. First of all, the technical services competencies called for in job

announcement listings found in *The Chronicle of Higher Education*² and the *LJ/SLJ Hotline*³ for September-December 1982 were studied. To obtain a better representation of data from other than university libraries, eighteen job announcements for positions in settings other than university libraries were obtained from the Placement Office, Graduate School of Library and Information Science (GSLIS), University of Illinois at Urbana-Champaign (UIUC). A total of 188 job announcements were identified and coded according to several categories.⁴ Librarians who are either now or have recently been actively engaged in technical services related work were surveyed to ascertain their ideas. The librarians were chosen from GSLIS, UIUC graduates. This method of selection does not satisfy the rigors of scientific sampling; nevertheless, the forty-three persons responding to the survey had a wide range of responsibilities covering all aspects of the technical services including administration as well as representing the vendor, network and foundation communities.⁵ In some cases the respondents sought opinions of other staff members thereby adding to the original number of respondents. Professional experience varied from a few months in the field to nineteen years and covered all types of libraries located from New York to California and from Minnesota to Texas. Their replies were filled with many insights and ideas. Although some of them had entered the field before the new technologies had really taken hold, these librarians have proved their ability to plan for, implement and manage work related to the new technologies.

An analysis of all the data revealed that the competencies fall into essentially two main groupings which will form the outline for this paper: (1) general, technical and bibliographic competencies; and (2) managerial, supervisory, organizational and communications competencies. In reality, however, categorization does not fall neatly into these areas—there will tend to be some overlap—e.g., technical competencies are interspersed throughout the discussion. Some of these competencies are not exclusive to technical services but are especially pertinent to that area of work at this point in time and that is the reason for their inclusion here.

GENERAL, TECHNICAL AND BIBLIOGRAPHIC COMPETENCIES

General Competencies

From the analysis of the 188 job announcements, 65.4 percent were for positions in university libraries; 18.1 percent for public; 9 percent for colleges; 3.2 percent for community colleges; 2.7 percent for special libraries; and 1.6 percent for other types (see table 1).

TABLE 1
TYPES OF LIBRARIES LISTING
TECHNICAL SERVICES POSITIONS

	<i>n</i> =188	
	<i>Number</i>	<i>Percentage</i>
University	123	65.4
Public	34	18.1
College	17	9.0
Community college	6	3.2
Special	5	2.7
Other	3	1.6
Total	188	100.0

Of the 182 positions which fall within definable categories, 61.6 percent were cataloging positions (9 positions were specifically for serials catalogers). Positions described no more specifically than technical services positions accounted for 21.4 percent while 4.9 percent of the positions were advertised as acquisitions positions (two-thirds of them were serials acquisitions positions). Another 4.9 percent were advertised as automation positions that included some aspects of the technical services as well (e.g., automation and retrospective conversion librarian; assistant catalog librarian and automation specialist; assistant director for automated systems and technical services; and an adult public services librarian in a public library who was also to carry responsibilities for technical services including conversion of data to an online catalog and development of an online circulation system—the latter position representing a truly wholistic librarian!). From the analysis of the positions, 4.4 percent were as administrators in more than one specific unit (but not all units) of the technical services while 1.7 percent asked for persons to work in technical services in children's sections and 1.1 percent were for general serials positions (see table 2).

Although more of an educational requirement than a competency, the master's degree in library and information science is still considered a necessity as 68.7 percent of the 188 positions in the study called for the degree from an institution accredited by the American Library Association (ALA) while 22.3 percent required the degree without specifying that it come from an ALA accredited institution. Therefore, a total of 91 percent of the 188 positions listed in the sources noted above called for a master's degree in library and information science (see table 3). Backgrounds in specialized areas varying from Oriental art (at the graduate level) to music and from biochemistry to law were specified in 32.9 percent (62) of the

TABLE 2
TECHNICAL SERVICES POSITIONS
(DEFINABLE CATEGORIES BY CATEGORIES DESCRIBED)

	<i>n=182</i>	
	<i>Number</i>	<i>Percentage</i>
Cataloging (includes 9 serials cataloging positions)	112	61.6
Technical services	39	21.4
Acquisitions (includes 6 serials acquisitions positions)	9	4.9
Automation (including some technical services responsibilities)	9	4.9
Administration of several (but not all) technical services units	8	4.4
Technical services work in children's sections	3	1.7
General serials	2	1.1
Total	182	100.0

TABLE 3
SPECIFIED MASTER'S DEGREE IN
LIBRARY/INFORMATION SCIENCE

	<i>n=188</i>	
	<i>Number</i>	<i>Percentage</i>
From ALA accredited schools	129	68.7
ALA accreditation not specified	42	22.3
Not specified	17	9.0
Total	188	100.0

positions while 9.6 percent (18) required or found desirable a second master's degree or some other advanced degree in a special subject. Two positions required Medical Library Association certification.

Traditional competencies in foreign languages are holding their own by being requested in 42.6 percent (80) of the 188 positions. Of these eighty requests, 61.3 percent were couched in general terms such as "Western European"; "European"; "two" or "Romance" languages; or simply "a language is helpful"; but 38.7 percent (31) specified particular language requirements (see table 4) with 29 percent of the 31 calling for German; 16.1 percent for French; 12.9 percent each for Spanish and Russian; 9.7 percent for Arabic and/or Hebrew; 6.5 percent for Latin and/or Greek; 6.5 percent

for Italian; and 3.2 percent each for Chinese and for a Slavic language (see table 5). Foreign languages were also believed to be important in a number of the survey replies for reasons well summarized by Richard A. Stewart: "we desperately need to start widening foreign-language competence among librarians as the information network continues to become more international and as our own country continues to enrich its culture with immigrants."⁶ It should be noted that this need for language competencies was not just expressed by those employed in university and college libraries but by those who worked in other types of libraries as well. (Stewart himself is a cataloger in a public library.)

TABLE 4
LANGUAGES SPECIFIED

	<i>n=80</i>	
	<i>Number</i>	<i>Percentage</i>
General terms (e.g., "two," "romance")	49	61.3
Specific languages designated	31	38.7
Total	80	100.0

TABLE 5
SPECIFIC LANGUAGES DESIGNATED

	<i>n=31</i>	
	<i>Number</i>	<i>Percentage</i>
German	9	29.0
French	5	16.1
Spanish	4	12.9
Russian	4	12.9
Arabic/Hebrew	3	9.7
Latin/Greek	2	6.5
Italian	2	6.5
Chinese	1	3.2
Slavic	1	3.2
Total	31	100.0

In the position listings, technological competencies were mentioned in two different ways: those calling for "knowledge of" a particular or general category of technology and those calling for "experience with"

technology. "Knowledge of" competencies were described ten times in terms implying knowledge of "computer applications and technology" while other terms used less frequently called for knowledge of integrated library systems, automated serials and cataloging, systems analysis, data processing to support acquisitions and book fund accounting, keyboarding skills, and retrospective conversion. Some "technological" experience (most frequently with OCLC) was requested in 25 percent of the listings. However, traditional experience, particularly cataloging, outdistanced technological experience by being called for in 50 percent of the job listings.

In the survey sent to technical services librarians many specific and general technological skills were mentioned. Keith Russell's statement serves as a concise summary statement calling for:

the ability to understand the technology (in a general way); interest in the technology; ability to understand (and change) workflow; ability to find out what one needs to know about the technology; knowledge of whom to trust and believe; ability to work effectively with systems people and vendors (and to treat promises with appropriate reservation and skepticism); and vision to see beyond the department and the library....⁷

Lacking in the job announcements but mentioned frequently in the survey replies was the commitment to *service* for the library user—the very reason for the existence of the technical services (or public services for that matter)! In order to give dedicated services to library users, the librarian must be competent in defining goals and objectives. Once again Randall's words of over four decades ago speak to technical services workers today: "The knowledge we need to define the objectives of a given library or class of libraries is a knowledge of the needs of library users; a knowledge of their abilities to employ the resources peculiar to libraries to satisfy their needs and a knowledge of the resources themselves."⁸

Bibliographic Competencies

The importance of bibliographic competencies permeated the survey answers. How can one work in library services of any type today without them? Bibliographic competencies are the very skills of librarianship itself—they are necessary to acquire, organize and preserve library materials—and technology changes them. These competencies will be considered under several different categories.

The Materials Acquired and the Sources for Acquiring Them

Librarians have always needed to know what materials should be acquired and the sources for acquiring them. But technology is affecting

both the materials and the sources. Only a few of the ways this is happening can be mentioned here.

Major electronic, computer and other media companies now control many publishing firms resulting, in some cases, in a change in the quality of materials as well as in the relationships with old, long established, family businesses. Dealing with the new houses and selecting from their publications requires new skills as does recognition of changes brought about by those aspects of electronic publishing that use computers to facilitate the production of printed products. In the future, shorter print runs should be more economical through the introduction of computerized composition and production.⁹ As publishers are eventually able to place such systems in-house, they should be able to make available books on current topics more quickly.

However, Judy McDermott warns that there is a good news/bad news syndrome at work here: acquisitions librarians may not be able to find out about the publications before they are temporarily out-of-stock or out-of-print.¹⁰ While additional start-up costs for a second print run will be lower as the text is already online, publishers will still have to see a demand for a title before investing in additional runs. Publishing on demand may be a real possibility in the future but may not be so until publishers can afford, and markets are viable, to foster such programs. Print media reviews will be too slow to inform librarians of these short runs therefore items may be temporarily or permanently unavailable by the time the orders are placed. Acquisitions personnel will find the need to develop new competencies in locating information about publications because even the distributors of prepublication bibliographic information will have less time to disseminate the bibliographic information to which we have become accustomed. McDermott suggests that acquisitions librarians will need to "approach acquisitions work more aggressively."¹¹

Thomas Hickey predicts that in the not too distant future a large proportion of the current journal literature will be available online.¹² This will require "subscriptions" that are totally new to acquisitions and serials librarians. Evidence that online subscriptions are beginning to appear comes from the announcement that on 1 June 1983, the full text of all the primary journals of the American Chemical Society will be available online through Bibliographic Retrieval Services, Inc. (BRS) which already offers the full text of the *Harvard Business Review* online and is prepared to offer online service for the medical journals of the Elsevier Science Publishing Company in the future.¹³ Other publishers are exploring the issuing of journals on videodiscs and making copies available for a fee.¹⁴ New competencies will be required to obtain, organize and maintain materials through these newer dissemination methods.

The recent introduction of microcomputers into educational settings requires competencies in the selection of software which can frequently best be obtained from personal visits to local vendors.¹⁵ To learn about the selection of software packages, the acquisitions librarian may be found reading from selection materials outside his/her usual realm. In addition to knowing about the software, acquisitions personnel must become knowledgeable about the documentation that accompanies the software taking into account what seems suitable to the needs and expertise of the intended users. It follows that the librarian will need to be knowledgeable enough about the hardware to be sure that the software is compatible with the equipment to operate it. The acquisitions librarian should also be aware that any program can have a "bug" in it and should be prepared to deal with the return of the package.

There are other library problems associated with software than those related to acquisitions. First of all, the *Anglo-American Cataloguing Rules*, second edition (AACR2)¹⁶ were formulated prior to the introduction of microcomputers; and the specific rules in AACR2's chapter 9 ("Machine-Readable Data Files")¹⁷ are not readily adaptable for this type of material. School librarians, in particular, are voicing difficulties with processing this type of material. For the time being, librarians will find Sue A. Dodd's *Cataloging Machine-Readable Data Files*¹⁸ a helpful tool to use in deciding how to handle this type of material. Secondly, new preservation problems are posed by software in libraries. The susceptibility of the software to damage from lightning, storms and high winds which cause power outages as well as from static electricity cannot be overlooked by the preservation librarian.¹⁹ Users too must be educated about damage that can come to software. Emard has prepared a list of "do not's" that could well become a part of the instructions given to users of microcomputer disks in order to protect this new carrier of information.²⁰

Microcomputers offer much in the way of word processing capabilities to take care of many of the correspondence details associated with the acquisitions process; therefore, paraprofessionals should be better able to handle an increasing amount of this work. Maximizing these and other capabilities of microcomputers such as employing software packages for budgeting, forecasting and planning will become an important area of supervisory expertise for the acquisitions staff. ✓

With the noted coming changes in publishing, new and speedier means are required to obtain the publications. Librarians, publishers and vendors will seek new means to order materials; therefore the librarian must become competent in evaluating the differing capabilities and costs of each system to meet the needs of the local institution and to recognize that capabilities and costs vary from vendor to vendor—and are constantly changing—and all the while, the field to choose from grows larger and the choices more difficult.²¹

The Tools that are Used

The tools used in technical services operations that come from outside the library have for some time, in one way or another, been affected by the new technologies; in turn, they affect work strategies in the local library. Many of the tools used in the past for verification of orders are no longer used in the same way, if used at all. Until the new shorter runs spoken about earlier become commonplace, the first, and often the only, tool needed for verification is the database of a bibliographic utility.²² This is especially so as the databases have come to include cataloging-in-publication data. For items not yet in the database, new routines must be established for re-searching the databases taking into account published studies that can help determine the optimum time lapse between searches.²³

Using these databases for any technical services function requires competency in the appropriate search strategies for each situation to save valuable time for the library staff as well as to decrease time spent on the system thereby helping to assure better response time and reduced costs for all users of the system.²⁴ Search strategies will become important in other ways; for example, some old familiar verification tools such as Bowker's *Books in Print* (BIP)²⁵ and *Ulrich's International Periodicals Directory*²⁶ are now online, but they are not identical, mirror images of their paper siblings.²⁷ The acquisitions personnel must know when to use the hard copies and when it is economical to use the enhanced search capabilities of their online counterparts each possibly with different search commands from other online systems.

The Tools that are Made: The Role of Bibliographic and Technical Standards

The hallmark of the technical services has been its record keeping tasks to support a variety of paper files. Each of these files, in its separate location, covered records necessary for processes from acquisitions through binding. Frequently, in the past, these files have demonstrated little consistency in format or content in relation to other files. When the same integrated file is shared by all local users within any one library and as more of the files are shared among libraries through online cooperative services, the need for consistency through bibliographic standards has increased. While at one time the new technologies were expected—because of their new search capabilities—to abrogate the need for such standards, quite the opposite effect has actually occurred at least in the past decade. Now, a larger proportion of the time and talent of the technical services librarian is occupied with standards (and learning the acronyms that name them!).

Cataloging codes are among our oldest standards and have for over 125 years been acknowledged as a necessity for cooperative efforts. Their continued importance was acknowledged by virtually all persons answering the survey. Knowledge of the present code as well as previous codes is essential (e.g., in retrospective conversion activities and in understanding and interpreting the catalog). However, in the job announcements only 7 percent (14) of the jobs advertised called for knowledge of the *Anglo-American Cataloging Rules*, first edition (AACR1)²⁸ while 31 percent (59) requested knowledge of AACR2. Perhaps a knowledge is presumed but this is not the best way to write a job announcement if such knowledge is expected.

While at one time catalogers were the librarians primarily concerned with standards, this is no longer the case. An acquisitions librarian entering an item which does not appear in the OCLC (Online Computer Library Center) Online Union Catalog into the OCLC Acquisition Subsystem is expected to format the record according to the standards of AACR2.²⁹ Every librarian in a local system finds it necessary to interpret not only local records but also those found in MARC³⁰ (or other machine readable) formats of the online bibliographic services, yet only 10 percent (20) of the 188 job announcements requested knowledge of MARC formats while knowledge of the OCLC system (and possibly its formats) was called for in 25.6 percent (48) of the listings. Serial librarians engaged in union listing efforts are likely to be describing serials holdings according to the summary level standards set by the American National Standards Institute (ANSI Z39.42) which have been adopted as the approved medium by the OCLC Serial Union Listing Capability.³¹

While the MARC format identifies and tags the data elements for the electronic transmission of bibliographic data, MARC does not specify the bibliographic content of the record; therefore, standards in the form of the National Level Bibliographic Record (NLBR)³² are devised so that an organization creating records in machine-readable form for its use will also be creating acceptable records content-wise for sharing with other organizations or for contributing to a national database.

As a large supply of bibliographic data emanates from the Library of Congress (LC), that library serves as a role model for cataloging standards. LC's policies have a strong influence on those of other libraries as well as the bibliographic utilities. Knowledge of the Library of Congress Rule Interpretations (LCRIs)³³ for AACR2 and their frequent changes are almost as essential as knowledge of AACR2 itself, especially when the bibliographic utility mandates their application.

The attempts at cooperation brought about by the new technologies have found the technical services librarian rediscovering an old, almost forgotten, competency—the building of authority control mechanisms

now, not only for the local library, but for other libraries as well through cooperative programs such as the Name Authority Cooperative (NACO) Project sponsored by the Library of Congress.³⁴ Later this year the Washington Library Network, the Research Libraries Group, and the Library of Congress will choose the sharing of authority records as the first application of the Linked Systems Project.³⁵ This online communications link and intersystem data retrieval and maintenance facility "will enable heterogeneous computer systems to exchange data, and is extensible to additional systems beyond the initial three," according to Wayne E. Davison and is based on existing and emerging international standards as much as is possible.³⁶ The resurging necessity for authority control brings forth a National Level Authority Record to help set the standard for data elements that should be included by an organization creating authority records in machine-readable form for sharing with other institutions or contributing to a nationwide database.³⁷

The new technologies call for a variety of technical standards and these too must become a part of the knowledge base for the technical services librarian. Hickey and Spies tell us that:

Without some standardization, the marketplace becomes fragmented. Information services and products will not break through on any large scale unless the user is assured of easy, trouble-free use. It is, therefore, important to standardize various aspects of the presentation format component of library and information systems to the extent to which they will meet the requirements of the majority of potential users.³⁸

Technical services are affected by standards from other parts of the information community such as those developed by the Books Industry Systems Advisory Committee (BISAC) for a standard purchase order communications format to facilitate computer-to-computer ordering. This standard will be incorporated into the design of online acquisitions systems of OCLC, the Washington Library Network, CLSI, and Dataphase. Locally developed in-house automated systems are encouraged to use this format too.³⁹

More and more, our standards become international in nature looking ahead to increased sharing of data as is evident by the use of the International Standard Book Number (ISBN) as the primary identifier in the BISAC order format;⁴⁰ the incorporation of the International Standard Bibliographical Description (ISBD) formats into AACR2 and the use of the International Standard Serial Number (ISSN) in a variety of ways. Developed as a national standard, MARC also goes international with UNIMARC. Specifications have been prepared to convert the U.S. MARC format into the UNIMARC format and it is expected that the Library of Congress will have the capability to distribute MARC cataloging data in the UNIMARC format in the near future.⁴¹

Standards must be revised and changed and that in turn changes other standards. Changes in cataloging codes brought about changes in MARC and OCLC formats. There are defects in the ISBN system so committees are at work to develop a machine generated Universal Standard Book Code to replace it.⁴² And if no one standard is settled upon, then, competing means arise such as is presently occurring in the identification of microcomputer software where at least three different coding systems are being developed to serve purposes similar to ISBN: the Universal Software Market Identifier (USMI) being developed by Technique Learning Corporation in conjunction with the Association of Data Processing Service Organizations; the International Standard Program Number (ISPN) created by Imprint Software Incorporated; and a five digit number which classifies the software into one of sixty-five categories as well as by title being produced by Visual Materials Incorporated along with WIDL Video. At the same time R.R. Bowker contends that as the agency responsible for ISBN numbering, Bowker is thereby authorized to assign ISBN numbers to computer software.⁴³ Until one of these systems or yet another system becomes the accepted standard, technical services personnel will find it necessary to be acquainted with each system.

Still new standards continue to be promulgated or considered. An ANSI Subcommittee, Z39, Subcommittee G (Standard Terms, Abbreviations and Symbols for Use in Interactive Information Retrieval) is searching for guidelines as to whether a standard online common command language is desirable for gaining access to a variety of databases instead of the required mastering of a number of different languages.⁴⁴

Tools That We Make: The Online Format

Except for a brief fling with the book catalog in mid-century, librarians have found the physical format of the twentieth-century tools that they have made to vary little. A stable and settled format such as the card format has enjoyed calls for few decisions in that regard. One accepts what the technology allows. Now technology allows viable alternatives—COM online and who knows what else even today is being invented in the dorm of some Stanford undergrad or in Silicon Valley. And now the librarian must decide not only the best format to use to meet the needs of the local clientele, but, if the choice involves the new technologies, decisions must be made between vendor-produced systems, in-house developments or borrowing from previously developed systems that offer the chosen format.

Paper files existed independently from other files. Now the opportunity for interfacing is near—a totally integrated local system cannot be far off. A whole new tool for librarian and library user alike is about to be born. A different approach must be taken by designer and user for this new tool. There are few examples to chart the course—there are few who have

passed this way before. This is the time to take into account the reminder of Shoshana Zuboff that information technology, by creating a medium where imagination instead of experience-based judgment is important, challenges our old procedures, and according to Zuboff: "Judging a task in light of experience thus becomes less important than imagining how the task can be reorganized based on new technical capabilities."⁴⁵ So imagination and creativity must be among the attributes of technical services librarians who build the new tools to meet the needs of local users, many of whom have become computer literate themselves. The computer literate user knows the capabilities of computers and will expect much more from the new tools than he/she did from the old.

Being creative and imaginative in making the new tool does not preclude understanding how to build a total catalog—one with integrity—even though the new tool will certainly relate and collocate in quite a different way from the old. Sara Stephan, one of the respondents to the survey of technical services librarians, indicates that being concerned about making a total catalog is somewhat easier with the card catalog because the physical entity is there to remind you of the necessity, and "when working online it is easy to forget about the other thousands of records in the system and see only the one that you are working with."⁴⁶ She notes that with changes in cataloging rules, filing systems and others tools, the necessity still remains to remember how changes must also take place in authority records and in the tagging of the fields to be retrieved. Frederick Kilgour too has pointed out that, in online systems, librarians are often too concerned about making an individual bibliographic record rather than "constructing a catalog."⁴⁷ Meanwhile, Nancy F. Carter cautions that, "the sound philosophy of cataloging should not be deleted in favor of mechanics and 'new toys.'"⁴⁸ These are but a few reminders that making an automated catalog is not an automatic process—it still requires knowing what a catalog is intended to do in addition to lots of work and thought to achieve the goals that are set for it.

Being imaginative and creative does not preclude learning all that is possible from the studies of existing online catalogs and research into the requirements of future catalogs conducted by the Council on Library Resources, OCLC and other institutions and from the wise counsel of Charles Hildreth,⁴⁹ Stephen Salmon,⁵⁰ Joseph Matthews,⁵¹ and MELVYL team,⁵² and others. But reading these studies should quickly tell us that careful and often lengthy planning is necessary to make a truly "user friendly" tool. The studies give us some pause to reconsider long held beliefs such as those which have claimed that known-items searches are of much more importance to the user than are subject searches. That is not the message from the new studies⁵³ and our century-long dedication to perfecting descriptive cataloging must now find equal dedication to perfecting

subject access—in a much shorter time frame. A really imaginative person can even devise ways to use classification as a tool for organization of subject content within the catalog rather than its long established predominant use as a shelf location device—and existing schemes may not be the ones to provide for the new use.

Content is not the only concern in making the new tools. Some knowledge of the internal organization of files will be helpful. Command languages will need to be devised that are user friendly and terminals will need to be chosen that are as easy to use as possible while still being responsive to the multiple and diverse needs of users. Of great help to the librarian should be the record-keeping capabilities of the computer and the creation of statistics. Meaningful interpretation and use of the statistics should help in continual design and redesign of a responsive tool. Therefore research on the local level and sharing the results of that research through publication will be an important part of the librarian's work. These findings and new developments will result in dynamic, ever changing tools, for the new technologies never stand still. Even now, as we are immersed in national and international standards and in the creation of networks and other cooperative efforts, the advances in hardware and the services offered by the increasing number of commercial vendors are making the possibility of creating local systems responsive to the needs of local users much more of a reality. Richard DeGennaro has written about the multiple options of the 1980s, speaking of the increasing possibility "for a library to put together multifunction library systems from the functional components of several different vendors with appropriate links as interfaces. Thus, as the various subsystem components become obsolete, they can be replaced with the latest and best components on the market."⁵⁴ Add open-mindedness to the competencies list for the 1980s.

*The Materials Preserved: Conservation/Preservation Competencies*⁵⁵

Record keeping for the activities of preserving library materials has, for a long time, been more than a local activity. Long since paper rubbings were made to send to the binder for assuring consistency in physical format for volumes of the same serial or series. Later, sample backs, or full-sized examples on buckram strips of the stamping patterns for titles bound for a customer came into use to create standardized prescriptions for commonly held titles. These methods, however, often proved restrictive for individual libraries and by the 1960s binders were making use of embossed plates to carry the standardized information. In the mid-1970s the content of the embossed plates was converted to machine-readable form to develop computer-assisted systems for storing and reproducing that part of the

binding record which was relatively constant. By the end of that decade, the advent of minicomputers and computer driven stamping equipment brought dreams of interactive systems, linking binderies and libraries much closer. In the 1980s, these dreams are just now becoming realities as some binding departments are just now beginning to experience some freedom from many paper files and from the copying of records many times over.

Binderies use computers in a variety of ways in the binding process although much of the process still is human-intensive. New competencies must be developed to ascertain the effect of these new operations on the materials as well as to write specifications for new contracts.

Knowledge of developments in both computer applications and preservation filming is a necessity in preservation work today. In the future, the videodisc holds promise of becoming a new storage medium if costs can be reduced and other problems resolved.⁵⁶ One disk is reported to have the capability of storing 54,000 frames per side which means storing 54,000 photographs or 13,500 pages of text per side.⁵⁷ The Library of Congress is engaged in several pilot projects using laser optical disk technology for information and preservation management.⁵⁸ While general use is not anticipated for some time, the technical services librarian must include knowing about and following the progress of this new technology among his/her competencies.

Establishing environmental conditions for materials involves the preservation librarian and many others with heating, cooling, humidifying, dehumidifying, air filtering, and scrubbing techniques. Many of these techniques are computer-controlled locally and the preservation librarian needs to develop a competency in monitoring these activities (at times aggressively) and their effect on the local collection. Chemical technology, too, has become an important component in developing improved paper, adhesives and preservation supplies as well as deacidification techniques.

As online databases develop, the preservation librarian should insist that preservation copies be identified on the records. Such information is helpful not only to local users but aids network members as well. Since its inception, the Research Libraries Group (RLG) has supported the idea of indicating conservation/preservation efforts through the RLIN system (Research Libraries Information Network) where indication of the quality of materials and the location of master microforms would be noted. Enhancements to the system are expected soon.⁵⁹ SOLINET (Southeastern Library Network) is also considering such efforts according to Frank P. Grisham.⁶⁰

MANAGERIAL, SUPERVISORY AND COMMUNICATIVE COMPETENCIES

Increasingly, librarians who work in the technical services area are called upon to be managers, supervisors and communicators. They have always assumed these roles, of course, but certain aspects of the roles are of greater importance because of the introduction of the new technologies.

Of prime importance is the identification of problems and working toward the solutions of these problems. Whether the librarian is the head of the department, an original cataloger, an acquisitions or preservation librarian, or a serials manager, problems that need to be solved are encountered. Some problems can be easily identified and even solved. Others are of greater magnitude. All require problem solvers, planners and decision makers at various levels in the organization. Solving a problem after it has been identified consists of several important steps that are likely to take considerable time, effort and expertise when the new technologies are involved. Therefore it is not likely (or advisable) that the problems of larger magnitude (or even some of the smaller ones) can be solved in isolation. Technical services operations usually affect the total library system; therefore several opinions need to be heard in the planning phase. Then, too, no one person can identify all the needs, read and comprehend all the literature, make all the on-site visits, determine all the hardware and software requirements, and all the other aspects involved in planning for the new technologies.

Richard Boss identifies the steps that are to be taken in this process as: first of all, defining the problem, spelling out the purpose of the project, setting its scope, and determining the budget available.⁶¹ This may require seeking expert advice outside the library staff by bringing in a systems analyst or a consultant and getting the approval of the person next higher in command for the solving of the problem because commitment to solving the problem (not necessarily just to automation) is essential.

Many libraries lack detailed information about their manual operations so an analysis of present operations and describing in detail the relationships among the parts becomes essential.⁶² Throughout the literature and from responses to the survey the point is frequently made that few libraries know enough about this aspect.

After analysis, a synthesis of the alternative solutions should be made.⁶³ This calls upon the creative competencies of the librarians involved as each remembers the problems to be solved and the desired improvements. At this point reinforcement should be made that more than merely performing the old tasks more quickly and economically will be necessary. A totally new way of doing things is likely to evolve.

Evaluation of the alternatives, according to Boss, means defining the criteria and specifications in terms of expected performance.⁶⁴ These criteria and specifications should be based on local needs rather than on a consultant's report alone or on the criteria set by another library or a vendor. Requirements should be grouped and weighed according to priorities which have been determined earlier. Richard W. Meyer sees evaluation as including the ability to screen out the unsuitable candidates against general requirements, evaluating those candidate systems that are left, listing the costs for each system, summarizing, comparing, and choosing.⁶⁵ It may be necessary to iterate the steps to increase the detail and modify the results if they do not adequately solve the problem.

Among the planning projects reported in the survey were for: retrospective conversion; the development of acquisition control systems; online catalogs; authority control systems; three libraries planning an automated circulation system which would eventually become an online union catalog; cooperative automated film booking; work flow rearrangements; computer linkage to the commercial bindery; and use of terminals.

But the manager must also plan for implementation which includes the ability to consult with vendors, write performance specifications and contracts, arrange for preparation of sites, prepare and train the staff, convert the data, draft work procedures, and sell the program. Not to be neglected is the manager actually working with the equipment in order to ascertain how the procedures operate, the potential output to expect, and the problems that may occur. Later on the system must be further evaluated. The manager realizes that all this is a risk. As Boss puts it: "Despite a library's best efforts in planning, procurement and promotion, automation can be a failure."⁶⁶ And so, among the technical services librarian's competencies must be risk taking, and the abilities to admit failure, bounce back, and start again. S. Michael Malinconico reiterates the same theme in warning that, despite careful planning, uncertainty and risks are not always eliminated; therefore realistic planning allows for unexpected turns of events or fortune such as costs exceeding budgets, time needed for implementation becoming greater than anticipated, or the system failing to perform as expected.⁶⁷

It is a strange quirk of automation that almost at the same time as the technical services librarian plans for a new system, he/she must also plan for obsolescence and make day-to-day decisions about the viability of equipment and systems after they come into use. "The stakes in both situations..." according to Joseph Becker, "are high and the penalties of being surprised by technological change can be severe."⁶⁸ This requires more than knowing just how one system works and calls for an intellectual framework for evaluating the emerging technologies in order to place new developments and trends in context with the older ones. Becker describes

this as acquiring "a broad, conceptual appreciation of new information technology and an intellectual curiosity about its capabilities, implications and consequences"⁶⁹—competencies which technical services personnel must certainly possess in the 1980s.

Financial Management

Financial managing also takes on new dimensions with application of the new technology. Reductions in staff, often predicted, do not seem to materialize especially during transition times. Margaret Myers agrees with this when she writes: "There is little data on whether automation has resulted in staff cuts. Some librarians have reported on reduction in staff requirements in certain departments, but the total number of library workers has not been radically affected"⁷⁰—although she readily admits that roles and responsibilities and even positions change because of the new technologies. Others speak, in both the literature and in the survey responses, of the staff time required for planning, developing and implementing the new systems and in keeping them going (often, for a time, along with the old systems). Duties expected to diminish, frequently actually increase as Carolynne Myall noted in her response to the survey: "The use of the Virginia Tech Library System and the growth of our collection and services created a need for greater quality control in cataloging and processing. Hence, we now have greater rather than less professional participation in cataloging and processing."⁷¹

Paul M. Gherman points out a number of considerations that must be taken into account for competent financial management with the new technologies. First of all, if there are reductions in staff, such reductions are likely to occur at the lower end of the salary scale where employees perform routine and repetitive tasks that a machine can do more easily.⁷² For those former typists who now work with computer input (e.g., into a bibliographic utility), Gherman notes that, "the complexity of the work has moved upwards considerably along with the pay classification."⁷³ Planning, budgeting and recruiting must be done for adequately trained (or retrained) staff to do each task. As the nature of work shifts and is no longer just production work, so shifts the demands of the workers. As paraprofessionals take on some of the work previously performed by professional catalogers, their salary expectations rise and all the while the new technologies must be developed and maintained. The new microcomputer may not come with appropriate software and thus programmers are required although none may presently be on the staff.

Gherman further points out that while direct costs for typists to create catalog cards are no longer needed, other personnel such as systems analysts and a greater number of managers will be necessary.⁷⁴ If book acquisi-

tions were to drop, typists might be laid off but one cannot lay off technology which must be maintained at the same level regardless of the acquisition level.

Costs for procuring or renting terminals and for telecommunication must be absorbed somewhere in these days of financial retrenchment as well as costs for use of the bibliographic utilities. Thus, we are reminded that technology operates not just within the sphere of the local library but is now a part of networks and bibliographic systems. As Allen Veaner has wisely written:

In a network one no longer sets one's own priorities. One is part of a group schedule. Decisions made by the group can have significant impact on local planning and budgets. A software change made by a computer manufacturer can require a user to buy new equipment even though the equipment in place is not worn out or obsolete. Changes in hardware can have the same effect. One expected result may be that money destined for an important local program may have to be allocated to maintaining the new technologically-based [sic] system. And there will be no choice because once installed, it is virtually impossible to revert to the manual system—not even the same forms will be used and if any time has elapsed there may be no one on the staff who remembers enough of the old system to use it.⁷⁵

Gherman concurs: "Participants of these systems can no longer act or exist independently as they once did but they must comply with national codes and standards. Change at the national level therefore means implementation at the local level, whatever the personnel costs."⁷⁶ This comes as no great surprise to anyone who has been through the implementation of AACR2, and the OCLC and MARC changes that went along with AACR2 and the establishment of authority files in order to enter data into bibliographic utility databases. These examples could be multiplied many times over by citing changes made by vendors, changes in software development, etc.

Organizational Management

The technical services librarian cannot be satisfied with old methods of organization. It soon becomes obvious that the traditional lines of work patterns no longer function when the new technologies arrive. Old lines of demarcation now result in redundant operations which can be better served by combining acquisition, cataloging and circulation functions. When all services use the same central record, the separate functions blur and overlap. Technical and public services overlap, too, in integrated systems and old barriers must break away—old rivalries cease. This, too, does not come without its birth pangs and death gasps but the competencies of the skillful persons involved help them happen more easily.

People

The new technologies are changing the inner workings of the library. The automated systems are important in facilitating the workload but our human resources are still our strongest asset and they need to be thoughtfully and carefully supported through the changes brought about by automated systems. When the systems are fully in place, they will only be as good as the people who interact with them.

So responded Marie Kaskus⁷⁷ to the technical services survey while another respondent, James Chervinko, noted that:

Despite all the wonders and problems of automation, technical services is still a people organization. The computers are simply tools—in the real sense....Above all, it is the people in technical services, the administrators, librarians, paraprofessionals, and clerical workers, who have to decide how best to use automation in their operation.⁷⁸

In writing about serials staffing guidelines for the 1980s, Margaret McKinley speaks out of long experience in saying: "Automation, the optimists' great hope and the pessimists' great fear, depends heavily for its success on an enthusiastic staff, carefully prepared for the radical changes which automation brings in its wake."⁷⁹ These three persons attest to the necessity for yet another important competency—the skillful management of change in relation to people. Everyone fears change and although most of us are better able to cope with the changes brought about by computers than we were a few years ago, even today there is still likely to be an element of fear, and especially of inadequacy, when *your* job becomes affected by the computer. A computer system requires different mental and emotional skills to work with it than does a manual system. For example, a computer system frequently demands more abstract thinking than does a manual system while at the same time the computer system requires a conformity and adherence to its protocols, delays and down times, and a tolerance of its blatant intolerance of errors or even slight deviations from its procedures. All of this may be difficult for some people to accept.

Nothing will be quite the same again when the computer comes to stay. It is a bittersweet experience full of anticipation yet mixed with a bit of sadness knowing that old work relationships and procedures will certainly change. Each staff member should be prepared for this change in relationships just as my mother tried to tell me before my marriage that our close family relationship would never again be quite the same. I argued and disputed her wisdom—but she *was* right. There were tradeoffs, of course, but you can never "go home again" in quite the same way. Technical services staff should be made aware of the changes in relationships that come with the introduction of a new "family member" when the "bridegroom" is a computer. Zuboff says it this way:

New forms of technology inevitably change the ways people are mobilized to work as well as the kinds of skills and behavior that are critical for productivity. These changes are rarely born without pain and conflict—nor do they emerge exactly as planners envision them. Instead, new conceptions of work organization and behavior emerge from an interaction between the demands of a new technology, its social organization, and the responses of the men and women who must work with the new technological system.⁸⁰

In my technical services seminar, we use a role playing experience to emphasize the problems associated with change—in this case change that results from the installation of OCLC into a medical school's library. This note appears in the in-basket of the technical services librarian:

For the past several months, I have been working at least six hours per day at the OCLC terminal while we are putting forth an all-out effort to input our new holdings and do some retrospective conversion especially of our serials holdings in anticipation of using the OCLC Serials Subsystem. As you know, we have only one terminal and therefore the two of us who work with the project are scheduled for different hours. We drew lots and I drew the afternoon shift working until OCLC "goes down" in the evening.

I am writing you this note because I think that OCLC is affecting my health. Lately my eyes have been bothering me a lot. I can no longer focus for long periods of time. I see colored fringes around objects and often my vision is blurred. I am using up my salary buying eye drops. I have heard of people turning "green with envy," well, I am turning green from seeing those OCLC letters for so many hours a day. Even at night when I go home, and close my eyes, it seems as if I still see those green letters floating around.

I really used to like my job and the people I worked with. Now I am beginning to hate it. First of all, I really miss my friends that I worked with. I enjoyed them so much as we shared work and life's little experiences. Now, I seldom see some of them. All I have to talk to is the computer—and it doesn't care one bit (or for that matter, byte) about me and the things that matter to me. Sometimes I feel like a slave chained to a galley—my galley is the terminal. And those chairs we have for the terminal really don't fit me—my feet don't touch the floor and I am getting a crick in my neck all the time—and a backache as well!

But at least I don't wear bifocals—then my neck really would hurt! And talk about frustrations—those really *come* when the system goes down—how I hate just sitting there (like a captive) waiting for that dumb machine to get its act together. And since it is rather quiet around here in the evenings when I work, it gets lonely waiting for those people in Columbus, Dublin, or wherever they are in Ohio now, to fix whatever is wrong or to enhance or whatever they are doing on MY time and making me lose MY statistics. (By the way, I might as well tell you that rumor has it that you are basing our merit raises upon our statistics at the terminal—in some ways, I don't think that is fair—I don't have any control over what happens as far as downtime is concerned. I just wanted you to know my sentiments about this while I am getting things off my mind and down on paper.)

Another thing that bothers me is when there is trouble with the terminal, and I become one of the 3000 calls a week OCLC says it gets at the User Services.⁸¹ That's a statistic I'd rather not be—talking to an engineer five hundred miles away who expects me to know what a cable is and where it leads to and whether a plug is male or female is not my idea of chatty conversation on the phone.

And then there are the times we have to wait for Paradyne from Peoria to come over and repair the modem—only to find the next day that that whatever thing isn't even plugged into the modem. I was never cut out to work with this kind of stuff. Add to this the fact that I'm missing out on a lot of social life because of my strange work hours and I think you'll see why I am feeling depressed and dissatisfied and find myself worrying all the time. Lately, I have found yet a new worry—concern about the harmful effects to my health from the radiation from the terminal—working with all this medical stuff does tend to open one's mind to the powers of suggestion! Recently, on my 15 minute break per half day (or night), I started reading up on harmful effects to our environment and, believe me, I am beginning to think that working at a CRT is high on the charts for that! Do you think maybe I'm experiencing burnout?

It is not too farfetched to believe that such a letter could have appeared in any number of real in-baskets (indeed, there is literature⁸² that speaks to these problems and each aspect was mentioned at least once by the librarians responding to the survey completed prior to the preparation of this paper). Wise is the librarian who, as Malinconico⁸³ suggests, both "hears" and "listens" to the resistance to change; wiser yet is the librarian who exerts a leadership role and who motivates the staff to develop positive attitudes toward change by skillful involvement of each person of any rank in the change process.

Sara Fine reports on a nationwide study that she has conducted among library administrators, practicing public librarians, library master's students, and library school faculty in which the findings have confirmed that the thing people fear most about the new technologies is that interpersonal relationships will suffer. However, the findings also indicate "that resistance is related to whether or not people are a part of the decision-making process in their organization."⁸⁴ By working with the staff to help them understand what *may* happen and by being sensitized to the harmful effects—physical and psychological—that may occur and cause stress, much resistance can be countered. Necks do get stiff; bi- and tri-focal wearers do experience difficulties and few work stations seem to have been designed with even a modicum of comfort in mind. Workers do take pride in their jobs—sometimes becoming even a bit proprietary about them—and when the alignments and working relationships are challenged, humans do tend to act as humans. Perhaps this has been the most difficult problem for catalogers for many of their duties have now, with the library networks, been taken over by support staff. (This was by far the area cited most frequently as having been changed by those who responded to the

survey.) There are catalogers who really do like to catalog—and as the professional cataloger is removed to managerial and supervisory responsibilities, that person may find these new duties less satisfying to him or her. And some help may be needed to make the transition easier.

Whatever the position, the person who does not like change (not necessarily related to chronological age) will not easily cope with the consistency with which the new technologies spawn change. Eventually automation does bring about changes in organizational patterns in libraries—catalog departments may no longer exist as centralized entities; circulation departments leave public services for technical services; technical services are no longer even known by that name. Supervisors are changed. Workers who formerly shared the same work areas are now found on different floors of the building. The pride once felt for following a task through to completion and holding a completed product in one's hand is swallowed up into an intangible grey terminal and probably, for all the workers know, digested by some Pac Man-like creature. No longer does the worker feel like a real "craftsperson." Malinconico suggests that the transition period from one system to another should not be rushed, particularly if it differs radically from the new one and he quotes David Nadler of the Columbia University School of Business, who says that: "People need to mourn for the old system or familiar way of doing things. This is frequently manifested in the emergence of stories or myths about the 'good old days,' even when those days weren't so good. The process of dealing with loss takes time, and those managing change should take this into account."⁸⁵

It becomes obvious that sympathy, compassion, motivation, understanding, a sense of good timing, and leadership become an important part of the competency pack for the technical services supervisor at this juncture as does the ability to recognize who is right for a particular job, realign existing staff and recruit new staff members from a variety of backgrounds.

The communication capabilities and competencies of the technical services librarian reach out to many different groups of people in dealing with the new technologies. In addition to close staff relationships within the local library, one will be working with persons outside the library; some of whom were not even mentioned in library school: engineers, electricians, telephone and other communications personnel, computer programmers, systems analysts, consultants, vendors, network service personnel, and those who work in the networks as well. Frequently automation work is teamwork or is a task force assignment involving many levels of personnel from all areas of the library, from different sectors of the local environment, and from many areas of expertise. Some of these persons do not speak "bibliographic recordese" and the ability to speak in their terms can be a real benefit.

In a network environment, control of the local environment is no longer truly local—much depends upon communication not only with persons but with machines far, far away. Vendors, engineers, personnel at network service centers and in users' councils, as well as those who form the governing bodies of networks influence our local operations and take our time and money more than we frequently care to admit.⁸⁶ And we—often to our dismay—need to become political in communicating with them and making our own needs and wishes known—and in resolving new and recurring issues of who owns the records, of copyright, etc.

Administrators and top management must know about our needs and plans. Communication is often, especially in special libraries, with administrators who have little knowledge of library needs. Today local automation projects frequently involve several libraries—particularly in the school and public library sector—and special negotiation skills must be developed in order to determine one standard for several libraries that have been doing things differently.

Users, too, need to be among the communication chain as it is prudent to make them aware of impending changes—and why there will be changes. Public relations at this juncture is very important to help assure acceptance of the change.

Clearly written communications are as much a necessity as are oral ones. Well-defined specifications, requests for proposals (RFP), work procedures, manuals, routines, and contracts have to be prepared as does other documentation. Because the new technologies continue to change, all of this will likely need to be done over and over again. No one system is apt to be satisfactory for long as the new technology of yesterday becomes the middle-aged technology of today and the geriatric technology of tomorrow. Patience and fortitude pay off in the communication arena but one also learns to defend one's own position. As Keith Trimmer put it in his survey response: "You can't be afraid to say 'This is unacceptable.'"⁸⁷ But one also learns to compromise and to eventually accept "tradeoffs."

Increasingly those who work in technical services must develop (or redevelop) the competencies of both a learner and a teacher, because as Constance L. Etter pointed out in the survey, "the moderate mushrooming of new technologies, new services, companies, devices, etc. just means that there is *much more* to learn about and try to keep abreast of *beyond* acquiring and maintaining good traditional library skills."⁸⁸ As a learner, he/she must be skillful in reading and interpreting technical information, in understanding new developments, in learning about areas which do not fit into the usual humanities and social science backgrounds from which many librarians came. Materials in disciplines and subdisciplines of the classification scheme which previously had been encountered only in acquiring, cataloging or binding these materials now become regular

reading matter. Each week's run of mail brings news of conferences where attendance must be considered relating to online systems, authority control, cooperation, microcomputers, and management. Telephones and electronic mail convey help from colleagues. Courses are enrolled in. Workshops, offered by associations, networks, consortia, and educational institutions, are attended as well as those given by vendors and user groups. Eventually the technical services librarian takes his/her place as a teacher and passes on what has been learned to others by teaching the public services librarian to learn about the RLIN system as a reference tool, the cataloger to interact with the vendor-supplied acquisition system, and the acquisition librarian to use the automated serial check-in system. Frequently, the paraprofessional now engaged in online cataloging has not had the opportunity to acquire a library school education. The librarian becomes the educator—conveying the purposes, objectives and functions of building a catalog as well as the required technical knowledge for adapting or making bibliographic records in the new system.

Teaching is not just confined to the library staff. Users will have to learn to use the new catalogs and other tools. Innovative techniques both from the traditional and technological environments will be employed to teach users how to effectively utilize the new tools. Users with their own microcomputers will work outside the traditional library setting to gain bibliographic access—they cannot ask their questions face-to-face—the new tools must make use of new instructional means and software packages to instruct the users.

SUMMARY

To fulfill the functions of the technical services, now, as never before, persons are needed who are dedicated to the service of library users. To do this, they need bibliographic and technical skills to assist them in acquiring materials, in making the tools that organize the collections and in providing the means to preserve them. Thinkers (with analytical minds) problem solvers, decision makers, and leaders are a necessity! These persons must be inquisitive, curious, imaginative, and creative—they must be capable of managing, organizing, supervising, and communicating. And, at this particular time, the message that comes through is that they should be adaptable and flexible persons amenable to change—as well as dreamers that envision new and better tools as the means to better service for users. Through all of this they must retain their sense of purpose—and sense of humor.

Over and over again the respondents to the survey noted how change had affected the technical services environment even within the short span

of five to ten years. Even in their wildest imagination, some confessed, they could not have believed the activities they would be engaged in today. But changes are not over yet. We all know that. Eloise Vondruska, one of the respondents to the survey, spoke for all of us when she wrote:

Today I have to be familiar with library applications of microcomputers as we prepare for a crop of Apples next year. But there were no Apples when I was in school ten years ago. I cannot venture to know what will be on the menu in another 10 years. But I do know that I will still need to be flexible, open to change and able to analyze problems, the competencies I listed first.⁸⁹

If we all have such insatiable appetites, the functions of the technical services, regardless of how they are organized or by what name they are known, will fulfill the vision Randall had for them almost a half century ago. I am sure that he, like most of us, would be surprised by the turn many of these "most typical of library activities" have taken, but I believe that he would be happy and excited by the potential for services which lie ahead and that he would be somewhat envious of the opportunity afforded those persons who possess the many required competencies to carry out such services in the future.

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