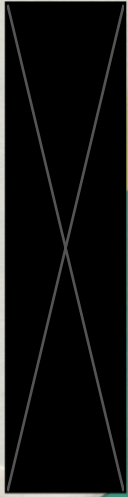


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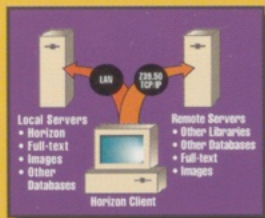
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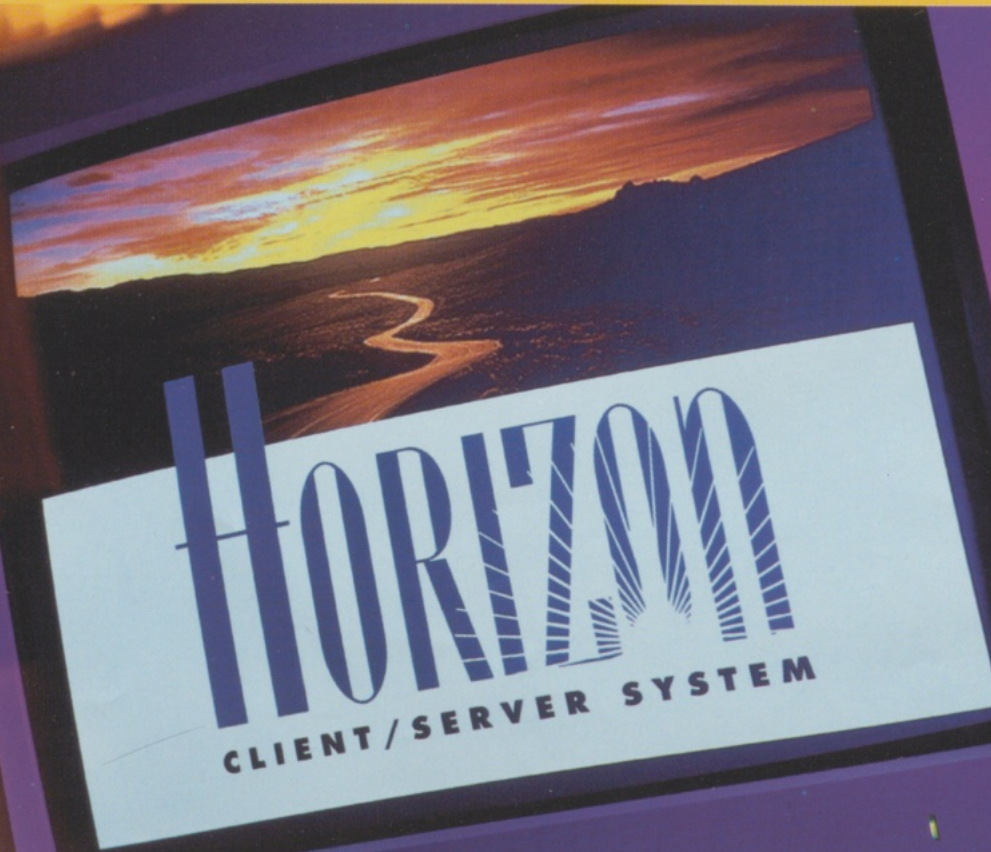
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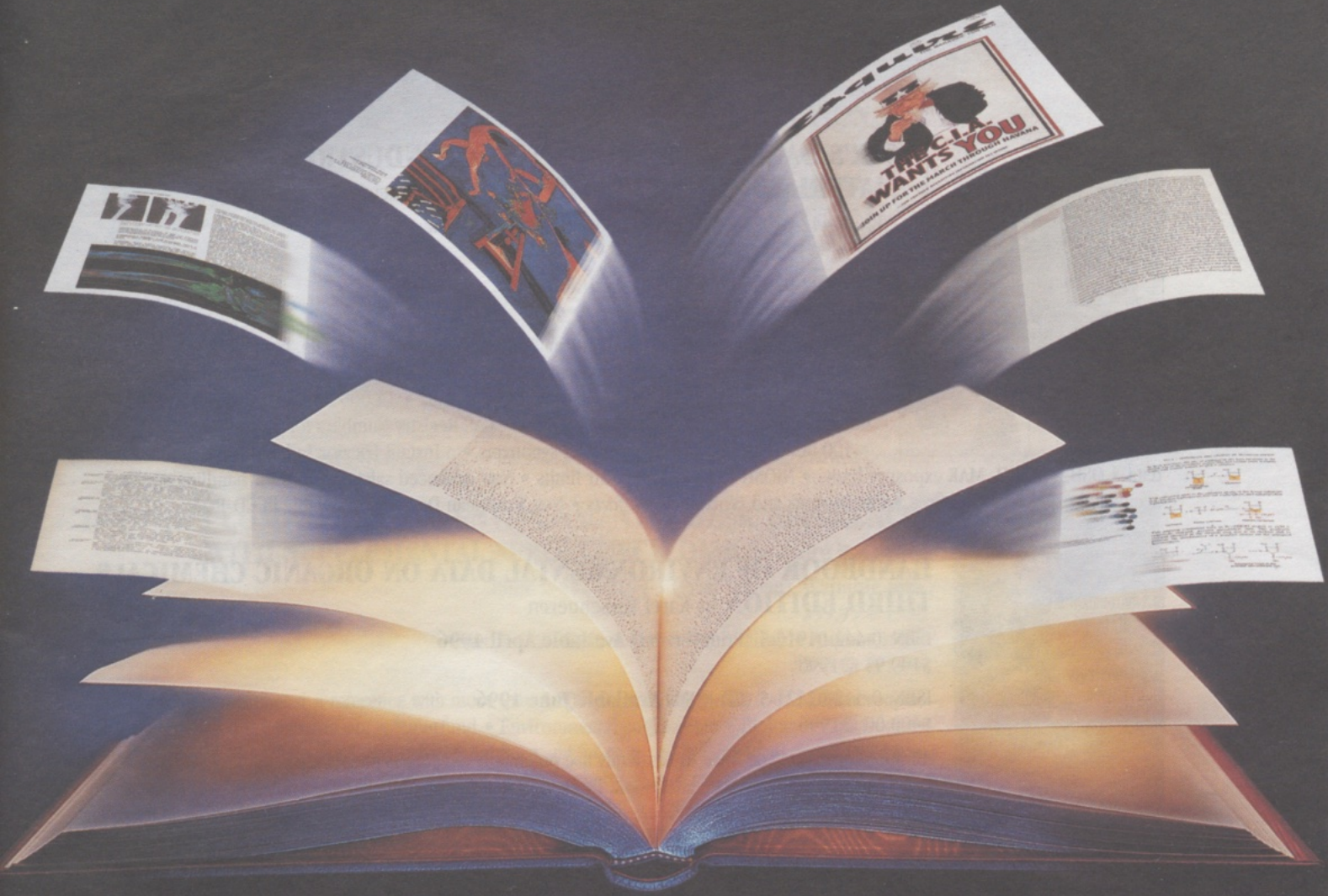
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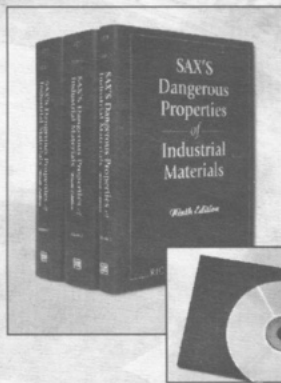
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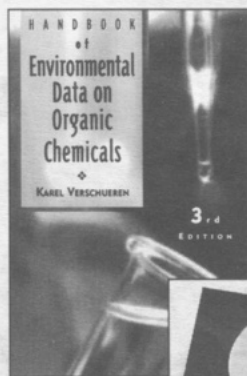
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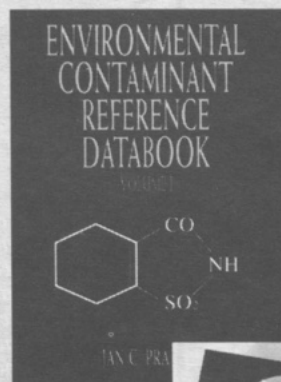
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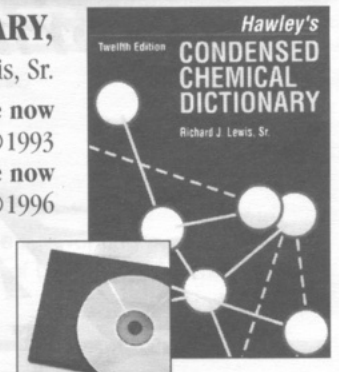
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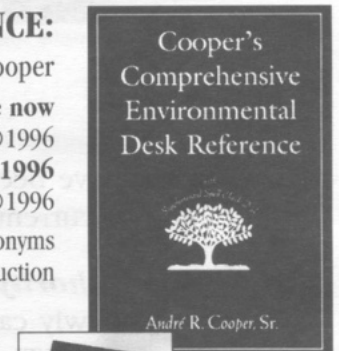
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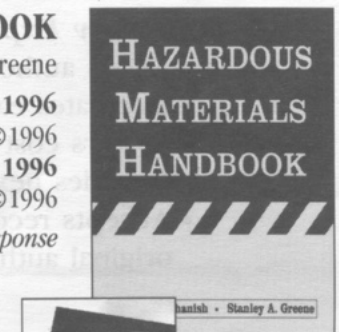
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Information Technology and Libraries (ISSN 0730-9295) is published quarterly in March, June, September, and December by the American Library Association, 50 E. Huron St., Chicago, IL 60611. It is the official publication of the Library and Information Technology Association, a division of the American Library Association. Subscription price, \$22.50, is included in membership dues. Nonmembers may subscribe for \$50 per year in the U.S.; \$55 in Canada, Mexico, Spain, and other PUAS countries; \$60 in other foreign countries. Single copies, \$15. Second-class postage paid at Chicago, Illinois, and at additional mailing offices. POSTMASTER: Send address changes to *Information Technology and Libraries*, 50 E. Huron St., Chicago, IL 60611.

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PRODUCTION: ALA Production Services (David Epstein, Bruce Frausto; Christine Squires, Leslie Stella, Laura Tillotson, and Donovan Vicha), American Library Association, 50 E. Huron St., Chicago, IL 60611.

Information Technology and Libraries

Volume 15, Number 2

June 1996

ISSN 0730-9295

- 62 Editorial: Worldwide JAMES J. KOPP
- 65 The Development of National Online Networking in the Republic of China—The Role of the National Central Library
SHARON CHIEN LIN
- 81 The Knuckle-Cracker's Dilemma:
A Transaction Log Study of OPAC Subject Searching
TERRY ELLEN FERL AND LARRY MILSAP
- 99 On Your MARC, Get Set, Go FAROOQ A. KHALID
- 105 LISPA (Library and Information Center Staff Planning Advisor):
A Microcomputer-Based System
F. J. DEVADASON AND H. A. VESPRY
- 113 **SPECIAL SECTION: Libraries and Technology in the European Union**
- 113 The Swiss National Library and Its Environment
JEAN-FRÉDÉRIC JAUSLIN
- 117 Libraries and Technology in the European Union:
Soldering the Connections
STUART EDE
- 122 A Library Fellow in Greece
PAUL FRANTZ
- 127 News and Announcements
- 126 Index to Advertisers

Cover Design by Jim Lange
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Abstracted in *Computer & Information Systems, Computing Reviews, Information Science Abstracts, Library & Information Science Abstracts, Referativnyi Zhurnal, Nauchnaya i Tekhnicheskaya Informatsiya, Otdyelnyy Vypusk*, and *Science Abstracts Publications*. Indexed in *CompuMath Citation Index, Computer Contents, Computer Literature Index, Current Contents/Health Services Administration, Current Contents/Social Behavioral Sciences, Current Index to Journals in Education, Education, Library Literature, Magazine Index, New Search*, and *Social Sciences Citation Index*. Microfilm copies available

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Hardly a day goes by without most of us either using, referring to, or wishing we had access to the World Wide Web. Although we often just refer to it as the "Web," WWW, or some other favorite label, it has become a standard term and tool in our profession in the mid-1990s. So casually do we deal with this concept that I believe we take for granted the "worldwide" aspect of this tool and the underlying international nature of the Web and of the Internet itself. And maybe that is good and how it should be. But on another level, we should not lose sight of the history, developments, successes, and challenges of libraries and information technology on the global scene.

The Library and Information Technology Association as a division of the American Library Association focuses predominantly on the activities and interests of its 5,000+ members who largely reside in the United States and Canada. But LITA, like ALA itself, adheres to the ALA Charter, which states that the organization was formed "for the purpose of promoting library interest throughout the world by exchanging views, reaching conclusions, and inducing cooperation in all departments of bibliothecal science and economy." In LITA, as in other ALA divisions and within ALA itself, adherence to

this objective is spearheaded by an International Relations Committee. The LITA International Relations Committee is active in monitoring developments in information technology on the international scene, works with U.S. and international bodies with shared interest in library technology, and participates in the education of LITA members and others in international matters. One of the ways in which the committee educates the LITA membership is through sponsoring programs in which it draws together presenters to keep the LITA and ALA membership informed on the global happenings in this area of the profession. At the 1995 ALA Annual Conference in Chicago, the International Relations Committee sponsored such a program, titled "Libraries and Technology in the European Community."

I have selected the papers from that session to serve as the hub of this issue of *ITAL* with a worldwide focus. The papers included in the special section reflect the status of information technology in Europe from three different perspectives. Building on this basis of international focus, other papers in this issue include a historical examination of networking in the Republic of China, a presentation of planning software developed in Papua New

Guinea and Thailand, and an examination of issues related to information technology in the Arabian Gulf states. And there is a study from the United States on a widely used library system that is often found on menus of other systems throughout the world. The breadth of these papers, geographically as well as in content, provides a glimpse into the similarities and differences of addressing the needs, opportunities, and challenges of information technology throughout the world.

ITAL has long published papers of an international nature, but it seems appropriate to bring together several of these to help us focus on and not lose sight of the *worldwide* nature of the work we do. The timing of this issue also is appropriate as the countries of the world come together this summer for the centennial celebration of the modern Olympic Games. The spirit of cooperation that is reflected in the Olympics is one that is at the core of the international relations of librarians. I hope that you sense that cooperation as you read the papers in this issue of *ITAL*, and I hope others will seek to contribute their research, experiences, and reflections on the worldwide nature of information technology and libraries so that these can be included in future issues of the journal.

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The Development of National Online Networking in the Republic of China— The Role of the National Central Library

Sharon Chien Lin

The development of the national integrated online information network in the Republic of China is described. First a brief history of library and information automation in Taiwan and the coordination efforts of the central government toward the establishment of such a network is presented. A more detailed description of the creation of the Chinese MARC format/database and the process of automation under the leadership of National Central Library (NCL) follows. The establishment of NBI Net, TANet and their electronic linkage is discussed, along with the present status of STICNET. The nationwide efforts at all levels to link the major networks, including those of public libraries, are also reported. It is expected that an all-encompassing, integrated national information network will be realized in the 1990s. Thus a full-scale information exchange and resource-sharing network among all libraries in Taiwan and abroad will soon be a reality.

Taiwan was under Japanese occupation for fifty years until 1945. At the time it was returned to the Republic of China (ROC), there were only about 100 libraries. Between 1945 and 1951, the government launched a system to restore the war-stricken libraries. Since then, library services in Taiwan have improved rapidly. According to a December 1989 survey, the number of libraries had increased to 3,579. They include the National Central Library (NCL) and its provincial branch library, 475 public libraries, 118 academic libraries, 2,485 school libraries, and 499 special libraries and information centers.¹ Statistics show that about 90 percent of the libraries belong to the educational system and are under the direct or indirect supervision of the Ministry of Education (MOE) at the national level or of various levels of government educational agencies. The NCL had been under the jurisdiction of the MOE until the beginning of this decade, when it was placed directly under the Executive Yuan, the central government of ROC. (See appendix A for a selective list of acronyms used in this article.)

Three Stages of Automation Development

Early Isolated Activities

Computer utilization in Taiwan began in 1960. For the first ten years, it was limited to processing administra-

tive information and office management in government units, or to supporting instruction and research in the academic field. Library and information services did not take advantage of computers until the early 1970s. Between 1970 and 1980, the development of library services abroad, especially the success of the Machine-Readable Cataloging (MARC) tapes of the Library of Congress (LC) and the Online Computer Library Center (OCLC) bibliographic database, had a great effect in Taiwan. Meanwhile, computer technology in Taiwan had also advanced significantly. This favorable environment encouraged Chinese library professionals to experiment with single-function systems to process Western-language materials.

The first attempt was carried out in 1972 at National Tsing Hua University, when the physics library experimented in processing its catalog on an IBM 1130. The design was rather primitive. What was considered to be the first major computerized library project was the compilation of the third edition of the *Union List of Scientific Serials in Libraries of the Republic of China* in 1974.² Created by the Science and Technology Information Center (STIC) of National Science Council (NSC), the *List* included holdings for more than 6,000 Western-language scientific and technological journals in university and college libraries in Taiwan. In the same year, Chungshan Institute of Science (CIS) imported LC MARC tapes, which were used for Western-language cataloging through online searching. CIS also created a bibliographic database on its CYBER 815 using LC MARC data. Printed catalog cards, accession lists, and new book announcements for Western-language books and technical reports were also produced from the application software CIS designed. In 1978 the institute began to develop its Chungshan Library Information System (CLIS). The integrated system included subsystems of acquisitions, circulation, cataloging, serials control, information retrieval, and selective dissemination of information (SDI). Meanwhile, Tamkang University carried out experiments in 1976 on compiling and printing its library holdings in Western languages on an IBM 370-138.

With improved Chinese-character processing capability in the late 1970s, libraries began to investigate the feasibility of computerizing data for Chinese-language materials. The first such experiment was conducted at National Taiwan Normal University with the assistance of a computer company.³ It was carried out on a Perkin Elmer 8-32 machine, using the TOTAL database

Sharon Chien Lin is a librarian at the University Libraries, State University of New York at Buffalo.

management system and a turnkey retrieval method. In 1978 the Chinese Educational Resources Information System (CERIS) was developed. It contained abstracts from 1,115 Chinese educational journals and was able to print both English and Chinese characters. CERIS, a counterpart of ERIC, was the first database in Chinese created in Taiwan.

In Taiwan's history of library and information automation development, 1979 was the most important year. Many breakthroughs were achieved in various aspects of information automation; systems of significance developed then continue to offer valuable services even today. The following are a few of the events.

1. The NCL, with the assistance of Wang Laboratory, created an online catalog for the *Union List of Chinese Serials* and offered a printed edition. This database consisted of 6,543 serials holdings from 135 public and private libraries in Taiwan.⁴ In the following year, a database for the *Index to Chinese Periodical Literature* was built in collaboration with the Comptroller General's Office of the Executive Yuan.
2. The design of the Agricultural Science and Technology Information Management System (ASTIMS) was completed by the Agricultural Science Information Center (ASIC). Developed on a Perkin-Elmer 3220, ASTIMS has been offering access to such foreign databases as DIALOG, BRS, and ORBIT since October 1982 and has been used to process all agricultural literature in both Chinese and Western languages. This system was a milestone in the development of library and information automation in Taiwan.⁵ ASTIMS was further developed in 1989 to become a library automation system encompassing acquisitions, cataloging, name authority, and serials control subsystems. It is linked with the Agricultural Development Commission, Asian Pacific Center for Food and Fertilizers, Institute for Food, and others.
3. National Chengchi University drafted a plan for an integrated automation system for its library. The circulation module became operational in September 1984. In the following years, many factors, such as the limited capacity of software and hardware, prevented the plan from being carried out. In 1989 a new plan was drawn, and it was decided that the INNOPAC system should be adopted for the university library's integrated system, which went online in September 1993.⁶
4. The Executive Yuan communicated with relevant agencies to study computer encoding of Chinese characters. Two major schemes were designed in the following two years. One of them led to the development of the Chinese Character Code for Information Interchange (CCCII).⁷
5. The Science and Technology Development Program (STDP) was instituted by the Executive Yuan. This action emphasized the important role of library and information services in the development of science and technology. The program has also conducted Information Week as an annual event since 1980 to promote the importance of the information industry.
6. The Institute for Information Industry (III) was established. Its responsibility was to help develop and upgrade information industries in Taiwan. Its mission included the enhancement of computer hardware and software; micro- and minicomputers; computers with Chinese-character processing capabilities; and Chinese character sets for information exchange, database management systems, and computer personnel training. CCCII was one of the major accomplishments of III. The Institute for Information Industry also contributed directly to Taiwan's position today as a leading producer of personal computers and software.⁸

In addition to the important events described above, access to foreign databases was made available in the same year by the International Telecommunication Administration (ITA) of the Ministry of Transportation. On December 28, 1979, ITA announced the opening of the Universal Database Access Service (UDAS) to academic, research, commercial, and industrial organizations in Taiwan.⁹ UDAS is a service that offers online retrieval of international databases and transmission of information activities, facilitating online access to foreign databases via satellite. In six years, it attracted sixty-three subscribers, of which nineteen employed UDAS to provide SDI services. In 1984 UDAS began to offer its resources to the general public through dial-up service. By 1987, fifty-four terminals were installed that could access international databases in sixteen foreign countries. Many international systems have since been imported by various institutions to meet different information needs. ORBIT and DIALOG were among the first introduced. Along with BRS, they are the most widely used systems in Taiwan.

Computers were quite popular in Taiwan by the end of the 1970s, and library and information personnel were aware of their potential in data processing and library automation. Libraries were interested in exploring uses of computer technology, but each wound up using its limited resources for designing single-function systems to meet specific needs in an isolated fashion.

The result was low-level duplication, since libraries were unaware of other ongoing research activities. Furthermore, the lack of established standards made it impossible to exchange information among systems designed by different units. This situation improved greatly when coordinated efforts began at the central government level, namely, with the Executive Yuan.

Coordinated Efforts

In the early 1980s, the Executive Yuan took a series of measures to correct the waste of both human and financial resources due to the lack of unified plans. The most important of these measures are the National Library Automation Plan (NLAP) and the Science and Technology Development Program. The implementation of these two national programs led the development of the entire library information system and moved its automation into a new era. The Library Automation Planning Committee (LAPC) was established in April 1980 as a joint effort of the NCL and the Library Association of China (LAC). Soon after its inception, LAPC began to formulate the NLAP, which was a five-year project to be implemented in three stages. NLAP had four objectives: to develop a Chinese MARC format within the constraints of international requirements as the standard for cataloging Chinese publications at home and abroad, to organize through joint efforts a data processing system in order to improve technical and information services of Chinese-language materials, to create a database for Chinese publications and introduce databases from overseas to meet research needs, and to establish a national information network for the advancement of academic research and development with the coordination of the National Reconstruction Project.¹⁰ With the heavy involvement of the NCL, the NLAP was instrumental in many achievements, which accelerated the development of library and information automation. During 1981–1983, NLAP's first three objectives were reached. The issuance of the Chinese MARC and other standards for improving bibliographic control ensured quality and uniformity in online cataloging performed by all agencies.

In March 1982 the Executive Yuan created the Information Development and Promotion Task Force within the structure of the Science and Technology Development Program to investigate and develop an integrated national information system. According to the "Report on the Plan for a National Information System" submitted in July 1983, library and information services were placed under the scientific and technological information system. This system is among the six subsystems under the plan.¹¹ Within the scientific and technological information system, three major information network

systems were approved by the Executive Yuan, namely, the national bibliographic information, the national scientific and technological information, and the national academic computer information service and university library network systems. Concurrently, the NCL also carried out its own computerization task and inaugurated its Automated Information System (NCLAIS) in 1984.

Meanwhile, noteworthy advancement was achieved in the computer processing of Chinese materials both in Taiwan and abroad. In early 1984, computer manufacturers in Taiwan started to market personal computers (PCs) that could process Chinese text. These were compatible with IBM 16-bit machines. Furthermore, application software packages for business management and Chinese-text processing for these PCs were also made available. The communication capability between mainframe host computers and PCs was also developed.

Integrated Systems and Networking

The successful automation experiments in 1979 and the establishment of the Chinese MARC Format stimulated many libraries to design their own systems in the first half of the 1980s. These earlier efforts provided experience for designing more complex systems later in the 1980s. Integrated systems became the goal of system design. Most units still preferred to design their own systems. Some cooperated with the computing center of their parent institutions; others collaborated with computer companies. Some, however, took advantage of the turnkey systems available on the market. For instance, TALIS, the first integrated system in Taiwan developed by Tamkang University, was based on DOBIS/LIBIS, while the Asian Vegetable Research and Development Center used MINISIS to create its automated system. Many institutions waited for more comprehensive and successfully developed systems to adapt to suit their own needs. For descriptions of automated systems developed by the library and information services in Taiwan, see Lin,¹² Lee,¹³ and Cheng.¹⁴

Libraries also engaged in the creation of Chinese character databases and full-text retrieval systems. Ambitious plans were carried out in the late 1980s. The Legislative Yuan was engaged in the planning of establishing various databases for all laws and regulations of ROC. In 1987 the Executive Yuan began planning for the development of a nationwide online database to provide information about legislative and legal issues. At the Academia Sinica, one of the most important centers for current research on the use of databases in full-text Chinese, a long-term program titled "Computer Appli-

cations for Humanities and Sociology Studies" was initiated in 1985 to develop a computerized information base for Sinology studies. Research-and-development projects have been carried out under this program. To date, many databases have been developed, including the Twenty-Five-Dynasty Histories of China. Still more are under way.¹⁵ There are also plans to put other records in databases, too. A database for bibliographical data of all books published in ROC is an example of such a plan. The NCL has developed several full-text image systems, including the Contemporary Authors Full-Text and Image System, and Reports on Overseas Assignments by Agency Officials of the Executive Yuan Image System.

Networking characterizes all the efforts of this period. As mentioned earlier, three major information network subsystems were mapped out for development within the scientific and technological information system. These networks are in operation, and two of them are already connected. Along with these, the public libraries in four regions in Taiwan will also be linked to form a network. Taiwan's ultimate goal is to form an integrated national online information network that will realize information exchange and resource sharing among libraries in Taiwan, as well as with libraries abroad.

National Central Library

The National Central Library, Taiwan's counterpart of the Library of Congress, serves all functions of a national library. As of June 1992 it had a collection of more than 1,700,000 volumes, including rubbings and Han Dynasty (206 B.C.–221 A.D.) bamboo slips.¹⁶ The collection emphasizes the humanities and the social sciences. In September 1988 the Information and Computing Library (ICL) was created as an affiliate of the NCL. ICL's collection, focusing on materials concerning information science and technology and covering a broad range of formats, complements that of the NCL. As is clear from the earlier description, the NCL has been in the forefront of many automation-development activities in the library and information field in Taiwan. It coordinates all library-related activities and actively participates in the planning of all major automation efforts. The NCL's earliest effort in automation was the creation of the Library Automation Planning Committee, which has been responsible for implementing the National Library Automation Project. With this project, the Chinese MARC Format was formulated in July 1981. Other standards essential to machine data processing and bibliographic control, such as CCCII, the Chinese Cataloging Rules, and the List of Chinese Subject Headings, were

also established. Aside from its many activities on the national level, the NCL also carried out automation within its own library.

Automation Projects

Due to its unique position in the library field in Taiwan, the NCL held itself responsible in serving as a national utility for the entire ROC library and information field. The various automation activities of the NCL library processes were closely tied in with those of other libraries on the island. The NCL is even more intertwined with the NLAP project. At times, they are actually two in one. The NCL's systematic effort to automate began in 1980. The development process can be divided into three stages: assisting LAPC to carry out the NLAP project, developing an in-house library automation system, and working toward the realization of the national online information system. These activities are described below.

National Library Automation Project

Three working groups were created to carry out the four objectives of the NLAP project. Each was responsible for the study of related topics so that standards could be established: the MARC group to develop a Chinese MARC format compatible with other MARC formats in use internationally, the cataloging rules group to revise the existing Chinese cataloging rules, and the subject heading group to establish subject headings. After careful evaluation of various MARC formats, the MARC group recommended to formulate Chinese MARC on the basis of UNIMARC, second edition and LC MARC.¹⁷ It was designed within the structure of ISO-2709, the Documentation Format for Bibliographic Information Interchange on Magnetic Tapes. CCCII was used for Chinese character sets. Its bibliographic description conforms with the principles laid down by ISBD, the *Anglo-American Cataloguing Rules*, second edition (AACR2), and all relevant national standards of ROC.

In January 1981 the first edition of Chinese MARC was published as *The Chinese MARC Format for Books*. It was eventually revised and expanded to include monographs, periodicals, rare books, rubbings, analytics, and various nonprint materials such as machine-readable data files.¹⁸ Later, based on the 1984 edition of the IFLA Authorities/UNIMARC and the LC MARC Authority Record Format, the Chinese MARC Authority Format was also developed. The publication of Chinese MARC has set a standard format for computer processing of bibliographic materials in Chinese as well as other languages, thus helping to promote information exchange within Taiwan and abroad. It also laid a solid foundation for the development of library and informa-

tion automation and stimulated enthusiasm for automation among libraries in Taiwan.

Meanwhile, the Chinese cataloging group issued the Chinese Catalog Rules in August 1983. Twenty-seven categories of subject headings were mapped out for the Chinese Subject Heading list by the subject heading group. Moreover, the CCCII, issued in 1980 by the Task Force for Chinese Information Processing, also provided a more comprehensive standard for computer processing of Chinese materials. At the beginning of fiscal year 1992, the Central Standard Bureau of the Ministry of Economy and the Library Association of China Standard Committee made a resolution on formulating twelve national library standards. The LAC committee has already commissioned relevant units to work on drafts in accordance with ISO standards. The NCL was in charge of cataloging rules and MARC format standards, both of which have become national standards (numbers CNS13227 and CNS13226). Drafts of six other national standards are being formulated, some of which are under evaluation.¹⁹ The NCL is working on Standards for Acronyms for Corporate Names.

Development of the National Central Library Automated Information System

For the second stage of automation, the NCL established the Computing Center within the library and installed a Wang VS-110 in December 1982. A Library Automation Working Group was established to analyze and assess existing library procedures as well as the NCL's needs in an online environment. The scope and plans for automating various library processes were drafted with the assistance of a software company. In 1984 major subsystems for the National Central Library Automated Information System (NCLAIS) were completed. The system contains four subsystems: acquisitions, cataloging, serials control, and online information retrieval.²⁰ All functions share a common database, which is created according to the Chinese MARC format in order to facilitate information transmission and exchange. To promote the use of the standard format for Chinese cataloging, the NCL immediately began to distribute computer-produced catalog cards and magnetic tapes and provided free copies of NCLAIS software to domestic libraries.²¹ Figure 1 shows the annual growth rate of the NCL's bibliographic databases between 1981 and 1987.²²

In 1988 the Chinese terminals were upgraded from two-bit to three-bit code to accommodate online cataloging and information exchange with other libraries, paving the way for a national network operation. Meanwhile, NCLAIS was also reassessed and current needs identified. A commercial company was contracted to redesign or refine the existing subsystems, namely online cataloging, OPAC searching, acquisitions, docu-

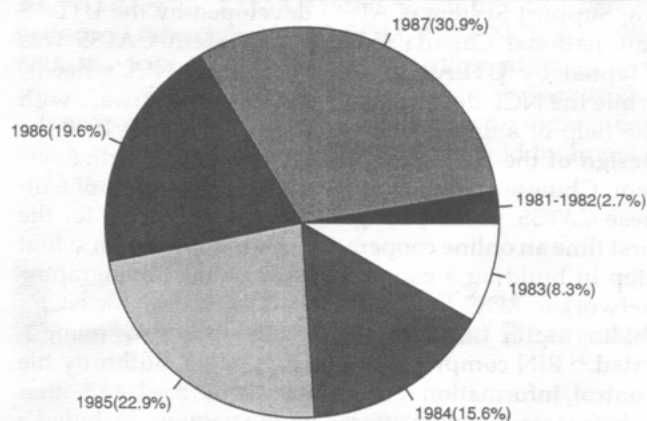


Figure 1
Annual Growth Rate of the NCL Bibliographic Database

ment index, and rare book cataloging systems. All regeneration work for these subsystems, except for serials control, was completed in 1989. The NCL also completed the development of the Reading Room Automatic Control in the same year, which became a part of the circulation subsystem. Since 1994 an integrated online system has been in operation.²³ Aside from OPAC searching, it offers such functions as acquisitions, cataloging, circulation, and reader services. It also handles the processing of government documents, official gazettes, rare books, and Sinological material. It also performs the indexing of laws and regulations, and Chinese periodical literature.

Development of the National Bibliographic Information Network

The NCL plays a crucial role in the overall planning and development of the national online network. Following the completion of the first three objectives of NLAP (i.e., to develop a Chinese MARC format, to organize a data processing system, and to create a database for Chinese publications and introduce databases from overseas), the NCL began to map out a national information network plan in 1984. The proposal was approved by the Executive Yuan in September 1987. The first step was to establish a database for cooperative cataloging among participating libraries based on the NCL's own system. In April 1988 a team of eleven members from the NCL's cataloging department was formed to conduct a detailed study on major international systems including BLAISE, OCLC, RLG's Research Libraries Information Network (RLIN), WLN, and UTLAS. The team submitted a proposal for a bibliographic network that best suited the NCL and other libraries in Taiwan as a whole. Its design was based on the cataloging system of Western Catalog-

ing Support System (CATSS) developed by the UTLAS International Canada Company. Western CATSS was adapted by UTLAS to accommodate the NCL's needs, while the NCL developed the application software with the help of a domestic computer company. In 1990 the design of the NCL's cooperative online cataloging system, Chinese CATSS was completed. By means of Chinese CATSS, participating libraries were offered for the first time an online cooperative cataloging system, a first step in building a comprehensive online bibliographic network in ROC. In September the same year, the NCL's Bibliographic Information Network (BIN) was inaugurated.²⁴ BIN comprised online cataloging, authority file control, information retrieval, electronic mail, and other subsystems. Services offered by the network included a card catalog, a book catalog, and catalogs on CD-ROM and magnetic tapes, news bulletins, electronic mail, and users' guides. A large-scale network linking academic and research libraries began quickly to take shape.

The NCL further exerted its effort to expand this network into a national bibliographic utility. To prepare for the added network activities, a Tandem TXP system was purchased for increased operational capability. In July 1990 immediately before BIN became operational, the National Bibliographic Information Center (NBIC) was formed within the NCL's cataloging department to implement and promote BIN with the ultimate goal of realizing a national online network for cooperative cataloging and resource sharing. To help develop the academic library network, the NCL provided its branch library and each academic library with a terminal and online facilities to carry out point-to-point online operations. Four university libraries were first linked to the NCL's BIN as testing sites, two in the northern part of Taiwan, one in the central, and one in the south. Since its inception, NBIC has provided training for the participating libraries. After training the professionals of the first four participating libraries, twelve additional libraries were provided with staff training. For these libraries, NBIC also installed hardware, which included CCCII workstations, monitors, modems, and printers. At the end of August 1991, sixteen universities were linked to the network.²⁵ This facilitated the standardization of cataloging practice in Taiwan.

On October 30, 1991, the National Bibliographic Information Network (NBINet) made its debut and greatly enhanced the cooperative cataloging operation, allowing the NCL and the participating libraries to share each other's cataloging resources online. To encourage the use of the NCL's database, participating libraries were provided with the NCL's 240,000 bibliographic records for Chinese- and foreign-language titles therein. Of those records, 100,000 were free of charge. The structure of the NBINet database is a decentralized one, with

two categories of files: source files and user files. As of March 1993, the former contains 250,000 Chinese MARC records (including CIP records), while the latter contains the files of participating libraries, which are online or batch input into the network database, totaling 80,000 bibliographic or authority MARC records.²⁶

Bibliographic Database and Service Systems

The NCL's automation system includes the following equipment: Wang VS-110 system, TANDEM TXP system, and CJK system. Each of these systems is supported by one or two host computers and several disk and tape drives, plus workstations, terminals, and printers. Some of the terminals have both Chinese and English capabilities. Its MARC database consists of records taken from three sources: original cataloging for Chinese materials; copy cataloging for Western-language materials from LC MARC tapes, BiblioFile, or OCLC online database; and conversion of the NCL's card catalog. In order to realize information resource sharing, the NCL began to create a Chinese database as soon as the Chinese MARC Format was formulated in 1981. Six major academic and public libraries in Taipei were invited to participate in cooperative cataloging of Chinese imprint materials. The first Chinese MARC tape consisting of over six thousand entries was produced in December 1982. Additionally, information for over eight thousand periodical holdings of more than 170 libraries in Taiwan also was incorporated into the same database. The NCL also imported LC MARC tapes to assist in cataloging Western-language materials. In 1986 it successfully converted the USMARC system into the Chinese MARC system. Thus a bibliographic database was built at the NCL.

The NCL also commissioned a computer company to accelerate the building of the database using Chinese Cataloging Rules and the Chinese Subject Headings. Since 1983, with the establishment of the Chinese MARC Format for various types of materials, the database also extended its scope to include rare books and nonprint materials. The compilation of the Indexes to Chinese Periodical Literature and Chinese Official Gazettes also became computerized, using the Chinese MARC Format for Analytics, which was issued in December 1983. To further increase the NCLAIS database, the NCL again invited fifteen national college and university libraries in 1987 to participate in an offline cooperative cataloging project.²⁷ Like the first one that took place between 1981 and 1984, this project was suspended after nine months because of the shortage of personnel at the NCL. Statistics show that this cooperative cataloging was most successful with Western-language materials because existing records from LC MARC tapes could be used for copy cataloging for these materials.

To help promote information sharing with the international community, the NCL signed a cooperative agreement with OCLC in May 1985 for the exchange of bibliographic records. This exchange came online three years later. The agreement offers NCL users access to OCLC's international database.²⁸ The NCL staff can retrieve, display, and edit OCLC bibliographic records online. Records created in this manner became immediately part of OCLC's database. In return, Chinese MARC tapes were sent to OCLC for downloading, making available Chinese bibliographic records to OCLC participating libraries throughout the world. The first set of tapes was sent to OCLC for testing early in 1988. In addition, MARC tapes of rare books in the NCL's database were sent to RLG in 1989 and 1990 for testing. They have since become part of the RLIN database as the first phase of a cooperative effort between the NCL and RLG.²⁹ These Chinese MARC records in turn were used as a resource in carrying out RLG's Chinese Rare Books Project involving Princeton and Columbia universities.³⁰

In 1987 the NCL imported BiblioFile to expedite the computerized processing of Western-language materials. The success of this project prompted the NCL to develop a CD-ROM edition for its own MARC tapes. In 1991 a pilot project for Taiwan's first Chinese bibliographic CD-ROM system was completed. It includes the NCL's bibliographic database and its index of periodical articles.³¹ The NCL achieved a world first in May 1992 with the issuance of its Chinese Catalog on CD-ROM. The "Index to Chinese Periodical Literature on CD-ROM" was completed the next year.³² The LC MARC tapes for Chinese-Japanese-Korean books and name authorities were also purchased in 1989 to further facilitate technical processes at the NCL.³³ Presently the NCL's database consists of seven types of bibliographic data: the national bibliographic data, the Index to Chinese Periodical Literature, Chinese government documents, the Index to Chinese Official Gazettes, Chinese rare books, Chinese dissertations and theses, and ISBN and CIP of ROC. As of July 31, 1994, the database held 923,906 records.³⁴ It is estimated that this database will increase at the rate of 20,000 records per month. The growth of this database and the size of various types of data between 1988 and 1994 are illustrated in figure 2.³⁵ The NCL is currently engaging in retrospective conversion for books acquired before 1981.

As a national library, the NCL offers unique public services to its users. Among the computer systems are the NBINet, the NCL ISBN/CIP System, the Catalog of Publications of the Executive Yuan, the ROC System, the NCL Index to Chinese Official gazettes, the NCLAIS Index to Chinese Periodical Literature, the NCL Rare Book Cataloging System. In addition, there are the Chi-

nese Catalog on CD-ROM and the Index to Chinese Periodical Literature on CD-ROM.³⁶ The NCL is linked with the Science and Technology Information Center Network (STICNET), Videotex, etc. It has also set up the International Online Information Service for those interested in locating the latest publications held by foreign institutions.

National Online Network and International Information Retrieval

National Online Network

Within the development plan of the scientific and technological information system, the Executive Yuan approved three major subsystems for realizing the national online information network: the national bibliographic network, the national academic computer information services and university network, and the scientific and technological information network. These will be the responsibility of the NCL, the Ministry of Education, and the National Science Council, respectively.³⁷ Moreover, a network of public libraries in four regions will be formed along these research networks by means of the NCL's branch library. Thus the integrated national online network will be an information service network consisting of libraries from academic institutions, major research organizations, and information centers, as well as public libraries in ROC. Figure 3 is a diagram of the proposed national online network.

The NCL plays a crucial role in implementing the nationwide network. The network project has five objectives³⁸: to establish a national bibliographic information center for promoting cooperative cataloging and achieving bibliographic control; to promote computerized information service, so that automation problems encountered by libraries and information agencies can be solved; to create a database for a union catalog of Chinese rare books; to encourage interlibrary cooperation and cooperative acquisitions, and interlibrary loans; and to pursue the linking of the national online network with those of foreign countries in order to achieve international information exchange. The first phase of the plan, completed in September 1990, included a cooperative cataloging system, name authority, and OPAC searching. The second phase is directed toward information sharing through cooperation among libraries in Taiwan and abroad. Tasks for this phase include developing an integrated system that can be adopted by individual libraries; designing systems to facilitate cooperative acquisitions, circulation, and interlibrary loans; establishing area networks for libraries of similar nature and

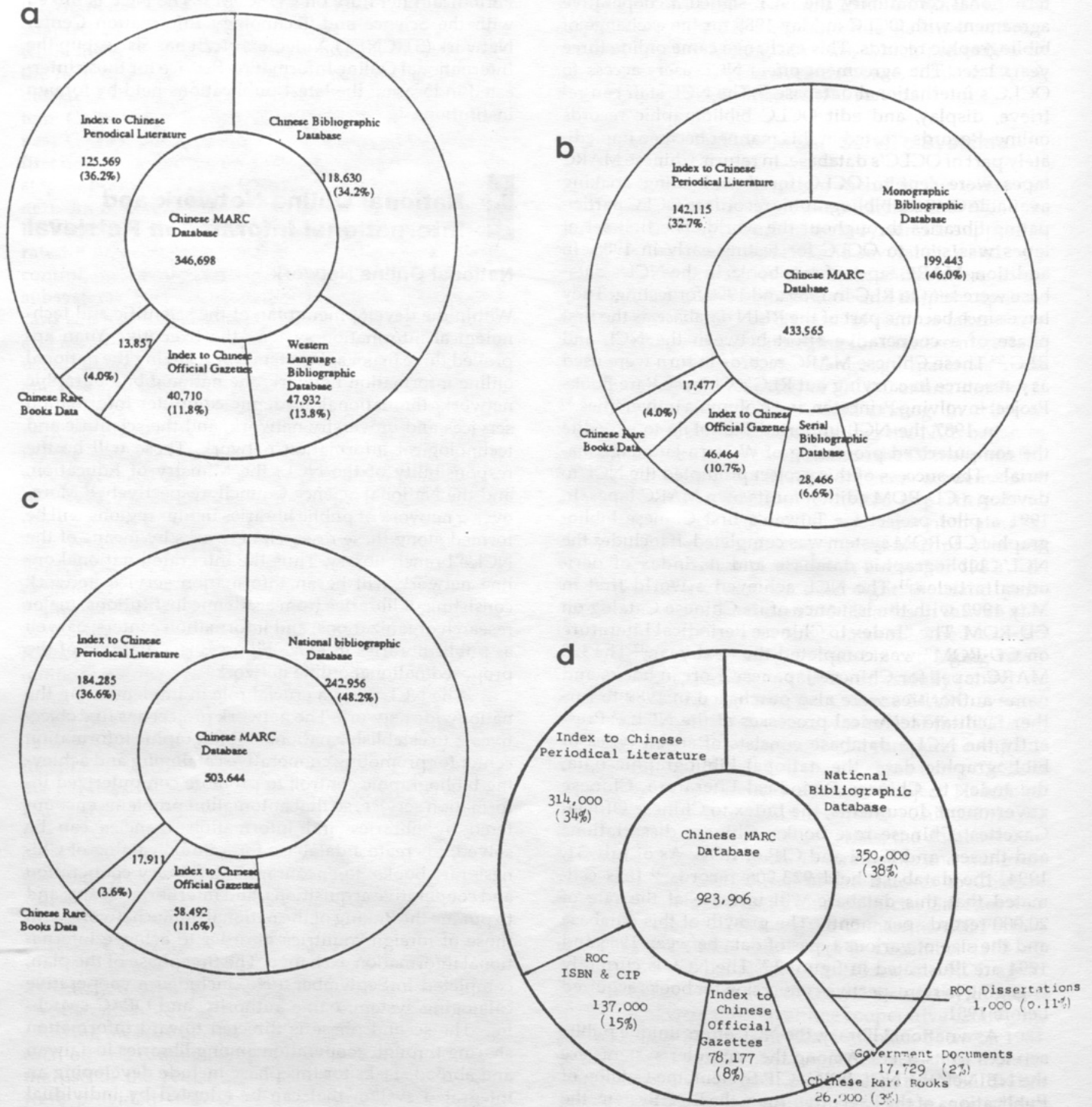


Figure 2
Growth Comparison of the NCL Bibliographic Database: (a) July 1988, (b) May 1989, (c) February 1991, (d) July 1994

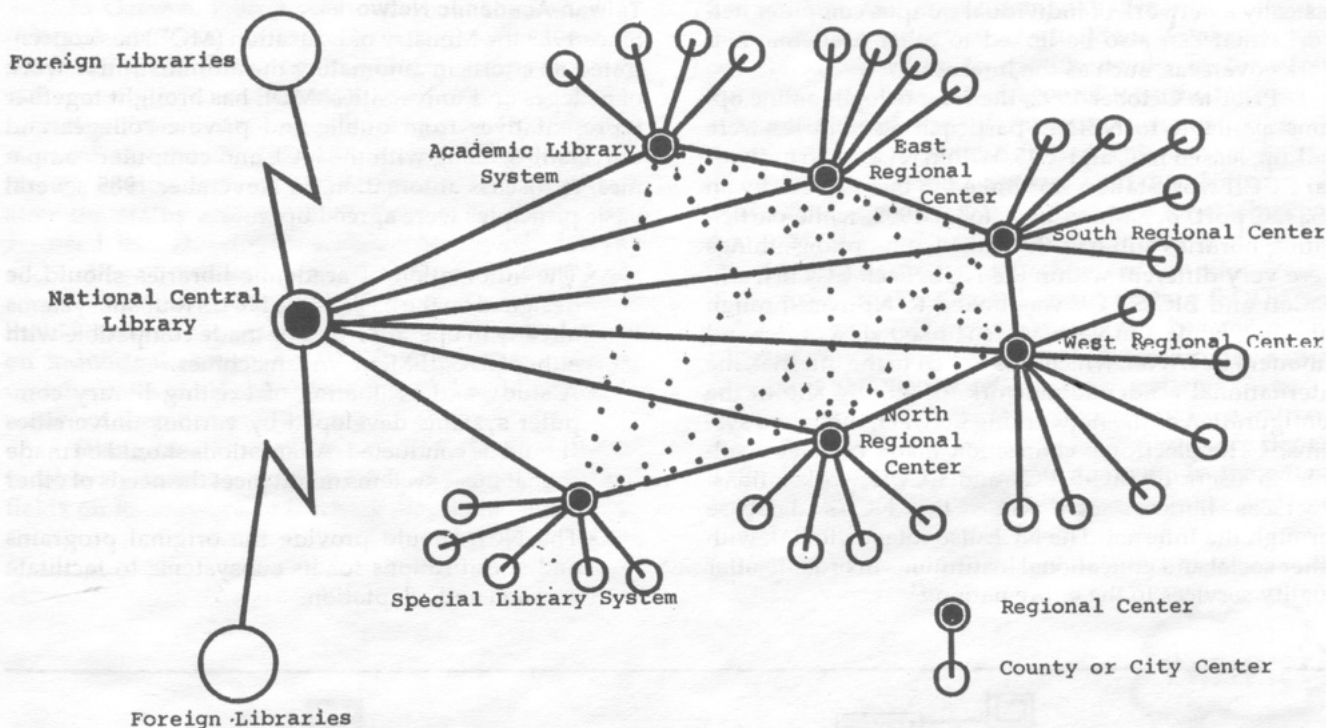


Figure 3
The National Bibliographic Information Network

function; creating a database for a rare book union catalog in conjunction with a full-text retrieval system and information delivery service; and developing electronic linkage of the bibliographic information systems at home and abroad. Some of the work for this phase is still being carried out. The following section outlines the development of these networks and the involvement of NLC.

National Bibliographic Information Network (NBINet)

The National Bibliographic Information Network, an arm of the NCL, is an expansion of its own network, BIN, as described earlier in this paper. NBINet was inaugurated in October 1991. Built on a Tandem mainframe, its operating system was upgraded in July 1992 in preparation for the linking with the Taiwan Academic Network (TANet) and the addition of RefCATSS.³⁹ The latter was added to NBINet in 1993, using Chinese CATSS as its application software. RefCATSS offers functions such as electronic mail, online interlibrary loan, and online help screens. While CATSS displays bibliographic records in the MARC format, RefCATSS' display is user friendly and easily understood by the general public with no special training.

NBINet now consists of four modules: online cataloging, authority control, batch products, and RefCATSS. Seven more libraries have joined the original sixteen since NBINet's inception. They include the library network of Academia Sinica, the Taiwan Provincial Taichung Library, and the Taipei Municipal Library. Academia Sinica is ROC's top research institution and consists of many research institutes. The libraries for each institute are highly automated and linked into an internal library network. Taiwan Provincial Taichung Library is a model institution that plays a guiding role among public libraries in Taiwan, particularly in automation endeavors.

NBINet was scheduled for further expansion in 1994 to include all public and private universities in Taiwan, so that their libraries could benefit from the network's online cataloging function. In October 1992 Ethernet was also added to the Tandem to facilitate testing of TANet linking. Within half a year, on April 20, 1993, NBINet was connected with TANet. It provides access to the 330,000 MARC records of the NBINet database to TANet member libraries for shared cataloging and online searching. It also makes the NCL's wealth of Sinological research materials available to Internet users throughout the world. TANet is

basically a network of individual campus computer networks that can also be linked to other academic networks overseas, such as the Internet.

Prior to October 1992, the remote login online options available to NBINet participating libraries were dial-up, leased line, and X.25. Within NLC, each individual CCCII workstation was linked to the network by an RS232C port. Beginning in October 1992, while participating libraries still had the same login options, things were very different within the NCL. Each CCCII workstation and BIG-5 PC⁴⁰ was linked to NBINet through Ethernet, while NBINet was also linked via a router and a modem to TANet, which was linked to the Internet, the international academic network.⁴¹ Figure 4 shows the configuration of the networking between these two systems.⁴² The electronic connection made NBINet available to users of BIG-5 PCs and CCCII workstations. Overseas libraries can access the NCL's database through the Internet. The NCL also intends to link with other social and educational institutions in order to offer quality services to the entire nation.⁴³

Taiwan Academic Network

Since 1983 the Ministry of Education (MOE) has concentrated its efforts in automating the administrative work of colleges and universities. MOE has brought together representatives from public and private colleges and universities, along with the NCL and computer companies, to discuss automation. In November 1985 several basic principles were agreed upon:

- The automation of academic libraries should be designed on the basis of the NCL's four subsystems already in operation and be made compatible with either CDC, IBM, or VAX machines.
- A study and evaluation of existing library computer systems developed by various universities should be conducted. Adaptations should be made so that these systems might meet the needs of other universities.
- The NCL should provide the original programs and specifications for its subsystems to facilitate revision and adaptation.

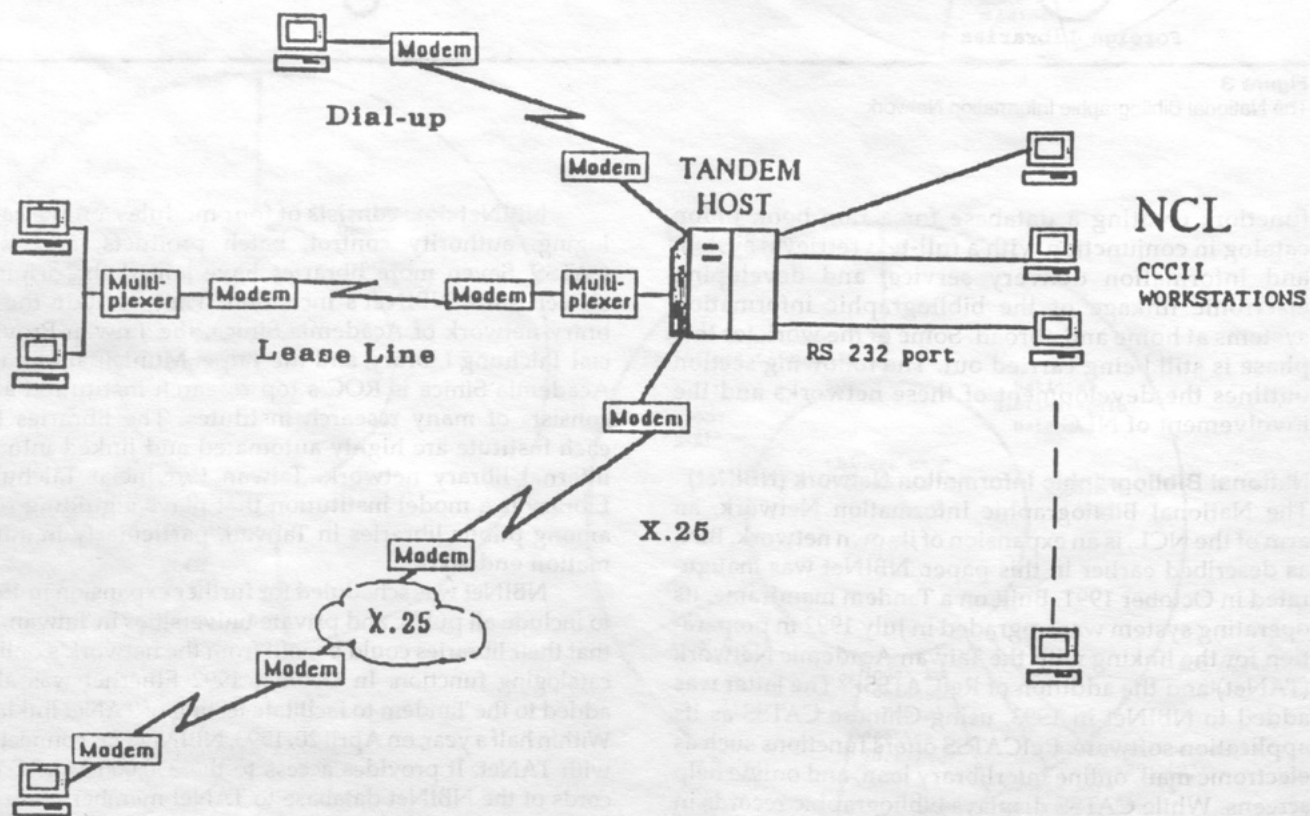


Figure 4a
Linking Structure of NBINet and TANet: Pre-October 1992

In October 1986 it was further affirmed that the national academic library automation system should adopt standard codes, be compatible among libraries, and meet the needs of individual libraries. Representatives from fifteen national colleges and universities met on December 26, 1986, to discuss reforms needed in library administration. A task force was formed, and after the status and needs of libraries in Taiwan was assessed, the "Development Plan of National University and College Libraries" was submitted to MOE on January 26, 1987.⁴⁴ The major objective of this plan was to build local area networks (LANs) and exchange systems on individual campuses so that departments and research offices would be linked with the mainframe computers of their campuses.

Throughout the years, MOE installed software turnkey systems of varying sophistication and subject fields on its network of teaching and research informa-

tion stations. Mainframe computers were purchased to facilitate high-quality research. More databases were developed according to specific needs. In June 1987 MOE also introduced BITNET, and later the Internet, to encourage scholarly information exchange with researchers both at home and abroad. This also accelerated the development of the Taiwan Academic Network. In 1988 MOE began to implement its plan for establishing the national campus network, with National Taiwan University (NTU) funding to carry out the pilot project. Using the Fiber Distributed Data Interface (FDDI) network system, NTU's campus network became operational in May 1989. Since then, MOE has provided fiscal support in automating other campus networks.

By the end of 1990, the environment for a national campus network was maturing. MOE Computer Center, which is in charge of library automation in the educational system of the nation, began to make linkages

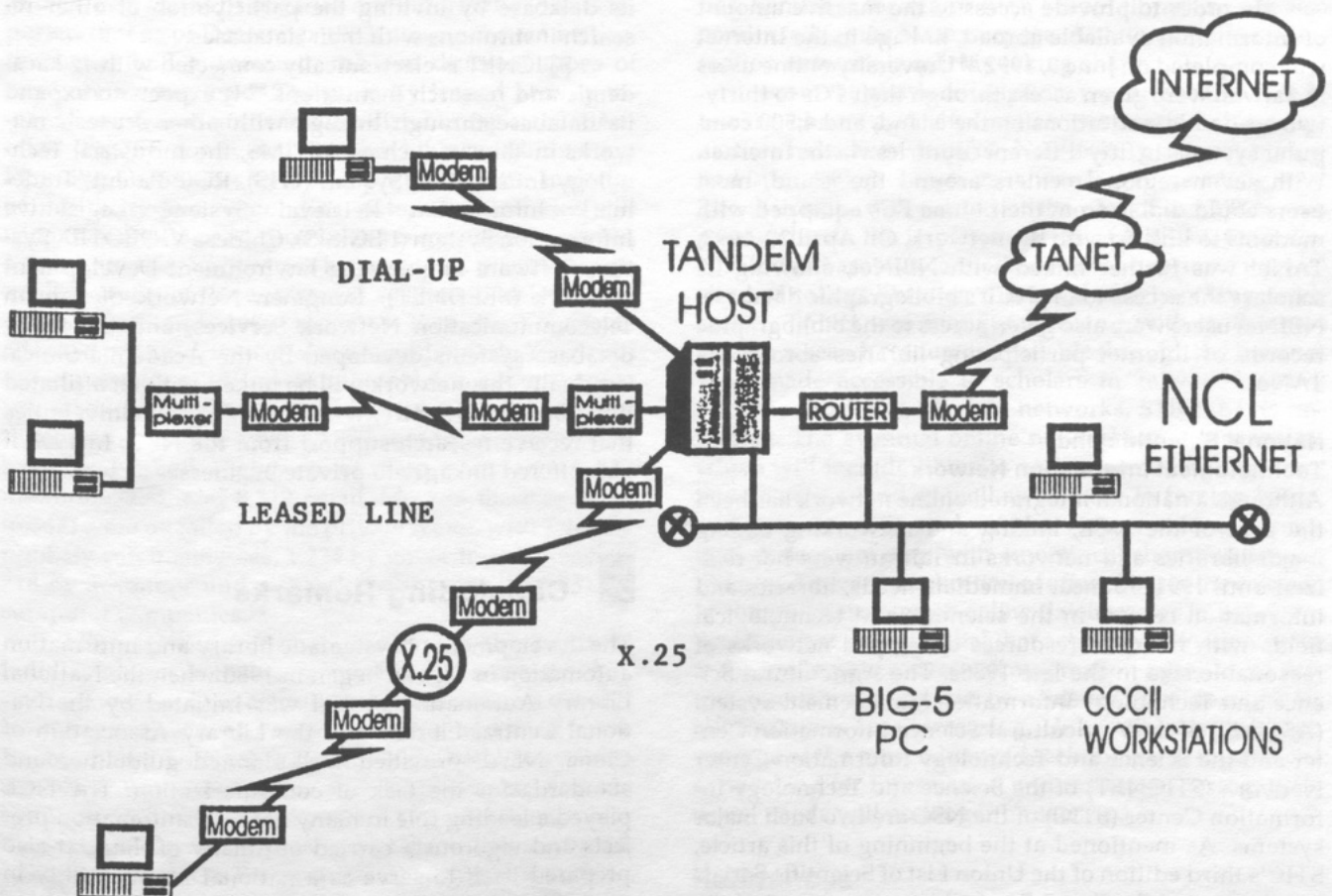


Figure 4b
Linking Structure of NBINet and TANet: Post-October 1992

among universities and colleges in Taiwan. Networks of heterogeneous computers of various campuses were connected to larger databases, forming seven regional networks around the island in Taipei, Taoyuan, Hsinchu, Taichung, Yunlin/Chiayi, Tainan and Kaohsiung.⁴⁵ In 1992 the Taiwan Academic Network was inaugurated.⁴⁶ Some of the campus networks in the regions are still under development. TANet features electronic mail, telnet, and file transfer protocol (FTP). Telnet allows one to instantly access mainframe computer systems and to browse through the world's university online catalogs, while FTP simplifies bibliographic record transfer among different library systems. Incidentally, the first campuswide network in Taiwan, the FMAN (Fiber Metropolitan Area Network), was created in 1985 by the International Telecommunication Administration. A state-of-the-art network at the time, FMAN was a fiberoptic network of Tsing Hua and Chiao Tung universities and the Research Institute of Industrial Technology in the Hsinchu, Taipei, area.⁴⁷

In order to provide access to the massive amount of information available abroad, linkage to the Internet was completed on June 9, 1992.⁴⁸ University online users in Taiwan were given access through their PCs to thirty-two academic institutions on the island, and 4,500 computer systems in fifty different countries via the Internet. With seven regional centers around the island, most users could dial in from their home PCs equipped with modems to link up with the network. On April 20, 1993, TANet was further linked with NBINet, allowing its scholars the access to the NCL's bibliographic database. NBINet users were also given access to the bibliographic records of Internet participating libraries abroad via TANet.

National Scientific and Technological Information Network

Although a national integrated online network has been the goal of the NCL, linking and networking among major libraries and networks in Taiwan were not realized until 1991. To meet immediate needs, libraries and information centers in the scientific and technological fields with financial resources developed networks of reasonable size in the late 1980s. The Agricultural Science and Technology Information Management System (ASTIMS) of the Agricultural Science Information Center and the Science and Technology Information Center Network (STICNET) of the Science and Technology Information Center (STIC) of the NSC are two such major systems. As mentioned at the beginning of this article, STIC's third edition of the Union List of Scientific Serials in Libraries of the Republic of China, now a part of the STICNET database, was the first major computerized library project in the ROC.

In early 1986, as part of its integrated information service program, STIC began to develop STICNET, which became operational on December 28, 1988. STICNET was the first complete online information system in Taiwan and also the first online system of the National Scientific and Technological Information Network. The latter, as we have mentioned earlier, is one of the three national online networks approved by the Executive Yuan. STICNET is an integration of foreign and domestic databases in the scientific and technological fields. It contained fifteen databases as of June 1991, nine of which were STIC-created and six of which were imported. STICNET offers online retrieval services to its own databases as well as to more than two hundred foreign databases provided by such international services as DIALOG, BRS and ORBIT. By mid-1991, STICNET had eight million records of theses, dissertations, and journal articles in the fields of engineering, chemistry, physics, biology, medicine, economics, education, and management.⁴⁹ Presently the system is expanding its database by inviting the participation of other research institutions with their databases.

STICNET is electronically connected with 122 academic and research institutions.⁵⁰ It expects to expand its database through linkage with other sci-tech networks in Taiwan such as ASTIMS, the Industrial Technology Information System (ITIS), ROC Patent/Trademark Information Retrieval System, Legislative Information System (LEGISIS), Chinese VIDEOTEX System, Software Engineering Environment Development Network (SEEDNET), Lungmen Network of Taiwan Telecommunication Network Services, and the many database systems developed by the Academia Sinica. Gradually this network will be linked with all affiliated units of the NSC, twenty-six colleges and universities that receive research support from the NSC. In 1993 it also offered linkages to private businesses as well.

Concluding Remarks

The development of systematic library and information automation in Taiwan began in 1980 when the National Library Automation Project was initiated by the National Central Library and the Library Association of China. NLAP provided well-planned guidelines and standards for the task of computerization. The NCL played a leading role in many national automation projects and vigorously carried out many of them. It also prepared itself to serve as a national library utility in support of the realization of an integrated national online network. Unfortunately, the burden of carrying out such ambitious automation projects for the entire nation

with limited personnel often forced it to drop ongoing projects for more urgent ones. The offline cooperative cataloging of the fifteen academic libraries in 1987, for instance, did not last beyond a pilot project, even though it was contributing to both the standardization and the size of the national bibliographic database. The NCL had to redirect its energy in pursuit of the national bibliographic information network plan. Hardware limitations also caused delays in linking and networking among major libraries in Taiwan.

Meanwhile, libraries with resources began to design their own systems to meet immediate needs. Many systems were developed for information retrieval or for carrying out certain functions of library processes. In the latter part of the 1980s, computer hardware and software companies also became involved with library automation endeavors as well as with meeting the needs of the information industry. Some developed turnkey systems for marketing. A 1985 survey conducted to assess the automation status of libraries and information units reported that as of December 1983, among the ten institutions that had automated, thirteen different types of computers were used. The majority leaned heavily toward mainframe and medium-sized computers.⁵¹ Another survey conducted by the Library Automation Planning Committee in 1988 reported that the majority of the thirty-five responding automated libraries still used mainframe or medium-sized computers. However, a good number of libraries began to use microcomputers.⁵² A study of the automated systems developed between 1972 and 1988 revealed that most systems adopted menu-driven dialogue mode. Only four provided a command-driven interface.⁵³ According to a survey carried out by the Comptroller's Office of the Executive Yuan as of June 1990, 10,267 computer systems had been established. Eighty-six of them were large, 1,869 medium-sized, and 8,312 small. Most of these systems (6,347) were installed by the private sector, with 1,437 by publicly run businesses, 1,234 by government agencies, 718 by academic and research institutions, and 531 by computer companies.⁵⁴

Libraries and information agencies also began to build databases in their systems. However, progress has been quite slow. Domestically created databases are still inadequate. Few are of reasonable size, and even fewer can be shared with other units. This is because systems are often not compatible, and bibliographic records available in different systems are not interchangeable. These databases are still a long way from allowing broad online retrieval. On the positive side, channels such as UDAS and the Internet exist for information seekers in Taiwan to access international databases with little problem. However, due to deficiencies in collections in certain subject fields and the lack of union catalogs in

Taiwan, search results cannot be fulfilled in many cases. It seems prudent for library professionals in Taiwan to seek the cooperation of their colleagues on mainland China in order to combine their efforts in database creation.

While professionals in computerized libraries are presently occupied with the enhancement of their databases, others at all levels throughout the island are mostly engaged in the planning or carrying out of initial automation activities. The automated library network system developed by Chiang-Ching Elementary School, though limited, has been adopted by 104 school and other types of libraries. Training workshops in preparation for automation are offered by the NCL, LAC, and other government agencies for librarians at different levels including those in public and school libraries. For example, MOE has delegated Tamkang and Fengchia universities to conduct workshops on library automation and campuswide networking for private universities. Seminars for senior high school librarians are also conducted for the same purpose. A national online information network is quickly taking shape.

From the above description, we can see that efforts toward library and information automation and cooperation have been fruitful. Networking among library and information centers in Taiwan has come a long way. The stalemate that existed at the end of the 1980s was removed with the implementation of NBINet. Once the NCL's database was connected with the nation's university and college libraries, the speed of networking accelerated. TANet was inaugurated, and with it, the vast foreign research resources available through the Internet were made accessible to scholars in Taiwan. Linking with the third of the largest networks, STICNET, is imminent. The eventual online networking environment, which will include libraries and information organizations on the island as well as to those in foreign lands, will be realized through TANet. However, library cooperation does not stop with smooth collaboration among libraries. To avoid duplication of effort, be it in the creation of computer systems or online databases or in collection development, it is essential that active coordination occur at the top level to oversee all automation activities so that true resource sharing can be achieved. The demand for information is ever increasing. Unless libraries take advantage of the most advanced technology in the form of networking for information and resource sharing, their users' needs will no longer be satisfied.

References

1. Chung-sen Yang, "An Account of the Development of Library and Information Services in Taiwan Area," (in Chinese) *National Central Library News Bulletin* 13, no. 3 (Aug. 1991): 3-4.

2. Lucy T. C. Lee, "A Study of the Automated Library Information System Development in Taiwan, R.O.C.," (in Chinese) *Bulletin of the Library Association of China* 43 (Dec. 1988): 110.
3. Nancy O. L. Chou and C. C. Yang, "The Development of Library Automation and Chinese Computer Technology in Taiwan, R.O.C." (paper presented at the Annual Conference of the American Library Association, Dallas, Texas, June 25, 1984), 2.
4. O. L. Hu, "Library Automation" (in Chinese), in *Chung-hua min kuo tu shu kuan nien chien* (Taipei: Kuo li chung yang tu shu kuan, 1988), 82.
5. Sharon Chien Lin, "Automation of Library and Information Services in China. II, Taiwan," in *Encyclopedia of Library and Information Science* 51 (New York: Marcel Dekker, 1993), 49.
6. *National Chengchi University Libraries* (Taipei: National Chengchi University Libraries and Social Sciences Information Center, 1994), 33.
7. Hu, "Library Automation", 89-91.
8. Lucy T. C. Lee, "Education and Training for Online Use of Databases in the Republic of China," in *Library and Information Science Education: An International Symposium*, paper presented at the International Conference on Library and Information Education, sponsored by the Department and Graduate Institute of Library Science, National Taiwan University, Nov. 29-30, 1985 (Metuchen, N.J.: Scarecrow, 1987), 190.
9. *Ibid.*, 192.
10. Library Automation Planning Committee, Chinese MARC Working Group, *Chinese MARC Format*, 2d ed. (Taipei: National Central Library, 1984), iii.
11. Lin, 4.
12. *Ibid.*, 39-59.
13. Lee, "Automated Library Information System", 111-19.
14. Yuling Cheng, "An Investigation of Present Status of Automated Library Systems in R.O.C." (in Chinese), *Bulletin of the Library Association of China* 45 (Dec. 1989): 64-76.
15. Lin, 36-37.
16. "National Central Library" (Taipei: National Central Library, 1993), 6.
17. B. H. Seng, "Future Development of Chinese Bibliographical Automation," in *International Cooperation in Chinese Bibliographical Automation* (paper presented at a conference held at the Australian National University, Canberra, Australia, 29 Aug.-1 Sept. 1982) (Canberra: Australian National University, 1982), 181.
18. "Library Automation News: Recent Development of the Chinese MARC," *National Central Library Newsletter* 18, no. 1 (1986): 26-28.
19. "National Central Library Cataloging Department Completed Drafts of Three National Standards" (in Chinese), *National Bibliographic Information Network Newsletter* 8 (Aug. 1993): 19.
20. Miao-Chih Chen, "The National Library Information System of NCL" (in Chinese), *National Central Library News Bulletin* 9, no. 3 (Aug. 1987): 10.
21. "National Central Library," 1993, 13.
22. N. O. L. H. Chou, "The National Bibliographic Database and Its Network Development" (paper presented at the Seminar in Library Automation & Information Network, Taipei, June 7-10, 1988), 10.
23. Chi-chun Tseng, "Library's Role in the Construction of 'Information Highway': the Experience of the National Central Library" (in Chinese), 1994, 2. Manuscript, courtesy of author.
24. "The Online Bibliographic Network," *National Central Library Newsletter* 22, no. 2 (Aug. 1989): 1-2.
25. "Inauguration Issue Statement" (in Chinese), *National Bibliographic Information Network Newsletter* 1 (Oct. 1991): 1.
26. *National Central Library Manual* (Taipei: National Central Library, 1993), 3.
27. "Cooperative Cataloging Project," *National Central Library Newsletter* 19, nos.2/3 (1987): 17-19.
28. "OCLC President Visits the NCL," *National Central Library Newsletter* 18, no. 1 (1986): 30.
29. "The Chinese Rare Books Project," *RLG News* 19 (Spring 1989): 10-11; Chung-sen Yang, "The Development of Library and Information Services in the Republic of China" (paper presented at the International Conference on New Frontiers in Library and Information Services, Taipei, May 1991), 17.
30. K. Smith-Yoshimura, "East Asian Studies," Research Libraries Group, Library Operations Division, *Operation Update* 52 (Dec. 1989): 16.
31. Li-ling Huang, "The Development and Prospect of NCL's Chinese MARC Data CD-ROM" (in Chinese), *National Central Library Bulletin*, new ser. 27, no. 1 (June 1994): 3-18; Hsiu-ying Chiang, "Completion of the First Set of Bibliographic CD-ROM System" (in Chinese), *National Central Library News Bulletin* 13, no. 3 (Aug. 1991): 18-19; Lin, 51-52.
32. "The Role and Functions of a National Library in the Age of Information," *National Central Library Newsletter* 25, no. 2 (Aug. 1993): 4.
33. "National Central Library Readers' Guide" (in Chinese) (Taipei: National Central Library, 1989), 5.
34. Tseng, "Library's Role," 2.
35. Lin, 20-21.
36. *National Central Library Information Network Exhibits Manual* (Taipei: National Central Library, 1993).
37. Hu, "Library Automation," 111.
38. Ou-lan Hu, "The Development Plan of the National Central Library Bibliographic Information Network" (in Chinese), *National Central Library News Bulletin* 10, no. 3 (Aug. 1988): 14-15.
39. Chih-ching Yang, "Tandem Mainframe Operating System Upgraded; NCL Computing Center Added Ethernet to Tandem" (in Chinese), *National Bibliographic Information Network Newsletter* 4 (Jul. 1992): 9.
40. There are many encoding schemes in use in Taiwan. The CCCII and BIG-5 are two of them. Currently, BIG-5 is by far the most popular scheme.
41. "The NBINet-TANet Linkup," *National Central Library Newsletter* 24, no. 3 (Nov. 1992): 1-2.
42. Chih-ching Yang, "The Linking Structure of NBINet and TANet" (in Chinese) *National Bibliographic Information Network Newsletter* 5 (Nov. 1992): 9-10.
43. Tsung-jung Ou-yang, "The Linking of NBINet-TANet-Internet" (in Chinese) *National Bibliographic Information Network Newsletter* 7 (May 1993): 13.
44. "Progress Report of the Development Plan of National University and College Libraries" (in Chinese) (Taipei: 1989).
45. "TANet Links up with Internet," *National Central Library Newsletter* 24, no. 2 (Aug. 1992): 12.

46. "TANet Linked with Internet" (in Chinese), *National Bibliographic Information Network Newsletter* 4 (Jul. 1992): 22.

47. Shih-hsion Huang, "Integration of Campus-Wide Information Network and Library Services" (in Chinese), *Journal of Educational Media & Library Sciences* 31, no. 1 (Autumn 1993): 49-51.

48. "TANet Links Up with Internet," 12.

49. Hsiao-liang Hsiang, "STICNET: An Online Sci-Tech Information Network," 159-64; Hsiao-liang Hsiang and others, "The Structure, Creation, and Searching of Ideographic Databases on STICNET," 165-71, both in *Proceedings, 2nd Pacific Conference, New Information Technology for Library & Information*

Professionals (West Newton, Mass.: MicroUse Information, 1989).

50. Shiu-chin Chen, "Current Status of Sci-Tech Database Creation in Taiwan" (in Chinese), *Journal of Educational Media & Library Sciences*, 30, no. 3 (Spring 1993): 285.

51. C. C. Yang, "Report on Research Plan of Bibliographic Information Network" (in Chinese), *Journal of Library & Information Science* 11, no. 2 (Oct. 1985): 163.

52. Cheng, 64-76.

53. Lee, "Automated Library Information System," 111-19.

54. Hsiu-chin Chen, 298.

Appendix A: Selective List of Acronyms

ASIC	Agricultural Science Information Center
ASTIMS	Agricultural Science and Technology Information Management System
BIN	Bibliographic Information Network
CATSS	Cataloging Support System
CCCII	Chinese Character Code for Information Interchange
CERIS	Chinese Educational Resources Information System
ICL	Information and Computing Library
III	Institute for Information Industry
ITA	International Telecommunication Administration
LAC	Library Association of China
LAPC	Library Automation Planning Committee
MOE	Ministry of Education
NBIC	National Bibliographic Information Center
NBINet	National Bibliographic Information Network
NCL	National Central Library
NCLAIS	National Central Library Automated Information System
NLAP	National Library Automation Plan
NSC	National Science Council
STDP	Science and Technology Development Program
STIC	Science and Technology Information Center
STICNET	Science and Technology Information Center Network
RefCATSS	Reference [Interface for] Cataloging Support System
ROC	Republic of China
TANet	Taiwan Academic Network
UDAS	Universal Data Access Service

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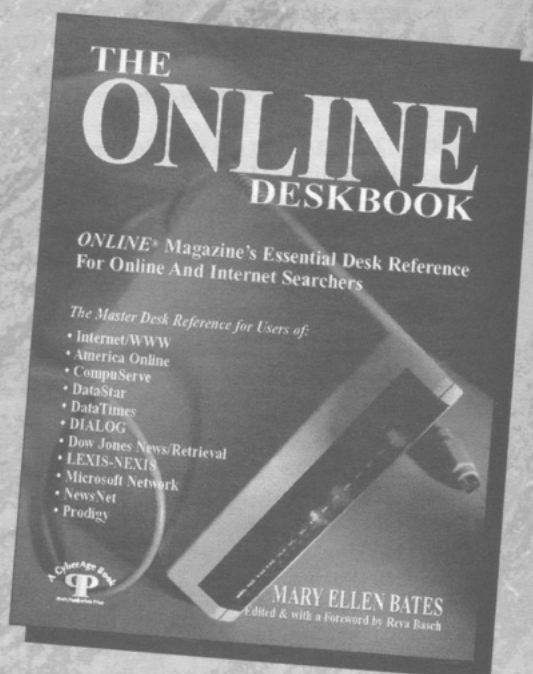
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"Wish I'd written it...wish I'd had it long ago."

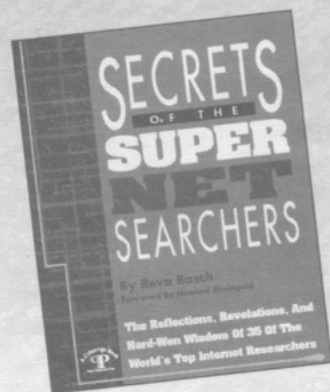
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The Knuckle-Cracker's Dilemma: A Transaction Log Study of OPAC Subject Searching

Terry Ellen Ferl
and Larry Millsap

This report presents the results of an online survey of users who access the University of California's computerized union catalog, the MELVYL Library system, from public access terminals in the libraries of the University of California, Santa Cruz (UCSC). The report includes descriptive statistics on user status, affiliation, anticipated focus of system usage, judgment on ease of system use, and need for assistance. The transaction logs of respondents to the survey are analyzed and cross-tabulated with demographic data on the same group of users. Particular attention is given to subject searching and to the dilemmas that confront users of a system in which heuristics are largely absent. Comparisons with data collected by the investigators in an earlier study of users who accessed the MELVYL Library system from remote sites are also included.*

Introduction

The MELVYL Library system, a pioneering OPAC developed by the University of California's Division of Library Automation, has evolved from a prototype catalog launched in 1981 to a vast system that is now a gateway to an ever-increasing number and variety of bibliographic resources. It also serves as the union catalog for the University's nine campuses.

In a study conducted in 1991, the investigators surveyed users who logged on to the MELVYL system from remote sites. They analyzed translation logs of those users and reported their findings (Ferl 1992; Millsap 1993). The present study was undertaken to capture similar information about in-library users of the system and to examine in more detail the search behavior of users performing subject searches.

The study focuses on the users of the two libraries that constitute the University Library at the Santa Cruz campus. Over the past decade at Santa Cruz, the MELVYL system had come to serve as the primary catalog. The catalog database within the MELVYL system has been described at length in the authors' studies cited above. It may be best characterized as a second-genera-

tion, command-driven OPAC in which there is a high degree of normalization of user search statements before they are processed for retrieval purposes, but in which heuristics—active guidance of the user in the search process—have been purposely kept to a minimum. The user, therefore, remains in virtual full control of the progression of his session.

Approximately 10,000 students, including 900 graduate students, are enrolled at the Santa Cruz campus. The library collection of one million volumes is housed in two libraries—one devoted to the humanities and social sciences and the other to natural sciences. Students are offered programs in the arts, humanities, natural sciences, and social sciences, as well as 22 graduate programs. Several research units in the sciences are based on the campus. The investigators use of their home institution as the focus of the study afforded them optimum methodological control, and at the same time provided a site that is generally representative of many academic institutions in the United States.

Subject Searching in the Catalog

The authors were particularly interested in investigating subject searches performed by in-library users in the MELVYL system's catalog database. Their study of remote users (Millsap 1993, 331–32) yielded the finding that a much higher proportion of undergraduate students (51.3 percent) are likely to perform subject index searches than are faculty (14.6 percent), graduate students (17 percent), or library staff (19.7 percent). This finding supported Ray Larson's hypothesis (1991) about the disinclination of more experienced users to perform subject searches. The failures in subject searching that the present investigators found in manual analysis of the remote users' logs served as the catalyst for examining more closely the subject searching of undergraduate students. They expected this group of users to be the most populous in an in-library study, and that expectation was warranted.

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Methodology

Presentation of the Questionnaire

A survey instrument in the form of an online questionnaire was presented to users from May 16–22, 1994, at twenty-four selected public access terminals connected to the MELVYL system through the UC telecommunications network. This period is typically a high-use period, both in terms of MELVYL system use and patron visits to the UCSC libraries. The terminals on which the questionnaire was offered were selected for the high number of searches known to be conducted on them, as well as for their location in the libraries.

The twenty-four survey terminals—seventeen located in McHenry Library and seven located in the Science Library—logged between four thousand and sixty-five hundred searches each during the entire month of May 1994. Twelve of the seventeen in McHenry Library and five of the seven in the Science Library were located near the reference desks. Four of the seventeen McHenry Library terminals and all of the Science Library terminals had printers attached. No downloading capabilities were available on any of the survey terminals.

The survey instrument was mounted under the auspices of the UC Division of Library Automation (DLA), which manages the MELVYL Library System. The questionnaire was announced in special welcome screens, which appeared only on survey terminals, replacing the standard MELVYL system welcome screen. Two filtering questions were posed to the user in the survey welcome screen. Through the initial filtering question, users who said they had already completed the questionnaire were prevented from answering it again. Those who replied they had not yet taken the questionnaire were given the second filtering question, which asked whether they wished to participate. If they agreed to do so, they were immediately presented with the questionnaire, which consisted of seven questions. On completion of the questionnaire, the user was thanked and prompted to type START to begin another MELVYL session or END to end his current MELVYL session.

Each of the seven questions was presented on a separate screen, and the answer choices were numbered. The following prompt appeared at the bottom of each screen: **Please type only one number and press RETURN, or just press RETURN for the next question.** It was not possible to back up to previous questions, but the user could skip questions or exit the questionnaire at any point. A statement about the confidentiality of the user's search sessions was included in the welcome screens. The text of the welcome screens and the questionnaire are presented as appendices A and B, respectively.

The default MELVYL system "timeout" (automatic ending of a session) was altered on the survey terminals from ten minutes to between five and eight minutes. Staff at DLA programmed the system to present the questionnaire following each automatic timeout, which occurred when no activity was detected on a terminal after five to eight minutes, or when a user formally ended a session by typing END, LOGOFF, QUIT, or one of thirty-four other session-closing commands recognized by the system. Shortening the default timeout was an effort to cause the questionnaire to be presented more frequently.

Several sequencing concerns in the presentation of the screening questions were addressed by DLA and the investigators. If a user simply pressed RETURN instead of answering YES or NO to the first screening question—the one asking whether the user had already taken the questionnaire—the system treated that RETURN as a NO and presented the second screening question, which asked if the user was willing to participate. If the user pressed RETURN again, the system treated that RETURN as a NO and presented the standard MELVYL welcome screen. If the user simply ignored the questionnaire welcome screen and entered a command, the system responded to the command and the questionnaire was not presented. Users who typed END or its equivalent during a session would cause the questionnaire welcome screen to be offered, and the presentation sequencing described above would then be put into play again.

Monitoring Sessions

Because the MELVYL system as presented to users at public access terminals in the UCSC libraries requires no LOGON or LOGOFF commands, the formal limits of a session are defined by the automatic system timeout feature (based on a default), or by the explicit START or LOGOFF command (or equivalent) that a user may choose to enter. Such a session may obviously consist of the searches of several users who access the system before timeout occurs or without previous users having logged off. On the other hand, what appears to the system to be multiple sessions may actually be the session of a single user who logged off one database in the system and logged onto another.

Because the investigators wished to link questionnaire data with the subsequent searches of the respondent, students were hired to observe and record the exact time, to the minute, that a user arrived at a terminal and later left the terminal. It was expected that these observations would help the investigators determine the actual boundaries of individual user sessions.

The students were stationed near banks of terminals to observe a small group of terminals (usually four),

for two-hour shifts, between 10:00 a.m. and 4:00 p.m., typically the high-use period for the MELVYL system. Since the recording task was straightforward, the "training" of these observers consisted largely of a brief introduction to the observation site, an explanation of the project and how to annotate the data collection form, and the stipulation that the observer not interact with the users. The students were asked to bring watches and to synchronize them with the time displayed on the MELVYL system terminals when a user keys SHOW TIME.

It was not feasible to engage students to observe all twenty-four terminals for the seven days of the survey period. Those who were hired were stationed near the larger terminal banks clustered near the reference desks of the two libraries. Statistical data from the recent past had indicated that these sites regularly log high numbers of queries.

The questionnaire presented to in-library users differed from that used in the 1991 remote user study conducted by the investigators. Eight questions in the latter study were omitted from the present study because they related directly to remote access. Two new questions were created to substitute for others that did not yield particularly interesting data in the remote user study. The new questions asked what the user planned to look up in the system, and whether the user found the system difficult or easy to use.

For the remote user study conducted earlier, the questionnaire was presented at the end of a session since it could reliably be assumed that users dialing into the system or otherwise accessing it remotely would log off, an action which initiated the presentation of the questionnaire. In-library users would not have to end their sessions formally, so the investigators felt it necessary to present the questionnaire at the beginning of a session (as defined above). Interestingly, it was discovered through casual observation that very many in-library users did indeed formally end their sessions by typing END or LOGOFF, which would trigger the presentation of the questionnaire welcome screen for the next user. One plausible explanation for this unexpected behavior is that the users who logged off might have wished to clear the screen rather than leave their search results visible to the next user.

Manual Analyses of the Logs

The investigators examined about two thousand pages of selected data printed from user search activity logged through the twenty-four survey terminals. In the initial review of the logs, they parsed the logged data into sessions as follows. They read the "command" line of each transaction, i.e., the user's search statement or

query (or commands such as "END") which the user keyed, then they noted the logged time of the transaction which, together with context, helped them identify the apparent session boundaries. A case number was assigned to each session which began with responses to the survey questionnaire. Whenever student observer reports existed for the period, these were reviewed to help confirm the investigators' judgments about session boundaries.

For each numbered case (i.e., for each session preceded by responses to the questionnaire) a coding form was completed to capture various characteristics of the session (appendix C). The coded data were entered in a computerized file, and the Statistical Package for the Social Sciences (SPSS/PC+ version 4.0) was used to tabulate the data. These results provided basic descriptive data, such as databases searched, indexes used in constructing search statements, numbers of retrievals, numbers and types of errors, validity of search terms, use of HELP features, and so forth. Next, the logs of respondents to the questionnaire who had performed subject searches in the catalog portion of the MELVYL system were subjected to another round of coding. In this round, the investigators attempted to track and code the subject searching strategy of the user, confining the coding to the initial subject search. The characteristics coded were numbers of hits in the first search, validity of the first search term, whether results were examined, next action, cumulative strategy or persistence, total number of attempts, and apparent usefulness of results (appendix D).

The questionnaire was presented to 3,407 users, 67 percent of whom responded that they had already completed it. About 12 percent replied that they did not want to participate. Ultimately, the questionnaire was completed by 667 users, a "return rate" of approximately 20 percent (appendix E). The total number of sessions analyzed was 620 since forty-seven people completed the questionnaire but performed no searches. The number of those sessions subsequently coded for subject searching was 222.

Comparing In-library and Remote Users

Status/Affiliation

Findings in regard to affiliation and status are markedly different when in-library users are compared with the remote users surveyed in the 1991 study. Approximately 90 percent of in-library users replied that they were affiliated with the University of California. In the remote

Table 1
Status of Users

	Status	
	Count	%
No response	5	.8
Fresh/soph	138	22.3
Junior/senior	342	55.2
Grad student	74	11.9
Postdoctoral	4	.6
Faculty	14	2.3
Staff	4	.6
Research asst	6	1.0
Librarian	3	.5
Programmer	1	.2
General Public	20	3.2
Other	9	1.5
Total	620	100.0

user study, by contrast, 65.5 percent replied that they were affiliated with the University (Ferl 1992, 287). Among the remote users, graduate students, faculty, and library staff were the most populous groups, accounting for about 25 percent, 19 percent, and 14 percent, respectively. Juniors and seniors constituted 8.9 percent of the remote users, while freshmen and sophomores were only 4.7 percent. The investigators hypothesized that undergraduates would be the most populous group in an in-library study, and this turned out to be the case. Juniors and seniors accounted for about 55 percent; freshmen and sophomores, about 22 percent; graduate students, 11.9 percent; and faculty, only 2.3 percent (table 1).

Frequency of Use

Comparison between in-library and remote users by frequency of use yielded one basic similarity. Half of those surveyed in each group used the system weekly: 45.2 percent of in-library users and 47.1 percent of remote users. There the similarity ends, for monthly use was reported by 27 percent of in-library users, rare use by 15 percent, and daily use by about 9 percent. Only

about 3 percent reported they had never used the system before. By contrast, more than twice as many remote users (20.1 percent) said they accessed the system daily. Monthly users (15.7 percent) and those who used the system rarely (8.7 percent) were about half the numbers reported by in-library users. First-time use among remote users was 8.4 percent, twice as high as that for in-library use.

Three-quarters (75.4 percent) of in-library users reported that they rarely or never used the system from remote sites. About half of the remote users (50.9 percent) said they never used the system from within the library. Some large constituencies of users therefore do not overlap in terms of access method. This finding may be suggestive of both problems and opportunities in user support and guidance.

Ease of Use

When asked about ease of system use, most in-library users responded that the system was "easy" (19.4 percent) or "rather easy" (58.5 percent) to use. One-fifth of the users said it was "rather hard" (16 percent) or "very hard" (3.2 percent) to use. Those surveyed in the remote user study were not asked this question; survey questions about help received and anticipated need for future help were asked in order to elicit from the user a general impression about ease of system use (Ferl 1992, 335).

There were notable differences between in-library and remote users in terms of what sort of help would be most useful in the future. Nearly half (47 percent) of remote users did not expect to need help in the future, whereas only 19 percent of in-library users expressed such confidence. Among those who replied that they would need help, the option of additional or different instructions on the terminal screen was the overwhelming choice of both survey groups (in-library, 32.6 percent; remote, 27.2 percent). Additional or different printed instructions were desired by 16.9 percent of in-library users and 14.5 percent of remote users. Help from library staff was selected by 15.3 percent of in-library users but only 3.1 percent of remote users. However, 5.1 percent of remote users said they would like help over the telephone (an option not posed to in-library users); choice of this option could be interpreted as a desire for assistance from library staff. Group instruction was preferred by a very small number of respondents: 1.9 percent for both in-library and remote users. Less than 1 percent of remote users said they would rely on a friend or colleague for assistance, but 3.1 percent of in-library users reported that they would do so. Interestingly, 10.2 percent of in-library users selected "Don't know" as the answer to this question (an option that was not posed in the remote user survey).

Table 2
Number of Retrievals

Retrievals for One or More Searches	Remote		In-Library		In-Library Subject	
	No.	%	No.	%	No.	%
0	559	53.4	447	72.1	183	82.4
1-50	840	80.4	542	87.4	206	92.8
51-200	295	28.2	227	36.6	99	44.5
201-500	107	10.2	57	9.2	22	9.9
501-1,000	45	4.3	23	3.7	7	3.2
1,001-2,000	33	3.2	25	4.0	11	5.0
2,001 or more	13	1.2	18	2.9	5	2.3

Number of Retrievals

When remote and in-library users were compared by the numbers of retrievals in their searches, the most notable finding was the occurrence of zero retrievals for a search. The occurrence of zero retrievals was the second most frequent phenomenon for in-library users (table 2). While 53 percent of remote user sessions had one or more searches with zero retrievals, this figure was 72 percent for in-library users. Among in-library users who performed subject searches, 82 percent had at least one zero-retrieval search. Several researchers caution that searches producing null sets do not necessarily represent failed searches (e.g., Peters 1993, 47-48; Kurth 1993, 101). However, zero retrievals in the range of 35-50 percent of searches continue to cause concern among system designers and researchers.

Length of Session

The investigators measured the length of sessions by coding for the number of FIND commands issued by the surveyed users (table 3). Just under 1 percent of users issued no FIND commands in any of the system's databases but employed it instead as a gateway to other databases and services (e.g., other library catalogs accessible on the Internet). Nearly one-third of the users had very short sessions of one, two, or three FIND commands. Another third issued between ten and eighty FIND commands, with approximately 12 percent of users falling in the range of twenty-one to eighty commands. The sessions of in-library users were, on the average, twice as long as those of remote users. Half of the remote users had one or two FINDS; the other half

Table 3
Length of Session

Length of Session	Number of Find Commands	
	Count	%
0	5	.8
1	105	16.9
2	71	11.5
3	56	9.0
4	51	8.2
5	33	5.3
6	37	6.0
7	20	3.2
8	25	4.0
9	15	2.4
10-15	93	15.0
16-20	40	6.5
21-25	30	4.8
26-30	14	2.3
31-35	9	1.5
36-40	4	.6
41-45	2	.3
46-50	2	.3
51-60	3	.5
61-70	3	.5
71-80	2	.3
Total	620	100.0

three or more. Half of the in-library users had one to four FINDS; the other half, five or more.

Errors and Long Searches

In-library users who performed subject searches were five times more likely than remote users to key terms that would initiate a long search—the kind of search that is either restricted or prohibited because of anticipated processing overload for the system (table 4). The occurrence of long searches was 40 percent higher for

Table 4
Number of Errors and Long Searches

Type of Error	Remote		In-Library		In-Library Subject	
	No.	%	No.	%	No.	%
Illegal index combination	10	1.0	9	1.5	0	0
Illegal truncation	12	1.1	20	3.2	6	2.7
Long search	66	6.3	118	19.0	72	32.4
Misspelling	N/A		28	4.5	13	5.9
Omit find command	19	1.8	23	3.7	6	2.7
Typographical	272	16.5	120	19.4	58	26.1
Wrong database	13	1.2	12	1.9	7	3.2
Wrong index	104	10.0	140	22.6	62	27.9

in-library users performing subject searches than it was for in-library searchers overall. Very similar statistical relationships among the three groups also prevailed for other problems, such as illegal truncation, typographical errors, searching in inappropriate databases, and use of the wrong index term in constructing a search statement. Misspellings were not coded in the remote user study because, in preliminary readings of their logs, the investigators found such occurrences to be statistically insignificant. Among in-library users, obvious misspellings were frequently the cause of search failures.

Some Dilemmas of Subject Searching

Charles Hildreth has observed that "the *major* subject access and retrieval problem in today's OPACs is the vocabulary problem" (Hildreth 1989, 69). He concedes that the problem has "many dimensions" but could be defined in simple terms as the "query expression, document term-matching problem"—and notes that the user is almost entirely on his own in solving this problem. Hildreth characterizes the Library of Congress Subject Headings (LCSH) syndetic structure as "shallow" and "inconsistent." When this problem is combined with the "crude phrase or keyword extraction of data" that governs subject access indexes in today's OPACs, the user is

doubly disadvantaged in the process of negotiating a match between document and term.

Karen Markey Drabenstott and Diane Vizine-Goetz (1994) have studied extensively the subject terms entered into online systems by users. These researchers call for a comprehensive review of LCSH because of its thesaural shortcomings. They caution that the failure to revamp LCSH—coupled with the parallel failure to develop computer systems with sophisticated textual navigation techniques—may cause future library users to abandon the library catalog for bibliographic and full-text resources whose access systems are more responsive to a user's subject searching behavior and needs.

Among which of the various kinds of OPAC-user queries does subject searching pose the most difficulty? Christine Borgman, in her comparison of online catalogs with other bibliographic retrieval systems, such as BRS/After Dark, has observed that both kinds of systems pose problems with "conceptual aspects of searching, including increasing search results when too little (or nothing) is retrieved, reducing search results when too much is retrieved, and use of truncation" (Borgman 1984, 384). She cites findings among the survey data from the landmark 1981–83 Council of Library Resources study that indicate "subject searching was the most problematic area," along with "search formulation" (Borgman, 393). The authors of the present study believe that the evidence they have found in user's transaction logs continues to support this contention.

Several recent articles—most notably those by Neal Kaske (1993) and Martin Kurth (1993)—address the complexities of conducting transaction log analysis and the limitations of findings in these studies. The investigators in the present study readily acknowledge the basic constraints in such studies, essentially the difficulties of controlling the variables. These difficulties are ably described by Kaske (80–81). But several years of reading MELVYL system logs, particularly those of subject searches, served as encouragement to devise a coding approach that would complement and help quantify their observations. The subject-search coding is assuredly a modest effort, but one that does attempt to go beyond simple counting in order to characterize the user's evident subject searching "strategy."

Examples from the Logs

To identify sessions with subject searches, the investigators selected sessions in which the user responded to question E in the online survey (appendix B) that he planned to look up a "topic or topics" or "some combination" of choices including a topic (table 5). The session also had to contain at least one search in

Table 5
Plan

	Count	%
No response	4	.6
Topic	154	24.8
Book	105	16.9
Magazine	123	19.8
AV	9	1.5
Catalog	1	.2
Combination	217	35.0
None	7	1.1
Total	620	100.0

Table 6
1st Term Valid

	Count	%
No	61	27.5
Yes	161	72.5
Total	222	100.0

Table 7
Used Wrong Index Name/Omitted Index Name

	Count	%
0	160	72.1
1	37	16.7
2	16	7.2
3	4	1.8
4	2	.9
5	1	.5
6-10	2	.9
Total	222	100.0

the catalog database and at least one search that was either a subject or title-word search, as opposed to name-only searches.

The validity of the initial search term was a problem for nearly one-third of the users (table 6). Again, about one-third used the wrong index name or omitted

Table 8
Typographical Errors

	Count	%
0	164	73.9
1	36	16.2
2	12	5.4
3	6	2.7
4	1	.5
5	2	.9
6-10	1	.5
Total	222	100.0

Table 9
Next Action

	Count	%
Quit	24	10.8
Corrected technical error	6	2.7
Corrected typo	4	1.8
New term	114	51.4
New index	34	15.3
New database	8	3.6
Repeated first search	10	4.5
Different search	20	9.0
Help	2	.9
Total	222	100.0

the index name in their search statements one to ten times in their sessions (table 7) or made from one to ten typographical errors per session (table 8).

About one-fifth of those doing subject searches either quit (twenty-four users) or changed subjects (twenty users) after their first search. The remaining four-fifths tried a variety of strategies to get some data or more data on their subject. Six users corrected technical errors as their second step (table 9).

The following examples illustrate several instances of, or difficulties with, term validity, error correction, term alteration, index variation, and combinations of strategies. There are also examples of hindrances posed by the system.

Case 1

Hits at location [in MELVYL catalog]	Command
0	find Indonesia
	Help
0	find SU Indonesia
0	find SU Indonesia ritual
15	find SU Indonesia religion
	d
224	find SU Micronesia
	d
0	find SU Bali
0	find SU Bali ruins
6	find SU Phillipines
	d
	exit

This searcher, who is a Santa Cruz freshman or sophomore and who uses the system monthly, was one of two users whose next step was to use HELP. After his first search, the system responded with this message: "Your FIND command does not specify the type of search you want to conduct. Type HELP for a list of the ways you can search." When he included an index, the result was a long search which the system would not process. Another zero result was obtained from use of an invalid subject term. Results were obtained on the fourth attempt. The last search command in this session demonstrates how some results can be obtained from searching with misspellings that retrieve records containing the same typographical errors.

An equally small number of users corrected a typographical error as their second step, as illustrated in the next session, which was processed in TEN, the MELVYL database of materials published in the last ten years:

Case 2

Hits at location [in TEN]	Command
0	f TW computer network architecture
0	f TW computer network architecture
	d
	d all
	loc all
	d
	exp loc
	exp fin loc
	f loc all
7	f TW network architecture
0	f loc all
7	d rev
	d 7

The graduate student in this example uses the system weekly. After he corrected his typo, the system told him there were no hits at his location but one on another UC campus. He made a series of unsuccessful attempts to display that one and then tried a new search. There were nineteen hits systemwide for his second search, but he was unsuccessful in displaying any of those not located at Santa Cruz. This user was one of fifty-two who varied only the search terms they used while employing the same index and database for all searches.

For more than half of the survey group, the second step in their subject search was to try a new term:

Case 3

Hits at location [in MELVYL catalog]	Command
10	find SU arthritis
	d
0	find SU knucle cracking
0	find SU knuckles
0	find SU arthritis and knuckle cracking
0	find SU arthritis and cracking knuckles
	help
0	f TW arthritis
	quit
	start news
172	find SU arthritis
0	find SU arthritis and cracking knuckles
0	find SU cracking knuckles
4	find SU knuckles
	d
172	find SU arthritis
	d
	d 9 ABS
	help
	d long
	d 9 ABS
	d
	start CAT
0	find SU arthritis causes
0	find SU causes of arthritis
1	find PE arthritis
	explain lib abbrev
	explain find location
1	f PE arthritis
	d periodicals
	d pe short

This frustrating session by a freshman or sophomore who uses the system weekly demonstrates a great deal of persistence. First he varied terms, then indexes, and then databases, not to mention his spelling of knuckles. His title word search on arthritis was a long search.

Otherwise his zero results were the result of invalid subject terms. We are afraid he ended his session not knowing whether cracking his knuckles today was going to be a cause of grief in his old age.

Case 4

Hits at location	Command
[in MELVYL catalog]	
0	f SU metacognition and AU Piaget
0	f SU learning and AU Piaget
0	f SU education and AU Piaget
0	f SU education and AU Piaget
0	f SU self-monitoring and AU Piaget
9	f SU education and AU Piaget
0	d
0	f SU education and au Neo-piagetian
0	f SU metacognition and SU information processing approach
0	f SU metacognition and SU information processing
12	f SU metacognition
	d

Most of the search terms of this freshman or sophomore who uses the system weekly were valid but resulted in long searches and thus retrieved no records. It is not clear why the first time the command "f SU education and AU Piaget" gives zero results and the second time yields 9. Both times the system detects it as a long search. This person's most successful action was to use a simple subject search instead of combining indexes.

The next most frequent second step was to change indexes:

Case 5

Hits at location	Command
[in MELVYL catalog]	
0	find SU hydrothermal vent chemistry
0	find TW hydrothermal vent chemistry
0	d
1	at all
...	start CC
	help
	explain commands
0	find SU hydrothermal vent chemistry
0	find TW hydrothermal vent chemistry
	help
	explain find
0	f JO hydrothermal vents
0	find JO hydrothermal vents
...	start MAGS

	help
0	find SU hydrothermal vent chemistry
75	find SU hydrothermal vents
	d
	text 1
	help
75	find SU hydrothermal vents
	d
	aquitfind su hydrothermal vents
75	find SU hydrothermal vents
	d loc

This is the session of a freshman or sophomore who uses the system weekly. By persisting in trying different indexes, different databases, and slightly different terms, he finally gets useful results but then has trouble displaying them.

A few users switched to another database as the second step of their strategy. MAGS is a journal citation database and NEWS is a database that indexes newspaper articles:

Case 6

Hits at location	Command
[in MELVYL catalog]	
1	f SU Harlan Ellison criticism
	logoff
	start MAGS
2	f SU Harlan Ellison criticism
	d
	logoff
	start TEN
0	f SU Harlan Ellison criticism
0	f TW Harlan Ellison
2	at ALL
	d
	logoff
	start NEWS
11	f KW Harlan Ellison
	d
	d1-
11	f SU Harlan Ellisonsd
	logoff

Persistence paid off for this junior or senior who uses the system daily.

The next step for ten users was to repeat their original search.

Case 7

Hits at location	Command
[in MELVYL catalog]	
0	f XS history of gambling

0 f XS history of gambling
 0 f KW history gambling
 69 f SU gambling
 d rev

The sort of search done by this freshman or sophomore who uses the system weekly is referred to as "incredulous repetition." It seems to be based on a feeling that the search is valid but something went wrong in the system. The following example by a freshman or sophomore who uses the system daily shows a repetition for a different reason. This user was creating ("saving") a set of citations for printing at the end of the session.

Case 8

Hits at location Command
 start MAGS
 98 f TW frogs
 d
 save 32 39 50 53 55 58 63 68
 98 f TW frogs
 save 7 8 11 14 16 19 22 40 85 94
 d list

Case 9

Hits at location Command
 start MED
 start COMMAND
 0 f TW animal research and 1994
 140 f TW animal research
 1 and date 1994
 0 and date 1993
 10 f TW animal research and DATE 1993
 d loc
 d save 1-
 save 1-
 d abstract 1-10
 print 6
 list 6-
 39 f TW animal research
 39 d loc
 0 and DATE Jan. 1994
 help
 0 and date winter 1994
 39 f TW animal research
 0 and DATE winter 1994
 10 and DATE 1993
 end
 24 f TW animal research
 d loc
 d abstract 1-
 d loc 1-
 6 and date 1992-1994

The user is a UCSC freshman or sophomore who uses the MELVYL system weekly. He is one of a small group who maintained the same terms during his entire session but varied the indexes and databases. He began in MED (MEDLINE) then switched to TEN. Since the system offers no prompt to include the term "date," we assume his familiarity with the system led him to do so. However, his further attempts show that his understanding of the date limit is not perfect, nor does he realize that he is already seeing the hits at his location, since the default setting for public terminals is Santa Cruz's holdings.

Conclusions

The persistence of the users illustrated in the preceding examples is impressive. Table 10 shows that close to half of them had zero retrievals on their first search. Table 11 indicates the kinds of efforts they employed to find what they were looking for. Nearly one-quarter of the users tried new terms, almost one-fifth tried new terms *and* new indexes, and another third tried new terms, new indexes, *and* different databases.

Over one-quarter of the users were willing to continue the search for their initial subject through ten or more attempts (table 12). Table 13 reflects a measure of the possibility that the results obtained were useful to the searcher. The investigators employed their judgment conservatively in this area. They find it remarkable that nearly three-quarters of the users obtained useful citations after persisting. This is a tribute to their ingenuity, given that nearly half of them started with zero retrievals and another quarter got either too many retrievals or irrelevant retrievals on their first search.

The fact that at least one-quarter of these searchers did not appear to retrieve useful citations is still troublesome, however ingenious their fellows may appear. The Knuckle-Cracker's Dilemma presents a powerful argument that the user should, at the very least, be provided with more vigorous contextual assistance by the system.

References

1. Christine L. Borgman, "Why Are Online Catalogs Hard to Use? Lessons Learned from Information-Retrieval Studies," *Journal of the American Society for Information Science* 37 (1986): 387-400.
2. Karen Markey Drabenstott and Diane Vizine-Goetz, *Using Subject Headings for Online Retrieval: Theory, Practice, and Potential* (San Diego: Academic Press, 1994).
3. Terry Ellen Ferl and Larry Millsap, "Remote Use of the

Table 10
Hits From 1st Search

	Count	%
0	104	46.8
1-25, relevant	61	27.5
1-25, not relevant	8	3.6
25-100	34	15.3
101+	15	6.8
Total	222	100.0

Table 11
Persistence

	Count	%
N/A	40	18.0
New terms	52	23.4
New indexes	6	2.7
New databases	2	.9
New terms and indexes	43	19.4
New terms and databases	10	4.5
New indexes and databases	9	4.1
New terms, indexes, databases	60	27.0
Total	222	100.0

Table 12
No. of Attempts

	Count	%
1	38	17.1
2	24	10.8
3	30	13.5
4	20	9.0
5	14	6.3
6	12	5.4
7	7	3.2
8	12	5.4
9	3	1.4
10+	62	27.9
Total	222	100.0

Table 13
Results Were Useful

	Count	%
Probably were	160	72.1
Can't tell	17	7.7
Probably weren't	45	20.3
Total	222	100.0

University of California MELVYL Library System: An Online Survey," *Information Technology and Libraries* 53 (1992): 285-303.

4. Charles R. Hildreth, *Intelligent Interfaces and Retrieval Methods for Subject Searching in Bibliographic Retrieval Systems* (Washington, D.C.: Library of Congress, 1989).

5. Neal K. Kaske, "Research Methodologies and Transaction Log Analysis: Issues, Questions, and a Proposed Model," *Library Hi Tech* 42 (1993): 79-86.

6. Martin Kurth, "The Limits and Limitations of Transaction Log Analysis," *Library Hi Tech* 42 (1993): 98-104.

7. Ray R. Larson, "The Decline of Subject Searching: Long-Term Trends and Patterns of Index Use in an Online Catalog," *Journal of the American Society for Information Science* 42 (1991): 197-215.

8. Larry Millsap and Terry Ellen Ferl, "Search Patterns of Remote Users: An Analysis of OPAC Transaction Logs," *Information Technology and Libraries* 54 (1993): 321-43.

Appendix A Welcome Screens

Welcome to the University of California's
MELVYL LIBRARY SYSTEM*

PLEASE HELP US CONDUCT A SURVEY OF THE
MELVYL LIBRARY SYSTEM

In order to improve access to the
MELVYL system, we are asking you to complete an online
questionnaire consisting of 7 brief questions.

Have you already taken the questionnaire (since
Monday, May 16, 1994)?

Please type YES or NO.

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of the University of California

[If the user typed YES, the following message appeared:]

THANK YOU. PLEASE CONTINUE YOUR SESSION IN THE MELVYL SYSTEM.

[If the user typed NO, the following screen appeared:]

In order to study MELVYL system usage, we are conducting this
questionnaire. We hope that the results will help us improve
the system.

The questionnaire contains 7 questions and takes about two
minutes to complete.

A small number of individual user sessions will be analyzed for
this study.

All sessions will remain strictly confidential.

Are you willing to participate in answering the questionnaire?

Please type YES or NO, and press RETURN.

[If the user typed YES, the questionnaire appeared.]

Appendix B Online Questionnaire

This brief questionnaire will help us to improve the MELVYL system databases. Please type the number corresponding to your answer for each question. Simply press RETURN without typing to go on to the next question without answering. Type END at any point if you do not want to complete the questionnaire.

MELVYL LIBRARY SYSTEM USER QUESTIONNAIRE

A. Are you a student, faculty or staff member affiliated with the University of California?

1. Yes
2. No

B. Which of the following best describes your present status?

1. Undergraduate student (freshman or sophomore)
2. Undergraduate student (junior or senior)
3. Graduate student
4. Postdoctoral student
5. Faculty or teaching staff at a college or university
6. Non-teaching staff at a college or university
7. Research assistant
8. Library staff
9. Programmer or systems analyst
10. General public
11. Other

C. Do you use the MELVYL System from a terminal in the library:

1. Daily
2. Weekly
3. Monthly
4. Rarely
5. Have not used it before today

D. Do you use the MELVYL System from a terminal OUTSIDE the library:

1. Daily
2. Weekly
3. Monthly
4. Rarely
5. Never

E. What do you plan to look up in the MELVYL system today?

1. A topic or topics
2. Specific book(s)
3. Magazine or journal articles
4. Audiovisual materials (recording, videos, maps, etc.)
5. Catalogs of other libraries
6. Some combination of the above
7. None of the above

F. Do you usually find the MELVYL system:

1. Very easy to use
2. Somewhat easy to use
3. Somewhat hard to use
4. Very hard to use
5. Have not used it before today

G. Which one of the following would help you most in using the MELVYL System?

1. Addition of different printed instructions
2. Addition of different instructions on the terminal screen
3. Help from a library staff member
4. Help from a friend or colleague
5. Help through group instruction
6. I do not expect to need help
7. Don't know.

Appendix C Coding Form (All Searches)

Case No. _____

Terminal location:

- 0 = McHenry near Ref Desk
 1 = McHenry remote
 2 = Science near Ref Desk
 3 = Science remote

No. of database changes:

- 0 = 0 4 = 4
 1 = 1 5 = 5
 2 = 2 6 = 6-10
 3 = 3 7 = 11 +

Printer attachment:

- 0 = No printer
 1 = Printer

Total number of FIND commands:

- 0 = 0
 1 = 1
 2 = 2
 3 = 3
 4 = 4
 5 = 5
 6 = 6
 7 = 7
 8 = 8
 9 = 9
 10 = 10-15
 11 = 16-20
 12 = 21-25
 13 = 26-30
 14 = 31-35
 15 = 36-40
 16 = 41-45
 17 = 46-50
 18 = 51-60
 19 = 61-70
 20 = 71-80
 21 = 81-90
 22 = 91-100

Time of day (start time):

- 0 = Before 10 a.m.
 1 = 10 a.m. to Noon
 2 = Noon to 4 p.m.
 3 = 4-8 p.m.
 4 = After 8 p.m.

No. of databases searched:

- 0 = 0 4 = 4
 1 = 1 5 = 5
 2 = 2 6 = 6-10
 3 = 3 7 = 11 +

Used citation/abstract databases:

- 0 = No
 1 = Yes

23 = 101-200
24 = 201-300
25 = 301-400
26 = 401-500
27 = 501+

MELVYL database: Number of searches

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

NIL, DLINE database: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

CC database: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

CCT database: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

UPE database: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

TEN-YEAR MELVYL database: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Magazine index: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Newspaper index: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

INSPEC index: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Computer index: number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

PsycINFO index: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Business index: Number of searches:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Non-MELVYL systems used?

0 = No
1 = Yes

FIND TITLE:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Title word follows subject search:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

FIND KEYWORD

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

FIND AUTHOR:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

FIND SUBJECT

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Combined indexes in a search:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with zero retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 1-50 retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 51-200 retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 201-500 retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 501-1,000 retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 1,001-2,000 retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Searches with 2,001 or more retrievals:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Used wrong index name/omitted index name:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

In wrong database:

0 = No
1 = Yes

Illegal combination of index names:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Illegal attempt to truncate:

0 = 0 4 = 4
1 = 1 5 = 5
2 = 2 6 = 6-10
3 = 3 7 = 11 +

Omitted FIND command:

- 0 = 0 4 = 4
- 1 = 1 5 = 5
- 2 = 2 6 = 6-10
- 3 = 3 7 = 11 +

Long search:

- 0 = 0 4 = 4
- 1 = 1 5 = 5
- 2 = 2 6 = 6-10
- 3 = 3 7 = 11 +

Typographical errors (including commands and index names)

- 0 = 0 4 = 4
- 1 = 1 5 = 5
- 2 = 2 6 = 6-10
- 3 = 3 7 = 11 +

Misspelled words:

- 0 = 0 4 = 4
- 1 = 1 5 = 5
- 2 = 2 6 = 6-10
- 3 = 3 7 = 11 +

Validity of subject search terms used in MELVYL catalog and Periodical database:

- 0 = Not applicable
- 1 = No terms were valid
- 2 = Some terms were valid
- 3 = All terms were valid
- 4 = Can't tell

Effectiveness of searches:

- 0 = Zero retrievals for all searches
- 1 = Some retrievals, no displays
- 2 = Displayed some records
- 3 = Displayed records and refined searches

Displayed abstract or full text:

- 0 = No
- 1 = Yes

Use of HELP/EXPLAIN features:

- 0 = Didn't use either feature
- 1 = Used feature(s) and it helped
- 2 = Used feature(s) to no apparent effect

Display command errors:

- 0 = 0 4 = 4
- 1 = 1 5 = 5
- 2 = 2 6 = 6-10
- 3 = 3 7 = 11 +

Appendix D Coding Form (Subject Searches)

Case number

1. No. of hits from first search

- 0 = 0
- 1 = 1-25, apparently relevant
- 2 = 1-25, apparently not relevant
- 3 = 25-100
- 4 = 101 +

2. Is first term valid

- No
- Yes

3. Examined results?

- N/A
- Yes
- No

4. Next action

- 0 = Quit
- 1 = Corrected technical error
- 2 = Corrected typo
- 3 = Tried new term
- 4 = Tried new index
- 5 = Tried new database
- 6 = Repeated first search
- 7 = Different search

5. Cumulative strategy/Persistence

- 0 = N/A
- 1 = Tried new terms
- 2 = Tried new indexes
- 3 = Tried new databases
- 4 = Tried new terms/new indexes
- 5 = Tried new terms/new databases
- 6 = Tried new indexes/new databases

6. Number of attempts (Finds per subject)

- 1 = 1
- 2 = 2
- 3 = 3
- 4 = 4
- 5 = 5
- 6 = 6
- 7 = 7
- 8 = 8
- 9 = 9
- 10 = 10 +

7. Results were useful?

- 1 = Probably were
- 2 = Can't tell
- 3 = Probably weren't

Appendix E
Summary Of Survey Data

3,407 were asked if they had taken the questionnaire

2,295 said yes*

16 said NO then typed START or LOGOFF

427 said they didn't want to take the questionnaire

2 said they would take the questionnaire but then typed START or LOGOFF

667 were given the questionnaire; four of these logged off before completing the questionnaire.

Those four plus 43 others did no searches; so there were 620 cases where sessions could be linked to questionnaire's data.

ANSWERS

Question	None**	1	2	3	4	5	6	7	8	9	10	11	Total
A	4	595	68	0	0	0	0	0	0	0	0	0	667
B	6	150	363	75	4	16	4	6	6	1	21	13	665
C	4	65	291	184	97	24	0	0	0	0	0	0	665
D	5	28	74	55	149	353	0	0	0	0	0	0	664
E	6	167	112	130	10	1	225	13	0	0	0	0	664
F	4	126	385	108	22	18	0	0	0	0	0	0	663
G	7	117	213	100	20	12	127	67	0	0	0	0	663

*The discrepancy between this figure and the 667 users who answered the questionnaire must be accounted for, in part, by the large number of frequent users who were presented with the questionnaire more than twice in the one-week survey.

** Number of non-responses

One of the outcomes of the meeting held at the United Arab Emirates University between October 5 and 6, 1993, titled "Workshop on Arabic Online Cataloging Network" was the creation of a committee charged with the responsibility of laying the foundations for the standards to handle Arabic machine readable data for bibliographic control. This paper highlights the status of machine readable bibliographic control in the Arabian Gulf countries and lists measures to be taken in establishing standards for Arabic machine readable data.

Defining the Need

Arabian Gulf states find themselves poised to enter the structured and hopefully smoother road to automation in libraries and information centers vis-à-vis Arabic bibliographic materials. Whereas several organizations in the Arabian Gulf states have mounted Arabic online catalogs, unfortunately none of the systems in use employs a standard character set or conforms to an acceptable communication format for exchange of machine readable data. The need for compatibility, standardization, and cooperation in the Gulf region is an issue that has received much attention.¹

Problems Faced

Some of the organizations found themselves in trouble as the support of Arabic on their hardware was abandoned by the vendors. For example, both the National Scientific and Technical Information Center (NSTIC) of the Kuwait Institute for Scientific Research (KISR) and the King Fahd University of Petroleum and Minerals, Daharan, Saudi Arabia (KFUPM), began working independently with the building of Arabic online catalogs in the early 1980s on IBM mainframes using the X BASIC character set (figure 1). KFUPM Arabized DOBIS/LIBIS, while NSTIC had its OPAC on an Arabized version of STAIRS/CMS (a text storage-and-retrieval system).

The problem of the hardware limitations for both data entry and output of Arabic data on NSTIC's and KFUPM's IBM mainframe must be resolved, as there is no intelligence built in at the keyboard level. The user is required to key the variant forms of the alphabet during data entry because of limitations in X BASIC and IBM 3270 terminal types; the process is cumbersome to say the least. Workstations with contextual analysis features

and keyboards that have one-letter keying capability are most desirable.

The pixel limitation on video display units does not allow the generation of Arabic characters in an elegant manner, and the quality of printed characters is poor. Yet another problem is that there is no byte-for-byte reversibility between the X BASIC character set and other known character sets.

It should be mentioned here that one of the reasons these organizations find themselves in this state of affairs is that they were the first to venture into Arabization when there were no standards and have had to pay the price for being the pioneers. Having had their fingers burned once, the organizations in the Gulf realize that this time around they will proceed only after standards are in place and vendors are committed to supporting their products.

Libraries are file-oriented organizations, and the database is by far the most important element of those required for automation. Since the integrity of the database cannot be compromised, the standard that dictates the character set and the record structure is of prime importance. All vendors of library automation systems interested in the Gulf market should bear in mind that compliance to existing and forthcoming standards will be the key to their success.

Groundwork for Establishing Arabic Standards

Funding

The first and foremost tangible step to be taken by the committee has been to match its responsibility to its authority by acquiring the financial support needed to carry out its mandate. The Gulf Cooperation Council Standards Organization (GCCSO) has been approached for its support. Under the GCCSO's umbrella, it is hoped that issues related to standards for machine readable data will be established and accepted by the participating organizations.

Creation of Subcommittees

The issues related to standards for machine readable data in libraries and information centers in the Arabian

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Hex Digits 1st → 2nd ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM0300X0	- SP100000	ح AH450003	ش AS230000	ظ AZ450000	غ AG310003	ك AK010003	: SP140007	؟ SP150007	x SA070000	ـ ND100001
-1	(RSP) SP300000	أ AA310002	/ SP120000	خ AH470000	a LA010000	j LJ010000	÷ SA060000	ل AL010000	A LA020000	J LJ020000	(NSP) SP310000	ي ND010001
-2	و AX100000	ؤ AW3100X0	ة AT020000	ذ AH470003	b LB010000	k LK010000	s LS010000	ي AL220000	B LB020000	K LK020000	S LS020000	ـ ND020001
-3	ھ AX100004		ت AT010000	د AD010000	c LC010000	l LL010000	t LT010000	ي AL220003	C LC020000	L LL020000	T LT020000	ـ ND030001
-4	ـ SM860000		ت AT010003	ذ AD470000	d LD010000	m LM010000	u LU010000	ي AL320000	D LD020000	M LM020000	U LU020000	ـ ND040001
-5	ل SM870000	ك AY3100X0	ث AT470000	ز AF010000	e LE010000	n LN010000	v LV010000	ي AL320003	E LE020000	N LN020000	V LV020000	0 ND050001
-6	ع AX300000	ا AA0100X0	س AT470003	ز AZ010000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	ي ND060001
-7	ت AA210000	ل AA0100J2	ج AG230000	س AS010000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	ي ND070001
-8	ا AA210002	ب AB0100X0	ح AG230003	س AS010003	h LH010000	q LQ010000	y LY010000	ي AL020000	H LH020000	Q LQ020000	Y LY020000	ي ND080001
-9	ي AA310000	ـ AB010073	ح AH450000	ـ SP080007	i LI010000	r LR010000	z LZ010000	ي AL020003	I LI020000	R LR020000	Z LZ020000	9 ND090001
-A	ف SC040000	ا SP020000	ا SM650000	: SP130000	ش AS230003	ع AC470000	غ AG310004	ل AL010003	(SHY) SP320000	ي AA020000	1 ND010000	
-B	.SP110000	\$ SC0300X0	,SP080000	!# SM010000	ص AS450000	ع AC470002	ف AF010000	م AM010000	ه AH010003	ي AA020002	2 ND020000	6 ND060000
-C	< SA030000	* SM0400J7	% SM020007	@ SM050000	ص AS450003	ع AC470003	ف AF010003	م AM010003		ي AY010000		7 ND070000
-D	(SP060000	) SP0700X0	_ SP090000	ا SP050000	ض AD450000	ع AC470004	ق AQ010000	ن AN010000	ف AH010004	ي AY010002	3 ND030000	8 ND080000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ض AD450003	غ AG310000	ق AQ010003	ن AN010003		ي AY010003	4 ND040000	9 ND090000
-F	| SM130000	ـ SM660000	? SP150000	" SP040000	ط AT450000	غ AG310002	ك AK010000	ه AH010000	و AW010000	0 ND100000	5 ND050000	

Figure 1
Arabic X-Basic-Supported Characters with Numeric Distinction (RPQ 8K 1306)

Gulf region need to be addressed in detail by experts in their prescribed areas. Once the funds to support the committee have been finalized, the technical subcom-

mittees to analyze the specifics for cataloging, holdings format, authority files, community information, and acquisitions standards should be formed. Subcommittees

could hire consultants and experts in each of these areas to come up with required standards.

Suggested Approach

Comparative Studies

It would serve the Gulf countries well to draw on the experience of other countries that have a non-Latin character set and have had success with MARC to make comparisons, noting similarities and differences and the manner in which problems have been overcome by other national libraries. The experience of Chinese MARC, which is one of several national formats developed within the constraints of USMARC and USMARC II formats, could be very useful. Its records are based on ISO-2709.²

Thorough research on the efforts that have been made in computers and the Arabic language should be conducted to reveal the experience that affects bibliographic record creation, storage, and retrieval of Arabic materials. Pierre MacKay's book is an example of such work.³ IBM's scientific center in Egypt has conducted much research that needs to be examined.

Identifying Areas Where Standards Are Required

Character Set

NSTIC recognized the problem and exchanged its ideas with the Kuwait Foundation for the Advancement of Science (KFAS) regarding the need for standards in Arabic for machine readable data. KFAS took the lead in issuing a grant to the Research Libraries Group (RLG) in California to develop a character set for Arabic. RLG had years of experience working with non-Latin languages, and Arabic was the last character set of the JACKPHY project that needed addressing. After much deliberation, a seven-bit basic Arabic character set (figure 2) following ISO—but preferring the ASMO standard 449 to CODAR-U—was proposed by RLG and was adopted by the Library of Congress. ASMO and CODAR-U are the two principal standards for computer encoding of Arabic. By the end of 1991, work began on cataloging the sizeable Arabic collections of Harvard and Princeton universities.⁴

The acceptance of this character set by the Gulf countries gives them a means of access to a rich source of cataloged materials in Arabic. During the workshop

	0	1	2	3	4	5	6	7
0				0	@	ذ	—	ـ
1			!	1	ء	ر	ف	ّ
2			"	2	آ	ز	ق	°
3			#	3	أ	س	ك	
4				4	ؤ	ش	ل	
5			٪	5	إ	ص	م	
6			&	6	ض	رئ	ن	
7			،	7	أ	ط	ه	
8			)	8	ب	ظ	و	
9			(	9	ة	ع	ى	
10			*	:	ت	غ	ي	
11			+	؛	ث] =	}	
12			،	>	ج	\	ء	ا
13			-	=	ح	[=	{
14			.	<	خ	^	ـ	-
15			/	؟	د	ـ	ء	

Figure 2
ISO Arabic Character Set for Information Interchange
(7-bit) ISO 9036

there was mention of a conference that was to be held in Jordan to establish a character set for Arabic. The committee from the Arab states should monitor the developments to ensure compatibility.

Cataloging- and OPAC-Related Issues

Another related development is that of the commissioning of an integrated Field Office System (IFOS) by the Library of Congress that will be used for the cataloging of Arabic materials.⁵ Even though the IFOS has many facets that are not directly related to the cataloging aspect of Arabic materials (since many functions are of an administrative and financial nature), the RFP of this workstation addresses many issues in both cataloging and searching for Arabic machine readable materials that could be very easily applied in the Arab world.

Authority Files

The agreement on the cataloging rules and authority files for Arabic is a necessary first step, as the fate of all exchange formats is dependent on the development and acceptance of accompanying cataloging rules. In the Arab world, subject heading lists such as Al-Khazindar⁶ and Swaydan⁷ exist, but there is no widely used name authority file. Cataloging rules for Arabic materials have

been published by the Jordan Library Association.⁸ A decision must be made, first on what to adopt and second to assign the responsibility to a body to keep these tools up to date in a standard machine readable format for ease of use and distribution.

Defining Mandatory MARC Fields

Agreement also must be reached on the mandatory MARC fields and minimum-level cataloging required to create a MARC cataloging record in Arabic. Monitoring the modifications and additions to the core fields would be another ongoing responsibility of a technical committee.

Holdings Format and Community Information

There are other related areas that need to be addressed by the committee; for instance, the format for the serial holdings of libraries also has to be reviewed and agreed upon. The relatively recent development of the US-MARC for community information format should also be analyzed to see how it could be applied in the Gulf region and how it could be incorporated into the responsibilities of the technical committee.⁹

Acquisitions (BISAC and SISAC)

Yet another area that merits attention is the automated acquisitions systems Book Industry Systems Advisory Committee (BISAC) and Serials Industry Systems Advisory Committee (SISAC).¹⁰ It was interesting to note that the attendees of the workshop included representatives from the private sector, who not only showed keen interest in the development but took active part in the proceedings.


The involvement of vendors, jobbers, and organizations that could become bibliographic utilities in the Arab world would be a great step forward for the libraries and information centers in the region. Since the BISAC and SISAC standards already exist for Latin materials, a similar standard for Arabic materials will be most welcome. We, the future users of these standards, need to grapple with the issues today and resolve the problems in the system as applicable to Arabic materials so that we can take advantage of automation as soon as possible.


Concluding Remarks


The willingness to comply with standards is a step toward cooperation. Following standards allows exchange of data, and the benefits of this will be visible in various parts of the library system such as the OPAC, interlibrary loan,




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union catalogs, and networking, with resource sharing its natural consequence. It is with this larger goal in mind that organizations in the Gulf are convinced that conformity to standards is essential and that the time has come to pool resources to solve problems that affect them all.

Acknowledgment

The author wishes to acknowledge the National Scientific and Technical Information Center of the Kuwait Institute for Scientific Research for the use of various resources and utilities in the preparation of this paper.

References

1. Mohammed Saleh Ashoor, "Arabization of Automated Library Systems in the Arab World: Need for Compatibility and Standardization," *Libri* 39 (1989): 294-302.
2. Betty W. Lee, "The MARC Formats: UK MARC vs. US MARC, UNIMARC & Chinese MARC," *The Hong Kong Library Association Journal* 10 (1986): 27-41.
3. Pierre A. MacKay, *Computers and the Arabic Language* (New York: Hemisphere Publishing Corporation, 1990).
4. Joan M. Aliprand, "Arabic Script on RLIN," *Library Hi Tech* 40-10, 4 (1992): 59-80.
5. The Library of Congress, *Request Proposal for the Integrated Field Office System for The Library of Congress Overseas Field Offices* (Washington, D.C.: 1992).
6. Ibrahim A. El-Khazindar *List of Arabic Subject Headings* (Kuwait: Kuwait University, 1983).
7. Nasser M. Swaydan, *Arabic Subject Headings* (Riyadh: King Saud University Libraries, 1985).
8. Jordan Library Association, *Anglo-American Cataloging Rules*, 1st Arabic edition (Amman, Jordan: Jordan Library Association, 1983).
9. Marilyn Lutz and others, "Special Section: The US-MARC Community Information Format," *Information Technology and Libraries* 11, no. 4 (1992).
10. Bullard R. Scott, "Standards for Automated Acquisitions Systems: BISAC and SISAC Considerations: The RTSD Acquisitions/In-Process Control System Discussion Group," *Library Acquisitions: Practice and Theory* 11 (1987):357-58.

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LISPA (Library and Information Center Staff Planning Advisor): A Microcomputer-Based System

F. J. Devadason
and H. A. Vespry

Staffing required for a library depends upon various factors such as number of working days in a year, hours the library is open, leave allowed per year, total stock, number of documents added per year, number of documents circulated per day, number of ready reference queries handled per day, types and quantum of services offered, and number of readers requiring guidance per day. LISPA is a set of programs developed to run on IBM PC/AT computers and compatibles to assist planning for library staff requirements, taking into consideration the above factors and more. Though it is not an expert system, it encapsulates the expert knowledge of a library staff planner. Although LISPA has built-in default values and ratios for computing the staffing required for a library, users can alter these values and standards and compute staffing requirements based on their library's needs. That is, LISPA allows the planner to choose the kinds of services required and the operational environment of the library and control the computation process according to these requirements. This facility makes LISPA useful for planning staffing needs for libraries in different socioeconomic and technological environments. The system can be used to check the present staffing needs of a library, to estimate its future requirements, and to plan staffing needs for a new library. The staffing requirements are computed and presented in the following categories: senior professionals, professionals, paraprofessionals, and skilled and unskilled staff. LISPA can be used both to plan and to teach how to manage staffing needs in a library, since it displays the steps involved in the computation and also the functions of the different sections in the library, including the various kinds of services a library can offer. The system is written in CBASIC and is easy to use, as it prompts the user throughout its execution.

Several standards for staff planning for college, university, special, research, and public libraries have been established.¹⁻¹³ But standards for planning staffing needs in libraries based on job analysis and workload were perhaps first established by Ranganathan.^{14,15} His staff plan model^{6,16} has been used as the basic model for the development of draft plans for several libraries and information centers in India¹⁷⁻²⁰ and

has been found useful in providing basic guidelines. Libraries have different working hours, working conditions, rules and regulations, sizes, equipment and facilities, and services offered, depending on the kind of organization they serve, e.g., college, university, research institution, business, industry, municipal body. LISPA was developed on the basis of work-performance data from a large academic library in India, and the system defaults will need modification in order to make the system applicable to libraries in different environments. LISPA is flexible enough to accept data regarding workload and other parameters regarding a particular library for which staffing needs are being planned, and also to allow the system's default values to be modified according to the socioeconomic and technological environment concerned. That is, LISPA encapsulates the expert knowledge of a library staff planner, which can be temporarily modified to suit to the requirements of a particular situation. But the knowledge base reverts to its original state once the program is executed. This is because both the knowledge and the rules are embedded in the programs, unlike with other systems.²¹

LISPA is derived from Ranganathan's model^{6,14-16} with several modifications. The system is self-documenting and runs on its own once the command LIPLAN or LISPA is entered. It is interactive; all data to be input and most of the parameters required are prompted. The functions and services required for a particular library can be selected and the staff planned accordingly. It runs on an IBM PC/AT computer or compatible running under MS-DOS 3.1 and higher.

The system is best suited to developing countries where automated systems for acquisition, cataloging, circulation, etc., are not yet commonly available. However, because the system displays and allows the standard default values to be changed, it might be possible to use it for planning of staffing needs for libraries in other socioeconomic and technological environments. LISPA can also be used as a teaching aid, since it displays brief descriptions of the functions of the different sections of the library, the various documentation and information services that can be offered, and the steps involved in computing staffing needs.

The system plans staffing for the following sections of a library: acquisitions, serials and periodicals, technical processing, maintenance, circulation, reference, documentation and information services, and

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administration. The system does not cover binding; printing and publication; training or retraining of staff, readers, and users; or maintenance of buildings, computers, networks, AV and reprographic equipment, etc. It should be noted that the functions and services of the planner's library might be grouped into sections other than the above. The staffing needs computed will then have to be noted separately and combined according to the organization of that library.

System Overview

As per Ranganathan's model,^{14,15} a library is like a hospital. In a hospital there are medical superintendents, surgeons, anesthetists, general practitioners, specialists, nurses, pharmacists, skilled technicians, clerical staff, and unskilled cleaners, etc. Except for skilled technicians and clerical and unskilled staff, all hospital employees are, more or less, professionals. Even some skilled technicians, such as those who operate X-ray, EKG, and EEG equipment, are attuned to the dedicated medical profession.

Whereas a hospital staff attends to physical and physiological weakness, a library staff attends to intellectual weakness. Hence in a library, too, all employees, except for skilled and unskilled staff, must be professionals in one sense or the other, though they possess different levels of professional expertise. LISPA is built on this philosophy. It delineates the following categories of staff for a library:

1. senior professional (M.A./M.S. plus M.L.I.S. plus about six years of library experience)
2. professional (M.A./M.S. plus M.L.I.S. plus about two years' library experience or B.A./B.S. plus M.L.I.S. plus about three years' library experience or M.A./M.S. plus B.L.I.S./Dip.L.I.S. plus about four years library experience or B.A./B.S. plus B.L.I.S./Dip.L.I.S. plus about five years' library experience)
3. paraprofessional²² (grade 10/12 plus certificate in library science or one year of library experience)
4. skilled staff (grade 10/12 plus typing, key-boarding, accounts, and stenography skills)
5. unskilled staff (literate)

In some situations the first three categories above are classified as professionals by LISPA for computational purposes and then assigned to the different levels. LISPA allows the planner to reallocate the staffing levels if the program's categorization is not acceptable.

LISPA consists of ten major modules. The first module, ASSIST, briefly describes the system. The

second module, WORKIN, deals with opening hours of the library, duty hours, leave permitted for workers, etc. The third module, CIRCUL, deals with the circulation section. ACQUIS, the fourth module, deals with the acquisition section. The fifth module, SERIAL, deals with the serials and periodicals section. The sixth module, TECHNI, deals with the technical processing (classification and cataloging) section. The seventh module, MAINT, deals with the stack maintenance section. REFERE, the eighth module, deals with the reference section and service. The ninth module, DAIS, deals with the documentation and information services. The tenth module, SUPERV, deals with the supervision and management section and presents the consolidated staffing plan.

ASSIST Module

ASSIST is invoked by the command LIPLAN; it asks for the name of the planner and uses that name to identify the computed values to be stored in a file named COMVAL.DAT. It requests a password and then displays a description of the system along with the listing of the input data required and the default values set in the system. Input data required include those listed in table 1.

This module also gives hints on how to run LISPA and how to resume after quitting at the end of any module. At the completion of a module, there is provision for selecting another module to be run. However, it is better to run the modules in the sequence indicated by LISPA, because the values computed in one module may be needed in another. To familiarize themselves with LISPA, users may wish to run the system using the default values and hypothetical values for input data. The major modules in the system, together with their functions, are displayed in the ASSIST module, allowing users to select the module they intend to run or to quit the program.

Table 1
Input Data

Input	Default Value
No. of days library is open in a year	365
No. of days a worker is given leave in a year	162
Ave. no. of hours library is kept open in a day	12
No. of hours of duty for a worker in a day	8
No. of hours circulation counter is open in a day	12

WORKIN Module

The second module, WORKIN, prompts the planner to key in the average number of days per year the library is open, number of days per year a worker is allowed leave, number of hours per day the library is open, and number of duty hours for a worker. The default values for the above can be changed by the planner. Using these values, the shifts required per day and the "batches" required for the staff to be available throughout the library's hours of operation are computed. This value of batches is used to multiply the value of staff for vigilance at the entrance gate, and for reference and supervision computed on the basis of workload, to make them available throughout the hours the library is open if the planner so desires.

CIRCUL Module

This module identifies some of the functions of the circulation section as lending and noting return of documents, updating membership files, issuing borrowers' identification, requesting return of overdue materials, renewing loans and reserving documents, handling of documents reported lost, processing interlibrary loans, and recording circulation statistics. The planner is prompted to key in the average number of hours the circulation desk is open per day (which may be less than the number of hours the library is open).

The number of staff (excluding unskilled staff) required is computed, based on the hours the circulation desk is open. Then, based on the average number of transactions that can be handled by a staff member at the circulation counter (the default of two hundred transactions per day per staff member can be changed depending on whether the circulation function is automated) and the average number of transactions per day, the staffing needs computed on the basis of hours the desk is open are checked for adequacy for handling the total number of transactions in a year. If the figures are inadequate, then the staff for the excess transactions (over and above those that can be handled by the staff computed on the basis of hours the circulation counter is open) is computed and added.

A member of the computed staff can be designated by the planner to be the head of the circulation section. If not, one is assigned to the paraprofessional category. The rest of the staff can be assigned to the same paraprofessional category or to the unskilled staff category by the planner. The number of unskilled staff required for assistance is computed as one for every two other circulation staff. This default can be changed by the planner,

or the unskilled staff value can be nullified. Another unskilled staffmember to monitor the entrance gate (gate register, articles left by readers, etc.) can be added if the planner desires. The computed staffing needs are displayed according to the categories (a) professional, (b) paraprofessional, and (c) unskilled staff.

ACQUIS Module

The fourth module identifies some of the functions of the acquisition section as selection of documents, ordering, arranging for payment of invoices, and accessioning of all documents, including bound volumes of periodicals and serials (excluding current serials). It prompts the planner to key in the number of serials and periodicals currently received, the number that are bound and added to the collection, and the average number of other documents added annually. Then it computes professional staff (including paraprofessionals) as one person for every six thousand documents added annually. The skilled staff required (for typing and keying in orders, checking invoices, accessioning, etc.) is computed as one person for every two professionals or paraprofessionals. These defaults can be changed by the planner depending on whether automated facilities are available or planned for the library. The unskilled staff required (for checking pages, stamping the library's emblem/seal, etc.) is computed as one for every two professionals or paraprofessionals. This default value for the computation of unskilled staff can be increased or decreased or nullified by the planner.

Among the professional staff (which also includes paraprofessionals), one person is assigned to the professional category after confirmation by the planner, and the rest are assigned to the paraprofessional category by this module. The computed staffing need is displayed according to the following categories: (a) professional; (b) paraprofessional; (c) skilled staff; and (d) unskilled staff.

SERIAL Module

This module identifies the functions of the serials and periodicals section as selecting, ordering, renewing, canceling, arranging for binding of completed volumes, claiming missing issues at the appropriate time, and arranging for the display of the current issues on display racks. The planner is prompted with the number of serials and periodicals currently received (data keyed in while running the ACQUIS module). The professional

staff (including paraprofessionals) is computed as one person for every five hundred current serials or periodicals. This default value can be changed by the planner. The skilled staff (typists, keyboard operators, clerks) and unskilled staff required for assistance are computed separately as one person for every two professionals. These default values can be adjusted or nullified for each category of staff as needed by the planner.

Among the computed professional staff, 50 percent are assigned to the professional category; the rest to the paraprofessional category. The staffing values are then displayed according to the category of staff.

TECHNI Module

Some of the functions of the technical processing section are identified by this module as classification, cataloging, updating the catalog, shelflist preparation, and releasing recent additions list. The professional staff (including paraprofessionals) required for the technical section is computed as one person for every three thousand documents added in a year. It is assumed that original cataloging is required and that documents are classified using a faceted classification scheme such as Universal Decimal Classification (UDC). This default value can be adjusted by the planner to suit the kind of technical processing work of the particular library (such as those where data are downloaded from OCLC, MARC, etc.). The skilled staff (for typing cards, entering records, etc.) required is computed as one person for every two professionals, including paraprofessionals. The unskilled staff required for the technical section (for pasting labels and preparing the volumes) is computed as one person for every three professionals. These default values can be adjusted by the planner. The skilled and unskilled staff value can be nullified also if needed.

Of the computed professional staff, 60 percent are assigned to the professional category; the rest to the paraprofessional category. The module displays the staffing needs according to the staff category.

MAINTE Module

This module identifies some of the functions of the maintenance section as shelving of newly added, returned, and consulted volumes; maintaining shelf arrangement in the stacks, i.e., shelf rectification and easing, moving volumes as necessary; maintaining gangway, bay, shelf, tier, and plank guides, boards, and labels; renewing old book tags; identifying and sending volumes for binding

or rebinding and repair; verifying continuous stock; and maintaining the interior of the library, including seating arrangements in the reading room and other furniture. The planner is prompted to enter data such as the total number of volumes in stock, the average number of volumes to be replaced on the shelves in a day, and the average number of volumes added in a year, including completed volumes of serials and periodicals. The staff (mainly paraprofessionals) required is computed as one person for every 100,000 volumes in stock; one person for every 200 volumes to be replaced in a day; and one person for every 6,000 volumes newly added in a year. These default values can be changed and if necessary particular computations can be nullified by the planner.

Of the professional staffing needs computed for the stack maintenance section, one person is assigned to the paraprofessional category; the rest, to the paraprofessional or unskilled category as desired by the planner.

This module further prompts the planner to key in the number of seats (20 percent of potential readers) and research cubicles (20 percent of research scholars, R&D staff, and teachers) and computes the unskilled staff as one person for every 1,000 seats (including research cubicles). These default values can be adjusted by the planner. The computed staffing for the maintenance section is then displayed according to the category of staff.

REFERE Module

This module identifies some of the functions of the reference section as initiating newcomers and introducing them to services and resources (library tour); answering ready reference queries; arranging in the "replacement shelf or cart" the returned volumes; helping readers to locate documents and to use other services in the library (reader guidance); maintaining vigilance; and studying shelf, catalog, and reference tools to become familiar with the resources of the library.

The module points out that services other than ready reference service (questions to which answers cannot be found out readily from sources such as dictionaries, encyclopedias, directories, compilations of bibliographies, online/CD-ROM search, SDI, etc.) are not included in the reference module but are included for convenience in the documentation and information services (DAIS) module. Most libraries do not have a separate section for documentation and information services but include these services under the reference section. For such libraries the staffing need computed for the DAIS section must be added to that for the reference section.

The planner is prompted to key in the average number of readers requiring assistance or guidance per day (if he or she desires to include readers' guidance service), the average number of ready reference queries to be handled per day, and the average number of returned volumes to be arranged on the replacement shelf or cart, if this is to be done by the reference staff. The professional staffing is computed as one person for every fifty readers requiring guidance in a day; one person for answering every fifty ready reference queries in a day; and one person for arranging 250 volumes on the replacement shelf. The planner can change the above default values. It is also possible to nullify the functions not needed.

This module then multiplies the computed professional staffing needs by the value of batches to arrive at reference staff needed to work through the open hours of the library, if the planner allows it. The unskilled staff required for the reference section is computed as one person for every four professionals in the reference section. This default value can be adjusted or nullified by the planner. The computed professional staffing need is as such assigned to the professional category and is not subdivided into the paraprofessional category.

The staffing for the reference section is displayed by this module as belonging to the categories (a) professional and (b) unskilled staff.

DAIS Module

This is the largest module in LISPA. It identifies some of the functions of the documentation and information services section as identifying the information needs of each reader and category of readers; developing and updating subject-interest profiles of selected individuals and groups working on projects; developing and maintaining directories of products, processes, experts and specialists, institutions, industries, and other organizations of interest to readers; producing and distributing various information products and publications to meet the readers' needs on demand and in anticipation; and arranging for translations. A list of documentation and information services is then displayed as follows:

- Current-awareness bulletin
- Selective dissemination of information
- Patent-awareness bulletin
- Retrospective bibliography service
- Database, CD-ROM, and online search service
- Notification of new and ongoing research projects, forthcoming conferences, seminars, trade fairs, exhibitions, etc.

- State of the art and trend report service
- Translations service
- New products, processes, and techniques announcement service
- Comparative product and process profile service
- News briefs, clippings, management and digest service
- Environmental scanning service
- In-house database service
- Technical enquiry service
- Referral service

For each of the above, an indication of target audience; size and makeup of text of any publication; periodicity (frequency of publication); and minimum professional staff required for the indicated quantum of work are given. Some of the documentation and information services that are closely related are also mentioned, so that overlapping and irrelevant services can be excluded in selecting the ones required. An example is given below:

Patent Awareness Bulletin Service

Purpose: To disseminate information about relevant new patents and utility models

Audience: Research scientists, R&D staff, design group, diversification manager, and research scholars

Makeup of text: Entries with informative abstracts arranged under suitable subject headings with appropriate indexes, if necessary.

Size: About 100 entries

Periodicity: Bimonthly

Staff Strength: 0.5 professional work-year

Remarks: This service is required if the parent organization of the library is an R&D laboratory, an industry, or a research institution. If current-awareness bulletin or any other regular service covers all the relevant patents, then this service may not be required.

The names of each of the documentation and information services are again displayed so that the planner can select the appropriate ones for the library. For each of the services selected, the professional work-years required, based on a standard quantum of work for the concerned service, is displayed. Manipulation of the computation of the staffing based on change in one or the other parameters affecting the quantum of work has not yet been incorporated in LISPA. However, the default value of professional staffing need for individual services can be adjusted by the planner. The module then displays each of the selected services and the professional staffing required for each. The skilled staff required to assist the professional staff is computed as one person for every two professionals in the DAIS section

to cater to the need for typing and other clerical work involved in the production of information service products. This default value for skilled staff can be adjusted by the planner. The staffing required for the DAIS Section is displayed under the following categories: (a) professional staff; and (b) skilled staff.

SUPERV Module

Some of the functions of the supervision and management section displayed are planning; coordination (between the library and the parent organization, if any); budgeting, finance and accounts; supervision, control, conflict resolution, and personnel management; correspondence; annual report coordination and preparation; stores; and liaison with outside organizations.

The professional staff required for this section is computed as follows:

- Head of library: one professional. If needed, one additional professional for supervising every fifteen other professionals in the library.
- For finance and accounts, correspondence and stores: minimum one skilled staff. If needed, one additional skilled staffmember can be added for each professional in the supervision section.
- Unskilled staff for assistance: Minimum one person, and if needed one additional for every five professionals in the supervision section.

The default values for the above computation of staffing can be adjusted by the planner as needed. The staffing needs required for the supervision section are then displayed under the following categories: (a) professional staff; (b) skilled staff; and (c) unskilled staff.

The SUPERV module then assigns the total professional staff (excluding paraprofessionals) to a senior professional category in such a way that, wherever possible, there is at least one person to head each of the following: supervision and management (i.e., chief librarian), documentation and information services, reference, and technical processing. That is, if there is more than one professional staffmember in each of the above sections (as computed by the respective modules), then one in each is assigned to the senior professional category to head the section. If the computed professional staff value is less than one in any of these sections, then the computed professional staff value is upgraded to the senior professional category for that section.

The total staffing need for the library as computed and assigned to each of the sections is shown in table 2.

LISPA then presents another table of the computed staffing under each category of staff, together with the

Table 2
Staff Required for the Library /Information Center

Section	Sr. Prof	Prof.	Paraprof.	Skilled	Unskilled
Acquisition		1.0		1.0	0.5
Periodicals		1.5	1.5	3.0	1.5
Technical	1.0	1.0	2.0	0.5	
Maintenance			1.0		3.0
Circulation			2.0		3.0
Reference	1.0	1.0			
Documentation	1.0	5.0	6.0		
Supervision	1.0	1.0	3.0		1.0
Total	4.0	10.5	15.0	4.5	9.0

minimum and desirable qualifications and experience, as shown in table 3.

LISPA then indicates that it is necessary to further group the staff within each of the categories (especially the professional category) into a few levels or grades (grade I [entry-level], grade II, etc.) as per salary scales and provide for time-bound or performance-based promotions. It is also helpful to provide for rotation of at least the senior professionals to enable them to have a working knowledge of the different sections of the library. Also, the system indicates that for computation of staffing for future needs (say after three or five years), LISPA should be run with estimated values for the different periods.

Limitations

LISPA does not include the computation of staffing for binding; printing; training of readers (users) and retraining of staff (e.g., for online and CD-ROM search); maintenance of machinery and equipment such as microcomputers, communication networks such as LANs, reader/printers for microforms, audio and video equipment, and photocopiers; or building maintenance. Moreover, no provision has been made in the current version to display in adjacent columns the data keyed in or assumed and the resultant computed staffing for each section categorywise, so that comparison can be easier. To have such a record, any memory-resident "notepad" utility can be used. Modifications made by LISPA users to system defaults are stored only for the duration of the

Table 3
 Staff Required for the Library/Information Center—By Category

Category of staff	Number of persons
<i>Chief of Library/Information center</i> M.A./M.S. + M.L.I.S./A.D.I.S. + 10 years experience (Ph.D desirable)	1.0
<i>Senior professional</i> M.A./M.S. + M.L.I.S./A.D.I.S. + 6 years experience	3.0
<i>Professional</i> M.A./M.S. + M.L.I.S./A.D.I.S. (2 years experience desirable) OR B.A./B.S. + M.L.I.S./A.D.I.S. (3 years experience desirable) OR M.A./M.S. + B.L.I.S./Dip.L.I.S. (4 years experience desirable) OR B.A./B.S. + B.L.I.S./Dip.L.I.S. (5 years experience desirable)	10.5
<i>Paraprofessional</i> Grade 10/12 + one year experience in a library or Certificate in L.I.S.	15.0
<i>Skilled staff</i> Grade 10/12 + Typing/ Stenography/ Accounts	4.5
<i>Unskilled staff</i> (ability to read and write)	9.0

Note: The qualifications and experience given above are those prevailing in India, which may not be acceptable to all.²³ However these can be taken as an indication of the requirements for the different staff categories.

session. Although a session can be rerun without quitting the system, modifications are lost once the user quits LISPA.

Software and Hardware

The programs are written in CBASIC language, with the different modules linked by CHAINing. LISPA will run on any IBM PC/AT or compatible with 512K RAM, a 1.2MB floppy drive using MS-DOS 3.1 and higher. A Visual Basic (Windows) version is under preparation. The modules will be tested and modified in the light of the experience gained. It is hoped that space, equipment, and financial-planning modules will be added later to make LISPA a model for both planning and teaching of planning of libraries.

Availability of LISPA

The present version of LISPA is available for free. Copies can be obtained from F. J. Devadason by sending a 720K floppy in a self-addressed disk mailer with \$5 (US) to cover airmail postage.

Acknowledgments

F. J. Devadason is grateful to Prof. A. Neelameghan for having involved him in the development of a draft plan for the Technical Information Center, Industrial Estate, Guindy, Madras¹⁹; and to Dr. G. Bhattacharyya, Professor, School of Information Science for Africa, Addis Ababa University, Ethiopia, for his encouragement.

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References

1. "An Evaluative Check List for Reviewing a College Library Program," *College & Research Libraries News* 40 (1979): 305-16.
2. ACRL College Library Standards Committee "Standards for College Libraries 1985," *College & Research Libraries News* 46 (1985): 241-52.
3. "ACRL Standards for College Libraries," *College & Research Libraries News* 36 (1975): 275-79, 290-301.
4. "ACRL Standards for University Libraries," *College & Research Libraries News* 40 (1979): 101-10.
5. J. B. Dodd. "The Gap in Standards for Special Libraries," *Library Trends* 31 (1982): 85-91.
6. India, University Grants Commission, Library Committee, *University and College Libraries: Report of the Library Committee of the University Grants Commission* (New Delhi, India: UGC, 1965), 72-73, 180-81, 199.
7. N. Jones and P. Jordan, *Staff Management in Library and Information Work* (Hampshire: Gower, 1982), 68-97.
8. D. Kaser, "Standards for College Libraries," *Library Trends* 31 (1982): 7-19.
9. P. Metz and E. A. Scott, "Proposed Staffing Formula for Virginia's Academic Libraries," *College & Research Libraries* 42 (1981): 127-33.
10. M. Slater, *Ratios of Staff to Users: Implication for Library Information Work and the Potential for Automation* (Aslib Occasional Publication, no. 24) (London: Aslib, 1981), 45-46.
11. "Standards and Guidelines Relating to Academic Libraries," *College & Research Libraries News* 44 (1983): 105-9.
12. D. R. Watkins, "Standards for University Libraries," *Library Trends* 21 (1972): 190-203.
13. F. N. Withers, *Standards for Library Service: An International Survey* (Paris: UNESCO Press, 1974), 60-61.
14. S. R. Ranganathan, "Manpower Analysis," *Annals of the Indian Library Association* 2 (1951-52): 220-32, 285.
15. S. R. Ranganathan and K. M. Sivaraman, *Library Manual* (London: G. Blunt and Sons, 1951), 33-34.
16. S. R. Ranganathan, *Library Administration*, 2d ed. (Bombay, India: Asia Publishing House, 1960), 28-30.
17. A. Neelameghan, *Food Science and Technology Information Service (FOTIS): A Five Year Draft Plan* (Mysore, India: CFTRI, 1973).
18. A. Neelameghan, *Technical Information and Documentation System for Iron and Steel Technology—A Draft Plan* (Bangalore, India: DRTC, 1976).
19. A. Neelameghan. *Technical Information Centre—Industrial Estate, Guindy, Madras: Five Year Development Plan* (Bangalore, India: DRTC, 1972).
20. A. Neelameghan, S. Seetharama, and M. A. Gopinath, "Planning of Library and Documentation Systems: A Model for Central and Regional Units of a System," *Library Science with a Slant to Documentation* 10 (1973): 529-82.
21. Mark Johnston and John Weckert, "Selection Advisor: An Expert System for Collection Development," *Information Technology and Libraries* 9 (1990): 219-25.
22. E. R. Christine, "Paraprofessionals: Plague or Promise?" *Australian Academic and Research Libraries* 5 (1974): 201-5.
23. Jean-Pierre V. M. Herubel, "The Ph.D. Librarian: A Personal Perspective," *College & Research Libraries News* 51 (1990): 626-28.

SPECIAL SECTION

Libraries and Technology in the European Union

Introduction

The International Relations Committee of the Library and Information Technology Association sponsored a program at the American Library Association's Annual Conference in Chicago on June 24, 1995, on the theme "Libraries and Technology in the European Union." The

The Swiss National Library and its Environment

Jean-Frédéric Jauslin

The Swiss National Library, which dates from 1895, initially had the function of collecting Helvetica; later the construction of a union catalog and the creation of a central information service were added to its responsibilities. It achieved much success, but from the 1970s reduced funds and a lack of foresight severely eroded its outstanding role. Following the appointment of a new director in 1990, a team of experts in information and technology was formed, a general review of the library's strengths and weaknesses was carried out, and an automation program was begun. A new policy has had to be defined for the role of a national library in a federal state. It is proposed that the library's responsibilities should include all kinds of informa-

Jean-Frédéric Jauslin has been Director of the Swiss National Library since March 1, 1990. He received a scientific education and graduated from the University of Neuchâtel with degrees in mathematics and computer science. In 1984 he submitted a doctoral thesis on user-friendly retrieval systems to the Swiss Federal Institute for Technology in Zurich. Following this, he entered private industry, where he headed the data processing department of a large insurance company for four years. The Swiss government then invited him to undertake the task of reorganizing the Swiss National Library.

three papers presented at that session provide different views of the role of technology in libraries in the European community, first from the perspective of the director of the Swiss National Library, who examines the environment in that country; second, from the director of the National Bibliographic Service of the British Library, who comments

tion resources and give equal attention to conservation and the provision of services, the latter particularly as an information center for material of Swiss interest. Greatly increased funds and staff are being sought. A new law relating to the National Library that defines its collection policy and prescribes its bibliographic services was passed by the Parliament in 1992. These developments should enable the library to regain a prominent position and lead to a national coordination plan for Swiss libraries. The National Library will seek solutions to the problems posed by multilingualism and national coordination. It will also look for cooperation with other national libraries in Europe and throughout the world.

History

The Swiss National Library was officially opened by the federal government in 1895. The library was entrusted with the responsibility (made law in 1911) of collecting Helvetica produced after 1848, the year of the country's last constitution, and making it available to the public. "Helvetica" refers to any literature produced in Switzerland, written by Swiss authors, or published about Switzerland. Before 1894, Swiss literature was collected by various establishments around the country. In 1928 the National Library was also assigned the responsibility of drawing up a union catalog, with the aim of creating a central information service to meet the exchange needs of libraries. It also

on networking and cooperation there; and third, from an ALA Library Fellow in Greece, who shares the trials and tribulations of the search for solutions to the mysteries of the online catalog in the shadows of the Acropolis.

meant that any foreign works in Switzerland's libraries could be rapidly located. With this sort of database, it was easy to set up an inter-library lending system.

From the 1970s onwards, unfortunately, the precarious financial situation of the federal government, on which the library depended, forced it to cut back its services sharply. Drastic budget reductions, a strict freeze on personnel, an inefficient global strategy, and a total failure to anticipate the age of information technology led to a disastrous situation. The smooth and harmonious development previously enjoyed by the institution ground to a complete halt. As the National Library let itself fall further and further behind the other libraries in the country, its role as a leader rapidly eroded.

In 1989, during a period of comprehensive restructuring, the Federal Ministry of the Interior decided to merge its cultural offices. As a consequence, the Swiss National Museum, the National Library, and the Office for the Promotion of Culture were combined to form the present Federal Office of Culture. It was the ideal occasion, therefore, for an in-depth reevaluation of the federal government's cultural objectives. It should be pointed out here that, since Switzerland is a federal state, culture is primarily a cantonal matter. The central government, therefore, only performs a subsidiary role in this sector.

Urgently Needed Reorganization

How should the National Library be reorganized? That, in a nutshell, was the mandate the director was given soon after he took up his post at the beginning of 1990. The very first step was to form a team of experts in the modern world of information technology. With Switzerland's limited job market in the areas of library science and information technology, however, obtaining new staff proved to be very difficult, so overcoming this first, important hurdle was no easy task. Work began in August 1990 and consisted of making a general survey of the library's merits and deficiencies, examining the numerous documents already written on the subject, and contacting several institutions both in Switzerland and abroad to see what sort of collaborations could be created.

The National Library's financial circumstances clearly represented the most critical factor. With regard to the funds allocated for training, travel expenses, conservation of collections, work delegated to experts, and public activities—to name just the most important—the situation was truly catastrophic. The predicament was just as serious as far as personnel were concerned: during the previous twelve years, while there had been no staff increase—in fact, the numbers had declined—the workload had constantly increased, and no investment had ever been made for a more rational management of the library. Worse still, national projects falling within the jurisdiction of the National Library (the catalog of foreign periodicals, for example) had only been launched thanks to the goodwill of a few interested employees; and outside organizations guaranteed the financing and continuation of these projects. Finally, all processes were entirely manual; there was no computer equipment whatever to proc-

ess the approximately 2.8 million documents and the 5 million bibliographic entries in the union catalog!

As far as contacts within Switzerland were concerned, the level of confidence expressed by the various establishments that should have benefited from the library's services could not have been lower. Every external organization that had agreed to participate in one or another of the National Library's new projects had to be remotivated. And it has to be admitted that, on several occasions over the past few years, the library could not fulfill its engagements. There were also serious deficiencies in its international role: apart from brief contacts with German-speaking libraries, the National Library was conspicuous only by its absence.

Profile of the New National Library

The given mandate is more than simply automation of the National Library. It calls for the definition of a new policy by specifying the functions of a national institution within a federal state. The reorganization project, begun in August 1990, was christened RAMSES (Reorganization for an Automated Management System and Enhanced Services). Particular emphasis has been laid on improvements to the library's services and its ability to equip itself with modern tools and techniques. It is with this end in mind that a working group, consisting of former library staff and reinforced by newcomers from different professional backgrounds, has studied the mandate, examined various proposals, and incorporated its own ideas.

This is how the National Library sees its new role. First and foremost, it must be entrusted with a public-service mission like any official institution. This will affect all its activities in the areas of history, culture,

and society, and will naturally embrace the important function of providing services. Its collections will include all kinds of information resources, both traditional and modern; material coming into the library will undergo four kinds of operation. It will be

- collected,
- classified,
- stored, and
- made available.

These four operations will serve two distinct objectives: conservation and provision of services.

These two objectives—the systematic conservation of collections and the guaranteeing of efficient services—are of equal importance but difficult to reconcile in any library. However, with the right approach, this dual objective can be achieved in spite of its inherent contradiction. Although the National Library is confronted with the same potential conflict, it is essential that it should give equal priority to these two functions in the future. Traditionally, the National Library has always been a lending library: its collections are available to the public in its reading room, and it sends documents directly to other institutions and private individuals. This practice is particularly strange because it has no legal deposit and possesses only one copy of what has been published in the country. This dilemma should be solved by the introduction of a legal deposit law on the national level.

The future National Library must envision itself as an information center for Switzerland's documentary heritage. It will also coordinate the conservation and classification of all media (Helvetica in the broad sense of the term). Furthermore, it will serve as a national and international center for all information held in Switzerland. Those using its services will include other institutions (libraries, multimedia libraries, archives, etc.) as well as scientific researchers

and the general public. In this way it will fulfill its role as the primary information center for Helvetica.

A total revision of the 1911 law was submitted by the government and accepted unanimously by the Parliament in 1992. This bill takes into account developments in data processing and provides a more precise definition of the coordinating role to be entrusted to the National Library.

The different areas of development described below summarize the National Library's new objectives.

Development and Conservation of the Collections

First of all, the National Library wants to cover all Swiss publications. Acquisition policy has been revised so that it is no longer limited to printed matter but includes all types of modern information resources—on the condition, though, that the media are produced and made available in several copies. Nevertheless, the National Library reserves the right to delegate the management of some media to specialized multimedia libraries while ensuring the coordination of their conservation. The National Library actively participates in a national project to conserve Swiss library collections by a mass deacidification system; the equipment, which will be made available to all institutions, will enable the National Library to restore its own collections. The National Library will also concentrate on methods for preserving collections and will adopt new storage technologies for conserving books and periodicals.

Developing Services

In order to automate the management of the collections, the Swiss National Library has introduced an integrated system for all internal op-

erations (acquisition, lending, cataloging, etc.) so that it can give the public direct access to its catalogs from anywhere in the country or abroad and establish an automated national bibliography as soon as possible. This new system must standardize the classification of, and access to, the cultural heritage on a national level. Moreover, access by subject to bibliographic data will be provided through a quadrilingual index (German, French, Italian, and English).

To maintain and develop the concept of service to the nation as a whole, all current lending methods, including lending by mail, will be maintained and improved. The National Library will concentrate on using new methods of information diffusion (electronic distribution systems, fax, or network access to document content stored on electronic devices).

To meet the needs of libraries and multimedia collections and their users, the National Library will establish a bibliographic information service with a union catalog covering all the sources of information in Switzerland (Swiss and foreign, books and non-books). Of course, production of bibliographies and specialized catalogs (Swiss history, literature from the German-, French-, Italian-, and Romansch-speaking regions of Switzerland, etc.) will be continued, using new reproduction technologies.

In 1992 the construction of underground stores in the vicinity of the library began; these will be in use by 1996. Alterations to the administrative offices and public rooms are also under way and will be completed by the end of the decade.

A Few Uniquely Swiss Characteristics

Legal Deposit

Unlike most western nations, Swit-

zerland does not have a national legal deposit law. Some of the cantons have such laws on a regional level, but there is no uniform system throughout the country. Without a national legal basis, the National Library has had to negotiate individual agreements to obtain a copy of each publication. This complicated procedure has sometimes put it in a difficult position, particularly when faced with a publisher who is reluctant to give away a copy of his product: should the National Library purchase a copy and, in doing so, favor a publisher who is unwilling to cooperate, or would it be preferable not to acquire his product, even though it would mean failing to fulfill the library's conservation mandate? A first attempt to include legal deposit in the new National Library law failed during the revision of the law in 1993. Although concerned professional groups were consulted and publishers, booksellers, and distributors reacted positively to the proposal, this topic had to be omitted from the new law. It seemed that there was an insufficient constitutional basis for putting this proposal into law immediately. However, the Parliament has asked the government to study possible ways for introducing a legal deposit in Switzerland and to make a decision on the matter during the next few months.

Multilingualism

A unique characteristic of Switzerland is that there are four national languages, which, in order of use, are German, French, Italian and Romansch. To these, of course, English should be added, since it has become the most widely used language in business and scientific circles. What usually happens in oral communication is that everyone speaks their own language, assuming that listeners understand enough of it to be

able to follow the conversation. However, an altogether different situation exists for written exchanges, as letters are answered in the same language they are received in. This creates a huge administrative burden throughout the country and necessitates the use of numerous translators. The circumstances are somewhat different for librarians, however, because almost every library has chosen one language for dealing with its collections. This means that indexing is done in German in the German-speaking regions and in French in the French-speaking ones. A document in any given language is indexed differently in the four linguistic regions. One would have expected the National Library to have lost no time in tackling the problem of thesaurus and multilingual cataloging, but here again it was not up to the task: Switzerland's bibliographic databases have been developed among the various languages in a totally uncoordinated manner. This is all the more regrettable as users are tending to turn more and more often to databases that are not actually located in their region. We feel that it is the National Library's responsibility to deal with this problem—not to develop a new system, but to recommend a single and clear option for each language. It is absolutely vital to find solutions for establishing direct and unique links between the indexing terms of the different national languages.

National Coordination

Restructuring the National Library is also part of a much larger plan to coordinate libraries on a national level. The above-mentioned activities represent a first phase that, once the National Library has regained a prominent position, should automatically lead to the introduction of a national coordination plan. The

main objective is to work out a coordinated information management policy in Switzerland for the medium and long term. Particular attention has been focused on the convergence of automated library management systems, the definition of a coherent system, and the problems involved in setting up such a system. It should be remembered that the restructuring of the National Library is taking place at the same time as serious reflection on the future of computer systems developed in Switzerland. Recent budget cuts have induced us to look for the most economical global strategy possible while maintaining and improving the high level of service provided by the country's six thousand libraries.

Proposal for a Swiss Information Network

In 1994 the National Library received from the federal government the mandate to develop a concept for a coherent network connecting every library in the country. At the beginning of 1995, the project leader, Genevieve Clavel, was able to present a study for a Swiss library network and union catalog. The two main objectives of this project are:

- to improve user access to information in Switzerland, taking into account current developments in access to and delivery of information, and
- to rationalize the work necessary to make available such information by working on a national level to improve cooperation among libraries in the fields of cataloging, indexing, and provision of user services.

In order to achieve these goals, the following proposals have been developed:

- To simplify user access to and

searching in existing and future heterogeneous online catalogs inside and outside Switzerland by facilitating and encouraging institutions to make their catalogs available via networking and adopting international standards for the searching and retrieval of data (e.g., SR/Z39.50). It is proposed to use SWITCH as the Swiss platform to international networks (Internet);

- To facilitate user searching of and access to homogeneous bibliographic information in Switzerland by creating an online national union catalog containing information about documents located in Switzerland no matter what form they are in (print, sound, image, electronic data, multimedia), and by introducing centralized authority control;
- To rationalize cataloging and indexing nationally by encouraging copy and shared cataloging and indexing in a central database;
- To enable wide participation in the union catalog by permitting centralized cataloging and downloading or local cataloging and uploading, subject to the use of the national authority files;
- To ensure improved document delivery to the end user by developing union catalog functions of interlibrary loan and document delivery in cooperation with existing functions in Swiss libraries to offer online ordering facilities for professional library staff or the end user combined with a fast and efficient document delivery service;
- To extend current services of access to information by facilitating access to databases outside Switzerland and to extend document provision by subsequently offering files of abstracts, indexes, tables of contents, and ultimately online access to full text and images;

- To improve communication among library and information services in Switzerland by the creation and maintenance of electronic mail lists on library topics, the provision of clearinghouses for information, the creation of coordination services, and the provision of documentation;
- To respect international standards in the fields of library science and computing in order to facilitate connectivity and exchanges of data within Switzerland and abroad;
- To provide guidelines to libraries and documentation centers concerning system platforms (hardware and software);
- To take into account the place of Swiss libraries and documentation centers within the context of other institutions and services in Switzerland and abroad;

Libraries and Technology in the European Union: Soldering the Connections

Stuart Ede

The United Kingdom is capitalizing on its strong links with both Europe and the English-speaking world to participate in multinational research-and-development projects that should facilitate the connections between the two communities and overcome the linguistic, cultural, and technical barriers to information flow. Thus the British Library is leading the Computerized Bibliographic Record Actions (CoBRA) initiative to stimulate cooperative research projects with other European national libraries and organizations active in the bibliographic arena under the auspices of the European Commission. Key projects that will promote

- To study at a national level questions of copyright arising from new services to libraries and to end users;
- To consider additional areas of long-term cooperation arising from the development of a national union catalog.

This study is now under review and has already encountered different reactions. Some groups are very positive; others, mainly Swiss-German university libraries, remain skeptical about the necessity of such an investment.

Conclusion

It is quite clear that the Swiss National Library is embarking on a long period of reflection and renewal and has a long way to go be-

the international exchange of bibliographic information are identified.

Participation in transatlantic programs such as the Anglo-American Authority File and MARC format harmonization are bringing the United Kingdom and North America closer together, which in turn narrows the gap between North America and continental Europe. International access to electronic documents will be the next growth area, and some British Library projects to realize the digital library are highlighted to illustrate the potential benefits to international scholarship.

There has been much hyperbole about networking breaking down international barriers, and one can point to a fair number of examples, but simply connecting to the global information superhighway in its present and future manifestations is not enough in itself. There are many other barriers—practical, cultural, and linguistic—that must be dismantled or

fore it can claim to have fulfilled its new role. One thing is certain, though: the reorganization of the National Library is set firmly on the future. The strongest effort will be made to catch up in the field of automation, an area in which the National Library has fallen far behind. The big question in Switzerland today is whether the country will join the European Community in the near future or whether it will continue to pursue its isolated existence. This is not the occasion to discuss this question, but as far as information processing is concerned, the decision has already been made. The new National Library will continue its reorganization in a spirit of open-mindedness and cooperation with its partners. The Swiss government is firmly committed to the project and has given it top priority in the program for the next parliamentary term.

circumvented before dialogue can thrive and we can make a quantum leap in expanding the interchange between nations. There are also more links that have to be forged than telecommunications interconnections. The aim of this paper is to give an indication of the activity going on to span the divide between libraries within the European Union (EU) and between the EU and North America.

The EU has been concerned for several years that it could be left behind in the information society. Its

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diverse association of nation states with their different languages, cultures, governmental systems and institutions means that, unless conscious action is taken, it will remain as a loose collection of small information markets whose development is slow and which are prey to domination from outside forces. In the same way that customs barriers have been removed between EU countries to create a single market, the aim is to create a single information market, a market that has the critical mass to stimulate and sustain development. Such a market would be of similar size to that in the United States, which provides a powerful example of the synergy between technology and information and of the paramount role that information plays in innovation and wealth creation.

The European Libraries Programme

To realize the aim of a single information market, the European Commission has funded a series of research programs in the area of "Telematics," which covers telecommunications, computer hardware and software, translation systems (a major goal for a multilingual society), and information. Libraries were recognized as key repositories of information that could form the nodes of the information society; they could make their contents much more accessible, thus stimulating the demand for, and the application of, information to the solution of social problems in education and learning and for innovation. The commission therefore created the European Libraries Programme as part of its much larger Framework Programme for Research & Technological Development. The European Libraries Programme is a scheme whereby libraries and other players in the information market are invited to submit proposals to carry

out research, undertake feasibility studies, or develop demonstrator and pilot projects. Commission funding must for the most part be matched by the partners participating in the projects.

The Programme was divided into four action lines:

- **Action line I:** Computerized bibliographies
- **Action line II:** International interconnection of systems
- **Action line III:** Provision of new library services using information and communication technologies
- **Action line IV:** Stimulation of a European market in telematics products and services for libraries

Cross-boundary partnerships are an essential element of the program, and proposers are strongly encouraged to include institutions from European countries with less well developed information services. Since most of these are clustered around the Mediterranean, this policy has been very popular among the more favored nations in the colder north of the continent.

Despite quite modest funding, the program, which has been running since 1991, has stimulated a lot of activity. Over fifty projects have been completed or are in progress. They cover a diverse range including distance learning, document delivery, multilingual access, transliteration, search and retrieve protocols (better known in the United States as Z39.50), electronic data interchange (EDI), SGML and full-text access, intelligent character recognition in retrospective conversion, image systems, multimedia, voice-recognition in searching, and conversion between national MARC formats. The application areas ranged from Venetian heraldry and incunabula to music and services to the disabled. It would be impossible in a paper of this length to survey

them all, so this paper will concentrate on those designed to promote the interchange of bibliographic data across national boundaries. An apparent bias towards projects involving the British Library reflects not merely the author's organizational allegiance but also the high-profile role that the library is taking in this sphere.

European National Libraries CD-ROM Project

The European National Libraries CD-ROM Project¹ is worthy of mention, because it was one of three pathfinder projects to prepare for the Libraries Programme. The national libraries of Germany, France, Portugal, Italy, Denmark, the Netherlands, and the United Kingdom aimed to promote the exchange of bibliographic data across national boundaries. While in 1990 CD-ROM was seen as the medium to develop—and which is still very relevant—the results can be applied to networked solutions as well. The project delivered a draft specification for a "standard" retrieval interface, created a concordance of key terms in ten languages for a multilingual search interface, produced a pilot disc with national bibliographic data from four countries, demonstrated a prototype PC-based converter, developed prototype software to link CD-ROM and online versions of the same database, evaluated CD-ROM authoring systems, and drafted guidelines and standard conditions for CD-ROM sales contracts.

The project spawned three further projects. The first was UseMARC-CON, led by the Royal Library of the Netherlands, to develop a generic PC-based converter for translating between MARC formats, into which conversion tables could simply be loaded. The need for this is clear: Ten different MARC formats are in use in

the European Union. To be able to convert records from other national bibliographies to a local format would greatly improve the use of bibliographic data in Europe. Of course, one does not have to be limited to European formats; such a converter would be of immense use around the world. UNIMARC was chosen as the intermediate format. The project is due to be completed in 1996.

The other projects stimulated by the European National Libraries CD-ROM Project are being pursued under the CoBRA Initiative.

The CoBRA Initiative

In 1993 the commission became concerned that few proposals were coming forward from national libraries. The reason for this was simple: the six partners in the European National Libraries CD-ROM Project were heavily committed in that project, and experience had made them wary of the burdens of project management under the structure imposed by the commission. However, the project had established a rapport between the partners, shown that they could work together well, and indicated what could be achieved for the future by closer cooperation. So when the commission asked the British Library to lead a concerted action—a forum to bring together potential partners and stimulate the development of project proposals—it received an enthusiastic response. The Conference of European National Librarians endorsed the initiative and provided the members of the CoBRA Forum to steer it.

Four task groups were set up to develop ideas for projects and studies. Those projects that passed the vetting procedures of the Forum and were approved for funding by the Commission were:

- Two studies on the technical and

legal aspects of extending legal deposit legislation to electronic publications

- A study of the application of UNIMARC to multilingual databases using the Consortium of European Research Libraries database as a test-bed
- A study of bibliographic data and service provision in Europe in order to develop models that take account of new and emerging technologies to forge links between national libraries, publishers, and commercial bibliographic agencies
- FLEX—file labeling and naming for file transfer
- AUTHOR—to investigate the feasibility of a European name authority network
- CHASE—feasibility tests for migration to the new UNICODE/ISO10646 character set standard

Meanwhile, CoBRA has turned its attention to planning the next round of projects. The commission launched its Fourth Framework Programme last year, and the deadline for the first call for proposals in the area of libraries fell on June 15, 1996. The Telematics for Libraries chapter has three action lines:

Action line I: Network-oriented internal library systems—designed to ensure that libraries are better placed to offer network-based services

Action line II: Telematic applications for interconnected library services—designed to improve cooperation, resource development, and resource sharing among libraries and to encourage the shift from collection- to access-based services through interconnections between libraries, suppliers, and publishers

Action line III: Library services for access to networked information resources—designed to build on and extend information resources

and services mediated and delivered by libraries

The CoBRA task groups formed to develop proposals for this and later calls have come up with some interesting ideas that, it is hoped, will meet with a favorable response from the commission. They concern:

- Bibliographic control of electronic publications by creating a direct link between publishers and national bibliographic agencies
- Retrospective error correction in large databases
- Two projects on the further development of user interfaces to smooth the differences between catalogs and databases (such as formats and cataloging codes), eliminating multiple hits and presenting search results in a uniform way; associated document delivery will benefit from the Group on Electronic Document Interchange (GEDI) standard and Open Systems Interconnection (OSI) ILL protocols
- A multilingual subject thesaurus and linked authority files

The last two proposals are seen as working toward a concept that is gaining increasing interest: the Virtual European Research Library.

The Transatlantic Connection

All this activity between nations of the European Union might give the impression of being introspective, but the sheer magnetism and dynamism of the North American scene as well as historical, cultural, and economic links make it inevitable that Europe work with its neighbors on the other side of the Atlantic. In that regard, the United Kingdom is well placed as one of the two English-speaking members of the union

and a long-standing partner in many forms of transatlantic cooperation (e.g., the *Anglo-American Cataloguing Rules*, second edition [AACR2]) to act as the solder in the connection.

Format Harmonization

Differences among MARC formats have been less of a barrier to cooperation among the United States, Canada, and the United Kingdom than they have in Europe. The closely linked publishing activities of the English-speaking world have necessitated that solutions be found, and the British Library and Library of Congress have exchanged, converted, and distributed each other's records for many years. However, these differences still impose a delay and a constraint to the free flow of information on the information superhighway. So the British Library, the National Library of Canada, and the Library of Congress have begun discussions to explore the feasibility of harmonizing USMARC, UKMARC, and CANMARC.

The idea of harmonizing was originally seen as a very desirable spin-off from the more radical aim of simplifying MARC. The British Library, in particular, in grappling with the apparently insoluble problem of resolving the issues of constrained resources, increased publishing volumes, and demand for more information content in records, was keen to explore the feasibility of simplifying the UKMARC format. The MARC format was designed in the 1960s when catalogs were linear sequences of records in card or printed form, which strongly influenced its design. Filing is now less important in the OPAC environment. Moreover the dramatic increases in computing power should allow one to rely on sophisticated search capabilities and less on the structure of the record to retrieve the records one needs.

By reducing the intellectual effort required to create records, it is hoped that resources will be released to improve record content and other more useful activities. This would, of course, apply to all libraries—not just the British Library. However, UKMARC is closely linked to AACR2, and to change one could entail changes in the other. Moreover, if other national libraries were of the same mind and the simplification could be pursued in tandem, the opportunity would exist to eliminate some or all of the differences in formats and promote the interchange of records.

With some trepidation, the British Library convened a workshop of key cataloging decision makers in November 1992 called "Standards—Back to the Future?" to gauge the mood for change.² There was a surprising appetite for change, because simplification would potentially deliver savings to the entire library and information community. This gave the British Library the confidence to explore the willingness of the Library of Congress, where an enthusiastic echo was received.

However, the recent format integration process in USMARC meant that a period of relative calm was needed before launching into major changes of this nature. Thus it was agreed that harmonization would take precedence, and simplification would be pursued as a second stage. Tripartite discussions were initiated, to which the National Library of Canada was invited. At present, working groups are investigating the scope and feasibility of change and issues such as governance. It is hoped that proposals can be brought forward for discussion during the early part of 1996.

The importance to libraries and systems suppliers in particular of changing the format is fully appreciated, and so consultation with the community is seen as crucial to the acceptance and success of the pro-

gram. Even if the principles are accepted as desirable, the cost implications of the change will have to be thoroughly investigated before harmonization can be embarked upon. One possible outcome is that the cost of change outweighs the long-term benefits. Even in this scenario, it may be possible to reap some rewards in working closer together. For instance, unique fields in each national format could be adopted by the others to avoid duplication of effort and incompatibilities. Personally, the author hopes that harmonization can go a lot further than that.

UNIMARC

Readers might be asking themselves whether we do not already have a common international MARC format in UNIMARC. And they would be right. Unfortunately, UNIMARC has not established itself as firmly as had been hoped. For one thing, the major nations had already invested too much in their national formats to make such a radical change. Secondly, UNIMARC offered too many options, which led to incompatibilities even where countries adopted UNIMARC as the basis of their national formats. Some national libraries, like the Library of Congress and the Deutsche Bibliothek, do convert their records into UNIMARC for distribution outside their countries, but this practice has not been widespread, since there have been other barriers to exchange.

This situation is changing. The European Commission is now encouraging the use of UNIMARC in Europe, and it has been the standard format for several EC-funded projects such as the European Register of Microform Masters. Nevertheless, economics and the flow of trade in bibliographic records mean that there will probably remain two main axes of international communication: the Anglo-American MARC

family and UNIMARC. However, provided that there is convergence within both families and that there is a means of converting between them by employing readily available and easy-to-use software such as that being developed in the UseMARCON project, the market in bibliographic records can still flourish.

Name and Subject Authorities

Format harmonization is just one aspect of promoting the interchange of records. The establishment of the same forms of names in each country will make sharing data easier. The Anglo-American Authority File is a major step in this direction. A surprising indicator of the importance with which this is viewed outside the library community is its recent discussion in a lead article in the *Times* newspaper.³ The British Library and National Library of Canada are already contributing records to the Library of Congress file, and work on resolving format differences and setting up the technological infrastructure continues, so that a truly multinational authority file is only months away.

But what about name authority control in Europe? Wouldn't it be nice if authoritative headings for those tricky foreign names could be left to the countries of origin? The AUTHOR feasibility study under the CoBRA initiative is addressing this question. Two scenarios are envisioned: either a merged file, perhaps on CD-ROM, or a networked solution whereby each of the participants mounts a UNIMARC version of its authority file on a server, and a common search interface allows them to be searched easily. Of course, there will be many problems to overcome—not least of which being the differing rules on the construction of headings—but it is to be hoped that ways around them can be

found so that the cataloger's burden can be eased by having authoritative headings at his or her fingertips.

Subject access is another area of incompatibility between nations. First there is the language and then there are the different schemes employed. No doubt U.S. librarians will welcome the decision last year by the British Library not only to reinstate usage of Library of Congress Subject Headings (LCSH) in the British National Bibliography from January 1996. These were cut in 1987 as an economy measure. Now the library has gone further and adopted LCSH as the strategic subject headings scheme for all its major collections. Obviously, the reader would not expect the British to accept the idiosyncrasies of American spelling, so a Queen's English version will evolve! To reflect its commitment, the library has joined SACO, the Subject Cooperative Program, and has begun contributing new subject terms to LCSH. The library's first candidate term was Rave Culture—possibly a comment on modern British culture?

While LCSH in translated form is in use in some parts of Europe, it would be too much to expect all European national libraries to follow Britain in adopting LCSH. However, help could be at hand. One of the proposals going forward under the latest call for proposals from the European Commission is to develop a multilingual subject thesaurus (MULIS) that would enable users to search foreign OPACs using their own familiar subject scheme. It is a very ambitious proposal, and it remains to be seen whether it will secure funding, but it is certainly a worthwhile aim that would not only benefit European countries but also stimulate access between Europe, North America, and other countries using LCSH, since LCSH is one of the target subject systems alongside the French RAMEAU (*Répertoire d'Autorité Matière Encyclopédique*

et Alphabétique Unifié), the German SWD (*Schlagwortnormdatei*), and the Dutch NB (*Nederlandse Basisclassificatie*).

The Digital Library

Because of the difficulty of encompassing the full scope of activity in a brief paper, attention has been focused so far on bibliographic records. However, the work going on to create the digital library should not go unmentioned, since this will be the next growth area of international cooperation.

France and Norway have extended their legal deposit legislation to cover electronic texts, the British Library is developing a proposal to the government to amend the law, and several other countries are at various stages in moving toward this goal; hence the CoBRA studies mentioned earlier regarding the legal and technical aspects of bibliographic control, storage, preservation, and access aspects of electronic documents. Access is the most political issue, particularly reaching agreement with publishers on services to remote users.

Meanwhile, the retrospective digitization of documents is beginning to gather momentum. The Bibliothèque Nationale de France is digitizing a substantial volume of documents to be ready for the opening of its new building. The British Library has made one of its strategic objectives for the year 2000 the creation of a digital collection and has invested over \$3 million in its "Initiatives for Access" program.⁴ A prime example that underlines the possibilities for international scholarship created by digitization projects is the Beowulf manuscript. The scanning of this Anglo Saxon manuscript made it possible for scholars at the University of Kentucky who are collaborating on the project to study the text remotely. Moreover, it

opened up a whole new strand of research. By scanning at different wavelengths of light, researchers could discover corrections, find what had been lost under stains and erasures, and even read the charred edges caused when the eleventh-century manuscript was damaged in a fire in 1731. Pages are mounted on the library's Othello server.

Digitizing the library's other treasures, such as the Lindisfarne Gospels and Sforza Hours, has begun. Through digitization, the library can reach a far wider audience than ever before, reaching out into universities, schools, the home, and the workplace. Early examples are the *Mediaeval Realms and Inventors and Inventions* CD-ROMs aimed at the school market to support national curriculum studies. Eventually, as schools become more networked, retrieval from servers will become more the norm. A trial electronic photo viewing service covering ten thousand of the library's collection of photographic slides is being evaluated. Readers such as authors and the media are able to scan the collection of high-quality Photo CD images, select the ones they want, and edit them to meet their needs. The key to success is the indexing, which is labor intensive,

A Library Fellow In Greece

Paul Frantz

Occasionally, as I sat at my desk in the main reading room of the Library of the Greek Parliament in Athens, I was reminded that it was not just another library. One mid-afternoon, when a colleague and I were the only people in the reading room, a man entered with a large golden retriever on a leash. The man was not carrying

so software was chosen that would ease that burden.

Digitization has a lot to offer for preservation. Decaying microfilms of the Burney Collection of newspapers are being scanned through the Digitisation of Ageing Microfilm Project (DAMP). Not only have they now received a new lease of life, but they can in future be made much more widely accessible.

To put the seal (literally) on this brief survey of the digital library, mention should be made of the use of the Excalibur PIXTEX software developed in the United States to provide access to the library's printed catalogs, in this case the Catalogue of Seals. The pages are scanned as images and by intelligent character recognition. Fuzzy logic overcomes the shortcomings of character recognition by choosing close as well as exact matches to the search term entered by the reader. These are then displayed highlighted on the image of the catalog page. This is a potentially cheap alternative to retrospective conversion.

The recent announcement by the Library of Congress and major U.S. research libraries of the National Digital Library program excited considerable interest in the United Kingdom. If this can be linked with

a white cane, so I assumed the two were out for a stroll and had somehow wandered into the Library of Parliament during their walk. The dog padded around the room, sniffing in all the corners, its claws scuttling on the wood floor.

"What is that dog doing?" I asked my colleague.

"He is finding bombs," she replied.

"Really?"

"Perhaps not finding them, but smelling them, if they are here."

"Is that necessary?" I asked.

similar initiatives in Europe, then the prospects for a quantum leap in international scholarship look very encouraging.

Conclusion

There is considerable technological development going on in the European Union, and it is possible to give only the merest indication of the scope in a paper such as this. Much of the technology itself will not be novel to North American readers, but its application in breaking down national barriers to the exchange of information is worthy of attention, because that will benefit all of us in the future.

References

1. "National Libraries Project on CD-ROM: Final Report," The British Library, Nov. 1993.
2. "Standards—Back to the Future?" Workshop on the Future of Bibliographic Standards: Papers. Boston Spa: British Library. National Bibliographic Services, 1993.
3. "What's in a Catalog?" *The Times* (London), May 30, 1994.
4. *For Scholarship, Research, and Innovation: Strategic Objectives for the Year 2000*. London: British Library, 1993.

"There are terrorist groups in Greece, you know." My coworker found my curiosity intriguing. "You do not have such dogs in your own library, where you work?"

I thought of the Knight Library at the University of Oregon, the silence of the ranges upon ranges of book shelves, the chatter of the computer stations in the reference area.

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"Not yet," I replied.

"It is a lovely dog, isn't it?" my colleague said. "They are specially trained."

Since that fall afternoon, one or another of the cadre of bomb-sniffing dogs often returned to the library's reading room. It would be on a leash, its owner, whom I learned was a plain-clothes security agent, looking slightly bored, as if he were an ordinary citizen waiting in the park for his dog to find a lightpole. The dog would always ignore my corner of the room, my desk, my books, my papers, my briefcase. I must be lacking in sulphurous content, I thought, somewhat disappointed.

It was in this Library of the Greek Parliament in Athens, Greece, that I worked as an American Library Association Library Fellow during the 1993-94 academic year. And from a window of this reading room of the library, I could gaze out over Syntagma Square, over the Plaka district of Athens with its hotels, tavernas, and souvenir shops, to the glory of the city, the Acropolis and the ruins of the Parthenon.

Then I would return to my desk and wonder what to do next. I wondered often during my nine months at work in the library, and the reading room was a wonderful place in which to do it. A room of moderate dimensions, approximately sixty feet by forty, with two half-floors of shelving and a slim, elegant balcony giving access to the upper half-floor, it was given over to a collection of the Greek classics. Its shelves were filled with editions in most of the European languages of Plato, Aristotle, Homer, the Greek tragedians and historians. If I felt bored, I could reach for that supreme storyteller, Homer; if I needed background on classification, I could read the original cataloger, Aristotle.

"Do the members of Parliament ever read these classical authors?" I asked one of my coworkers at the

library, after I had been at work several weeks and noticed that no one seemed to make any use of the reading room's collection.

"Occasionally."

"I have never seen them used," I persisted.

"Sometimes the members of Parliament, or a scholar, will consult them," said my colleague, patiently.

"Might I ask why they are here, if they are so seldom used?"

"They represent Greece," she said.

The project that I undertook for the Library of Parliament seemed a good fit for my public services experience. According to the official project description, I was to "advise the staff of the Parliamentary Library in Athens, Greece, on the development and use of an electronic research/reference service." I was also to work on "the development of networking and online linkages." On paper, the project looked manageable and appropriate to my skills. But it had a major problem, as I would soon learn.

One morning, I was discussing the reference project with a member of the staff, who had been assigned as my assistant.

"I need help assembling a reference collection for this library, and I need big help in getting Greek-language materials for it."

"You do not know Greek?"

"Hardly at all. I don't speak it, and I don't read it. I need someone who can locate the most useful Greek-language reference sources. I need someone who can go to the various government ministries and pry out of their hands whatever publications we think would be useful."

"And by reference sources you mean . . . ?" asked Aspasia.

"They're what we refer to when we need answers to questions," I said.

This did not seem to help. "Questions?"

"Yes, questions. When you want to

know something, you ask a question."

"I know what questions are," said Aspasia, "but what I don't know is the kind of questions that would be asked in this library."

"Let's imagine a situation," I said, "where the Deputies of Parliament need more information about some legislation they are considering, some background information that would help them make decisions in the wording of the legislation, for instance." The Deputies are the elected legislators of Greece, the equivalent of the members of Congress sitting in our House of Representatives in Washington, D.C.

As I talked with Aspasia, I had in mind a reference function for the Library of Parliament similar to the Congressional Research Service of the Library of Congress, whose staff provides reference assistance to the members of Congress and to their staffs.

"I see," said Aspasia. "So the reference collection would be for the Deputies, to answer their questions."

"Yes, that is my—that is our—job. To set up such a collection for their use."

She was too polite to ask the next question, the question I had been asking myself ever since I had started work, the question that had loomed whenever I noticed that the people using the Library of Parliament were students from the universities of Athens, scholars doing research into Greek history, or prominent Athenians who regarded it as a birthright that they could use the library's resources. But the people who were not using the library were the Deputies of Parliament, the patrons for whom the library had been established. It was the question whose answer I was afraid to hear, but I asked it anyway.

"Aspasia, to your knowledge do the Deputies ever use the Library?"

"I can speak for the Deputies from New Democracy (the party for

whom she had formerly worked as an administrative assistant). Some of these deputies do use the library," she said, almost tenderly, as if my feelings were at stake, "but they do not consider it a library for asking questions."

"What do they use it for?"

"Some read the Greek newspapers here or the magazines. Others might look up a line from one of the tragedians to use in a speech. And the Reading Room, because it is very . . . elegant? . . . it is a place the Deputies take people when they show them Parliament."

"The Library is a showplace, then, a showplace with newspapers, kind of a lavish kiosk."

"Exactly," Aspasia said, pleased that we had communicated so well.

My notion that the Deputies might use the Library to inform themselves on important legislation prior to voting was, I soon found out, naive. I was talking to another of my Greek colleagues in the Library about the Deputies and why I never saw them in the Library.

"Why would they come?" she asked.

"For one thing, they could find out more about issues they were voting on."

"And what good would that do?"

"Well, obviously, the more they know about an issue, the better they will be able to decide how to vote."

"Decide how to vote?" she said, with huge amusement. "The party tells them how to vote. They don't go to a library to find that out."

Nevertheless, I continued with the reference project, encouraged by the director of the library and a key administrator of Parliament. In November of 1993, with the assistance of a bibliography compiled by the Congressional Research Service for the development of parliamentary libraries in the emerging democracies of Eastern Europe, I assembled a list of print reference resources to form a modest, beginning reference

collection. This list was about three weeks in the making but over six months in being approved by the library's bureaucracy for orders to be placed. After I returned to America, I learned that the first of these books had finally begun to arrive in early 1995 to begin forming a core reference collection.

The administration of the Library of Parliament and the lawmakers reacted more vigorously to the introduction of electronic reference services. In the main reading room, flanked by the works of Homer, Aristotle, and Sophocles, I arranged a demonstration of online databases for a select group of Greek Deputies and Parliamentary administrators. They were mildly impressed by the Reuters News Service available through a Data-Star database, intrigued by the European Union CELEX and ECHO databases, but visibly excited by a Greek database that indexed Greek newspapers. The latter was the biggest hit, because the Deputies could use it to see their names in print and find out how local newspapers were reporting their activities in Parliament. By the end of my stay in Athens, the Parliamentary Library had subscribed to several of the European Union's legal databases and to the services of the Greek newspaper database.

In November of 1993, during my third month on the job, I began spending some time with the processing staff, the workers in a back room of the Library of Parliament, who cataloged and classified the books when they arrived. The cataloging hardly followed the *Anglo-American Cataloguing Rules*, second edition (AACR2). On a 3-by-5-inch card was typed the book's author, title, and imprint. One or two subject headings were assigned, not from the *Library of Congress Subject Headings* (LCSH) but from a local thesaurus developed by the National Library of Greece. Another woman in the room then typed copies of the

cards, while a third figured out a call number for the book, based on a nineteenth-century German classification scheme originally designed for a public library in Munich.

The cataloging of the books in the Parliamentary Library was efficient inasmuch as there was no backlog of materials when I arrived. Cards were inserted into the card catalog and the books were available on the shelves a few days after their arrival. (I cannot resist a comparison here with one of the world's most sophisticated and highly automated libraries, the Library of Congress, which, according to a conversation I had with an administrator, as of a couple years ago had a backlog of 38 million items.)

The rather elementary processing practices of the Library of Parliament were soon to change. Only months before my arrival, the library had contracted with the Library of the University of Crete to purchase its online public access catalog, called Ptolemaos (interestingly, an OPAC developed by a previous library fellow). The four or five typed lines on a catalog card were to give way to AACR2 and to MARC records, the subject headings were to be compared against LCSH, and the quite archaic German classification system was to be replaced by either LC or Dewey.

The processing staff of the Library of Parliament would hardly be considered qualified to make such changes. None of the people involved were professional librarians, in the sense of a person who has completed a graduate degree in library science. (There are no graduate programs in library science in Greece.) The people who processed books in the library had been hired by the Parliament, probably because of someone they knew with influence, and then placed in the library and told to work in the room where the books got cataloged.

Even if their official qualifica-

tions were slight, these men and women were not stupid. One of them tried to engage me in discussions of the work of Derrida and Foucault, until I had to tell her I had read nothing of their work. Another had earned money during university by writing entries in one of the more authoritative Greek encyclopedias. And a third had two master's degrees in comparative literature, the second from New York University. (When I asked her why she didn't go for her doctorate at NYU, she said that her husband was also studying for a master's, and it would not have been prudent to surpass him.)

I was asked to help train the cataloging staff in the complications of the new technical era they were entering. It didn't seem to matter that

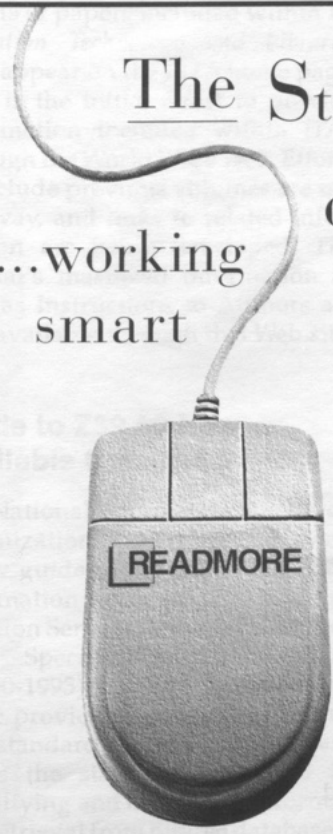
my particular skills were in library instruction and the reference interview and online searching. I was from an American university; it was assumed I could be of help in any library capacity. And so I found myself in a familiar position as a librarian: the skills in which I felt most competent were generally ignored, and the skills in which I felt least qualified were most in demand.

I began giving workshops to the processing staff, using cataloging and classification textbooks I had brought with me from America. I taught in English, which meant that half the processing staff could not attend, since they would not have understood one sentence. I prepared handouts. I talked slowly. And by some miracle, the staff seemed to un-

derstand and to profit. They asked me to continue the workshops and, more important, to work side-by-side with them on the new cataloging routines.

So for most of the winter of 1993-94, I worked every morning on cataloging. The library had begun receiving various CD-ROM bibliographic products from the Library of Congress, including the MARC records, the CONSER database, and *LCSH*. We would take non-Greek-language materials and see if LC had cataloged them. If they had, we would look through the MARC record as a teaching model and then download it into Ptolemaos. None of the staff had ever retrieved information from a CD-ROM, and none had ever downloaded a record before.

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Or I would sit with one of the catalogers over a pile of Greek-language books. She would describe their content one by one, and then we would argue about what their subject headings should be. She would tell me she was not so much interested in learning how to manipulate the CD-ROMs but in how the mind operates when it's trying to figure out what a book is about. That is, she wanted to learn subject analysis.

By the time I left the Library of Parliament, the staff had cataloged 5,000 books and had begun on its serials. And they had begun to run a backlog.

I experienced many defining moments during my stay in Greece: reading the Oedipus plays of Sophocles one evening, and then the next morning visiting the ancient theater where those plays had first been presented; or climbing the hill

to the Acropolis on a sunny March midweek morning, when I had the ruins virtually to myself; or sitting by a harbor on an island one late afternoon, when the light turned everything I saw into a canvas. But surely what I shall remember as long as anything from my experience was working side-by-side with my colleagues at the Greek Library of Parliament, as we ventured together into the mysteries of an online catalog.

Index to Advertisers

ALA Editions	104, 128	Readmore	125
Ameritech Library	cover 2	SIRSI	111, cover 3
Gale Research	103	Todd Enterprises	cover 4
H. W. Wilson	63	UnCover Co.	102
Library Technologies, Inc.	60	Van Nostrand Reinhold	58-59
Minolta BSD	57	WLN	64
Online, Inc.	80		

News and Announcements

LITA/LAMA National Conference Close at Hand

The LITA/LAMA National Conference, with the theme "Transforming Libraries," will take place in Pittsburgh on October 13-16, 1996. This is the first national conference to be held jointly by two divisions of the American Library Association and promises to be an event to be remembered. LITA and LAMA members should have received registration materials in April. If you did not or wish more information, phone 1-800-545-2433, ext 4268. See you in Pittsburgh!

ITAL on LITA Home Page

Beginning with the March 1996 issue, the Table of Contents and abstracts of papers included within *Information Technology and Libraries* now appear on the LITA home page. This is the initial effort to provide information included within *ITAL* through the World Wide Web. Efforts to include previous volumes are under way, and links to related information are being developed. The journal's masthead information as well as Instructions to Authors are also available through this Web site.

Guide to Z39.50 Now Available from NISO

The National Information Standards Organization (NISO) has published a new guide to the recently revised Information Retrieval (Z39.50): Application Service Definition and Protocol Specification (ANSI/NISO Z39.50-1995). The twelve-page guide provides a concise history of the standard's development, explains the standard's function in simplifying and enhancing information retrieval from remote databases, and includes a list of automation vendors and information service

providers using the standard. *A Guide to the ANSI/NISO Z39.50 Protocol: Information Retrieval in the Information Infrastructure* by William E. Moen is available from NISO Press Fulfillment, P.O. Box 338, Oxon Hill, MD 20750-0338; (301) 567-9522; fax (301) 567-9553.

Heath Named President/CEO of Internet Society

Donald M. Heath was named in April as the first full-time president and chief executive officer of the Internet Society, the international organization responsible for global coordination and cooperation of the Internet. Heath has an extensive background in telecommunications, computer, and software industries, most recently serving as executive vice-president and chief operating officer of Transaction Network Services of Herndon, Virginia. In his new position he will lead a broad spectrum of activities focused on the Internet's development, international growth, education, and associated technologies.

National Digital Library

The Library of Congress's National Digital Library (NDL) Program continues to add collections and other resources to its World Wide Web home page. In March Librarian of Congress James H. Billington announced the availability of five new American history collections available at <http://www.loc.gov/>. These are:

- Documents of the Continental Congress and Constitutional Convention, ca. 1774-1790; 272 broadside documents
- African American pamphlets from the Daniel A. P. Murray Collection, 1820-1920; 351 pamphlets on 11,000 pages
- World's Transportation Commis-

sion photographs by William Henry Jackson, 1894-1896; approximately 900 photographs

- Documents from the National American Woman Suffrage Association Collection, 1860-1920; approximately 160 publications on 10,000 pages
- Daguerreotype photographs, 1842-1862; approximately 600 photographs

Other collections already available on the Internet included Matthew Brady Civil War photographs, recently recovered notebooks of Walt Whitman, sound recordings from the Nation's Forum, and early motion pictures. The NDL Program also has mounted an online congressional database called THOMAS, which offers bills of the current and previous Congress, the full text of the *Congressional Record*, the Bill Digest from the Library's Congressional Research Service, and links to other legislative Internet sites.

Also in March, the NDL Program launched an online gateway specifically tailored to the needs of students and educators. This Learning Page is found at <http://lcweb2.loc.gov/ammem/ndledu> and offers organized help for searching the library's online resources. The Learning Page is part of the library's effort to reach a new constituency, the K-12 community.

McCarthy Selected WLN President/CEO

Paul McCarthy was selected in March by the WLN board of directors as president and chief executive officer of WLN. McCarthy had been serving as acting president/CEO since September 1995 as well as chair of the WLN board since August 1994. He also had been a WLN customer through his association with the University of Alaska, Fairbanks.

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LITA Monographs, #6

Mary Engle, et al.

The second edition of the bestselling LITA monograph offers: a current snapshot of the networking services available; a discussion of the concepts and terms; and a bibliography of the notable guides that document the search techniques, navigational tools, and information resources available. Also provides a general overview of the electronic service providers who offer dial-up access to the Internet. Published by LITA.

\$24.00pbk. • 280p. • 1995 • ALA Order #7793-6-2035

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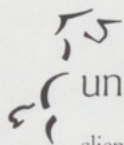
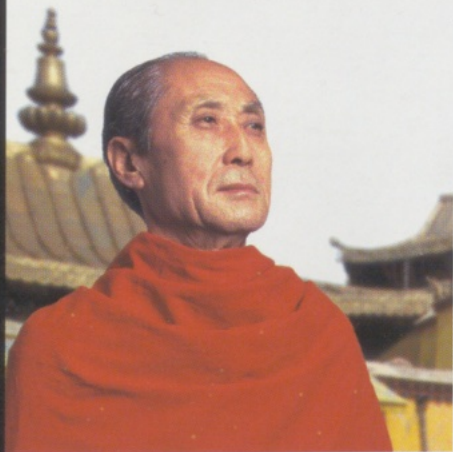
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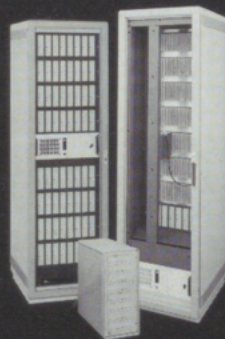


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