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April 1981, vol. 72, no. 2

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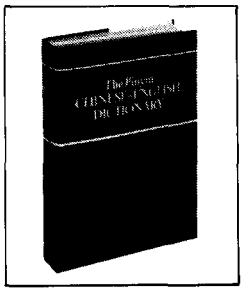

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Issue Editor

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LETTERS

Professional Image

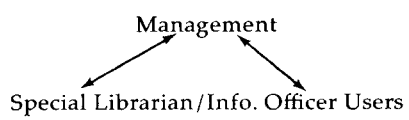
I want to share a rewarding conversation I recently had with my supervisor, who heads Administration and Personnel at Palo Alto Science and Systems Research Centers. On his latest business trip, returning from the East Coast, he had the opportunity to peruse the *1979 SLA Salary Survey,* which I had brought to his attention some time ago. He was immediately captivated by the professional aspects of the presentation and spent some time going through the various breakdowns. Perhaps part of his interest was derived from the fact that our organization scored well on the charts, but he emphasized in his conversation with me that SLA's was the most valuable, well-structured salary survey he had seen in a long time and—I quote—one that well fits the image of the information profession. I was particularly impressed by this praise because my supervisor is considered an expert in the compensation field; he keeps up with the literature and is aware of the latest developments.

Giuliana A. Lavendel
Technical Information Center
Xerox Corporation
Palo Alto, Calif.

Communications Triangle

The lead-off article in the September issue ["Is Tension Inevitable Between SLA and Associated Information Managers?"] was the most useful article to appear in *SL* for some time. I hope it will be read and taken to heart by many. It also merits consideration for distribution as a reprint in an attractive cover at SLA booths of fellow associations—ALA, ASIS, etc.

A quibble might be that the author, Roberta Gardner, didn't give enough attention to the influence of articulate users on higher management; rather than being a two-way street between librarians/information officers & management, it is a triangle, like so:



Since the special librarian/information officer is suspect of "special pleading" for her/his cause, communications of users to management are more influential than otherwise. (A main reason I go to ASIS meetings, in addition to SLA, is that the former has more information-minded users among its attendees.)

Lucille Whalen's abstracts in Staff Development were very well chosen and well written. I found the October issue of *SpeciaList* to be somewhat better than the preceding ones. As a possibility for next issue: The University of Texas' Board of Regents took action on Oct 24 to change the school's name to "Graduate School of Library *and Information* Science" and the name of the degree to "Master of Library *and Information* Science."

E. B. Jackson
Austin, Tex.

Document Retrieval

I certainly agree with Miriam Drake's thesis that environmental factors must be considered in library planning (*SL* 71 (no. 12): 509-518 (Dec 1980). However, I do take issue with one of the quotes in the article stating that through present technology access to most of the world's literature can be had in a couple of days.

While online literature searching has made quick retrieval of references a reality, it has not, nor have the online ordering services, solved all the problems of document retrieval. In fact, my colleagues and I find that the quick retrieval of references highlights the much slower acquisition of documents—and this document retrieval has become our major operational problem. True, online ordering has brought some improvements, but we are far from the position described in the article. We are looking forward to some of the changes Drake anticipates to bring us to that point.

Lou B. Parris
Information Center
Exxon Production
Research Company
Houston, Tex.

(continued)

KWIC, KWOC

I found Eileen Bator's article "Automating the Vertical File Index" [*SL* 71 (no. 11):485–491 (Nov 1980)] interesting. I can't quite understand, however, why she didn't consider using a KWIC or KWOC index. She admits "the subject indexing proceeded very slowly" since a thesaurus had to be constructed by the reference librarian. Had she developed a KWIC or KWOC by title, much of the work could have been handled by other staff, leaving the librarian the task of any necessary enrichment.

Madeleine Bailey
Muriel Ffoulkes Learning Resource Centre
Kelowna, BC, Canada

Feedback

I have to tell you (having complained so much at other times) that I think the September *SL* is excellent—*very* good articles.

Mary Larsgaard
Colorado School of Miner
Golden, Colo.

What a good way to end 1980, with a great December issue. John Kok's article "Now That I'm in Charge, What Do I Do?" was an excellent review, even for the veteran, and his common sense rules were well stated.

Victoria M. Bleick
Production Library
Baptist Foreign Mission Board
Richmond, Va.

Hurrah! Hurrah! Congratulations on not having any more articles in *Special Libraries* on "How I Run My Library Good in Antarctica." I think that the December issue was the best in years. Congratulations to all the authors and to the SLA staff involved. I hope that this issue has set a precedent of what we can expect in the future!

Sandra K. Hall
The Arizona *Daily Star*
Tucson, Ariz.

* * *

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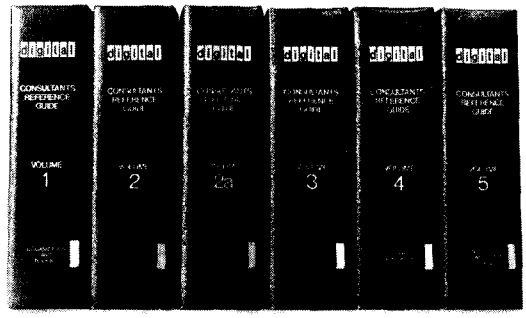

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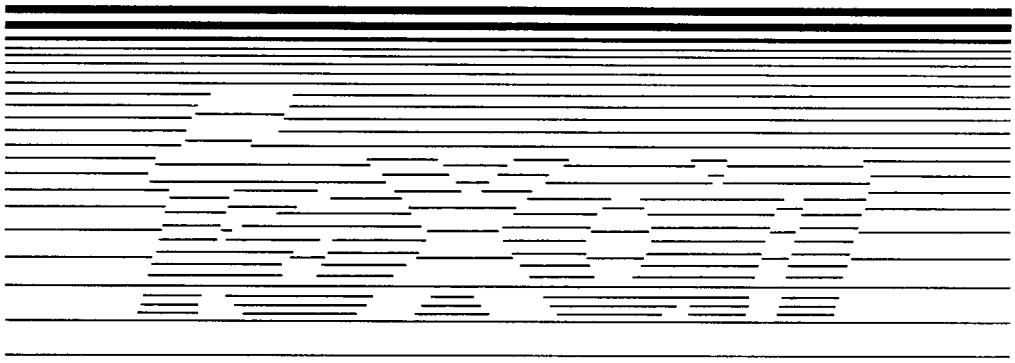

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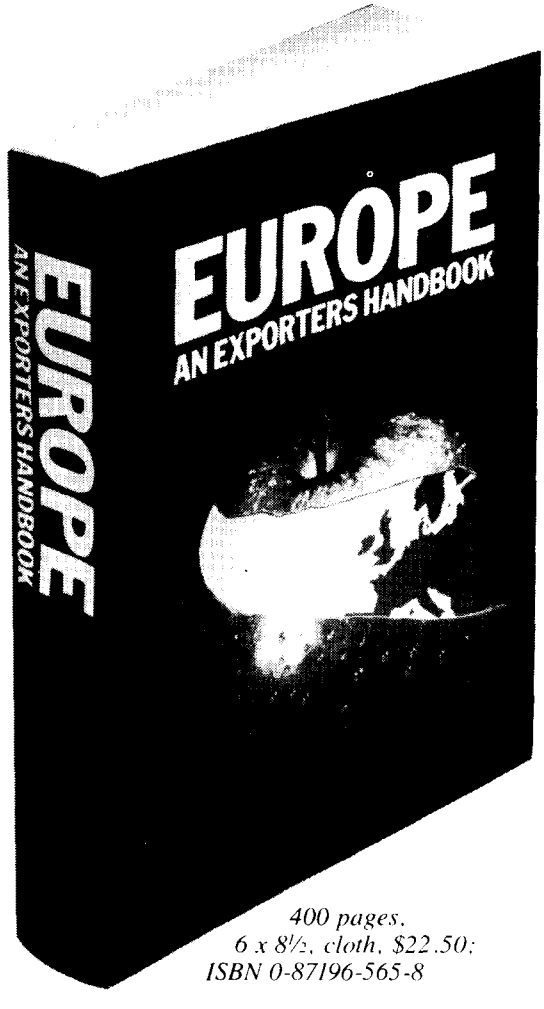

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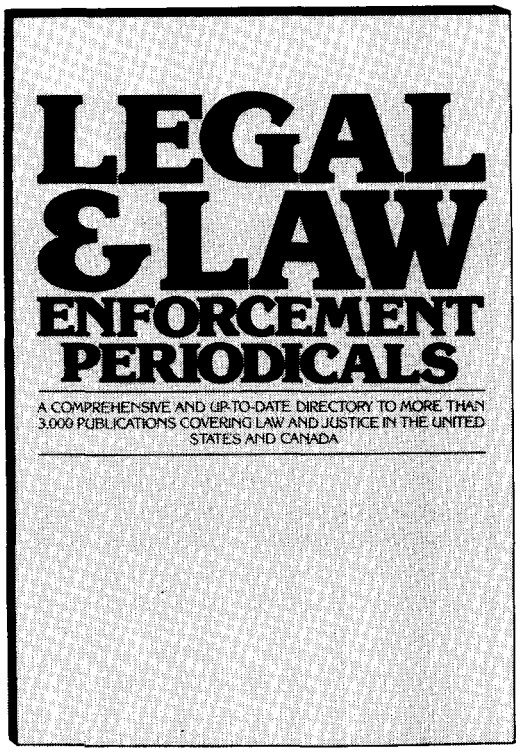

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Introduction

Quietly, a revolution is transforming the field of information processing and organization. The revolution has been quiet since it is proceeding by subtle means, in discrete steps, and at graduated intervals. But every segment of library and information services is being affected.

The recent pace of advances in information technology—its computer and telecommunications components, software developments, combinatory searching techniques, switching mechanisms, the merging, linking and interactive modes of access to information systems and their databases—are transforming many of the traditional library procedures, practices, and functions. The transformation impacts on each of us—personally, professionally, and collectively.

To what extent can information professionals constructively channel the emerging developments in information technology? To what extent can the SLA membership become adequately informed about current advances and the opportunities and pitfalls involved in adopting this new technology? Which of the newly emerging innovations can be efficiently and economically integrated for the improvement of existing systems and services?

Although this issue of *Special Libraries* was not planned to celebrate a particular occasion or event, it is significant that 1981 marks the 30th anniversary of the founding of the Association's Information Technology (née Documentation) Division. In approving the change of name to Information Technology (ITE), the SLA Board of Directors in June 1979 reaffirmed the Division's objectives to encompass "the planning, development and practical application of existing new technologies and systems for the processing and control of information in any subject discipline and in any form. . . ."

In conformance with this objective, the members and officers of the Information Technology Division have been seeking opportunities to further broaden overall SLA membership awareness and understanding of information technology and its potential for special librarianship. Under the leadership of Joe Ann Clifton and Carolyn Brown, past chairmen, ITE, Jim Olsen, the current chairman, and Frank H. Spaulding, chairman, Long Range Planning, ITE, three projects were suggested for action, to be coordinated by Nolan F. Pope, Chairman of the Divison's Technology Applications Committee: 1) sponsoring an issue of *Special Libraries* emphasizing information technology, its use, and its potential for special libraries; 2) bringing new information technology vendors to forth-

coming SLA Conference exhibits; and 3) identifying possible information technology vendors for brief product reviews in *Sci-Tech News.*

In agreeing to serve as guest editor for this issue of *Special Libraries,* I became aware that the tasks involved were much more formidable than first envisioned. What is meant by "information technology?" Which components of this technology should be highlighted? Can we discuss information technology without reference to the human, societal, or sociopolitical environments within which such technology functions? Even when decisions were made, there was still the necessity of securing quality manuscripts within a specified time frame for the specific topics deemed to be important.

The editor was fortunate in obtaining excellent contributions from a number of authors having varying educational backgrounds and professional responsibilities. The aim was a balanced issue of *Special Libraries* representing, in some logical manner, the interlocking segments of an emerging technology. The aim was also to provide an overview, some illustrative special library applications, and a vehicle for reflection and further study.

An effort was made to reduce overlap to a minimum. Although approaching the subject from different vantage points, the contibutors of this issue seem to be in agreement that, in a variety of ways, information professionals have influenced and can influence the direction, diffusion, and application of information technology. It is hoped that this issue, in its totality, will provide the SLA membership with a deeper understanding of the technical and social dimensions of a technology that has become the prime driving force in our society.

Irving M. Klempner

The Fortune Cookie:
Socio-Political Impact of Information Technology

Marilyn K. Gell

Arlington, Va. 22207

■ **Emerging information technologies will radically alter the nature of our society and affect the prevailing economic, political, and social values. An historical perspective and analysis of information policy issues, including the relationship between public and private sectors, information and productivity, and the role of government, are presented. Information professionals need to examine the direction and nature of these changes with respect to the future applications and direction of information technology.**

Achilles: Please. Those little cookies look delicious. (Picks one up, bites into it, and begins to chew.) Hey! What's this funny thing inside? A piece of paper?

Tortoise: That's your fortune, Achilles. Many Chinese restaurants give out fortune cookies with their bills, as a way of softening the blow. If you frequent Chinese restaurants, you come to think of fortune cookies less as cookies than as message bearers. Unfortunately you seem to have swallowed some of your fortune. What does the rest say?

Achilles: It's a little strange, for all the letters are run together, with no spaces in between. Perhaps it needs decoding in some way? Oh, now I see. If you put the spaces back in where they belong, it says, "ONE WAR TWO EAR EWE." I can't quite make head or tail of that. Maybe it was a haiku-like poem, of which I ate the majority of syllables.

Tortoise: In that case, your fortune is now a mere 5/17-haiku. And a curious image it evokes. If 5/17-haiku is a new art form, then I'd say woe, O, woe are we . . . May I look at it?

Achilles (handing the Tortoise the small slip of paper): Certainly.

Tortoise: Why, when I "decode" it, Achilles, it comes out completely different! It's not a 5/17-haiku at all. It is a six-syllable message which says, "O NEW ART WOE ARE WE." That sounds like an insightful commentary on the new art form of 5/17-haiku.

Achilles: You're right. Isn't it astonishing that the poem contains its own commentary!

Tortoise: All I did was to shift the reading frame by one unit—that is, shift all the spaces one unit to the right.

Achilles: Let's see what your fortune says, Mr. Tortoise.

Tortoise (deftly splitting open his cookie, reads): "Fortune lies as much in the hand of the eater as in the cookie."*

Information Technology

In many ways modern information technology can be compared to the fortune cookie in the story. It is a bearer of messages; those messages are frequently ambiguous and the future clearly lies as much in the hands of those using the technology as it does in the technology itself. Unlike the fortune cookie, however, information technology is radically changing the society in which we live at a rate that is unprecedented. Stanford University economist Edward Steinmuller has noted that if the airlines were progressing as rapidly as this technology, the Concord would be carrying half a million passengers at 20 million miles an hour for less than a penny apiece (*1*).

Information technology itself is not new. Computers have been around since Charles Babbage invented the Difference Engine in the mid-nineteenth century, and mankind has been communicating since the beginning of the species. Electronic communication itself has been a fact of life since Morse sent his famous message "What hath God wrought," more than 150 years ago. Little did he know what was to come. There have been quantum leaps in this technology over the past two decades, and the rate of change is expected to continue for at least the next two.

The application of these technologies will ultimately affect every aspect of our lives: the way we work, the way we live, the way we govern ourselves. If we are to design and manage library and information services that will respond to the needs of people in this high technology environment, it is critical that we examine the social and political changes that flow from technological innovation.

There are many hazards in the business of prophecy. Arthur Clarke has identified two: The failure of nerve, and the failure of imagination (*2*). The failure of nerve occurs when, given all the relevant facts, the would-be prophet cannot see that they point to an inescapable conclusion. Failure of imagination is more interesting. It arises when all the available facts are appreciated and marshaled correctly—but when the really vital facts are still undiscovered, and the possibility of their existence is not admitted. Leaps of the imagination and discovery have given us such scientific breakthroughs as X-rays, nuclear energy, radio and television, photography, sound recording, and transistors. The list goes on.

Today, however, we are in danger of committing a failure of nerve if we fail to carry trends in the application of technology to their logical conclusions. The impact of computer and communications technologies is already apparent. In the United States, 400,000 computers are now doing work that would require five trillion people if done by hand. Moreover, all the information machines in the country can be powered for a year with the energy of one oil tanker, and the primary resource needed to build the machines of the future is sand. In many ways information technology may be considered our new internal combustion engine, driving society in new directions and creating an environment that is in many ways unpredictable.

Howard Resnikoff has called this the era of the fourth great communication invention (*3*). The first was the invention of writing about 5,000 years ago by the Egyptians and Akkadians. These civilizations flowered as a result of the new-found ability to accumulate knowledge and transmit it from generation to generation. The second was the

*Hofstadter, Douglas R./*Gödel, Escher, Bach: An External Golden Braid.* New York, Vintage Books 1980.

invention, about 3,000 years ago, of the alphabet. The third was the application of moveable type to printing in 1453. This invention generated the creation of mass production and dissemination of information at a relatively low cost. In many ways our modern societies can be traced to the invention of moveable type. With the advances in telecommunications and micro-electronic technology, we find ourselves in the fourth era.

While many may disagree about the speed of application or the extent to which it will effect our society, it is clear that computers are getting smaller, faster, cheaper, more reliable, and more pervasive. The range of applications is growing at an enormous rate. To illustrate the magnitude of change we might consider the human brain as our base. In the early 1950s, it would have taken a computer the size of New York City, and drawing more power than the whole subway system, to contain most of the functional elements of the brain. By the early 60s, with transitorization, the computer containing those functions had shrunk to the size of the Statue of Liberty, and a 10-kilowatt generator would have kept it going. By the early 70s, with the introduction of integrated circuits, there had been a further compression down to the size of a Greyhound bus. By the mid-70s, it was the size of a television set and now is not much larger than a typewriter. Soon, a computer with this capability will shrink below the size of a human brain and will draw all the power it needs from a portable radio battery.

By the late 1980s, if data compression techniques continue, it will be possible to store an entire library in a space about the size of a paperback.

Central to these changes is the silicon chip. At the present time, 100,000 transistors can be integrated on a piece of silicon a quarter-inch square. By 1985, chips containing one million bits are expected to be in use. Computer scientists are even talking about putting 30 million bits on a single chip. By the mid 1980s, a powerful third-generation microcomputer will be available in the $100 price range.

Existing microprocessor techniques can compress information at least 10,000 fold. The entire contents of a book will soon be found on a single silicon chip that can fit through the eye of a large needle. By the late 1980s, if data compression techniques continue, it will be possible to store an entire library in a space about the size of a paperback. Even now, using video-disc technology read by a laser, it is possible to store the entire contents of the Library of Congress on 200 feet of shelving, that is, on one wall of a large room. In addition, over 500 databases are now available online, and additional information, such as the 1980 census data, will be available only in this format.

Breakthroughs in communications systems are closely linked to the development of increased computer capability, creating massive "telecomputing" networks. Digital information may now be transmitted using the electromagnetic spectrum (radio, television, satellite) or some form of telephone line or cable.

Applications of these technologies are almost limitless. Declining costs of both satellite time and earth stations will make possible, in the next few years, the increased use of satellites for video conferencing and interlibrary document transfer. Forecasters estimate that 85% of American homes will be on cable by the end of the decade, with many having an interactive capability. In addition, if the telephone company is deregulated, it is likely that subscribers will be offered as many as 200 channels. Viewdata and teletext systems are

bringing massive amounts of information directly into the home, electronic mail is a reality in many places, and a paperless office (perhaps even a paperless library) is on the horizon.

This technology is creating a society in which massive amounts of information can be economically collected, distributed, and controlled. It is creating dislocations not only in traditional institutions but affecting the operation of government, and is generating a host of public policy issues. While many of these issues may seem far removed from our day-to-day activities, their resolution will in fact determine how we live and work in the decades ahead.

Historical Perspective

The United States was founded on the belief that a democratic society depends on an educated and informed electorate. Many of our founding fathers, including Thomas Jefferson, James Madison, and Thomas Payne, spoke eloquently about this principle. Indeed, the belief in diversity of opinion and mobility of ideas is embedded in the First Amendment to the Constitution of the United States.

The constitution also provided for government involvement in the communication process by granting Congress the power "to establish Post Offices and Post Roads." This early communications network grew slowly but provided the primary means of communication until the introduction of the telegraph in 1837 and the telephone in 1876. The electronic age heralded by these inventions was accompanied by increasing involvement of the federal government in the establishment of what may now be seen as early information policy.

The term "information policy" was not used until the 1970s when a number of organizations and individuals began to build on the earlier work of Fritz Machlup who identified a large, knowledge-based industry in the United States in a landmark study published in 1962. (*4*). Since then, Daniel Bell has described a coming "post industrial society" (*5*), Marc Porat has concluded after exhaustive research that over 50% of the gross national product of the United States is derived from information-related activities (*6*), and Alvin Toffler has warned us that we may soon be swept away by "the third wave" (*7*).

Information Policy Issues

The term "information policy" is best used to describe not a single policy but an interrelated set of policies that condition the availability of information. These policies are concerned with the creation, production, collection, management, distribution, and retrieval of information. Their significance lies in the profound affect they have on the manner in which an individual in society, indeed a society itself, makes political, economic, and social choices.

An analysis of information policy issues, options, and consequences is made more difficult by the fact that information is characterized by a convergence in the technology and a divergence in the use and application of the information itself. Thus, while computer and communications technologies are becoming increasingly indistinguishable, information policy decisions affect energy, transportation, employment, economic development, health, education, international relations, and practically every other program within government. As a result, many informed observers, both within the government and outside it, feel that the primary political issues of the 80s will be information policy issues.

Several notable attempts have been made to identify the primary issues to be considered. In 1976, the Domestic Council on the Right of Privacy submitted a report to the President of the United States which identified 15 major issues in five issue clusters (*8*). Several years later, in a report that was never published, the National Telecommunications and Information Agency identified seven issue areas (*9*). Finally, in

1979 the Information Industry Association identified some 75 issues in 9 issue areas (*10*).

Many of these issues may be grouped into two general areas of concern: the relationship between information and productivity and a consideration of the role of government and its relationship to the private sector. The first group of issues usually marches ahead under the banner of economy in government, while the second set is concerned in a more straightforward manner with political consequences. The two areas do, of course, interrelate and both have profound social implications.

Information and Productivity

For years librarians and other information professionals have struggled with the knotty problem of assigning value to information. Whether in communities, businesses, or educational institutions they have sought ways to tell their constituencies what information was worth. To date no satisfactory formula has been discovered, but the subject is now being debated at the federal level.

Within the federal government, the relationship between information and productivity is a subject that is attracting increasing attention. President Carter has established a program to study this relationship within the National Technical Information Service (NTIS), and the Office of Management and Budget (OMB) has issued a series of circulars designed to control the flow of government-generated information and make it more accessible to the public.

Congressman Brooks introduced HR-6410 which resulted in the Paperwork Reduction Act of 1980, approved by the 96th Congress on Dec 11, 1980 as Pl 96-511. The law establishes an Office of Information and Regulatory Affairs within OMB and vests it with considerable power and authority. While this legislation was designed to establish greater efficiency in the management and control of information, many feel that it is a short step from management and control to power and politics. The legislation is to take effect on Apr 1, 1981.

The rising cost of energy together with the declining cost of communications has generated interest in possible communication/transportation tradeoffs. As government and society begin to move information rather than people, certain industrial dislocations are sure to occur. These impacts are already being felt in the automobile and airline industries. Regulatory issues emerge and will become increasingly pronounced in the decade ahead. Massive retraining efforts may become necessary as traditional jobs appear.

Role of Government

The relationship between the public and private sectors in this country has always been in a state of creative tension. The prominence of information technology has led to a reexamination of regulatory issues and a new look at the degree to which government should intervene in the functioning of the free market. While decisions in this area will have massive ramifications within the United States, they will be even more significant in the international arena. To a large extent the economic position of the United States, with respect to the rest of the world, depends on the degree to which it exports high technology and scientific and technical information. While the United States continues to export an increasing quantity of this technology and information, its share of the world market has begun to decline.

As new information packaging and handling capabilities spring up, questions associated with the government's responsibility to protect the public interest proliferate. To what extent should the federal government provide information services that may appear to be competitive with private sector offerings? To what extent is the government obligated to provide information that is unavailable from the private sector in areas such as consumer prod-

uct safety, employment hazards, or environmental impact? To what extent should information be made available at no cost to the user? What regulatory controls are necessary for emerging technology such as interactive cable? What will be the impact of the new Telecommunications Act when it is finally passed? How can privacy be assured? The answers to these and other questions will surely redefine the role of government in the decade ahead.

In the international information policy area it is commonly felt that there is no agency that speaks for the United States. The Department of State, the International Communications Agency, and the National Telecommunications and Information Administration (NTIA) all have roles, but they are frequently uncoordinated. The World Area Radio Conference held in 1979 illuminated many major issues in this area. The tense relationship between the United States and the underdeveloped countries is reflected in national and world policies governing information distribution and the use of satellite space and other communications technologies.

Conclusion

Resolution of the issues outlined will not be easy. Emerging information technology is radically altering the nature of our society. Over a period of time it is likely to affect the fundamental balance between economic, political, and social value as it exists in our society. It is certain to affect our library and information services, our political structures and institutions, even the basic nature of our government and society.

Technological developments are predictable. Their social and political impacts are not. We have been given a fortune cookie carrying an often inscrutable message. What we do with that fortune will become the future. For indeed "Fortune lies as much in the hand of the eater as in the cookie."

Literature Cited

1. Edward Steinmuller is quoted in an article by Thomas O'Toole/Information Business Booms, *Washington Post*, Jun 4, 1980.
2. Clarke, Arthur C./*Profiles of the Future.* New York, Harper & Row, 1973.
3. Resnikoff, Howard/*Program Report: Information Science and Technology.* National Science Foundation, August 1979.
4. Machlup, Fritz/*The Production and Distribution of Information in the United States.* Princeton, Princeton University, 1962.
5. Bell, Daniel/*The Coming of Post-Industrial Society.* New York, Basic Books, 1976.
6. Porat, Marc/*The Information Economy: Definition and Measurement.* Washington, D.C., U.S. Government Printing Office, 1977.
7. Toffler, Alvin/*The Third Wave.* New York, William Morrow and Company, Inc., 1980.
8. Domestic Council Committee on the Right of Privacy/*National Information Policy: Report to the President of the United States.* Washington, D.C., U.S. Government Printing Office, 1976.
9. National Telecommunications and Information Agency, unpublished report.
10. Horton, Forest Woody, Jr., ed./*The Information Resource.* Washington, D.C., Information Industry Association, 1979.

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Special Libraries and Databases

A State-of-the-Art Report

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■ **A state-of-the-art review, analysis, and projection of the use of machine-readable databases, including online search services and online support services, are presented. Emphasis is on the application of bibliographic databases for special libraries and the potential of such files for future use. Current use and applications of non-bibliographic files are also discussed. Sources are provided for further study of online systems and related services.**

TWO MAJOR FACTORS distinguish special libraries from other libraries. First, special libraries place a heavy emphasis on custom-tailored service to their clientele. Second, special libraries generally have been under pressure to provide high levels of service with limited resources (*1*). These factors led many special libraries, particularly those in defense or government, to create and use computer-based systems in the early to mid-sixties, long before many other libraries had begun to think seriously about this new technology. Several automated systems developed by special libraries still operate today, although some are batch-oriented systems that never made the transition to online modes of operation.

Many of the systems developed were for individual libraries and were not considered to be part of a "network" in the common sense of the word. Consequently, since special libraries are fairly well served by their own internal systems and often have access to the more sophisticated retrieval systems developed by the National Library of Medicine (NLM), National Aeronautics and Space Administration (NASA), and the Atomic Energy Commission (AEC), they have been slow to enter the field of networking. Their collections typically are narrow in scope but richer in depth than those of other, more general libraries. As a result, special libraries usually are borrowers for materials outside their specialty but lenders within their speciality. In recent years, special libraries have become an increasingly valuable asset to network activities as creators and users of cooperatively built machine-readable databases.

In a discussion of machine-readable databases, most librarians immediately think of commercial online search services such as Lockheed Information Systems, System Development Corpo-

ration (SDC), and Bibliographic Retrieval Services (BRS). These services traditionally have been used for public service functions, with a strong emphasis on reference activities. However, librarians now are beginning to think of online support services such as OCLC, Inc., Research Libraries Information Network (RLIN), Washington Library Network (WLN), and University of Toronto Library Automation System (UTLAS) as well. These bibliographic utilities offer extensive support services for many library activities and are used primarily for technical service functions.

Databases

Librarians use the term "database" and "file" synonymously rather than following the more technical definition used by data processing personnel. A database, as defined by Martha E. Williams of the University of Illinois and used by most librarians, is "an organized set of machine-readable records containing bibliographic or document-related data" (*2*). Databases vary in subject coverage, file format, record format, document coverage, indexing or vocabulary practices, and data elements (*3*). Files also vary in type, as exemplified by the terms used to describe them: textual, representational, referral, numeric, source, and statistical (*3, 4*).

Databases have been classified in numerous ways (*4, 5*). However, the two major categories seem to be bibliographic and nonbibliographic. Traditionally, bibliographic databases are those which, in the true sense of the word "bibliographic," refer to literature sources for information. Nonbibliographic databases, by exclusion, include all remaining files; these files stand alone as source information or raw data. Cuadra Associates recently adopted a classification scheme for online databases. This scheme categorizes files into similar groups: reference databases, referring users to primary sources for more complete information; and source databases, including numeric and statistical, fact and answer-oriented, chemical and physical property, and full-text files (*4, 6*).

Bibliographic Databases

Bibliographic files, estimated to contain more than 70 million records, provide access to a wide range of subject material. These files are produced primarily from three sources: government, professional societies, and commercial companies (*7*). The majority of files available through online search services and online support services fall within the bibliographic category.

Online Search Services—These services have had a positive effect on special libraries. Computerized access to major databases has enhanced the ability of special libraries to meet the information needs of their clientele by providing rapid access to specific data and by enabling searches to be individually tailored to users' needs.

Online database searching, while not a substitute for traditional manual approaches, is the automated and interactive version of reference services. Database searching can be used to identify or verify known items, for quick reference, for retrospective searching, and for selective dissemination of information (SDI). The output is an exact copy of information stored in the database and can vary from simple bibliographic citation information to that information augmented with index terms and/or abstracts or full text. These search results can be viewed on the screen of a cathode ray terminal (CRT), printed on a local teleprinter, or batch run on a centralized high-speed printer and mailed to the user.

Search service databases usually are accessible through online vendors, such as Lockheed, SDC, and BRS. Although several hundred files covering many subject areas are available through these online vendors, users often search one file at a time (*5*). Combined indexes, microbased systems, and intelligent terminals are

aiding in cumulating and tailoring the output of searches. Frequently accessed bibliographic files include Educational Resources Information Center (ERIC), National Technical Information Service (NTIS), INSPEC, *Psychological Abstracts*, Medical Literature Analysis & Retrieval System (MEDLARS), and *Science Citation Index*.

Special libraries have found a number of advantages from online literature searching (*8–11*).

- Online searching is much faster than manual searching; seconds or minutes online can translate into hours or days for comparable printed index searching.
- Online searching, requiring less time than manual searching, can be less expensive.
- Several years of coverage can be accessed in one online search, thereby minimizing physical handling of numerous printed volumes.
- Online searching has better precision/recall control by providing: more access points than may be available in printed indexes; the ability to create complex searching combinations; and the ability to expand, narrow, or redirect searches instantly on the basis of search results.
- Online searching expands the resources of the library by providing access to materials not held and current materials not yet indexed in print sources.*

With such advantages, it is not surprising Martha Williams has estimated "that the heaviest users of online searching are industry, government, and academic libraries, in that order" (*10*). Richard Boss, Information Systems Consultants, Inc., stated that as of mid 1979, 30% of the special libraries provided access to computer-assisted reference service (*9*). The estimates are corroborated by information released from major vendors of online databases: 46% of the subscribers to the New York Times Information Bank are special libraries; 50% of Lockheed's subscribers are special and public libraries (predominantly special); 32.2% of System Development Corporation's subscribers are commercial libraries; and 18% of BRS subscribers are special libraries (*10, 12*).

Online Support Services—Just as online search services have changed reference services in special libraries, online support services have revolutionized technical services. Online support services include bibliographic utilities such as OCLC, RLIN, WLN, and UTLAS. Unlike online search services, which act as vendors for purchased or leased files, OCLC, WLN, RLIN, and UTLAS offer access to their own files. Their users contribute most of the records to these files and can edit or modify the records for local requirements. Their offline products reflect such changes.

Electronic interlibrary loan systems have made cooperative collection development a reality and rapid service the norm.

Of the support service bibliographic databases, the OCLC Online Union Catalog is one of the largest files, with over 7 million titles. OCLC's file is used by libraries to support cataloging, interlibrary loan, serials control, acquisitions, and reference services. RLIN and WLN, maintaining smaller files, provide similar services, except for serials control.

Automated technical services have permitted special librarians to devote more of their financial and staff resources to direct patron services, including online search services to support the reference function. Although the cost of cataloging has continued to rise as inflation affects the cost of materials and staff, networks and cooperatives, by using biblio-

*See also "User Evaluation of a Corporate Library Online Search Service," pp. 113–116 of this issue.

graphic databases to share the effort of creating and maintaining cataloging data, have reduced these costs substantially. Indeed, much cataloging activity has become a routine operation that paraprofessional staff can perform. Also, online access to and knowledge of the collections of neighboring libraries have enabled special libraries to spend collection dollars more wisely. Electronic interlibrary loan systems have made cooperative collection development a reality and rapid service the norm. Such systems provide real benefits through the control of serials collections which require an ever-increasing proportion of library budgets.

Special libraries will continue to contribute to the development of new services by publicizing their needs and actively using online capabilities.

A concern in the early development of support-service bibliographic databases was the adequacy of subject indexing. However, libraries have found network cataloging acceptable or have modified records to add their subject data. The increase in membership of special libraries in networks has tended to diminish the need for additional subject data; the entry by other special libraries can be used. Advantages stemming from online technical support services are numerous but include:

- Reduced cataloging time through the use of machine-readable records contributed by other libraries.
- Elimination of backlogs of uncataloged materials.
- Improved access to information through multiple access points often not possible in the traditional card catalog.
- Rapid access to newly cataloged materials.
- Access to the collections of other libraries in the United States and Canada instantaneously.
- Rapid response to interlibrary loan requests, including the ability to negotiate the request interactively.
- Access to Cataloging-In-Publication (CIP) information for acquisitions.
- Easy control and access of serial issues.
- Preparation and control of orders and better control of acquisitions funds.

The growth and continued development of online support services are a ready testimonial to their usefulness. New services and enhancements to established services continue to demonstrate the versatility of these facilities.

Nonbibliographic Databases

Nonbibliographic (or source) files are receiving increased attention. Often these databases provide not only for the retrieval of records but also for analysis, manipulation, and forecasting of data elements constituting the records (*4, 6, 13*). Examples of nonbibliographic files include: *Dow Jones News/Retrieval Service;* Chemical Abstracts' *Chemdex, Chemline,* and *Chemname* files; *Current Population Survey;* and the full-text legal systems of Mead Data Central and West Publishing Company.

Online systems vary considerably in search features, output formats, command languages, and system responses (*3*). As the number of bibliographic and nonbibliographic databases continues to grow, so does the number of sources containing information about online searching. The appendix to this paper lists annotated references for the journals and directories reporting online system activities.

Trends

Online search-service searching in its current form is a relatively new process. Although online search services such as Lockheed and SDC are based on software originally developed in the mid-sixties, these services did not become available on a large scale until 1974.

Prior to that time, their use was restricted largely to government and defense-related institutions. With the introduction of these services to a wider audience, the number and types of databases have grown rapidly. Similar system features have been developed, and competition has increased.

Online support services had roots in the early sixties. The development of MARC (Machine-Readable Cataloging) gave a substantial assist to automated systems development by providing a core of acceptable cataloging data. OCLC began online services in 1971. RLIN, formerly BALLOTS, started initially in Stanford University in the early 1970s. Today, online support services are growing from online cataloging toward fully integrated systems, encompassing all traditional library activities. These services are weakest in reference services which have been mainly supported by the online search services.

Database Coverage

Subject coverage and access have expanded as the number of available files has increased. In the bibliographic databases, the online search services initially were strong in the scientific and technological fields. Since 1978, files in the social sciences and business fields, as well as a few in the humanities, have appeared online (*9*). In contrast, nonbibliographic databases are strongest in the areas of business, finance, and economics. Nonbibliographic files in the areas of social sciences and humanities, as well as those covering science and technology, are becoming increasingly available (13). Increased coverage has affected special libraries as collections are usually concentrated in specific subject areas; broad online coverage allows easy access to materials outside subject specialties.

Online support services have continued to add new MARC formats, to extend time-based coverage, and to add new services. OCLC and UTLAS have made the Library of Congress Name Authority files available online. RLIN has provided new subject-based files, such as the one in Columbia University's Avery Library which indexes more than 500 periodicals relating to architecture.

Vocabulary

The specificity of the vocabulary is the important element in the bibliographic databases for searching and, ultimately, for retrieval. In general, the highly specific terms control the level of precision; the nonspecific vocabulary controls the amount of recall. These measures vary inversely.

Controlled vocabulary search, which provides access through an established control term, has formed the basis of operation for most manual or mechanized information systems. Vocabulary control contributes to both cataloging/indexing and searching consistency. Controlled terms prevent the scattering of related subject matter, reduce ambiguities among terms, and provide structure to retrieve either on a narrow topic or on a broad subject (*14–16*).

An increase in the use and development of free-text searching capabilities has evolved, particularly in online search services. Free-text searching allows for retrieval of items by any word/term from any field in the unit record. According to BRS, free-text searching is especially helpful if topics are very specific, terminology is new, thesaurus terms are too broad, narrow, or nonexistent, and/or topics are cross disciplinary (*12*). Use of proximity connectors currently varies from one online search service to another. Lockheed and BRS both allow for adjacency of single terms, but only Lockheed has capabilities for qualifying the degree of nearness. Both BRS and Lockheed have the capability for truncation with proximity search statements and field qualifiers.

RLIN currently offers subject access to portions of its file. While OCLC has investigated subject access, it has

encountered substantial problems in providing rapid access to a larger database using only Library of Congress subject headings and titles. Demands by users will prompt further developments by online support services in this area. The Council on Library Resources is sponsoring research into online catalog access.

Of significance in vocabulary development is the Battelle Columbus Laboratories' Vocabulary Switching System (VSS), an operational and automated technique. As online users continue to perform an increased number of searches with multiple databases, subject switching will assist in "transforming a user's stated information request into the data base language of one or more target data bases, i.e., finding the most appropriate and valid search term(s) for data bases to be searched" (*17*).

Printed Indexes, Catalogs, and Schedules

Increased use and confidence in online databases are leading to a decreased dependency on printed indexes, catalogs, and schedules. Multiple access points, currency, and retrieval speed have contributed to the growing attraction for online files; many librarians welcome the opportunity to forego handling the cumbersome printed volumes.

Of significance to special librarians is the limitation of their collections to those subject areas reflecting the interests of the parent organization. Accordingly, collection policies of many special libraries do not provide for the acquisition of each and every hard copy index, catalog, and schedule that might at some time be helpful. Online availability of information that is needed on an infrequent basis has provided a cost-effective method of access.

Client Use

The role of intermediary versus end user is being questioned for both bibliographic and nonbibliographic database searching. To date, the complexities and lack of standardization among major online search services have necessitated the presence of an intermediary. Carlos Cuadra, in a study of online reference services, estimated that information intermediaries conduct 95% of all online searches (*18*). Traditionally, the end user is familiar with terminology and his information needs while the searcher has expertise with file structures and system commands. The more successful database searches now seem to be those which are performed after the intermediary has conducted a skillful reference interview and performed an online search, either with or without the presence of the end users. Special libraries will continue in the role as intermediary, i.e., providing individualized custom-tailored services to their clientele.

Alex Tomberg, coeditor of *Online Review*, points out that direct access by the end users is the norm for nonbibliographic files. He has reported that, although 79% of bibliographic file searches in the United States are performed by mediators, probably most online searches of nonbibliographic files are conducted by end users (*13*).

Access to online support services, such as OCLC, WLN, RLIN, and UTLAS, also may require an intermediary. However, OCLC has a number of public access terminals in use, and RLIN is experimenting with them. In most instances, the OCLC terminals are used directly by library users, often with little or no assistance.

An increasing number of prompt commands, coupled with additional user aids and tools, will ultimately contribute to an increase in use of systems by end users. A declining role for librarian intermediaries will be the end result of both technological and economic change (*19*).

Standardization

A definite need exists for standardization among online systems. Two

potential areas are unit record elements and system commands. Referring to online search services, Ryan Hoover of the University of Utah Library states: "There is too much variation in subject term field labels. One vendor's 'descriptor' is another's 'identifier' is another's 'index term' " (*20*).

Lucinda Conger's *Online Command Chart*, showing a comparison of commands for 39 online operations among seven online retrieval systems, demonstrates the variety of commands. For example, the "PRINT" command, if used with SDC, BRS, or NLM, will generate online printing; if used with Lockheed, the command will generate offline printouts (*21*). With another example, Simone Klugman, University of California at Berkeley, humorously reflects: "We are not opposed to learning sophisticated retrieval techniques, but we do balk at remembering that to end a search on Lockheed you 'logoff', but on SDC you must cry 'stop', whereas the Information Bank would like you to say 'Z' followed by 'A', and BRS will not terminate your search until you have told it to be 'off' " (*21*).

Similar differences exist among OCLC, WLN, RLIN, and UTLAS, the online support services. Thus, the need is apparent for developing more user-oriented transparent systems, or "systems containing the necessary convertors or translators to help the user circumvent the need for understanding all the specific differences of data bases, systems, command languages, vocabularies, and access protocols" (*3*).

Conclusions

The effect of online databases has been both dramatic and positive. What can be expected from the online future? For online search services, Carlos Cuadra predicts, "more of the same ... there will be more data bases, more systems, longer service hours, faster printout service, lower prices per search, and additional new system features" (*11*). Martha Williams expects "... increase in size and type of data base together with an increase in the availability of terminals and user interface ... greater percentage increase for numeric and textual data bases than for bibliographic ... large numbers of minicomputers and intelligent terminals accessing more data bases in multiple locations" (*3*).

Along with these developments, an increased trend will continue for full text and answering services and for the development of additional online initiated document delivery services, such as Lockheed's DIALORDER. The same pattern already established in the online information industry's brief history, of competition among online systems, will ensure new system features, improvement of services, and continued responsiveness to user needs (*11*).

Online support services also continue to add new services and features. The trend is mainly toward the development of integrated systems including acquisitions, cataloging, processing, circulation, interlibrary loan, and online catalogs for client use. New developments include the BRS move toward online catalogs for individual libraries and some support for cataloging activities such as access to the Library of Congress MARC records. SDC offered such services at one point but found them unprofitable. This trend toward combinatory access to all types of databases, involving interaction of both online search services and support services, will have a positive effect on libraries, special libraries in particular. For most libraries, the prospect for more services at lower prices is a certainty. The present and potential competition continues to benefit libraries in general.

Special libraries will continue to contribute to the development of new services by publicizing their needs and actively using online capabilities. They will be developing their own online databases for their users, as well as using and storing those developed by others.

Literature Cited

1. Jacob, Mary Ellen / Special Libraries and OCLC. In *The Special Library Role in Networks.* Robert W. Gibson, Jr., ed. New York, Special Libraries Association, 1980.
2. Williams, Martha E. / Use of Machine-readable Data Bases. *Annual Review of Information Science and Technology* 9: 221-284 (1974).
3. Williams, Martha E. / Online Retrieval—Today and Tomorrow. In *International Online Information Meeting, 1st.* New York, Learned Information, 1977. pp. 1-15.
4. Wanger, Judith and Ruth N. Landau / Nonbibliographic On-line Data Base Services. *Journal of the American Society for Information Science* 31(no. 3): 171-180 (May 1980).
5. Epstein, Hank / The Technology of Library and Information Networks. *Journal of the American Society for Information Science* 31(no. 6): 425-437 (Nov 1980).
6. Spreading the Word on Non-Bibliographic Databases. *The Information Manager* 1(no. 4): 28-31 (May / Jun 1979).
7. Kunkel, Barbara K., Susan L. Rau, and Betty Miller / The Use of Computerized Data Bases by Special Libraries. *Bookmark* 36: 49-54 (Winter 1977).
8. Christian, Roger / *The Electronic Library: Bibliographic Data Bases, 1978-79.* White Plains, Knowledge Industry Publications, Inc., 1978.
9. Boss, Richard W. / *The Library Manager's Guide to Automation.* White Plains, Knowledge Industry Publications, Inc., 1979.
10. Atherton, Pauline and Roger W. Christian / *Librarians and Online Services.* White Plains, Knowledge Industry Publications, Inc., 1977.
11. Cuadra, Carlos A. / Commercially Funded On-line Retrieval Services—Past, Present, and Future. Paper presented at the 51st Aslib Annual Conference, Sep 20-23, 1977, University of Lancaster. In *Aslib Proceedings* 30(no. 1): 2-15 (Jan 1978).
12. St. Pierre, Elizabeth / *Letter to OCLC Affiliated Online Service Members,* Oct 27, 1980.
13. Hardy, Nancy F. / The World of Non-bibliographic Information. *The Information Manager* 1(no. 5): 20-22 (Jul / Aug 1979).
14. Lancaster, Frederick Wilfred and Emily Fayen / *Information Retrieval On-line.* Los Angeles, Melville Publishing Company, 1973.
15. Lancaster, Frederick Wilfred / *Information Retrieval Systems,* 2nd ed. New York, John Wiley & Sons, Inc., 1979.
16. ——— / *Vocabulary Control for Information Retrieval.* Washington, D.C., Information Resources Press, 1972.
17. Niehoff, Robert, Stan Kwasny, and Michael Wessells / Overcoming the Database Vocabulary Barrier—a Solution. *Online* 3(no. 4): 43-54 (Oct 1979).
18. Cuadra, Carlos A. / The Impact of Online Retrieval Service. In *On-line Bibliographic Services—Where We Are, Where We're Going. Proceedings of an All-day Meeting at the Centennial Conference of the American Library Association, Chicago, Jul 18, 1976.* Watson, Peter G., ed. Chicago, American Library Association, 1977. pp. 2-9.
19. Nielsen, Brian / Online Bibliographic Searching and the Deprofessionalization of Librarianship. *Online Review* 4(no. 3): 215-224 (Sep 1980).
20. Hoover, Ryan E. / A Comparison of Three Commercial Online Vendors. *Online* 3(no. 1): 12-21 (Jan 1979).
21. Conger, Lucinda D. / *Online Command Chart.* Weston, Conn., Online, Inc., 1980.
22. Klugman, Simone / Online Information Retrieval Interface with Traditional Reference Services. *Online Review* 4(no. 3): 263-272 (Sep 1980).

Supplemental References

Association of Research Libraries / *On-line Bibliographic Search Services; Spec Kit #62.* Washington, D.C., Systems and Procedures Exchange Center, Mar 1980. 107 p.

Conger, Lucinda D. / Multiple System Searching: A Searcher's Guide to Making Use of the Real Differences Between Systems. *Online* 4(no. 2): 10-21 (Apr 1980).

Davis, Trisha L. and Ann T. Dodson / *OCLC Find Rate in a Special Library.* Columbus, Ohio, OCLC, Inc., 1980. 15 p.

Diener, Ronald E. / Information Data Base Services. *Minitex Messenger* 6(no. 2): 1-6 (Sep 1980).

Illinois Libraries 62(no. 3) (Mar 1980).

International On-line Information Meeting, 1st, London, England, 1977. New York, Learned Information. 237 p.

International On-line Information Meeting,

2nd, London, England, 1978. New York, Learned Information. 286 p.
International On-line Information Meeting, 3rd, London, England, 1979. New York, Learned Information, 428 p.
Kent, Allen/On-line Information Systems. In *Encyclopedia of Library and Information Science*, v. 20. Allen Kent, Harold Lancour and Jay Daily, eds. New York, M. Dekker, 1977. pp. 394-405.
_____/The On-line Revolution in Libraries. *American Libraries* 10(no. 6): 339-342 (Jun 1979).
Kuedke, James A., Jr., Gabor J. Kovacs, and John B. Fried/Numeric Data Bases and Systems. In *Annual Review of Information Science and Technology, 1977*. White Plains, Knowledge Industry Publications, Inc., 1977. pp. 119-181.
Markey, Karen, Pauline Atherton, and Claudia Newton/An Analysis of Controlled Vocabulary and Free Text Search Statements in On-line Searches. *Online Review* 4(no. 3): 225-236 (Sep 1980).
Matthews, Joseph R./The Four On-line Bibliographic Utilities: A Comparison. *Library Technology Reports* 15(no. 6): 665-838 (Nov-Dec, 1979).
Niehoff, Robert, Stan Kwasny, Ann Walker, and Mike Wessells/*Final Report on the Design and Evaluation of a Vocabulary Switching System for Use in Multi-base Search Environments*. Columbus, Ohio, Battelle Columbus Laboratories, 1980. 80 p.
Nitecki, Danuta A./Online Services. *RQ* 19(no. 4): 319-322 (Summer 1980).
Pope, Nolan/Database Users: Their Opinions and Needs. *Special Libraries* 71(nos. 5/6): 265-269 (May/Jun 1980).
Saffady, William/The Economics of Online Bibliographic Searching: Costs and Cost Justifications. *Library Technology Reports* 15(no. 5): 567-653 (Sep/Oct 1979).
Trubkin, Loene/Migration from Print to Online Use. *Online Review* 4(no. 1): 5-12 (Mar 1980).
Watson, Peter G., ed./*On-line Bibliographic Services—Where We Are, Where We're Going. Proceedings of an All-day Meeting at the Centennial Conference of the American Library Association; Chicago, Jul 18, 1976*. Chicago, American Library Association, 1977.

* * *

Annotated References

The following annotated references indicate journals and directories which report on online systems and activities.

Journals

Online Review. Learned Information (1977-).

An international journal of online information systems, this quarterly publication presents articles on all aspects of online searching. Of special interest are occasional bibliographies and directory articles. Examples of such include the following:

(a) "On-line Information Retrieval Bibliography, 1965-1976." v. 1(no. 1) Supplement (Mar 1977); update 2:63-103 (Mar 1978); 3:37-73 (Mar 1979); 4:61-100 (Mar 1980). Citations, totaling 1,838, are grouped by subject; permuted title and author indexes are included.

(b) "Nonbibliographic Data Bases Online." V. 2(no. 2): 125-146 (Jun 1978). [An update to v. 1(no. 4): 257-268 (Dec 1977).] A worldwide listing of online nonbibliographic databases; entries list name of database, database producer, subject, and online vendor.

(c) "Data Bases On-line." v. 4(no. 1): 101-115 (Mar 1980). Lists approximate search costs for databases of nine online services; entries list database name and producer, subject coverage, online suppliers, start year online, and maximum and minimum costs for no commitment and minimum commitment contracts.

Online., Weston Conn., Online, Inc. (1977-).

A quarterly publication, this journal presents general articles on current issues in the online information field. Included are overview descriptions of databases, special reports on online concerns, a workshop calendar, a directory of user groups, and a column devoted to user group activities.

Database. Weston, Conn., Online, Inc. (1978-).

Serving as a complement to *Online*, this quarterly journal provides excellent in-depth coverage of online issues. Articles include detailed reviews of new and existing databases, searching techniques, and specific system descriptions. *Online* and *Database* together provide excellent cover-

age of information needs for those involved in online information retrieval.

Directories

1. *Computer-Readable Data Bases—A Directory and Data Sourcebook.* Williams, Martha, ed. Washington, D.C., American Society for Information Science, 1979.

   A highly comprehensive guide to online databases. Databases described meet criteria for being a) in computer-readable form, b) publicly available, and c) used for information retrieval purposes.

   The main section of this directory is an alphabetically arranged guide to 528 databases. Entries include detailed descriptive information in the following categories: a) basic information (including database name and acronyms, frequency of updates, number of tapes issued per year, time span covered, and correspondence with printed sources); b) producer/distributor/generator information (including names, telephone numbers, and contact persons); c) availability and charges for acquisition of database tapes; d) subject matter and scope of data in database (including number of items in the file and breakdown by original document type); e) subject analysis/indexing data; f) data elements present; g) database services offered; and h) user aids available. The directory contains four highly detailed indexes—producer, processor, name/acronym/synonym, and subject—as well as a table of contents.
2. *Directory of Online Information Resources,* 6th ed.: Kensington, Md., CSG Press, 1980.

   Guide to publicly accessible bibliographic and nonbibliographic online databases. Entries are arranged alphabetically by database name and include cross references; descriptions include subject content, correspondence with printed indexes, producer, coverage, file size, unit record description, and organizations supplying access to the database. Contains a subject index, source index (listing of databases offered by online vendors), and an address list of database suppliers and producers.
3. *Online Reference Aids: A Directory of Manuals, Guides and Thesauri.* San Jose, Calif., CLASS, 1979.

   A useful guide for identifying search aids and documentation, this directory lists manuals, guides, and thesauri for databases accessible through major online search systems. Entries are arranged alphabetically by database name, and vendors and producers for each file are identified. Search aids for databases are listed by title, with price and pertinent ordering information noted. Appendixes include indexes to databases by search system and by subject category.
4. *Directory of Online Databases.* Santa Monica, Calif., Cuadra Associates, Inc. (1979–).

   A quarterly subscription, this directory lists both bibliographic and nonbibliographic online databases. The directory cites classification, subject, producer, online services, conditions, content, coverage, and updating. It contains lists of databases by subject, producer, online services and name, as well as address listings for producers and online services.

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User Evaluation of a Corporate Library Online Search Service

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■ **The responses to an evaluation questionnaire administered primarily to first-time and remote-site users of a corporate library online search service indicated that the searches yield a high percentage of relevant citations for most users. A further correlation between the users' responses to broad relevance categories and their presence at the terminal during the search reconfirmed the importance of interactive feedback between the user and the search intermediary in improving search precision. The study identified significant time savings by the users. Most respondents endorsed the cost effectiveness of the service, particularly those involved in ongoing research projects or starting a new project.**

ONLINE SEARCH SERVICES have been available to General Electric technical and managerial personnel from the Corporate Research and Development (CRD) Whitney Library since 1974. Currently, the library accesses seven online systems: Bibliographic Retrieval Services, Information Bank, Lockheed, National Library of Medicine, NIH/EPA Chemical Information System, Systems Development Corporation, and U.S. Department of Energy RECON.

An evaluation questionnaire was administered to selected users of the search service during 1978 and 1979. Routinely surveying all users who requested searches for a fixed time period was considered inappropriate for frequent users and too time consuming. Instead, questionnaires were sent primarily to first-time users and users remote from the CRD site. A small number of "regular" onsite users were sent questionnaires to provide a broader spectrum of user feedback.

The following objectives were specified in undertaking the study:

- Identify any impact of the search service upon the users' productivity or research progress.
- Evaluate the effect of the end user's presence during the search session upon the quality of the search results.
- Identify any correlation between search retrieval and the number of documents identified by the search which were later read or looked at.
- Identify the methods by which users learn about the service so that the most effective promotional aids can be employed.
- Identify problems encountered by users as well as the good features of the service.

Questionnaire Response

The evaluation questionnaire (*1*), which is reproduced in the Appendix, was sent to 233 users. The composite result for the 78 users (33%) who returned the questionnaire is given in the Appendix. The questionnaire return rate was low; however, many users who had not returned the questionnaire requested subsequent searches. For this reason, the frequency of repeat usage was analyzed as a further measure of user satisfaction with the search service. Data for 1978 search requests showed 55% of all users in 1978 requested two or more searches, while 30% had three or more searches performed.

Promotional Methods

Question 2 of the questionnaire inquired how users learned about the search service. Of the users responding, 46% marked "colleague," reaffirming the familiar maxim that the best advertisement is a satisfied user. However, a combined response of 45% to the options "library announcement" and "library staff" ranks a close second to "colleague." This result points out the important role for library services of publicity aids such as brochures, pamphlets, special announcements, and feature articles in company publications.

Table 1. Relevance Response by Users.

Relevance Category	Percent of Users *Not Present* at Terminal	Percent of Users *Present* at Terminal	Total User Response
Most	13%	10%	12%
Many	42	52	45
Few	31	31	30
None	2	0	1
Can't Tell	9	3	7

Search Retrieval

Discussion of the remaining questionnaire results is limited to two major areas: search retrieval relevancy, and search benefits to the user and the company.

User Present at the Terminal

A higher overall percentage of relevant citations was indicated by users present at the terminal during their search session. The response to question 9 ["How many of the citations retrieved from your search were relevant to your search topic?"] is broken down in Table 1 for the not present and the present users. Of the users present during their search, 62% indicated that most or many of the citations retrieved by their search were relevant, as opposed to 56% for users not present during their search. Furthermore, a smaller percentage of the present users responded "can't tell," and none of them selected the "none" relevance category. Even though the correlation is not consistent for every relevance response category, the higher overall relevance noted by users present during their search confirms the expected result that interactive feedback with the end user improves search precision (*2, 3, 4, 5*)

The importance of having the user present during the search was quickly recognized by the company management. At the Whitney Library a special two-terminal setup is used for these searches. A standard print terminal is coupled with a CRT display terminal to enable the user to view the search results on the CRT without having to peer over the searcher's shoulder. Users remote from the CRD site who have access to a terminal can also participate interactively during their search through a remote or conference call search (*6*).

Documents Read or Looked At

Question 12 requested data on the percentage of documents identified by a search which the user later read, looked at, or ordered. Table 2 shows the response to this question for users present and users not present at the terminal. The data do not show a direct correlation between the presence of the user at the terminal and a higher percentage of documents read or examined. However, the percentage of present users who only looked at document abstracts was lower for three of the four document percentage categories.

The data in Table 2 indicate that a high percentage of users subsequently used a library (or libraries) to read or study the documents or abstracts identified by their search, or to order documents not available in the library collection. One user commented on the frustration of learning about important documents from the search but being unable to obtain them quickly in a local library.

Search Benefits

Time Saved

Question 11 asked the user to estimate the time necessary to complete an equivalent literature search by hand. Average time estimates for manual literature searches performed by professional literature searchers range from 20 to 22 hours (*7, 8, 9*). Respondents who answered this question identified significant time savings through use of the service; 84% indicated their search would have taken a number of days to do by hand or that an equivalent search of printed sources simply could not be done.

Impact on Research and Productivity

An overwhelming majority of respondents (84%) answered that their search was worth the cost incurred. Users of the service are billed for the

Table 2. Documents Read, Looked At or Ordered by Users Present and Not Present at the Terminal.

	Percent of Documents Retrieved								
	0–25%		25–50%		50–75%		75–100%		Percent of All Users Responding
	NP*	P†	NP	P	NP	P	NP	P	
Read or looked at in library	47%	41%	9%	14%	7%	7%	2%	0%	62%
Copy obtained for later study	29	17	2	7	4	0	2	0	32
Ordered through library	56	41	11	10	2	0	0	3	62
Looked at abstract only	22	17	16	14	27	14	20	21	75
Other	7	0	—	—	—	—	—	—	4

*Percent of users *not present* at terminal.
†Percent of users *present* at terminal.

actual search cost plus a 20% surcharge, which partially supports online reference searching by library staff. The following excerpts from users' comments indicate the impact the search service has had on research or organizational productivity:

- . . . Extremely valuable in my research areas as the data appear in so many journals.
- . . . Recent *Chemical Abstracts* search cut lab work from 3 months to 1 month.
- . . . Saved us enormous amounts of time.
- . . . Great value to us in preparing a contract-deliverable product.
- . . . Search extremely important for personnel in development work.
- . . . The information obtained is invaluable to my research and has saved many days of my time.
- . . . More information in a few minutes than I had over the several months (of searching on my own).
- . . . Extremely valuable as it saved me a considerable amount of time and provided me with some crucial references.
- . . . Put us years ahead of the competition.

Conclusion

A followup study to determine quantitatively the impact of online search services on overall R & D productivity is recommended. A recent study by Jensen, et al. (4), presented data on the dollar cost and dollar value estimates by industrial users for their online searches. Another method of quantifying benefits to the company from the search service would be to correlate search requests with measures of productivity such as resulting publications, patents, contracts, or prizes.

Literature Cited

1. Questionnaire based in part on an earlier questionnaire by P.A. Oliver.
2. Knapp, S.D./ The Reference Interview in the Computer-Based Setting. *RQ* 17(no. 4): 320–324 (Summer 1978).
3. Cleverdon, C.W./ On the Inverse Relationship of Recall and Precision. *Journal of Documentation* 28(no. 3): 195–201 (Sep 1972).
4. Jensen, R.J., H.O. Asbury, and R.G. King/ Costs and Benefits to Industry of Online Literature Searches. *Special Libraries* 71(no. 7): 291–299 (Jul 1980).
5. Rogalski, L./ On-Line Searching of the American Petroleum Institute's Databases. *Journal of Chemical Information and Computer Sciences* 18(1) 9–12 (Feb 1978).
6. Warden, C.L./ Update on Conference Call Searching. *ONLINE* 3(no. 3): 34 (Jul 1979).
7. Elman, S.A./ Cost Comparison of Manual and On-Line Computerized Literature Searching. *Special Libraries* 66(no. 1): 12–17 (Jan 1975).
8. Calkins, M.L./ Online Services and Operational Costs. *Special Libraries* 68(no. 1): 13–17 (Jan 1977).
9. Bivans, M.M./ A Comparison of Manual and Machine Literature Searches. *Special Libraries* 65(no. 5): 216–222 (May/Jun 1974).

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Appendix. Whitney Library Online Search Services Evaluation Questionnaire.*

1. Are you a 54% first-time user 38% previous user?
2. How did you learn about the search service?
   - 28% Library announcement
   - 46% Colleague
   - 4% Orientation
   - 17% Library Staff
   - 1% Demonstration
3. Why did you request a search?
   - 67% Research
   - 5% Contract/Proposal
   - 21% Management/Planning
   - 13% Publication
   - 7% Other
4. Was the information and assistance received when requesting your search helpful?
   - 95% Yes Please comment:
   - 3% No
5. Were you present at the terminal during the search?
   - 38% Yes (29 users)
   - 59% No (49 users)
6. If you answered *yes* do you think this was helpful?
   - 34% Yes Comments:
   - 0 No
7. Was the time lag between requesting your search and receiving the final results
   - 95% Satisfactory Comments:
   - 3% Too long
8. Were the explanatory sheets helpful?
   - (1) Search strategy outline: 53% Yes 16% No
   - (2) 'How to read your printout' sheets: 63% Yes 11% No
9. How many of the citations retrieved from your search were relevant to your search topic?
   - 12% Most
   - 45% Many
   - 30% Few
   - 1% None
   - 7% Can't tell from citation alone
10. Was the search worth the cost?
    - 84% Yes Comments:
    - 4% No
11. Could you have done your search manually?
    - 7% In a few hours
    - 37% In a few days
    - 47% Not at all
12. How many documents retrieved by your search did you look at or obtain? (Please mark approximate percent)

	Percent of Documents Retrieved				
	0–25%	25–50%	50–75%	75–100%	(Total Percent of Users)
Read or looked at in library	43%	11%	7%	1%	62%
Copy obtained for later study or referral	24	4	3	1	32
Ordered through library	49	11	1	1	62
Looked at abstract only	20	14	21	20	75
Other	4	0	0	0	4

13. Would you be interested in periodic update searches on your search topic?
    - 26% Yes
    - 63% No
14. Please add any comments:

*The figures given in the answer spaces represent the composite results of submitted responses.

Telecommunications and Facsimile

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■ **Advances in telecommunications have made possible more rapid and cost-effective transmission of information. Libraries should now review and consider a number of communication developments, including devices such as facsimile, copiers, word processors, terminals, and computers, in order to attain integration of devices and processes. Facsimile transmission is examined in some detail, and its advantages and disadvantages are discussed.**

TELECOMMUNICATIONS may be considered the linking of two or more parties at a distance via the use of information technology. Early forms of telecommunications made use of the semaphore, smoke signal, and telegraph. We have come a long way in the last century. Messages can now be transmitted through the use of copper wires, optical fibers, wave guides, and satellites. Signal capacity has grown from the simplicity of the Morse code to the complexity of multichannel, bidirectional cable television.

Telecommunications now exist in many modes. The broadest mode permits messages to be received by all communication nodes and potential nodes from a single source. A multiaccess system mode allows more than one node to transmit and receive messages. Development of viable multiple-access systems has been the goal of recent research and development in the technologies of cable, radio, and satellite transmission. The advantages and disadvantages of various approaches have been discussed by Bunch and Alsberg (*1*).

Generally, the transmission channels used must be cost-effective, as free of noise as possible, and capable of accommodating many messages. Messages can be transmitted in either analog or digital form. Telephone or voice grade messages are usually analog. Definitions for the terms "analog" and "digital" are provided by Hordeski (*2*):

analog—A continuous DC level of voltage or current, the magnitude of which is usually proportional to an unrelated parameter of function being monitored or measured.

digital—Employing discrete integers or voltage levels to represent data and information. A digital format can be used to represent any and all information required for problem solution.

Cawkell explains the advantages of digital transmission:

> The advantages of digital transmission are so great that it pays to adopt it when possible, even in a worldwide system designed for voice. A major advantage is that digital signals can be strengthened at intervals along a long-distance channel by regeneration; this process does not add noise (and thus errors) as does the amplification of analog signals. Digital devices are relatively cheap and reliable and can handle computer-generated code directly (3).

The sending and receiving devices for transmitting information using either analog or digital systems can include, but are not limited to, telephones, computers, electronic mail devices (word processors, facsimile devices), video of various types, and similar equipment.

In offices, information is generally handled in the form of documents, letters, memos, and data—or as Horton calls it, "literature, documents, and data" (4). These materials must be received, distributed, filed, retrieved, amended, and transmitted. Interposed in these tasks is the organization of the files so that the foregoing tasks can be accomplished. Most of these functions are still performed manually, and the materials are still mostly in paper form.

Office Automation

As the costs of machine storage decreased and microminiaturation increased, a rethinking of general office functions brought about a new system conceptualization, i.e., "the paperless office," "the automated office of the future," "office automation," and so on. These new buzz words have one central concept behind them: the clerical functions of the office and the decision-making functions that occur in an office could be simplified and made more efficient so that office or white collar productivity would increase. Since the records management function in libraries and information centers is analogous to that of the office, comparable automation goals are appropriate. One additional factor, however, must be considered: the information facility and the operations it performs are part of an *integrated* system. The literature of office automation has touched on this integration but, in general, has treated each function separately. Word processing, electronic mail, facsimile transmission systems, and so on are discussed as discrete office automation topics.

Many devices are now available to provide information facilities for an integrated system. Optical character recognition (OCR) devices can transmit signals to an "intelligent word processor" which can transmit the messages onto a floppy disk, or to a computer storage, or to a distant "intelligent copier," and produce a paper copy. A facsimile device can also transmit information in analog or digital form and produce a copy of the original, or the signals can be stored until copies are needed. This process is sometimes considered a form of electronic mail. Even microfiche can be scanned and hardcopy produced at a distance. Experimentally, if scanned and read onto film or via a microcomputer, new fiche could also be produced.

Libraries have been accused of slow adoption of technology from the typewriter to the modern computer. However, in terms of research and development, there must be a convergence of basic research and technological development that permits a known need to be met cost effectively (5).

The introduction of telecommunications systems is taking place in all areas of information operations, albeit not on an integrated basis. As shown in Table 1, both in-house and out-of-house systems are proliferating.

Facsimile Transmission

Facsimile transmission and its adoption for use in libraries is an example of a specific telecommunications application. Facsimile, a nineteenth century development, is now being reconsi-

dered since it is at a point of being effective in public service organizations. Costigan provides a good historical overview of facsimile (*6*). He describes facsimile transmission as:

> . . . converting visual details of a diagram, document, etc., to an analogous electric current, conditioning the current for transmission by wire or radio to a receiver, restoring it to its original form at the receiver, and amplifying it sufficiently to drive a reproducer, which converts the current variations to a visual facsimile of the transmitted item (*7*).

The library's function of transmitting information from storage to the end user at a distant place has always been a prime cooperative resource-sharing service. The exchange of books, journal articles, and technical reports through interlibrary loan was originally accomplished, and to a large extent still is, using the mails or some other form of physical delivery. The idea of "loan" had been modified; libraries now reproduce articles (subject to copyright law restrictions) and forward them for retention to avoid depriving their own users of the materials. The forms of delivery and the tasks involved in interlibrary loan have made this process expensive. Moreover, the built-in time delay poses a problem for the end user.

Attempts to reduce time delays gave rise to linear programming and other solutions (*8, 9*). Nevertheless, past experiments showed that, due to the analog technology being used, transmission and scanning were too slow and therefore too expensive, that quality was poor, that equipment breakdowns were frequent, and that cost effectiveness required high volume.

As early as 1968, Schatz did a thorough state-of-the-art survey reflecting these facts (*10*). However, recent technological developments have improved the ability to digitize information cheaply, to scan more rapidly, and to provide quality output. As a result, industrial organizations and information facilities are taking a second look at facsimile transmission.

Table 1. Current Applications of Telecommunications Systems to Library Operations.

Area	Telecommunications Effort
Ordering	Online acquisitions are promised by OCLC. Experiments are also progressing with such companies as Brodart and Baker & Taylor with local libraries.
Receiving & paying	Mostly in-house efforts, with the record keeping function.
Cataloging & classification	OCLC, RLIN, WLN and other networks, as well as locally held MARC records which can be shared on a networking basis.
Directory switching center, union lists	OCLC; the various bibliographic centers provide locations and sometimes process interlibrary loan requests. Batelle is investigating the linking of bibliographic utilities.

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Current perceived advantages for using facsimile include the following:

- Speed in communication. Facsimile is more rapid than the mails. This is especially true for the types of materials held by libraries.
- Flexibility is provided for non-coded, printed information. Facsimile has the ability to transmit printed as well as graphic material without different encoding. Despite the fact that digitized data can be transmitted more rapidly, one must remember that for such information to be transmitted, it must at some time have been input, i.e., entered into the system.
- The consequences of error in facsimile transmission are miniscule because of the high scan rate, whereas errors based upon binary systems require error checks, e.g., parity. Moreover, the consequences of digital error affect the entire character or data.
- Cost-effectiveness is attained, since minimal instruction is needed to train clerical help compared to the more complex and expensive training required for computer data transmission, or for key-punch conversion.
- Modern fax systems are essentially automatic once the material to be

scanned has been put into the machine and the telecommunications established. Also, there are autofeed fax scanners that can take advantage of the less expensive night rates.

There are, however, also disadvantages to the use of fax:

- Very little data compression can take place. Every area on a document, whether it contains print or white space, must be scanned. Therefore, much time may be spent scanning informationless material.
- Fax transmission, especially when converted to analog form is essentially slower than digital transmission. This disadvantage has been overcome in some machines that are able to digitize directly the information to be transmitted.
- Transmission impairments and equipment servicing are difficult to identify and correct.
- As there have been few standards developed, compatibility between scanners and receivers is as great a problem as compatibility between terminals and computers.
- Since scanning is done only on single sheets, materials must be photocopied from books and periodicals—a further time delay and cost increment.

Summary

Telecommunications have permitted the transmission and integration of information processes over wire, via wireless, satellite, optical fibers, lasers, and similar means. The library, which has treated the various devices—such as facsimile, copiers, word processors, terminals, and computers—as separate devices, should now consider the integration of devices and processes. A detailed look at facsimile devices and their applications can now be viewed as part of a system which will send an original, translate it into digital form, record the digitized information on a floppy disk or a computer memory, transmit the information to such devices, and record the information on demand. However, once multifont optical character recognition (OCR) devices become common and effective, facsimile may become an obsolete technological innovation.

Literature Cited

1. Bunch, S. R. and P. A. Alsberg/ Computer Communication Networks. In *Annual Review of Information Science and Technology*, v. 12. White Plains, N.Y., Knowledge Industry Pubns., 1977. pp. 183–216.
2. Hordeski, M./*Illustrated Dictionary of Microcomputer Terminology*. Blue Ridge Summit, Pa., TAB Books, 1978. (No. 1008).
3. Cawkell, A. E./Information Technology and Computers. In *Annual Review of Information Science and Technology*, v. 15. White Plains, N.Y., Knowledge Industry Pubns., 1980. p. 39.
4. Horton, F. W./*Information Resources Management*. Cleveland, Ohio, Association for Systems Management, 1979.
5. Klempner, I. M./*Diffusion of Abstracting and Indexing Services for Government-Sponsored Research*. Metuchen, N.J., Scarecrow, 1968. p. 45.
6. "Fax" in the Home: Looking Back and Ahead./*IEEE Spectrum* 11 (no.9):76–82 (Sep 1974).
7. Costigan, D. M./*Electronic Delivery of Documents and Graphics*. N.Y., Van Nostrand, 1978.
8. Heinritz, F. and Hsiao, J. C./Optimum Distribution of Centrally Processed Material. *Library Resources and Technical Services* 13 (no. 2):206–208 (1969).
9. Hsiao, J. C. and Heinritz, F./Optimum Distribution of Centrally Processed Material: Multiple Routing Solutions Utilizing the Lockset Method of Sequential Programming. *Library Resources Technical Services* 13 (no. 4):337–544 (1969).
10. Schatz, S./Facsimile Transmission in Libraries: A State-of-the-Art Survey. *Library Resources and Technical Services*. 12 (no. 1):5–15 (1968).

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The Impact of Office Automation on Libraries

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■ **The "Paperless Office," a model of "The Office of the Future," demonstrates the feasibility of integrating present office functions through the use of voice, text, digital, micrographic, facsimile, and related information technologies. The processes and component features of the automated office and the relationships among them are described. Since most people in the library world spend a considerable portion of their time performing traditional "office" functions, the library community should become more fully aware of developments, testing, and applications of integrated office technologies.**

IN RECENT YEARS, the library community has been preoccupied with the impact of the emerging information technologies on such functions as the maintenance of card catalogs, circulation control, interlibrary loans, library networking, online bibliographic searching, and other library-oriented activities. Information technologies using voice, text, digital, and micrographic media are also causing significant changes in the way information workers can perform traditional office activities. Most information professionals continue to spend a considerable portion of their time in traditional "office" activities. Therefore, it is important for the library community to become aware of the impact of automation on the "office" activities of libraries.

The Paperless Office

Office automation firms have demonstrated the operational feasibility of "The Paperless Office," a model of "The Office of the Future," which makes use of commercially available hardware, software, and service components supplied by a variety of vendors. "The Office of the Future" is a concept that relates to the integration of present office functions by the use of new information technologies; thus, "The

Paperless Office" is intended not to eliminate paper but to reduce the amount needed to perform integrated, multimedia office functions.

The integration of office functions will directly affect managerial, professional, and technical functions, as well as administrative and clerical tasks in every library and information center. The introduction of automated procedures in factories has greatly increased worker productivity. Similarly, the integration of many of the office functions performed in libraries should produce equally dramatic increases in the productivity of library operations.

The Effects of Automation

Over the years, the office has been transformed through the use of electromechanical devices, i.e., the telephone, typewriter, and office copier. These devices were introduced slowly over several decades. Their impact on office workers, while significant, did not have the dramatic emotional or organizational effect that the rapid introduction of new technologies has produced in libraries. Another important difference is that, in the office, the telephone, typewriter, and office copier each "stand alone" and perform discrete functions, whereas the devices employed in library operations are interconnected or interfaced.

This paper discusses the various processes and components of the "automated office" and the relationships among them. The development of a logical plan for the progressive integration of these various functions will be critical to the successful evolution of library operations.

The Integrated Office System

The technologies that are being interfaced and integrated to create the "automated office" are: machine dictation; word processing; optical character recognition (OCR); data processing; reprographics; communication; graphic systems; teleconferencing; electronic mail; photocomposition; facsimile; and video systems. Figure 1 illustrates a typical "automated office." The descriptions that follow refer to the components and their interrelated functions as shown on the flow chart.

Document Creation

Documents will continue to be created by hand. A typical example is a book request form filled out by hand. Many documents will continue to be prepared on ordinary typewriters. Information, first produced on paper, may be converted to digital form or indexed (in the computer) and converted to microform for subsequent cost-effective storage and retrieval. Information can also be created using voice directly into dictation devices within the office or over the telephone into centralized dictating equipment. The information is keystroked using a word processing device that produces paper or digital records. Finally, alphanumeric or graphic (color or black and white) information is created directly on an electronic terminal that is interfaced with a computer.

Digital Conversion and Manipulation

In order to improve productivity and to more efficiently handle information, it is necessary to have certain information in digital form. Documents prepared by typewriter go through an Optical Character Reader (OCR) which scans and converts the information to digital form. It is then possible to transmit that information to a word processing system or to a computer for further manipulation. The digital documents that are originally created on word processors or on OCR are indexed by key words, reference numbers, dates, and other descriptive parameters on a terminal to the computer.

The type of computer used can be a mainframe, a centrally located mini device, or a microprocessor associated with or integrally connected to the OCR or word processing devices. Access to a computer can also be

arranged through a service bureau on a time-shared basis. The computer provides the capability to manipulate the information, put it in another form, update it, get it ready to be sent to a subsequent operation or remote output, or have some other function performed on it. The data can then be converted into hard copy using a draft or letter quality printer—one of the various paper mode output devices available.

Micrographic Conversion

There are three ways of converting information into microfilm and microfiche that provide a permanent and low-cost means of storing information: 1) information coming from the computer can be sent to a Computer Output Microfilmer (COM) which converts digital information back to readable form on microfilm or microfiche; 2) paper-based documents that are frequently updated or changed and the more dynamic types of databases can be filmed on updatable cameras which provide the ability to successively add a page of information to a microfiche or to void outdated material as required; and 3) large reports and documents that do not need to be changed can be filmed on a source document camera.

Storage and Retrieval

The microforms produced by all three cameras are put into an Automatic Document Storage and Retrieval (ADSTAR) device so that they can be retrieved as needed. The index to the material in the automatic retrieval device is in the computer so that appropriate documents in microform can be located more quickly, efficiently, and inexpensively than is possible with paper or computer storage and retrieval systems.

Replication

There are two ways of producing copies from master microfiche in the automatic microform retrievel device: 1) a duplicator, which is a device for making duplicate microforms; and 2) an enlarger/printer for making hardcopy from the microimages. Hardcopy can also be obtained directly from the word processor or the computer.

Activity Station

The user is equipped with an electronic terminal for sending and receiving electronic messages, maintaining an electronic calendar, accessing the electronic telephone directory, putting information into the electronic files, searching for and retrieving references to indexed microform documents, dialing up to remote databases, and interacting through the computer with other office personnel who also have terminals. A microform reader is available for viewing the duplicate microforms that were obtained from the masters in ADSTAR (Automatic Document Storage and Retrieval System). The user can create hardcopy at the terminal or have access to hardcopy produced from microforms or the word processor. Hardcopy can be transmitted to or received from other offices electronically by the use of the facsimile device. Information generated at the terminal can also be transmitted directly to a photocomposition device.

Indexing, Procedures and Communications

Since the flowchart is a two-dimensional representation, it can not adequately project the importance of the indexing activity and the communications network. In order for the automated system to most effectively serve its users, all documents are properly indexed using set procedures. All indexes are created in the computer from a terminal and all queries are made from the terminal to obtain the location of the appropriate microform in the ADSTAR device.

Communication facilities are the "glue" which brings all the components of the system together; they provide the means by which components are interfaced to form an inte-

grated office information system. A computer-controlled digital switch device allows distant locations and remote sites to tie-in with the system. The system may literally be used anywhere—at home, while traveling, or at a location as remote as another country.

Figure 2 describes in more detail the specific inputs, facilities, processes, support components, and output of a typical integrated office activity station. Different individuals, performing certain types of tasks, are provided with the appropriate facilities and support components at a particular station.

Such integrated activity stations will become available in many forms by the mid-eighties. The library and information service community should become more deeply involved in the development, testing, and use of the integrated office systems and activity stations.

Figure 1. The Integrated Office System.

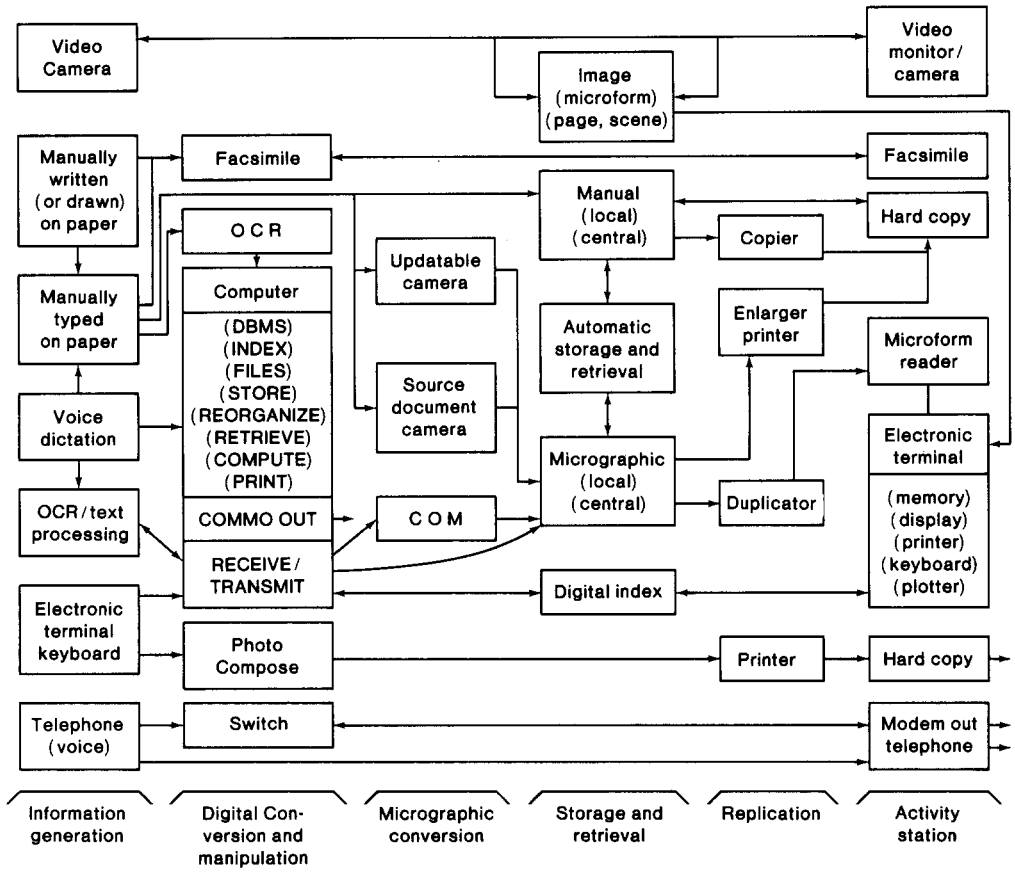
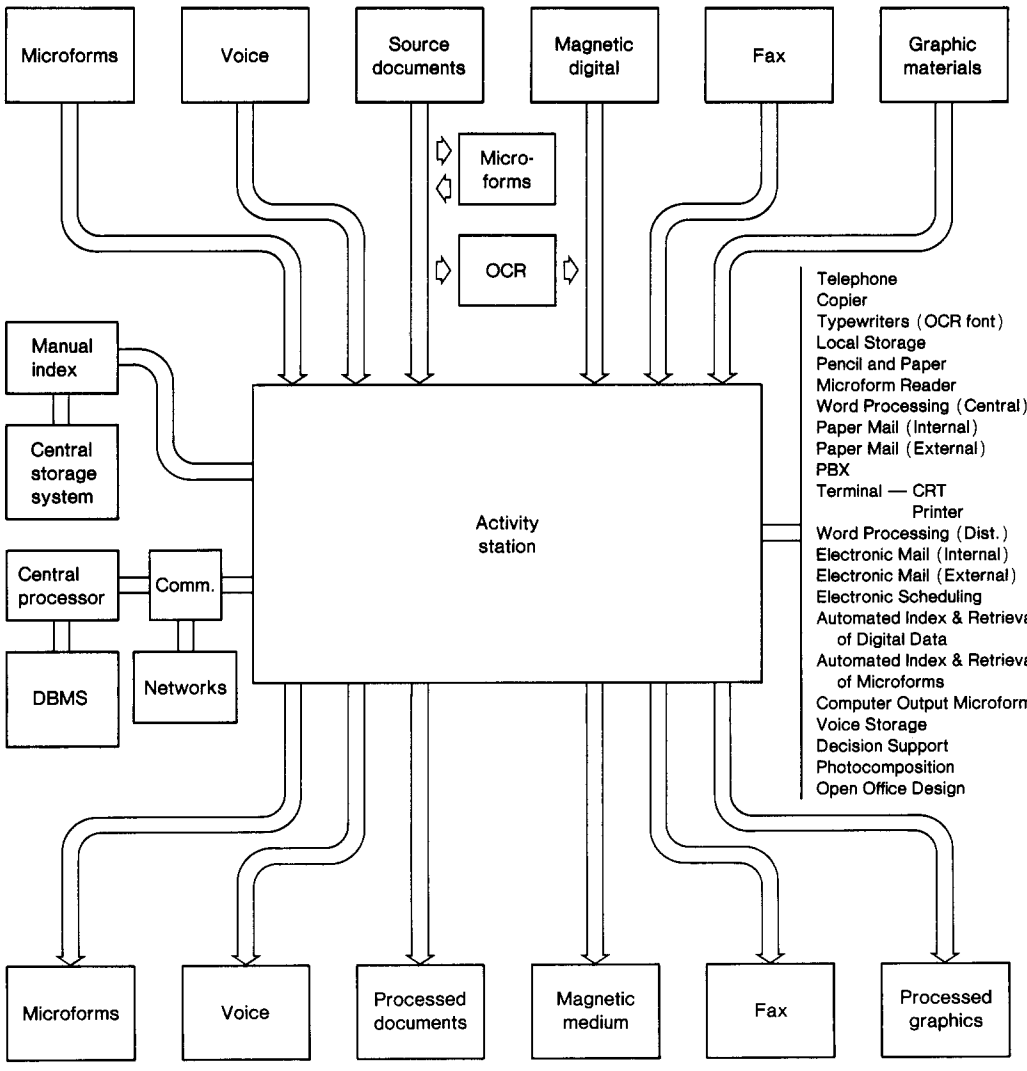


Figure 2. The Integrated Office Activity Station.



*Element composition may vary between work stations.

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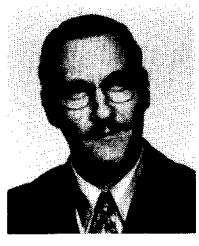

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Microcomputers in Personal Information Systems

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■ **Powerful microcomputer systems have become available at a cost which many individuals and small libraries can afford. The present and near-term future capabilities of microcomputers for personal information systems is examined. Requirements for such systems are discussed. The currently available hardware and software are examined in terms of these requirements, as are current trends in this rapidly developing field.**

THE DEVELOPMENT of microprocessor and microcomputer systems has started a revolution in personal computing. The price of microcomputer systems is falling rapidly, and powerful systems are now within the reach of many individuals and small libraries. These systems offer many possible uses, including the maintenance of personal information files for researchers. This paper will examine the characteristics and requirements of personal files and the characteristics of microcomputers and their suitability for handling the personal information needs of the researcher.

Personal Information Systems

Most researchers have growing collections of reprints, technical reports, photocopies, books, and other documents. Many maintain some kind of indexing system and/or retrieval mechanism for their collection. Traditionally, these indexing and retrieval systems have taken the form of card files or systems with some degree of "mechanization," such as edge notched or optical coincidence cards. Jahoda (*1*) and Foskett (*2*) describe a number of approaches to the design of individual information systems. The availability of centralized information services such as libraries, information centers, and large bibliographic or nonbibliographic databases does not diminish the need for these personal collections. Indeed, the opposite seems to be true; studies show that individuals with the largest personal collections are also the heaviest users of their organization's library and information services (*3*).

The increasing availability and library use of commercial database services is likely to bring more information to the attention of the researcher, thus placing a greater burden on the

personal system. Personal information systems tend to be idiosyncratic, reflecting the knowledge, habits, and work environment of the individual. The systems need to be flexible and responsive to the needs imposed by changing sets of specialized tasks. Also, there are several classes of documents not readily handled through nationally centralized services. Some of these classes, listed by Wallace (4), are: working notes, laboratory notebooks, preliminary sketches and drawings, memoranda, formal drawings, data, progress reports, test reports, technical orders and specifications, operational manuals, maintenance manuals, and trade catalogs. The researcher needs to correlate information from several of these categories as well as from technical reports and papers and articles.

Individual and centralized files are seen as complementary. Some materials retrieved in a literature search may not have immediate value but may have potential future value. Public data transferred to a private database are given a unique identity by being reformatted, annotated, and indexed to suit the personal requirements of the user. The transfer could be done electronically if the individual system were suitably equipped.

Microcomputers are now being used for transfer of information from computer networks. Personal information systems based on microcomputers offer the possibility of being integrated into larger systems for access to several levels of service and several types of information. The special librarian may thus be called upon to provide advice with respect to design or compatibility characteristics of proposed personal information systems.

Microcomputers

The first all-electronic computer, ENIAC, weighed 30 tons, contained more than 18,000 vacuum tubes, 70,000 resistors, 10,000 capacitors, and 7,500 relays. It required many miles of wire and cables, occupied 3,000 cubic feet of space, and consumed about 150 kilowatts of electricity. Today, through progress in microminiaturization and integrated circuitry (5), we can hold more computing power in one hand. The transistor, invented in 1948, displaced the vacuum tube by 1959, and steady and rapid progress in integration (the combining of multiple components on a single chip of silicon) led to the microprocessor. The early microprocessors (1971-74) had a four-bit word size, i.e., they could manupulate information coded as a string of four binary digits. They were used in digital watches and pocket calculators but were limited in their ability to perform general information processing. An eight-bit logic capability is required by the standard information interchange codes.

Eight-bit microprocessors appeared in 1974. Today there are several eight-bit microprocessors and a few 16-bit microprocessors being used in microcomputers. More 16-bit machines are making their appearance. Eight-bit processors are well-suited for character manipulation, but the 16-bit processors are better for computation. Since most minicomputers have a 16-bit word size, the new generation of microprocessors is comparable to many minis, to the extent that power depends on word size.

The microprocessor chip is the heart of the microcomputer. It is the component that performs most of the functions of a computer's central processing unit. When interfaced with timing, memory, input and output control, and a power supply they form a general purpose computer. The term "microcomputer" refers to such a fully interfaced device. A "microcomputer system" is a microcomputer with its associated input, output, and storage devices (e.g. printers, terminals, tape and disk storage units) and operating software.

Costs

The first commercial computer, the Univac I, cost about $1,000,000 in 1952 dollars. A computer of comparable power can be purchased today for under $1,000. Costs of computers have been decreasing by about two orders of magnitude (a factor of 100) each decade.

The cost of the microprocessor is becoming a smaller and smaller percentage of the total computer system cost. Peripherals, such as terminals, printers, mass storage devices, are dropping in price also, but less rapidly than computers themselves.

Computers for Personal Information Handling

The main effort in using computers for handling bibliographic records has been directed at large public databases, but computers have also been used for support of personal indexes. Early systems, beginning in the mid-sixties, were batch-oriented; their primary product was a printed index or collection of indexes. Examples of these systems, all of which ran on large computers, are SURF (*4*), FAMULUS (*6*), ACCESS (*7*) and INDEX (*8*).

Systems designed for text editing and personal notebooks were also used for bibliographic files. SHOEBOX (*9*), RIQS (*10*) and AUTONOTE (*11*) are examples of flexible systems for personal files implemented on large computers. Many of these systems are described by Lancaster and Fayen (*12*).

Minicomputers appeared in the mid-sixties, and software for the use of these systems for personal files has been developed during the past several years. Compared to mainframe or "macro" computers, minicomputers provide easier access and less complex protocols. Virtually all are designed for use in an online, time-sharing mode. The capabilities of minicomputers have expanded with time to include larger memories, more languages, and better operating systems and system software, i.e., database management systems, sort and merge utilities, and so on.

Minicomputer systems have proven to be competent in handling personal and group files. Parker and Thorpe (*13*) describe GRIP (General Retrieval of Information Program), a system based on Hewlett-Packard 2100S and 21MX(E) minicomputers. This system was designed to be flexible for handling small files of less than 200,000 characters which are typical of personal and departmental files.

Leggate and coworkers (*14*) studied the suitability of minicomputers for handling personal databases. Their experimental system ran on a PDP 11/20 minicomputer with 12 K words (16 bits per word) of main memory, 2.4 Megabytes (millions of characters) of disk storage and tape storage—a fairly small mini by today's standards.

CAIRS (Computer Assisted Information Retrieval System) (*15*) is one of several examples designed for organizational rather than individual use. It runs on a Texas Instrument 980 minicomputer and is able to handle about 12,000 items per year, provide online retrospective searching, SDI, and bulletin and report generation.

Pathfinder I is a minicomputer-based system developed by the Intelligence System Staff, U.S. Drug Enforcement Administration (*16*). It provides a wide range of sophisticated searching capabilities. This system runs on PDP series (11/45 or 11/70) minicomputers.

Bell and Jones (*17*) describe MORPHS—Minicomputer Operated Retrieval (Partially Heuristic) System. This system uses linguistic algorithms for finding word roots, and handling synonyms and compound words. It runs on a Varian 620 with 32 K bytes of memory, although it is capable of running in 12 K.

The AMP Inc., information center has developed an information retrieval system which runs on a Prime minicomputer (*18*). This system allows natural language searching, word truncation, adjacency and pattern matching,

searching of all special fields, and convenient display control. User aids are provided in the form of online instructions, term frequency lists, a vocabulary guide, and preconstructed strategies.

The author has developed a minicomputer-based information handling system, known as FUINUI, for the input, editing and maintenance, and online searching of local databases (*19*). It operates much like the commercial online services in its use of Boolean operators, comparison searching, free text search capabilities and formatting of output. Though originally designed for teaching the basic concepts of online searching, the system is finding other uses as well, such as student placement file, bibliographic production, reserve book file. This system is written in BASIC and runs in a region of about 10K (16-bit words) on the University of Hawaii's Hewlett-Packard 2000 minicomputer. The system is capable of handling a variety of record formats. The largest file used thus far is about 200,000 characters.

These examples of viable, minicomputer-based systems would suggest that the microcomputers now available or soon to be available at a low cost would be capable of handling these tasks. The power of the new 16-bit microprocessors is approaching that of the low to medium end of the minicomputer spectrum.

Present Capacities of Micros

Present day microcomputers generally employ flexible, or floppy, disk storage with from 90K bytes to 1 M bytes per drive, going from single-density, single-sided, mini floppy (5¼") to dual-density, dual-sided, 8-inch floppy disk. Some 5¼-inch drives offer quad density, and the technology is advancing toward much higher recording densities. These disk drive units with the necessary software and hardware for interfacing to a microcomputer sell for between $300 and $2,000. Appearing on the market in late 1979 and early 1980, hard disk systems with from 5 to 70 M bytes of storage are being offered at prices which compare very favorably to floppy disk systems (about $2,000 to $3,000 for 10 M bytes) (*20*).

Bubble memory technology has not made an impact on the mass storage market as yet, but this may soon change as the technology advances. This technique has the advantage of having no moving parts. Other technologies, which show potential for low-cost and high-density storage, include video disk (*21*) and holographic (*22*) storage.

Eight bit processors have a maximum addressable internal memory of 64 K bytes, although some offer the capacity to bank switch for larger memory. Clock rates are typically 1 to 4 M hertz (millions of cycles per second). Clock rates determine the speed at which the basic operations of the computer are performed and are a major factor in determining the processing speed of computers.

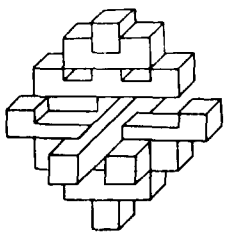
The new crop of 16-bit microprocessors are capable of addressing larger memories—up to 8 M bytes. Their clock rates are higher, and the instruction sets (the basic machine instructions) are more powerful. They are closing the gap with minicomputers.

Software for Micros

Three levels of software are found in computing systems. Systems software includes operating systems and programming languages (assemblers, interpreters, compilers). Utilities which are normally available are sort and merge programs, editing functions, statistical subroutine packages, and database management systems. Applications programs can be written or purchased for a wide variety of tasks. Progress in software tends to lag behind developments in hardware, but there is also progress being made in this area.

In general, the operating systems on

microcomputers are less complex than on larger machines, in part because most micros are single-user machines. Operating systems are getting more elegant and simple to use. A UNIX-like operating system is now available for 8080/Z80 systems (two of the more



popular microprocessors) (23) and will likely be available for other microprocessors before long. The UNIX operating system was developed at Bell Labs, originally for large PDP-11 minicomputers.

During the first few years, BASIC was about the only higher-level language available (with as many versions as there were vendors since it is not standardized). Now there are many higher-level languages to chose from: FORTRAN, COBOL, PASCAL, FORTH, C (a relatively new language well-suited to database programming), APL, and PL/I are available. Of course the usefulness of a computer language depends not only on the presence of a compiler but also on features implemented, diagnostic aids, efficiency of code produced, and speed of compilation. The level of this support is frequently lower with microcomputers.

In the area of applications software, there is a vast array of programs available for applications ranging from game playing to word processing. Unfortunately, much of the available application software is of mediocre quality and poorly documented. Compared to the cost of software for minicomputers and mainframes, the software for micros is inexpensive, due to the large potential market and the limited budget of most individual users.

Requirements of Personal Information Systems

Convenience and Ease of Use

A number of studies have shown that researchers rank their information sources primarily in order of convenience. As Lancaster states, "Convenience appears to be the single most important factor determining whether or not an information service will be used. It is the overriding consideration in the information seeking behavior of professional people" (*24*).

Libraries and other formal sources consistently rank low as preferred sources. Personal files, however, are likely to be the first source that a professional will turn to for information. The study by Soper (25) demonstrated the importance of personal collections: 59% of the references cited in researchers' publications were found to be in their personal collections. Personal files have several advantages over central files: they are physically accessible; they consist of material selected and evaluated in view of personal needs and interests; and they may be organized to suit the user's own view of the subject. The extent to which such files are organized depends on the user's ability and motivation to do the necessary planning and maintenance.

Beyond the personal collection, the next step in searching for information is usually to contact a colleague. Each established field of study has its own informal network, referred to as the "invisible college," which facilitates communication among the "in group." The use of computer conferencing and electronic mail facilitates this approach.

Convenience and ease of use is dependent on the programming of the information processing modules. Programmers will need to keep human factors in mind when developing personal information systems. The factors to be aware of are addressed by P.F. Jones: "The four basic aspects of man-computer interaction are predictability,

implication (the extensive use made by humans of context), experimentation (the importance of trial and error procedures), and motivation (the part played by feelings such as trust, hostility, etc.)" (*26*).

Lancaster (*24*) lists the following as requirements of a user-oriented system:

- natural language-oriented;
- searching should be by means other than formal Boolean strategies, e.g., natural language statements;
- allow citation searching;
- minimize keyboarding;
- the system should be forgiving;
- provide document delivery.

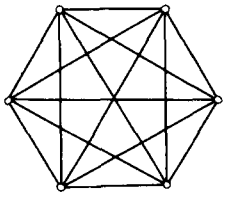
Some of these requirements call for sophisticated programs which may well take more than the 64 K memory of the 8-bit processor. As the newer 16 bit processors can address several million bytes of main memory, they will be able to handle even the most elegant systems. Most of the systems developed for the mainframe computers use less than 250 K bytes of main memory.

The ability of microcomputers to accept voice input and light pen or touch panel response, as well as speech synthesis for output, offers some interesting possibilities for convenient interaction.

Flexibility

Personal files contain various forms of documents collected for a variety of purposes. Bibliographic storage and retrieval will, therefore, be a major function, but other tasks such as text editing, correspondence, data collection, and manipulation are likely to be included. The system should provide help for inexperienced users without hindering the experienced user. It should also allow for easy modification of content and structure of stored records.

Flexibility is primarily a programming problem. Some of the minicomputer systems mentioned use sequential files and string searching to allow total flexibility in record format and content. This involves a trade-off with search time which is practical for small files. With new head-per-track disk drives, it is possible to efficiently search larger, sequential files by means of parallel associative searching in which all read heads scan their tracks in parallel manner. Data independent programming (storing the data description with the data) will allow for flexibility in record structure and content. Most operating systems and database management systems that are being marketed for microcomputers also have good text editing capabilities, allowing changes to be made with ease.



The range of potential applications of a personal computer is another aspect of flexibility. These systems can be used in many information processing activities. Word processing packages permit the input, editing, and formatting of various writing tasks. Mathematical and statistical programs perform computational jobs. The personal computer can be programmed to behave like an intelligent terminal for communication with other computers in computer conferencing, exchanging electronic mail, checking computer bulletin boards, accessing bibliographic utilities, and so on.

One obstacle in the use of computer-based information systems is the problem of data entry. The prospect of keying in hundreds or thousands of records may discourage potential users. Some alternate means of data entry, which should encourage the use of these systems, include publication of data in machine-readable form on floppy disk, tape, phono-record, bar code printing, optical character recognition, holographic fiche, and video disk. One of the magazines in the personal computing field has published

its annual index in the form of a flexible, plastic phonorecord insert; another has experimented by publishing programs and data in bar coded form. Online transfer of data from secondary vendors, from colleagues' personal files, and other sources is also technically feasible. Some progress in standards is needed for this to become widely used.

Cost

The initial investment and ongoing operating costs of a personal system must fit within the user's budget. In a research organization, the employer may decide that institutional support of such systems is justified.

The purchase price of personal computer systems currently range from a low of about $500 to a high of about $10,000, with no real upper limit. The lower figure will buy a minimal system with little memory and only cassette tape storage. The higher figure will purchase a powerful system with 64 K memory, dual floppy disk drives and a hard disk unit with at least 10 M bytes. An expenditure of $3,000 to $5,000 will purchase a system adequate for most single-user, personal information systems.

Capacity

Most manual systems, such as edge-notched cards or optical coincidence cards, can handle up to 10,000 items, though they work better with smaller collections. Soper (*25*) found a collection size ranging from 1 to 41,412 documents with a mean of 1,257.9. The personal files described by Burton and Yerke (*6*) ranged from 500 to 3,500 records with average record lengths of from 200 to 2,500 characters. The largest file in the Burton and Yerke study was about 7.5 million characters.

A mass storage capacity of 10 M bytes should be sufficient for even large personal collections, while 1 M byte capacity should be adequate for the average collection. Currently available hard disk systems for microcomputers will handle the 10 M byte requirements, while up to 4 M byte can be provided by floppy disk systems. Larger collections can be handled with floppy disk systems if the files can be subdivided and stored on separate disks. Disk storage units are available that will store even the largest personal files. The price of the high capacity systems is perhaps out of reach of many individuals at present.

Some Current Micro-Based Systems

Though microcomputers have not been available long, some systems have been reported in the literature, and many more exist that have not been reported.

Van Styvendaele (*27*) reports on a microcomputer system that is capable of dealing with a 2,000-item bibliographic file. The system runs on a Tektronic 4051 with 32 K bytes of RAM (random access memory) and a magnetic tape drive with 300 K capacity. The system features a simple command language (close to natural language), ease of operation, explicit error messages and easy error correction, editing features for easy handling of free text, sorting on specified character positions, and several search types.

Bivins and Palmer (*28*) describe the application of a low-cost microcomputer system to information retrieval for use by reference librarians. REFLES (Reference Librarian Enchancement System) is designed to provide both fact retrieval and bibliographic or pointer retrieval.

Thompson (*29*) reports that the International Development Research Center in Ottawa has designed a minicomputer package based on ISIS software. The Center is working with ILO and institutions in several countries to draw up specifications for a microcomputer version of the system.

Also in the developmental stage is a plan by the Institute for Scientific Information to market a microcomputer-based information retrieval system

called PRIMATE (Personal Retrieval of Information by Microcomputer and Terminal Ensemble) (*30*). This system is aimed at the individual researcher. Citations will be provided by ISI for personalized indexing by the individual.*

Conclusions

The microcomputer systems of today are capable of supporting the personal information processing tasks of file maintenance, retrieval, text processing, communications, and data manipulation. Performance comparable to systems available on some minicomputers and mainframe computers can be achieved now, and the power of the personal computer is growing rapidly. Projections indicate that personal computers with the computing power of current large mainframes will be available in the mid 1980s.

Recent technological innovations have helped make personal and public information systems a reality today. Developments such as videotext services offer information in an easy-to-use interactive mode via the telephone and the television set (*31*). The Source and Micronet are online information systems that offer a variety of services including electronic mail, an online encyclopedia, access to UPI worldwide news and sports coverage, home shopping, programming languages, and numerous applications programs (*31*). Further developments in software and communications technology are needed before personal information systems can be integrated into worldwide information systems.

One can envision the day when a researcher will turn to his own information system to access his personal files, his invisible college network, departmental files, his local library or information center, centralized bibliographic utilities, and electronically published journal systems.

The microcomputer systems of today are capable of supporting the personal information processing tasks of file maintenance, retrieval, text processing, communications, and data manipulation. Performance comparable to systems available on some minicomputers and mainframe computers can be achieved now, and the power of the personal computer is growing rapidly. Projections indicate that personal computers with the computing power of current large mainframes will be available in the mid 1980s.... One can envision the day when a researcher will turn to his own information system to access his personal files, his invisible college network, departmental files, his local library or information center, centralized bibliographic utilities, and electronically published journal systems.

*See also "Minicomputers in Information Work," pp. 138–141 in this issue.

GLOSSARY

Application programs: Programs written to solve specific problems or perform specific tasks.

Batch processing: The mode of computer use where all the items to be processed are submitted prior to running.

Binary digit: A numeral in the binary number system which may be zero (0) or one (1).

Bit: Derived from binary digit; a single character (0 or 1) in a binary number.

Bubble memory: A relatively new medium for digital information storage, employing magnetized domains (bubbles) in thin magnetic film, usually of garnet or ferrite.

Byte: A group of bits usually operated on as a unit, normally 6 to 8 bits used to code characters. A byte can be thought of as a character in binary coded form.

Central processing unit or CPU: The part of the computer which actually performs the computations.

Chip: A small wafer usually of silicon, on which integrated circuitry is fabricated.

Direct access: Storage or retrieval of data according to its address independent of the location of the data previously accessed.

Disk storage: External storage medium on which information is stored as magnetized spots on the surface of a disk. This kind of storage allows direct access to any item stored on it.

Floppy disk: A disk storage medium employing a flexible polyester (plastic) disk. There are two standard sizes, 8" and 5¼"; the latter is sometimes referred to as "minifloppies."

Hard disk: A disk storage medium employing a rigid material (e.g. aluminum) on which a magnetic coating is applied. These provide higher storage capacity than floppy disks.

K: 1024 or, approximately 1000.

M: One million.

M byte or MB: A megabyte, or one million bytes.

Microprocessor: A CPU on a chip.

Online: Mode of computer use involving direct connection to the computer while the program is executing. Information can be provided to the computer during processing. In library applications, commonly implies online-interactive mode, which allows for a dialog between the user and the computer.

Sequential file: A file in which records are written and read only in sequence, not allowing any to be skipped.

String searching: Character by character matching of a searched for series of characters within records, or parts of a record.

Utility routine or utility software: Standard programs to perform frequently needed housekeeping tasks (e.g. copying files, sorting and merging).

Literature Cited

1. Jahoda, Gerald / *Information Storage and Retrieval Systems for Individual Researchers.* New York, Wiley, 1970.
2. Foskett, A.C. / *A Guide to Personal Indexes Using Edge-Notched, Uniterm and Peek-a-Boo Card,* 2nd ed. Hamden, Conn., Archon Books, 1970.
3. Line, Maurice B. / The Information Uses and Needs of Social Scientists: An Overview of INFROSS. *Aslib Proceedings* 23(no. 8):412-34 (Jul 1971).
4. Wallace, Everett M. / User Requirements, Personal Indexes, and Computer Support. *Proceedings of the American Documentation Institute* 3:73-80 (1966).
5. For a survey of electronics technology and microcomputers, see the following three single topic issues: *Scientific American,* "Microelectronics" (Sep 1977). *Science,* 195(4283), "Electronics" (Mar 18, 1977). *Mini-Micro Systems Journal,* "Fundamentals of Microcomputer Systems" (Nov-Dec 1977).
6. Burton, Hilery D., and Theodore B. Yerke / FAMULUS: A Computer-Based System for Augmenting Personal Documentation Efforts. *Proceedings of the American Society for Information Science* 6:53-6 (1969).
7. Purdy, J. Gerry / ACCESS—a Program for the Catalog and Access of Information. *NTIS PB-201 917* (Mar 1971).
8. Bridges, K.W. / Automatic Indexing of Personal Bibliographies. *Bio-Science* 20:94-7 (1970).
9. Glantz, Richard S. / SHOEBOX—a Personal File Handling System for Textual Data. *AFIPS Conference Proceedings, Fall Joint Computer Conference* 37:535-45 (1970).
10. Mittman, B. and L. Borman / *Personalized Data Base Systems,* Los Angeles, Calif., Melville Publishing Company, 1975.
11. Reitman, Walter, et al. / AUTONOTE: A Personal Information Storage and Retrieval System. *Proceedings of the 24th National Conference of the Association of Computing Machinery* 67-76 (1969).
12. Lancaster, F.W. and E.G. Fayen / *Information Retrieval On-Line.* Los Angeles, Calif., Melville Publishing Company, 1973.
13. Parker, Ian M. and Peter Thorpe / GRIP—a Personal Online Indexing System Using a Minicomputer. *Program* 13(no. 1):14-22 (1977).
14. Leggate, P., et al. / An On-Line System for Handling Personal Data Bases on a PDP 11/20 Minicomputer. *Aslib Proceedings* 29(no. 2):56-66 (1977).
15. Saunders, R.J.D. / An On-Line Computer Assisted Information Retrieval System Using a Minicomputer (CAIRS). *Program* 11(no. 1):16-30 (1977).
16. Levine, Emil H., Steve E. Rodgers, and Stanton E. Mintz / Pathfinder I—a Minicomputer DBMS: Low Cost High Powered Computing. In *Information Management in the 1980's. Proceedings of the ASIS Annual Meeting* 14:46-7. Published by Knowledge Industry Publications, Inc., White Plains, N.Y., 1977.
17. Bell, C. and K.P. Jones / Towards Everyday Language Information Retrieval Systems Via Minicomputer. *Journal of the American Society for Information Science* 30(no. 6):334-9 (1979).
18. Birula, Kay, William Graham, and Ehud Gudes / An In House On-Line Information Retrieval System Using a Minicomputer. In *The Information Age in Perspective. Proceedings of the ASIS Annual Meeting* 15:32-4. Published by Knowledge Industry Publications, Inc., White Plains, N.Y., 1978.
19. Lundeen, Gerald / Introducing the Concepts of On-Line Boolean Searching with a Minicomputer Based System. In *The Value of Information. Collection of Papers Presented at the 6th Midyear Meeting.* Syracuse, N.Y., The American Society for Information Science, 1977.
20. Manuel, Tom / The Hard-Disk Explosion: High-Powered Mass Storage for Your Personal Computer. *Byte* 5(no. 8):58 ff. (Aug 1980).
21. Wooley, Robert D. / Microcomputers and Videodiscs: New Dimensions for Computer-Based Education. *Interface Age* 4(no. 12):78-82 (1979).
22. Maugh, Thomas H., Jr. / Holographic Filing: An Industry on the Verge of Birth. *Science* 201(4354):431-3 (1978). (Reprinted in *IEEE Transactions on Professional Communication,* PC-22(no. 1): 34-6 (1979).
23. Libes, Sol / Byte News. *Byte* 4(no. 12):103 (1979).
24. Lancaster, F.W. / Have Information Retrieval Services Been Successful? A Critique. In *Proceedings of the 1975 Clinic on Library Applications of Data Processing,* University of Illinois, Graduate School of Library Science, Urbana-Champaign, Illinois, 1976. pp. 145-156.

25. Soper, Mary Ellen / Characteristics and Use of Personal Collections. *Library Quarterly* 46(no. 4):397–415 (1976).
26. Jones, P.F. / Four Principles of Man-Computer Dialog. *IEEE Transactions on Professional Communication* PC-21(4):154–9 (1978).
27. Van Styvendaele, B.J.H. / The Making of an RNA Phage Bibliography with Personal Information by Microcomputer. *Methods of Information in Medicine* 18(no. 3):158–164 (1979).
28. Bivins, Kathleen T. and Roger C. Palmer / REFLES (Reference Librarian Enhancement System). In *Information Choices and Policies. Proceedings of the ASIS Annual Meeting* 16:58–65. Published by Knowledge Industry Publications, Inc., White Plains, N.Y., 1979.
29. Thompson, George K. / The Use of Microcomputers by Secondary Services and Individual Researchers in the Social Sciences. In *The Information Age in Perspective. Proceedings of the ASIS Annual Meeting* 15:341–4. Published by Knowledge Industry Publications, White Plains, N.Y., 1978.
30. Garfield, Eugene / Home Systems and Personal Computers. *Library Journal* 105(no. 13):1474–1475 (Jul 1980).
31. Lancaster, F.W., Laura Drasgow and Ellen Marks / *The Impact of a Paperless Society on the Research Library of the Future.* A Report to the National Science Foundation, Division of Information Science and Technology (NSF Grant No. DSI 78-04768), Library Research Center, Graduate School of Library Science, University of Illinois, Urbana, Illinois, 1980.

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Minicomputers in Information Work

An Overview of the DOMESTIC System

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■ **DOMESTIC, a German-Israeli project for developing the application of minicomputers to information centers, is described. System modules include functions for creating and updating databases, formulating and running database searches, and printing search results. The information system is applicable to the acquisition, cataloging, circulation, and statistical needs of information centers.**

SPECIAL LIBRARIES and information centers are among the beneficiaries of the past decade's progress in electronic data processing. The technical sophistication and ever-decreasing cost of current minicomputers and peripheral equipment, coupled with modern telecommunications, enable the small library to enjoy the same data-handling assistance provided by mainframe systems to large users.

For several years, a joint German-Israeli R&D project has sought to demonstrate the feasibility of using minicomputers for most facets of library and information work. The result is DOMESTIC (Development Of Minicomputers in an Environment of Scientific and Technological Information Centers), an integrated system for handling the various aspects of information storage and retrieval. The system provides facilities for the creation and updating of databases, the formulation of database searches, and output printing. Besides handling information retrieval from textual and other databases, system components are capable of meeting the acquisition, cataloging, circulation, and statistical needs of an information center.

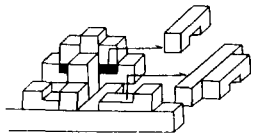
Historical Background

The DOMESTIC concept originated in Israel at COSTI (National Center of Scientific and Technological Information) as a joint R&D project carried out

under the auspices of the German Ministry for Research and Technology and the Israeli National Council for Research and Development.

COSTI develops and coordinates the Israeli national information network, formulates national science-information policy and planning, and provides information services to users throughout the country. As a service center, COSTI provides selective dissemination of information and document-accession services, performs online interactive searches, organizes training courses and professional seminars, and publishes directories and journals.

In 1975, COSTI completed a study of the feasibility of introducing minicomputers into information centers and suggested a cooperative R&D program to realize the scheme. After several years of consultation and systems analysis of hardware and software options, detailed R&D proposals were prepared. Programming of the first phase of the project—the information-retrieval function—began at the end of 1977. COSTI's German counterpart is the Munich firm of KTS Information Systems. The two partners combined experience in both systems programming and information services.



Most developments of minicomputer information systems have generally involved small, cohesive teams working over a great length of time. In contrast, a limited time schedule and a relatively large work force were employed in this R&D effort. The work method introduced several unusual aspects to the project. The geographical separation of the two teams demanded resolution of basic system problems before initial programming, and provision of detailed, up-to-date documentation. Also, since COSTI wrote programs on a PDP computer for implementation on KTS's Philips device, transferability was a precondition and resulted in a number of innovative procedures.

An advisory committee of computer scientists, librarians, information specialists and other experts from both countries meets occasionally to review current work, suggest revisions, and set tasks for the coming months.

Hardware and Command Language

A distinctive feature of DOMESTIC is that it was conceived as an integrated system, with a dedicated minicomputer serving all required functions.

DOMESTIC is written in FORTRAN and, at COSTI's installation in Tel-Aviv, operates on a PDP-11/70 minicomputer under the IAS operating system. The system employs a 128K-word memory, though the applied programs don't use more than 64K. With this capacity, four interactive terminals can function simultaneously; as memory size increases, terminals may be added to the system. Also required is a disk for file storage, its size depending on file size. Only the data base management system (DBMS) is written in assembler language. To install DOMESTIC on another computer it is only necessary to rewrite the DBMS in the new host's assembler language.

Access to all system functions is made possible by interactive terminals. The user communicates with the system via a simple dialog command language. This language is "friendly" and flexible: the beginner can get results with the basic commands, while the parameter options give an experienced user the opportunity to execute more sophisticated operations. The command set includes nearly all commands found in the EURONET/DIANE Common Command Set and provides other commands not established in the European information-retrieval system.

The three main components of the system which are now in the implementation stage are: DOMESTIC I, the

database-search facility; DOMLIB, the library-automation functions; and, DOMPRINT, the print generator.

DOMESTIC I: Information Retrieval

The "raw material" of a DOMESTIC setup is its collection of databases which are mainly, but not exclusively, textual. An information center can create and update in-house databases or acquire external databases on magnetic tape or other medium. Translation tables are available for reformatting acquired databases (e.g., MARC and its German equivalent, MAB) so that they conform to the system's standards.

Keyword-based search queries are set up and run on the databases and saved for regular execution as an SDI service. The system provides full-text searching; that is, all words of a document entered into the database may be designated as keyterms for use in formulating search queries.

The user begins by viewing a list of databases established in the system and selecting one in which he wishes to work. He then examines the database keyterm list and builds search statements from the terms appropriate to the inquiry and Boolean logical operators. The user thus creates his own search profile, which he may save in his directory by assigning it a symbolic name. This query can then be run at intervals to retrieve recent additions to the database. It is also possible to revise the query by adding, changing, or deleting search terms and Boolean operators or by narrowing a search to specified fields.

DOMLIB: Library Automation Functions

This phase of the system covers the acquisition, cataloging, and circulation phases, as well as the generation of statistical, administrative, catalog, and summary documents: e.g., indexes, circulation statistics, overdue notices, and so on.

The heart of DOMLIB is its database, the Master Document File (MDF), created online. A record is established at time of order for each acquisition and completed when the item arrives and is assigned local data, such as call number, subject headings, circulation restrictions, and so on. The user has the choice of free-form entry into the data fields, or of receiving system prompts for the relevant fields.

Searches are run on the MDF by users and staff to determine, for instance, which books by a particular author are in the library holdings, how many items on a given subject are circulating, which issues of serials are held, and so on.

A special set of circulation fields in the MDF are called for data entry when an item is charged out. These fields are automatically updated when the item is returned or renewed. A second database, the Borrower Master File, contains information about library users, both individuals and institutions sharing in Interlibrary Loan programs.

In addition, the fields of the DOMLIB database provide data for library documents, which can be printed with the appropriate DOMPRINT print format (see next section). These include order forms, registers of outstanding orders, notices of overdue outstanding orders, registers of material received but not yet cataloged, letters to clients advising them of new acquisitions, book catalogs in various formats, and processing priority lists.

DOMPRINT: DOMESTIC Print Generator

DOMPRINT's two main applications are the printing of documents retrieved from a database search and the printing of miscellaneous documents needed by a library. In both cases, field data are extracted from a specified set of database documents and printed in a predefined layout.

This data manipulation is performed by a print format, a set of instructions

for page size, field length, page and line feeds, and other data that completely define the appearance of a final document. Within a particular system, one or more standard print formats exist for each of the various types of documents that may need to be printed: i.e., there will be a standard format for a full database record, an order form, an author catalog, an overdue notice, and so on.

After selecting a print format from the system directory, the user may request a "test run" on a sampling of the document set to see if the output is acceptable. If it is not, another format can be chosen, or DOMPRINT editing commands can be used to revise the format or create a new one from scratch.

When a suitable print format is found, the full document set is submitted to the computer. Printing is in batch mode, so that further operations on the interactive terminal are not disrupted. As with search queries, the user's edited or custom-built print formats may be saved in the directory for later use.

Current Status of DOMESTIC

Programming of the DOMESTIC I search functions began in late 1977 and was completed in mid-1979. In addition to the COSTI installation in Tel-Aviv, DOMESTIC I is operational at the information center of the German Political Science Research Institute at Eberhausen near Munich.

Design of DOMLIB and DOMPRINT was carried out in 1979 and culminated in the preparation of preliminary user's manuals. Programming of the second phase of DOMESTIC should be completed by Spring 1981.

Conclusion

Successful completion of the first phase of Project DOMESTIC demonstrates the validity of the concept that minicomputers can perform the same information-handling functions that, until now, have been confined to large, expensive hardware. Such systems are programmable and functional, and are in some respects superior to mainframe batch operations. The ongoing development and application of systems such as DOMESTIC will continue to demonstrate the potential of the minicomputer in all phases of information handling.

Bibliography

Grosch, Audrey N. *Minicomputers in Libraries, 1979–80.* White Plains, N.Y., Knowledge Industry Publications, Inc., 1979.

Keren, Carl, Slonim, Yakov, and Wollman, Peretz/"Project DOMESTIC." Tel-Aviv, May 1977. (Available from COSTI).

Keren, Carl, Seelbach, H. E., and Wollman, Peretz/Using Minicomputers in Information Work: Project DOMESTIC. *Nachrichten für Dokumentation* 29 (nos. 4/5): 163–64 (1978).

User's Manuals for DOMESTIC, DOMLIB and DOMPRINT. (Available from COSTI).

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Standards

Developments and Impacts

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■ **Standards have assumed greater importance with the introduction and use of advanced telecommunications, computers, and cooperative, resource-sharing activities. Examples of past standardization successes and failures are noted, and ongoing examples of parallel standardization efforts are provided. The mechanisms and motivation for standard development and coordination are discussed. While standards involving technological factors have been successfully developed and implemented, those involving human factors, policy, and management prerogatives still lag behind.**

STANDARDS AND COMMON PRACTICES in information management are the basis for effective and efficient design and implementation of our systems. As a professional community, we have been committed to the development of and adherence to standards for many years. From the development of cataloging codes at the turn of the century to current efforts toward standard computer communication protocols, common solutions have been sought for common problems.

Standardization at various levels has been pursued to meet perceived needs. Thus, design standards specify appropriate materials for particular products (such as fabrics for book covers), or the dimensions of products (such as the widths of magnetic tape for computer applications). Performance standards define what devices must do, or what a system must accomplish (such as throughput performance measures for a computer system).

It has been noted that everyone benefits from the use of standards and that, by the same token, everyone suffers from their absence (*1*). Past examples of success, such as the adoption of the Anglo-American Cataloging Rules (AACR) or the use of standard formats for sharing bibliographic data on magnetic media (e.g., MARC), were, unfortunately, matched by failures, such as the variant reduction ratios used for microforms or the incompatible computer programs employed to accomplish the same or similar tasks.

Standards will assume ever greater importance as we continue to develop regional and national networking facilities. They are the keystone for building resource-sharing systems (*2*). The lack of standardization becomes burdensome at some point in technological development. Consequently, the

sooner appropriate standards and common practices are developed and implemented, the better.

Mechanisms

Standards, even common practices, are hard to come by, partly because standardization often entails a painful process. For standards to be developed, cooperation and coordination are necessary prerequisites. Cooperation was once described as a collaborative effort or sharing between organizations in the processing of materials for information systems, or in the exchange of products of such processing (3). Noted examples are the sharing of coverage in a particular subject field and joint efforts in the establishment of thesauri and indexing standards.

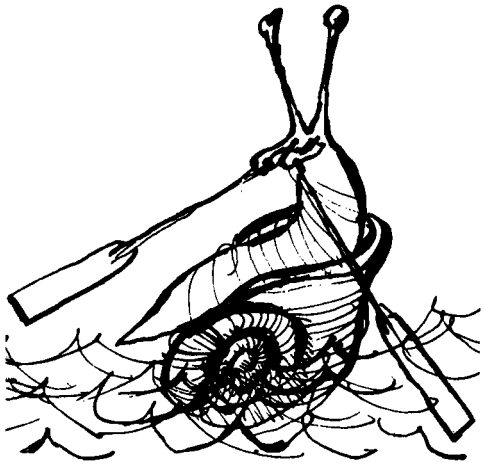
Official U. S. national standards for the information community are issued by the American National Standards Institute (ANSI). However, these are often based on guidelines, unofficial standards, or common practices developed by standards committees of such professional organizations as the American Library Association, the National Federation of Abstracting and Indexing Services, the National Micrographics Association, and others. ANSI is not a government agency, but it does officially represent the United States in the International Organization for Standardization (ISO) which is the only organization that can issue international standards. Again, guidelines and quasi-standards are produced by other international organizations such as the International Federation for Documentation (FID) and the International Council of Scientific Unions' Abstracting Board (ICSU-AB).

ANSI Committee Z39 (Library and Information Science and Related Publishing Practices) is the focal point for national standards in the library and information fields, with a companion role taken by ANSI Committees X3 (Computers and Information Processing) and PH5 (Photographic Reproduction of Documents). The Z39 Committee's statement of purpose is "to develop and promote standards for information systems, products and services." Some 35 standards and guidelines have been formulated and another 30 are in process or proposed; in the latter category, the number that are pertinent to computer-based systems is a measure of the increased interchange and cooperative activities brought about by advances in information technology. Since ANSI standards are reviewed every five years and either reaffirmed or revised as appropriate, continuing advances can be accommodated in the standardization process.

Relations within the Community

Most examples of past cooperation dealt either with physical aspects of the exchange of information or with the identification and description of documents. Cooperation in the expression of the subject content of such documents was not so successful. Major deterring factors in this area appeared to be those relating to the attainment of consistency in human indexing and in bridging the unfortunate gap between librarians and information scientists, between traditional libraries and information centers dealing primarily with the reports literature (3, p. 119). Although these observations were published 14 years ago, certain human problems still affect cooperation in the sense that the greatest success has been achieved in format and protocol development, while lack of cooperation seems to surface at the policy and management level (2, p. 441).

There are, however, indications that the "unfortunate gap" is being bridged, at least partially. There are more information communities than in the past; not only libraries and technical reports processing centers but also the broader abstracting-indexing services and information dissemination centers. While each of these organizations or institutions plays an important and separate



role in the total information community, trends toward resource-sharing and networking require them to interact and coordinate more closely. During the past decade, great developments have occurred in the processing of bibliographic collections. Large computer-based files of references to books, journals, technical reports, and other forms of documents have been established and continue to grow in a wide variety of agencies, organizations, and communities. Online interactive access to these files is available, either directly to the site of the agencies responsible for the files or through commercial services which offer access to a number of such files nationally. At the same time, cooperative processing and resource-sharing have resulted in the establishment of networks of organizations linked through telecommunications facilities. The proliferation of such databases, networks, and services has been supported through the development of appropriate standards. These standards have encompassed both the bibliographic data and the automated systems for processing the data. The development and application of such standards have ensured more efficient processing and more effective access for users.

As efforts toward standards and cooperative activity within, between, or among these information communities increase, the opportunities for interaction and coordination will improve and lead to further standards and cooperation, cutting across the traditional lines which, in the past, tended to divide rather than bring us together.

Current Efforts Toward Standardization

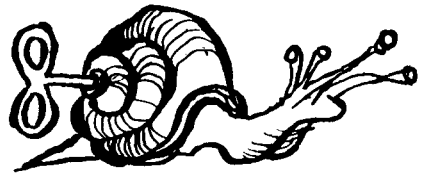
Technical Reports Processing Study

As noted earlier, standards development requires continued review and updating to take advantage of technological advances and continued coordination and modification to meet the growing number of interfaces, and interactions between various files, networks and communities involved. A review of the standards in place for the processing and bibliographic control of the technical reports literature provides a useful example. The standards cover data elements, content designators, and machine-readable format structure. The major technical reports-processing agencies of the federal government—e.g., National Aeronautics and Space Administration (NASA), Defense Technical Information Center (DTIC), and Department of Energy (DOE)—have been using standards developed by the Committee on Scientific and Technical Information (COSATI), or some variation of them, in their internal systems for the descriptive cataloging and machine processing of their bibliographic data, and in order to contribute tapes to others, including, of course, the National Technical Information Service (NTIS).

It was recognized that there was a need to upgrade the technical reports standards and to keep these standards up-to-date. Lack of uniformity caused confusion and frustration to users. Some efforts had already been undertaken to update the standards, particularly in the area of corporate author

entries. Corresponding attention needed to be given to other data elements used by the agencies and the "tags" used to designate these elements. It was proposed that a standard data element dictionary and subsets of codes and rules be developed for more efficient transfer of bibliographic information.

The need for and the feasibility of updating technical report standards were to be identified in light of developments in the respective agency's automated systems and their plans for further cooperative processing and source cataloging. For example, the Shared Bibliographic Input Experiment, conducted by the Defense Technical Information Center, in which remote terminal sites input indexing and abstracting information online to DTIC, proved to be viable within one year. This approach promises cost-effective benefits for all participants—the information source, the processor, and the end user.



Consequently, a small study was initiated, suggested by the Committee on Information Hangups and cosponsored by NTIS, DTIC, DOE, and NASA. The study sought to determine: 1) the need for and expected benefits of development of additional standards, or update of standards already in place, to improve the cooperative processing of technical reports among those four leading federal reports-processing agencies; and 2) the feasibility of and costs to be anticipated in such development or updating, with particular attention to standards for data elements and tags. In addition, it was proposed that the study examine the desirability of and potential for closer coordination between the standardization efforts of the technical reports community, exemplified by the above agencies and their user groups on the one hand, and those of the library community and its networking activities on the other.

The results of the study, as reported to NTIS in August 1980, show that all the data elements used by the major reports-processing agencies differ in number, definitions and rules for use, but that some 17 data elements are common to all agency systems. These common data elements, showing the variations of all the elements, can thus be regarded as the "core" data elements needed to identify documents for storage and retrieval. They are sufficient to identify documents, but may not provide all the elements necessary to control stocks or produce the printed services offered by individual agencies.

Given the variations, it was suggested that the agencies involved consider compilation of a data element dictionary (DED) of all data elements now used by all the systems. Such a DED can serve the needs of users of the databases and products of the agencies, as well as the managers of the systems who need to review their operations to determine whether the differences that now exist can benefit from further standardization.

The combined DED, it is believed, can support modifications or increased standardization in order to promote increased cooperation and coordination in federal technical reports-processing activities. Such increased cooperative activities should be viewed in the context of similar activities already underway within the library community.

Library Activities

One example of cooperative, retrospective studies of standards in the library community is the review of the entire series of MARC formats carried out under contract with the Library of Congress. The review is to evaluate the

formats in terms of networking requirements and to provide recommended specifications for change. Again, the content designators and the content or data themselves were the subject of review, not the format structure. As reported in the *L. C. Information Bulletin*, "From the original model of one-directional distribution of MARC outward from the Library of Congress, the Library is moving into a networking situation with multi-directional interchange of bibliographic data among different organizations"(*4*). An analysis was needed to determine whether new data elements had to be added and whether some of the existing data elements were still valid in this new environment.

It appears that the two federal agency efforts described were proceeding along parallel tracks. The technical reports-processing activities need to be examined because of incipient problems and/or questions of economies in the operations themselves, the impact of the operational differences on users and managers of reports collections, and in light of probable moves toward data input at the source. By the same token, the library community recognizes that after 10 years of changes in MARC formats, a reexamination was necessary with the view of attaining internal and external compatibility and broad user acceptance.

Another example of common but separate efforts is in the area of standardization as it relates to corporate author headings. NTIS is spearheading work to improve procedures for reporting new corporate authors used in technical reports processing, for cross-referencing various forms of headings, and for automating the collection, maintenance and presentation of the list of authorized entries.

There are, simultaneously, parallel efforts going on in the library community: a single comprehensive name authority file has been mandated by participants from the national libraries and major bibliographic utilities. That agreement is significant because it signals an effort to coordinate authority file building and prevent wasteful duplication. Again, common concerns, goals, and cooperative attitudes are evident. A mechanism for the exchange of information or for the formal or informal coordination of parallel yet similar standardization efforts should be developed.

Trends/Projections

Emerging Needs

Some other areas where standards and cooperation will be highly desirable, if not essential, include numeric and statistical data bases, or what are called the non-bibliographic data bases: business data, legal texts, news sources, and so on. Many of these databases provide the capability for not only retrieval but also analysis and manipulation of stored data. These databases tend to be linked to particular retrieval services (not necessarily the major sources of bibliographic data), and to particular communications networks. The software packages developed by these services differ, thus complicating the opportunities for libraries and information centers to use these files. Methods for improving compatibility and accessing modes for such resources will need to be explored.

Another area for future activity in standardization and cooperation is in the realm of portable computer programs. The notion of developing more standardized and transportable programs has been widely discussed, but there have been few practical efforts to tackle the problem. Much duplicate time and effort is spent in many organizations in writing programs to solve common problems of input, storage, and retrieval, to implement programs written elsewhere, or to revise working programs when a computer configuration is upgraded. The increasing use of minicomputers will compound the

problem of duplicated effort. Ways need to be found to develop core programs which are general in scope, well documented, and transportable from machine to machine, possibly using structured programming techniques, as well as pre-processor and macros (i.e., translators and instructions).

Cautions

While espousing the desirability of standards, we must recognize the underlying problems and pitfalls in their development and implementation.

Standards are a means to an end, not an end in themselves. Although standards and common practices are the basis for effective and efficient information management, and the keystone for building resource-sharing systems, standards are merely the tools for getting the job done, not the job itself. If we get too enamored with standards, too devoted to enforcing them regardless of extenuating circumstances, we run the danger of making our systems too complicated so that they tend to serve us rather than our users. Format standards can bring this about; cataloging or other data entry guidelines designed to cover the "worst case" situation can have the same effect.

Standards and guidelines, even when promulgated under ANSI or ISO auspices, need not be cast in concrete. As mentioned earlier, ANSI procedures call for a review every five years for every standard. This review can reaffirm a standard's continued relevance and applicability to the environment for which it was developed; or, alternatively, the review can point to editorial or substantive changes in the standard that will clarify or improve its applicability. Moreover, the five-year review process can result in the recommendation for new standards. The information interchange format (ANSI Z39.2) is a case in point: it applies to the exchange of bibliographic data on magnetic tape. Today, such data are also exchanged via transmission over communication lines. Thus, the question of the need for still another standard can be raised.

A similar review procedure needs to be applied to those standards and guidelines developed by professional groups for their specialized communities. Feedback from these communities and from users is necessary and should be encouraged to ensure that standards really reflect needs.

Before information professionals plunge into standardization or even guideline development, a review is needed of the processes and procedures the library community is seeking to standardize. Program evaluation techniques applied to library operations help to determine whether certain steps in the procedures, or certain data elements required by these processes, are necessary or particularly useful. There is a tendency to perform operations so as to conform to the way they have been performed in the past. To standardize such commitments only compounds the situation. Similar cautionary advice has been heard in connection with decisions to automate: review your manual system thoroughly before automating. By the same token, library operations, whether manual or automated, should be reviewed prior to standardization.

A companion suggestion is that standardization should be undertaken in segments, formalizing minimum levels of operations or conventions, at least in the beginning, in order to accommodate a larger section of the community involved. Broadly-based national or international standards may not be responsive to, or may conflict with local needs. If a basic or core standard is promulgated, additional details can be added to take cognizance of local conventions. This point of view may be surmised from the results of the technical reports-processing study described earlier; standardizing common or core data elements could improve coopera-

tive processing while, concurrently, allowing the individual agencies to add unique data elements suitable for their own needs. A final caution relates to standards implementation: standards are mere exercises or references unless they are implemented by the community for which they were designed. Adoption of standards can be virtually automatic, as in the case when a new interlibrary loan form is developed and publicized and its use made requisite for ILL transactions. But standard data elements (e.g. date, place names, corporate author headings, and so forth), can be, and often are, ignored in favor of "the way we do things." As standards and guidelines are developed they should be reviewed, examined for applicability, and, when issued, adopted.

Conclusion

Our world, the information community, has become more complex as technological advances proliferate and accelerate. These advances, coupled with the pressures of economic and national policies, necessitate more resource-sharing, more networking, more "horizon-enlarging." As we interact more frequently and in more diversified ways, we must seek closer cooperation and coordination within our own specialized areas and among the various components of the information community. Wherever possible, we should follow such cooperation and coordination with more formal efforts at standardization.

However, it must be emphasized that not only are standards hard to come by, they can be hard to adhere to. The information world is not static. It is dynamic, far flung, and diverse in responsibilities and attitudes. But standards can serve us—and serve us well—if we only let them.

Literature Cited

1. Becker, Joseph and Madeline M. Henderson/Interstate Library Interconnection. *The Southeastern Librarian* 21(no. 4): 202 (Winter 1971).
2. Avram, Henriette D. and Sally H. McCallum/Directions in Library Networking. *Journal of the American Society for Information Science* 31(no. 6): 442 (Nov 1980).
3. Henderson, Madeline M., et al./*Cooperation, Convertibility, and Compatibility among Information Systems: A Literature Review.* NBS Misc. Pub. no. 276. Washington, D.C., U.S. Government Printing Office, 1966.
4. *LC Information Bulletin,* November 9, 1979: 464.

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The Psychological Impact of Automation on Library and Office Workers

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■ **The successful design and implementation of library automated systems require careful attention to the human, psychological needs of system operators and users. A review of the literature is presented focusing on automation fears, their underlying causes, and some of the means available for their reduction or elimination.**

Honey was poured into one computer terminal, while another was fed a set of car keys and a few paper clips. Other computer devices have been attacked with screwdrivers, "shot to death" with revolvers, and "accidentally" run over by forklift trucks. Still others, multimillion-dollar information systems built to support management, have been deliberately fed wrong information or simply ignored until they die a natural death (1).

Introduction

Information technology devices such as the electric typewriter and the telephone have become so commonplace that virtually all office workers take them for granted and few view them as threatening. During the last few decades, automated systems in libraries and offices have exploded to the point where many now have photocopiers, dictation machines, word processing systems and some kind of desk-size computer terminal. An increasing number of libraries and offices also use electronic transfer of mail or documents, online catalogs, and other online bibliographic and nonbibliographic database services. While many libraries have been using automated systems and, in particular, computers or minicomputers to handle their acquisitions, cataloging, circulation and inter-library loan tasks, others are still faced with the prospect of implementing rudimentary or more advanced systems including "computerized microform retrieval systems, computerized text retrieval, sophisticated telecommunication networks, text editing and management systems" (2).

There are many reasons why large

segments of the public, including library and office workers, fear the introduction of automation into their work environments. Automated systems, and computers in particular, have been feared and disliked because many perceive them "as cold, metallic, and the servant—the tool—of the rich and powerful" (3). Burch notes that those who are confronted with computers and other new technologies tend to protest the "dominance of scientific and commercial over aesthetic and humanistic values" (4). He also contends that many users of technology "feel physically endangered and economically victimized by vast technological systems over which they have no control."

A review of the literature further reveals that some of the major reasons of library and office workers fear of automation have to do with the threat or reality of job loss, job displacement, reduced opportunities for advancement, and the feeling of human obsolescence. Mansfield observed: "When technological change is mentioned, the first thing many people think of is unemployment" (5).

In their study of manpower development and technological change, Burack and Sorensen found that management must recognize "that changes in technology are frequently interpreted in a manner which results in closing off promotional opportunities for existing nondegree personnel, calling for a more realistic analysis of changes in jobs and job structures" (6). This view is shared by Faerber and Ratliff who note that "the computer does cause some job displacement, requiring either the release or relocation of some of the firm's employees" (7). Robinson believes that structural unemployment, "the loss of jobs when changing technology makes currently held skills obsolete" will continue to be a major challenge to companies that implement new technologies (8).

Burch also believes that "For many purposes computerization is virtually synonomous with automation, and automation generally means the displacement or replacement of people. . . . The fear of human obsolescence in one way or another accompanies all computer applications" (4, pp. 90–91). From the point of view of librarians, the automation of well-established library functions, such as acquisitions and cataloging, may cause them to question their future roles in the library profession. Tomeski observes: "As more work is absorbed by the new technology, organizations will need relatively fewer employees to do a given volume of work" (9). The problems of displaced library and other office workers is particularly serious for older workers because as Mansfield found, "once unemployed, they are less likely than younger workers to be re-employed" (5, p. 109). Indeed, the reduction in the number of positions available in libraries may force librarians to pursue careers outside their profession.

Retraining

Even when retained by their organizations, the introduction of automation into the work setting is often accompanied by changes in office workers' tasks. This in turn, implies a need for retraining which often places a financial and psychological burden on workers. Many office workers have the mistaken belief that their need for education ended when they completed their formal schooling. The need to return to an educational setting for retraining is an unwelcome challenge to many. Robinson advances the position that "individual workers will continue to feel substantial and sometimes traumatic impacts including the need to learn new skills for jobs with different responsibilities. . . .as technological change continues at a rapid rate, a pattern of lifelong education and multiple careers will replace the tradition of training for one lifetime vocation" (8, p. 1179).

Mealiea also found that the need to learn new tasks is viewed by many employees as a threat. He theorized that

"to remain viable, the employee is forced to upgrade old skills or develop new ones" (*10*). This is not always possible due to constraints of time, lack of management support, or an inability to learn new tasks. Faerber and Ratliff also concluded that "for a systems application to fully achieve its objectives, management and staff may require additional training so that they may use the system effectively" (*7*, p. 20).

When technological change is mentioned, the first thing many people think of is unemployment.

Despite the documented need for organizations to provide their employees with adequate opportunities for retraining and upgrading of tasks, Baum and Burack found that "some 40 per cent of companies do not conduct nor have any general plans for educational efforts, irrespective of industry affiliation or size. It is this type of confused, almost paradoxical thinking that seems to characterize the realities of upper management thinking" (*11*).

In their study of management preparation for computers and automation, Burack and Sorensen came to a similar finding with respect to lack of retraining for office workers. They note that "although computers have moved into a diversity of applications, it does not follow that organizational members, especially supervisors and lower-level managers, have been prepared to cope fully." (*6*, p. 319). These authors also note that not only their research, but supplementary information obtained during their consulting experiences in numerous firms indicates that management's computer preparation often seriously lags behind installation, "is narrowly conceived, is incomplete or may never take place."

In addition to the negative feelings that most library and office workers have toward retraining, they along with the public at large, share the general fear of the misuse of information stored in computer files. Simon observed: "The potential of computers for increasing the control of organizations or society over their members and for invading the privacy of those members has caused considerable concern" (*12*).

Loughridge points out that library workers are faced with a special problem with respect to privacy and the protection of information stored in local or remote computer files. He feels that "the accessibility of information stored in such files may not be as restricted or controlled as it should be" (*13*). He advances the position that librarians will be forced to make decisions about who should have access to computer generated records and that this may cause librarians or information service staffs to feel a great deal of job-related stress. The imposition of user charges may also increase the degree of stress.

Another reason why library workers may feel distrustful of automated systems is what Loughridge refers to as "the prospect of a paperless society [which] is *the* nightmare implicit in computerization of library systems." He observes with some cynicism that books are thought by some people to represent "undesirable intrusions into neatly worked-out automated systems" (*13*, p. 118).

Dowlin discounts Loughridge's fears of automation by observing that if libraries do not "soon develop a role in the emerging electronic revolution—Toffler's 'Third Wave'—[they] will become irrelevant to people who require rapid, convenient, and energy-conscious access to information and materials" (*14*). Whether or not one agrees with Loughridge or Dowlin, one must realize that automation carries with it serious responsibilities which some librarians may not be ready to assume.

A related factor which may contribute to the fear of automated systems is the alienation people feel toward machines. This alienation may be due in part to the workers' lack of under-

standing of the new technology and/or the decrease of worker's interaction with other people. Faerber and Ratliff state: "Computers, data processing, and management information systems, with their associated jargon, still bear a mystique which tends to frighten, or at least discourage, many people. This concern, coupled with visions of having their jobs replaced or downgraded by the computer, provides ample motivation for resistance and opposition to the computer" (*7*, p. 21).

The belief that some workers perceive computers as almost magical is reiterated by Sheridan who states that "phylogenesis, . . . the threat real or perceived, that the race of the intelligent machine is becoming more powerful than humans" adds to a negative self-image of operators of automated systems (*15*). Tomeski notes that: "To a large number of people, the computer still remains a mysterious and threatening device" (*9*, p. 30). He adds that such a threat to library office staff also manifests itself because of the probability that "people and work must adjust to the computer rather than vice versa." Kets de Vries came to a similar conclusion when he observed: "Restructuring an organization to meet the psychological needs of its members frequently has been a relatively low priority item. Top management has been more interested in fitting the man to the job than fitting the job to the man" (*16*).

Some of the dehumanizing aspects of automation include its unrelenting pace, its intolerance of human error, and the requirement that its operators communicate in a coded language.

As has been noted by Moan, great amounts of money are wasted on automated systems which workers do not understand how to operate (*17*). Whisler believes that until people can understand and control the technology they work with, they will feel threatened by the machine (*18*). This belief that the lack of understanding and control of computer systems contributes to users' alienation is also supported by Burks (*19*).

It has also been argued that library workers can become victimized by and alienated from computer systems because of the "attitude of mind which implicitly ascribes to computerized files a superiority in all respects which they may not and could not possess" (*13*, p. 118). This victimization of the library worker may occur because "the computerization of a system leads to a growing emphasis on form at the expense of content, on routine to the detriment of initiative and inventiveness and represents a gradation from independent, explorative and intuitive activity to increasing reliance on a system, which, however ingenious it may be, is limited by the imagination and inventiveness of its designers and implementers, not by the demands made upon it by those for whose ultimate benefit it was, hopefully, designed" (*13*, p. 117).

Moreover, both librarians and office workers are often alienated by having their work checked by a machine rather than by a human supervisor who could offer feedback and assistance in improving the quality of their work (*13*, p. 115). Tomeski notes: "The over-rated power and potential of the computer as an indispensable tool can create a feeling of inadequacy on the part of individuals. These negative reactions are shared by such diverse groups as the middle managers who see their decisions programmed, the older, long-time employees who have difficulty in adapting to the new technology, or the relatively uneducated and unskilled workers whose backgrounds deter comprehension of abstract concepts" (*9*, p. 30).

Some of the dehumanizing aspects of automation include its unrelenting pace, its intolerance of human error, and the requirement that its operators communicate in a coded language. As Tomeski, Wood and Stephenson point

out, "The so-called conversational mode, which exists today, between people and computers, is relatively stilted, esoteric, and often frustrating. Perhaps even more important, communication with computers requires thought processes that are unfamiliar and unnatural for most people" (*20*).

Loughridge argues that library applications of computer technology may "lead to a dehumanization of relationships both within the library and between the library and its users" (*13*, p. 115). Maskovsky describes the office of the future as "a humanist's nightmare [which is] silent except for the quiet whir of electronic gadgetry" (*21*). Tomeski sums up the uneasiness many people feel about computers: "The computer, an inanimate device, creates feelings of discomfort for people used to interacting with humans" (*9*, p. 30). He notes that this discomfort may arise from the "impersonal objectivity and uniformity" with which the computer treats all of its users.

The computer, an inanimate device, creates feelings of discomfort for people used to interacting with humans.

Burch has come to the conclusion that "The new problems created by the computer, like those created by modern technology as a whole, result from a stubborn unwillingness to allow the computer to be designed and used in accordance with humanistic values" (*4*, p. 89). He further contends that if workers hate or distrust a computer system, the system will often fail.

Technological innovation may have a major negative impact on the social structure of the work environment. Burch argues that "The introduction of new and alien technological systems that randomly disrupt established social interactions and organizational structures can create terrible inefficiency in the overall functioning of the library in spite of whatever improvements they may bring to the automated function or functions, such as circulation, acquisitions, cataloging, serials, etc" (*4*, p. 91). An example of disruptions of social interactions in libraries would be changes in accountability for certain library functions. When some library tasks are automated, it may be difficult to trace responsibility for mistakes entered on the computer files.

Shaughnessy's study of technology and job design in libraries led him to a conclusion similar to Burch's. He found that the introduction of new technologies changes the social structure of the organization (*22*). Driscoll notes that human organizations must provide social support to maintain the commitment of their staff members and that "the introduction of electronic technology increases the need for social leadership" (*23*). This leadership role could be assumed by the library manager or some other library worker involved with the introduction of an automated system. The impact of technology upon social structures of organizations cannot be ignored.

A contributing factor to the distrust of automation in the office and the library has been systems designers' lack of consultation with operators as well as users who are directly affected by the implementation of new technologies. Lucas found that "there is too little user involvement in developing a system and too little ownership of the resulting system. These conditions lead to lack of use and dissatisfaction with the system" (*24*). Kets de Vries believes that workers' "participation in decision making [may] increase a sense of control over one's destiny and mastery of uncertainty and may be in some ways stress-reducing" (*16*, p. 9). Systems designers usually consult with top management personnel who will rarely be the operators or direct users of the automated systems in libraries and offices. Shaughnessy found that "If the new technology is simply superimposed, staff will inevitably become anxious, alienated, and perhaps incompetent" (*22*, p. 271).

Mealiea also reinforces the view that

"Resistance to change is more likely to occur in those instances in which (a) the employee is unfamiliar with the relevant facts, (b) the consequences are not seen as directly beneficial to the employee, (c) it is difficult for the employee to relate to the change or to the change agent, and (d) the change was not initially sought by the employee" (*10*, p. 215-216). Faerber and Ratliff found that "Much of the resistance people have comes from a fear of the computer, or from poor communication between the information user and the systems designers and programmers" (*7*, p. 21).

Very few managers want more data than they now get, whether historical or projected; most managers are inundated with data.

If the change agent has been trained as a computer specialist, many human relations problems may arise in the design and implementation stages. Couger and Zawacki found that data processing "systems professionals have a startlingly low proclivity to social interaction. In fact, the results showed that these job holders have negligible need to work with other individuals" (*25*). Salmon believes that the systems designers' "ignorance of libraries and their operations" has often caused librarians to react negatively toward computer systems personnel (*26*). He also notes that computer systems personnel's attitude of elitism—"the notion that the masters of the computer are inherently superior to and have better judgement than computer customers"—has contributed to the distrust of these external change agents.

The proliferation of irrelevant computer-generated data is another form of technological harassment which may have a negative psychological impact, not only on library and office workers but on users as well. Tomeski states: "Managers and employees are saturated with seemingly endless reports" that are computer generated (*9*, p. 32). Dickson advances the position that there is "a general dissatisfaction with the results produced by our computer systems" which may lead to the non-use of computer produced output (*1*, p. 63). Faeber and Ratliff claim that the bewildering amount of computer output can have a negative effect on workers (*7*, p. 21). This negative attitude toward paper-work pollution is also held by Vyssotsky who states, "Very few managers want more data than they now get, whether historical or projected; most managers are inundated with data" (*27*).

Despite the multiple problems associated with introducing automated systems into the office environment, there are, of course, aspects of automation which could have a positive psychological impact on workers. Simon found that "If we look at office automation, we see that . . . the kind of jobs that are displaced tend to be those that are most repetitive and restricting" (*12*, p. 1189). Zisman notes that automation may "relieve workers of the mundane and routine functions and turn these over to computer control" (*28*). From Strassmann's point of view, "the new 'revolution' is properly focused on the labor-intensive, time-consuming, frequently wasteful processes involved in originating, manipulating, and disseminating information" (*29*). Although the need to retrain displaced workers still remains, the retrained worker may obtain a more satisfying position.

Vyssotsky notes that although information workers do things that are impossible or difficult to mechanize, the computer can do some things that are difficult or impossible for people to do (*27*, p. 24). From the librarian's and user's point of view, the ability of the computer and other components of information technology to accomplish otherwise impossible tasks may be one of the most important aspects of automation. An example would be the use of a computer terminal to search millions of entries in multiple data-

bases in a very short amount of time. If such automated functions were not available, librarians might find it impossible to satisfy users' current and projected information needs. Mansfield sums up the beneficial aspects of automation: "Technological change has improved working conditions, permitted the reduction of working hours, provided an increased flow of products, old and new, and added many new dimensions to our way of life" (5, p. 1).

Conclusion

The successful implementation of automated systems in libraries requires careful consideration of the psychological needs of employees. Perhaps the only effective way to produce positive psychological impacts on library and office workers who are facing the introduction of automated systems is to use what Shaughnessy calls the socio-technical systems design which "simultaneously attends to the technical and production requirements of the work and to the psychosocial requirements of individual employees and working groups" (22, p. 271). A number of researchers have noted that in order to successfully introduce and implement automated systems, with a minimum of negative psychological impacts, office workers, operators and users should be allowed meaningful participation in the design and implementation phases of automation.

Library and office workers will have to learn how to adapt to automation. This process of adjustment could be aided by a highly placed information technology staff member who is charged with the responsibility of implementing automated systems. One of the major tasks for such an individual would be to maintain high morale and good working relationships among workers (17, p. 21). Automated systems are here to stay. We can assume that they will play an ever larger role in libraries and offices in the future. As noted by Pizer, "the problems are great but the rewards are even greater" (30).

Literature Cited

1. Dickson, Gary W./When a Computer Comes to Work. *USA Today* 108:62 (Mar 1980).
2. Morgan, Margaret B. Coleman/Office of the Future: Is Management Ready? *Journal of Systems Management:* 32 (Jun 1980).
3. Barna, Becky/Toffler Talks of Tomorrow. *Datamation* 26:38 (Sep 1980).
4. Burch, John L./Computers, Humanistic Values, and the Library. *Public Library* 18:90 (Winter 1979).
5. Mansfield, Edwin/*Technological Change.* New York, W. W. Norton & Co., 1971. p. 103.
6. Burack, Elmer and Peter F. Sorensen/Manpower Development and Technological Change: Some Considerations for Revised Strategies. *Journal of Management Studies* 8:313 (May 1971).
7. Faerber, Leroy G. and Richard L. Ratliff/People Behind MIS Problems. *Financial Executive* 48:22 (Apr 1980).
8. Robinson, Arthur L./Impact of Electronics on Employment: Productivity and Displacement Effects. *Science* 195:1179 (Mar 18, 1977).
9. Tomeski, Edward A./Computers Create Social Issues. *Journal of Systems Management* 27:31 (Feb 1976).
10. Mealiea, Laird W./Learned Behavior: The Key to Understanding and Preventing Employee Resistance to Change. *Group and Organization Studies* 3:214 (Jun 1978).
11. Baum, Bernard and Elmer Burack/Information Technology, Manpower Development and Organizational Performance. *Academy of Management Journal* 12:286 (Sep 1969).
12. Simon, Herbert A./What Computers Mean for Man and Society. *Science* 195:1189 (Mar 18, 1977).
13. Loughridge, F. Brendan/Against the Self Image of the Trade: Some Arguments Against Computers in Libraries. *Assistant Librarian* 72:115 (Sep 1979).
14. Dowlin, Kenneth E./The Electronic Eclectic Library. *Library Journal* 105:2265. (Nov 1, 1980).
15. Sheridan, Thomas B./Computer Control and Human Alienation. *Technology Review* 83:71 (Oct 1980).
16. Kets de Vries, Manfred F. R./Organizational Stress: A Call for Management Action. *Sloan Management Review:* 3 (Fall 1979).

17. Moan, Floyd E./Does Management Practice Lag Behind Theory in the Computer Environment? *Academy of Management Journal* 16:7 (Mar 1973).
18. Whisler, Thomas L./*Information Technology and Organizational Change.* Belmont, Calif., Wadsworth Publishing Company, Inc., 1970. p. 89.
19. Burks, Arthur W./Computers—Ultimately Controlling Humans? *USA Today* 107:16 (Dec 1978).
20. Tomeski, Edward A., Dorothy E. Wood, and George Stephenson/2001: A Computer Space Odyssey. *Journal of Systems Management* 29:7 (Apr 1978).
21. Maskovsky, Gerald S./Office of the Future—Not Peopleless. *Management World* 9:29 (Feb 1980).
22. Shaughnessy, Thomas W./Technology and Job Design in Libraries: A Sociotechnical Approach. *Journal of Academic Librarianship* 3:271 (Nov 1977).
23. Driscoll, James W./People and the Automated Office. *Datamation* 25:110 (Nov 1979).
24. Lucas, Henry C., Jr./The Evolution of an Information System: From Key-Man to Every Person. *Sloan Management Review:* 42 (Winter 1978).
25. Couger, J. Daniel and Robert A. Zawacki/What Motivates DP Professionals? *Datamation* 24:117 (Sep 1978).
26. Salmon, Stephen R./*Library Automation Systems.* New York, Marcel Dekker, Inc., 1975. p. 222.
27. Vyssotsky, Victor A./Computer Systems: More Evolution than Revolution. *Journal of Systems Management* 31:24 (Feb 1980).
28. Zisman, Michael D./Office Automation: Revolution or Evolution? *Sloan Management Review:* 9 (Spring 1978).
29. Strassmann, Paul/Office of the Future: Information Management for the New Age. *Technology Review* 82:54 (Dec/Jan 1980).
30. Pizer, Irwin H. "Automation-Planning to Implementation, the Problems en Route. *Bulletin of the Medical Library Association* 64(no. 1):1–14, (Jan 1976).

Further Readings

Abelson, Philip H., and Allen L. Hammond/The Electronics Revolution. *Science* 195:1087–1091 (Mar 18, 1977).

Burack, Elmer and Peter F. Sorensen. "Management Preparation for Computer Automation: Emergent Patterns and Problems." *Academy of Management Journal,* 19 (June, 1976), pp. 318–323.

Demb, Ada/*Computer Systems for Human Systems.* Oxford, Pergamon Press, 1979.

Dorn, Philip H./Automated Office; the Road to Disaster? *Datamation* 24:154–156 (Nov 1978).

Juvigny, Pierre/Data-Handling and the Protection of Workers' Rights. *International Labour Review* 114:247–260 (Nov–Dec 1976).

Lawrie, John W., John M. Ryan, and Alastair Carlyle/Terminals and Their Impact on Employee Motivation. *Datamation* 20:59–60 (Aug 1974).

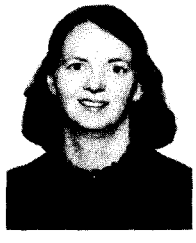
Menkus, Belden/People Spell Success . . . and Failure. *Journal of Systems Management* 31:12–15 (Sep 1980).

1985: New Technology for Libraries. *Library Journal* 105:1473–1478 (Jul 1980).

Pasmore, William A., and Donald C. King/Understanding Organizational Change: A Comparative Study of Multifaceted Interventions. *Journal of Applied Behavioral Science* 14:455–468 (Oct/Dec 1978).

Robey, Daniel/User Attitudes and Management Information System Use. *Academy of Management Journal* 22:527–538 (Sep 1979).

Vickery, A./The Clash of Interests in Computer Information Services. *Information Processing and Management* 14:37–43 (1978).



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Information Technology and Personal Responsibility

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■ **The inauguration of the era of total information systems, i.e., the combining of advanced hardware, software and communications technology in a networking, interactive mode, represents a unique and unprecedented innovation. It is the application of this innovative process that leads to the mechanization of judgment and to the automation of certain middle-management functions. The societal implications of these and related developments are discussed. Ethical and moral questions are considered, and the role and personal responsibility of the information professional are emphasized.**

IN EVERY ERA, the introduction of specific innovations brought about drastic human and environmental consequences. The consequences of corporate or governmental decisions, of personal decisions, of human action or inaction, are difficult to predict. Yet, it is essential for us to reaffirm that what we do or do not do, what we accept or reject, the kind of information systems we develop or do not develop, *does* have consequences.

A review of the history of science and technology would reveal that new power elites have been created as a direct result of the introduction of certain technological innovations, that new institutional alignments were made necessary, and that often fundamental personal and societal dislocations became the inevitable by-products of the adoption of these innovations. A debate must have raged with the introduction of each significant innovation, as to whether its adoption would prove to be a boon or a menace to mankind.

In our era, the innovations may have changed in character, but the debate remains similar and unremittingly with us: Should we, or should we not, build nuclear power plants? Should we, or should we not, declare a moratorium on genetic research? Will the creation of merged national and international data

banks tend to liberate or enslave mankind? Choices need to be made, and with each choice, society either benefits or loses something for its members.

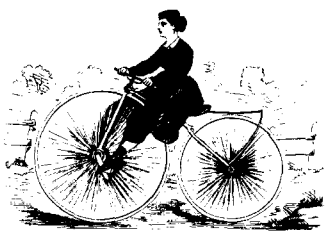
The Computer as an Innovation

Without a doubt, the computer represents one of the greatest technological innovations of our era. As has been the case with so many other innovations, initially the computer was used for automating tasks which previously had been performed manually, e.g., payroll, inventorying, accounting, and repetitive work embodied in such activities as circulation transactions. In the realm of research and development, through use of programmed mathematical procedures, the computer was used to solve specific types of problems relevant primarily to the field of science and technology which were also previously carried out through laborious, manual methods. The larger and more powerful computers linking information from a number of collection points and from multiple organizations were not introduced until the early sixties. It is only within the last decade that the third generation of computers—minicomputers, microprocessors, advanced terminals, and related communication equipment and software—have been introduced. It is essential to realize that it is the *linking of a number of the innovations* introduced during the last decade that made possible the network and networking approach, i.e., the total system approach.

The Mechanization of Judgment

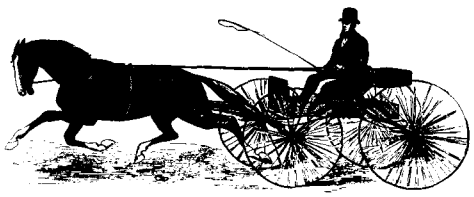
The implementation of the total system approach—the combining of advanced hardware, software, and communications technology—represents, in its own right, an innovation which is perhaps more significant than the initial introduction and use of the computer. This innovation represents not merely the use of a machine as a replacement for manual labor or manual procedures but an entirely new process. In advanced systems, the collection and machine processing of data *precedes* manual execution of tasks—the processing of data which formerly required human perception and individual human decisions. Some have referred to this process as the "mechanization of judgement."

Is mechanization of judgment an essential requirement of post-industrial society? A number of writers, information scientists, and system designers such as Allen Kent, Daniel Bell, or Isaac Asimov have been advancing the notion that the prevailing knowledge-based society is so complex as to be "counterintuitive," i.e., decision-making based on intuitive judgment is no longer adequate. They call for a new intellectual technology to support the increasing complexity of the decision-making process and propose that algorithms be created as substitutes for human, intuitive judgment. Rational action, it is argued, needs to be defined and programmed; utilizing the system approach, the need for carrying out such action must be identified.



These notions are not to be construed to represent idle projections, science fiction, or futuristic writing. As has become clear within recent years, the unskilled laborer, the industrial worker, and the white-collar office employee are not the only ones who are being replaced by machines and office automation. Office managers and middle-management in general—indeed, much of human intuitive judgement—is being supplanted by the more rational, programmed information system. In the April 1978 issue of *Datamation*, John E. Seely, Jr., a consultant in the data processing field, noted the following:

For the last 20 years, executives have been deluding themselves into believing that the impact of automation need not be feared at management levels, that policy decisions cannot be automated, that the manager's function is too judgmental and humanistic to be computerized. However, it was obvious from the beginning that computer systems would invade this management area some day. And this day has come.



In a paper delivered at a National Symposium for Philosophy and Computer Technology, held at the State University of New York at New Paltz in 1977, Dr. Abbe Mowshowitz of the Department of Computer Science, University of British Columbia, also stressed that contemporary management represents the latest stage in the mechanization of the decision-making processes through the application of the computer and its related information technology:

> Automation of decision-making will proceed according to the needs of organizational control. What we are witnessing today is the resolution of management functions into tasks which can be implemented in computer programs. The middle manager is now suffering the fate of the skilled craftsman before him. With the disappearance of another link in the rigid chain of command, the gap between top and bottom widens.

It should become obvious that the continued automation and the subsequent elimination of middle management positions would replace human links in the communications chain by machines—a substitution of personal communication channels by impersonal ones. Moreover, Seely and others predict that at some future point, the ability of information systems to store data on such entities as a corporation or governmental agency in accordance with sets of optimizing rules would be so great that no one person, not even a group of technically competent people, would be able to understand the patterns of procedures and methods being interwoven automatically. At that point, it is predicted, the *system* would provide the organization structure, set the policies, and direct people in their supporting functions.

"The Machine" and Its Critics

In light of these predictions, it is not surprising that in the United States, one of the most advanced post-industrial societies, the extensive use of information technology has aroused fear of intellectual inadequacy, powerlessness, and frustration. In numerous books, journal articles, motion pictures, and other media, the fear seems to be expressed that man is out of control and that many of the enormously expensive information systems function not so much for the benefit of humans as for the support and welfare of the systems themselves, or for the support and welfare of some unknown and irrelevant objectives. Whether imbued with a dynamism of their own or consciously determined by design, the fact remains that such systems do exist; that they increasingly embrace a variety of complex tasks bordering on cybernetics as envisioned by Wiener and Von Neumann; and that decisions which would have been questioned had they been made and communicated by humans are now resignedly accepted when made and delivered by machines.

Of course, technology in general—"The Machine," in the broadest definition of the term—has undergone intense and vociferous criticism. If Lewis Mumford's reference to "The Machine" in the following passage were to be substituted by "information systems," the projected prime engines of our post-industrial society, one would arrive at the following:

> Most of the creative forces in our time have been canalized into . . . [information

> systems], a systematic organization of scientific discovery and technical apparatus that, under pressure of excessive pecuniary gains and exorbitant political power, has transformed the entire existence of the Western world. The insensate dynamism of this mechanical organization, with no goals but its own ceaseless expansion and inflation, has broken down the continuity of history.

While somewhat harsh, Mumford's comment does reflect the dangers inherent in the use of information technology in a narrow, uninformed, or unenlightened way and illustrates the fear engendered in the employment of impersonal, segmented, standardized, programmed, and computerized procedures. In a larger sense, the statement lays bare the abandonment of our societal system of ethical and moral values—the controlling goals of our society—and points to the embrace and adoption of those forms of knowledge which are susceptible to precise quantification and, consequently, to computer storage and database manipulation.

Quantification And Unquantifiables

In Italy there is a cathedral which stands in Pisa's main square. Inside the cathedral, the Lorenzi lamp hangs from a chain so long that it truly resembles a pendulum. This is said to have prompted Galileo to work out the theory of isochronism. There is a certain irony in the fact that four centuries ago, amidst the splendor of Italian art, when Galileo first gave an empirical formulation to many of the physical laws governing our universe and advocated the idea that the book of nature is written with numbers rather than letters, he inaugurated not just the era of modern science but, more significantly, the era of quantification, objectivity, and detachment. Perhaps there was a need in Galileo's time to counterbalance the world of art, mysticism, and religion with numeracy, quantification, and empirical evidence. Perhaps there is a need in our era to review "What Galileo hath wrought."

System Design and Quantification

Like scientists and technologists in other disciplines, information scientists, technologists, and system designers have the ability to observe, to count, to calculate, and to quantify. Yet, in almost all areas of science and technology, we select to quantify only a few of the many relevant factors that are essential for fully valid generalizations and system decisions. It must be understood that decisions resulting from selective or partial quantification of relevant factors would only be partially valid and would only enable us to partially assess and predict the effects of our services. With respect to decisions as products of computer-based systems, one can discover legions of disastrous results based upon generalizations derived from too few relevant factors. For example, in his book *The Best and the Brightest,* David Halberstam discusses the work of the highly knowledgeable system people that were on the staff of the Department of Defense under Robert McNamara. While all the basic statistical (quantifiable) data relating to the vehicles, guns, tanks, and men of the South vs. the North Vietnamese forces were entered into the Pentagon computers, the motivation of the North Vietnamese soldiers vs. that of the South Vietnamese forces was not adequately quantified or even included.

Science, Detachment and Objectivity

The Galileo legacy, that is the "hard sciences" approach, calls for a detachment and objectivity which transforms us into theoretical knowers, into spectators, into information professionals who can be effective only if we keep ourselves and our interest separated and unaffected by what we are observing, designing, or applying. Too infrequently do we raise the question, "How do the things I observe, record, quantify, and design relate to *me* as a human being? How do they relate to the society in which I live and work?"

What effects will the current trends toward depersonalization and programmed mechanization of judgment have on our society? How will the automated decision-making process affect the user, that is, the recipient of the decisions, as well as the information professional who designs and operates the information system? What responsibility does the information professional have to alleviate or compensate for the more mechanistic and impersonal communication channels that have come into being? To what extent is automated decision-making truly a substitute for human judgment? In this knowledge-based and system-based era, is there a unique role and responsibility that society has thrust upon the information professional, a role and responsibility of which he or she is not yet fully aware and to which he or she has not yet become sensitized?

Abstract and Functional Systems

A substantial literature exists on system design. Much of this literature is accompanied by detailed and elaborate flow charts and diagrams. Yet, the bulk of this literature and its precise charting is of little value in seeking to deal with the more universal social, moral, and ethical values that are difficult to quantify. The literature, at best, offers only abstractions of systems and shadows of a reality which, when functional, touches people's lives, operates within a social environment, and often behaves quite differently from that envisioned and projected on paper. To paraphrase Jesse Shera, information systems are social instrumentalities and, as such, they are conditioned and shaped by the social milieu in which they were designed to function. It is society and not the particular corporation or institution that is the system's trustee; it is to society that the information system and the information system designer must ultimately respond and be responsible.

Thus, to understand the relationship of information system design to the broader social environment and the role that the information system designer must play in that relationship, it is essential to look past the flow charts, past the local goals and objectives, and look at the system user, at society itself and the cultural and value system that operate within it.

A System of Values and Personal Responsibility

One has to assume that there exists within society a system of values, a set of abstract principles and moral precepts, relativistic rather than absolute, which may not be susceptible to quantification but which would help us, as human beings and as information professionals, determine what is or is not the right system and what does or does not constitute personal, moral obligation and responsible professional action. Rationalism, quantification, economy, and efficiency may be essential for system design. But are they sufficient?

Applying the Galileo legacy, that is, looking at the information world as being comprised of numbers rather than letters, the information professional may become enmeshed in what some critics have labelled deterministic, reductionist, and mechanistic values. This tendency, of course, is reinforced by the computer. The information professional might also become a disciple of the Alfred North Whitehead doctrine of reality—an environment comprised of nothing more than bits, bytes, information chips, electrons, and physical datons which are senseless, purposeless and valueless, and which do what they do without reference to human experience, to overall societal needs and aspirations, or to human feelings, fears and frustration.

The danger exists that acting as spectators and observers, as implementers of events, as information technologists who meet the goals and objectives set by others but who are unwilling to relate quantified data and conclusions to ourselves as total human beings—to

the totality of our perceptions and environment—it would follow that we would begin to raise certain questions with respect to the purpose of all this equipment, machinery, and systems technology. Certain tensions would be created within us and, eventually, within our society at large; a certain skepticism and uneasiness would gain ascendancy about the reality of our purposes and the direction and meaning of our systems and our lives.

We have seen such evidence all around us and in our literature. In a paper published in the *ASIS Journal*, one observer comments: "It is my firmly held belief that many of the premises which make up the currently held paradigm of information science are socially and politically pathogenic." [Webster defines pathogenic as "causing or capable of causing diseases."]

Considered somewhat differently, the quantitative and essentially materialistic cosmology inaugurated by Galileo and embraced by information technology and the hard sciences today, having often ignored the broader yet extant system of social values, having cast aside the qualitative and unquantifiable factors, would as a consequence, tend to undermine the notion of moral choices and personal responsibility for our individual decisions. And yet, like the ancient watergate keepers of the Indus valley, we who are involved in information system design and implementation have had a heavy responsibility cast upon us by society. We did not ask for this role and responsibility. It is ours nonetheless. Although top management, the politician or the government official may make the initial basic decisions and establish the system's goals and objectives, as information professionals we cannot escape personal responsibility for assuring that not only our professional expertise but our perceptions as human beings have been included in the basic design process. The information professional may be the only individual fully aware of a system's strengths and weaknesses, of a system's potential for good or evil. Frequently, trade-offs are involved in a system's or subsystem's processes. It would seem irresponsible for an information professional not to consider and weigh carefully the overall human and social implications of decisions affecting system design and its services. The quantification, detachment, and objectivity called for in modern science cannot mitigate or relieve us of our responsibility. It is a responsibility in which we must not fail.

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Information Technology A Bibliography

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Bell Laboratories, Murray Hill, New Jersey 07974

■ **This is a selective annotated bibliography of 86 references on technological innovations that have had or are expected to have an impact on libraries. It generally covers references appearing in the late 1970s through 1980. The authors have been highly selective because of space limitations; there are undoubtedly other publications which could have been included. Within each section, entries are arranged alphabetically by author.**

Future Technology for Libraries

1985: New Technology for Libraries.
Libr. J. **105**(13): 1473-8 (July 1980)

Five opinions from prominent information practitioners on the new products or innovations that are likely to affect libraries. Descriptions of the library of 1985.

Information in the 1980's.
Anthony, L. J. (Ed.)
Aslib, London, 1976, 98p.

Proceedings of a seminar held in 1976 in which representatives of management from some of the principal industrial companies of Europe and the U.K. participated. Contains a predictive statement for the 1980's concerning the economic, social, political, information, and technological environments. Also discusses information resources in the next decade, including the "client of today" in a major industrial company. Highly recommended.

Libraries, Society and Technological Change.
Becker, Joseph
Library Trends **27**(3): 409-16 (Winter 1978)

A discussion of the forces of change on the library of the future: economic pressures, force of technology itself, and the merger of computer and communications technologies with related ones such as printing and photography. More than technology alone is needed in the future—expert social engineering is required.

Information: The Ultimate Frontier.
Branscomb, Lewis M.
Science **203**: 143-7 (1979)

A 100-year scenario on information and the role of increasing memory and high speed circuits of computers, coupled with lightwave communication. Information will be reacquired rather than just stored in future computers. Satel-

lites will be used to obtain up-to-date street maps for city planning rather than using existing ones.

The Electronic Eclectic Library.
Dowlin, Kenneth E.
Libr. J. **105**(19): 2265-70 (November 1, 1980)

Describes the use of information technology, including database searching, electronic mail, and the online catalog. The future of videodisc is also discussed. According to Dowlin, "The issue is not technology. The issue is access and the use of technology to increase access."

How Will New Technology Change the Characteristics of Libraries and Their Users?
Garfield, Eugene
in *Knowledge and Development—Reshaping Library and Information Services for the World of Tomorrow, A Festschrift for Bjorn Tell.* S. Schwarz and U. Willers (Eds); Stockholm: Royal Institute of Technology Library, 1978.

Emphasizes that librarians must not feel threatened by forthcoming technology. Videotext systems with online searching power in the home are "perhaps the most far-reaching of the information technologies on the horizon".

2001: An Information Society?
Garfield, Eugene
J. Info. Sci. **1**(4): 209-15 (October 1979)

Distinguishes between an information-conscious society where we are now and an information society to be realized. Garfield thinks society is not yet "information literate", but steps are being taken to mitigate this.

New Information Systems.
Kilgour, Frederick G.
Bull. Amer. Soc. Info. Sci. **6**(3): 13 (February 1980)

A brief description of some emerging information systems for the public, including pre-coordinated indexes and videotext systems.

The Role of the Library in an Electronic Society. Lancaster, F. Wilfrid (Ed.)
Clinic on Library Applications of Data Processing, 1979. University of Illinois Press, Urbana, IL, 1980, 200p.

Contains 13 papers on the future of the library in the electronic age, including machine-readable databases, computerized newsrooms, the virtual journal, electronic mail, etc.

The Changing Face of the Library: A Look at Libraries and Librarians in the Year 2001.
Lancaster, F.W., Drasgow, Laura S., and Marks, Ellen B.
Collection Management **3**(1): 55-77 (Spring 1979)

Draft of a scenario developed by the authors during a research report on the role of the library in a paperless society. The authors are seeking feedback on this draft from the library profession. (Also published in the volume cited immediately above.)

Information Science and Scientists in 2001.
Meadow, Charles T.
J. Info. Sci. **1**(4): 217-22 (October 1979)

Discusses the impact of technological innovations on users of information, and particularly on information scientists. Future developments will be in two directions: intelligence and intelligent systems, and integration, where collections of information will be viewed as an integrated whole. Information scientists will have to operate more in a counseling role and will have new pressures on them as the volume of information and the number of information systems grow.

Library Automation

The Library Manager's Guide to Automation.
Boss, Richard W.
Knowledge Industry Publications, White Plains, NY, 1979, 106p.

Contains a discussion of the steps in the decision-making process on whether to automate and how to carry out this decision. The reader is not assumed to have expertise in automation.

Problems and Failures in Library Automation.
Lancaster, F. Wilfrid (Ed.)
Clinic on Library Applications of Data Processing, 1978, University of Illinois Press, Urbana, IL, 1979, 109p.

Contains nine papers on problems in library automation in the areas of circulation systems, networking, teaching the subject, etc. Highly recommended.

The Professional Librarian's Reader in Library Automation and Technology.
Martin, Susan K.
Knowledge Industry Publications, White Plains, NY, 1980, 201p.

A collection of selected chapters from eight monographs in the Professional Librarian Series by the same publisher.

Automated Text Editing: The State of the Art and its Implications for Libraries.
Saffady, William
J. Libr. Automat. **9**(2): 101-16 (June 1976)

A state-of-the-art review of automated text editing using various recording and storage media. Contains descriptions of some commercially available systems, and a bibliography of 44 references.

Library Automation Systems.
Salmon, Stephen R.
Dekker, NY, 1975, 291p.

A good introductory text for the novice. Contains an extensive bibliography.

Introduction to Computer-Based Library Systems.
Tedd, L.A.
Heyden, London, 1977, 208p.

Similar to Salmon's book, except that an introduction to a computer and how to communicate with one is included. Also contains a discussion of SDI and online database searching, which are not in Salmon. For the librarian with no computer experience, Tedd is the better starting place of the two.

Paperless Information Systems and Other Publication Alternatives

Word Processing Compiles News for the White House.
The Office **91**(4): 30 (April 1980)

Describes the use of interactive word processing equipment to produce the daily news summary for the President and the White House staff.

Technology Brings the Office to the Man.
Myers, Del
Telephony **199**(2): 26-34 (July 14, 1980)

An interview with Vincent E. Giuliano, senior consultant of Arthur D. Little. Giuliano says that "we already have an information society" and gives an example of how communications technology and the office of the future have affected him: "I only go to the office location when it fits my work patterns. I have started to use the term 'teleworking' to describe what I do."

The New Technology.
Cawkell, A. E.
Aslib Proc. **31**(1): 29-32 (January 1979)

A brief summary of electronic storage and retrieval of information.

The Paperless Revolution. (Parts 1 and 2)
Cawkell, A. E.
Wireless World **84**(1511): 38-42 (July 1978); **84**(1512): 69-74 (August 1978)

Factors influencing the takeover of electronic systems from paper are developments in the technology, the price of the devices, and communica-

tions methods. New technology and the political issues of communications are discussed in the first part; future developments and applications of electronic transfer of information are discussed in the second.

White House Information Handling.
Part 1: Information Infrastructure.
Harden, Richard M.

Part 2: Technology Impact on EOP Information Program
Kadec, Sarah T. and Mancher, Rhoda

Telecommun. Policy **4**(2): 134-47 (June 1980)

Part 1 of this pair of papers describes the information flow about the President and the steps involved in handling this information. Part 2 discusses some computer-aided systems used in the White House information program.

Toward Paperless Information Systems.
Lancaster, F. Wilfrid
Academic Press, NY, 1978, 179p.

The best source for information on the evolution toward paperless information systems. Valuable also for the discussion of a prototype paperless system at the CIA called SAFE (Support for the Analyst File Environment), which provides access to both central files and analysts' personal files. Contains an excellent bibliography.

Whither Libraries? or, Wither Libraries.
Lancaster, F. Wilfrid
Coll. Res. Libr. **39**(5): 345-57 (September 1978)

The transition from traditional, paper-dependent information transfer to electronic means seems inevitable. A scenario for libraries in the paperless age is presented.

Alternative Methods of Journal Publishing.
Lea, P. W.
Aslib Proc. **31**(1): 33-9 (January 1979)

Some developments in the publishing of journals are described. These include: synoptic journals, electronic journals, use of text processing, and microforms.

Digital Comunications and the Conduct of Science: The New Literacy.
Lederberg, Joshua
Proc. IEEE **66**(11): 1314-19 (November 1978)

An example of a new form of communication, called the EUGRAM, is described. The EUGRAM is a form of electronic mail; it may replace the telephone in some circumstances.

The Synopsis Journal: Its Prospects for the Scholarly Author, Publisher, and User.
Millson, R.
J. Research Commun. Studies **1**(4): 315-16 (October 1979)

This is the introductory paper of a seminar on the synoptic journal. Papers following discuss experiences with a synopsis journal in chemistry, a librarian's view of these journals, and a synoptic journal in management research.

Computers in Publishing.
Terrant, Seldon W.
p191-219 of *Annual Review of Information Science and Technology*, Volume 15, Williams, Martha E. (Ed.), Knowledge Industry Publications, White Plains, NY, 1980.

A review, primarily of the 1978 and 1979 literature, of the technology involved in computer-assisted production and publication of information, including the mechanisms and problems associated with input, processing, and output. Database publishing, applications of computer publication (photocomposition, production aids, current awareness services, electronic publishing), and other topics are covered. Contains an extensive bibliography.

Micropublishing and Libraries in the Future.
Thomas, Peter A.
Aslib Proc. **30**(5): 165-71 (1978)

A review of micropublishing with emphasis on the role of microfiche. Computer output microfilm is briefly discussed.

Electronic Mail—Its Use in a Corporate Information Center Network.
Birks, Grant
p41-3 of *Communicating Information*, Benenfeld, Alan R. and Kazlauskas, Edward John (Eds.), Knowledge Industry Publications, White Plains, NY, 1980, 417p. (Proceedings of the 43rd ASIS Annual Meeting, Anaheim, CA, October 5-10, 1980)

A description of the Corporate Communication System (COCOS) at Bell-Northern Research, Ltd. COCOS is an information handling system including electronic mail capabilities. It is useful in communication over a long distance, but less so within the same city. It has enhanced communication between the technical information centers and other departments within the company.

Electronic Communication: Technology and Impacts.
Henderson, Madeline M. and MacNaughton, Marcia J.
AAAS Selected Symposium No. 52, Houston, 1979, Westview Press, Boulder, CO, 1980, 173p.

Contains 15 papers on computer conferencing, videotext systems, and social impacts and policy issues of them.

The Network Nation: Human Communication via Computer.
Hiltz, Starr Roxanne and Turoff, Murray
Addison-Wesley, Reading, MA, 1978, 525p.

An excellent introduction to computer conferencing. Also discusses applications, man-machine interface problems, and the social impact of computer conferencing. Contains an extensive bibliography.

Electronic Meetings: Technical Alternatives and Social Changes.
Johansen, Robert; Vallee, Jacques; and Spangler, Kathleen
Addison-Wesley, Reading, MA, 1979, 244p.

Discusses how meetings can be made more effective for members of groups separated by both space and time by using electronic technologies—audio, video, and computer. Contains an extensive bibliography.

Electronic Mail: The Future is Now.
Josephine, Helen B.
Online **4**(4): 41-3 (October 1980)

A description of some commercially available electronic mail systems, such as facsimile transfer and electronic message systems. Document ordering systems developed by some online information retrieval vendors are also covered.

Practical Electronic Mail Through a Centralized Computing Facility.
Lynch, Clifford A.
p34-7 of *Communicating Information*, Benenfeld, Alan R. and Kazlauskas, Edward John (Eds.), Knowledge Industry Publications, White Plains, NY, 1980, 417p. (Proceedings of the 43rd ASIS Annual Meeting, Anaheim, CA, October 5-10, 1980)

Describes an electronic mail system at the University of California which has been implemented as an extension of a general text-editing system on the central computer. The paper describes the human interfaces necessary for a successful and useful electronic mail system.

Time to Retire the Telephone?
Marill, Thomas
Datamation **25**(8): 185-8 (August 1979)

A scenario highlighting the difficulties of communicating in today's business world. Electronic mail can replace the telephone for many messages and can significantly increase executive productivity.

Computer-Based Message Systems: a Taxonomy.
Meyer, N. Dean
Telecommun. Policy **4**(2): 128-33 (June 1980)

A guide to what factors to consider for actual use when evaluating commercial computer-based message systems.

Computer-Based Messaging in a Research Organization.
Rittenhouse, Robert G.
p38-40 of *Communicating Information*, Benenfeld, Alan R. and Kazlauskas, Edward John (Eds.), Knowledge Industry Publications, White Plains, NY, 1980, 417p. (Proceedings of the 43rd ASIS Annual Meeting, Anaheim, CA, October 5-10, 1980)

Describes the changes in the mail handling process and the work patterns of those involved with an electronic messaging system.

Teleconferencing Enters its Growth Stage.
Sonneville, Walt
Telecommunications **14**(6): 29-32, 34 (June 1980)

Teleconferencing offers the potential of substantial savings in business travel, yet it is greatly underutilized. This paper describes some of the advantages of teleconferencing and the equipment and services available.

Videotext Systems, Videodiscs

Viewdata—A Review and Bibliography.
Online Rev. **2**(3): 217-24 (September 1978)

A short review and bibliography of 68 references, principally covering the British Prestel system.

The Prestel System and Information Retrieval.
Dew, Bryan
Program **14**(2): 76-89 (April 1980)

An explanation of how videotext systems operate, including several good schematic diagrams. Describes some of the system software and hardware, as well as the Prestel network and its database.

The Viewdata Revolution.
Fedida, Sam and Malik, Rex
Wiley, NY, 1979, 186p.

An analysis of the potential of viewdata systems by one of their early developers.

The Optical Videodisc.
Gunther, Greg
Bull. Amer. Soc. Info. Sci. **5**(2): 39-40 (December 1978)

Videodiscs hold promise as information storage and delivery media. They should have a high utility and low cost.

Prestel and Public Libraries: an LA/Aslib Experiment.
Martyn, John
Aslib Proc. **31**(5): 216-36 (May 1979)

Presents some example of the possible uses of videotext systems in libraries.

Videotex and Teletext in the U.S.: Prospects for the 1980's.
Nyhan, Michael J.; Johansen, Robert, and Plummer, Robert
Telecommun. J. **47**(6): 396-400 (June 1980)

Examines why the U.S. currently lags in this field, the companies involved in the U.S., and discusses the problems of regulation. Excerpted from "Viewdata in Action" (Winsbury, R. (Ed.), McGraw-Hill, UK, 1980).

Text Storage and Display via Videodisc.
Schipma, Peter B. and Becker, David S.
p103-5 of *Communicating Information*, Benenfeld, Alan R. and Kazlauskas, Edward John (Eds.), Knowledge Industry Publications, White Plains, NY, 1980, 417p. (Proceedings of the 43rd ASIS Annual Meeting, Anaheim, CA, October 5-10, 1980)

The technical development of a prototype videodisc system for storage and retrieval of information is described. Videodiscs have a great potential in information storage in retrieval because of their high storage densities, random access, and ubiquity of display devices. The system appears to have potential for cost savings in library and classroom environments.

Videotext: The Coming Revolution in Home/Office Information Retrieval.
Sigel, Efrem; Roizen, Joseph; McIntyre,

Colin; and Wilkinson, Max
Knowledge Industry Publications, White Plains, NY, 1980, 154p.

A first-hand report on various videotext systems, including those in England, the U.S., and other countries. The initial market appears to be among business and professional users; consumers will be slower to subscribe to the service. The book contains illustrations of the various systems, as well as a directory of organizations involved in videotext technology.

Microfilm vs. Optical Disk as Storage Medium for Document Retrieval and Dissemination.
Suthasinekul, Surachai
p100-2 of *Communicating Information*, Benenfeld, Alan R. and Kazlauskas, Edward John (Eds.), Knowledge Industry Publications, White Plains, NY, 1980, 417p. (Proceedings of the 43rd ASIS Annual Meeting, Anaheim, CA, October 5-10, 1980)

Microfilm and optical disk are compared and contrasted as storage media for information storage and retrieval. There are advantages to both media, depending on the circumstances.

Viewdata: A Public Information Utility. 2nd Edition.
Stokes, Adrian V.
Langton Information Systems, Ltd., Surrey, England, 1980, 133p.

A comprehensive description of the British Prestel system. The history of viewdata, its technical aspects, uses, and associated services are all described. Contains a glossary of terms, a bibliography of 32 items, and a list of Prestel information providers.

Videotex, Prestel, and Teletext.
Tyler, Michael
Telecommun. Policy **3**(1): 37-51 (March 1979)

A review of the key technical and managerial issues, as well as options, involved in videotext and similar systems. Economics, public policy, and other aspects of the issue are discussed.

Communications Technology

Telecommunication in Library Networks: A Five-Year Projection.
Aronofsky, Julius S. and Korfhage, Robert R.
J. Libr. Automat. **10**(1): 5-27 (March 1977)

Describes the computer industry, library networks, and the telecommunications industry as well as six model networks and the means of communicating among them.

Information Technology and Communications.
Cawkell, Anthony E.
p37-65 of *Annual Review of Information Science and Technology*, Volume 15, Williams, Martha E. (Ed.), Knowledge Industry Publications, White Plains, NY, 1980.

A thorough review of communications technology as it applies to information transmission. Analog and digital transmission, packet switching, satellite communications, and fiber optics are among the topics covered. The review then goes on to discuss the man-machine interface and regulatory, political, and social issues. Contains a good bibliography.

Universal Communications via Satellites—Dream or Future Reality?
Cawkell A. E.
J. Info. Sci. **1**(2): 69-75 (May 1979)

Technical, political, and future considerations of satellite communications are discussed.

Look! Up in the Sky! It's a SALINET.
Katz, Ruth M.
Bull. Amer. Soc. Info. Sci. **1**(2): 14, 38 (August-September 1974); *J. Libr. Automat.* **7**(3): 228-9 (September 1974)

The first article discusses the establishment and early development of SALINET—the Satellite Library Information Network—which uses satellites for communications between libraries in sparsely populated areas. The second article is a brief summary of the network.

Telecommunications in Libraries: A Primer for Librarians and Information Managers.
King, Donald W.
Knowledge Industry Publications, White Plains, NY, to be published in 1981.

Will discuss communication trends in libraries, including technology, satellite communications, facsimile, and home information systems.

Telelibrary: Library Services Via Satellite.
Liu, Rosa
Spec. Libr. **70**(9): 363-72 (September 1979)

Satellite communications can be useful and economic in communications between libraries. They are expected to have a major impact in the 1980's.

Advances in Electronic Technologies.
Mathews, William D.
J. Libr. Automat. **11**(4): 299-307 (December 1978)

Advances in electronic technology are reviewed. These include: microprocessors, multiprocessors, personal computing, high-speed access to stored information, videodisc, and other communications methods.

Fiber Optics: A Bright Information Future.
Rice, James, Jr.
Libr. J. **105**(10): 1135-7 (May 15, 1980)

A brief, non-technical overview of fiber optics technology and its possible impact upon communications.

The New Data Networks—Now and in the Near Future.
Rigg, Peter
Program **14**(2): 62-8 (April 1980)

A review of communications networks and the technology applying to them, including public switched networks, packet switching, and circuit switching.

Communications for Tomorrow: Policy Perspectives for the 1980's.
Robinson, Glen O. (Ed.)
Praeger Publishers, NY, 1978, 526p.

A five-part overview of the communications industry. Sections are: communications policy, communications industry structures and regulatory boundaries, applications of the new electronic media, government institutions and policymaking processes, and communications issues, institutions, and processes.

Networks

Networking—North America.
Bull. Amer. Soc. Info. Sci. **5**(5): 11-31 (June 1979)

A special issue devoted to networking. Subjects include the interconnection of networks, networking in Canada, technological issues, role of abstracting and indexing services, and emerging network services.

Getting Into Networking: Guidelines for Special Libraries.
SLA State-of-the-Art Review No. 5, Special Libraries Association, NY, 1977.

Discusses steps to be followed in the exploratory, planning and development, and operational and evaluation phases of forming a network of libraries.

Research Libraries Enter the Information Age.
De Gennaro, Richard
Libr. J. **104**(20); 2405-10 (November 15, 1979)

Reviews the early efforts of libraries to share resources, then discusses some existing networks, such as OCLC, and RLG.

From Monopoly to Competition: The Changing Library Network Scene.
De Gennaro, Richard
Libr. J. **104**(11): 1215-17 (June 1, 1979)

Library networks have been very successful, but they need to be alert to prevent administrative matters from overwhelming service, their prime reason for existence. The author argues that a single national library network is undesirable for this reason.

The Special Library Role in Networks.
Gibson, Robert W., Jr. (Ed.)
Special Libraries Association, New York, 1980, 296p. (Conference held at the General Motors Research Laboratories, Warren, MI, May 5-6, 1980)

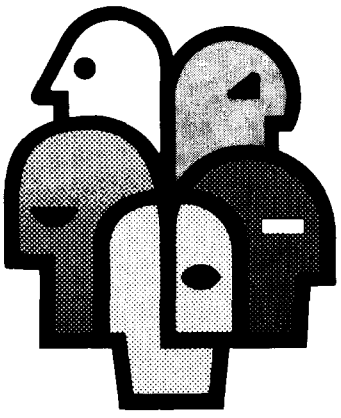
The conference was to provide "a modest answer to a perceived lack of active participation by special libraries in the various networks." Seventeen presentations and discussions address various aspects of special library network participation, including both formal and informal cooperative structures.

The Bell Laboratories Library Network.
Kennedy, Robert A.
p165-76 (Chapter 11) of *Industrial Information Systems,* Jackson, Eugene B. and Jackson, Ruth L., Dowden, Hutchinson, and Ross, Stroudsburg, PA, 1978. Updated version: p17-31 (discussion, p31-6) of *The Special Library Role in Networks.* Gibson, Robert W., Jr. (Ed.), Special Libraries Association, NY, 1980.

A description of one of the most centralized and advanced industrial library networks in existence. This article describes its organization, some of the systems it has developed, and some of the services it provides to its users.

The Structure and Governance of Library Networks.
Kent, A. and Galvin, T. J. (Eds.)
Dekker, NY, 1979, 352p. (Proceedings of the Conference on Resource Sharing in Libraries, Pittsburgh, 1978)

Contains the 34 papers and discussions held at this conference, which was sponsored by the National Commission on Libraries and Information Science (NCLIS) and the University of Pittsburgh. The papers are grouped into four main subject areas: network anatomy and objectives, network topology, technological impact, and governance. Recipient of the American Society for Information Science's Best Information Science Book award in 1979.



EURONET DIANE—the European Online Information Network.
Mahon, Barry
Program **14**(2): 69-75 (April 1980)

A brief history of the development of Euronet. Also discusses its technical interfaces, access procedure, charging structure, and DIANE (its information services).

Networks for Networkers: Critical Issues in Cooperative Library Development.
Markuson, B.E. and Woolls, B. (Eds.)
Neal-Schuman, New York, 1980, 444p.

A record of 19 papers representing the proceedings of a conference sponsored by the U.S. Office of Libraries and Learning Resources. The papers examine the current state of network development, suggest future directions and are arranged under the following subject themes: the network revolution, national policy and network development, network technology and standards, network governance and funding, and network users and services. Appendices present discussion and critical issues submitted by conference participants.

Library Networks, 1978-79. 3rd Edition.
Martin, Susan K.
Knowledge Industry Publicatons, White Plains, NY, 1978, 144p. (4th edition published, 1981)

An overview of the issues involved in establishing and operating a network of libraries. An extensive directory of existing networks in the U.S. and Canada and their members is included.

Online Information Retrieval, Cataloging

Perspectives on... Online Systems in Science and Technology.
Crawford, Susan and Rees, Alan M. (Eds.)
J. Amer. Soc. Info. Sci. **31**(3): 155-200 (1980)

An excellent compendium of five papers providing a brief overview of online retrieval. The first paper describes history and economics; the second lists over 130 online databases available from several vendors. Subsequent papers discuss the growing field of nonbibliographic databases, the MEDLINE system, and the present and future place of online retrieval systems in the information transfer process. Highly recommended.

Online Information Retrieval Sourcebook.
Hall, J.L.
Aslib, London, 1977, 267p.

An excellent textbook for those unfamiliar with online searching. Contains chapters devoted to the major commercially available systems, with examples of searches, as well as an extensive bibliography.

Online Information Retrieval Bibliography, 1964-1979.
Hawkins, Donald T.
Learned Information, Oxford, England, 1980, 174p.

A cumulation of four annual bibliographies on online searching that have been published in *Online Review*. Contains 1,784 entries, arranged in seven sections, with KWIC and author indexes.

The Library and Information Manager's Guide to Online Services.
Hoover, Ryan E. (Ed.)
Knowledge Industry Publications, White Plains, NY, 1980, 270p.

A compendium of nine papers on a tutorial level for library managers contemplating setting up an online information retrieval service. Sections are: The Nature of Online Services, Managing Online Services in the Library, Searchers and Training, and The Future of Online Services in Libraries.

Everything You Always Wanted to Know May Soon be Online.
Keichel, Walter, III
Fortune **101**(9): 226-40 (May 5, 1980)

A layman's review of online information retrieval and the changes it has brought to the library world.

Shared Cataloging at OCLC.
Kilgour, F. G.
Online Rev. **3**(3): 275-9 (September 1979)

A review of the organization and activities of OCLC. The processes and products of OCLC's shared cataloging system are described, as well as the communications system and the terminals. Online cataloging is also described in several other papers appearing in the same issue of this journal.

Information Retrieval Online.
Lancaster, F. W. and Fayen, E. G. Wiley, NY, 1973, 597p.

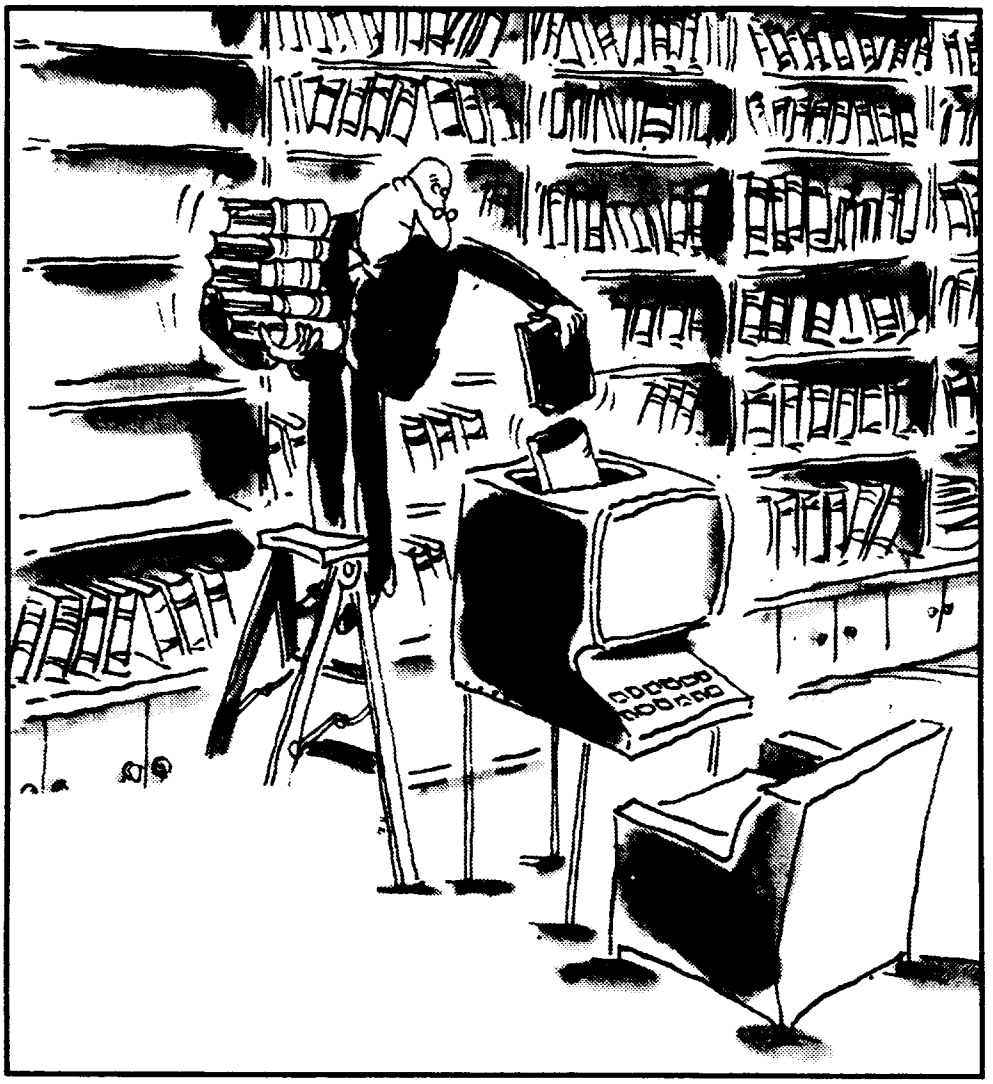
The original classic text on the subject.

The Future of the Catalog: The Library's Choices.
Malinconico, S. Michael and Fasana, Paul J.
Knowledge Industry Publications, White Plains, NY, 1979, 133p.

A good overview of machine-assisted cataloging as contrasted to more traditional methods. A discussion of online catalogs and a detailed cost analysis of the various cataloging options is included.

Online Retrieval—Today and Tomorrow.
Williams, Martha E.
*Online Rev.***2**(4): 353-66 (1978)

A review of online retrieval and the directions in which it is heading. Contains a good bibliography of 54 references.



Reprinted from the New York Times, Sunday, June 29, 1980.

Minicomputers and Microcomputers

The Computer Age. A Twenty-Year View.
Dertouzos, Michael L, and Moses, Joel (Eds.)
MIT Press, Cambridge, MA, 1979, 491p.

Presents the views of twenty "noted people" on the implications for computers in information processing in the next 20 years.

Introducing PRIMATE™—Personal Retrieval of Information by Microcomputer And Terminal Ensemble.
Garfield, Eugene
Curr. Cont. No. 29, July 17, 1978. (Reprinted in p551-5, Vol. 3 of *Essays of an Information Scientist.*)

A description of a desktop microcomputer retrieval system for individual scientists' reprint collections, etc.

Minicomputers in Libraries, 1979-80.
Grosch, Audrey N.
Knowledge Industry Publications, White Plains, NY, 1979, 142p.

A good description (but not critical evaluation) of systems available at the time of publication. It is assumed that the reader has a knowledge of basic data processing concepts.

Applications of Minicomputers to Library and Related Problems.
Lancaster, F. Wilfrid (Ed.)
Clinic on Library Applications of Data Processing, 1974, University of Illinois Press, Urbana, IL, 1974, 195p.

The 14 papers, though now dated, are good examples of applications of minicomputers. Among them are tutorials on hardware and software.

The Use of Microcomputers in Libraries.
Pratt, Allan D.
J. Libr. Automat. **13**(1): 7-17 (March 1980)

An excellent primer on microcomputers in libraries. Suggest the use of a microcomputer word processing system initially for fast and accurate production of reading lists, holdings lists, bibliographies, etc. Then the same microcomputer could also be used for circulation, etc. Contains a good bibliography.

Microcomputers in Library Automation.
Simpson, George A.
Mitre Corp., McLean, VA, 1978, 50p. ED-174217

An excellent introduction to the technology of microcomputers, with specific application to libraries. The use of microcomputers in circulation, acquisitions, serials control, and reference is covered. Contains a detailed Table of Contents and Glossary.

The Potential of the Microprocessor in Library and Information Work.
Williams, P. W.
Aslib Proc. **31**(4): 202-9 (April 1979); Comment by Rowat, M. J., *Aslib Proc.* **31**(8): 414 (August 1979)

Applications of microcomputers in a library environment are reviewed, including their uses for online information retrieval. Other possible uses are for circulation control, order processing, and cataloging.

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Beyond Efficiency to Effectiveness
Special Libraries Association
72nd Annual Conference
Atlanta, Ga., June 13–18, 1981

MANY SLA Conferences of the past have focused on techniques for doing things better—more efficiently. While this approach is useful and necessary, this year's Atlanta Conference will expand that focus beyond questions of efficiency to questions of effectiveness. The difference is significant, as described by Peter Drucker in *Management: Tasks, Responsibilities, Practices.* "Efficiency," says Drucker, "is concerned with doing things right. Effectiveness is doing the right things."

While the need for library and staff effectiveness has always been important to the library's success, such effectiveness becomes even more critical at a time when many organizations are looking at ways to reduce costs, cut overhead, and improve productivity. More and more, librarians are having to compete harder for their share of an organization's diminishing resources. To compete successfully requires that they and their libraries be effective.

The Atlanta Conference will aid librarians in becoming more effective by looking at the library's market, its users, and seeing what can be done to meet those users' and the organization's needs more effectively. How can the library best meet the corporate business objectives or the institution's mission? How can the library best apply available new technology in fulfilling the organization's goals? Who and what are the library's markets, and how can the librarian best determine the markets' information needs and develop programs to meet those needs.

General Sessions

At the first General Session on Monday morning, June 15th, two noted speakers will address the issue of effectiveness. Dr. William F. Ford is president, Federal Reserve Bank of Atlanta and former senior vice-president and chief economist, Wells Fargo National Bank. A former trade association executive, he has also been an economics professor and dean. Dr. Ford will discuss the information needs of top management, how these executives typically view the library, and how the library can evolve into an effective, dynamic organization.

The second speaker, George Wiltsee, is affiliated with the Harvard Business School where he is administrative director, External Relations. He was formerly administration director, Harvard Advanced Management Program, and has also been a consultant and an insurance and manufacturing executive. Wiltsee will speak on his experiences in the Advanced Management Program, a program to which corporations send their up-and-coming executives. What are the information needs of these "fast-trackers," how are these executives' needs changing, how will they change in the future, and what effect will technology have on the librarian–executive relationship?

The Tuesday morning session will feature three professors of management: Dr. John R. Rizzo, an industrial psychologist who is professor of management, Western Michigan University, director of the Library Administration Development Program, University of Maryland, and author of the recent book, *Management for Librarians: Fundamentals and Issues;* Dr. Henry L. Tosi, Jr., professor of management, University of Florida, and specialist in organizational behavior, personnel, and leadership theory; and Dr. W. Clay Hamner, professor of organizational behavior, Duke University, and a specialist in bargaining behavior, supervisory rating scales, management attitudes, the relationship between satisfaction and performance, job enrichment programs, and leadership styles.

The session will offer an overview of library effectiveness by Dr. Rizzo followed by two

concurrent sessions led by Drs. Tosi and Hamner. Topics to be discussed include effectiveness determination and measurement at the total library level, i.e., the key indices of effectiveness for the special library and how to determine when effectiveness is achieved; managing performance, satisfaction and learning at the level of the individual employee; and either goal setting at the individual or group level, or decision-making models for effectiveness, including strategies and pitfalls in resource allocation.

Division Programs

The Division programs will cover new developments in the respective subject areas and how these developments can be incorporated effectively. Examples of general interest Division-sponsored events are the Management Workshops jointly sponsored by the Library Management, Business & Finance, and Nuclear Science Divisions. The overall topic is "Optimizing Library Management Results." Individual workshops will cover staff productivity, long- and short-range planning, staff coaching and counseling, and decision-making and problem-solving. Each of these workshops will be held on both Tuesday and Wednesday afternoons.

Other highlights of the divisional programs include a panel discussion on "Approaches to Effective Service in Small Newspaper Libraries," sponsored by the Newspaper Division; a talk on "Future Management Trends," by the Library Management Division; an address on "How Effective Managers Use Information Systems," sponsored by the Aerospace and Military Librarians Division; and a talk on "Information: A Manageable Commodity" by the Aerospace Division.

Still other sessions are a program sponsored by the Metals/Materials Division on "Effective Planning: Theory and Practice" which will cover techniques for developing a long-range plan, planning a special library, and establishing a special library—the first year. The Division is also sponsoring a panel on "Marketing Services for User Responsiveness" which will concern general marketing studies and a case study in information center techniques. In conjunction with the Engineering Division, Metals/Materials is also sponsoring a panel on "Bridging the Gap: The User/Information Counselor Interface." The Social Sciences Division is sponsoring a talk on "Personal Effectiveness in Small Groups: Learning the Ropes."

Division-sponsored tours on Thursday, June 18th, will include such highlights of Greater Atlanta as the information centers at the Coca-Cola company and Lockheed-Georgia, the Atlanta newspapers, SOLINET, Ted Turner's Cable News Network, the Georgia State Archives, Tullie Smith House and Swan House, the Yerkes Primate Center, Calloway Gardens, and the U.S. Public Health Services Center for Disease Control.

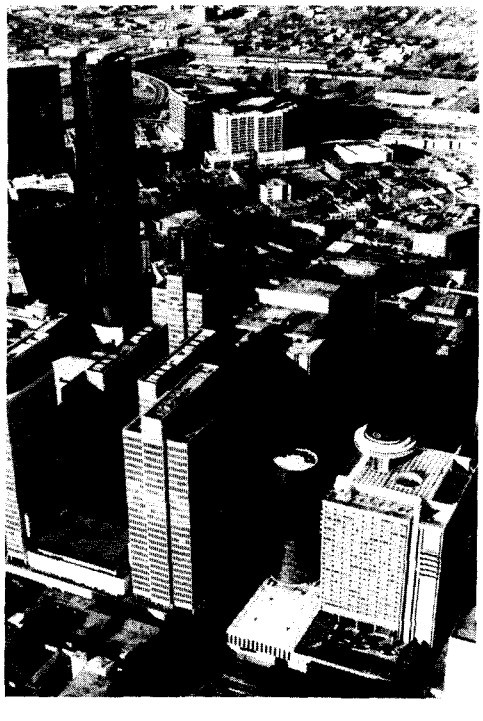
Downtown Atlanta—yesterday . . .

Scholarship Event

The 1981 Scholarship Event, held Sunday evening, June 14th, will be a fun-filled excursion to Stone Mountain Park, the 3,200-acre home of the world famous Stone Mountain Memorial Carving. The Park will be reserved for SLA that evening. This taste of the Old South will include a dinner of down-home Southern cooking, blue grass or country western music, a riverboat ride, a tour of an ante-bellum mansion, and mint juleps. We anticipate a big turnout for this event and remind those attending the Conference that few Atlanta restaurants are open for business on Sundays. So, sign up for Stone Mountain, have fun, and give some money to a good cause.

Continuing Education Program

Continuing Education courses will be held on Sunday, June 14th, and will include the following: "Handling Legal Materials"; "Group Dynamics"; "Management by Objectives"; "Putting Research on the Record—Techniques for Scholarly Writing"; "Microcomputers"; "Information Management in the Office of the Future"; and "Cost-Effective Techniques for Information Functions." In addition, two other courses have been tentatively scheduled: "Technological Advances in Information Storage" and "Introduction to Computer Programming." In the event that these short courses are over-subscribed, a second session will be scheduled for Saturday, June 13th.



. . . and today.

Atlanta

Known as the "Sun Belt Capital" and the "Capital of the New South," Atlanta is a bustling, cosmopolitan city offering many attractions. In addition to sights offered on Division tours, SLA members will want to visit the Atlanta Memorial Arts Center, home of the High Museum, Symphony Hall, the Alliance Theater, and the Atlanta College of Art. Members can walk over the nature trails of the Fernbank Science Center, a 65-acre park and science museum that includes a planetarium and experimental garden. The newly opened Atlanta Public Library is designed by the noted German architect, Marcel Breuer.

Those flying in to Atlanta will see the world-acclaimed William B. Hartsfield International Airport, opened in September 1980. The Martin Luther King, Jr., Historic Center includes the Ebenezer Baptist Church where both King and his father preached, King's birthplace, a restored Queen Anne home, and the King Center for Social Change. For some escapist adventure, members can visit the 276-acre Six Flags Over Georgia, the lively theme park that is an attraction throughout the South. From Atlanta, members may visit many battlefields and memorials of the Civil War. Food fanciers will find a plethora of restaurants in Atlanta with a range to suite every pocketbook and taste.

We think you will find Atlanta a wonderful place to visit and believe that the Conference program offers one of the most worthwhile, stimulating, practical, and practicable SLA conferences ever. *Y'all come!*

Patricia Berger
Corinne A. Campbell
Ted Slate
Dr. Martha Jane Zachert
Jeannette M. Privat, Chairman
Atlanta Conference Program Committee

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Actions of the Board of Directors January 28–30, 1981

The SLA Board of Directors met Jan 28–30, 1981, at the Association's 1981 Winter Meeting in the Benson Hotel, Portland, Oregon. President James B. Dodd presided. The following actions were taken.

Awards—The Awards Committee reported to the Board that Helen J. Waldron is the recipient of the 1981 Hall of Fame Award. The Committee also announced the selection of Dr. Estelle Brodman as the recipient of the John Cotton Dana Award. Both awards will be presented at the 1981 Annual Conference in Atlanta.

The Board approved a resolution to honor the contributions to special librarianship of Mr. Yasushi Sakai upon his retirement from the National Diet Library (Japan).

Bylaws Amendments—Proposed amendments to the Association's Bylaws were presented by the Bylaws Committee and were approved by a unanimous vote of the Board. (Note: Proposed Bylaws amendments must be approved by at least a two-thirds vote of the Board.) The proposed amendments appear on pages 181–184 of this issue.

The proposed amendments now must be approved by the majority of the members present and voting at the Annual Business Meeting in June 1981 before they can be submitted for final decision by mail ballot to the entire membership. A two-thirds vote of at least 40% of the membership eligible to vote is required to amend the Bylaws.

Campaign Statements—A recommendation of the Rio Grand Chapter to require the distribution to the membership of campaign statments of candidates for SLA Board of Directors seats was referred by the Board to the Nominating Committee for the Spring 1982 Elections.

Conferences and Meetings—The theme "New Technologies—New Frontiers" was approved for the 1982 Annual Conference in Detroit.

The Franklin Plaza Hotel in Philadelphia was chosen as the site of the 1985 SLA Winter Meeting. The meeting will be held Jan 29–Feb 1.

Consultation Service—The Board took action to increase the size of the Consultation Service Committee from three to five members to give the Committee wider geographical representation. Thus, the Committee will be able to work more directly with Chapter/Division Consultation Service Officers. The Board also acted to revise the Committee's definition to include Division as well as Chapter consultation consultation services within its scope.

The Board approved, in principle, documents prepared by the Consultation Service Committee entitled: 1) Guidelines for Conduct of Consultation Officers, and 2) Qualifications of Chapter/Division Consultation Officers. These documents will be incorporated into the Chapter/Division Consultation Officers Procedures Manual.

Cross-Representation with APLIC—A request of the President of the Association of Population/Family Planning Libraries and Information Centers (APLIC) for the establishment of cross-representation with SLA was considered. The Board deferred taking action on this request until more information on APLIC is available.

Division Affairs—The Division Cabinet Chairman reported to the Board that an Online Section of the Information Technology Section had been formed by members present at the Winter Meeting. The new section will serve as a forum for the promotion of interests in online systems, databases, and the utilization of information retrieval systems.

The Board approved two Division name changes as recommended by the Division Cabinet Committee on Division Formation. The changes are: 1) Telecommunications/Communications Division becomes Telecommunications Division, and 2) Insurance Division becomes Insurance and Employee Benefits Division.

The Board referred to the Special Com-

mittee on Division Structure a recommendation of the Women's Caucus, Social Science Group, New York Chapter, SLA, that autonomy, national membership budgeting, and decision-making representation be provided in SLA's structure for groups representing association-wide concerns to be called Interests Groups of the Special Libraries Association.

Electronic Mail Experiment—The Board approved a revised proposal for a ten-month experiment with an electronic mail system to involve the Association's President-Elect, Past President, Executive Director, Secretary, and Networking Committee Chairman. These participants will use Tymnet's On-Tyme II Electronic Mail Service during the period Mar 1-Dec 31, 1981, to determine the effect of electronic mail on the conduct of the Association's business. The proposal was developed by the Networking Committee and was first presented to the Board in June 1980. An amount of $2,600 is available in the FY81 budget for the project.

Exchange Advertising—The Board approved a policy for exchange advertising in SLA publications. Copies of this policy are available from the SLA Publications Department.

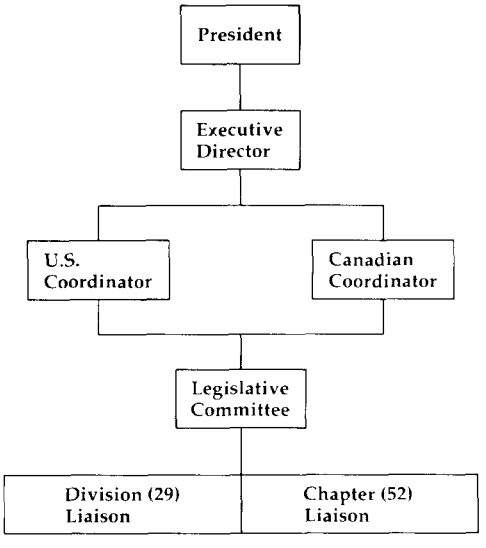
Financial Matters—The Executive Director reported that there was surplus income in excess of $85,000 in fiscal year 1980. By action of the Board, a portion of the surplus will be divided among the Reserve Fund ($34,500) and the Special Programs Fund ($15,000). The excess income will also be used 1) to support the expenses of the NCLIS/SLA Task Force on the Role of the Special Library in Nationwide Networks and Cooperative Programs ($5,000), and 2) toward the outright purchase of the Association's currently leased IBM System/3 computer system ($30,500).

The surplus income resulted from the highly successful 1980 Annual Conference, well-attended continuing education courses at the Annual Conference, and careful monitoring of expenditures in all areas. The plan for apportioning the surplus was made in light of priorities and directions established during the 1980 Fall (budget) Meeting of the Board of Directors.

The decision to purchase the System/3 computer system at $30,500 was made because the price of the system is now equal to the cost of approximately one year's rental and maintenance. Given current usage and the Association's growth pattern, it is anticipated that the System/3 will be adequate to meet the Association's needs for another three years.

The Board also voted to place the funds previously budgeted for computer rental in FY81 ($18,100) in a special account to be used toward the purchase of a new computer system. A related Board action requires that in 1982, and each subsequent year until the year of purchase, an additional $10,000 be added to this special account.

Government Relations—A definition of the Government Relations Committee was accepted. The diagram of the proposed structure of the Committee [see below] was partially incorporated into the definition. However, the Committee has the freedom to detail the structure in the form of guidelines or a manual of procedures if it so wishes.



Long Range Planning—The Board voted to authorize the appointment of a seven-member Special Committee on Long Range Planning. The Special Committee was authorized after two 2-hour informal open sessions of the Board in which the members of the Chapter and Division Cabinets actively participated. The minutes of these long-range planning sessions will be the basis of the Special Committee's initial work.

NCLIS Vacancies – The Board discussed two vacancies that will occur for NCLIS commissioners in July 1981 and conveyed to the President, SLA the sense that he and the Executive Director should solicit suggestions for candidates from the membership. The Board wishes to cooperate with other library and information organizations in forwarding a name for one of these posts to President Reagan's appointments secretary.

Networking Task Force – The Chapter Cabinet Chairman reported to the Board that the current involvement of special libraries in national, regional, and local networks will be surveyed by the NCLIS/SLA Task Force on the Role of the Special Library in Nationwide Networks and Cooperative Programs. Such data previously have not been collected. SLA Chapters have agreed to assist in this effort through distribution of a survey questionnaire to their members. Mailing labels are being provided to the Chapters by the Association Office.

Photocopying Survey – The Board ratified an action of the Executive Committee of the Board (President, President-Elect, Past President) to endorse the statistical survey of photocopying that has been commissioned by the Copyright Office to determine the effectiveness of the new Copyright Law. Unlike the previous survey, which was limited to library photocopying activities only, the new survey also will include users and publishers.

75th Anniversary Celebration – The Association's 75th anniversary will be celebrated during the 1983/84 Association year. It will culminate with the 1984 Annual Conference; to be held in New York City. The Board decided by consensus that the Chairman of the as-yet-to-be-appointed 1984 Annual Conference Program Committee should be approved in June 1981 instead of June 1982 in order to coordinate and facilitate planning and communication between the Program Committee and the Special Committee on the 75th Anniversary.

The Board also 1) urged the Special Committee to appoint a fund-raising subcommittee and 2) encouraged the Special Committee to continue with its plans for the development and preparation of an historical slide show for distribution to all the Chapters on a rotating basis during the anniversary year.

Proposed Bylaws Amendments

The Annual Business Meeting of Special Libraries Association will be held at 9:00 a.m. on Wednesday, Jun 17, 1981, at the Atlanta Hilton Hotel, Atlanta, Ga, during the Association's 72nd Annual Conference.

Amendments of the Bylaws as proposed by the Association's Bylaws Committee and approved unanimously by the Board of Directors will be submitted to the members for approval.

The proposed amendments to the Bylaws are presented here as formal notification to the members that these amendments will be submitted for approval at the Annual Business Meeting in Atlanta. If these proposed amendments are approved by a majority of the voting members present and voting, they will be submitted to the entire voting membership for mail ballot according to the procedures stated in the existing Bylaws (Article XVI, Sections 1, 2, and 3):

Article XVI: Amendments

SECTION 1. Amendments may be proposed by the Board, the Association Committee concerned with Bylaws or 25 voting members of the Association. Proposals originating in the Board or in the Association Committee concerned with Bylaws shall be approved by a two-thirds vote of the Board before submission to the members. Proposals originating by petition shall be submitted in writing to the Board and shall be presented to the members with the recommendations of the Board.

SECTION 2. Notice containing the text of any proposal shall be sent to each voting member at least 30 days before the Annual Business Meeting at which it is to be discussed. If approved by a majority of the voting members present and voting, the proposal shall be submitted to the entire voting membership for final decision by mail ballot. A proposal not approved at the Annual Business Meeting may be referred to the Association Committee concerned with Bylaws.

SECTION 3. These Bylaws may be amended by a two-thirds vote of the returned mail ballots sent to the entire voting membership provided that, of the total members eligible to vote, at least 40 percent shall have voted.

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Article II: Membership

SECTION 1. Membership in the Association shall consist of: Members, Associate Members, Student Members, Retired Members, Sustaining Members and Honorary Members. Eligibility for and privileges of each class shall be as stated herein. The Association ~~committee~~ [department] concerned with membership shall be the authority on the eligibility of membership applicants. Within the terms of this Article, a special library is defined as:

(a) A library or information center maintained by an individual, corporation, association, government agency or any other group; or
(b) A specialized or departmental collection within a library;

for the organization and dissemination of information, and primarily offering service to a specialized clientele through the use of varied media and methods.

SECTION 2. Member status shall be granted to an applicant who fulfills any one of the following requirements:

(a) Has a graduate degree in library or information science; or
(b) Has a bachelor's degree or higher degree and has three or more years of professional experience in a special library or information center; or
(c) Has at least seven years [professional] experience in a special library or information center [.] ~~determined by the Association committee concerned with membership to be professional experience.~~ (One year of under-graduate college credit equals one year of professional experience); or
(d) Has a teaching position in a university or college and is engaged in educating students in one or more disciplines related to special librarianship or information science; or
e) Has a bachelor's degree or higher degree and has or has had general administrative responsibility for one or more special divisions or subject areas in an academic or public library.

A Member shall have the right to vote, to hold any Association, Chapter or Division elective office or appointive position, to affiliate with one Chapter and one Division without payment of additional fee, and to receive the official journal free.

SECTION 5. Retired Member status shall be granted, upon request, to a Member who has reached the age 60 and who has retired. In this connection "retirement" shall be defined by the Board [.] ~~with the advice of the Association committee concerned with membership~~. A Retired Member shall have the right to vote; to hold any appointive Association position, to hold any elective office or appointive position in a Chapter or a Division; but not to hold any elective Association office; to affiliate with one Chapter and one Division without payment of additional fee, and to receive the official journal free.

Rationale. References to the Membership Committee must be removed from Article II, Sections 1, 2, and 5 because the Committee was disolved by Board action in June 1977.

SECTION 7: An Honorary Member shall be an individual elected to this honor by the Association ~~members~~ [Board of Directors]. At the time of ~~his~~ [the] election, a candidate shall not belong to the Special Libraries Association. Nominations shall be presented in writing to the Board and may be proposed by one or more Association members. ~~Upon endorsement by a two thirds vote of the Board, the nomination shall be submitted by the Board to the members for election at an Annual Business Meeting.~~ [Election shall be by a two-thirds vote of the Board.] The total number of Honorary Members shall not exceed 15 at any one time and not more than two may be elected in any one year. An Honorary Member shall have the right to affiliate with one Chapter and one Division, and to receive the official journal free.

Rationale: This recommendation originated in the Awards Committee, was subsequently referred to the Bylaws Committee, and has the unanimous approval of the Bylaws Committee. Election of Honorary Members becomes possible at several times during the year, rather than only at the Annual Business Meeting, with the concomitant advantages in public relations and publicity aspects, as well as the elimination of the admittedly slight risk of a negative vote at the Annual Business Meeting when the proposed nominee may be present. The Bylaws Committee considered establishing a specific committee to consider nominations for election to Honorary Membership, as well as requiring referral to and review by the Awards Committee. Both concepts were rejected as being inappropriate for incorporation in the Bylaws. The Board can assign responsibility for review and recommendations to the Awards Committee.

Article V: Chapter Cabinet

SECTION 2. The Chapter Cabinet shall consist of each Chapter President and President-Elect. If either is unable to attend a meeting of the Cabinet, the Chapter President shall designate ~~an eligible~~ [a] member of ~~his~~ [the] Chapter [, who is a Member, Associate Member or Retired Member of the Association,] to ~~represent the Chapter Cabinet member unable to attend.~~ [serve as alternate representative of the Chapter.]

Article VI: Division Cabinet

SECTION 2. The Division Cabinet shall consist of each Division Chairman and Chairman-Elect. If either is unable to attend a meeting of the Cabinet, the Division Chairman shall designate ~~an eligible~~ [a] member of ~~his~~ [the] Division [, who is a Member, Associate Member or Retired Member of the Association,] to ~~represent the Division Cabinet member unable to attend~~ [serve as alternate representative of the Division.]

Rationale: The first change in these Sections is intended to clear up questions of interpretation of "an eligible member" which have persistently arisen during the past several years. As reflected in the Model Bylaws, most Chapter and Division Bylaws now specify member classes eligible as alternates. The second change is to make clear that the function of the alternate is to represent the Chapter or Division at meetings of the respective Cabinets.

Article VII: Association Meetings

SECTION 5. When not in conflict with these Bylaws, *Robert's Rules of Order Revised* [(latest edition)] shall govern all deliberations.

Article VIII: Chapters

SECTION 5. Each Chapter shall submit an annual report on its activities and ~~an annual financial statement to the incoming Chairman of the Chapter Cabinet.~~ [no later than 30 days prior to the date of the Association's Anual Business Meeting a report on its activities to the Chairman and to the Chairman-Elect of the Chapter Cabinet. Each Chapter shall annually submit not later than 30 days after the end of the Association's fiscal year a financial statement to the Association Office.]

Article IX: Divisions

SECTION 5. Each division shall submit ~~an annual report on its activities and an annual financial statement to the incoming Chairman of the Chapter Cabinet.~~ [no later than 30 days prior to the date of the Association's Anual Business Meeting a report on its activities to the Chairman and to the Chairman-Elect of the Chapter Cabinet. Each Chapter shall annually submit not later than 30 days after the end of the Association's fiscal year a financial statement to the Association Office.]

Rationale: The change is necessary in Articles VIII & IX to codify practices that have had to be specified when the fiscal years of the Chapters and Divisions were changed to coincide with the Association's fiscal year.

Article XI: Nominations and Elections

SECTION 1. A Nominating Committee for each election of Members to the Board shall be elected by the Board at least one year before the closing date established for the Committee's report. This Committee shall be composed of five Members, no one of whom shall be a member of the Board. The senior two of the six Directors shall present to the Board the names of five candidates for election to the Nominating Committee, and one of whom shall have been the ~~chairman~~ [Chairman-Elect] of the Nominating Committee in the immediately preceding year, [and who will serve as Chairman of the Committee,] and the two senior Directors shall also designate the candidate to be ~~chairman~~ [Chairman-Elect] of the Committee.

Rationale. This recommendation originated with the Nominating Committee for the Spring 1981 elections. Under the present Committee structure, an experienced past chairman serves in an advisory capacity under a new inexperienced Chairman. The proposed change is consistent with the structure of the Chapter and Division Cabinets and of the Board itself.

Article XIII: Dues and Fees

SECTION 2. Dues for Association membership and fees for additional Chapter and Division affiliations shall be determined by the Board subject to approval by two-thirds ~~of the voting members present and voting at an Annual Business Meeting, provided that written notice shall have been given to all voting members at least 60 days in advance of the meeting.~~ [of the voting members voting by mail ballot, provided that the number voting is 30% or more of the members eligible to vote and that the date of return is not less than 120 days after the date of notification either through a notice in the official journal or separate notice by mail. If less than 30% of the ballots are returned, the recommended Board proposal shall be subject to approval by two-thirds of the voting members present and voting at the next Annual Business Meeting.]

Rationale. Two petitions dealing with total membership approval of dues changes were submitted to the Board of Directors in June 1980 and referred to the Bylaws Committee. The Committee readily agreed with the concept and has combined the major points from both petitions and included the same time period for advance notification, etc., which is part of the Bylaws amendment procedure. An important feature of this proposed change is that provision is made for a decision at the next Annual Business Meeting should the percentage of mail ballots returned be too low. We hope that this procedure will shorten the decision-making span and eliminate additional expenses for resubmission of a mail ballot.

Article XV: Association Affiliation and Representation

SECTION 2. A Chapter may affiliate or disaffiliate with a local common interest organization in accordance with the provisions of its own Bylaws, and a Division may affiliate or disaffiliate with a common interest organization in accordance with the provisions of its own Bylaws, provided that in either event:

(1) The objectives of such organization are consistent with those of the Association, and (2) The activities of such organization are not in conflict with Article I: Sections 3, 4, and 5 of these Bylaws;

any other affiliation including that with a national or international organization, ~~must~~ [shall] be approved by the Board. Notices of affiliations and disaffiliations ~~are to~~ [shall] be reported to the [appropriate Cabinet officers and to the] administrator of the Association Office.

Rationale. To clarify questions of interpretation by Chapters and Divisions.

Article XVI. Amendments

~~SECTION 2. Notice containing the text of any proposal shall be sent to each voting member at least 30 days before the Annual Business Meeting at which it is to be discussed. If approved by a majority of the voting members present and voting, the proposal shall be submitted to the entire voting membership for final decision by mail ballot. A proposal not approved at the Annual Business Meeting may be referred to the Association Committee concerned with Bylaws.~~

~~SECTION 3. These Bylaws may be amended by a two thirds vote of the returned mail ballots sent to the entire voting membership provided that, of the total members eligible to vote, at least 40 per cent shall have voted.~~

[SECTION 2. Notice containing the text of the proposed amendment shall be printed in the official journal or otherwise mailed to the entire voting membership. The Board shall fix a closing date for the return of the mail ballots. The closing date shall not be less than 120 days after the date the issue of the official journal containing the notice or a separate notice is mailed. No ballot postmarked after the closing date shall be counted. The amendment shall be effective as of the closing date for return provided it shall have received a two-thirds favorable vote of the returned ballots, and further provided that of the total members eligible to vote, at least 30% shall have voted. If less than 30% of the ballots are returned, the recommended Bylaws amendment(s) shall be subject to approval by two thirds of the voting members present and voting at the next Annual Business Meeting.]

Rationale: The Bylaws Committee is of the opinion that a more expeditious method of amending the Bylaws should be provided. The requirement for discussion at the Annual Business Meeting (before submission to all voting members for a mail ballot) can delay membership action for well over one year, and the Committee therefore recommends removal of this requirement. The proposed amendment permits a membership vote at other times during the year after action by the Board. However, the Committee felt that if this change is made, a longer notice period should be required so that the members would have more time for consideration of a proposed amendment. The new 120-day notice, quite arbitrarily chosen, would permit most Chapters, if the Board should act in June, to discuss the amendment at Chapter meetings, and most Divisions, if they so wish, to reprint the notice in Division Bulletins. The Board may, of course, refer a proposed amendment to the Cabinets for discussion before the Board votes to refer the proposed amendment to all voting members for a mail ballot.

The Committee is of the opinion that the mail ballot to the entire voting membership should be retained. The Committee has also included provision for decision if the required percentage of mail ballots is too low.

REVIEWS

Micrographics: A User's Manual, by Joseph L. Kish, Jr. New York, N.Y. Wiley-Interscience, 1980. 196 p. $19.95. ISBN 0-471-05524-7.

Spurred on by the many references to the office of the future that have appeared in the trade and management literature, an increasing number of organizations are in the process of establishing a microfilmed records center. Joe Kish has written this book for use in today's business organization "to provide information with respect to the primary alternative to paper-micrographics." It is intended to serve as a manual for managers to provide sufficient information for their decision-making and also as an aid to systems technicians in evaluating and installing a cost-effective micrographics system.

The book's eleven chapters cover information ranging from an introduction to micrographics through all phases that include microforms, technology, indexing, systems analysis and design, applications, COM (computer output microfilm), and the management program, concluding with a useful glossary of micrographics terms. The reader is lead in a well-presented explanation from basic information to the more sophisticated concept of the role of microfilm in the future. Microfacsimile, micropublishing, word processing, and computerized micrographics are briefly discussed.

In a chapter on micrographics technology, the author stresses the need to establish minimum standards of acceptability for each specific microfilm application and to include these standards in the overall procedure, instructions, or guidelines. He defines the terms that need to be understood to deal effectively with suppliers.

The book is well organized. Each chapter gives advantages, limitations, disadvantages, or drawbacks to the use of microfilm for specific applications. Each discussion includes evaluation criteria. Photographs and schematic representations also are included to show how equipment operates.

In the chapter on indexing, Kish recommends that the indexing system selected should be closely related to the complexity and frequency of reference to the specific microform. The four basic categories discussed are serial records indexing, unit records indexing, encoded film indexing, and computer based systems indexing. While more detailed information is necessary for program development, the essentials are stated here.

A chapter on data analysis and systems design offers helpful suggestions for preparing cost estimates and determining legal and regulatory acceptability, including acceptability in foreign jurisdictions.

Although the book would have been enhanced by a list of pertinent references and other sources for obtaining information, it will be as useful to librarians and information specialists as to managers and systems analysts.

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Fee-based Information Services: A Study of a Growing Industry, by Lorig Maranjian and Richard W. Boss. Information Management Series, 1. New York, Bowker, 1980. 199 p. $24.95. LC 80-20176; ISBN 0-8352-1287-4.

This book, one of the first North American full-scale studies of fee-based information services, presents a wealth of information based on an industry survey conducted in late 1979. Text and tables compare such characteristics as the variety of services offered by each firm, fees charged, techniques used to obtain information, marketing tools employed, and training and background of the principals. The authors raise a number of relevant issues: the potential impact on the market of the more widespread use of new technology; librarians' reactions to fee-based services; the need for standards and articulated professional ethics; and the possibility of industry-wide marketing for the fee-based sector through a new or existing trade or professional association. (Far more of the survey respondents belong to SLA than to any other association.

A directory of respondents, descriptions of useful trade associations, references to workshops and panel discussions dealing with the subject, profiles of several types of companies in the field here and abroad, illustrations of marketing materials, and a lengthy bibliography and index make this a

valuable reference compendium for librarians, competitors, and educators.

Perhaps it is the very range of information presented in this volume that tempts one to wish it had accomplished more. Much of the interpretation of the data is left to the reader, while some of what is carried out is equivocal. Since the nonprofit, internal, and Canadian services have not been analyzed by size, the figures for them are not easily compared with those of the other organizations. Some statements, such as those concerning telephone directory listings, salaries, and average lengths of contracts, lack explicitly corresponding questions on the survey form. Neither the directory nor the survey form clearly differentiates between small and free-lance services, and no definition of the latter category is provided.

By far the most critical source of confusion, however, is the lack of a distinguishing criterion for a fee-based information service. Information brokerage firms are compared with organizations offering such diverse services as library planning, cataloging, records management, computer systems consulting, book promotion, conference management, audio-visual consulting, and even book and serials exchange. To a considerable extent, this jumble was unavoidable since few firms appear to concentrate on information brokerage alone. However, it would have been helpful to know the percentage of the total business for each firm that any particular service comprises.

Because the authors chose not to require information brokerage as the essential criterion for a fee-based service, they lost the opportunity to narrow their field into a more manageable object of study. Given their wide-ranging criteria, one suspects that there must be hundreds, if not thousands, of others—consultants and free-lance researchers of all kinds—eligible for inclusion. Perhaps it would have been wise to focus more on librarians offering nontraditional services, as Sellen did in *What Else You Can Do With a Library Degree.* As it is, the reader is left with many unanswered questions when the authors conclude that the success of fee-based services will lie in diversification beyond strict information brokerage. Perhaps future research will add to the base that this pioneering study has constructed.

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Theory and Application of Information Research: Proceedings of the Second International Research Forum on Information Science, 3-6 August 1977, Royal School of Librarianship, Copenhagen. Ole Harbo and Leif Kajberg, eds. London, Mansell, 1980. 235 p. ISBN 0-7201-1513-2.

As a follow-up to a research forum on information science held in London in 1975, the Second International Research Forum on Information Science, sponsored by the Royal School of Librarainship in Copenhagen, met in that city in 1977, but with a somewhat broader scope than the previous conference. It was the intention to include not only theoreticians and researchers but also practicing professionals in information science. However, the majority of the contributors to the Forum were representatives of library schools or similar educational institutions. Of the twenty-one authors whose papers were presented (not all were able to be present for the Forum) nine were British, six American, and the remaining, European.

All except one of the papers were presented in four sessions of the Forum. The final session was devoted to a paper on the future tasks of information scientists in Europe, based on a Delphi study conducted in the Federal Republic of Germany, and to reports of group discussions. All twenty-one papers are included in the volume, as are brief discussions of the papers.

Although the subject matter of some of the papers seems to overlap, generally, the papers fall into four broad categories. The first group deals with the definition and general models of information and information science. One of the papers, for example, reviews the three different ways in which the term "information" is used by information scientists: in the Shannon-Weaver sense of reducing uncertainty; in the information-as-property sense; and in the information-as-power sense. The five papers in the first session serve to point out the difficulties inherent in attempting to develop a theoretical basis for information science when basic definitions and concepts are not agreed upon.

The second group discusses the relationship of information science, however defined, to other scientific disciplines, such as cognitive psychology and linguistics. The third group focuses on the theoretical aspects of relations between user and information officer, and applications of informa-

tion science procedures. Papers in the fourth session consider different aspects of the information retrieval process; one, for example, is devoted to the formulation of a classification scheme for fiction based on users' requests.

Following the fourth session, participants broke into six groups to discuss specific topics in the light of the papers presented. Two of these topics were how the contents of the papers of such conferences could be applied to teaching, and which fields in information science should receive the highest priority in research.

Taken as a whole, the papers are scholarly and thought-provoking, though, as is usually the case with proceedings, some are of more significance than others. Many ideas and issues emanated from the Forum, but since there has been a time lapse of over three years, some are less crucial today. Also, it should be kept in mind that certain factors tend to increase or lessen the applicability of ideas depending on the country. The bibliographical control of a particular subject area in a country, or the educational level of those in the library/information professions, would surely affect the sophistication of information systems as they are developed. Some of the issues presented in the papers that still need attention include the extent of the dependency of information science on the other disciplines; measures of information retrieval-effectiveness as they relate to relevance, user satisfaction, and cost-effectiveness; and the role of the information professional in raising awareness about major issues, fostering an understanding of social problems, and acting as a catalyst for effecting change.

For educators and those interested in the development of a theoretical body of knowledge in information science, the book should prove both challenging and interesting. For those who are seeking practical solutions to problems in information transfer, the volume may offer some helpful ideas, but it might also prove frustrating since it is principally devoted to the theoretical aspects of the field.

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Legal and Legislative Information Processing, edited by Beth Krevitt Eres. Westport, Conn., Greenwood Press, 1980. 299 p. $29.95. LC 79-7063; ISBN: 0-313-21343-7.

Every profession and information processing activity will have to be revaluated in the light of the technological—especially computer—revolution. This book is readable, informative, and balanced in its coverage of congressional and state legislative automated information, as well as legal and bill drafting developments. The list of contributers reads like a Who's Who in Legal Computerization, and the text is worthwhile simply for the value of their opinions.

The arrangement of the text is useable and comprehensive. The major sections cover congressional information processing; state legislative computer use; automated legal tools (e.g., Lexis); the impact of computers on litigation; and some "in practice" federal agency experiences with computer applications. The charts, case studies, and comparisons are worthwhile and informative. The chapter headnotes, references, and conclusions are helpful to both the interested observer and the practicing user.

The text is sensitive to the dilemma facing the legal custodians of our society. Lawyers, legislators, and judges have been confronted with the almost superhuman task of keeping up with a plethora of current events and an increasingly complex topic- or case-related body of knowledge, as well as performing ever expanding legal and legislative research. These demands have heightened the need for more sophisticated retrieval and indexing access to available data.

The editor has appropriately addressed her target audience of practicing lawyers, legislators, librarians, information specialists and computer scientists. This book is a must for legislative or legal librarians and for schools of library and information science. It would make an excellent "reserved reading" for legal reference or computer information courses. It is also the type of book that should be called to the attention of corporate, agency, legislative and academic electronic data processing units.

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STAFF DEVELOPMENT

Bush, Gerald W. and John W. Stinson / A Different Use of Performance Appraisal: Evaluating the Boss. *Management Review* 69(no. 11): 14–17 (Nov 1980).

The traditional type of performance appraisal in which a superior rates a subordinate and then discusses the rating in an interview has generally not proven very effective. It seems to assume that one's organizational behavior can be summarized in a few sentences, agreed upon, and laid to rest for another year. Rarely do supervisors request performance feedback from those who work for them. The Gulf Oil Corporation experimented with this aspect of performance evaluation by asking human resources employees to rate a senior vice-president who was their overall supervisor. A two-page rating form, using a five-point scale in six job component areas, was agreed upon and sent to 21 senior-level human resources people who, in the opinion of the vice-president, had a useful perspective on his performance. The responses were coordinated in a summary that was given to the vice-president, who subsequently discussed it with the project coordinator. Those engaged in the project as well as the vice-president felt it was a fairly simple method of obtaining useful performance feedback and that such a process could play a meaningful role in information exchange and job improvement.

Brief, Arthur P. / How to Manage Managerial Stress. *Personnel* 57 (no. 5): 25–30 (Sep–Oct 1980).

When managerial stress is at a relatively low level, it can be productive. However, working with superiors, peers, and subordinates whose demands may sometimes be in conflict with one another and also trying to fulfill one's self-imposed expectations can frequently put high levels of stress on managers. This may affect them personally, and also the organization, in a disturbing manner. The two primary causes of managerial stress are role conflict and role ambiguity. By identifying and then attacking these problems in a systematic way, stress can be reduced. Three managerial practices that are helpful in the process are discussed: goal setting, a viable performance appraisal system, and a formalized reward system. The author suggests, also if needed, a role management process in which the manager and his or her superiors meet periodically as a group to identify the sources of stress and plan ways of dealing with them. The process includes the formulation of role descriptions, the designation of counselors, and a specification of consequences of the way in which the manager performs or fails to perform his or her role.

Gomez-Mejia, Luis R., and David B. Balkin / Classifying Work-Related and Personal Problems of Troubled Employees. *Personnel Administrator* 25 (no. 11): 27–32 (Nov 1980).

Industry's recognition of the need to provide assistance for the "troubled" employee has led many firms to establish employee assistance programs (EAPs) to help employees deal with their problems or to make referrals to appropriate community organizations. The results of a research study of 14,000 employees who had sought assistance in such programs are discussed. The study attempted to determine what the work-related and personal problems were and what the demographic profiles of employees experiencing these problem areas were. Using anonymous forms for the 14,000 employees for the period of 1976–1979, researchers identified a factor analysis of 28 problem areas which, by employing statistical procedures, were reduced to nine areas, including health-related problems, the effects of chemical dependency, both on and off the job, and work relationships. Charts provide detailed information on the nine factors by sex, ethnic group, age, and job family. The findings should be useful to counselors, managers, and personnel professionals who work with troubled employees.

Hoyman, Michele and Ronda Robinson / Interpreting the New Sexual Harassment Guidelines. *Personnel Journal* 59(no. 12): 996–1,000 (Dec 1980).

Several studies have shown that sexual harassment continues to be a widespread problem in the workplace. The Equal Employment Opportunity Commission (EEOC) issued "Interpretive Guidelines on Sexual Harassment" in March 1980, which made it clear that the problem must be addressed by employers. Aside from ethical

considerations, employers can be held liable for their employees' actions, as has been shown by recent court cases. Under the new guidelines, each case will be decided individually on a factual basis with the Commission looking at the whole record and at the context in which the behavior occurred. The expanded role for the personnel manager, implied by the guidelines, is not entirely clear and does raise some problem issues which are discussed. The authors propose a program that may serve as a model for any employer's compliance program. Although employers and personnel managers may well feel overwhelmed by the time and costs of implementing such programs, in the long run, a workplace free from sexual harassment and intimidation should improve morale, lower absenteeism, and reduce turnover.

Humy, B.G. and P.R. Richards / Maslow, Motivation and Your Employees. *Management World.* 9(no. 10): 25-27, 44 (Oct 1980).

Based on Maslow's theory that most people work (or behave) to satisfy identifiable needs, the authors point out that while employers do not have to be too concerned with physiological and security needs they should concentrate on the social and ego needs of their employees if they want to effect change. Every person has these needs in various combinations, but no two people have the same degree and mix of them. Several techniques that have proven successful for helping employees satisfy these needs are presented. Among them are turning the organization chart upside down, or at least sideways, i.e., helping employees overcome the "top is great, bottom is bad" syndrome; judging performance and not personalities, and managing by inspiring respect rather than fear. Fear causes people to react in one of three ways: they fight, sometimes by intentionally slowing down the work effort; they freeze, or perform their jobs by rote; or they take flight, frequently taking their talents with them to other jobs.

Mandt, Edward / Employee Termination: Proceed with Care. *Management Review* 69(no. 12): 25-28 (Dec 1980).

Although certain groups of employees have traditionally been protected from being fired under certain conditions, others could be terminated at the whim of their employers. Two recent court rulings in Michigan may change this, not only in Michigan but the whole country. In both cases, the courts upheld the employees' right not be dismissed for arbitrary reasons. In one case, the court stated that the agreement with the employee need not even be in the form of a written contract; oral assurances about job security made at the time of hiring are binding. In the past, organizations have generally followed a common law based on the master and slave principle. The author points out that this practice runs counter to the natural law which holds that each person has the right to life and implicitly the right to earn a living, and to most accepted principles of personnel practices and social values. Business should take steps now to ensure that policies and procedures protect employees from such arbitrary terminations by managers. One way to do this would be to set up an impartial board to review terminations. A better way would be to take steps to make better hiring decisions in the first place and not allow a manager to terminate anyone during the first year of employment and then to go through the review process.

Mashburn, James I. and Bobby C. Vaught / Two Heads Are Better Than One: The Case for Dual Leadership. *Management Review* 69(no. 12): 53-56 (Dec 1980).

Although unity of command has been a principle adhered to in organizations for many years, the authors believe that the old adage of two heads being better than one can be effective in organizations because leadership demands two almost diametrically opposite types of behavior: one is task-oriented and the other is relationship-oriented. Research on effective group activity shows that three issues surface again and again: power, leadership, and perception. Examples are given to show that few managers can operate in all three areas with effectiveness and ease. Thus, the proposal that two managers—one, goal-oriented and the other, people-oriented—can share leadership successfully if they agree on the basic goals for the group. The authors caution, however, that the change from single to dual leadership should be conditioned, reasonably presented, and controlled. Areas where it could be used are in committee action groups, crisis situations, and management training.

Piamonte, John S. / An Employee Motivational System That Leads to Excellent Performance. *Personnel* 57(no. 5): 55–66 (Sep–Oct 1980).

This motivational system, based on the incentive/contingency theory, holds that three preconditions must exist if a company is to increase motivation: 1) there is a clearly defined goal for each employee; 2) there is a reasonable expectation that a qualified employee can attain that goal; and 3) the employee has the requisite knowledge and skills to handle (or learn to handle) the job successfully. The employee must value the incentives and rewards given by the institution for meeting established goals and must understand that the rewards are strictly contingent upon meeting these goals. Because many managers are unable to meaningfully relate company objectives to employee objectives, employees are not highly motivated and the organization becomes ineffective. A planning program that gives managers more control over available motivational tools and establishes a merit pay system would go far toward increasing productivity of employees.

Wadia, Maneck S. / Participative Management: Three Common Problems. *Personnel Journal* 59(no. 11): 927–8 (Nov 1980).

Participative management, in theory, involves a manager consulting with employees and letting them participate in the decision-making process in the hope of achieving greater individual satisfaction on the part of the employees and greater goal achievement for the manager. There are a number of reasons why it has not been as successful in practice as had been originally predicted: 1) it has been confused with democratizing the organization—it was not meant to be a rule by the majority; 2) it has often been used as an exclusive tool instead of being one of a number of managerial techniques; and 3) it has been used more often for the benefit of the manager than for the employees, i.e., the manager uses it only in situations in which he or she is trying to avoid making a difficult decision as, for example, when a decision must be made on whether to cut salaries or fringe benefits. If managers avoided these errors, the practice of participative management would more likely lead to greater individual satisfaction and better achievement of organizational goals.

The Woodland Group / Management Development Roles: Coach, Sponsor and Mentor. *Personnel Journal* 59(no. 11): 918–21 (Nov 1980).

The authors, an informal group of training and development specialists from Woodlands, Texas, make a case for a management technique that is rarely mentioned in policy manuals and job descriptions: the use of three vital roles—the coach, the sponsor, and the mentor. The coach is described as a "boss" who helps a subordinate meet specific growth needs on the day-to-day job. Coaches perform such tasks as keeping subordinates informed of what is expected, appraising subordinates regularly, and preparing them to fill-in in the coach's absence. Sponsors foster individuals for enhanced placement in other parts of the organization, e.g., they get people's names onto promotion lists; get people assigned to task forces or committees; or advise protégés on how to get desired assignments. Mentors take increased responsibility for guiding, directing, and developing people. They are more apt to be concerned with the needs of the protégé than with the needs of the organization. Although there are risks in playing these roles, when properly played they can contribute significantly to a useful management development program.

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PUBS

(81-001) ABC's of Library Promotion, 2nd ed. Steven Sherman. Metuchen, N.J., and London, The Scarecrow Press, Inc., 1980. 242 p. LC 79-24232; ISBN 0-8108-1274-6.

Written in a down-to-earth style, this handbook stresses the importance of community public relations. Includes tips on how to get local newspapers, television and radio networks, lobbyists, and legislators to help promote the library's services. Also explains how to make films and slides for presentations, how to advertise library programs, and how to organize bookfairs, workshops, and other public service activities.

(81-002) Journal of Library Administration 1 (no. 2) (Summer 1980). ISSN 0193-0826.

Covers topics ranging from planning and financial management to staff development and management models. Intended to bridge the gap between librarianship and other fields of administration, the journal includes several articles by nonlibrarians writing on topics pertinent to library management. Available from The Haworth Press, Inc., 149 Fifth Avenue, New York, N.Y. 10010. The regular subscription rate for 4 issues is $42; special library organization member rate is $31.

(81-003) The Making of a Code: The Issues Underlying AACR 2. Doris Hargret Clark, ed. Chicago, American Library Association, 1980. 264 p. $15.00 (pbk). LC 80-17496; ISBN 0-8389-309-6.

Based on papers presented at the International Conference on AACR 2 held Mar 11-14, 1979, in Tallahassee, Fla., the book examines the theory behind the AACR 2 rules changes from the point of view of the individuals who were responsible for the revision.

(81-004) Essays of an Information Scientist, Volume 3, 1977-1978. Eugene Garfield. Philadelphia, ISI Press, 1980. 892 p. $15.00. LC-602, ISBN 0-89495-009-6.

These essays, which first appeared in *Current Contents*, discuss a wide range of topics, including the importance of style in scientific writing, copyright practices, the value of miniprint, and the state-of-the-art of scientific journalism. Includes a cited-author index, subject index, list of essays, index to illustrations, and index to authors in most cited lists.

(81-005) Standards of Service for the Library of Congress Network of Libraries for the Blind and Physically Handicapped. Association of Specialized and Cooperative Library Agencies, Chicago, American Library Association, 1980. 76 p. $4.50 (pbk). LC 79-22963; ISBN 0-8389-0298-7.

Library services to the blind and physically handicapped has some unique characteristics and problems. This publication addresses the implications of these factors in relation to the goals of quality library services. The standards are intended to assure high-quality service to disabled people unable to read conventional ink print materials. These standards cover the agencies, regional libraries, machine leading agencies, and subregional libraries in public libraries which are part of the National Service Network. Network libraries and other human service organizations will find the standard useful in program development and standardization.

(81-006) International Directory of Acronyms in Library, Information and Computer Sciences. Pauline M. Vaillancourt. New York and London, R. R. Bowker Company, 1980. 518 p. $45.00. LC 80-18352; ISBN 0-8352-1152-5.

Contains over 5,500 acronyms and intialism widely used in the field of library, information, and computer science. Entries are arranged alphabetically by acronym and include additional information to aid the reader in accurately identifying the entries for which particular acronyms stand. This book also contains a detailed index of key words and phrases extracted from the full names of the acronyms. All acronyms listed were culled from journals, indexes, brochures, conference proceeding, and monographs in the field.

(81-007) Access: The Supplementary Index to Periodicals. John Gordon Burke and Ned Kehde, eds. Evanston, Ill., John Gordon Burke Publisher, Inc., 1980. 222 p. ISSN 0095-5698.

This supplementary index to periodicals is designed to complement the existing general periodical indexes. It provides indexing for new periodicals as they are published, as well as a wide range of city and regional magazines. Its aim is to provide a national index to popular periodical literature of the United States and to supplement the indexing of periodicals found in the *Reader's Guide to Periodical Literature.* It is divided into two parts: an author index and a subject index. *Access* is published in May and September of each year. Available through subscription, $75.00 per year.

(81-008) Primer for Agricultural Libraries, 2d ed., rev. and enl. Olga Lendvay. Wageningen, Netherlands, Centre for Agricultural Publishing and Documentation, 1980. 91 p. $15.25 (pbk). ISBN-90-220-0727-8.

This manual has been designed to provide some idea about what is involved in the operation of a library. It is directed toward helping those people who must operate an agricultural library even though they have not had the benefit of adequate specialized training. It contains the

basic concept of library administration and comments on all aspects of library practice. Available from UNIPUB, 345 Park Avenue South, New York, N.Y. 10010.

(81-009) A Manual for AACR 2 Examples. Edward Swanson and Marilyn H. Jones, eds. Lake Crystal, Minn., Soldier Creek Press, 1980. 87 p. $7.50.

This manual was designed for use at a series of workshops on AACR 2 held in Minnesota in the spring of 1980. Since the workshops were planned to serve as a general introduction to AACR 2, most of the 89 examples given deal with printed materials. Some examples of nonprinted materials are included. Each example illustrates a number of rules from AACR 2 and follows closely the interpretation and decisions announced by the Library of Congress. The index to the manual is arranged by rule number.

(81-010) ALA Filing Rules. Filing Committee of the Resources and Technical Services Division, ALA. Chicago, American Library Association, 1980. 62 p. $3.50 (pbk). LC 80-22186; ISBN 0-8389-3255-X.

This book offers guidelines for arrangements of display of bibliographic records representing library materials. The rules reflect, with very few exceptions, the "file-as-is" principle. The basic order of filing is word by word. *ALA Filing Rules* includes an introduction, general rules, special rules, two appendixes, and a glossary. The final section is an index to the entire work.

(81-011) Topics, Terms and Research Techniques: Self Instruction in Using Library Catalogs. Richard R. Strawn. N.J. and London, The Scarecrow Press, Inc., 1980. 90 p. $8.00 (pkb). LC 80-12569; ISBN 08108-1308-4.

This book is aimed at high school and college students, as well as library aides and technicians. It is based on Library of Congress classification and subject headings. In step-by-step exercises, the six parts treat the nature of catalog cards, words as possible subject heading, the use of subject heading specificity and generality, subdivisions of headings, and common filing practices. Each section opens with a test to show what one does or does not already know of the matter and ends with a summary.

(81-012) Media Library Catalogue. University of Waterloo Audio-Visual Centre. Waterloo, Ontario, University of Waterloo, 1980. $20.00.

This catalog contains information on over 1,250 films, video tapes, slides and other media available from the Audio-Visual Centre and has been divided into two sections: the "Title Listing" and the "Subject Index."

(81-013) Directory of Planning and Urban Affairs Libraries in the United States and Canada – 1980. Council of Planning Librarians. Chicago, Ill. CPL Bibliographies, 1980. 112 p. $15.00 (pbk).

The entries are arranged geographically, with states, cities, and the names of libraries listed alphabetically. For each of the nearly 300 libraries listed, there is included (besides address, telephone number, and hours) such useful information as library contact, nature and number of holdings, and the library's special strengths. The *Directory* also contains an Index of Agencies and an Index of Persons.

(81-014) Mason on Library Buildings. Ellsworth Mason. New Jersey and London, The Scarecrow Press, Inc., 1980. 348 p. $25.00. LC 80-12029; ISBN 0-8108-1291-6.

Written to share with librarians and architects a wide range of experience in library planning and construction, the book provides an understanding of how a library building emerges and the complexities involved in the planning process. Part I discusses in detail the library program, leading the reader through all steps required to plan each area and describing how to achieve outstanding results. Part II presents critical analyses of six buildings and emphasizes a different major aspect of library buildings that must be planned well to achieve a successful library.

Wanda Kemp

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Smith, John and Virginia Dare / Special Librarianship in Action. *Special Libraries 59* (no. 10): 1241-1243 (Dec 1968).

Smith, John J. / The Library of Tomorrow. *In Proceedings of the 34th Session, International Libraries Institute, city, year.* 2v. city, press, year published.

Featherly, W. / Steps in Preparing a Metrification Program in a Company. ASME Paper 72-DE-12 presented at the Design Engineering Conference and Show, Chicago, Ill., May 8-11, 1972.

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Brown, Able / *Information at Work,* New York, Abracadabra Press, 1909. 248p.

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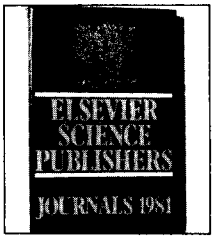

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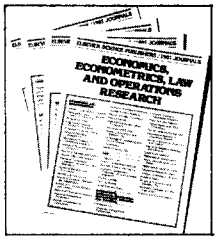

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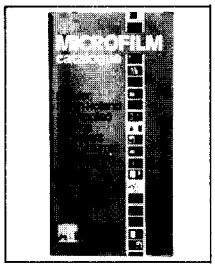

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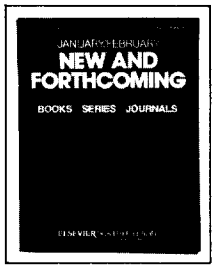

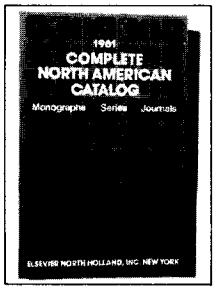

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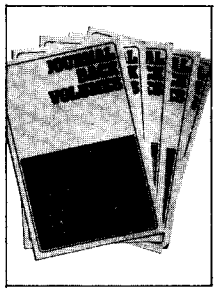

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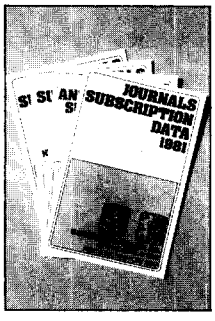

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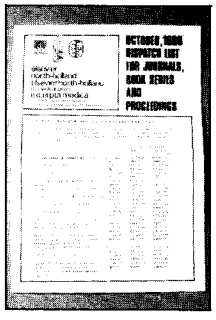

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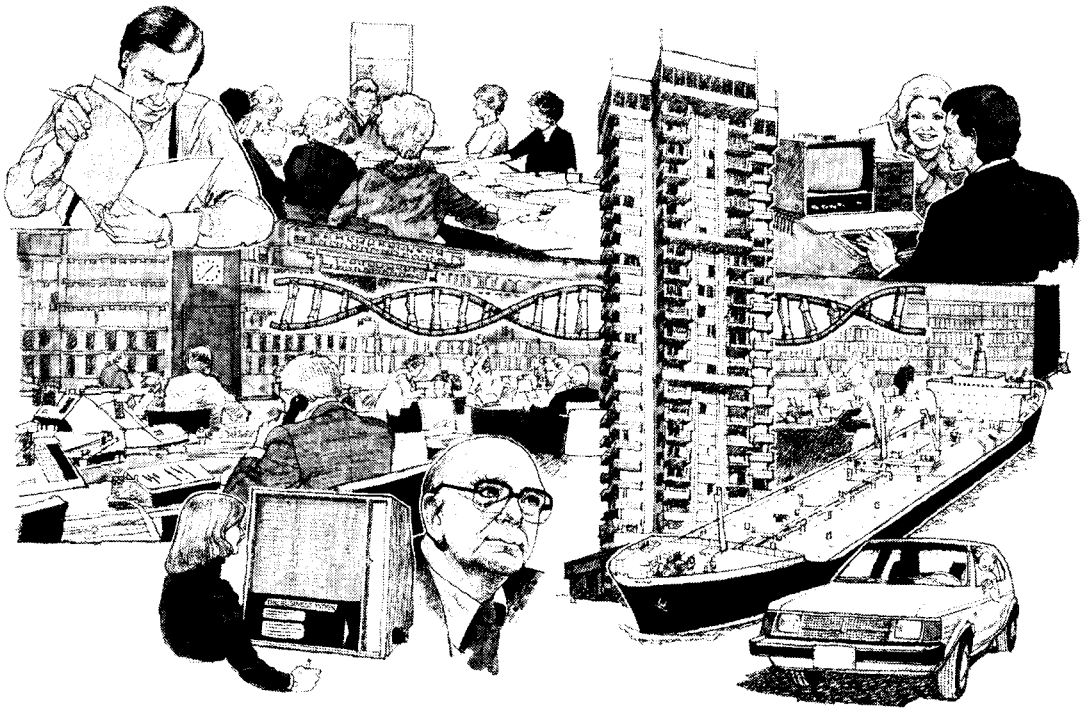

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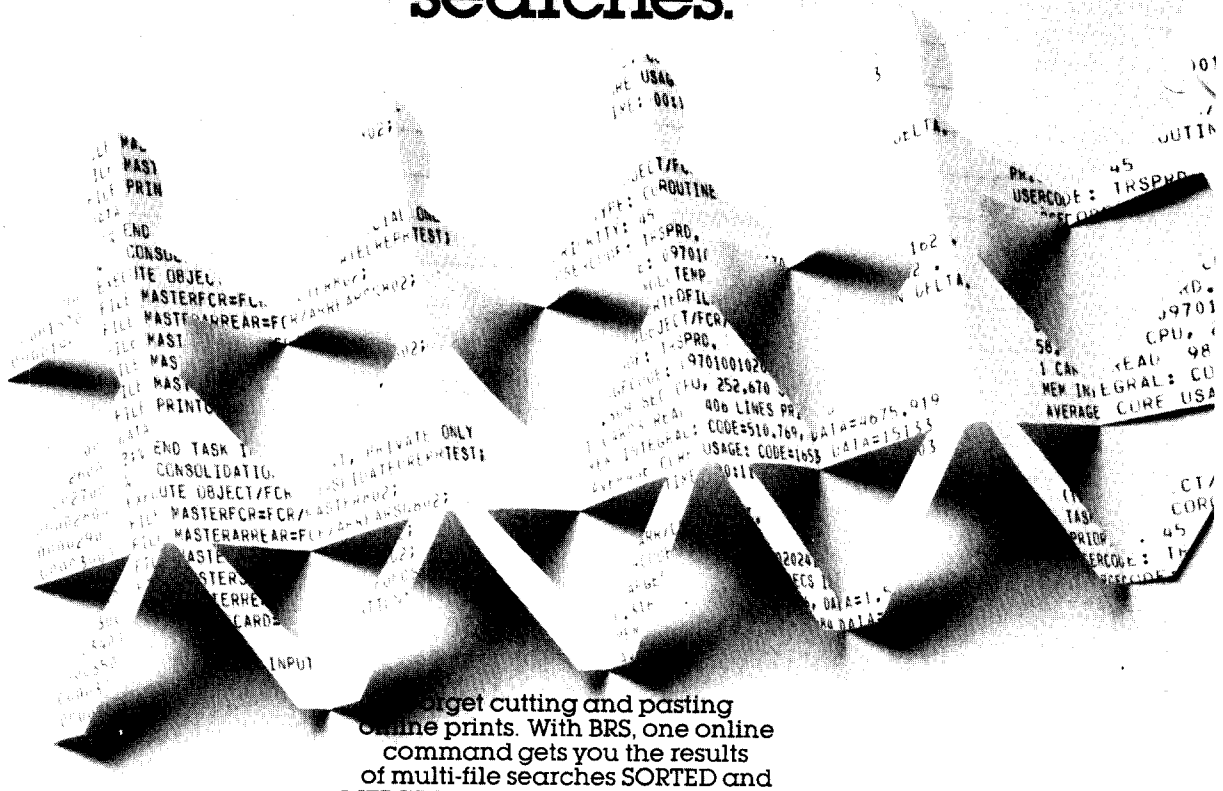

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