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ABSTRACT
        The Program Session of the April 1984 meeting of the
Library of Congress Network Advisory Committee (NAC) was devoted to
discussion of electronic information delivery systems. Recent
developments in six areas were covered: (1) electronic manuscript
generation and transmission; (2) online full-text searching and
retrieval; (3) online database production and distribution; (4)
nontraditional sources of information; (5) trends in equipment and
equipment applications related to electronic information; and (6) the
changing interactions between libraries and library users being
brought about by emerging information delivery systems. Seven invited
speakers presented reports: "The Publishing Environment: The
Electronic Manuscript Project" (Anne Mehringer); "The Publishing
Environment: Online Full Text--Biomedical" (Eleanor Y. Goodchild);
"The Publishing Environment: Online Full Text--Legal" (William H.
Lindberg); "The Abstracting and Indexing Services Environment:
Current Trends/New Directions" (Ronald L. Wigington); "From
Acquisition to Access: New Roles for Libraries and Library Networks
in the '80's" (Frances G. Spigai); "New Equipment and Applications:
New Technological Environments 1984-1990" (William R. Nugent); and
"Computer-Aided Database Searching" (Brett Butler). An introduction,
executive summary, list of attendees, and summary of the business
session are included. (THC)

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FOREWORD

The Library of Congress Network Advisory Committee devoted its April 14-16 program session to the topic of electronic information delivery systems as they affect the publishing and the abstracting and indexing environments. Invited speakers talked about non-traditional information sources, new equipment and applications, and library/library user relationships. The session was well planned and the chair of the Network Advisory Committee gratefully acknowledges the excellent preparation done by the program planning subcommittee: James L. Wood, chair, Thomas DiRenzo, Frank Grisham, Deanna Marcum, Betty Taylor.

This document is the first to be called proceedings of the Network Advisory Committee meeting and to be published as part of the Network Planning Papers series. It should be noted that the opinions expressed in the proceedings are those of the individual speakers at the Network Advisory Committee meeting and do not necessarily represent those of the individual organizations they represent.

Henriette D. Avram, Chair
Network Advisory Committee

July 31, 1984

ATTENDEES

Organizations	Representatives
American Library Association	Carol Henderson
American Society for Information Science	Ward Shaw
AMIGOS Bibliographic Council	Louella Wetherbee
Association of American Publishers	Sandra Paul
Association of Research Libraries	William Studer
Bibliographic Center for Research	JoAn Segal
Chief Officers of State Library Agencies	Anthony Miele
Cooperative Library Agency for Systems and Services	Ronald Miller
Council on Library Resources	C. Lee Jones
Federal Library Committee	Not represented
Information Industry Association	Brett Butler
Institute for Scientific Information	Thomas DiRenzo
Library of Congress	Henriette Avram
Medical Library Association	Erika Love
Minnesota Interlibrary Tele-communications Exchange	Charlene Mason
National Agricultural Library	Samuel Waters
National Commission on Libraries and Information Science	Dianne Rafferty
National Federation of Abstracting and Information Services	James L. Wood
National Library of Medicine	Lois Ann Colaianni

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Organizations	Representatives
NELINET, Inc.	Laima Mockus
OCLC, Inc.	Mary Ellen Jacob
Research Libraries Group	Not represented
Southeastern Library Network	Frank Grisham
Special Libraries Association	Barbara Robinson
University of Chicago	Charles Payne
Washington Library Network	Not represented

Observers

Betty Davis, Information Industry Association

Cyril Feng, Medical Library Association

Mary Ghikas, Universal Serials & Book Exchange, Inc.

Marcella Grendler, National Endowment for the Humanities

Deanna Marcum, Council on Library Resources

Betty Taylor, American Association of Law Libraries

Other

Sigrid Harriman, Network Advisory Committee, Secretariat

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INTRODUCTION

The Program Session of the April 1984 meeting of the Network Advisory Committee (NAC) was devoted to discussions of electronic information delivery systems. This topic was chosen in order to give NAC members the opportunity to learn of recent developments in six different areas related to electronic information delivery systems. The six areas were: 1) electronic manuscript generation and transmission, 2) online full-text searching and retrieval, 3) online data base production and distribution, 4) non-traditional sources of electronic information, 5) trends in equipment and equipment applications related to electronic information delivery, and 6) the changing interactions between libraries and library users being brought about by these emerging electronic information delivery systems.

The goal of this NAC meeting was twofold; first to provide the NAC members and guest speakers a forum for discussion of issues emanating from the changing environments that library networks and networking libraries are and will be finding themselves in as the result of the impacts of the electronic delivery of information and second to make the results of this meeting available to the library and information services communities through the medium of this proceedings volume.

Seven invited speakers presented reports on various aspects of existing and emerging electronic delivery systems and offered predictions on how these systems may impact on libraries. Papers based on their presentations are contained herein.

Anne Mehringer of the Aspen Systems Corporation reported on the joint project of the Association of American Publishers and the Council on Library Resources to develop standards for the processing of author-produced electronic manuscripts. Author-produced electronic manuscripts should speed-up print publication, reduce publication expenses, and provide input for full-text data bases.

Eleanor Goodchild, Biomedical Librarian at the University of Pennsylvania, described the work done at the Biomedical Library at her university with the online full-text medical journals. While full-text searching can provide more relevant answers and the user receives information rather than citations, full-text searching of the primary journal literature is not likely to be significant to more general libraries until there is a critical mass of the journal literature to be searched online.

William Lindberg of the West Publishing Company described his company's online full-text legal services. Full text searching of legal literature is already well established in both law offices and law libraries. The West Publishing Company has made good market penetration with its services which are comprehensive and do fulfill a definite need.

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Ronald Wigington, Research and Development Director of the Chemical Abstracts Service, reported on CAS's experiences in becoming a distributor as well as a producer of online data bases. He illustrated how the business of the abstracting and indexing services was changing by describing STN International a new scientific and technical information network being developed by CAS's parent organization, the American Chemical Society, in cooperation with the West German government. He also described how CAS had entered the computer software business by contracting to produce the software for the multi-million dollar automation of the United States Patent and Trademark Office. These are two entirely new businesses for what was a traditional abstracting and indexing service.

Frances Spigai, President of Data Base Services, a Los Altos, California information consulting concern, reported on the ever increasing number of electronic information sources. She said there were over 1600 commercial data bases, 800 data base publishers, 250 database distributors, and over 50 communications networks. These services have over 300,000 unique users or subscribers and generate in excess of $1 billion in annual revenue. Subscribers to these services are increasing at a rate of 50% per year and revenues are growing at an annual rate of 25%. To some degree all of these services compete with libraries for customers and more and more libraries are becoming customers of these services in order to better serve their users.

William Nugent of the Library of Congress Automated Systems Office described the technology both needed and available for the storage, retrieval, and display of electronically-delivered information. He reviewed the optical disk projects at the Library of Congress and identified many of the financial, technical, and legal challenges and problems associated with these new methods of information transfer. The technology for the library of the future may well be in place long before the library community as a whole is able to provide a viable market for it.

Brett Butler, former President of the Information Access Corporation and the NAC member representative for the Information Industry Association, addressed computer-aided database searching in the contexts of electronic information delivery systems and library/library user interfaces. He spoke of where the interface is today and how that interface will shift during the years to come. Brett predicted that analytical or expert systems to be developed in the future will enable the library user of the future to access needed information much more independently than is possible today.

Each speaker contributed to the overall perception that libraries and information centers will benefit by the changes being brought about by the emerging electronic information delivery systems. These changes will occur only as rapidly as libraries and information centers are able to afford and assimilate them. They will come about more rapidly in some institutions than in others. But come they will and NAC will continue to monitor developments in electronic information delivery systems and to report them to the library and information services communities at large.

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The planning subcommittee for this NAC program was chaired by James L. Wood, Director, Bibliographic Operations Division at Chemical Abstracts Service. Other members were Thomas DiRenzo, Institute for Scientific Information; Frank Grisham, Southeastern Library Network; Deanna Marcum, Council on Library Resources; and Betty Taylor, Law Library at the Spessard L. Holland Law Center, University of Florida. Henriette D. Avram (ex officio) and Sigrid Harriman (secretariat) from the Library of Congress took also part in the program planning activities. At the end of the presentations, Mr. Wood asked how we could prepare for the future. Would a "state of the art" paper of particular problems perceived help in the understanding and long range planning? Mrs. Avram suggested that Mr. Wood and Mr. Shaw draft a proposal to be sent to the Council on Library Resources on "The Impact of Start-Up Expert Systems".

Prepared by: James L. Wood

EXECUTIVE SUMMARY

A brief introduction by James Wood, who chaired the program planning subcommittee, gives an overview of the sessions and their speakers.

The first three address the publishing environment. Mehringer describes the Electronic Manuscript Project, sponsored by the Association of American Publishers (AAP), which seeks to develop an industry standard and a set of guidelines for preparing and processing manuscripts on a computer. Application of the standard will make possible the transfer of electronic manuscripts from one brand or class of computer to another without regard for hardware and software compatibility. Hence, editors and designers will be able to process writers' electronically prepared manuscripts to edit and mark the file for page composition or other applications. Generic coding also will facilitate bibliographic control of published works. When the study phase is completed, project participants will begin developing standard requirements. A provisional model will be field tested later in 1984. The AAP believes it can propose a validated standard to ANSI's Z39 Committee within the year.

Goodchild identifies the constitutents of the biomedical community, their specific information needs, and some recent developments in electronic information services for the health sciences community. She differentiates between library/information users (user groups) and library/information service providers (service groups): user groups being composed of researchers and basic scientists in the life and health sciences, clinical practitioners, health care administrators and students in these disciplines; service groups including publishers, vendors, jobbers, health care agencies, computer personnel, information specialists, and librarians. Both groups have made unique contributions to recent developments in electronic software and hardware applications, specifically user friendly retrieval systems such as Paper Chase, BRS/After Dark, and full text online services such as those offered by the American Medical Association. (AMA/GTE Medical Information Network)

Lindberg traces the development of computer assisted legal research from early experiments at the University of Pittsburgh in the late 1950s to the first commercially developed LEXIS in 1973, followed by a series of new computer-based legal services. West Publishing Company, an early pioneer in the field of electronic publishing, has offered WESTLAW since 1975 as an online abstracting service, and as an online full text service since 1978. Some 60,000 new court decisions each year find their way into various electronic legal products, including full text articles from over 160 law review and bar association journals. The ability to search online for scholarly distillations of the massive amounts of legal literature adds a new dimension to the practice of law. It also creates a disadvantage for practitioners who have no access to computerized research tools and who must compete with those who do and can afford it, a potential inequity with broad social implications in future legal research.

Information sources are represented by the "traditional," i.e., indexing and abstracting, and the "nontraditional services." Wigington deals with the A&I Environment, the "traditional," and emphasizes the interrelatedness between electronic distribution systems and electronic information use systems; without one the other is either not possible or useless. After briefly tracing developments in the abstracting and indexing environment, and outlining the driving forces of change in the environment, i.e., the shifting boundaries of knowledge disciplines, the advent of new information technology, and national and international governmental influences, the author cites a six-point program mounted by Chemical Abstracts Service (CAS) in response to these changes: 1) online search services, 2) international networking, 3) improved document delivery service, 4) integration of electronic bibliographic and full text services, 5) contracts with government and industry, and 6) bypass long distance communications. In conclusion, Wigington sees the integration of information use at the work space (i.e., home or office), as the key aspect for electronic distribution of information, possibly replacing library reference collections, research librarians, the stacks, and "reading room" facilities as primary information sources. He concedes, however, that networking and electronic distribution endeavors are "in it for the long pull, because there still remains far more to do than has been done."

Spigai looks at nontraditional information sources and explores the impact of electronic publishing on libraries and library networks. The author predicts that four distinct phenomena will force libraries to change their structures to accommodate this trend:

1. Information service technologies will be centered around the microcomputer and a new set of local storage devices, smarter and faster modems and new software.

2. Information service resources will be re-allocated from the library materials budget to pay for access to electronic publications.

3. Information service policies will, and must remain flexible to respond to rapid changes in technology, especially those related to user groups which now receive subsidized services, and to copyright issues.

4. Information service management will require staff role changes. Because of increasing complexity in the electronic publishing environment and attendant price structures, future roles of librarians and information professionals will revert back to "collection development" (evaluation of new databases), "acquisitions" (contracts and account administration), "processing" (installation and training), and "reference" (a mix of user education and searching).

In contrast to libraries, networks will continue their present f `r` ons. They will, however, experience a major shift in the content of ation they will be handling rather than in the services they now 'e.

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New equipment and applications, their impact on networks and libraries is discussed by Nugent, who first notes that building a database and publishing its contents began some twenty years ago. Full text publishing, on the other hand, has only become economically feasible with the decrease in cost of online disk storage and an increase in the speed of online processing. The author sees three major benefits resulting from progress in semiconductor technology: 1) capability to perform mainframe searching on small computers, 2) capability of small computers to handle full text databases, and 3) modular parallel processing which will allow growth of computer capacity rather than the traditional "upgrading" every few years to a new configuration of greater power. Television-based information systems will see considerable improvement in the coming decade with the advent of digital and high definition television, while cable television, a distribution utility currently possessing the required bandwidth recording techniques for high definition use, merely awaits more creative applications. Nugent emphasizes the need for better information analysis, and concludes by summarizing some of the newer technologies which will impact on future information delivery systems, including inexpensive replicable digital storage devices, image automation and fifth generation computing, via knowledge-based and inference computers.

In the concluding paper Butler discusses computer-based aids for the untrained searcher, the direct end user of information who may not be aware of the library and the skills of its staff, and who encounters a host of new search aids. The author divides these computer-based aids into five groups: 1) housekeeping functions, 2) directory and classification guides, 3) tutorial communications, 4) linguistic and grammatical support, and 5) analytic or expert systems. He predicts developments in each of these five areas that will lead, a decade hence, to easily used electronic systems in which the user interface will reflect our formal understanding of the reference process. Butler poses the challenge of automating the reference process as one that will require all the knowledge we as library professionals possess to "formalize what we have done for many decades intuitively."

Prepared by: Erika Love

The Publishing Environment

The Electronic Manuscript Project

presented by Anne Mehrinker,
Aspen Systems Corporacion*

TASK ONE

Requirements Study Results
Summary Report

INTRODUCTION

In 1983, the Association of American Publishers (AAP) initiated the
Electronic Manuscript Project, which is being co-sponsored by the Council
on Library Resources. The goal of the Project is to help all those
involved in publishing and disseminating information to realize the
greatest possible benefit from computer technology. Ultimately, this
will be achieved when every version and derivative of a published work
-- whether a magazine article, a database file or a bibliographic record
-- can be generated directly from the original electronic form of the
manuscript.

The end result of the Project will be an industry standard and set of
guidelines for preparing and processing manuscripts on a computer.
Application of the standard will make it possible to transfer electronic
manuscripts from one brand or class of computer to another, without
regard for hardware and software compatibility.

A complete description of the Project is contained in the original
Project Plan which is available on request. The Plan calls for a
two-year effort involving six successive tasks. In July 1983, AAP
contracted with Aspen Systems Corporation (Rockville, Maryland) to
perform four of these tasks, the first of which was a study aimed at
determining industry requirements and current efforts to work with
manuscripts in electronic form.

*Presented at the Network Adv*sory Committee meeting on April 19, 1984 at
the Gramercy Hotel in Washington, D.C.

NATURE OF THE STUDY

The study, which Aspen successfully concluded in March 1984, consisted of two parts: a series of industry surveys, and a bibliographic analysis of document structures.

Separate mail-surveys were administered to authors, publishers, independent editors, indexers, database publishers, and information services and distributors, for the purpose of assessing needs, current practices, and the compatibility issues.

The surveys also sought specific reaction to the concept of "generalized tagging" as the basis for a standard. Generalized tagging is an idea that has been advanced in recent years by the Graphic Communications Association, initially through its work on "generic coding" (GenCode), and currently through companion ANSI/ISO* efforts for a "standard generalized markup language" (SGML). The AAP is planning to adopt the GenCode/ANSI technical base for a more application-oriented standard of its own. It will draw from all other related standards efforts as well.

A standard for generalized tagging would overcome many of the problems of incompatibility that hinder the interchange of electronic manuscripts between authors and publishers. The text of these manuscripts would contain only the structural tags to identify elements of text, and would be unimpeded by codes that are specific to a given word- or text-processing system. Electronic manuscripts could then be circulated and marked-up almost as readily as are double-spaced typescripts.

Such a standard would also establish a common list of manuscript parts to be tagged. In this regard, a special bibliographic task force was set up, under the auspices of the National Library of Medicine, to analyze document types and structures.

What follows is a summary report on Task One, the study task, covering the industry surveys and the work of the bibliographic task force.

GENERAL CONCLUSIONS

Results of the study confirm the value of the Project and the validity of its underlying assumptions:

o Electronic manuscripts are an established fact in the publishing world.

o Some publishers are capitalizing on this fact, but not as fully as they would like to, or could.

o Authors are a major catalyst in the movement toward electronic text interchange.

o All concerned would benefit from a common approach to electronic manuscript preparation.

o An industry standard for generalized tagging would be the most effective way of establishing a common approach to electronic manuscript preparation.

o The most cost-effective way to implement a generalized tagging standard in the short term is through author guidelines.

o The most cost-effective way to implement such a standard in the long term is through a combination of author guidelines and technology.

There is every indication that electronic manuscripts are quickly becoming an important part of the publishing process, and that the industry can be optimistic about the benefits they afford. The potential benefits are visible and important to every segment of the industry

o Publishers see ways to contain costs as well as to create new products.

o Authors feel the standard will help them "become more productive" and speed up the publishing process.

o Editors expect fewer errors, improved productivity and better interaction with authors.

o Librarians and information services expect to realize greater efficiencies and improvements in the information dissemination process.

o Typesetters would be able to accept work from a larger base of publishers.

Generalized tagging is seen throughout the industry as an important way of enhancing the value of manuscripts, especially if carried out according to an industry standard. Most would accept and use such a standard if it were practical.

In short, the results of Task One have provided both the incentive and the data needed to proceed with Task Two, in which the requirements for developing a standard and guidelines will be defined in detail.

PRIMARY FINDINGS

As previously mentioned, the study entailed industry surveys and a bibliographic project.

The surveys were preceded by an open-ended inquiry aimed at qualifying the central issues and setting the boundary conditions for the study.

This preliminary inquiry consisted of interviews with 60 people from representative segments of the information industry, and also involved a group discussion with representatives from each major publishing function.

The findings of the qualitative inquiry supported the basic premises of the Project and shaped the questions to be asked in the industry surveys. These surveys revealed an electronic future that is almost here. The following graphs illustrate how rapidly this future is unfolding, especially for authors.

///// INSERT FIGURE 1 - LABEL this figure:

PER CENT OF AUTHORS USING COMPUTERS
FOR MANUSCRIPT PREPARATION

Divergent Views of Authors, Editors and Publishers

/////INSERT FIGURE 2

(Label Figure 2 as follows:)

PER CENT OF PUBLISHERS USING COMPUTERS

FOR TEXT PROCESSING

Authors have been promoting the electronic processing of manuscripts more extensively than have publishers. Even so, publishers are heavily engaged in computerized text-processing today. They are actively developing procedures for accepting manuscripts electronically from authors, albeit with difficulty, given the need to apply variant sets of house rules in the absence of a common set of industry rules.

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Among the more significant findings were the following:

From Publishers:

o   The percentage of publishers using in-house text-editing systems will exceed 60% in 1985, compared to 15% in 1980 and 40% in 1983.

o   Nearly 60% of the responding publishers expect that by 1985 they will request authors to submit manuscripts in electronic form.

o   40% of the manuscripts that publishers accepted electronically in 1983 were used as electronic input for production. Publishers expect this percentage to exceed 70% in 1985.

From Authors:

o   80% of responding authors expect to prepare manuscripts electronically in 1985, compared to 20% who did so in 1980 and 60% in 1983.

o   More than 75% expect to ask publishers to accept manuscripts in electronic form in 1985, compared to 3% who asked publishers to accept electronic manuscripts in 1980.

o   More than 65% expect the transfer of electronic manuscripts to be easy in 1985.

From Independent Editors:

o   17% expect to ask authors to submit manuscripts electronically in 1985. None of the responding editors asked authors for electronic manuscripts in 1983.

o   Only 50% expect to accept manuscripts electronically in 1985.

From Indexers:

o   100% of responding indexers expect to prepare manusripts electronically in 1985, compared to 20% who did so in 1980 and 90% in 1983.

o   Nearly 90% expect to ask publishers to accept manuscripts in electronic form in 1985. Only one responding indexer requested acceptance of an electronic manuscript in 1980.

From Database Publishers:

o   100% have been accepting electronic input from primary publishers, authors, abstractors and indexers, since 1983.

From Information Services & Distributors:

o   All of the respondents indicated that they received some of their databases as the by-products of the publishing process.

Perhaps the most encouraging word to come out of the study was the "remarkable degree of user acceptance of [the idea for] an industrywide standard and author guidelines for manuscripts in electronic form," to quote directly from Aspen's report. As a condition of acceptance, however, respondents insisted that any such standard and guidelines be practical and easy to use. This is a challenging condition, given the varying complexity of text and graphic structures. But it can be met through the use of modular and expandable sets of tags and guidelines that would include a basic set for straight text, and supplemental sets for complex matter such as tables and equations.

In addition to survey findings, the study produced a recommended hierarchy of text elements to be tagged within each of the most common forms of publication: books and monographs, serials, conference proceedings, technical reports, machine-readable databases, and software. This hierarchical list is presented in a report of the special bibliographic task force, which is appended to Aspen's report on Task One.

Where possible, the Task Force used the work of other standards groups, modifying and supplementing this work as necessary. Its recommended groups of taggable elements apply to documents that fit within three levels of bibliographic hierarchy, as previously established by ANSI: the analytic level, for documents that are part of a larger work (e.g., an article); the monographic level, for single works that can stand alone (e.g., a book); and the collective level, for a set or collection of separate works (e.g., a monograph series).

The Task Force also made a special effort to treat software and machine-readable databases as document types, because of their increasing importance in publishing and providing access to information.

THE TASK AHEAD

With the study over, the Project now moves on to a definition of the requirements for a standard, and then to the development task. A provisional standard and set of guidelines are expected to be field-tested with representative groups of authors, editors and publishers later this

year.   The AAP believes that, within a year, it can propose a validated standard to ANSI's Z39 Committee and other international standards groups.

Even with ANSI approval, AAP realizes that the real test will be industry acceptance and author compliance. Toward this end, the Project has the support and participation of nearly forty industry groups and organizations (See Project Organization). These include associations of authors, editors, publishers, compositors, indexers and librarians; the publishers of major style manuals; national libraries and library networks; leading scientific and technical societies; graduate schools; and three ANSI groups. And support is growing internationally.

"Regardless of how much institutional authority backs us up," cautions the Project's chairman, UMI's Nick Alter, "compliance will come only through practical application of a standard that authors will choose of their own free will. That's what we're after."

The Publishing Environment
Online Full Text - Biomedical

Library of Congress Network Advisory Committee
April 19, 1984

Eleanor Y. Goodchild

I.   Constituents of the Biomedical Community

In considering the potential impact of electronic information delivery systems
on networks and network-oriented libraries, in particular, those of the
biomedical community, it would seem well to examine the constituents of this
group. For this paper I have categorized them into two groups, that is, those
composed of library/information users (user groups) and those composed of
library/information service providers (service groups).

The "user groups" are composed of:

o   basic scientists: researchers in the life and health sciences

o   clinical practitioners: physicians, dentists, nurses, and other
      allied health care members

o   health care administrators

o   students in all of the above areas and ranging in training from
      one to two year programs to the postdoctoral levels

Note: The general public also has an interest and need for different
kinds of biomedical information.

The "service groups" are composed of:

o   health sciences librarians and information specialists

o   computer personnel

o   health sciences libraries: academic, hospital (teaching to
      community) and special (companies and agencies)

o   health care agencies

o   publishers in the commercial area as well as those of the
      professional health care organizations

o   vendors/jobbers and bibliographic utilities

II. **Specific Information Needs and Formats of the Biomedical Community**

In describing the information needs of the biomedical community, the most current information or the latest information is the major requirement. This coincides with the basic mission of this user group, namely, research, patient care and education. This is extrapolated to the service groups in their provision of biomedical information resources and services (supportive of the user groups mission). Indeed, then, the biomedical community is prime for the newer electronic technologies of (user-friendly) online databases, knowledge data banks, computer-assisted instruction and artificial intelligence systems. At the same time, there is still a need for the printed format of book and journal, as well as use for a variety of educational audio-visual media. The new communication technology via satellite transmission is already in use in this community and is rapidly expanding to more than just rural areas where it was first used.

Of primary importance to the future direction of information use and information management are two recent reports published by the Association of American Medical Colleges (AAMC). They are that by Nina W. Matheson and John A. D. Cooper on <u>Academic Information in the Academic Health Sciences Center: Roles for the Library in Information Management</u>. [1] This study was supported by the National Library of Medicine, appearing as supplement to the October 1982 issue of the "Journal of Medical Education." It provides guidelines for introducing electronic data systems (EDP) into academic programs with a desired end product of a network linking "a technologically sophisticated library with extramural and intramural information systems. The results, states Dr. Cooper, would be an effective, efficient approach to expanding information in the biomedical sciences and clinical medicine." [2] The second AAMC study entitled <u>The Management of Information in Academic Medicine: an Assessment of the Application of Technology, Policy Consequences, and Needed Changes in the Present System</u> is complimentary to the first. It looks broadly at all of the information systems in the academic medical center and "attempts to project EDP into the future." Lastly, it provides "a basis for short-, intermediate-, and long-term strategic planning by academic institutions." [2]

III. **Unique Features of the Biomedical Community User Groups**

In briefly describing the specific information needs and formats of the biomedical community, emphasis was placed on the immediacy of the information with a corollary being accessibility, hence the projected impact of electronic technology. In trying to further assess the need, impact, and readiness of the biomedical community for electronic information delivery systems, some of their unique features in this regard need to be kept in mind.

In particular, the user groups are:

A. <u>Information based and information dependent for effectiveness.</u>
A prime example is medicine which processes a variety of data and information input before and during decision-making processes. Additionally, the presence of the invisible college of professional colleagues (exchanging information) is a viable part of the network.

B. <u>Computer/technology oriented</u>, and perhaps more than many other groups, scientific aside. Consequently, they are a prime and an appropriate target community for the newly emerging electronic formats. An obvious example is the new "user-friendly" online databases which are aimed at this market. A further observation is the lack of resistance to try new products, and instead, enthusiasm for a better or improved or faster ways to do something, in this case, to access, use and manage information and scientific data.

The user groups have been:

C. <u>Recent self analysis of many medical schools curricula</u> both from within the schools themselves and their representative groups with the awareness of the need to integrate information management into an already full curriculum. This offers new opportunities and new challenges for health sciences libraries to become much more involved in the educational programs of their user groups.

D. <u>Recent decisions by some colleges and universities to require all incoming students to purchase their own computers</u>, so that the current computer literacy gap will rapidly disappear within the next few years. Also notable are the number of computer courses being offered to faculty and staff to bridge this gap. Further, most laboratories in this country have made use of computers and their products for some time. For the research community in particular, it—the computer—is an old friend, a familiar and necessary component for most research projects.

E. <u>The emergence of new information related disciplines within the professional schools and community.</u> One example of this trend is the area of medical decision-making which is emphasizing, among other things, a synthesis of information processes and tools. Direct application is extended to the selection of laboratory tests for the patient: what criteria should be in place for the physician (medical student, intern, resident, fellow or senior staff member (faculty, physician). Note as well that the National Library of Medicine, long the mainstay of the health sciences library community, is sponsoring a new postdoctoral research program. The area is called "medical informatics" and is "an umbrella term for using information sciences and computers for a variety of medical information purposes."[3]/ Again, the potential for the health sciences library is a real one.

IV. Unique Features of the Biomedical Community Service Groups

The role of the various service groups is to support the mission of the user groups, in particular, via their information based capabilities. Some of the unique or special features of this group that facilitate this process include:

A. Studies such as those already described by the AAMC. It should be noted that groups other than biomedical are examining these in particular in that the planning and networking aspects can be extrapolated to other kinds of library environments other than biomedical.

B. Information policy development by many universities and their respective schools and teaching facilities (hospitals). Again, the AAMC studies provide appropriate background and planning guides. Planning grants for Integrated Academic Management Systems (IAIMS) programs are also available from the National Library of Medicine.

C. Networking background of this group, in particular, the health sciences library community which has long supported the Regional Medical Library network of the National Library of Medicine. Additionally, many libraries of this group are members of the various bibliographic utilities, such as OCLC, Inc. and the Research Libraries Group (RLG). Many hospital libraries are members of consortia which were expressly developed to share a variety of services and functions.

D. Prevalence of automation in health sciences libraries as compared to other kinds of libraries. The integrated library system originated in the health sciences library, and has received ready acceptance again due to the information environment existing therein.

E. Vendor/university computer agreements, such as the Apple Consortium which has issued special purchase plans for all participants--23 universities and colleges. Other major computer companies such as Digital Equipment Company (DEC) and IBM are involved in similar kinds of programs, and one continues to read daily of new vendor/university computer agreements. In this same vein, universities such as the University of Pennsylvania have formulated a computer plan [4]/ which will facilitate the implementation of computer technology throughout the university in a coordinated fashion. The individual schools at Penn are also developing their respective plans as well and within this framework. A Five Year Plan [5]/ has been developed by the Penn University Librarian,
. Richard De Gennaro, who outlines a coordinated approach to library automation and the development of "PennLIN," an acronym for the Penn Library Information Network. A last point would be to emphasize the need to integrate library/information centers and services into the overall planning for automation in the parent organization or institution. Carrying this thought one step further is to include the library in any kinds of vendor/university computer agreements. All members of the

information network should be able to access each other, much less share in the benefits of any special arrangements for the purchase of equipment and software.

F.   **Some recent developments in the area of electronic formats include:**

    a.   **Software examples:**
- o The Institute for Scientific Information's (ISI) Sci-Mate Personal Data Manager and Universal Online Search, which are menu-driven microcomputer software packages for online and offline information retrieval. [6], [7]

- o The American Chemical Society's journals online full text

- o Biosis' Bio-Superfile, a user friendly microcomputer program for use with BITS (Biosis Information Transfer System)

- o the Paperchase [8], [9] program for searching the medical literature

- o BRS/After Dark [10] and Colleague user-friendly systems and their Critical Care Medicine database

- o IRCS Medical Science offers full text online

- o AMA/GTE medical information network online offers a variety of databases.

    b.   **Hardware:** Richard W. Boss' recent article on "Technology and the Modern Library" [11] provides an update on this area.

    c.   **The Elsevier/BRS joint publishing experiment** has been described by J. Franklin and colleagues in a presentation entitled "Biomedical Journals in an Online-Full Text Database: a review of reaction to ESPL. It was a study of biomedical journals online full-text from certain Elsevier science publishers' journals (ESPL) and it concludes that "...the early results indicate that scientists will use user-friendly systems to access their literature providing the material covered is current and scientifically important. Information scientists welcome the power of full-text as a searching tool, but generally lack the subject knowledge necessary to fully utilize the main advantage of full-text, instant verification." [12]

V. Issues of Concern

Naisbitt in Megatrends [13]/ details the change our society is currently under-
going from an industrial society to an informational one. He refers to the
life channel of the information age as communication, and speaks of the
collapse of the "information float." By this he means the reduction of time
that information spends in the communication channel, so that with the faster
flow of information, the sender and receiver are brought closer together with
the pace of change accelerating as this occurs.

Some of the major issues that have been identified as areas of concern for
both the user groups and service groups alike include:

o   the cost, value and use of information

o   the question of free access to information

o   the shift from collection development to access

o   the changing economics for libraries with more monies
     of necessity going to and for online services

o   the matter of information policies both on a national, regional
     and local level

o   copyright for the new electronic formats

o   maintenance and development of standards

o   telecommunications rates and costs

o   ethical and legal questions concerning the provision
     and use of information

o   networking and linking of users and libraries via compatible
     equipment and software

o   the librarian "synthesizer" – the new information specialist
     –or how to educate the profession for interfacing with a
     variety of information sources to extract or provide the
     desired information.

De Gennaro, [14]/ Line, [15]/ and Stueart, [16]/ delineated the issues for the changing
library scene as well as stating the concerns facing the user groups broadly
speaking. None predict the demise of the library, but all state the need to
adapt to the changing times. Depending then on one's outlook, great chal-
lenges or great peril or a bit of both, are facing the libraries and other
service group members. Whatever the case, it is a time of rethinking for all.

VI. Summary

The biomedical community, both user groups and service groups alike, are particularly affected by the electronic information technology which has already caused a significant reduction in their respective information floats. Relationships are changing between and among the different group members. Both groups have to work together, and with others, to resolve the many intriguing and troublesome issues and concerns emanating from the new information society we all find ourselves in and a part thereof.

Because of the nature of the biomedical community's mission, it is especially important to be aware of the far ranging effects of the changes going on in their environment. In ending, I would like to offer a quote as to the potential for this community to share with the rest of the world via the new information technology. Becker states as follows: "...The invisible electronic information environment offers the scientific community a promising opportunity to reach out more widely as a whole, to extend the utility of the scientific record beyond the traditional boundaries of science and to apply scientific knowledge and expertise more directly to the problems of survival in a complex world. Hasten the day." [17]/

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The Publishing Environment
Online Full Text - Legal

Library of Congress Network Advisory Committee
April 19, 1984

William H. Lindberg

Introduction

This paper will describe the current context of online full text legal
retrieval from the point of view of one of the major providers in the industry.
The emphasis of this paper will be on West Publishing Company's WESTLAW service.
There is no specific claim of exhaustiveness or disinterest on the part of the
author.[1]

If there ever was a time that lawyers could function well on the basis of
bluster, intimidation and bluff, an increasingly complex world has produced an
increasingly complex legal information framework which now makes these methods
risky. It becomes perilous to practice law without a comprehensively grounded
legal information base from which to render service.

Lawyers, as other professionals, rely heavily on their body of professional
literature, whether that is primary authority (i.e. court decisions, statutes,
etc.) or secondary authority (treatises, commentaries, periodicals, etc.)

Dependence on the legal literature is especially acute for the legal
profession. First, a large part of legal literature is
"authoritative", in a sense different from the literature of, say,
medicine or history. Legal authority is binding, backed by the coer-
cive apparatus of the state. One is compelled to be familiar with
legal authority, for, in the ancient phrase, ignorance of the law is
no excuse. Second, the very principles of Western legal systems
require that governmental bodies operate according to law. Courts
must resolve their cases in accordance with the law. This jurispru-
dential theorem imposes upon lawyers and judges the duty of iden-
tifying and examining all relevant authority. Failure to exercise due
care in carrying out this duty may render the attorney liable to a
suit for malpractice.[2]

In some respects, the complexity of legal information needs of attorneys,
which in theory ought to have been perfectly susceptible to computerization,
proceeded slowly. The American legal profession probably enjoyed one of the
most thoroughly indexed bodies of professional literature in the world. In
part, this is why lawyers were slow to embrace the new technology.
Basically, traditional resources served their needs quite well.

West, and other major legal publishers, felt quite secure in serving in the
role as a traditional print publisher. After all, West had served the legal
profession since 1876, founded on the principle of "Better Service to the Bench
and Bar." Events began to change quickly, however, as the speed of the computer
revolution and Toffler's Third Wave began to arrive.

HISTORICAL BACKGROUND

Computer-assisted legal research (CALR) is a relative newcomer to the field of legal research. In the late 1950s, initial efforts were made to search statutes by computer at the University of Pittsburgh. The results of these early experiments sparked interest in extending the principles to case law research. The first major system to apply these principles was the United States Air Force's Legal Information Through Electronics (later known as FLITE.) In the late 1960s and early 1970s, work was begun on commercial systems.

The Ohio Bar Association developed a system called OBAR which was eventually developed commercially as LEXIS in 1973, by Mead Data Central, a subsidiary of the Mead Corporation. At the same time, the United States Department of Justice developed its own system, known as JURIS. Computer-assisted legal research systems also appeared in a number of European countries.

WESTLAW itself had been under development for several years before its introduction to the public in 1975. It initially offered headnotes from state and federal cases. WESTLAW added the full text of cases to the headnotes in 1978. In 1979 it became the first computerized source for Shepard's Citations. In 1981 and 1982, WESTLAW added special topical files in areas such as tax, securities, labor, etc. Federal materials, in addition to case law, such as statutory and administrative material, were also added. In 1982, WESTLAW introduced legal periodicals on line with its Tax Notes database. In 1983, WESTLAW introduced a new search system, a new custom terminal called WALT (West's Automatic Law Terminal), INSTA-CITE, and an international link to United Kingdom and European community laws found on the EUROLEX system.

The competition between the two leading services has been quite intense, and users are the beneficiaries of the intensity of that competition.

West's most recent characterization of that competition has been portrayed in a parody of the Star Wars series entitled Law Wars/Return of the Edi:

> In days gone by legal researchers depended on the famed Edi
> Knights (short for Legal Editors) to help create the tools
> that enabled them to perform their research.
>
> Then there came the advent of high technology. Some forgot
> the work of the Edi Knights and others disparaged them saying
> that human beings were no longer needed to produce research
> tools. They claimed that the massive computers were all that
> was needed.
>
> But the Edis remained faithful to their task. In the course
> of time it became known that the Edi's efforts added greater
> richness and force to the capabilities of the new technologies.
> And the researchers celebrated the return of the Edi.

West has undertaken its electronic publishing efforts with increasing corporate commitment. The current database of legal materials contains well over a million full text documents. A large portion of the database is prepared as a byproduct of materials published in printed form, but an increasing share of the materials are published specifically in WESTLAW.

A study by Arthur D. Little, Inc. <u>Discovering</u> <u>the</u> <u>Fountain</u> <u>of</u> <u>Youth:</u> <u>An</u>
<u>Approach</u> <u>to</u> <u>Corporate</u> <u>Growth</u> <u>and</u> <u>Development</u> (1980), describes how mature com-
panies who wish to continue to serve traditional customers must innovate
vigorously to avoid obsolescence by spiralling technology. One of West's mottos
is "Forever Associated with the Practice of Law", and to continue to keep faith
with that principle in today's world, a massive commitment to technology has
been called for.

CURRENT DEVELOPMENTS

The most dramatic growth to occur over the past several years has been
in the area of database development (See Appendix A). Case law data-
bases contain the full text of court opinions, plus editorial enhance-
ments such as headnotes, synopses, topics and key numbers. The signi-
ficance of these additional editorial features rests in the ability to
ameliorate limitations of full-text searching. William Maron, of the
University of California at Berkeley, and David Blair, of the
University of Michigan, for example, coordinated a study on full text
retrieval. Their study focused on the recall capabilities of full
text using the IBM STAIRS retrieval system on a large litigation sup-
port file. Their conclusion was that use of full text alone resulted
in fairly poor (20%) recall, even though users thought it had been
higher.[3]

Truly effective legal researchers are both imaginative and tenacious in
their research efforts. They realize that no single system, print or electro-
nic, will likely supply all the answers to a particular research inquiry. The
power and versatility of computer resources ought, therefore, to be merged with
other information tools.

In an effort to mesh electronic products with traditional titles, a series
of reference publications by established legal experts will contain preform-
ulated search queries to suggest a prototype search for the user to employ.
Obviously, the iterative process does not permit total anticipation of every
user's request. Often, however, all that a novice user needs to be able to
develop effective searches are sample queries from which to pattern search
requests. The first titles to be published in this series are in the areas of
Federal Tax, Torts, Evidence, Property and Antitrust.

During the past several years the primary focus of database development has
been on primary legal materials. As of May, 1984, selected full text articles
from over 160 law reviews and bar association journals have begun to appear.
The ability to search on-line for scholarly distillation of the massive amounts
of legal authority adds a new dimension to a researcher's ability to cope with
"information overload". This is particularly valuable with the capability of
reaching the Legal Resources Index, available through Dialog. Realizing that
there is an annual outpouring of about 60,000 new court decisions each year,
something must be done to help practitioners cope with this massive amount of
new legal information.

At the same time the WESTLAW database is becoming more comprehensive, certain help features within the system have been developed to ease the burden for users. Particularly on the WALT (West's Automatic Law Terminal), function key access permits single-stroke commands. For senior attorneys who may only use the terminal occasionally, this is particularly useful. Also, for public terminals, this feature is helpful for users.[4]

In addition to custom terminal availablity, WESTLAW can be accessed from nearly any general industry terminal, provided it operates in a dial-up environment at 1200 baud (bits per second) and displays a screen of 80 characters by 24 lines. For some terminals such as the IBM PC, special communications software exists; for others, generic communications software is used. Although WESTLAW is ordinarily accessed at 1200 baud through TELENET, TYMNET or WESTNET, it can also be accessed at 4800 baud in several dedicated line environments, such as IBM 3270, WANG, and DEC, etc.

As today's law students become better acquainted with computer-assisted legal research in law school, the user friendliness problems of the past ought to be much less of a problem.

EMERGING TRENDS

Though somewhat peripheral to a discussion of full-text legal retrieval, two other noteworthy developments are emerging: computer-assisted instruction and legal expert systems. The Center for Computer-Assisted Legal Instruction, which began as a joint venture between the Harvard Law School and the University of Minnesota Law School, has been developing some significant materials in substantive legal instruction.[5]

An even more striking possibility is the evolution of legal expert systems which mesh the capabilities of research databases, word processing, document drafting and computer-assisted legal analysis. Although these developments are still in their infancy, they certainly bear watching. These systems may be based on mainframes or even micros as the power of microcomputers continues to expand.

SOCIAL IMPLICATIONS

Current online costs for using legal research services are typically in excess of $100/hour. Though there is some equalizing of opportunity in the availability of information to both sole practitioners and large firms, the social implications cannot be ignored. In view of the vital role that legal information plays in the just and efficient administration of the legal process, access to massive computer databases is an important issue. Several commentators have addressed this development.

The availability of computerized databases is already creating a disadvantage for the practitioner who does not have access to computerized research tools, and who must compete with government agencies and law firms that have such terminals at their disposal. This inequity is not being alleviated by the limited number of public or shared terminals available. This situation is not essentially different than the problem of inequality in access to research facilities between large firms and single practitioners, between urban and rural practitioners, and in fact between representation for the rich and poor generally in our society, but the computer is certainly increasing these inequities. It is thus creating a problem in legal research for the future which must be faced by the courts, the legal profession, and society as a whole.[6]

CONCLUSION

As we approach the twenty-first century, the pace and array of change appears to be ever-quickening. The foregoing examples of how one online full-text retrieval service has been affected by this change is illustrative. West Publishing Company's point of view is grounded in a long tradition of service to the legal profession, which itself is changing dramatically as electronic products become increasingly pervasive in law offices, courts, law schools and corporations. It is probably too early to tell whether the "electronic cottage" structure of society will take effect. Although the technologies necessary for such a lifestyle make it possible, the social and psychological issues remain. A comprehensive discussion of those issues is beyond the scope of this paper.

Other studies under way, such as, the role of the book in the future by the Center for the Book, at the Library of Congress, should be informative as to the future proportion of electronic, print, and microform media. Congress has mandated that this study be published by December 1, 1984.

Developments in off-line storage and retrieval in optical disk technology will most certainly have long term impact on legal publishing formats. Likewise, computer-assisted instruction and legal expert systems will complement computer-assisted legal research. The Chinese symbol for crisis has a dual significance of threat and opportunity. As issues such as downloading, pricing and dissemination of legal information affect the legal profession (there are now over 600.000 lawyers in the United States) and the public generally, the resolution and implementation of the new technology in a positive, socially useful manner becomes important for all of us.

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WESTLAW
Databases

Federal Statutory Law

The U.S. Code

The complete, official text of the U.S. Code.

Special search methods make it easy to find the exact section or subsection you need, or scan related sections when necessary.

Administrative Law

Code of Federal Regulations

The 50 Titles of the Code of Federal Regulations give you access to current federal administrative regulations.

Federal Register

This is the original source for federal regulations before they are added to the Code of Federal Regulations. 1980 to date will be covered in near future.

Presidential Documents

Includes Executive Orders and Presidential Proclamations from 1936 to date.

Federal Case Law

Supreme Court Reporter

U.S. Supreme court cases, **Full Text Plus**, from 1925 to date.

Federal Reporter, 2d

Full Text Plus:

U.S. Courts of Appeals Decisions, 1945 to date
Court of Customs and Patent Appeals cases, 1945 to date
Temporary Emergency Court of Appeals, 1945 to date
Court of Claims Decisions, 1954 to date.

Federal Supplement

Full Text Plus:

U.S. District Court Decisions, 1950 to date
Court of International Trade cases (formerly Customs Court), 1950 to date
Special Court, Regional Rail Reorganization Act, 1970 to date
Judicial Panel on Multidistrict Litigation, 1970 to date
Court of Claims, 1954 to 1960.

Federal Rules Decisions

Full Text Plus, 1978 to date; headnotes from 1961 to 1978.

U.S. Court of Appeals for the Federal Circuit

Full Text Plus, Oct., 1982 to present.

Also includes decisions of the former U.S. Court of Claims beginning in 1954, and decisions of the former U.S. Court of Customs and Patent Appeals beginning in 1945.

U.S. Claims Court

Full Text Plus, beginning with 1 Claims Court (1982) to present.

NOTE: In the following special interest libraries, all Federal cases which includes cases from the U.S. Supreme Court, Courts of Appeals, District Courts and Court of Claims can be searched inclusively or individually if desired.

Federal Special Interest Libraries

Federal Tax

Internal Revenue Code

Federal Tax Regulations

IRS Manual will be available in the future; General Counsel Memorandums, Actions on Decisions and Technical Memorandums now available in Tax Notes file (1981 to date) will be extended to 1967 in the near future.

Tax cases and other documents:

	Start of Full Text Coverage	Projected Depth of Full Text Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. District Courts	1950	
U.S. Court of Claims	1954	
Tax Court Reported Opinions	1954	
Tax Court Memorandum Decisions	1954	
Cumulative Bulletin	1954	
Revenue Rulings	1954	
Revenue Procedures	1954	
Commissioner's Delegation Orders	1954	
Executive Orders	1954	
Treasury Dept. Orders	1954	

	Start of Full Text Coverage	Projected Depth of Full Text Coverage
Written Determinations	1...	
Private Letter Rulings	1954	
Technical Advice Memoranda	1954	
Tax Notes	1981	
IRS News Releases	1981	
International Acts	1954	
Public Laws	1982	

Federal Securities

Relevant sections of U.S. Code; relevant sections of CFR titles.

Cases and other documents:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. Court of Claims	1954	
U.S. District Courts	1950	
SEC Admin. Decisions (selected)	1934	
SEC Interpretive Releases (selected)	1934	
SEC No-Action Letters	1971	
SEC Corporate Reorganization Reports	1934	
Commodity Futures Trading Commission Opinions and Orders	1976	

Antitrust and Business Regulation

Relevant sections of U.S. Code; relevant sections of CFR titles.

Cases and other documents:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. District Courts	1950	
U.S. Court of Claims	1954	
FTC Decisions	1959	

Labor

Relevant sections of U.S. Code; also relevant sections of CFR titles to be added in future.

Cases and other documents:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. Court of Claims	1954	
U.S. District Courts	1950	
NLRB Decisions	1972	
OSHRC Reports	1971	

Federal Government Contracts

Relevant sections of U.S. Code; also relevant sections of CFR titles to be added in future.

Cases and other documents:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. Court of Claims	1954	
U.S. District Courts	1950	
Board of Contract Appeals		
Agriculture	1975	
Armed Services	1955	
Energy	1960	
Corps of Engineers	1953	
General Services	1962	
HUD	1975	
Interior	1955	
Labor	1973	
NASA	1960	
Postal Service	1959	
Dept. of Transportation	1967	
Veterans Admin.	1958	
Comptroller General Opinions	1982	

Patent

Relevant sections of the U.S. Code; also relevant sections of CFR titles to be added in future.

Cases:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. District Courts	1950	
Court of Customs and Patent Appeals	1945	
U.S. Court of Claims	1954	

Copyright

Relevant sections of the U.S. Code.

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. District Courts	1950	
Court of Customs and Patent Appeals	1945	
U.S. Court of Claims	1954	

Federal Communications

Relevant sections of U.S. Code; relevant sections of CFR titles.

Cases and other documents:

	Start of Current Coverage	Projected Start of Coverage
U.S. Supreme Court	1925	
U.S. Courts of Appeals	1945	
U.S. District Courts	19..	
U.S. Court of Claims	...4	
FCC Reports (partially available)	1975	

Admiralty

Relevant section of U.S. Code; relevant sections of CFR titles.

Cases:

U.S. Supreme Court	1925
U.S. Courts of Appeals	1945
U.S. District Courts	1950
U.S. Court of Claims	1954

Federal Bankruptcy

Relevant sections of U.S. Code; relevant sections of CFR titles.

Cases and other documents:

U.S. Supreme Court	1925
U.S. Courts of Appeals	1945
U.S. District Courts	1950
U.S. Bankruptcy Courts	1979

Delaware Corporation Law

Selected Federal Cases:

U.S. Supreme Court	(currently available in
U.S. Courts of Appeals	WESTLAW's
U.S. District Courts	general federal libraries)

Selected Delaware Cases:

Reported Decisions	1967
Unreported Decisions	1975

Federal Energy

Relevant sections of the U.S. Code and relevant sections of CFR titles to be added in future.

U.S. Supreme Court	1925
U.S. Courts of Appeals	1945
U.S. District Courts	1950
U.S. Court of Claims	1954
Commission (FERC) Decisions	N/A

WESTLAW State Law Libraries

Alabama

Supreme Court	1965
Ct. of Civil Appeals	1965
Ct. of Criminal Appeals	1965

Alaska

Supreme Court	1965
Ct. of Appeals	1980

Arizona

Supreme Court	1965
Ct. of Appeals	1965

Arkansas

Supreme Court	1957
Court of Appeals	1979

California

Supreme Court	1945
Ct. of Appeals	1965
Appellate Dept., Superior Ct.	1965

See also separate libraries on Family Law, Insurance Law and Attorney General Opinions.

Colorado

Supreme Court	1965
Ct. of Appeals	1970

Connecticut

Supreme Court	1957
Superior Court	1957

Delaware

Supreme Court	1967
Ct. of Chancery	1967
Superior Court	1967
Corporation Law	1967

District of Columbia

Court of Appeals	1967

Florida

Supreme Court	1965
District Courts of Appeal	1957

Georgia

Supreme Court	1965
Ct. of Appeals	1965

Hawaii

Supreme Court	1957
Intermediate Court of Appeals	1980

Idaho

Supreme Court	1967
Ct. of Appeals	1982

Illinois

Supreme Court
Appellate Court

See also separate library on
Attorney General Opinions

Indiana

Supreme Court — 1980
Ct. of Appeals — 1957

Iowa

Supreme Court — 1965
Ct. of Appeals — 1977

Kansas

Supreme Court — 1967
Ct. of Appeals — 1977

Kentucky

Supreme Court — 1966
Ct. of Appeals — 1976

Louisiana

Supreme Court — 1957
Courts of Appeal — 1957

Maine

Supreme Judicial Court — 1967

Maryland

Ct. of Appeals — 1966
Ct. of Special Appeals — 1967

Massachusetts

Supreme Judicial Ct. — 1967
Appeals Court — 1972

Michigan

Supreme Court — 1965
Ct. of Appeals — 1965

Minnesota

Supreme Court — 1945

See also separate library on
Attorney General Opinions.

Mississippi

Supreme Court — 1967

Missouri

Supreme Court — 1957
Court of Appeals — 1957

Montana

Supreme Court — 1965

Nebraska

Supreme Court — 1965

Nevada

Supreme Court — 1967

New Hampshire

Supreme Court — 1967

New Jersey

Supreme Court — 1948
Superior Court — 1948
Tax Court — 1980

New Mexico

Supreme Court — 1967
Court of Appeals — 1967

New York

Court of Appeals — 1940
Supreme Court, App.Div. — 1965
Supreme Court — 1965

See also separate libraries on
Family Law, Insurance Law and
Attorney General Opinions.

North Carolina

Supreme Court — 1965
Court of Appeals — 1968

North Dakota

Supreme Court — 1965

Ohio

Supreme Court — 1965
Court of Appeals — 1965

See also separate library on
Attorney General Opinions.

Oklahoma

Supreme Court — 1965
Ct. of Criminal Appeals — 1968
Ct. of Appeals — 1968

Oregon

Supreme Court	1955
Court of Appeals	1969

Pennsylvania

Supreme Court	1967
Superior Court	1967
Commonwealth Ct.	1970

See also separate library on
Attorney General Opinions.

Rhode Island

Supreme Court	1967

South Carolina

Supreme Court	1965

South Dakota

Supreme Court	1965

Tennessee

Supreme Court	1967
Ct. of Appeals	1967
Ct. of Criminal Appeals	1967

See also separate library on
Attorney General Opinions.

Texas

Supreme Court	1920
Court of Civil Appeals	1950
Court of Criminal Appeals	1950

See also separate library on
Attorney General Opinions.

Utah

Supreme Court	1965

Vermont

Supreme Court	1967

Virginia

Supreme Court	1965

Washington

Supreme Court	1964
Ct. of Appeals	1969

West Virginia

Supreme Court	1965

Wisconsin

Supreme Court	1965
Ct. of Appeals	1978

Wyoming

Supreme Court	1965

Attorney General Opinions

Attorney General Opinions from 1977 to date are now
available for the following states:

California	Ohio
Illinois	Pennsylvania
Minnesota	Tennessee
New York	Texas

Insurance

California and New York currently available. Other
states will be added in the future.

Family

California and New York cases are currently available.
Other states will be available in the near future.

Education

California, New York and Arizona cases are currently
available. Other states and federal education cases will
be added in the near future.

Extra WESTLAW Services

Shepard's Citations

Shepard's Citations allows the researcher to Shepardize
cases that appear on the screen or cases that are
entered separately. Shepard's includes subsequent
history of a case, other cases which have cited the case,
and notations as to how the case is treated in the citing
cases. Researchers can rapidly move between the
original case, Shepard's listing and cases cited in the
list.

Military Justice Reporter

Covers reported decisions of the U.S. Court of Military
Appeals and Courts of Military Review for the Army,
Navy, Air Force and Coast Guard from 1978 to date.

AMBAR

Compiled by the American Bar Association, this
collection of abstracts contains information on
publications, programs, activities and products of the
ABA staff and members.

Forensic Services Directory

The Directory, compiled by the National Forensic Center, lists 3700 expert and technical consultants plus translators, testing laboratories, investigators and other specialists who provide trial support services. A user may search by particular topics or specialties, by names of experts, or key words descriptive of an accident or event.

Eurolex

This optional service is now accessible through WESTLAW. EUROLEX provides extensive coverage of Common Market, European, English and Scottish legal materials.

Black's Law Dictionary

Complete text of Black's Law Dictionary helps researchers quickly define legal terms.

INSTA-CITE

West's INSTA-CITE is a totally new case history service available on WESTLAW. It provides instant cite verification, plus complete appellate history of a case.

Case Highlights

This special file includes current state and federal cases from around the country of general interest and significance to lawyers. This service is provided free of charge.

On-Line Courses

On-line training courses designed to teach search techniques and use of the terminal are available free of charge on WESTLAW.

Tax Highlights

This special file alerts the tax researcher to cases and developments of interest and significance.

The Abstracting and Indexing Services Environment
Current Trends/New Directions

Library of Congress Network Advisory Committee
19 April 1984

Ronald L. Wigington

Introduction

Before becoming more specific about abstracting and indexing - current trends and new directions, we need to place those activities in a broader context - in both scope and time span. There has been much attention on changes occurring in information activities as the driving force of our economy, as a significant factor in national security, and as the means of spreading knowledge in a free society. For the past 15-20 years, advances in information technology have enabled some improvements in information production and distribution. While those improvements have been very important to many of us, improving our performance and helping keep us economically viable, the corresponding revolution in use of information has hardly started. We can expect many more years of change before a stable environment is established. Even though it may seem that change is occurring rapidly, plans must be constructed with a long time span in mind.

Electronic information distribution systems and electronic information use systems are the "chicken and egg" of the future environment we all talk so much about. Without one, the other is either not possible or useless. In order for the future environment to be achieved and for any of us to participate in that environment, we have been simultaneously using electronic information technology to do better what we have traditionally done while building the base for the future environment.

In a 1972 report of a study, which I chaired for the National Academy of Sciences, called Libraries and Information Technology - A National System Problem, (and paid for by CLR), we said that the capturing of original input during the publication process was the only way that large scale computer-based information systems on a broad scale could come about. This position appears to still be valid and seems to be getting closer to reality.

While, until recently, the preparing for the future has been a by-product of the electronification of the past, I sense that we are now in the process of shifting our primary objectives to the electronic environment. We will still have to carry the past along with us for a long time, but as the use of information shifts to the electronic environment, we will find it becoming the pacing factor in how we must carry out our functions. As we do that we should expect that our functions themselves will change. We all will either change to fulfill those needs, or other institutions will emerge and fill the gaps.

As we consider current status and trends, we should not inhibit the future with the institutional structure that now exists, some of which has only recently formed. We should all be responsive to provide what is required for the information use environment that is effective for users - whether they are

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in industry, education, government, various scholarly endeavors, or the general public.

Abstracting and Indexing - Basic Functions

The means for producing and using indexes and abstracts have been shaped over the centuries by the technology of information recording and distribution - from clay tablets to electronic technology. The essence of abstracting and indexing is the identification and organization of knowledge in a specific area of scholarly endeavor in order that information seekers can find what they are interested in without reading the total literature. The indexes serve primarily as recall means and the abstracts as precision filters. The judgement exercised in the A&I activity is one of "relevance," not of certification of validity of the work reported. The latter function is carried out by peer review or editorial review in the primary publication process.

Subject cataloging in libraries has the same objective, but it is at a much more generic level and does not satisfy the full needs of specialized disciplines of knowledge. Thus, both libraries and A&I services have an information access function, but the A&I services are more in-depth and are specialized. I see no serious conflict between them.

Key objectives of A&I services within their disciplinary scopes are completeness of coverage of the discipline, timeliness of reporting, and quality of the services, which includes accuracy of reporting, selectivity of referencing, and effective linkage with other functions in the information supply chain.

The source of our input is the total primary publication activity that is related to the discipline of knowledge covered by each A&I service. We must be seen as a facilitator in the use of those publications, not as a replacement for any part of them.

A&I services typically concentrate on a discipline of knowledge and use in-depth means for characterizing the basic aspects of that discipline, such as chemical structures for chemistry, taxonomy for biology, etc. In developing these characterizations, the domains of the discipline and information about the discipline become merged. Thus, the A&I service is a strong linkage between the discipline and the information about it. This linkage must be provided consistent with the manner in which the workers in the discipline perform their work and communicate about it. The dominant literature covered is serials, and, for science and technology, patents. There are other materials of interest, but they are not as high volume.

In the past, the presence of the printed A&I service on the shelf of a library was the integration of the document collection, access tools and human aids to help find things in it, and a convenient workspace for the information-seeker. This essential relationship between the document collection and the access tools must be preserved as the user workspace moves to the user site and is fed by electronic distribution. Currently, I believe this linkage has been disrupted somewhat, and one of the challenges of networking is to restore it.

There are important linkages among disciplines of knowledge, and thus among the corresponding A&I services, because knowledge has no clear boundaries. A notable example is the common interest of biologists and chemists in biochemistry, the most rapidly growing field of interest in both disciplines. Cooperation and joint programs between BIOSIS and CAS is the natural result.

Changes in Environment Affecting A&I Services

The environment in which A&I services operate, and will operate in the future, is being changed by a variety of influences. Some of them are both hazards and opportunities. Changes are occurring in:

o   Knowledge discipline boundaries and requirements,

o   Information industry participants and structure,

o   Information technology,

o   User work environment,

o   National and International governmental influences.

One example of the changing boundaries of knowledge disciplines was cited above. It is only one of many such changes in scope and perspective of interests that A&I services must accommodate. The evolution of new knowledge tends to be in the relatively uncharted area between established disciplines as new national missions and industrial opportunities are developed. Also, users continue to want more direct access to information such as facts and numerical data, not just the identification of documents or files in which they are contained. This is a long time desire not yet satisfied, except in a few isolated cases, due to unfavorable economics so far. As the technology improves, the expectations of users in this regard increase.

The "information industry" wasn't even called that 25 years ago. Information needs were taken care of by the activities of traditional libraries and knowledge discipline organization was performed by professional societies and other special interest groups, mostly non-profit institutions. The publishing industry produced the medium for information transfer, which, as a physical object, could be treated as an ordinary item of commerce. In hindsight, things were relatively simple then. Even copyright was not a "burning issue" and downloading had never been heard of. In order to take a positive step in respect to downloading, CAS has established downloading licenses. We are still learning about the specifics that are practical.

As new technology became available and existing institutions did not apply it to provide new services, such as online search and retrieval, the resulting gaps created new business opportunities. These gaps, the rise in economic significance of information itself, and budgetary pressures on information activities have led to various forms of resource sharing and an increasing commercialization of information service functions.

Many of us have talked about networking for a long time but what has existed has been mostly telecommunication networking for distributed access to

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isolated centralized resources. The current information industry structure, including both profit-making and non-profit participants, has developed to respond to that environment. As technology continues to make new things possible and affordable, including networking among special resources and distributed computer-supported information use, and as both commercial and non-profit institutions respond to the changing conditions, the "information industry" structure will change again. That change has already begun with publishers and database builders becoming online distributors (and the reverse), more people entering the document delivery business, and various alliances and corporate acquisitions being created, all competing for more complete direct service to information users. That competition, economic necessity, and the entry of for-profit organizations have changed the way we must all operate.

In the A&I segment of the industry, these changes have been recognized by the changing membership requirements of the National Federation of Abstracting and Information Services (NFAIS), creating classes of membership for service vendors who are not database builders and, this year, admitting for-profit database producers to full membership.

Quite enough has been said about information technology in many conferences, publications, and special meetings. It continues to improve in performance and per unit economics, enabling needs to be satisfied better, and as it changes the environment, creating new expectations and requirements. So far, information functions have had an insatiable appetite for information technology spending more and more in total on it even as its per unit economics improves. It is both necessary for and a creator of the new environment.

The most important driving force in changing the environment will be the spread of terminal availability and use due to office automation and personal computers. As these facilities become available for other purposes, there will be increasing pressure to deliver information services into those environments. This introduces a new influence into networking, the necessity to interface the "home" system of the user to the network-delivered services. That "home system" will range all the way from the isolated home personal computer to a major corporate or institutional computer support system. It also makes downloading, the capturing of selected and retrieved information for subsequent processing and use in the home system, an indispensable part of the electronic delivery environment. To try to deny its existence or prevent its happening is to reject some of the fundamental use benefits of electronic distribution.

Government policies have changed significantly in recent years, with the US government taking less of a role in developing national information resources and national "capabilities" and foreign governments taking a much more proactive role. I would be among the last to suggest that governments should themselves undertake to create all the necessary information services, but the retreat of the US government from supporting and coordinating national information interests has left US institutions to fend for themselves in an increasingly competitive and subsidized international environment. While we may be talking about "national" networking, most scholarly information activities are inherently international and cannot operate only in a national scope.

One A&I Service's Reaction to the Changing Environment

Given the changing environment described above, CAS, as one A&I service, is changing a great amount what we do and how we do it. We may be somewhat atypical because of our size, and thus, one cannot apply what we do to many A&I services, but our actions and plans may have an impact on what others do. Certainly, our directions are network-oriented and depend heavily on electronic distribution, and they should have some relevance to this discussion.

In short we:

o   have entered the online search business.

o   are forming a multi-disciplinary international network for science and technology information.

o   already have a very successful document delivery service.

o   are working with our colleagues in the Books and Journals Division of the ACS to integrate bibliographic and full text services.

o   are applying our technology to information functions in government and industry.

and o   have joined with others in our local community to establish "by-pass" long distance communications.

Online Search Services

In November 1980, CAS started to deliver online search services, called CAS ONLINE®, from its own facilities in Columbus. The first service was substructure searching of a portion of the CAS Chemical Registry file. It used a partially completed system with only preliminary capabilities. Over the next two years, it was expanded to cover the entire Registry file and many system features were added to make it much easier to use. In April of 1983, all of the abstracts from CA from 1975 on were added for display for answers in addition to the bibliographic information for documents citing the retrieved substances.

In December 1983, a major milestone was passed when a full bibliographic search capability was added and the complete bibliographic file from 1967 was integrated into one file. Better performance of the system had been engineered, easy crossover between the structure and bibliographic files was provided, and the automatic expert/novice dual mode interaction language was extended to cover all searching.

During 1984 and 1985, further new features will be added to improve the ease of use of the system and to complete its basic repertoire for application to broader purposes summarized below. The generic name of Messenger^{SM} has been given to the software for the system, which was developed by CAS.

STN International^{SM}

Because this activity, initiated by CAS, is likely to have the most far-reaching significance for the networking interests of the Network Advisory

Committee and the topic of this meeting, it will be described in more detail than the other CAS/ACS initiatives. In October 1983, we joined with Fachinformationszentrum Energie, Physik, Mathematik GmbH as the first cooperating organization (among several others in the future) to establish STN International, an international service providing online access to scientific and technical information. It will be an internationally distributed and networked set of search centers using the Messenger software.

The network, designed to meet the needs of a broad range of users, is intended also as a service for database producers. We will incorporate the principles and policies that we have identified to be desirable, based on our experience as a database supplier to a variety of online service systems. We intend to build an environment in which the information suppliers for various scientific and technical disciplines can come together for resource sharing and mutual benefit.

The types of information to be handled would include the full range of primary literature (full text), secondary literature as "access tools", and evaluated compilations of factual and numerical data. The scope of STN International spans all areas of science and technology, not just Chemistry. It also is intended to include information on related commerce that is of interest to professionals in science and technology, but which is not traditionally "scientific." Examples are news about science and technology, manufacturing statistics, regulatory information, etc.

Looking broadly, the network, and related service activities will grow, over a period of years, into a comprehensive set of functions for information dissemination and use. This will include, in addition to search and retrieval operations, database building and loading, composition, computationally-oriented processes such as molecular modelling and linkage to supercomputer centers reachable via networks, document ordering from a variety of fill sources and established interlibrary loan systems, and electronic mail and bulletin boards. CAS is active to some degree, either delivering services externally or using the techniques internally, in most of these kinds of functions already.

The user would see STN International as a single integrated network involving from 3 to 10 major service nodes. Normally, each specific file would be loaded on only one node, for economy and simplicity of maintenance. Each user will have a home node and from it will reach files, for which the user has authorization to use, in a "transparent way" on all nodes. The structuring of each database and the interaction language used to access it follow a consistent set of file design guidelines and interaction language adopted and maintained by internode "Integrity Groups" composed of technical experts from all nodes.

Some basic definitions for STN International components:

Node: Hardware, software, staff, and services that constitute an STN service center

Node Operator: An organization that operates an STN node under an agreement with the ACS

Database Producer: An organization that produces a database and has the legal right to determine its disposition

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Fundamentally, STN International is a "resource sharing" endeavor. The ACS is sharing its software, know-how, and facilities of the Columbus node. Other node operators, likewise, will provide facilities and expertise for the benefit of the entire network. Database producers share risks and costs of loading their files and marketing them and the costs of further enhancing the system. Although, if a database producer wishes to forego the control and other benefits of the sharing arrangement, a node can function as an ordinary online service vendor and license that file.

Each node operation is intended to operate on a non-profit basis, returning the total margin between the price set by participating database producer and the operating expense to the database producer, who may be either a not-for-profit or for-profit organization. The operating expense includes support of ongoing software development for the network.

STN International is not only "international" in name, but also in scope. It is intended to be multilingual and transact business in multiple currencies. Pricing for each database is set by the database producer for its own purposes, but a major principle is that prices are to be uniform geographically once a user has logged into his home node.

Depiction of the the target STN International architecture, on a 3 node basis, is shown in the following figure:

STN INTERNATIONAL
(Target System)

Tokyo Node   Columbus Node   Karlsruhe Node

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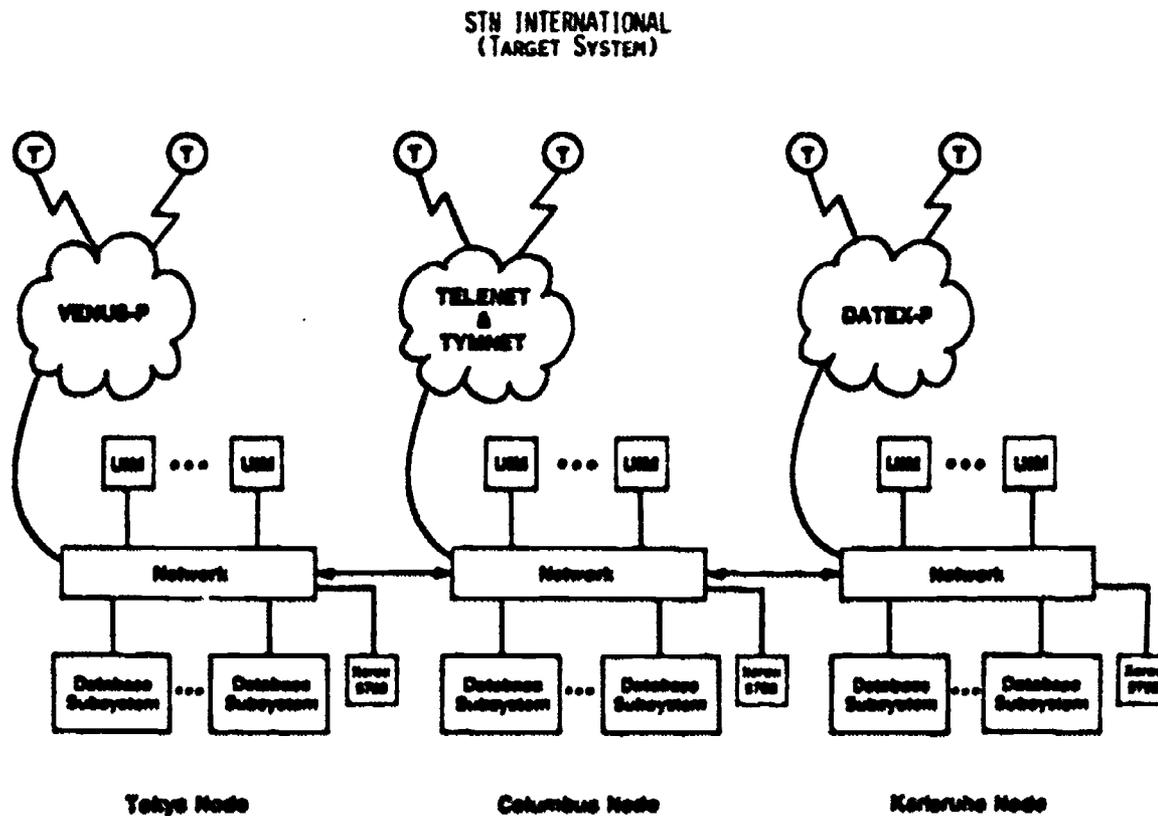
The User Interaction Modules (UIM) are separated from the backend database subsystems and may access any backend module on any node (limited by established use authorization). Offline prints are produced on the user's home node. Value-added data communication networks, such as TELENET, TYMNET, DATEX-P, and VENUS-P, or other communications arrangements, connect users to the home nodes. The main system is based on an IBM-compatible MVS environment. Special backend search systems will be used for some files.

At this time, The Columbus node of STN International is in full operation providing CAS ONLINE services. The transfer of the technology to the second node, at Karlsruhe, is in progress. Pending its installation the Physics Briefs file will be provided from Columbus (starting in May 1984) and will subsequently be moved to Karlsruhe. A Xerox 9700 is in operation in Karlsruhe to produce offline prints for European customers.

Communication lines via DATEX-P, for the Karlsruhe node, and via VENUS-P, for Tokyo and Osaka, now connect directly to the Columbus node, until the other nodes become operational. Arrangements for establishing a node in Japan are being discussed.

Document Delivery

Another networking function is document delivery. CAS already has a well established hardcopy document delivery service. The number of orders being placed online, through our online search system and others, is increasing. What the future document delivery technology will be and how it fits into full text searching and other information services are yet not clear. However, it is clear that full document delivery is an important component of any future networked system.

Full Text

The ACS was a pioneer in the field of "database publishing", as documented in The Seybold Report on Publishing Systems, Vol. 11, No. 24, August 1982 "Data Base and Journal Publishing at the American Chemical Society." From the beginning of that work, output from the composition system was planned to be adaptable for searching. The clean definition of "data elements" and preserving the "information structure" of the document, as contracted with the printed formatting, were basic aspects.

These techniques were applied not only to the productions of CAS Publications and Services, but also to the composition of the ACS Primary Journals. The files resulting from that composition system have been used by the Books and Journals Division of the ACS in experimental and test marketing services for online searching of full text information. There remains the question of how best to combine the information functions of primary and secondary publication activities to best serve users of information.

Other Information Technology Applications

CAS has long used its technology to serve other interests that are compatible with its mission. Examples from the past include the building and managing of files for the National Cancer Institute, the construction of the

Toxic Substances Inventory for the Environmental Protection Agency, similar duties for the European Commission, and maintenance of chemically significant files for private industry. The most recent example is the award of the contract by the US Patent Office to the team of Planning Research Corporation and CAS to automate the US Patent Office.

These activities underscore the opportunity and utility of integrating internal information use environments and external information services.

By-Pass Communication Technology

Yet another networking-related activity, which CAS is participating in, is the formation of Columbus Teleport Corporation. It is a joint activity of CAS, The Ohio State University, CompuServe, and Ruscille Realty Company. It is being formed to provide alternatives to existing long distance communications for data, video, and audio, with the main emphasis on data. The objectives are to provide better quality and higher bandwidth communication services at a competitive cost. Such capabilities will be very important to future networks.

A&I/Library Networking Impacts

Given the developments, outlined above, what are the interrelationships and impacts?

The integration of information use at the workspace of the using individual is the key and essential aspect for electronic distribution. We must do electronically what was formerly supplied traditionally by library reference collection, research librarians, the stacks, and the "reading room" facilities to use information. The likely integrating point will be the home or office workstation of the information user. How to integrate the necessary functions is not fully known at this time.

As I inferred at the beginning, I think the electronic distribution and use environment some of us have believed in for many years is becoming more believable by others and nearer to reality. Certainly, the CAS commitment to it should be obvious, and things like CAS ONLINE, STN International, and major technology efforts like the Patent Office Automation are tangible evidence of our efforts in doing something about it.

Yet, we all are still working on a bunch of islands with uncharted courses among them. Anyone who intends to be serious about networking and electronic distribution better be in it for the long pull because there still remains far more to do than has been done.

From Acquisition to Access: New Roles for Libraries and Library Networks in the '80's

Database Services, Inc.
Los Altos, California

Frances G. Spigai

Introduction

The central theme of this paper is the impact of electronic publications on libraries in general and on library networks in particular.

With few exceptions, the role of the library network during the past 15 years has been focussed on the support of catalog and inventory services for library technical processing applications.

Within the past few years, the academic and public library community has turned its attention to making online patron access to catalogs a reality. During the next few years OPAC activities and economical patron access to reference databases along with a spate of microcomputer activities and other activities using local databases or database subsets will be the predominant technological developments in academic and public libraries. As a result, these will become the major concerns of the networks as well.

New network services and "products" will be required to support the shifts from

- departmental activities to individual activities

- information use by the information professional to the end user, and

- acquisition of books and serials for the library collection to access and acquisition of articles, news items and other materials which are not retained in the library collection.

Megatrends and the Design of Information Products

As new information services and products are designed, it will be essential to keep in mind the megatrends identified by John Naisbitt.[7] The five listed below constitute some design goals of future information products.

- High tech/high touch (rather than forced technology)

- Decentralization (rather than centralization)

- Self-help (rather than institutional help)

- Networking (rather than hierarchies)

- Multiple options (rather than either/or options)

Products and services ignoring these basic parameters may not be desirable and competitive in tomorrow's marketplace.

Information Services: The Business of Libraries and Library Networks

It will be useful to make distinctions between information, information technology and information service. With the exception of derivative works such as catalogs and bibliographies, the purpose of the library has not been to produce information content but to acquire and access it. Likewise, the library is a purchaser and user, not a manufacturer, of information technology such as computer terminals or facsimile devices. The main purpose of the library has been to provide access to local and remote published information for its patrons. In turn, library networks have served a number of purposes for libraries:

- as brokers or wholesalers for online services such as RLIN, OCLC, DIALOG and BRS

- as educational centers for information systems and publishers such as OCLC, BRS and Chemical Abstracts Services, Inc.

- as installation and customer support services for information systems and services, and

• as service bureaus for producing (1) catalog databases of member holdings and (2) by-products of databases

The conclusion of this paper will suggest some future roles for library networks based on the change in library emphasis from acquisition to access.

Electronic Publishing -- The Online Phenomenon

During the past 15 years we've seen the birth, growth and levelling of the growth curve for online time-sharing services--services which have permitted instant access to many databases. These database services have been based on the use of large computer mainframes and mass, magnetic storage devices. Since 1969 the growth of online database services has been quite dramatic. In a 1977 presentation in San Jose, California, Dr. Carlos Cuadra posited an order of magnitude growth every four years for the number of terminals used to access online databases:

Year	No. of Online Database Terminals
1969	50
1973	500
1977	5,000
1981	50,000
1985	500,000
1989	5,000,000 (Estimated)

The numbers have been pretty much on target and, if videotex experiences the successes predicted for it during the next few years, five million database "viewers" will not be an unreasonable target for 1989. However, much of the recent growth is directly attributable to online services appealing to individual microcomputer users. Subscribers to Dow-Jones, CompuServe and The Source already comprise over 300,000 subscribers in a grand total of almost 750,000 subscribers to the 29 top online services.[10]

The emergence of microcomputers have already begun to spell the demise of time shared computing and have just begun to change the face of centralized, time shared database access.[18]

A snapshot of the online industry, provided below, indicates its size:

Approximately 1,000 publishers distribute more than 2,100 databases
through about 350 online vendors to more than half a million online
searchers throughout the world.[5] The number of online searches of
textual databases in the library community alone is estimated to have
exceeded ten million in 1983 (straight-line projections from Williams'
data).[13]

Trends in Electronic Publishing

An inspection of online services directed to end-user markets points to
system and service features which can be expected to be more widespread in the
future and which already shape the perspectives of library users.

- **User friendliness**--Features will include auto-dialing, menu-
  driven or prompting modes which require little or no training,
  and smart help messages to keep the use of documentation to a
  minimum.

  Centralized gateway services or gateway software on
  microcomputers will be standard and may actually decrease search
  costs because of off-line search formulation. Command languages
  will be complemented by touch screen systems or systems
  exploiting function keys or the mouse.

- **Full services**--Features include electronic mail, computer
  shopping, facilities for personal file storage, file consulting
  and/or other extensive customer services.

- **Pricing**--Many options will exist in the near future because
  electronic publishing will be so competitive and because of the
  need to mask prices higher than the print equivalents.

- **Use of microcomputers**--Because the micro has local storage and
  processing capabilities at a price rivalling "dumb" terminals,
  micros will be a universal terminal of the future. This use will

permit simple and inexpensive decentralized database
distribution. Segmenting and updating digital publications will
permit subscription sales for online publications following the
models already in place for magazines.

- **Graphics**--Both computer prepared graphics as well as integration
  with video discs will be available for services where graphics
  are essential (i.e., where the economics support their
  existence).

- **Expert systems**--The reference interview can be started and often
  finished by sea ;h services employing prompting and profiling
  techniques. While this outgrowth of artifical intelligence has
  yet to make its way into general reference service, the very
  specialized applications of expert systems in biotechnology and
  electronic and energy engineering promise fertile fields for the
  transfer of technology and software for other databases.

This subsection has been revised and updated from a subsection in reference 14.

Electronic Publishing and Future Technologies

The predictions below are merged from two sources of information on future
technologies which will have a major impact on the economies and distribution
of electronic publications. One source holds the perspective of the
microcomputer industry,[12] the other the perspective of the information
industry.[23] Below are the five technologies which will drive our
microcomputer/mainframe, database-oriented, professional society of the late
'80's and early '90's.

(1) Software based on artificial intelligence (AI) technology (e.g.,
    expert systems).

(2) Mass storage devices based on optical disks and improvements in
    magnetic disks.

(3) Telecommunications: "the emergence of local and national data
    networks on an integrated part of all interbusiness communications."

(4) Very large file processors.

(5) A new generation of workstations integrating voice and data.

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Information Services -- Markets and Growth Problems

The major market factor driving increased use of electronic publications
is the continued shift for greater productivity in information handling from
productivity in industrial production. MIT data suggests that present invest-
ments in information technology are only the tip of the iceberg.[15]

In the Information Industry Association survey mentioned above,
information companies were asked to name the most important problem for their
company. Two major issues emerged: "(a) educating the market to the benefits
of their product and (b) finding qualified staff." The IIA author, summarizing
results of the survey, posits that (a) is due to ". . . the fact that
businesses do not immediately see how to put new information to work." In
addition, and unlike manufacturing situations, "information does not deliver
value incrementally: because one subscription leads to one sales opportunity
doesn't mean that two subscriptions will lead to two." He continues,
addressing (b), "The urgent need for staff is caused not by growth but by
change." (Ref. 23, p. 13) Because the IIA author is depicting information
service companies, it is no surprise that libraries and library networks have
been grappling with these same issues in a secondary "marketing" role. The
next two sections will explore the impacts the shift from print to electronic
publishing will have on libraries and library networks.

Electronic Publishing -- Impacts on Libraries

Just as secondary, and some primary, publishing is migrating from a print
to an electronic base because of the added value electronic publications offer,
so libraries have to change their structures to accommodate this trend.
Electronic databases will not be just national publications, but local
directories, news and indexes as well.

Libraries will have to cope with change in four directions to accommodate
the market for electronic publications:

- **Information service technologies**--The microcomputer is assuming
  the role of the dominant, universal database terminal that the
  "dumb" ASCII terminal used to have. As a result, local storage

devices, microcomputer software, and a new set of smarter, faster
modems will all be part of new library workstations that have to
be mastered. Because so many essential databases are remote and
because the telephone industry has been deregulated,
telecommunications also will bring about a rash of options as new
competitors vie for a piece of the lucrative communications
marketplace.

- **Information service resources**--Though electronic publications
have value-added relative to print, there are also real cost
increases for many markets such as small academic libraries and
small public libraries unable to pass costs on to all patrons.
As a result, dollar resources are pinched or re-allocated for and
by these new media. In addition, staff are in short supply as
commercial services, publishers and a variety of libraries
compete for experienced, competent online searchers. At the same
time as the materials budget has to contend with higher priced
(online) abstracting and indexing services, rapid bibliographies
resulting from these services encourage requests for copies of
journal articles and reports, many of which are not in the local
collection. So source documents that usually make their way to
personal or departmental files also vie for the central, research
collection budget.

- **Information service policies**--New technologies, new demands and
scarce resources create a context rife with conflict. Policies
must be established to handle the problems, but the policies
cannot be iron-clad because of the rapid changes in technologies
and demands that highlighted the policy void in the first place.
Just a few of the problems facing library directors and middle
management in charge of public service units follow. Most
problems are not new, but many are now too visible to be avoided:

    - Whom do you service?

    - What services should be subsidized, charged for, "free?"

    - How proficient or comprehensive can a search staff afford to be?

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- How do you apply controls for, or advise about, or understand copyright issues with respect to electronic databases (e.g., downloading)?

• **Information service management**--In the dynamic world of electronic publishing services, skills require constant updating and staff roles change. It becomes important to provide staff with opportunities to learn new skills on a continual basis. Reference librarians roles have shifted from emphasis on time-consuming research using printed materials to a higher productivity for reference work, but one where the question/answer negotiation requires almost as much time as the compilation of relevant references. Many gateway software packages (e.g., In-Search from the Menlo Corp.) address the logjam of the reference interview. Document delivery now looms as one of the next problems/opportunities and electronic mail, automated interlibrary loan and full-text digital delivery all press to the fore as solutions. With so many online services offering so many price structures and each having complex inter-relationships of content and search mechanisms, future roles for information professionals may revert back to electronic publication "collection development" (evaluation), "acquisition" (contracts and account administration), installation (training and local training materials plus any necessary hardware or software) and reference work (a mix of patron education and intermediary searching). Dowlin's version of "the more things change, the more they remain the same," sees the librarian's major roles in the electronic library as gatekeeper guide and value adder.[20]

Figure A lists four major shifts occurring in libraries as a direct result of the shift from acquisition to access to publications. In addition, the large number of end users subscribing to online services such as The Source, Dow-Jones and after-hours, simpler versions of DIALOG and BRS will produce another set of effects on libraries. These will range from a more educated market for library online searching (beyond the "consumer" services mentioned and after the novelty of searching wears off for many) to a new set of problems

resulting from the simplistic assumptions end users may draw about how professional an activity online searching is based on their experiences with consumer services and with gateway software offering simplified approaches to complex DIALOG databases. End users are already beginning to confound library staffs with lists of incomplete or inconsistent references.[14]

ACCESS vs. ACQUISITION

World's literature vs. Local collections

Local expertise vs. Local collections

Search strategy (electronic browsing)
vs. Scholary browsing

Document acquisition vs. Loans of physical volumes
by library and individual collections

Figure A

Impacts on Library Networks

Likely shifts within libraries have been sketched above, but what are the impacts of electronic publishing likely to be on library networks? In general, their major functions will remain the same. They will continue to broker services, to train, to integrate, to facilitate and to act as clearinghouses for automated library systems and services. It is the content of the information they'll be handling which will provide the major shift. Some specific scenarios are listed below:

- Just as some networks were formed and funded to replicate OCLC for their regions, some larger networks and some utilities will become online vendors for selected reference databases. The reasons for this move will include an intent to provide lower cost service to libraries than can be provided by commercial vendors and an attempt to secure future survival by offering essential services. Networks will deal directly with a select number of database publishers (10-20) for core services. In

addition, local databases of state regulatory or historical
information might be additional grist for a regional network
mill.

- These same networks will have "gateway" contracts with a variety
  of online vendors for other databases. That is, member libraries
  will use the network as the host and be switched through to other
  online vendors such as BRS, DIALOG or Dow-Jones. This may
  provide the first real integration of online catalogs and
  reference services.

- Broker agreements for volume discounts will continue to be a
  major service offered by other networks.

- Shared resources will take on a new meaning and will include
  search expertise. Since the reference utility is comprised of
  many vendors, and many databases available via terminals, the
  local resource is not the collection but the access. The access
  is comprised of people, documentation and, perhaps, software.
  For awhile the intelligence resides in the experts and so online
  searchers will be a shared resource. We are already seeing
  catalogs of such expertise,[4,9] indeed one of these will be an
  online database soon.[24]   Interlibrary searches may be essential
  since expertise is as decentralized as are special collections.
  Regional networks might provide a new location for "scholars" who
  need access to information. Centralized teleconferencing or
  computer conferencing alcoves from a regional network might
  provide minimal levels of consulting research strategy (vs.
  collection access).

- The increase in telecommunications rates and rapid changes in
  communication options cry out for brokers and clearinghouses on
  the subject. Long-range consulting advice about what
  telecommunications costs will mean to the viability of linked
  services is essential for network planning.[2,19]

- Database information clearinghouses and database evaluation units[8] for libraries and parent organizations will become increasingly important in the future as these numbers grow. This "collection development" activity will take place within the library and in the networks.

- Training centers will continue in importance as information technology, software systems and services continue to change rapidly during the next decade.

- Administrative functions may include much more complex accounting systems, proprietary rights monitoring (e.g., copyright infringement) and new statistical compilations based more on output rather than input.[3]

- The opportunities offered in re-packaging information may be the most interesting of all as regional document delivery service and current awareness needs are profiled much in the manner of RLG's Conspectus programs.

With the exception of becoming an online vendor and gateway service, the services mentioned above can all be accomplished without a great deal of capital. And, results from the IIA survey proclaim that low entry cost, information broker services yield the high profits.[23]

Conclusion

The trend back to local autonomy[22] may breathe new life into regional networks. But, this trend must be served with the right products and services. As Drucker so clearly points out "One gets paid only for strengths; one does not get paid for weaknesses."[6] Networks must ask themselves a "Drucker" question regarding their specific strengths: "Are they the right strengths? Are they the strengths that fit the opportunities of tomorrow, or are they the strengths that fitted those of yesterday? . . . . And, finally, what additional strengths do we have to acquire?" Networks working with libraries to deliver relevant electronic publications to users during a transition age from acquisition of print to access to a variety of media must seek the strengths for the opportunities of tomorrow to survive.

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NEW EQUIPMENT AND APPLICATIONS

New Technological Environments 1984 - 1990

Summary of a Talk Presented to the

NETWORK ADVISORY COMMITTEE

by

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April 19, 1984

Developers of electronic information delivery systems have a wealth
of new technologies to consider in their planning, but to an equal degree the
new technological environment is characterized by the rapid convergence of
existing technologies into the areas of electronic information. To the new
entrepreneurs in the information business this provides a richness of choice
unavailable in most industries; to the established packagers of information
this provides the constant challenge of competition from new and unexpected
quarters.

We briefly examine following a variety of these new technological
environments which will have varying degrees of impact on electronic infor-
mation delivery systems in the 1984 to 1990 period. While some of these may
prove to have minor consequence in the information industry, the impact of
their collective confluence is certain to be major.

FULL-TEXT DATA BASES FROM MACHINE READABLE MANUSCRIPTS

The concept of building a data base and publishing from it is far
from a new idea; the first scientific journals began this practice more than
20 years ago. One reason then, which is still a good one now, was the faci-
litation of the production of derivative information products. What has
changed, however, is that the decrease in the cost of online disk storage and
the increase in the speed of online computer processing has now made the
direct use of full-text data bases economically viable. Along with some other
contributing technologies we will mention, we expect that full-text (or its
digitized page-pictorial equivalent) will soon become the dominant form of
machine accessible information. Few users will settle for citations or
abstracts, except as intermediate finding tools, when the source materials
themselves become directly available.

INCREASED COSTS OF TELEPHONE DATA COMMUNICATIONS

It is generally expected that normal telephone services will double
in cost by 1990. This, plus the push by the operating companies for single
message unit tariffs, will have a negative impact on the data communications
services we are familiar with today, particularly when we consider the added
traffic loads imposed by full-text transmissions. This does not bode well for
data base service bureaus in the long run, but does bode well for new and
innovative forms of data base sales and distribution. As we mention later,
data base distribution on optical storage will have a major role here.

BYPASS COMMUNICATIONS TECHNOLOGIES

In the near term we may expect the emergence of the so-called
"bypass technologies" (not totally unrelated in concept to the advanced
cardiac surgical procedures employed when the main pathways become clogged or
inefficient) to offer significant price competition to telephone systems for
data communications. Using technologies such as packet radio, private micro-
wave, cable TV channels, and private fiber optics links to the "dish farms" of
urban teleports providing satellite communications services, many alternative
ways will be found to bypass the use of the voice telephone network to gain
digital data links to computers and service bureaus. While such services will
not alter the long term trend to data distribution rather than remote access,
they will aid in delaying the more serious impacts of higher telephone costs
to existing information delivery systems.

VLSI (Very Large Scale Integration) - PROCESSORS ON A CHIP

The rate of progress in semiconductor technology has continued to be
extraordinary, with chip densities doubling approximately every 18 months.
The "Processor on a Chip" has similarly advanced, very recently, from an 8-bit
CPU without control circuits or memory of any consequence, to a fully con-
figured 32-bit computer. The increasing power at decreasing cost which
results from these advances provides at least two major new opportunities
related to information delivery systems: the capability to perform mainframe-
class searching on small computers (albeit with far fewer users), and the
capability to dedicate a small computer to the generally tedious tasks
attendant to the analysis and handling of downloaded or physically distributed
full-text data bases.

FAULT - TOLERANT PARALLEL PROCESSING

A third major benefit resulting from the new classes of "Processors
on a Chip" which is deserving of special mention is the new cost - feasibility
of providing a configuration of replicated processors operating in parallel.
Two related benefits obtained from this: first, it is now reasonably inex-
pensive to provide the replicated processors needed for fault tolerant

computing. Fault tolerant computing is a well-established art long in use by
the military and aerospace sectors for missions of critical importance. Today
one emerging mission of critical importance is providing users of online
information services with uninterruptable access and processing. In large
multi-user transaction-based systems the lost labor costs of idled employees
combined with the lost opportunity costs of suspended business operations
resulting from a single hour of outage can be of major magnitude. Fault
tolerance now makes economic sense in computer design and will soon become a
necessity in all online operations. Several new companies have been formed
and are now forming to exploit this high-opportunity match of sense and
necessity, and we may reasonably expect such machines to become the norm
rather than the exception. There is a related trend worth watching: while we
have been waiting for fault tolerance to become cost feasible, conventional
uniprocessors have become increasingly more reliable, which at first glance
would seem to lessen the originally expected impact of fault tolerance. Not
so, however, since the modular parallel processing now present in a large
proportion of the newer fault tolerant machines also provides for the graceful
and gradual modular growth of computer capacity, as needed, in an installation
rather than the traditional traumatic switch every few years to a new machine
of significantly greater power.

DIGITAL TELEVISION

        Information delivery on conventional television, and text delivery
in particular, has suffered from the intrinsic low resolution of U.S. NTSC
(National Television System Committee) standard TV. Among other reasons, this
is a principal reason why none of the various forms of teletext and videotex
have had much success in the U.S. to date. Among the earliest improvements we
may expect is the limited introduction of digital television which will have
the effect of maximizing the quality of the received TV signal. While the
same standards of transmission will apply, it is the nature of digital com-
munications with proper encoding methods to enable the reception of a perfect
signal from a noisy or distortion-prone channel. In a very restricted sense,
some digital means, such as digital comb filters, are already being employed
in the most modern TV monitors and receivers, but this is not yet digital
transmission. One of the factors slowing the introduction of digital tele-
vision is the extremely wide bandwidth required; in the order of 115 MHz in
one proposed embodiment. This would be very feasible for direct broadcast
satellite (DBS) systems, but the introduction of these DBS systems has
received a serious setback with the recent withdrawal of the plans of CBS and
Western Union to establish such systems. But early commercial setbacks are
often the rule in new technologies, and do not alter the technological trend
lines.

HIGH DEFINITION TELEVISION

        The proposed standards of high definition television (HDTV) would
offer an image quality essentially equal to that of theater quality 35 mm
motion picture film, and would offer a very significant improvement in

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television-based information delivery systems. One of the major impediments to progress here, until very recently, has been the inability to make magnetic recordings of such programs because of the extremely high bandwidth involved. This inability has prevented commercial broadcasters from considering HDTV seriously because of their dependence on a high proportion of recorded vs. live programs. Recent progress in wideband recording techniques would indicate that this bottleneck will soon be eliminated. We may expect, therefore, that HDTV will become available in this decade.

CABLE TELEVISION

Cable television is a general purpose vehicle for information distribution to the home. One of the pioneers of the information industry, Richard Leghorn who was a founder of the Itek Corporation, and later of Cape Cod Cablevision, before moving on to other enterprises once made a most perceptive observation that "Cable is a 300 MHz publication." In this sense it is clear that the available bandwidth of cable TV is not limited to the one-way distribution of conventional television, despite its original name and purpose of "CATV" or Community Antenna Television. The increasing percentage of television households which either have, or could have, connection to regional cable systems makes cable a form of distribution utility awaiting more creative applications for the unused portions of its bandwidth. Teletext, videotex, service bureau information services, home security monitoring services, buying and banking services are merely the more obvious candidates which have had some use on cable. The unused bandwidth available in most cable systems offers a creative challenge for new forms of electronic information delivery.

INFORMATION ANALYSIS FIRMS

The greater volume of data available increases the difficulty of understanding its meaning and import, with the consequent need for both machine analysis (in such forms as "expert systems") and for deliberative human analysis. The earliest commercial firms specializing in information analysis were those in marketing research, economic analysis, security and commodity analysis, and of course the ever popular analysis of sporting events. All of these activities now include a strong component of forecasting, in many cases including the use of complex mathematical models. As the events of the world speed up, retrospective analysis must invariably be replaced by prospective analysis, and this need generates new opportunities for information systems which can go beyond historical facts and the latest news and progress to futures.

OTHER AREAS HAVING IMPACT ON INFORMATION DELIVERY

There are other areas of technology too numerous and complex to describe at length here which will have telling impacts on the information delivery systems of the future. Three areas must be highlighted, however.

The first of these is that of inexpensive replicable digital storage devices for data base distribution. Digitally encoded analog videodiscs are one embodiment, such as those of LaserData and Reference Technology. Replicable digital optical disks, such as the Compact Disk Read Only Memory (CD ROM) soon to be available from Sony, are likely to have even greater application.

The second area is that of Image Automation, which now appears as the emerging "third wave" in computing. We started with numbers, advanced to text processing, and are now starting in Image Automation: the entry, storage, processing, retrieval, and display of pictorial data. Much work is needed here as we are still at a primitive level of development, but the trend lines are unmistakeable.

The third and last area is that of Fifth Generation Computing. In the Japanese plan this will be composed of two separate developments which will be later merged: the knowledge-based computer which would have a system of knowledge representation within a relational framework for retrieval; and the inference computer which would be able to operate upon knowledge and extract inferential information. The combination of these two would provide a truly "expert system." While the stated goals are extremely ambitious for achievement in this decade, it should be recognized that even partial success would change the nature of information systems as we know them.

CONCLUSION

We have briefly pointed to some of the more important vectors of change which are currently converging on information systems in general and on information delivery systems in particular. This new technological environment offers a shifting but rich mosaic of elements with which to build the information delivery systems of the near future.

COMPUTER-AIDED DATABASE SEARCHING

An Informal Review

and

Trend Analysis

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Presented at:

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Network Advisory Committee

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It is a peculiar kind of pleasure to start a speech by admitting that the very title you have chosen is inaccurate and misleading; I guess it's a way of beating anyone else to the criticism. The context of this paper and this morning's panel is very largely that of online searching - and of course all online searching is already computer-aided because it is computer-based. However, it is fair to observe that most of that computer aid has been in support of functions and skills only known to the professional librarian - and in fact to a minority of librarians.

Online searching, as you can observe by scanning the periodicals now devoted to the subject, has become something of a new religion in librarianship, probably providing a more current replacement for cataloging and classification. The search for the holy grail of a perfect search using the perfect system and employing the perfect database occupies both waking and sleeping hours of some librarians.

At the same time, we must recognize that the great majority of public and academic libraries do not have staff trained in the use of online reference systems, yet they are about to undergo a tremendous upheaval in public reference based on those online search technologies developed by Dialog and other systems. This is the very rapid development of local public access systems, which began a few years ago with limited access to circulation systems, has now encompassed online catalogs, and is beginning to integrate the two. For a detailed discussion of these issues, I recommend papers in a conference proceedings entitled Online Catalogs, Online Reference: Converging Trends, which was edited by Brian Aveney and myself and is being published by ALA.

The title of this session - "Library/Library User Interface" -- provides the focus which brings a different meaning to an analysis of computer-aided searching. This is the end user, the patron, the customer, the untrained searcher: a member of the general public, the academic environment, or the corporate organization. It is this direct user of information, who may be perfectly ignorant of the library and the skills of its staff, who is being approached by the new generation of computer aids.

I am going to discuss where this "user interface" is today; what types of search aids are being offered and developed; the mix of locations and computers on which these aids are provided; and make some observations regarding likely future directions.

1. TODAY'S ENVIRONMENT: DIALOG AND MELVYL

In the context of this brief session, my observations are basically going to be limited to the library bibliographic environment, although we should all be increasingly aware of the kinds of non-library information services Fran Spigai has discussed. I am going to do further violence to the complexity of the real world by using two systems with which I am particularly familar as exemplars of the two major types of systems: Dialog of the online reference services, and Melvyl (from the University of California) of online public access catalogs.

What we have today is a parallel but interestingly unbalanced stage of development in these two types of systems. Dialog has considerably greater size (number of databases, bibliographic records, and overall users) and experience with online searching; but Melvyl has a design oriented much more to the direct user.

Both systems, however, deal with the elements of bibliographic records, definitions of those elements, and their display in relatively familiar ways. It is neither possible nor useful to review all the analyses of search and display on these systems and the other reference services and public catalogs; but I think it is fair to say that they proceed from assumptions of searching which are based in bibliographic tradition. It is also important to understand that most of these systems have come from a research tradition and orientation which considerably predates the online computer functions themselves: they support sophisticated, complex functions which enable the researcher to wring out every last bit of information from the databases with which they deal.

In Dialog, for instance, precision can be obtained in a wide variety of ways -- multiple forms of word truncation, variations of word and term proximity, and the like. In Melvyl, information is provided the searcher about the location of materials on all nine University of California campuses, a particularly large and farflung collection of exceptionally wide diversity.

Another important element is the extremely large size of these databases and systems. The public catalogs and circulation systems are dealing with database sizes not practical only a few years ago; Melvyl is working up to 1.5 million catalog records, and circulation systems with millions of copy-holdings records are becoming operational if not yet commonplace. The reference systems dwarf these local

databases, though; Dialog alone is edging up toward a total record count over two hundred million, and the publisher of Information Today estimated in the March 1984 issue that the industry "...will soon hit 2,000 publicly available databases." One major impact of this size growth is that problems of plenty -- massive `hits' from simple inquiries -- have replaced problems of scarcity -- finding anything at all.

To some extent, it is the very power and complexity of these systems which have led to the design and development of computer-based searching aids. An axiom among Dialog users is that "if you don't use it, you lose it" - regular searching in actual databases is necessary to keep effective skills which have themselves generally been learned in multiple classroom instruction sessions. Melvyl librarians are increasingly recognizing a need for retraining of public users, because the search skills do not remain in the individual's memory from session to session. It was an in-house joke at Information Access that we really had to develop Search Helper so the management staff could use our own databases. It has become necessary to focus the power of the computer on training, education, and evaluation rather than on the sheer technology of information retrieval.

What we can discuss as direct user aids today is only a fragmented response to needs and problems but dimly perceived. Our search systems have been growing so fast that design efforts have largely been dedicated to providing effective daily operation of retrieval functions which were largely developed in the early 1970's. Our librarians have been so busy absorbing the power of interactive retrieval, training ourselves and our staffs, that we have not been able to make the jump to the needs of the direct, untrained user.

The computer revolution has run past us - or at least has provided a base of microcomputer power which, by all accounts, is somewhat short of things to do locally and is beginning to reach out to all kinds of information sources. Most of these are not represented by the organizations in NAC; for instance, only a few IIA members take an active interest in NAC or library network activities.

Many of these information services are dealing with simple questions -- stock prices, electronic mail queries, airline schedules -- where the type of direct user "interface" we are discussing is not necessary. But we can expect them to build on their base (according to the February 17, 1984 issue of IDP Report, some 675,000 passwords were counted as customers of the 27 largest database retrieval services) to provide more sophisticated user interfaces as needed.

2. TYPES OF COMPUTER-BASED SEARCH AIDS

There seem to be five main types of direct user aids which are appearing in one or more systems: housekeeping functions, directory or classification guides, tutorial or educational communication, linguistic or grammatical support, and analytic or expert systems.

Housekeeping Functions

A good deal of recordkeeping is involved in using many online search systems, particularly those accessing more than one database or file. Particularly with the microcomputer software packages, much of this housekeeping work is kept in the memory of the user's computer, or in the program disk. Telecommunications numbers -- often with multiple or alternate paths identified -- are the most common type of data. In addition, individual or multiple user passwords and access codes can be stored, although this may mean some lack of security if the media on which they are stored can be removed (as with floppy disks) and used by unauthorized individuals.

In addition, a variety of in-process work information can be captured and used to assist the user. A simple level of this involves easy or extended display of search arguments, often along with the ability to store a given search argument for use on related databases or repeated, periodic use on a single target database.

One of the more useful functions is the provision of microcomputer software which supports local organization and storage of search results after they are obtained. The BIOSIS BITS system, for instance, offers a micro program called **BioSuperfile**, which supports local management and publication of citations drawn from the BIOSIS Previews database.

Directory and Classification Guides

Although a distinction has been made between "menu" and "command" driven systems, in reality the command systems can make significant use of menus for guidance and the menu systems simply provide easier ways to execute specific computer retrieval commands.

In the Dialog/Melvyl context we are discussing here, the computer-aided enhancement of traditional searching is the use of menu systems to provide one or more guides to the

overall functions of the system. As a trivial example, in Search Helper the user selects from a menu one of five Information Access databases on which to perform a search.

A new micro-software product called **In-Search** provides the most ambitious example of this type of guidance. Basically, it provides an excellent graphic guide to the types of databases on Dialog and their various features, automating otherwise tedious and difficult lookup in several volumes of database descriptions.

Tutorial Communications

The most familiar example of this type of user aid is the "help" screen which is provided on user request (or in response to common types of searching errors) in Melvyl and other public catalogs. In effect, any type of computer instruction which responds to a user command can be considered a "help" instruction.

The sophistication and effectiveness of these tutorial aids varies greatly; some create more problems than they solve. The coded instructions dear to the hearts of system programmers are gradually being replaced by English-language words and commonly understood phrases. One of the most effective microcomputer 'front ends' I have seen is being developed for the University of Illinois, to provide common access to their LCS circulation system and their WLN public catalog; it was designed by a linguist on the Urbana faculty, and is described in the March 1984 issue of Information Technology and Libraries.

Most online systems have not moved to complete dependence on training via the computer screen; a variety of printed instruction aids supplement the online tutorials. This is partly a response to the cost of storing and communicating training information online, partly an attempt to reserve scarce terminals for actual searching, and partly a recognition of the difficulty to developing good computer-aided instruction modules. A good seminar on current practices in training users of online public catalogs was sponsored by the Council on Library Resources in San Antonio in early 1983; a proceedings volume is available.

With cheaper microcomputer intelligence, much of this tutorial material can be provided offline, and demonstration disks from the various microsoftware vendors are becoming the standard way to explore the power of the various retrieval systems without incurring the costs and problems associated with early training. This will become even more common as the public catalogs reach out beyond their buildings to remote users who will wish to avoid "online training" costs which would otherwise be associated with dial-up access.

Linguistic and Grammatical Support

Online searching combines two very different forms of information retrieval. Because most online databases were originally created in order to produce a book index or a card catalog -- what we at IAC call a linear publication -- they provide access for information retrieval primarily through creation of standardized lists of subject terms or subject thesauri. The power of online retrieval, though, allows the user to find desired words or terms anywhere they may appear in the description of the work, in an abstract of it, or in other annotations.

Therefore, in Dialog and Melvyl, we have two very different forms of language with which to deal: a formal cataloger's or indexer's set of terms, and the wide variety of general and special-purpose English.

Computer aids to handle these two languages and make their differences apparent are just beginning to appear in these types of systems. The problems are multiplied in Dialog by the wide variety of databases which exhibit an almost total lack of consistency in their formal retrieval languages; Melvyl, at least, deals with a relatively common cataloger's standard.

Some good examples of aids in the area of formal or informal languages are given in the description of the PaperChase system described in the New England Journal of Medicine, and distributed as one of the handouts for this meeting.

A simple example is that the system can locate the name of a journal through more than one language. The New England Journal of Medicine can be located by the terms NEJM, N.E.J.M., NEW ENGL JOUR MED, NEW ENGLAND JOURNAL, or NEW EN. The user then does not need to know the particular formal language to identify the item, or the formal grammar of punctuation and spaces.

A more significant example is that the system does not require the user to know the proper form of many subject terms where common variations have been recognized. The term "Systemic Lupus" is described to the system as a synonym for the MeSH term "Lupus Erythematosus, Systemic" and the direct user can use either one to obtain a successful search.

These public access systems have progressed further in the development of computer algorithms to bridge the intent of the direct user to the formal command language of the retrieval system. But none have yet provided a systematic analysis of the different languages used by the direct users

on the one hand and the indexing/cataloging databases on the other. This issue was addressed last year in the CLR institute and publication, Subject Access, particularly with regard to the relation of users' languages to the Library of Congress Subject Headings structure - but little has been done to provide a wide range of conversion languages.

Analytic or Expert Systems

This category is more important in prospect than in reality; very little has been done in developing expert systems for the general-purpose retrieval systems of the class of Dialog and Melvyl. This is, in part, because the topics these systems cover range over all of human knowledge, and in part because the development of such systems is extremely complex and requires skills from disciplines not traditionally connected with indexing, cataloging, and computer-based retrieval software systems.

The characteristics of an expert direct-user reference system would, at minimum, include the following capabilities:

* modification of future searches, based on results and evaluation of past searches;

* a set of different search rules based on the needs of different types of direct users;

* the ability to discriminate meanings of terms in formal or text language, based on the type of database and user search being performed; and,

* incorporation of value judgements, from peers and subject-area professionals, to aid the selection of relevant information.

The most interesting item in the handouts for this meeting was the announcement that ICRS Medical Science, a British publisher, is not only putting the fulltext of its journal articles online, but is providing "....a new facility [which]...will make it possible to add further information and comment to published papers in such a way that all comments can be directly linked to the original article and be obtained automatically in the course of online access". That is, within the limits allowed by the ICRS editors, you will be able not only to find the article, but to read related scathing remarks about its shortcomings.

Bringing evaluation as well as description to bibliographic systems really makes possible the provision of computer-based expert guidance in the use of the materials those systems reference.

3. NETWORKING OF COMPUTER SEARCH AIDS

Changing technology is supporting the development of much more sophisticated user aids, basically because the cost of local microcomputer processing, and of regional minicomputer systems, continues to drop as performance continues to increase. In fact, one major trend is that the microcomputer systems are taking the "online" user offline for an increasing number of search functions.

As with the functions of these aids, their location and configuration within the network environment varies widely. There are basically three types of configuration: micro, mini, and mainframe. And they vary from standalone software products to integral elements of major retrieval systems. A brief inventory illustrates the variety and highlights the many directions for development.

Microcomputer Search Aids

A good number of 'standalone' software products which provide a link between a microcomputer user and bibliographic databases have developed over the past three years. It is fair to observe that the first commercially available product was __Search Helper__, developed by Dick Kollin at Information Access in mid-1979; we market a considerably different version for the IBM PC, Apple, and other micros today. The initial __Search Helper__ is notable in this review because it was, and remains, the most limited in its ambitions, and provides something of a baseline for other software products. It is basically an offline search-builder, which provides a low-cost way to develop a search argument and then execute it, at low cost via a one-time online retrieval.

It is interesting that most of the successful micro-based search enhancers in the bibliographic area have been developed by database publishers, rather than by online services. Disclosure offers __MicroDisclosure__, which aids searching and downloads data for processing. The Institute for Scientific Information has developed __Sci-Mate__, which supports citation file management for scientists using its files. BIOSIS, as already mentioned, has developed __BITS__ and __BioSuperfile.__ Other publisher-based systems are in development.

The first independent search software is the __In-Search__ product already mentioned, which is the primary business of a new Silicon Valley startup named Menlo Corporation. It is, at present, entirely devoted to enhancing use of Dialog databases, but clearly can be expanded to other systems. As

with the provision of various information-related services by firms entirely outside the library community, it appears that the venture capital community sees a future in database access quite independent of the publisher or the online distributor. Other gateway-like services are coming into existence quite independent of the service providers; and with OCLC, RLIN, and WLN all employing the IBM PC (with various modifications) as their new terminals or workstations, we can expect the provision of independent software for our library networks as well.

Minicomputer Aids

One level removed from the individual microcomputer are the local systems, based on minicomputers such as DEC, Tandem, and the like, which are rapidly appearing in most major library systems to support circulation and related functions. These operating systems clearly can handle any of the user-aid functions provided at the micro level to assist database searching. And, to the extent they are now providing public catalog, or some portion of public catalog searching they are also capable of integrating those search aids in their software programs.

While not much applicati ..s software has yet been developed for these systems, they are likely to be the optimum location for networking aids between local searchers and local/remote databases. These systems have the computer power to provide substantial search assistance -- for instance, checking search terms against a spelling dictionary -- not yet feasible on microcomputers. Yet they share resources by employing already-dedicated lines rather than remote communications, and by providing search aid functions on existing terminals rather than dedicated or special equipment.

Mainframe Aids

As mentioned above, most of the online public catalogs provide some level of direct user aid, but the degree of development here has been limited by the economics of central database access: broadcast distribution from a central location of lengthy tutorial information costs system time and limits terminal access.

Here, the initial steps have been taken by the reference utilities, in the programs they have developed to provide off-hours access to databases generally used by professional librarians. Dialog and BRS have almost simultaneously developed **Knowledge Index** and **BRS After Dark** respectively. Aside from off-hours pricing, the main features of these services are the inclusion of significant tutorial functions

aimed at making it possible to use the systems without any
on-site or in-person training.

4. FUTURE SEARCH AID PROSPECTS

Returning to the early classification of search aids --
housekeeping, directory, tutorial, linguistic, and expert --
we can see directions, if not specific developments, in each
of these areas. It appears, in general, that the great
period of machine-readable bibliographic database development
has now matured; the period 1960-1980 probably saw automation
of the great bulk of the catalog and index databases which
will be automated for general library use. What we are now
beginning is an era of automated reference - the intelligent
use of the computer to use these very large databases and the
complex systems which access them.

Housekeeping

We can expect, relatively soon, microcomputer programs
which will access not one publisher's files on one system,
but any of the files on dozens of systems. These programs
will handle logon, telecommunications, retention of standing
searches (SDI will return in the '80s), cost accounting and
user billing, and related tasks necessary to satisfy the
computers with which these systems will be dealing.

These programs will, additionally, manage the local
retention of citations retrieved, of fulltext delivered, and
of reports generated using the information on these systems.
We can already see this integration in some of the software
handling numeric data, notably that from Dow Jones. Local
bibliography programs will help not only academic
researchers, but financial analysts, publicity and promotion
departments, and many others who need reference to published
information.

A particular form of housekeeping will be the increased
standardization -- within but probably not beyond the
bibliographic utilities -- of definitions of the retrieval
functions performed by various systems, and therefore of the
control 'housekeeping' systems can have in using these
disparate systems. An ANSI Z39 subcommittee, chaired by
Charles Hildreth of OCLC, is presently studying these issues,
albeit under an unfortunate committee name of 'Command
Language for Interactive Search Systems'.

Directory and Classification

Proliferation of microcomputers at the local end of
bibliographic search systems -- Dialog and Melvyl -- will

result in increased use of directory and classification systems which are presented as "menu" control systems. Because such systems can be used by the direct patron at locations remote from the local catalog or database, and generally can be used a good proportion of the time offline, they can provide considerable savings compared to direct online usage.

It should be recognized that the largest portion of this savings is not in the telecommunications cost savings, but in the directly billed (Dialog) or implicitly budgeted (Melvyl) connect time charges. NEWSEARCH on Dialog, for instance, costs $ 120 per hour for a normal callup user, and Tymnet or associated charges are less than $ 10 per hour of this figure. Using Search Helper, however, a subscriber can execute a search (within that software's limits) for a flat fee of $ 2.50.

In the reference area, some bibliographic publishers look at these developments with concern, worrying about lost income from the normal callup rates. Others of us look at the very small proportion of library budgets (except for corporate and special libraries) being dedicated to online access, and assume we have an opportunity to increase overall use many times over if the individual use cost is low enough.

Classification systems offer a particular advantage for micro-based retrieval, and it would appear that classification analysis is likely to see a resurgence after a period of being out of fashion in information retrieval systems. Martha West gave a paper at Online '84 based on the work of the Language of Data project under the direction of Jim Dolby, which shows ways in which the more structured numeric and tablular data area offers lessons for future growth of classification in bibliographic systems.

Linguistic and Grammar Aids

We can expect most of the search systems to provide, relatively soon, the aids that secretaries now have on the better word processing systems: online dictionaries to check spelling, global changes of words or forms, and even real assistance with search grammar and syntax.

Versions of synonym dictionaries, organized by discipline and interest of the direct searcher, will help bridge the formal languages of our catalog and index databases. We may even allow direct-user formulation of such bridges for individual or peer-group use.

The analysis of meaning will be reserved for the development of real expert systems, which can be expected to lag the linguistic aids by five to ten years.

Analtytic or Expert Systems

As with topics discussed above, those aids that can be provided on a quantitative basis will come into usage well before those that require understanding of the cognitive process of the (online) searcher.

Public online catalog designers are already discussing how to use the transaction-log analyses they have in overwhelming quantity to identify good and bad search paths and strategies. Feedback is more and more being provided to cut down searches resulting in excessive hits, and to provide guidance in zero-hit situations.

As discussed above, despite concerns regarding privacy, it seems likely it will be worthwhile to develop different tutorial and search functions based on differing needs of the direct user -- the Ph. D. candidate, the undergraduate, the home or family user, and the like. Different strategies are likely to serve the needs of different groups better than one single, generally undirected, searching utility. Some of this type of custom design is already being provided by 'vertical industry' user-oriented online services beyond the library; Innerline for bankers and AgriStar for farmers are two of the pioneers in this area.

A homely form of an analytical or expert system is the "pathfinder" concept -- a selective guide to a small, defined, area of literature. The traditional pathfinder was a pamphlet-length selection of the better works, often at an introductory level, on a particular topic. The Science and Technology Division of the Library of Congress produces some excellent current examples.

These guides never made an impact on library reference work because they were difficult to prepare on a local basis and were not suitable for standard printed publication, although various loose-leaf guides of this type have been published over the years. The pathfinder guide is a natural candidate for electronic publication.

Much more complex systems will no doubt be tried and devloped, but many practical steps can be made for library and bibliographic retrieval if we merely assume a modest definition of an 'expert' system, and provide some natural rather than artificial intelligence.

CONCLUSION

Ten years from now, library sch 1 graduates will probably look back on our descriptions f "user interfaces" with present systems and marvel at the problems with which we were forced to deal; somewhat like drivers with automatic starters would look at the hand crank. It is most likely that large numbers of information direct users will use online catalog and reference systems who never opened an index or thumbed through a card drawer. In general, the computer will probably support a quality of dialogue with the user which is not approached at most library reference desks -- and it will certainly provide that conversation at distances and times not practical for personal reference.

It does appear, however, that the current infatuation with artificial intelligence and expert systems is unlikely to result in the removal of need for the skills of the reference librarian. We may, in the next ten years, produce easily used electronic systems in which the "user interface" is a help rather than a hinderance. But we are unlikely to foresee in all the answers to the information questions which come across any active public library reference desk in an average week.

It seems that the most complex challenge facing us will be the need to gain a better understanding of what the direct patron is doing when seeking information, but we will decreasingly have a skilled professional librarian to serve as the direct intermediary. In this regard, I cannot suggest better food for thought than two papers presented recently by William Paisley of Stanford University; both address the human elements of computer system interaction and the larger social issues they raise. The ALA "...Converging Trends" preconference proceedings contains the earlier paper, and the later, titled 'Rithms of the Future: Learning and Working in the Age of Algorithms is, I understand, to appear as part of the proceedings of an invitational conference sponsored by the California State Library which was itself titled "Libraries and the Information Economy of California", held in March of 1984.

I believe that what we will be doing in the next decade is creating a formal understanding of the reference process and -- in fragmented pieces -- automating the reference work which is the most professional part of librarianship. And this should in no way be taken as a reduction in the level of need for those skills; we will need all the knowledge we have as a profession to formalize what we have done for many decades intuitively.

SUMMARY OF BUSINESS SESSION

The business portion of the Network Advisory Committee meeting on April 18, 1984 began with a report on its membership. Mrs. Avram, the chairman of the Library of Congress Network Advisory Committee, reported for Ms. Bearman, the chairman of the membership committee, that no new applications for membership had been received. Mrs. Avram reminded everyone that alternates are designated for the duration of two years minimum and during that period there could be no substitutes.

The next topic on the agenda was an update by Mrs. Henderson from the Washington Office of the American Library Association on the results of the letter-writing campaign to the Congress, the Federal Communications Commission (FCC), and to AT&T itself, following the October 1983 Network Advisory Committee meeting on Telecommunications Systems--Industry Structure, Evolution, and Degree of Regulation. A grass-roots movement, called for by the representatives of NAC member organizations, formed the basis for strong support to a coalition to amend the proposed new tariffs. Monitoring of these very complex developments has been enhanced by the retention of a telecommunications consultant through a cooperative library effort. Initiated by ALA and the Association of Research Libraries, 24 library associations, bibliographic utilities and library networks pooled their resources and began operating on January 1, 1984 on a coalition to monitor telecommunications developments affecting library and educational data transmission. The ALA Washington Office serves as the operational base and liaison.

Ms. Marcum, from the Council on Library Resources, was the next speaker and reported that the Council on Library Resources issued "Document Delivery in the United States", a report by Information Systems Consultants, Inc., on methods libraries employ to obtain materials for their users. The report is designed to provide a 'snapshot' of current activities, and includes data on document suppliers, interlibrary loan systems, use of delivery options, and electronic document delivery. The study was commissioned under the Council's Information Delivery Services Program, in part as a response to the Network Advisory Committee's 1982 recommendations for a nationwide study of document delivery activities. The report is available from the Council on Library Resources, 1785 Massachusetts Ave., N.W., Washington, D.C. 20036 for $5.

Mr. Miele, representing the Chief Officers of State Library Agencies, reported on another study, "State and Commercial Bibliographic Activities and their Effect on the Bibliographic Utilities." The telephone survey-based study had been commissioned by the Network Advisory Committee and was also prepared by Information Systems Consultants, Inc. The study had been forwarded to each of the state library agencies at the end of August 1983 for

reviews and revision. At the request of the Chief Officers of State Library Agencies (COSLA), a short questionnaire was included requesting data on what funds were being used to produce COM catalogs or to pay for network participation on the part of the libraries in the state. Responses to the study were received from thirty-two state library agencies.

Mr. Jones, also from the Council on Library Resources, reported on the progress of various projects at the Council on Library Resources' Bibliographic Service Development Program (BSDP) during the preceding six months. His report included the progress in the development of standards and guides for manuscripts in electronic form. He also mentioned a report on retrospective conversion activities and prospects. The purpose of the report is to determine whether or not a national plan for retrospective conversion makes sense. He also reported on the Linked Systems Project (LSP) and stated that the protocol has been successfully tested up through layer five between the Library of Congress and the Research Libraries Group. (The Council on Library Resources' progress report and the Library of Congress' automation activities report were distributed before the meeting).

Mrs. Avram tabled the report on the "Public/Private Sector Interaction in Providing Information Services," the study commissioned by the National Commission on Libraries and Information Science, until the next Network Advisory Committee meeting in November. Ms. Bearman will report at that time. Mrs. Avram reminded all to look at the list of topics for future NAC meetings and let her know at the next meeting which topics are still of interest.

For the next Network Advisory Committee meeting, to be held on November 14-16, 1984, the chair selected a program planning subcommittee consisting of Barbara Robinson (chair), Lois Ann Colaianni, National Library of Medicine; Laima Mockus, NELINET; and Samuel Waters, National Agricultural Library; to present suggestions for the program. The topic selected was "The Information Economy in the U.S.: Its Effect on Libraries and Library Networks." The proliferation of electronic delivery systems presents specific challenges to libraries, focusing most immediately on the reallocation of the traditional budget distribution and on the need for finding new measures of productivity to evaluate the quality of service performed in a changed environment. The Network Advisory Committee will look at these challenges when it meets next November.

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No. 2   Dataflow Systems. A Glossary for Library Networking.
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No. 3   Buchinski, Edwin J. Initial Considerations for a Nationwide
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No. 4   Network Technical Architecture Group. Message Delivery System
for the National Library and Information Service Network:
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No. 5   Long, Philip L. Study of Message Text Formats: Bibliographic
Search Queries. (Washington, Library of Congress, 1979). 28 p.

No. 6   Vondran, Raymond F., 1946 - National Union Catalog Experience:
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