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ABSTRACT

This festschrift contains 17 papers on the impact of CD-ROM technology: (1) "CD-ROM and Access to Information in the South" (Abdelaziz Abid); (2) "CD-ROM and Bridging of Cultural and Technological Gaps in Developing Countries" (Shmuel Sever); (3) "Electronic Publishing Developments and Opportunities from OCLC" (Janet Mitchell); (4) "Science Citation Index Print and CD--The Best of Both Worlds from ISI" (Heather Taylor); (5) "The Forgiving Building Revisited" (Anders C. Dahlgrer); (6) "How Will CD-ROM Affect the Cooperation within Library Networks?" (Hans-Albrecht Koch); (7) "Beyond Online? Interactive Public Access to Library Files via CD-ROM" (Heiner Schnelling); (8) "Electronic Library? The Consequences of Micros on Data Processing Systems in Libraries in the Age of CD-ROM" (Karl Wilhelm Neubauer); (9) "The Impact of CD-ROM on Library Operations: To Buy or To Make--One Library's Experience Producing a Catalogue on CD-ROM" (Ellen M. Pearson); (10) "ADONIS--The Strategic Needs of Publishers" (David J. Brown); (11) "ADONIS--From Myth to Reality" (J. Andrew Braid); (12) "The ADONIS-Project: First Experiences in the Central Library of Medicine, Cologne" (Ulrich Korwitz); (13) "The Future of CD-ROMs for Full Text of Journals" (Maurice B. Line); (14) "Dutch Reference Databases (NRB)" (J. Martin Feijen); (15) "The Deutsche Bibliographie and CD-ROM" (Kurt Nowak); (16) "CD-ROM for National Bibliographies: A European Project" (Robert L. Smith); and (17) "Two Major British Catalogues on CD-ROM" (Sir Charles Chadwyck-Healey). The seminar agenda, a list of participants, and a list of participating vendors preface the collection. (KRN)

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The Impact of CD-ROM on Library Operations and Universal Availability of Information

11th International Essen Symposium
26 September - 29 September 1988

Festschrift in honour of
Dr. Maurice B. Line

Edited by

Ahmed H. Helal
Joachim W. Weiss

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Essen University Library

THE IMPACT OF CD-ROM ON LIBRARY OPERATIONS AND UNIVERSAL AVAILABILITY OF INFORMATION

26 September - 29 September
1988

Preface

More than 100 librarians from 15 countries attended the 11th International Essen Symposium 1988 during the period from 26 September to 29 September 1988 which was devoted and dedicated to MAURICE B. LINE, one of the promoters of the British Libraries, a colleague of exceptional and outstanding flow of ideas. The endless flow of papers, lectures, and active participation in meetings with valuable contributions, judgment and penetrating vision bring unusual realism into discussions with practical approach goals. MAURICE B. LINE's activities covered a very broad field of topics ranging from library cooperation, user education, conservation for use, studies of new media, library technology and automation, interlending, universal availability of publications, etc.

MAURICE B. LINE is a world renowned librarian whose books, papers, and ideas greatly influenced library services and library science. In addition to British librarianship, librarians all over the world are fortunate in having M. B. LINE for his ideas which are in advance of their time. He is the first librarian to point out the weakness of libraries - not to avoid taking risks. M. B. LINE is of a transglobal reputation, great and an eminent practitioner.

This is the reason for the choice of the topic of the 11th International Essen Symposium 1988: "The Impact of CD-ROM on Library

Operations and Universal Availability of Information" and devote it to MAURICE B. LINE.

The papers presented describe some of the many systems and dynamic topics which are either already operational or now being developed and tested. They discuss various areas and applications, some of them traditional such as CD-catalogues and some of them innovative such as ADONIS.

The rapid developments in computer technology and increasing availability of software packages and support services show that it is impossible for any library to stop the development and equip itself with facilities of long-standing value to its operations. Optical storage technology using laser readers/writers, "CD-ROM and WORM" offer dynamic opportunities for enhancing our traditional role of providing access to information which are not limited by traditional linear indexing.

CD-ROM, or Compact Disc Read Only Memory, is a compact disc containing up to a quarter of a million manuscript pages of permanent, digitally encoded information which can be accessed rapidly by a CD-reader. The advent of CD-ROM revolution has greatly enhanced the advantages to be gained from computerization in library operations. CD-ROM have in fact a profound impact on librarianship and have shaped both library user services and operations.

It is one of the wonders of information storage media available to libraries to store, manipulate and/or reproduction of library materials. Librarians are talking about the CD-ROM myths or the "New Papyrus" with the unlimited present and future potentialities.

The entire industry is shifting from online access to optical disc technology. Indications are to be found in libraries by the increase of number of installed microcomputer equipments that can be used for online access to databases and the rapidly increase of CD-ROM products. However, it is not a matter of comparison of CD-ROM with mainframe data storage available through databases.

The appropriate use and applications of CD-ROM and optical media as new tools for library operations and availability of information are still at the beginning and will require time for an intensive and wide implementation. One important effect of the introduction and use of CD-ROM, however, is that the technological infrastructure needed in a library - appropriate hardware and software - to support its operations will be completely different than it was 10 or 20 years ago.

The development of CD-ROM technology will aid and facilitate to publishers, libraries and patrons to interact with each other giving the end user local access and avoiding excessive and expensive telecommunication costs. CD-ROM will expand the range and raise the quality of library operations and services. It will promote and open new dimensions of new products and processes.

CD-ROM will not only accelerate the communication revolution but also expose the range of services offered and its quality. The CD-technology will effect us all in the north as well as in the south and will be a gradual substitution of print on paper or microfiche. Accordingly, as the installed number of CD-ROM equipments grows, online vendors and database producers will offer more databases in the CD-ROM format. This is a new issue to help libraries to justify the costs of online services via CD-ROM and the costs of equipments.

CD-ROM provides libraries with cost-effective alternatives to both print and online materials. While in the 1970s, online services enabled the libraries to access remote databases, now in the 1980s the CD-ROM brings the databases themselves into the library.

Standards for the basic CD-ROM hardware and software needed to operate the CD-ROM drive and to extract the information from the CD-ROM disc are adopted by the International Standards Organization - ISO - and labeled it ISO 9660. These standards should allow CD-ROMs to operate on all CD-ROM drives. However, there is still a lack of a standard search language.

Comparing CD-ROM with print and online shows that the substantial

investment for CD-ROM, which stands between online and printed information, is much less as the per-use cost decreases with each use. In addition, there are other advantages to be considered when comparing CD-ROM with print and online media such as ease of searching, compactness of CDs, unlimited access, non-cost browsing, durability, etc.

The environment of CD-ROM is attractive because users of CD-ROM pay no separate search fees, connect-time charges, full-text and source files. However, this is only attractive if the pay-as-you-search-fees for online access to databases is more economical and attractive than subscription to the CD-ROM subscription. The pricing structure merits very careful attention.

The costs for implementing CD-ROM to meet the current demands and trends in terms of the services we provide to our clients is not a risky investment. It is an additional base of services and access to the world of information. Changes in balance between online access to optical disc access is attractive for libraries with more limited funding and smaller information needs or if online database services would only offer those data not yet published on CD-ROM and those between the supplements, i.e. which appear between the CD-ROM issues.

Special offer or "SALE" of both online access to database files and access to the CD-ROM data for one and the same costs just to encourage the growth by marketing computer hardware packages with their optical disc products may have favourable effects. This is only right for neglected and less used information services and their databases or on already existing online user base group.

Very huge union catalogues, national bibliographies, one library catalogues, specific databases, reference books, directories, dictionaries and encyclopedias, etc. are already existing on CD-ROMs and available as a type of physical artifact. However, there are three main areas in which the CD-ROMs developments would concentrate; bibliographic utilities (union catalogues of cooperative systems), local library catalogues and SDI services. CD-ROM bibliographic databases are already in use to support cataloguing, acquisition and interlibrary loans. In other words, the CD-

ROM usefulness and limitations in library operations context and as current facilities is to be found in the sense of catalogues and finding aids. This is due to the fact that CD-ROMs are suitable to generate a greater and more useful variety of catalogues, indexes and research tools.

There is a clear consens among publishers that CD-ROM will develop over the next years as a powerful and standard electronic medium for information delivery. In addition, the online vendors will offer access to their databases - if not yet on CD-ROM - at greatly reduced rates.

In the 1980s, electronic publishing has emerged as a major new technology. An ambitious publishing application of optical disc computer memory, CD-ROM, the called ADONIS, was launched February 1988 with the aim to improve the speed and quality of document delivery at lower costs. The data collected during the 2 year trial will be of importance to publishers and librarians.

The CD-ROM marketability of publications depends largely, in the future, on "Jukebox" players that can handle several CD-ROMs, LAN-CD-ROM, and network of CD-ROM workstations. Lucky enough, CD-ROM access can now be provided over local-area-network. This means that CD-Net and CD-Server can allow an unlimited number of CD-drives to be mounted on a LAN.

The outcomings of the symposium underline the importance of computer technology which increases productivity, availability of resources and increase in-depth services. Libraries should and must be run economically to provide the utmost and best service possible within the today limited financial resources.

Thanks to all speakers and participants who made the symposium as in the last ten years a great success, giving it the international reputation and honouring our distinguished colleague DR. M. B. LINE.

Essen, November 1988

A. H. Helal
J. W. Weiss

11th International
Essen Symposium 1988
Essen University Library

THE IMPACT OF CD-ROM ON LIBRARY OPERATIONS AND UNIVERSAL AVAILABILITY OF INFORMATION

26 September - 29 September
1988

Agenda

Monday, 26 September

9.30	Registration
10.15	Online presentation
14.00	Product Reviews
15.00	Opening of Symposium **Ahmed Helmi Helal**
CHAIRMAN:	**Ahmed Helmi Helal**
15.15	CD-ROM AND ACCESS TO INFORMATION IN THE SOUTH **Abdelaziz Abid**
15.45	CD-ROM AND BRIDGING OF CULTURAL AND TECHNOLOGICAL GAPS IN DEVELOPING COUNTRIES **Shmuel Sever**
16.15	Discussion Coffee
16.45	Online presentation
19.00	Reception

Tuesday, 27 September

CHAIRMAN:	**Genevieve Clavel-Merrin**
9.30	ELECTRONIC PUBLISHING DEVELOPMENTS AND OPPORTUNITIES FROM OCLC **Janet Mitchell**
10.00	SCIENCE CITATION INDEX PRINT AND CD - THE BEST OF BOTH WORLDS FROM I.S.I. **Heather Taylor**
10.30	Discussion Coffee
11.15	THE FORGIVING BUILDING: DESIGN NOTES FOR THE HIGH-TECH LIBRARY **Anders C.Dahlgren**
12.00	Discussion
12.30	Lunch Break
CHAIRMAN:	**Ronald Schmidt**
14.00	HOW WILL CD-ROM AFFECT THE COOPERATION WITHIN LIBRARY NETWORKS? **Hans-Albrecht Koch**
14.30	BEYOND ONLINE? INTERACTIVE PUBLIC ACCESS TO LIBRARY FILES VIA CD-ROM **Heiner Schnelling**
15.00	Discussion Coffee
15.30	CD-ROM AND NETWORKING: CD-ROM CATALOGUE IN A PC-NETWORK **Karl Wilhelm Neubauer**

16.00	ONE LIBRARY'S CD-ROM EXPERIENCES - MAKE OR BUY **Ellen Pearson**
16.30	Discussion Coffee
19.00	Reception

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CHAIRMAN:	**Joachim-Felix Leonhard**
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10.00	ADONIS **J. Andrew BRAID**
10.30	Discussion Coffee
11.00	THE ADONIS PROJECT: FIRST EXPERIENCES IN THE MEDICAL CENTRAL LIBRARY, COLOGNE **Ulrich Korwitz**
11.30	ADONIS **Maurice B. Line**
12.00 12.15	Discussion Lunch Break
CHAIRMAN:	**Klaus-Dieter Lehmann**
13.30	THE PICA PILOT PROJECT: DUTCH REFERENCE FILES ON CD-ROM **J. Martin Feijen**

14.00	THE GERMAN LIBRARY AND CD-ROM **Kurt Nowak**
14.30	Discussion Coffee
15.15	CD-ROM FOR NATIONAL BIBLIOGRAPHIES: A EUROPEAN PROJECT **Robert L. Smith**
15.45	TWO MAJOR BRITISH CATALOGUES ON CD-ROM **Sir Charles Chadwyck-Healey**
16.15	Discussion Coffee
19.00	Reception

Thursday, 29 September

9.30	OPEN FORUM FOR VENDORS
11.00	Discussion Coffee
11.30	SUMMING UP **David Buckle**
12.00	CLOSE OF SYMPOSIUM

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CD-ROM AND ACCESS TO INFORMATION IN THE SOUTH

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CD-ROM AND ACCESS TO INFORMATION IN THE SOUTH

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Abstract

The need for access to appropriate scientific and technological information to support national development is widely accepted. The enormous difficulties faced by many developing countries in the procurement and use of relevant literature are also well documented.

To which extent could CD-ROM contribute to alleviating this situation? CD-ROM disks could be utilized in several ways in the developing countries.

The paper discusses the potential and limitations of using CD-ROM in developing countries, its relevance to the objectives of UNESCO's General Information Programme and the aspects which appear to hold specific interest to the Programme, and reviews current activities and possible future co-operative projects.

CD-ROM AND ACCESS TO INFORMATION IN THE SOUTH

Effective handling, exchange and use of information and data are increasingly seen as key factors in development since they help ensure the availability and application of existing knowledge. The Unesco General Information Programme (PGI) is responsible for carrying out the Organization's activities under Major Programme VII on "Information Systems and Access to Knowledge" by promoting the development and use of libraries, archives, documentation centres and specialized information systems and services with particular reference to scientific and technological information. PGI includes development of the UNISIST framework of standards, methods and techniques for handling information which aims at ensuring the compatibility of information systems at both the national and international levels.

It should be stressed that PGI, as Unesco's programme to assist Member States and international organizations in the development of information systems and services, is distinct from Unesco's own library and information services although both are administered within the Organization's Office of Information Programmes and Services. Another related activity within this office is the dissemination of the CDS/ISIS software developed by Unesco for bibliographic and other textual databases, which has been widely distributed free of charge to institutions in Member States for use on main-frame and mini/micro-computers including PC's.

A fourth and last library and information component of this Office is the Division of Operational Activities, dealing with projects in the field under Unesco's Participation Programme or funded by extrabudgetary resources.

PGI's objectives include the application of compatible, standardized techniques in information work at the national and international levels, with emphases on the construction and use of databases and the promotion of regional and international information networks, and the development of

effective information policies, infrastructures and education/training facilities for both information specialists and users. Its modes of action include the preparation and dissemination of guide-lines and other documentation on the conduct of information work, the provision of advisory services, the organization of training activities and international consultations, and the sponsorship of pilot projects designed to demonstrate and transfer experience on the application of modern and innovative information-handling techniques for development. Emphasis is placed on improving the use of information through better evaluation, presentation and dissemination, and on the appropriate utilization of modern information technologies.

The enormous difficulties faced by many developing countries in the procurement and use of relevant literature are well documented.

The obstacles in the way of the development of information infrastructures in the developing countries are many; illiteracy and insufficient use by decision-makers of existing information systems create a vicious circle. As decision-makers do not use the information systems, they do not give priority to these systems, and do not, therefore, give them the support needed to make them effective. The operating budgets of information services are consequently insufficient and the portion set aside for the acquisition of sources of information - if any - is derisory. Qualified staff are very few in number. Equipment is scarce, obsolete and badly maintained. The use of microcomputers has only just begun, very often in the framework of projects supported by bilateral or international development agencies. Moreover, development agencies are reluctant to fund any activity that has recurrent costs which cannot quickly be taken over by beneficiary institutions, such as periodicals and database subscriptions. A further difficulty is that the sources of information useful to decision-makers, researchers and the general public are to a large extent produced and stored abroad; specific obstacles related to telecommunications, exchange regulations, linguistic barriers, etc. badly limit the access to foreign publications and remote databases.

CD-ROM has been the main theme of many international conferences like this one during the last few years. Considerable interest has been shown in

the information profession in the potential of using CD-ROM technology in developing countries.

In a paper presented at the FID Conference held in Helsinki a few weeks ago, Jane Kinney discusses the potential role of CD-ROM in information delivery in the least developed areas which she designates as information isolated areas (1). Geographic location may be a determinant of the cost of acquiring equipment and materials for library and information work, as well as of the degree of dependence upon telecommunications, for which an expensive infrastructure is required. Information isolation is also defined in terms of cultural, infrastructural, economic and political characteristics which make unsuitable the use of traditional information gathering and dissemination techniques. CD-ROM and the prerequisite microcomputer support are considered in this context as of high potential to overcome some of the constraints associated with information deprivation and isolation.
Information poor or isolated areas do not have sufficiently large markets to support the economies of scale required for efficient production and depend heavily on remote produced and stored information.

Beside the possibility of making available locally large bibliographic databases and giving users most advantages of on-line access without the disadvantages (2), one of the most obvious uses of CD-ROM is the replacement of large reference publications, such as directories, dictionaries, statistical year-books, encyclopedias, medical and legal reference books ...

The CD-ROM technology appears, therefore, as the new media for delivery of huge amounts of information. The advantages of CD-ROM beside its huge storage capacity are its durability, ease of use and its price. The hardware needed to read the disks is not really expensive. Its disadvantages are the inability to update the data on disk and the high cost of the disks, due mainly to the fact that the publishers have to protect their interests and market.

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(1) 44th FID Conference and Congress, Helsinki, August 28-September 1, 1988. Proceedings. Part 2, p. 305-315.
(2) Timeliness and multi-user access are still a problem.

Areas of interest to Unesco/PGI

Improving document availability and application of modern technology for this purpose have been reiterated in several of the international, regional and national seminars and conferences sponsored by Unesco, including PGI Consultative meetings in Asia, Africa and Latin America and the Caribbean, and on UAP.

Use of CD-ROM as a medium for transfer of large volumes of data and full texts of documents at a relatively low cost for use by researchers, engineers, technologists, managers, etc. in developing countries is considered from various angles in a few projects carried out by PGI.

The first objective of Unesco in this field is to promote awareness of the potential and limitations of CD-ROM in information handling, especially in developing countries.

For this purpose a state-of-the art review of CD-ROM technology, is just published by Unesco under the title Guide to CD-ROM. This document prepared by Anneli Heimbürger, Technical Research Centre of Finland, under contract with FID, reviews CD-ROM hardware, software and applications in library and information work. It is based on the literature published during the last three-four years, on information gained from international conferences and exhibitions. The potentials and limitations in using CD-ROM as substitute and compliment to on-line access to remote databases are highlighted. The guide includes appendices providing directories of CD-ROM drives, software packages, CD-ROM products, CD-ROM disk manufacturers and companies for data preparation, as well as information sources like journals, conferences and exhibitions. This guide is meant to be a practical source of information on CD-ROM hardware, software, services, products and related training opportunities. It is intended to be used by a broad spectrum of information professionals - librarians, archivists, record managers and end-users in developed as well as in developing countries. Copies are provided free of charge by PGI (PGI-88/WS/11).

A French version of the Guide is expected to be published by

December 1988.

Other objectives of Unesco are:

- To collect information and data on CD-ROM applications so as to be able to advise on various options and to examine the feasibility and viability of CD-ROM for enhancing accessibility to and availability of information and information sources in developing countries.

- To examine CD-ROM technology options for enhancing the flow, exchange and sharing of information between developing and developed countries on the one hand and among developing countries on the other, and to facilitate transfer of information and technology relating to CD-ROM through international cooperation.

The following examples are given to illustrate the action of PGI in this regard.

1. Using CD-ROM to make the International Bibliography of the Social Sciences more available in countries at different stages of development

It was decided that the International Committee for Social Science Information and Documentation (ICSSID) prepare, with a Unesco financial contribution, a test disk. This experimental database on CD-ROM has been created for assessing the viability of using CD-ROM work stations as nodes for the development of information networks in countries where direct access to remote international on-line databases is not feasible. The funds available allowed the production of a test disk in a limited number of copies, in order to have it tested on a few sites (about 10). The bibliographical data for the two years 1984-85 were converted to a suitable format on the computing centre used by ICSSID in Guelph, Ontario, and then transmitted to the manufacturer in France.

The aim of this experiment is not related with the technicalities of preparing and pre-mastering a compact disk, but with the uses which may be made of it. Every institution having received the disk is being asked to

use it for retrieval of bibliographic information, and to report on the conditions under which this use proved efficient or not (user-friendliness, response time, difficulties arising from the diversity of languages of the bibliographic records, deficiencies of the search software, etc.). The final assessement report will show to what extent the CD-ROM is an adequate medium for the dissemination of social science bibliographic information, to which type of countries or institutions it is more suited and how it may be improved.

2. Using micro CD-ISIS to operate CD-ROM databases

The mini-micro version of CDS-ISIS software package was developed by Unesco in 1985. This software package, originally developed for mainframe computers and made available free of charge to non-profit organizations in Unesco's Member States, is widely used all over the world, in particular in developing countries.

The micro CDS-ISIS software package was chosen by the American Health Organization (PAHO) as the text database management system for their CD-ROM Pilot Project (1).

PAHO acts in the region of the Americas through local offices and specialized centres such as the Latin American Health Sciences Information Centre, Bireme, located in Sao Paulo, Brazil. BIREME coordinates a network of libraries and documentation centres on public health, located in Latin American and Caribbean countries. The collected bibliographic records are stored in a database known as the Literatura Latinoamericana en Ciencias de la Salud, or LILACS.

Another PAHO centre, the Centro Panamericano de Ingenierìa Sanitaria y Ciencias del Ambiente, or CEPIS, in Lima, Perú, coordinates the development of REPIDISCA, a sanitary engineering database.

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(1) Claudio J. Brito. Pan American Health Organization CD-ROM Pilot Project, Washington, DC, August 1988, 4 p.

The BIREME and CEPIS networks have a membership of more than 700 institutions dealing with handling health information. The lack of reliable telecommunication links among the network members limit the effectiveness of their work.

A CD-ROM pilot project was, therefore, designed. CDS/ISIS was selected as the software system for several favourable reasons. It was already being used by both BIREME and CEPIS; it was made available to PAHO by Unesco at no charge; compatible versions were available for IBM mainframe computers, microcomputers, and personal computers, and Unesco was willing to participate with PAHO in developing a specialized version of CDS/ISIS incorporating changes to make CD-ROM databases operate efficiently.

About 500 disks were produced and distributed to approximately 150 sites in Latin America. About 100 of these sites received from PAHO a microcomputer or a CD-ROM reader; the remaining sites already had microcomputers and CD-ROM readers.

After this initial distribution, it is expected that libraries, universities, hospitals will finance additional equipment acquisitions on their own.

The first edition of PAHO CD-ROM released in August 1988 contains, besides LILACS and REPIDISCA, DOCPAL, which is a database developed by UNECLAC, the Unesco database containing records from 1972 to date, a subset of AGRIS database etc.

A similar project is being considered within the framework of a cooperative regional information network, set up with the assistance of Unesco, that is the Asian Pacific Information Network on Medicinal and Aromatic Plants (APINMAP). Each national node in the eleven participating countries builds its own bibliographic and referal database under mini-micro CDS-ISIS, national inputs are then provided to the Network's technical centre, which is the Agricultural Information Bank for Asia (AIBA) in Los Banos (Philippines). AIBA is responsible for integrating national inputs though elimination of duplicate entries, harmonization of the indexing, etc. and for producing a common database. The first release is foreseen by February

1989. The fully integrated database will then be provided to all national nodes, as they are responsible for user information and related services at the national level. The first integrated bibliographic and referal database will be provided to national nodes on floppy discs. The APINMAP Management Board intends however to examine the possibility to produce the integrated database on CD-ROM, as from 1990.

Unesco will certainly consider favourably supporting this project. The approach seems sensible and cost-effective within cooperative shared information systems, giving to each of the partners, while providing national input, the possibility of operating locally the totality of the common database.

3. Training activities

PGI organizes in co-operation with other institutions workshops and training courses on use of information technologies for information work , on software packages, in particular CDS/ISIS and on-line information retrieval, and publishes guide-lines and teaching materials on related topics.

The increasing popularity of mini-micro CDS/ISIS software package has contributed in no small measure towards the computerization of library and information services in many institutions in developing countries. The short-term training courses and workshops have significantly broadened the qualified human resource base in many countries to the extent that basic training requirements can now be handled by local personnel.

The Guidelines for teachers of on-line information retrieval (1), just published, is an example of PGI documents in the field of education and training in information technology. This document is directed at teachers and others who are involved in the planning and implementation of education and training programmes wholly or partly devoted to on-line

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(1) F.E. Wood. Guidelines for teachers of on-line information retrieval. Paris. Unesco. 1988. 81 p (PGI-88/WS/7).

information retrieval, whether in-house or remote. On-line information retrieval is considered very broadly so that it includes the retrieval of information from all types of on-line service, bibliographic and non-bibliographic. Database creation and electronic publishing are also considered in this document.

Two other PGI documents in this area may be mentioned:

- The Guidelines on curriculum development in information technology for librarians, documentalists and archivists, prepared by Michael Cook. (PGI-86/WS/26)

- and A Modular curriculum in information studies, prepared by J.A. Large. (PGI-87/WS/5)

Final remarks - Proposed collaborative activities

Areas of short term and long term interest for PGI for co-operative work in information handling using CD-ROM technology may include the following:

1. Promoting awareness of the potential and limitation of CD-ROM in information handling through publications, workshops, seminars, demonstrations, training courses, etc.

2. Production, distribution and use of core source-materials in science and technology on CD-ROM for school and university libraries in developing countries.

3. Production, distribution and use of basic source materials on CD-ROM in specialized fields of current interest in developing countries, such as biotechnology, renewable energy, environment and low cost housing.

4. Production, distribution and use of information location tools, such as directories, catalogues, union catalogues and inventories.

5. Use of CD-ROM in document back-up and document delivery in association or in comparison to other technologies such as postal services, facsimile, satellite communication systems.

6. Preservation of and providing access to archival records of all kinds on CD-ROM.

7. Preparation of curriculum and training of information personnel in the use of CD-ROM and in converting and producing databases on CD-ROM.

CD-ROM AND BRIDGING OF CULTURAL AND TECHNOLOGICAL GAPS IN DEVELOPING COUNTRIES

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CD-ROM AND BRIDGING OF CULTURAL AND TECHNOLOGICAL GAPS IN DEVELOPING COUNTRIES

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Abstract

The exiting possibilities opened up by recent developments in information technology apply at present to only about a quarter of the world's population. Developing countries do not have ready access to relevant information, sometimes even that produced within their own borders. The CD-ROM medium can be a practical, short-term alternative for improved, and cheaper, information supply, and increased information self-sufficiency in developing countries. There is an urgent need for a neutral international organization, such as UNESCO, to undertake projects to implement the use of CD-ROM technology to close the information gap. Possible applications for educational and technological development are suggested in the following areas:

1) bibliographic support,
2) document delivery,
3) surrogate libraries, and
4) literacy campaigns.

CD-ROM AND BRIDGING OF CULTURAL AND TECHNOLOGICAL GAPS IN DEVELOPING COUNTRIES

THE INFORMATION GAP IN DEVELOPING COUNTRIES

The rapid progression of Western nations into the Information Age, with the aid of advanced technology, has served to highlight the problems facing developing nations in their perpetual struggle to catch up to developed countries. In the first place, developing nations do not have ready access to relevant information; sometimes even that produced within their own borders.

Secondly, when transfer of information does occur, it is most frequently in the North-South direction, that is, from industrialized countries to developing countries (Van Hartevelt, 1987). In addition, about one third of the world's population is still illiterate. While economic development is possible up to a point, without a concomitant high degree of literacy in the population, no society with a high rate of illiteracy can aspire to the status of a developed country, even when it has the economic resources needed for massive purchase of technology and consumer goods (Sever, 1983).

For our purposes, literacy must be redefined to fit modern times; simple skills of reading and writing are not sufficient any more. Literacy in the mother tongue is the main vehicle for concept acquisition, but literacy in our world means also:

1. visual literacy, especially the ability understand and use different forms of mass media (film, television, videotape)

2. basic technological and scientific literacy, without which it is impossible to grasp the complexities of today's world

The author wishes to thank Cecilia Harel for her editorial assistance in the preparation of this paper.

3. in small and developing countries, bilingualism (Sever, 1983).

Each of these three points requires amplification.

The novelty which complicates the acquisition of visual literacy today is the wide dispersion of visual images beyond their place of origin - televised scenes of men walking on the moon and of war in Vietnam are extreme but instructive examples of this new form. As a result of far-flung visual imagery, people are brought face-to-face with cultures they had never reckoned with before. We come from societies that take the medium of film for granted; we learned to assimilate unfamiliar images as part of our formal or informal education. Elsewhere in the world, that understanding is acquired more slowly and with greater difficulty.

The increasingly technical character of the world means that one can remain totally illiterate of scientific and technological matters only by retiring to a cave. Science has come to form the basis of the contemporary world-view, and developing countries cannot help but be influenced by science in its theoretical and practical forms. Thus, the benefits of modern technology are today keenly desired by leaders and citizens of the developing lands. But much of that technology is often too expensive, or its adoption demands a greater resource and personnel base than is available.

Developing nations are hampered by an inadequate telecommunications infra-structure to get hold of the abundance of computerized information available today. As summarized by Van Hartevelt, the relatively few tropical countries that do have access to online information, are in Latin America, where online use of databases is in its second decade. In the developing countries in Asia, the general online situation is developing very slowly. Even a country such as India, which has achieved remarkable advances in economic development recently, is not connected to any international telecommunications network (Van Hartevelt, 1987, p.163). In my own country of Israel, where more than fifty different databases have been developed locally (Directory..., 1986), relatively poor telecommunications support among other reasons, has slowed the development of a national network and impeded access to our own information resources (Harel,

1984). In China the use of online information is still in its first decade, and in Africa, at present hardly any country is connected to any data network (Van Hartevelt, 1987, p.163).

Many developing nations have unsophisticated or underdeveloped library systems, and are thus deprived of another instrumental vehicle for assisting the development process. In the United States and the Soviet Union libraries have historically served as tools of social change and disseminators of literacy. Today, the library's potential as a partner in the development process, is strengthened by the on-going application of technology, which decentralizes information and makes it more accessible. Line says that electronic technology has made nonsense of the "holdings versus access" debate since digitized text can be transmitted easily over any distance (Line, 1986, p.108). But is it?

Bilingualism is a necessary criterion of literacy in developing countries. The scientists, engineers, planners, educators and other "prime movers" and gatekeepers of developing countries need access to the current knowledge in their respective fields, as gathered in journals and other publications. Inability to read these source materials in the original language, usually English, requires a dependence on abstracting and translating services to deliver the information in a form suitable for local use. Such services, beside being prohibitively expensive for small countries, impose an additional delay on the information's reaching those who need it - over and above the already substantial time lost in waiting for a journal to arrive by post.

Just as technology forces us to redefine literacy, it may also be the single most powerful tool available for spreading literacy. Moreover, it is technology that creates a socioeconomic climate favourable to the growth of literacy and spread of information, while combating those influences that tend to hold back the necessary developments.

Some potent and far-reaching technological means have been used to disseminate literacy. Radio and television are examples of mass media techniques for delivering an identical message to large numbers of people and thereby coping with problems of isolation and lack of trained

personnel. Microcomputers are proving to be a promising, versatile and inexpensive tool for personal development, as well as boosting the capability of less developed countries to get and use information. The CD-ROM medium, with its unique characteristics, is a promising new link in the information technology chain and may in part replace some of the functions of networking.

WHAT MAKES CD-ROM SO ATTRACTIVE?

The excitement and interest generated by this new technology is probably greater than that associated with any technology in the online database field since the introduction of the personal computer. Many conferences, such as this one, have been wholly, or at least largely, devoted to CD-ROM. Several journals and news-letters on CD-ROM have sprung up and hundreds of papers on the subject have been written in a very short time.

This small disc, 4.72 inches in diameter, can hold approximately 550 million characters of information, the equivalent of 1500 microcomputer diskettes or two hundred 1000-page books, and thus, is an efficient and economic medium for storing and publishing large amounts of information. "CD-ROM in an of itself is not an electronic information product any more than a stack of paper, a well of ink, a spool of thread, and a piece of cloth are books, or printed information products. However, as an information storage and publishing medium it can be used to deliver new forms of information. The function and operation of CD-ROMs can and should intrude, favourable, upon the design, content, utility, and use of the information which they deliver" (Kurdyla and Harris, 1988).

We are witnessing a steady increase in the emergence of information products on CD-ROM as a result of the conversion of already computerized data to this format, and of specific programs to convert printed materials for preservation purposes.

HOW CAN CD-ROM HELP TO BRIDGE THE GAP?

Developing nations have yet to fully reap the benefits of this latest technological innovation, whose capabilities make it a particularly suitable medium for overcoming some of their most pressing technical and cultural knowledge barriers. Diverse CD-ROM applications are possible for accomplishing this end by facilitating the development of bibliographic products, document delivery, surrogate libraries and literacy education. I wish to point out some of these here.

Bibliographic Support

Traditional abstracting and indexing databases, formerly reserved to online retrieval systems now abound on CD-ROM. Complete databases on compact discs, which can be used in conjunction with software, a micro-computer, a CD-ROM player, and a printer can be distributed to libraries in developing nations. Together with the information itself, the software is also recorded onto CD, giving the user access to the data by simply turning on his or her micro-computer, and thus eliminating the need for telecommunications linkups. In bibliographic databases updates are periodically added to the already existing core of information. Each cumulative, newly updated disc replaces the previous one.

Van Hartevelt has suggested such a pilot project for local access to relevant databases on CD-ROM in sub-Saharan Africa. He estimates that for less than US $ 1 million, 46 African countries could be provided with a micro-computer, a compact-disc player, a printer, and a database on disc containing information specifically pertinent to developing countries. Training in the use of the software could be provided to one major institution, a department, university or research institute, in each country (Van Hartevelt, 1987, p.162).

CD-ROM can be produced on two different levels of search software: a package for experienced searchers, or an easy menu option for those who are not familiar with literature searching by computer. Another advantage of CD-ROM is that users can spend as much time as they like searching

without taking the "taxi-meter syndrome" into account, and without having to rely on sophisticated and expensive communication infrastructure. The cost of searching is not dependent on the length of the search, an extremely useful benefit for teaching users in literature searching and information retrieval (Van Hartevelt, 1987, p.166).

Local library catalogues and union catalogues are also appearing in CD-ROM format, further facilitating immediate access to bibliographic information, encouraging resource sharing, and increasing the demand for supply of desired publications.

Document Delivery

In the area of document delivery, CD-ROM is being used to provide creative solutions to speed up international provision. No library can be completely self-sufficient, least of all those in developing economies. Local libraries can subscribe only to a fraction of the world's available literature. Having identified the existence of a suitable article, perhaps in minutes using electronic means, it is frustrating for users to have to wait days or weeks to obtain a copy. Therefore large document supply centres like the British Library Document Supply Centre are emerging as specialized services with the single main objective of rapid delivery of requested literature (Stern, 1986, p.25).

The pioneering ADONIS project, about which we will learn more later in this symposium, is exemplary of the economic and service benefits possible when competing commercial interest and publicly funded enterprises collaborate to capitalize on new technology. In brief, the project has experimented with the conversion of whole issues of journals, as well as their indexing information, to CD-ROM format. Copies of discs are prepared and sent to participating document supply centres, where the information is stored, and then used to quickly retrieve and print articles as requested (Stern, 1986). The interfacing of the ADONIS workstation with facsimile transmission, as planned, means that there is no need to produce a printed copy of the article; the image will be sent immediately and directly to the requester (Bradbury, 1988, p.135).

Surrogate Libraries

The above concept, which significantly contributes to the closing of the technological gap, can and should be expanded further to also meet the cultural needs of developing nations. Computerization of printing and publishing processes have made the subsequent conversion of printed materials to CD-ROM format a relatively simple prospect. A comprehensive project should be undertaken to identify and convert to CD-ROM selected core book and journal titles to be distributed as complete self-contained collections in countries where needed. These "surrogate libraries" would virtually close certain aspects of the information gap "overnight" and reduce the cost of local research library development and collection building.

Full text of books such as encyclopedias and other reference sources are available on CD-ROM, and the possibilities of innovative combinations are limited only by the imagination and demands of librarians and users. For example, Microsoft's "Bookshelf" contains the text of ten basic reference sources on one CD-ROM disc for $295. The graphic storage capabilities of CD-ROM, and new indexing concepts will make possible cross-references across data types, for example a telephone directory with an atlas (LaRue, 1988, p. 28; Tenopir, 1987).

International cooperation in conservation of materials and conversion of printed matter to computerized and CD-ROM format is a realistic proposition. It would be absurd for major libraries in many countries all to film or digitize without reference to other libraries and other countries, since much of the effort would bound to be duplicated. CD-ROM can be a replacement for microforms, and is especially advantageous for economic storage of archival materials of national and international significance. Once a master copy is made, further copies can be made quickly and very cheaply. Not only could they be supplied to libraries that also had the originals; they could also be sold to libraries that did not have them, and thereby greatly enhancing their holdings at the cost of little money and little space (Line, 1986, p.107).

Literacy Campaigns

The new technology can help to address the many concerns of public education through various, data-intensive administrative, professional and instructional applications which until now have been impractical and uneconomical. Kauffman has suggested a school administration reference base which would include policies, procedures and reports. Another potential product for educators is a compendium of lesson plans and worksheets from within a country or abroad, completely indexed by subject, level, type of activity, and specific learning objectives. A compendium of test items would also be useful with a similar indexing scheme (O'Connor, 1986, pp.329-331).

CD-ROM can provide some real value to the instructional process, especially once the more advanced concept, called CD-I, compact-disc interactive, is fully exploited. This standard, announced by Philips and Sony in 1986, will offer a combination of: audio, using music, sound, and voice; video in the form of pictures, graphics, and animations; and text and data. CD-I is a self-contained, user-friendly system, oriented toward consumer and institutional applications. These qualities offer great potential for multimedia information products, for teaching languages, as well as other applications (Moes, 1986, p.510; O'Connor, 1986, p.331). Consider the possibility:

- of providing an individualized English course for a capable student in a remote, rural area, complete with sound, sight, and complete texts of selected literature;

- of first graders and even kindergarteners learning to read and write full pages of poetry and stories even before they are able to form letters with dexterity and speed;

- of 200 students a day performing a chemical experiment with their own variations without one dollar spent on chemicals and no mess to clean up.

All this is possible with CD-ROM-assisted technology. Problems such as diverse population needs, equity in education for all students, uniformity in curriculum applied to individual needs and various learning styles, shortage of qualified teaching personnel, the need for lifelong learning and retraining, and society's demand for greater productivity lend themselves uniquely to technological solutions (Berger and Hill, 1985, pp.3-4).

WHAT COSTS ARE INVOLVED?

From the start, prices and costs have varied greatly in the young CD-ROM industry. Once data are in digitized form and indexed, the actual mastering and replicating costs, are the only true fixed costs. In the past three years, these fixed costs have dropped from about US$ 20,000 to US$ 3000 for mastering, and from approximately US$ 20.00 to US$ 5.00 for each replicated disc. (These prices are based on quantity or volume production for companies dealing directly with disc mastering facilities; Kurdyla and Harris, 1988, p. 17). CD-ROM makes good sense where the production volume is high enough to offset the cost of mastering a disc plus a reasonable percentage of the database production cost (Williams, 1986, pp. 3-4). If the market were large enough, CD-ROMs could be sold very cheaply.

While the factors contributing to the actual costs of the product are fairly straightforward, the economics of the CD-ROM industry and market are less so. To date, no clear production, marketing, and distribution channels have been established. CD-ROM producers include traditional publishers, software companies, system integrators, library service organizations, and others (Kurdyla and Harris, 1988).

PROBLEMS OF CD-ROM

With CD-ROM as an alternate medium for storage and distribution of databases, producers of online databases, vendors of online search services, and users should all consider a number of factors as they approach this new technology. It will be out of the question for those with

small needs, and less clear for those using a wide variety of databases, and they are in the majority. Those user organizations (e.g., information centres and libraries) that purchase or lease databases on CD-ROM will again have to budget for a limited number of databases and institute charge-back systems with all of the associated administrative headaches. A user organization that acquires several of the highest use databases on discs, and receives periodic updates will have to maintain a disc library with receipt records, claiming, and the like, and they will very likely initiate and maintain usage records to justify the purchase. It is likely that CD-ROM users in those organizations will maintain their logons to online services or print subscriptions for conducting searches in the databases they do not have on CD-ROM (Williams, 1986, p. 3).

Other limitations have been documented (Kurdyla and Harris, 1988; Pearce, 1988; Reese, 1988). Although it is now possible to connect more than one CD-ROM reader to a single workstation or microcomputer, the process of connecting more than one microcomputer or workstation to one CD-ROM player has not been perfected. Thus, in order for more than one user at a time to access the information on the disc sophisticated solutions will be necessary.

The computer component of the CD-ROM process and product, an additional layer of technology and barrier between the information and the reader, presents both advantages and disadvantages. The advantages are the retrieval capabilities and random access of information through the use of micro-computers. The disadvantages include the fact that one must have a micro-computer and a CD-ROM reader in the location where one wants to use the information on the disc, and adequate maintenance support for both.

There are also problems of hardware and software incompatibility. Most CD-ROM products are designed for IBM personal computers, and some CD-ROM products may not work with compatibles. There is still no standardization of software, so not all products will run on a single CD-ROM reader.

There are workstation space, security and scheduling requirements, as

well as training needs of staff and users. Various hidden costs will surface, for paper, ink, wiring, furniture, not to mention the relatively high cost of the CD-ROM product itself. Licensing restrictions, including copyright, today require the subscriber to return the product when a new disc is received or if a subscription is cancelled. This practice discourages libraries from cancelling print subscriptions for fear that a CD-ROM product may be discontinued or ceased.

CONCLUSION

Notwithstanding these problems, we must begin the process of helping developing countries to circumvent the need for remote and costly online access to distant databases, to facilitate the provision of documents and other full-text sources, to mitigate the need for large and comprehensive, local collection building and duplication, and to boost educational efforts to eradicate illiteracy. That is why I propose that there is an urgent need for a neutral, non-commercial international organization, such as UNESCO, to organize and implement projects to further exploit the strengths of CD-ROM in the service of developing nations. Since 1948 UNESCO has been active in encouraging the growth of information infrastructures in developing countries and in devising appropriate schemes for this purpose. Thus, it would seem appropriate and feasible that this organization continues in this vein by coordinating the adaptation of CD-ROM technology.

If UNESCO undertakes the project of core literature selection and limits its distribution on CD-ROM, free of copyright fees, exclusively to developing countries, that are not the major purchasers of publications, there would be no danger of copyright infringements. Developed countries would be able to use it for a price. The problems are not insurmountable, and improvements in performance and cost-effectiveness will occur with increased use.

With prudent planning, CD-ROM can be a powerful addition to the arsenal of means with which to eradicate illiteracy, and has the potential to be a short-term, practical alternative for improved information supply and increased information self-sufficiency in developing countries

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ELECTRONIC PUBLISHING DEVELOPMENTS AND OPPORTUNITIES FROM OCLC

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ELECTRONIC PUBLISHING DEVELOPMENTS AND OPPORTUNITIES FROM OCLC

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Abstract

The paper will explore the possibilities for bibliographic products offered by CD-ROM technology and compare their adoption in the United States and Europe. The paper will also describe the research currently being undertaken in this area by OCLC and the products currently in development or currently available.

OCLC Europe will demonstrate two CD-based products - Search CD450, an OCLC Reference Product and CAT CD450, OCLC's cataloguing CD product during the Symposium.

ELECTRONIC PUBLISHING DEVELOPMENTS AND OPPORTUNITIES FROM OCLC

I travelled to Essen by car and ferry. It wasn't the quickest method - I could have flown from Birmingham directly to Duesseldorf in less than two hours. It wasn't the cheapest since I suppose I could have ridden a bike particularly through Holland and, given my inclination to sea sickness it might not have been the most comfortable but since I had to bring an exhibition stand, a PC, CD drive and printer to say nothing of all the OCLC product literature I think I made the best choice.

Choice is the essence of consumerism and libraries are consumers. In terms of acquiring bibliographic data or even information itself there are now a wide range of delivery media : print, microform, online and now electronic delivery and CD-ROM. A single bibliographic record created by a national library such as the British Library or the Deutsche Bibliothek or an individual library may be "available" via all these media simultaneously. Libraries can choose how they gain access to that record and factors such as cost, timeliness, flexibility and the Library's own state of technological literacy are all factors which will influence that choice. Information providers, such as OCLC, like transport companies, may choose to specialise in one or more mode of delivery.

It is, however easy to be carried away by the possibilities and promises of the new technology without really understanding it. New technologies first make an impact by replacing older technologies. However as their adoption increases, new functions (rather than replacement functions) make the impact of the new greater than the capacity of the old. To return to the example of transport for a moment, the greatest impact of new methods of transport is not the ability to travel faster but the changes resulting from a mobile society. It is arguable that CD-ROM will firstly have a quantitative affect on the way information is stored and delivered but in its second phase will have a qualitative effect on the way in which information is used.

The products which are currently available to libraries are still at this first level of technological development. Many of them providing an alternative to expensive online telecommunications in areas where currency of information is not critical. Second wave products are still in research and development, and it is these products which will affect the way in which information is used and delivered.

As with all new technologies the rate of take up is exponential. Every year OCLC undertakes a mail and telephone survey to track microcomputer and now CD-ROM product ownership over time. This survey has up to now been restricted to the U.S.A. but we hope to widen the survey to include other countries in the future.

The key findings of the 1987 study were:

1. CD drive ownership grew from 6% of OCLC members in 1986 to 28% in 1987. For non-members ownership remained stable at 4%.

2. During the next 12 months (i.e. during 1988) 45% of the OCLC members who owned a CD product planned to purchase an additional product.

3. 21% of members who did not currently own and 8% of non-members who did not currently own a CD product planned to buy their first CD product during 1988.

4. Over half of current owners planned to purchase additional CD products and 57% also intended to purchase new hardware to use with the new product.

It is not easy - or wise - to try and make direct comparisons between the USA and Europe since there are a number of factors which must be taken into account:

1. The European market is smaller and more diverse with wide variations between individual countries.

2. European telecommunications costs are generally higher and less

reliable than the US.

3. European libraries are not as affluent as their US counterparts.

4. PC penetration and computer literacy skills are lower in European libraries.

5. CD drives are at least twice as expensive in Europe.

A recent report "CD-ROM in Europe" undertaken by Knowledge Research (2) made projections for the installed base of the CD-ROM drives by country over the period 1987-1992 (Table 1). This report identifies the United Kingdom and the Federal Republic of Germany as the two greatest potential markets for CD products based largely on the analysis of the numbers of PCs, level of professional expertise and existence of CD-ROM mastering and replication plants in these countries.

However, the size of the US market is likely to remain at least 10 times greater than the whole European market (1) (Table 2). Over the twenty years OCLC has been in existence our member libraries have contributed more than 18 million MARC records into the OCLC Online Union Catalogue making it the world's largest and richest bibliographic databases. OCLC sees its entry into CD-ROM technology as a natural progression in not only providing alternative modes of access to that resource and to other commercial resources but also as an opportunity to provide enhanced, more cost effective or additional services to libraries. In order to do so OCLC has developed search software, undertaken research into the subsetting of large databases and entered the areas of electronic publishing and CD-ROM pre-mastering.

To date we have developed two CD-ROM products : firstly a reference product Search CD450 and secondly a cataloguing product CAT CD450 - but more about these later.

One of our initial considerations was to investigate the selection of appropriate databases for CD-ROM applications. With the current technology and storage capacity we discovered that with the overhead

required for indexing, approximately 700,000 OCLC bibliographic records could be stored on one CD-ROM. With a database of over 18 million records it would take over 20 CD-ROMs to deliver the entire database. We therefore faced a choice : either to find a method to satisfactorily and conveniently order the database on multiple CDs or look at applications where it was appropriate to deliver only a proportion of the entire database. Whilst the entire database is comprehensive each of or 6,000 or so individual member libraries only ever accesses a small proportion of the available records. We were therefore interested in finding out more about current online use of the database to discover:

Is it possible to identify subsets?

by type of library
public, academic, special,
medical, law, music

by size of library
Here we were particularly interested in investigating "single terminal" libraries who we initially thought might benefit most from a CD cataloguing product.

by country
Germany, France, Spain

by activity
reference, current cataloguing, retrospective cataloguing,
resource sharing

by some bibliographic characteristic
source of cataloguing, date of publication,
physical format, language

When you undertake such analyses the structure of the database raises some interesting results. Let's take two examples: language and data of publication.

Language

The overridingly dominant language in the OCLC database is English. To produce CD-ROMs for the English language records does not overcome the barrier of multiple discs since it would require 17 CD-ROMs to hold the 11,948,295 bibliographic records in English. If however you look at the other major languages then single disc subsets of monographs become a reality for German, French, Spanish, the group of Scandinavian languages and also for a collection of East European languages.

Such subsets might appeal to two or three different markets: firstly for current cataloguing in those countries where the language concerned is a high proportion of current cataloguing but also to specialised departments or collections outside the country where the language is not the mother tongue and where such titles are "foreign" and therefore usually considered "difficult". They are equally of value for specialised retrospective conversion projects or for general reference/bibliographic checking functions.

Date of publication is potentially of even greater interest.

Let's look at the breakdown in terms of CD size breakdown.
This identifies possible subsets of value both for the current cataloguing but also for retrospective conversion. Since the majority of current items are of recent date of publication one can logically produce a suitable subset. Further in a union catalogue such as OCLC's it is also possible to record the number of holdings attached to a particular record and therefore to attempt to produce the most "desirable" or "most used" or "most recently used" records and since our member use different authorizations for current and retrospective conversion it was further possible to identify the most used records for current cataloguing and retrospective conversion. Also since much retrospective conversion is undertaken for a specific timeframe either because an individual library has split catalogues or because a library community has identified a particular time period as a priority for conversion and allocated additional funding for such projects. The recent Wissenschaftsrat Empfehlungen zur retrospektiven Katalogisierung an wissenschaftlichen Bibliotheken (3) is a

good example whereby post 1945 material has been identified as a high priority for West German scientific libraries. Such subsets could be easily identified and produced to support such initiatives.

OCLC does not, however just view CD-ROM as a new delivery medium although in countries where online telecommunications are either too expensive, too unreliable or just not available this too has benefits to those library communities. CD-ROM because of dependence on micro-computers allows the producer to add value to the data stored on the CD-ROM. By including additional facilities on the software the local processing power can be used to sort, manipulate and download the data so that in one process not only can searching be enhanced and made easier and the burden of connect time be removed but the entire concept changes rom a "passive information container" into an "active information system".

When operating in a local environment using microcomputers and CD-ROM drives searching can be quite different to that required using a large central database held on a mainframe computer with the overhead of expensive connect time. The searching interface can also be developed to enable both professional trained staff and end users to access databases both within the library and elsewhere.

Full text and boolean searching can be easily performed: the resulting records can be ordered or sorted in a sophisticated manner; records can be displayed or downloaded according to user defined parameters and software can be incorporated to convert records into different standard formats such as MARC or MAB.

Let's examine how such features have been incorporated into OCLC's CD products and the way in which we see products developing.

OCLC has used the ability to combine records from different sources and packaging them conveniently for libraries with particular subject interests to develop a series of reference products known as Search CD450. This is the first OCLC product to be aimed at reference librarians.

Search CD450 combines the power, storage capacity and convenience of CD-ROM by offering a comprehensive range of databases - both from commercial information suppliers and unique subsets from the OCLC Online Union Catalogue.

Search CD450 was launched in Europe in April this year in three series: Education, Agriculture and Science and Technology.

The OCLC subsets and the OCLC search software are unique features of OCLC Search CD450 and have been introduced to complement the information provided in the commercial databases and to provide both reference librarians and end library users with a single search interface. Libraries who have purchased Search CD450 are increasingly making it available to end library users many of whom have no previous experience of online database searching.

The current Search CD450 databases are:

The Education Series

ERIC - current from 1982 - present including
Current Index to Journals in Education (CIJE)
and
Resources in Education (RIE)
ERIC - retrospective files are available for CIJE 1969 - 1981
and RIE 1967 - 1976 and 1977 - 1981

The Education Library (EMIL) is a database containing 450,000 bibliographic records selected from the OCLC Online Union Catalogue and updated annually. It contains both English and other language materials in all bibliographic formats (books and non-books). The coverage is mainly 20th Century but does include older items.

This database, like the other OCLC subsets, have been selected by using a combination of Library of Congress and Dewey Decimal Classification Numbers and Library of Congress Subject Headings.

The Agriculture Series

At present consist of 3 databases on 4 compact discs:
Agricultural Online Access (AGRICOLA) current citations together with Current Research Information System (CRIS).
AGRICOLA retrospective files covering 1979 - 1982 and 1983 - 1985.
Agriculture Library - an OCLC subset consisting of 322,246 OCLC records in the areas of agriculture, food production, forestry, fisheries and veterinary medicine.

The Science and Technology Series

This series consists of seven databases:

National Technical Information Service (NTIS) current file consisting of 1986 to date.
NTIS retrospective files covering 1983 - 1985
Selected Water Resources Abstracts (SWRA)
Earth Science Databas, including the Earth Science Data Directory, GeoIndex and the US Geological Survey Library Catalogue.
The Computer Library - an OCLC subset containing 252,308 OCLC records.
The Environment Library - an OCLC subset containing 400,000 records.
The Energy Library - an OCLC subset containing 297,697 records.

All the OCLC subsets include all bibliographic formats and dates of publication in the particular subject area represented in the OCLC Online Union Catalogue.

I hope you will take the opportunity to look at these databases and use the OCLC Search CD450 software which is being demonstrated in the exhibition area.

There are two future developments which will extend the Search CD450 concept and further develop OCLC use both in reference departments and also by individual library users and individual scholars and researchers.

The first of these developments is that OCLC plans to introduce reference

online access to a range of databases, including the Online Union Catalogue itself. This service, to be known as EPIC will provide currency to supplement the databases available on CD-ROM. Libraries, both OCLC members and non-members, and individuals will be able to apply for passwords and display, download and order printed copies of records in 9 display formats plus a user defined format. Charging will be on a connect time and display/print command basis. EPIC will enable users for the first time to subject search and use boolean searching techniques online with the entire OCLC database. EPIC will offer standard menu and command language interfaces.

The second development will be to provide not only access to bibliographic and citation databases but also to provide full text databases including graphics using the Search CD450 software. OCLC currently has two prototype projects, both in the humanities an area which has not been traditionally well served by online services. These are the Twayne Biographies of American Authors and a database on sources of American History.

These databases will provide bibliographic records and full text including access to the title page, bibliographies, index and the text to allow researchers to use the same search interface throughout. The software also allows the researcher to compile notes and comments on floppy or hard disc which can be transferred to other programs - an electronic update to the notes scribbled in the margin!

The second OCLC CD-ROM product is a cataloguing product - CAT CD450. CAT CD450 is currently being field tested in seven US libraries. In parallel to this three month field test OCLC Europe is reviewing CAT CD450 for its suitability for European libraries. During this time we will undertake hit rate studies of database subsets, evaluate the system's functionality, software and computer based training courseware.

The field test software and CD databases are available in the exhibition area and we invite your comments. The Essen Symposium is the first European demonstration for this software.

CAT CD450 is a cataloguing product designed to reduce telecommunications and processing costs for full OCLC cataloguing members. Libraries undertake the majority of their cataloguing processing using OCLC workstations, the CD discs and CAT CD450 software. This includes searching, editing, authority work and creating original cataloguing.

The software includes communications software to connect CAT CD450 users either by dial access or dedicated lines occasionally to the OCLC Online Union Catalogue to download records not found on the CD subsets and to upload holdings and original cataloguing information. This is undertaken in a batch processing mode which can be timed for any time the OLUC is available. Libraries can also use this link to order printed products and magnetic tapes. They may alternatively use CAT CD450's local card printing facility or MARC export function to transfer full MARC records into their local systems.

The CAT CD450 databases currently developed are:

Recent Books

1.2 million OCLC records consisting of the most recently used OCLC books format records with an imprint within the last 6 years on two CDs. The recent books subset is updated quarterly.

Older Books/Non Books

1.2 million record of the most recently used non-books records and books with imprint dates older than the recent books collection on two CDs. This collection is also updated quarterly.

Authorities Collection

The complete file of the Library of Congress Name and Subject Authority Records on two CDs. This collection is updated semi-annually.

Future CAT CD450 databases are planned over the next two years for medical libraries, law libraries, music libraries and non-English language subsets.

The advantage of CAT CD450 are that it provides local processing available 24 hours per day, 7 days per week if the library wishes with freedom from continuous online connections.

The system can be configured for use with up to 4 CD-ROM drives thus improving efficient access, use and reducing handling of the CD discs.

CAT CD450 provides improved searching capabilities using control numbers, free text words and boolean logic. The traditional OCLC search keys can also be used and combined with the "AND" operator.

CAT CD450 also provides full OCLC membership and access to the entire OCLC database offering high overall hit rates through its communications link.

The CAT CD450 software also benefits from windowing allowing two bibliographic or bibliographic and authority records to be displayed simultaneously and validation programs to validate all records and holdings being added to the OCLC Online Catalogue.

The export function allows for the first time the transfer of full MARC records to local systems and the context specific help facility provides assistance to users at any point. CAT CD450 also provides a computer based training package, full system documentation and OCLC ongoing support - samples of which are available on our stand.

It will be apparent that OCLC in developing these products has acquired a great deal of expertise in the subsetting, indexing and pre-mastering of CD-ROM discs and we actively pursuing the possibility of providing this as a service to other libraries and organisations. This is not restricted to data in the LC MARC format. We are currently analyzing tapes from a number of sources including the Zeitschriftendatenbank with the intention of producing a demonstration disc.

I hope I have in this paper demonstrated that CD-ROM offers opportunities not only to make existing services more efficient and cost effective but also to provide libraries with new products and services to offer their

users. To quote our current publicity material - CD-ROM offers more information - for a more informed world.

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TABLE 1

WESTERN EUROPE: PROJECTED GROWTH OF INSTALLED BASE OF CD-ROM DRIVES BY COUNTRY 1987-1992

	1987	1988	1989	1990	1991	1992
UK	720	2,400	6,400	17,200	32,500	54,000
France	420	2,150	5,300	12,800	27,500	54,500
West Germany	720	2,950	7,200	18,000	36,000	61,000
Italy	4,020	13,800	19,600	27,300	37,000	45,000
Scandinavia	200	850	2,400	9,300	16,500	26,000
Rest of Europe	620	2,950	6,300	15,900	32,500	52,500
Total Europe	6,700	25,100	47,200	100,500	182,000	284,000

Source: CD-ROM in Europe: a special report / Adam Daun.
ISBN: 1871258006

TABLE 2

CD-ROM Market Comparison - US and W. Europe 1985-1992

	Installed Base of Drives		Discs Manufactured	
Year	Europe	US	Europe	US
1985	n/a	80	n/a	200
1986	n/a	6,260	n/a	18,400
1987	6,700	42,900	26,500	205,000
1988	25,100	159,000	170,000	1,110,000
1989	47,200	448,000	675,000	4,210,000
1990	100,500	983,000	1,990,000	12,300,000
1991	182,000	n/a	4,665,000	n/a
1992	284,000	n/a	8,850,000	n/a

Source: the US market forecasts were taken from "CD-ROM Market Opportunities", a Multi-Client Study by Link Resources Corporation, 1986. They have been rounded to three significant figures for easier comparison.

SCIENCE CITATION INDEX PRINT AND CD - THE BEST OF BOTH WORLDS FROM ISI

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SCIENCE CITATION INDEX PRINT AND CD - THE BEST OF BOTH WORLDS FROM ISI

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Abstract

From the viewpoint of the producer of a major printed reference work, the most obvious advantage of CD-ROM technology is the huge storage capacity available in a very small physical space. The medium offers opportunities for developing new search features which maximise the integration of CD-ROM and microcomputer technology.

The Science Citation Index contains information from more than 3,300 science journals, and is regarded as a major reference source in the sciences. The size of the index means that it is ideal for distribution on CD-ROM as a complement to the well-established print and online services.

However, it is not sufficient to simply deliver bibliographic information in yet another format - users are looking for the 'value added' element which will increase the effectiveness of their searchers. The paper will discuss features and benefits of the Science Citation Index Compact Disc Edition developed at the Institute for Scientific Information and innovative search techniques will be demonstrated.

SCIENCE CITATION INDEX PRINT AND CD - THE BEST OF BOTH WORLDS FROM ISI

Introduction

The release of the Science Citation Index Compact Disc Edition in May 1988 marked the first of the Institute for Scientific Information's ventures in compact disc technology. As a complement to the existing print Science Citation Index and the online database SciSearch, the SCI Compact Disc Edition was designed specifically for end-user searching of the literature of science and technology. The huge storage capacity available on a CD-ROM disc meant that there were now opportunities for combining the coverage and features of a large multidisciplinary science database with additional search and retrieval techniques which were innovative, effective and, above all, user friendly.

Product Information

The Science Citation Index Compact Disc Edition is published quarterly and back-year discs for 1987 and 1986 are also available. Each quarterly issue is cumulative and supplied on two discs, referred to as the 'Title word access disc' and the 'Citation access disc', so that at the end of each year, twelve months of information is stored on the two discs. Superseded discs for each year are returned to ISI. The Compact Disc Edition is purchased by the customer not leased, so the customer has full control of the subscription.

The Science Citation Index, printed version is published six times a year in softcover format, with an annual cumulation. Five-year cumulations are available: 1965-69, 1970-74, 1975-79 and 1980-84, together with ten-year cumulation for 1955-64, and 1945-54 (to be published later in 1988).

The size of the database from which the Compact Disc Edition was developed was a considerable element in designing search and retrieval

techniques. The Science Citation Index contains bibliographic information from more that 3300 journals in all areas of the sciences and is regarded as a major reference work in its field. The index includes information about more than 600,000 source items from these journals and also the cited references contained in them - over 10,000,000 - each year. This magnitude meant that the Science Citation Index was an ideal tool for availability in CD-ROM format as a complement to existing services. However, bibliographic information in yet another delivery format does not always automatically increase user interest - the area of interest for the producer and ultimately the user must inevitably be the development of new features not available in other products and increasing the effectiveness of a search through a powerful search software.

Disc Content

As already mentioned, the Science Citation Index in both print and compact disc form covers the same 3300 source journals, a full year of data comprising sixteen volumes in the printed product and two discs in the Compact Disc Edition. The Compact Disc Edition consists of a title access disc and a citation access disc. Both are self-contained and independently searchable, and many searches can be completed on a single disc, although switching discs is an extremely simple operation and search statements created on one disc can be combined with statements created on the other.

Both discs contain the basic source bibliographic data found in the print Source Index of the Science Citation Index. Other features and dictionaries which are found on the respective discs are listed in the tables below, together with an indication of the corresponding coverage in the printed version.

TABLE 1: SCI CD EDITION - DISC CONTENTS

Source Disc	Citation Disc
Basic Source Data (same as Citation Disc)	Basic Source Data (same as Source Disc)
Source Author Dictionary	Source Author Dictionary
Title Word Dictionary	Cited Author Dictionary
Coterms	Cited Works
Address Directory	References
Source Author Addresses	
Journal Code Dictionary	
Language Dictionary	Language Dictionary
Document Type Dictionary	Document Type Dictionary
Related Records	Related Records

TABLE 2: SCI DATA ON PRINT AND CD - A COMPARISON

SCI CD Edition	Print SCI
Data available on disc	Information in print SCI
Source (citing) resources	Source Index
Author names	
Author addresses	Corporate Index
Cited references displayed	
Related records	
Dictionaries/searchable access points	
Source author names	Source Index
Cited author name	
Cited author name and cited work	Citation Index
Title words	
Coterms	Permuterm Subject Index
Address word	Corporate Index
Source Journal	
Language	Shown but not
Document type	searchable

It is easy to move from one disc to another, without re-starting the program and search statements can easily be re-executed. In this way users are encouraged to follow through their own search ideas, rather than re-structure their search to fit the confines of the system design.

Search Options

The retrieval software supplied with the SCI Compact Disc Edition was developed by ISI exclusively for this product, so that a variety of searching options can be offered together with a comprehensive help screen system. Searchers can browse through lists of 'dictionaries' of cited authors and cited patents, cited works, title words, author names, author addresses, and journal titles. They can move within the dictionaries to choose qualifying search terms, to examine variant or similar terms, or to check intermediate hit counts for a particular search strategy. Search terms can also be entered directly, using the direct term entry option which is always available.

Dictionaries allow you to quickly determine how productive a search may be (by examining the hit counts listed in the dictionary window brackets on the right) so that the search strategy may be modified to produce greater or fewer hits, as required. In addition, the dictionaries offer flexibility in selecting cited authors' names and combining them with specific cited works, even when the searcher may have an incomplete reference for the earlier cited work. (See Fig. 1). When searching under title words, browsing in the title word dictionaries for co-terms (words which appear frequently in combination with the original search term in the titles of papers) also suggests additional search terms for broadening or refining the search strategy. The dictionary selection option can also be very useful to combine a series of terms or names which would be very unwieldy or give false hits if you used truncation. The key element here is browsing before executing a search and viewing all the options - something which is prohibitively expensive when online.

Searching through dictionaries and searching directly have not been developed as 'novice' and 'expert' search modes - they are meant to be interchangeable throughout a search session, as appropriate. Direct term entry can be used for truncating search terms, and for combining search terms from different fields, for example source authors' names combined with title words. When searching directly, the dictionaries are still available for reference.

Citations and related records

The Science Citation Index was originally developed from the basic principle that a subject relationship exists between a published paper and the citations listed in the text or in the bibliography at the end, and this link can be used as a method of finding relevant papers on a particular topic. By starting with an earlier significant work on a particular subject, through the use of the Citation Index it is possible to quickly find later, related papers which have developed that particular topic. In this way it is possible to come forwards in time to find the latest papers on a particular subject, which may have been missed by doing a title word search alone. Citation Indexing is an extremely powerful and effective search technique for retrieving pertinent articles, and the most significant aspect of ISI's use of CD-ROM technology is that it has made possible, for the first time, the implementation of the full power of citation indexing through bibliographic coupling. The technique is the essential component of the 'related records' feature which is available on the SCI Compact Disc Edition and which considerably expands searching capability.

Identifying related material through bibliographic coupling is based on the principle that papers on a similar topic share common references. In other words, the subject relationship between two or more papers is determined by the number of shared cited references in their respective bibliographies. It is the opposite technique to co-citation, which is a measure of how often two or more works are cited together.

With SCI Compact Disc Edition, the technique of bibliographic coupling is used to increase the power and depth of your search with one single keystroke. In fact, it can be considered as a 'hypertext' function in that it allows lateral searching to find linked records without returning to or re-executing the previous search strategy. Once you have found an article of interest - perhaps by searching under title words or cited authors and cited works, the records can be displayed directly on the screen, and the full bibliographic information is given. Also displayed, however, is the number of related records - these related papers have been identified by the fact that their bibliographies share references with the original record which you retrieved. (See Fig. 2). A special program has been developed at ISI

to statistically test these related records to ensure that the system will indicate only those papers with strong, significant links to your selected paper. While there may be hundreds of records on the CD which share references in common with your first paper, only 20 of the most strongly linked papers are displayed initially. These can be used to develop additional search strategies or to broaden the scope of the search by retrieving 'related records of related records'.

With a single keystroke, the bibliographic information for each related paper can be displayed in turn. (See Figs. 3 & 4). For each paper the information displayed includes the number of shared references - the number of references in common with the original paper which you retrieved. In this way, it is very easy for users to investigate new areas of interest related to their original search, without needing to know about specialized terminology or the names of publishing authors on the topic. It is easy to locate related papers without identifying synonyms, and if you choose you can instantly modify your search by displaying additional levels of related records. In other words, you are searching the SCI Compact Disc Edition in exactly the same interactive, heuristic way in which you would approach any research problem.

Making the cost of the technology

The size of the journal coverage and the citation information in the printed Science Citation Index means that although ISI would prefer to make the bibliographic information available in a larger print format with more space between the individual entries, the economics of production dictate that the present layout must be maintained, since increased paper and binding costs would unfortunately only be met through price increases. However, since the space limitations of the printed Science Citation Index do not apply to the Compact Disc Edition, the records can be displayed in an attractive, easily read format which makes full use of the available technology, including highlighting and windows. In addition, the full, rather than the abbreviated information can be included in a source record, for example full journal titles, the names and addresses of all source authors and the full bibliography of cited references - even if a source paper on biochemistry has over 500 references at the end (and this is not

uncommon), all these citations can be displayed on the CD version.

The maximizing of CD technology in terms of information content and search strategies has already been discussed. In addition the Science Citation Index Compact Disc Edition makes maximum use of microcomputer technology for storing and manipulating search results. Records can also be 'downloaded' to a file for saving on a floppy disc, for printing or editing at a later date by copying the disc to a word processing program, e.g. Wordstar. In this way current awareness bulletins and SDI lists can quickly be generated.

A complement, not a replacement

It might be concluded from this summary of the features of the Science Citation Index Compact Disc Edition that the Science Citation Index print index can be completely replaced by the new product. This is certainly not the case for the foreseeable future, since many libraries will need the advantages of the essential scientific literature being available in a variety of formats so that as wide a range of user needs as possible can be met by the library service. For retrospective searching, the print edition is unbeatable, with editions going back to 1955, and a further ten-year cumulation for 1945-54 scheduled for publication toward the end of 1988. For currency, the online database, SciSearch, with weekly updates, will continue to be the search system for the latest papers in the sciences.

Although the Science Citation Index Compact Disc Edition uses standard equipment and systems which are already widely accepted in the library environment - that is, IBM or 100% compatible personal computer with hard disk and standard compact disc drive - the printed index will always have the advantage of being immediately available without a need for special equipment, or even an electricity supply. For many people, browsing through the pages of a printed index will always seem more attractive and less intimidating than finding their way around an unfamiliar keyboard. In addition, users in less developed countries - who are already denied access to online information because of unreliable telephone communications networks - may not have the necessary equipment and the availability of scientific information in printed format is essential for

their library and informations services to function effectively.

For the moment, until the networking procedures for CD-ROMs become more standardized and reliable, the printed edition will maintain the important advantage of multiple use by library readers. At present, the use of the CD ROM is limited by the availability of equipment and the supply of discs in the library. With the printed index, several readers can use the resource at any one time, since normally their searches involve using completely different volumes.

Comments from users

Considerable research was involved in the development of the Science Citation Index Compact Disc Edition, including testing at beta sites. Comments and suggestions from these tests were considered when developing the final commercial version. This final version is by no means static - comments and reports received from selected 'preview sites' in addition to more general remarks made at presentations and exhibition demonstrations will all be taken into account when considering product development and enhancements.

Initial reaction from users has been very favourable. Even those who are unfamiliar with microcomputers and keyboard layout find the system very easy to learn and the menu options user-friendly and easy to follow. The dictionary option for searching is particularly popular, and the browsing capability means that users approach the system in a more relaxed way - they can take their time and consider all the options and do not have the added pressure of considering online connection and print costs. Indeed the only drawback is that users tend to spend more time using the CD, browsing and trying out all the options, and since many libraries are at present limited to purchasing only one CD-ROM drive until the medium becomes more established, queues can begin to build up in the library. Part of the attraction is of course the novelty of the new technology, but a major element is that the system is easy to use - so people are using it!

Other favourable comments relate to the screen design with the clear graphics, the help screens and the imaginative use of windowing, and also

the additional bibliographic information which is available in the Compact Disc Edition - all source author addresses (when supplied in the original article) and all the cited references, for example.

However, the most popular feature of the Science Citation Index Compact Disc Edition is the 'related records' search technique. Users have been very impressed by this, and it is seen as the aspect of the Compact Disc Edition which is truly 'value added' - indeed one user commented that this feature put Science Citation Index Compact Disc Edition in a class of its own - 'The Cadillac of CD-ROMs'. Using the related records option, users have retrieved papers on the same topic which would never have been found using more conventional search techniques, for example searching under title words, and a collection of relevant papers on a subject can be assembled very quickly. This feature is particularly popular with users whose mother tongue is not English - searching under title words for synonyms and alternative expressions can be problematic. Once they have found a useful paper, with the related records feature they can instantly retrieve additional relevant papers - papers which may have unfamiliar terminology in the title of which would not have been retrieved at all using a title word search, because their relevance is indicated instead by the citations.

Improvements in the search and retrieval software have ensured that the retrieval speed is now very acceptable, although it cannot of course be compared with the speed of online retrieval. Searchers soon become familiar with searching under specific terms with lower hit counts and combining them, rather than by using broad terms which take up considerable processing time. This is particularly important when searching for author addresses.

Changing discs for different types of searches has not proved a major drawback, mainly because the technique for changing the discs is very simple, and search strategies and results are saved. It is planned to develop the system so that the same search can be re-executed on a disc of a different time period - again in response to customer comments. Some users have commented that a single disc per year would be preferable; however, because of the size of the database, this could only

be done at the expense of the dictionary information which takes up considerable disc space but which is also widely used.

To summarize, the user reactions have been very favourable and comments received will be incorporated into system enhancements whenever appropriate, while always maintaining the two chief factors - 'value added' features and simplicity of use.

Concluding remarks

The popularity of the Science Citation Index Compact Disc Edition does not herald the demise of the print edition - indeed it was developed as a complement, not a replacement. The print edition has stood the test of time, and is established as one of the major, essential reference sources in the sciences. The Compact Disc Edition has, for now, the advantage of novelty in addition to the alternative search methods on offer, and, as with all CD products of this type, it will be interesting to watch developments and see it find its own niche in the market place. The availability of the SCI databases in different formats increases user choice and broadens availability of access to information, and in the information business this can only be beneficial for everyone - producer, library and user.

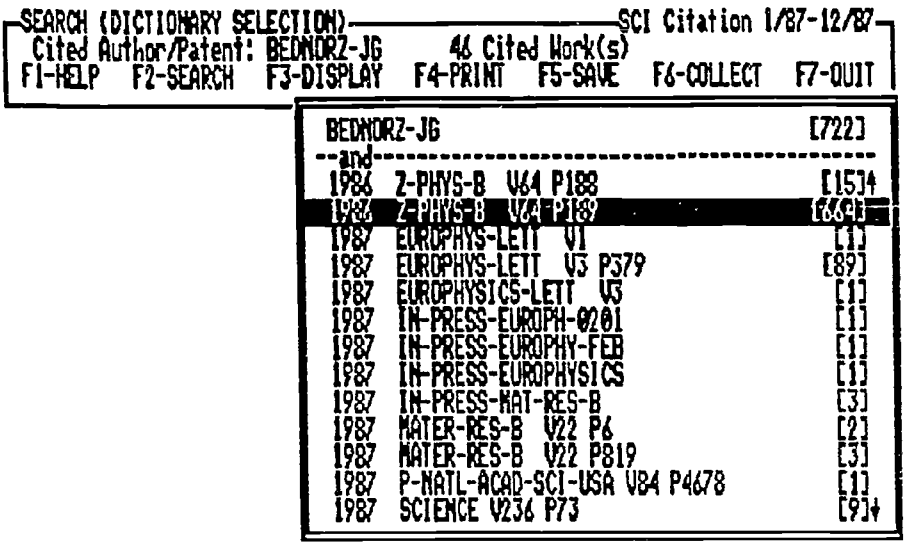
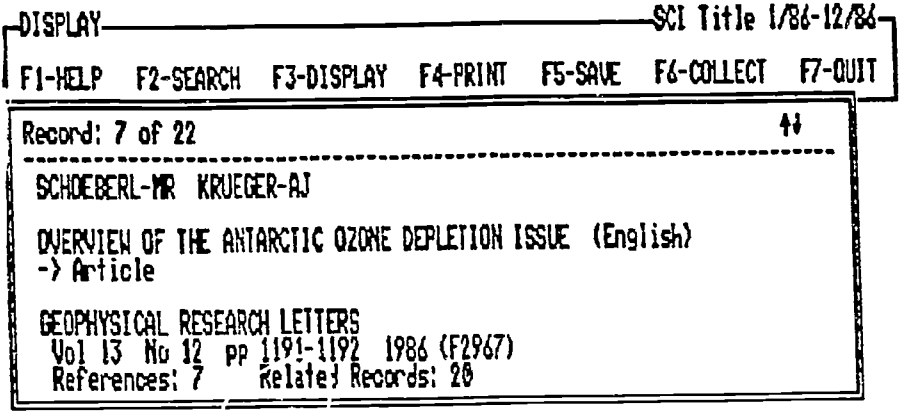
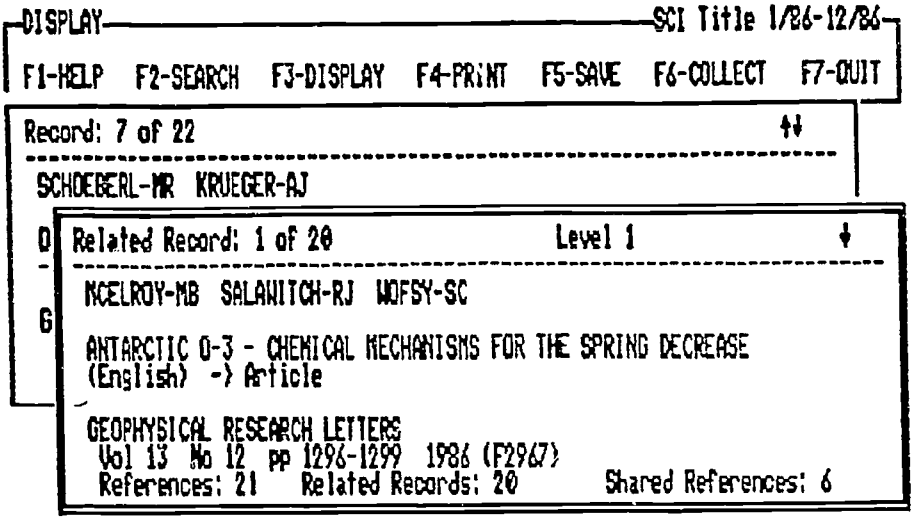


FIG. 1: COMBINING DICTIONARY SELECTIONS: CITED AUTHOR/CITED WORK



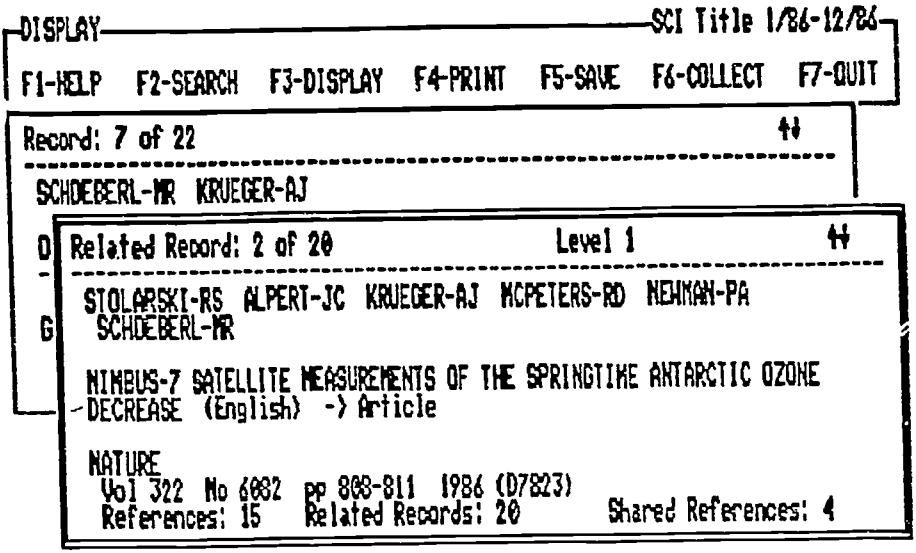
Use cursor keys to display next record, F3 to display related records.

FIG. 2: RECORD RETRIEVED FROM A SEARCH



Use cursor keys to display next related record, ESC to return to source record.

FIG.3: DISPLAY OF FIRST RELATED RECORD



Use cursor keys to display next related record, ESC to return to source record.

FIG.4: DISPLAY OF SECOND RELATED RECORD

THE FORGIVING BUILDING REVISITED

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THE FORGIVING BUILDING REVISITED

The theme of this conference is "The Impact of CD-ROM on Library Operations and Universal Availability of Information". The papers we've heard have focused on how CD-ROM is affecting the way we deliver library services now and how it may affect the way we will deliver library services in the future. CD-ROM and library automation also affects how we design and use the buildings our libraries occupy.

I've been asked to speak on facilities planning and automation, especially how CD-ROM affects space planning issues, and on the imperatives to consider the needs of automated equipment early in the planning for an expanded facility. My title, "The Forgiving Building Revisited," is intended to suggest a characteristic that the design of a modern library should emulate. Library services are changing at an ever-increasing pace, technologies are also changing rapidly, and in ways that are not always possible to anticipate. If, as library administrators and planners, we cannot always discern future trends, the buildings we design must be able to forgive our errors in the present with future flexibility. My title is also intended to suggest that my subject matter today is ground I have covered before and not too long ago, specifically as a contributor to a print symposium on "The Forgiving Building" that appeared in the Winter, 1987 issue of Library Hi Tech, and before we go any further I must acknowledge my debt to that publication and to my colleagues who were co-contributors.

So in the next few minutes I will set out to review the impact of automation and CD-ROM technologies on library facilities design, but not without some warnings: (1) I bring a parochial, but rapidly expanding and transatlantic view to the subject; (2) I may focus more on automation in general than on CD-ROM in particular, because my own direct experience with space planning for CD-ROM applications in libraries is more limited than my experience in planning for other types of automation, though I expect there is a fair amount of transferability between the two; (3) if I do this right I will raise more questions than I answer because space planning

is first and foremost a local issue; I urge you to be suspicious of standard, ready answers; always question the applicability of any general solution or statement to your particular setting; and (4) this is a topic that could easily expand to fill a half-day's session or more, though we're perhaps lucky that I only have an hour on the conference agenda.

Now, having warned you to be skeptical about generalizations and simple solutions to complex problems, let me spend the balance of this paper offering simple solutions to complex problems.

First, I want to address the imperatives to consider automation needs early in the planning for a new or expanded facility. It is crucial that any building planning project not be hurried. You must allow ample time to consider the interplay of complex issues that will face the library for the next twenty years or more. You need to start planning early. You simply must do that. Period.

This is my one gospel. My responsibilities as the building consultant for the Wisconsin Division for Library Services and as an occasional independent building consultant involve orienting libraries to and guiding them through planning expanded facilities. Over the last four years I have met with about 100 local library staffs and boards, describing for them what needs to be done to implement a construction project. Almost a third of those libraries have gone on to engage in more detailed planning - retaining an architect, developing floor plans, contracting for construction, and so on. Through all of these meetings, my primary message is the old Boy Scout motto: be prepared.

There are many reasons for this. A building project is an extremely complex undertaking. A library requires a great variety of very specific environments to support housing the collection (in open shelving or closed storage magazines, in a multiplicity of formats, many of which haven't even been invented yet), to invite its public to remain in the library with comfortable and appropriate seating, and to accommodate ever-changing staff work routines. All of these settings and environments must be arranged to promote maximum staff and patron effectiveness. A building project will also affect the library's capability to deliver service for

many years to come. The building designed today will likely serve its clientele well into the twenty-first century, and ideally the design will be able to respond to changes in service patterns over that time. Also, local planners have just one chance to build a new building, and they want to do it right. Finally, at any given time it may seem highly improbable that a new building could ever be politically or economically feasible, but climates can change, and change rapidly. If the library is not ready with a plan, if the library doesn't have an understanding of how its program of service is likely to develop in the future and what its long-term space needs are, it will not be ready to take advantage of the opportunity when the climate does shift.

So I return to my gospel: be prepared. Leave yourselves plenty of time to consider the variety of issues - including automation and CD-ROM - that will affect how your library will deliver service in the future. This translates into knowing your community, knowing your library, knowing the needs of the community and the library, and knowing how all of these things are changing (through population shifts, the development of new media, the application of new technologies, and so on). It can seem overwhelming for its scope, but I assure you it is survivable. Even if it appears highly unlikely that an expanded facility can ever come from such planning, you should nevertheless plan for the possibility that an expansion can be implemented. The readiness is all.
End of sermon.

Perhaps it's appropriate at this time for me to describe some of my background with CD-ROM applications. Everyone at this conference has had a CD-ROM project to describe. I'm no different. My CD-ROM project is WISCAT. WISCAT stands for the Wisconsin Catalogue, a database of statewide library holdings in Wisconsin. This is a continuing project, which began about six years ago. The database now contains more than 3.1 million titles, representing over 14 million holdings in just over 500 public, academic, school and special libraries. To date, the catalogue has been distributed in microfiche, in a divided author-title-subject format. The last edition required more than 3,000 individual fiche. The cost per copy is around $600.

With the 6th edition, the Division for Library Services began a CD-ROM experiment. A CD-ROM version of WISCAT has been mastered onto three disks at a cost per copy of $60. Hardware requirements include an IBM PC XT or AT or compatible or an IBM PS/2 with 640 K of memory, a floppy drive and three Hitachi CD-ROM drives. The package costs between $3,500 and $4,000 dollars.

Seventeen libraries were selected to test the CD-ROM version of WISCAT. The advantages of WISCAT on CD-ROM include greatly expanded searching capabilities, more sophisticated delimiters, and vastly decreased costs per copy. The results of this pilot program have been promising, and there is every indication that we will soon offer the CD-ROM version to all participating libraries and start encouraging them to convert from microfiche.

Turning to automation, CD-ROM, and the library environment, we can ask what are the issues regarding space planning? I divide them into two categories: environmental issues and what I call "framing" issues. Environmental issues address how we must change the library environment to support automation. These deal with the space needs of automated equipment, lighting the automated environment, power distribution needs, data transmission needs, acoustics, and the like. Framing issues have to do with how we approach space planning questions; they have to do with how we frame such questions. Are we looking at a large library or a small library? Are we looking at short-term needs or long-term needs? I contend that a library's response to space planning for automation and new technology changes depending on how these questions are framed.

What are the space needs of automated equipment, especially CD-ROM equipments? As we noted earlier, WISCAT on CD-ROM requires an IBM PC XT or AT or compatible. The box for an IBM PC measures about 55 cm wide by 42 cm deep, with a keyboard that measures 55 cm by 22 cm, plus the three external stacked CD-ROM drives at 40 cm wide by 32 cm deep. (Each individual station requires the three drives; multi-user access via a file server is not presently supported by the WISCAT CD-ROM software.) When space is added for a printer and "walk-around" space, I would

recommend up to five square meters for a single CD-ROM station. The actual allocation may vary, depending on whether the station includes a printer (which would reduce the allocation below this general recommendation), and depending on whether the station is a stand-up or sit-down terminal (a stand-up configuration would further reduce this general recommendation). This range of space needs for a CD-ROM query station then is from 3.5 square meters to 5 square meters.

The space needs for an on-line public access catalogue (OPAC) are typically somewhat smaller, since an OPAC, being connected directly to a main frame computer, doesn't usually need to accommodate external drives. The same variables mentioned for CD-ROM stations apply to OPACs: does the station include a printer? Is a seat provided or is it a stand-up query station? The range of space needs for an OPAC station is from 2.5 square meters to 4 square meters.

How does that compare with other manual technologies? Comparing automated and manual catalogue functions, a card catalogue of 60 drawers, single-faced, should allow roughly four square meters, a card catalogue of 120 drawers, double-faced, should allow ten square meters. A six-place index table, on the other hand, should allow 14 square meters. I will try to make more sense of these distinctions when I discuss "framing" issues. For now, it's important simply to know that the space needs are different for automated and manual equipment.

Another general environmental concern for automated environments is lighting. Time doesn't permit a lengthy discussion of lighting, I'll refer instead to a good overview of these issues by Bradley A. Waters and Willis C. Winters in the Fall, 1987 issue of Library Trends. But by way of a brief introduction let me note that there are several distinctions that can be made regarding lighting. Lighting can be distinguished between natural and artificial light, by type of fixture, and between direct and indirect light.

Comparing natural and artificial light, one finds that natural light is typically stronger, more direct. Natural light usually produces stronger shadows and greater contrast. This creates glare and unpleasant reflections in a computer screen, making it difficult to read. It's easier to control contrast

and glare with artificial lighting, so artificial light is usually the choice for an automated environment.

There are three types of fixtures usually found in libraries - incandescent, fluorescent, and high-intensity discharge (HID) lamps. Fluorescent lamps are usually the lamp of choice. Of the three types of lamp, incandescent lamps offer the best colour correction (most closely resembling the warm, natural spectrum of sunlight), but the shortest lamp life. HID lamps, on the other hand, offer the poorest colour correction, but the longest lamp life. Fluorescent lamps offer moderately accurate colour correction and moderate lamp life, and because they offer this balance, fluorescent lamps are most often used in library settings.

Light can also be direct or indirect. Direct lighting is just that: the light shines without obstruction from its source to the subject or work surface. Indirect lighting on the other hand will be reflected off another surface - a ceiling or a wall - before shining on its subject. It may simply be a matter of personal preference, but I find myself recommending indirect lighting more and more. I find indirect lighting to be gentler, softer, and even more soothing, than direct lighting. It is more even, and less subject to glare. These qualities are very appropriate for automated environments.

Many libraries that use indirect lighting also supplement the indirect lighting with task lighting - small desk or table lamps that the patron can use to focus brighter light on a small area or work surface. When I toured the new Essen Stadtbibliothek earlier this week I noticed that most of the general reading areas also had task lighting fixtures that the patron could adjust according to their individual preferences and needs.

The use of task lighting suggests another environmental concern: power distribution. How can you deliver electrical service to all of those table lamps easily and cheaply? What do you do if you relocate that table later on? The same questions can be asked of microcomputers or OPAC terminals. There are a number of alternatives available.

One can supply power to a variety of locations using a traditional conduit and wire installation. For every location or outlet that is not used, however,

this option represents an increased cost that needn't have been incurred in the construction of the building. One can use "power poles", bringing the electrical service through the ceiling plenum to a point above the location for a new outlet, then bringing the service to ground level by installing a narrow pole from ceiling to floor and running the power lines along or inside that column. Where many electrical outlets or terminals are being added, the use of power poles creates the impression of a cluttered forest and may not be a pleasing alternative. Another option is to lay a grid of trenches into the floor at regular intervals; these trenches can be used subsequently to route electrical service to various parts of the floor, albeit they will not reach every possible location where new electrical service may be desired. Raised floors are another option. These are familiar in computer rooms, where the floor actually rests on supports measuring up to one foot high, creating a space between the raised floor and the actual floor through with electrical service can be rerouted to meet changing needs. Another option is to use flatwire, which employs electrical wiring formed in wide ribbons and installed directly on the floor beneath carpet squares. Locations for outlets may be changed by removing the carpet tiles and moving the flatwire to the new location. Your architect and electrical engineers can help determine which of these options will be the most effective for any particular project.

Data transmission is another general environmental concern. Many early library automation projects involved connecting remote terminals to a central main frame. The next phase of library automation involved the installation of individual, stand-alone microcomputers; data transmission became less important. Now we are entering a third phase of library automation, tying those stand-alone microcomputers together into local area networks (LANs). Data transmission among computers is becoming more important again. In fact, one of the bywords for Wisconsin's WISCAT project is "Plan for LANs". How do we move the data from one computer to another? How can we connect a local PC with a shared file server? Many of the same options discussed under power distribution also apply here: using traditional conduit and wire to a variety of locations, some of which will be used and many that won't; power poles; regular trenches cut into the floor; raised floors; flatwire.

We mentioned framing issues, suggesting that how one frames a question tempers the response to the question. Certainly size of the library (large or small) and the planning time frame (short-term or long-term) does have an affect on how one approaches space planning. In the revision of Keyes Metcalf's Planning Academic and Research Libraries, Weber and Leighton observe that a typical research library is adding enough to its book collection each year to warrant the construction of 20,000 square feet of new space just to house those new books. In contrast, the majority of public libraries in the States need less than 20,000 square feet total to meet their long-term needs. There is a clear distinction between the space needs of large and small libraries in this case.

Looking at automation issues, once I might have argued that only large libraries could afford access to the equipment and technology. Then I visited the smallest free-standing public library in Wisconsin, a remarkable little library that serves less than 500 residents and is in a building of around 30 square meters in total area. There, as you come in the front door, you're greeted by the library's public access Radio Shack microcomputer. The last time I talked with the librarian there, I learned that they were expecting the delivery of their second public access microcomputer. Now this is not a wealthy library, and I'd argue that if they can afford not just one but two microcomputers, such equipment should be accessible to virtually any library inclined to want to own a computer.

If size alone doesn't determine whether a library owns computer hardware, perhaps it will affect how a library uses that equipment. We can imagine an example from the catalogue function. In the past, the space needed for the public catalogue was dependent on the size of the collection. More books translated into more cards. If the library was a larger one, adding significant quantities to its collection annually, the library probably also had a larger, more highly trained cataloguing staff, and that would translate into more detailed cataloguing and more cards per new titles. All of these factors have the effect of increasing the number of drawers that would be needed in a card catalogue, which means the library would need a larger piece of furniture occupying more floor space. An automated catalogue, by contrast, can gain quantum leaps in storage capacity with much more modest increases in the space needs to provide that added storage. If

WISCAT on CD-ROM needs to be expanded to a fourth CD-ROM drive, I'm sure we will simply stack the new drive atop the original three. This will increase the catalogues capacity by the equivalent of several hundred drawers without increasing the floor space for the catalogue at all.

Access to an automated catalogue and the number of terminals needed to provide adequate access to those resources are becoming increasingly important. In his recent book Information Technologies and Space Planning for Libraries and Information Centers , Richard W. Boss provides some recommendations for how many terminals should be provided in different automated settings: one circulation terminal for every 70,000 transactions per year; one OPAC for every 100 visits per day; one OPAC for every staff reference point; one acquisitions terminal for every 10,000 titles ordered per year; one serials control terminal for every 50,000 issues received per year; and one database editing terminal for every 10,000 records entered per year.

By these standards, a small, very busy library may have need for many terminals and increased space for its public catalogue function. A larger, little-used library may be another matter.

We noted earlier that a small library catalogue of 120 drawers may occupy 10 square meters. It's been my experience that such a catalogue can support as many as five patrons with reasonable comfort, assuming all five don't want to explore the same part of the alphabet. To give each of these five patrons their own CD-ROM catalogue or OPAC terminal at an average of four square meters apiece would require 20 square meters, a two-fold increase in the space needed for the public catalogue.

The converse of this may be found in the library at my alma mater, a multi-million volume collection where the card catalogue contained hundreds of drawers, occupying a room of perhaps 400 square meters, and may be more, spilling out into corridors on either side of the main catalogue room. Again assuming that a CD-ROM catalogue or OPAC terminal would require an average of four square meters, this 400 square meter catalogue room could support as many as 100 stations. During my year as a graduate student there, I can't recall ever meeting 99 other people (including staff)

using that catalogue simultaneously. This library would seem to need less space for its catalogue in an automated format.

According to this example, the impact of automating the public catalogue is different for libraries depending on their size. Small libraries appear to need more space for the public catalogue function in an automated environment than in a manual environment; large libraries appear to need less space for the public catalogue in an automated environment.

But maybe not. I'd argue that automation simply redistributes the space needed for the catalogue function in a large library. My alma mater may not need 100 OPACs in the main catalogue room where the card catalogue was once housed, they may need only 40 OPACs there, but the library's public service capability could be improved by providing all 100 terminals, with 40 in the main catalogue room and the remaining 60 terminals distributed throughout the library. There were many times when I found myself deep in the stacks and needing to return to the card catalogue to pursue a new search strategy. It would have been convenient to have access to the complete catalogue of the library without leaving the stacks, walking through the security checkpoint, and back to the card catalogue. An automated catalogue affords the opportunity to provide access in a variety of locations.

The smaller library, on the other hand, probably won't need to decentralize the catalogue function in the same way. I'm thinking of that smallest free-standing public library building in Wisconsin. The far corners of that library are not particularly remote from one another. A single, central location for the public catalogue will serve that library sufficiently, whether in a manual or an automated environment.

The distribution or allocation of space for the public catalogue in an automated environment, then, is another issue that varies between large and small libraries.

What of the distinction between short-term and long-term responses? One of my colleagues from Wisconsin argues that his short-term space need is greater than his long-term space need. He says that his patrons will soon

be able to dial into his library's database of holdings and confirm from their home or office whether or not the library holds a particular book and whether or not it's available for loan. This, he says, will lead to fewer visits to the library (if they dial in and find the material they want isn't available, they'll save themselves the trip), so he will need to provide fewer reader seats. He looks at his audiovisual collection and notes that for the near term he must provide both VHS and Beta videocassettes. VHS is fast outpacing the Beta format, though, and in time he will be able to provide just a single video format, but for now he must provide both and that places a certain premium on space. Likewise, in audio formats, his library provides vinyl disk recordings, audiocassettes, and now compact disks. He contends that CDs will be the format of choice for public libraries (I tend to agree with him), and that in the future, after the audio marketplace settled a bit, his library will need to provide just the one format. He and I haven't yet discussed what will happen when still newer formats, like digital audio tape, are introduced into the market. In the meantime, however, he's providing at least three formats, again at a certain premium of space. He argues that this library's short-term space needs are greater than his long-term space needs, and he likes to chide me by asking how, as a responsible public manager, he can address that problem.

Unfortunately, I don't know the answer. Certainly the media we employ continues to change, and change rapidly. Just before coming to the conference, I read in the latest Infoworld that Steven Jobs' new NeXT computer will include a 300+ megabyte optical read-write drive, introducing tremendous storage capabilities for a microcomputer.

Where will this all lead? Will it lead to the condensation of our collections into a few CDs or a few of these new optical read-write disks? I happen to be a firm believer in the convenience of the codex volume, and I don't think our stock in trade is going to disappear, but I don't know what will happen, and I'd be foolish to attempt to tell you. Perhaps, like my colleague from Wisconsin, we need to be sensitive to these changes in technology and their implications for short-term and long-term space needs as we design our new buildings. We must try to design our buildings so that they can adapt to change easily, so that they will "forgive" the mistakes we make as we plan for the future. That's the forgiving building of my title.

I like to leave my audiences with two simple rules for library space planning, both borrowed from colleagues in the library space planning business. The first is "Make only mistakes you can live with". And the second is "Make only new mistakes; don't repeat other peoples' errors". If you can do that, any expanded building you plan should qualify as a great success!

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HOW WILL CD-ROM AFFECT THE COOPERATION WITHIN LIBRARY NETWORKS?

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Abstract

In the paper is discussed in what way network cooperation will be affected by the CD-ROM technology. The devices of network cooperation as outlined in the last few years, based the cooperation between the network centre and the individual libraries mainly on the possibility of online access from the individual library to the network centre with the double function of a host for databases and a central processing facility. Now it must be taken into account that it will be possible, cheaper and more effective to distribute the data of the network centre (bibliographic utility) to the individual libraries on CD-ROM. The distributed data can be used for cataloguing (of new items as well as for retrospective conversion) and for inter-library-lending. With respect to a reasonable number of participants of a network a regular updating is worthwhile. Even in spite of the new recommendations of highly reputated organizations in the Federal Republic of Germany like the German Research Society (Deutsche Forschungsgemeinschaft) and the Council of Research (Wissenschaftsrat) it is not yet clear whether and in what manner the present structure of individual libraries, regional library centres and the German Library Institute (Deutsches Bibliotheksinstitut) will or must be reshaped after the realization of the recommendations. One of the main reasons why this is not predictable at the moment is that new perspectives for library cooperation arise not only from the increasing capacity of new storage media but also from the standardization of Open Systems Interconnection (OSI). In addition, there must be already considered forthcoming optical storage technologies besides CD-ROM as, e.g., the WORM technology which might affect the libraries much more because it can be used for full document storage and distribution.

HOW WILL CD-ROM AFFECT THE COOPERATION WITHIN LIBRARY NETWORKS?

1. GENERAL REMARKS

If one looks at the recent developments in the application of information technology in (research) libraries one might get the impression that we are not on the way to a fixed destination. It rather seems that, according to an insight of Manès Sperber, the way itself is becoming the destination.

A year ago Charles Hildreth described the radical changement in his report 'Library Automation in North America: A Reassessment of the Impact of New Technologies on Networking' as follows: "At almost every dimension of the computerized library and networking environment, major, fundamental, structural and functional changes have occurred during the 1980s up to the present time (1)". The changes mentioned include among others, "that two grand visions still alive in 1980 are now completely dead ideas: 1. the concept of a national bibliographic network, and 2. the dream of a network-based 'total library system' developed and operated by one of the bibliographic utilities (2)".

Reasons why are

the enormous improvement of the microcomputer technology;

the growing EDP competence of the individual libraries in combination with local solutions via turnkey systems which compete with the offers from the bibliographic utilities and cause the individual libraries to react to the competition with respect to the most cost-effective solution;

the increasing debate of online public access catalogues (OPACs).

The OPAC discussion brought with it a changement of the paradigma

which Hildreth - in accordance with Barbara Markuson - described as follows: "... until recently ... library networkers have designed and implemented models of networking that optimize bibliographic control rather than facilitate bibliographic access through advanced computer technology, and have developed systems that serve the needs of librarians more than the needs of library users (3)".

Some reactions already can be seen, e.g. decisions of vendors of turnkey systems to redevice their products to PC suitable modules, or the forthcoming application of the CD-ROM technology for public access catalogues (CD-PACs). We have learnt about the Guelph and Bielefeld projects last year from Ellen Pearson and Karl Wilhelm Neubauer (4), and have additional reports on progress on the agenda of this symposium. We are especially wondering how progress has been made, e.g. "to link the CD-ROM catalogue data to the current status information collected by the acquisition and circulation systems ... [or how] access via the campus communication network (5)" has been achieved, or how the updating problems has been solved - all this, of course, with a terminal response time that can be accepted by the user.

It is not necessary to mention the obvious advantages of CD-ROM, like easy distribution, retrieval facilities or the fact, that there is no interference of conflicting access activities as is usual within a configuration consisting of mainframe-linked terminals. Commercial systems like LE PAC, offered by the Brodart Company, or LaserQuest show that, in the meantime, libraries feel encouraged to introduce CD-PACs (6).

With special respect to the Federal Republic of Germany there are some reactions to the American challenges on different levels, e.g. on the level of organizations concerned with the national planning respectively the coordination and harmonization of state planning activities on the federal level, or on the local level of the individual library. Only the following examples should be mentioned:

> The German Research Society (Deutsche Forschungsgemeinschaft) published 'Vorschläge zur Weiterentwicklung der Verbundsysteme unter Einbeziehung lokaler Netze' in 1986 (7). In these

recommendations, the responsibility for EDP functions like acquisition and circulation management is transferred from the network centres to the individual libraries.

The Council of Research (Wissenschaftsrat) published 'Empfehlungen zur retrospektiven Katalogisierung an wissenschaftlichen Bibliotheken' in 1988 (8). The Council sets up the aim, that the conversion of card catalogue records to machine readable ones, in combination with local online public access catalogues, should enable every user to have quick and direct access to the holdings of all research libraries in the FRG. The method recommended to achieve this goal is to expand the so-called Verbundkatalog maschinenlesbarer Daten (VK), a machine readable union catalogue of those libraries using already EDP for their cataloguing activities, from about 4,1 million main entries in the actual second basic edition to a national database of about 10 million entries after the addition of other existing machine readable records, e.g. from the EDP supported union catalogues in Bavaria and Lower Saxony, and, finally, of about 30 million entries after the full conversion of all (card) catalogues.

Another reaction on the national level is the pilot project distributing the data of the 'Deutsche Bibliographie' on CD-ROM which is going to be a normal service of the Deutsche Bibliothek in 1989. The Deutsche Bibliothek is also preparing a machine readable version of the older parts of the 'Deutsche Bibliographie' via scanning of the printed edition. Some coordination would be desirable with the project of the Börsenverein des Deutschen Buchhandels to publish also the 'Verzeichnis lieferbarer Bücher' (VLB), i.e. the current books in print service.

As a local reaction the mentioned Bielefeld CD-ROM catalogue can be understood.

Finally, as a remarkable reaction there should be not overlooked the warnings put forward by the director of the Deutsche Bibliotheksinstitut not to neglect political, technical, economical etc.

limits of the application of new technologies and not to give up or change running projects the moment when new technologies are just coming ahead (9).

2. OPEN SYSTEMS INTERCONNECTION

The mentioned recommendations of the Council of Research and of the German Research Society also take into account network communication facilities based on Open Systems Interconnection (OSI) protocol standard application. This has been reflected earlier, e.g., in the US or in the Netherlands than in the FRG (10), where now the Stadt- und Universitätsbibliothek Frankfurt a. M. carries out a pilot study on behalf of the German Research Society (11). How important OSI communication might become for libraries is obvious from the library cooperation practice in the United Kingdom where via the Joint Academic Network (JANET) online public access catalogues of other than the user's own library can already be searched. The OSI communication possibilities might also encourage libraries to set up new forms of network cooperation as has already happened within the CURL (Consortium of University Research Libraries) Group in the UK combining the library facilities of some of the most outstanding universities. With respect to document supply the CURL libraries building up a common register of their catalogues understand their cooperation also as a 'decentralised' response to the central supply activities of the British Library Document Supply Centre (12). It must be kept in mind that the CURL cooperation is by no means characterized by criteria of regional cooperation.

I should like to underline that new possibilities of Open Systems Interconnection will allow new constellations of cooperation which, till now, are no more than desirable. Let me mention as an example that there could be a very useful cooperation in the FRG between the new university libraries which have in common that they are open access libraries whose OPACs consequently will have to meet more and, with respect to classification and subject access, stronger demands than the OPACs in the closed stack central libraries of the old universities, at least for a

remarkable period.

3. CD-ROM FOR LIBRARIES

Even a short look at the CD-ROM Directory (13) shows the increasing number of CD-ROM products which are important for libraries. They include as well databases for general or subject information the library must provide as especially library-related databases, e.g., the bibliographical and catalogue databases like BIBLIO-FILE, Ulrich's etc. A reasonable number comes out every year. Just the pilot version of the 'Österreichische Zeitschriftendatenbank' (ÖZDB-Compact) has been published in surprisingly short a time (14). It is the increasing number itself to rise special problems for the libraries - problems which the individual user of only one or two products has not to face. They are, e.g.:

the incompatibility of the retrieval software;

the combination of CDs with the data and floppy discs with the retrieval software;

The lack of double or even more than double drivers is as more concerning as more products come out which comprise more than one CD (the handling problems are known from many microfiche products). Hitachi has announced such players but they are not yet available.

Juke-boxes for CD-ROMs are announced in the context of the ADONIS project, but they will not solve the handling problems of CDs and floppy discs in combination.

Access from more than one PC to one driver might be a normal procedure in the near future, so that this problem can be neglected.

If these difficulties can be reduced and if - as foreseeable - the capacity of CDs will increase, the CD-ROM might become a basic instrument of big networking - perhaps as well for the individual library to present its catalogue (note: its only one catalogue because the difference between

author and subject catalogues does no longer make sense with respect to the retrieval facilities) as for the network centres to distribute their data to their participant libraries. To provide the holdings and their locations stored in a network database for all members on CD-ROM would mean to make use of all advantages of the CD-ROM technology, as

the data can easily be distributed to dislocated libraries;

there are no online communication costs to be faced;

the reasonable number of members of a network brings with it comparatively cheap production costs of the single copy;

for inter-library-lending purposes the CD-ROM products might be up to date enough if new editions are produced in regular intervals, because some time lag guarantees that newly added titles are not only recorded in the catalogue databases but also available on the shelves when ordered from outside.

Nevertheless there remain problems still to be discussed. E.g., as long as even CD-ROMs are limited in their storage capacity as they really are, such distributed databases could be thought of also as short title catalogues, if this output is in accordance with the purpose, in order to reduce the number of CDs making out one product. Perhaps it could be helpful in this respect to try to learn from the experience of the Anglo-American colleagues with such catalogues. It seems to be a little bit a question of ideology that we cannot imagine the usefulness of short title catalogues. The example of the 'Eigteenth Century Short Title Catalogue' (ETSC) could be a reason good enough to rethink. So large a database as the expanded VK, perhaps at least in the inter-library-lending version, could be a short title catalogue on CD-ROM. In order not to be misinterpreted it should be underlined that the short title idea refers to the form of the output and does not mean that the original records are reduced to short title entries. One of the main advantages of the CD-ROM technology, namely the quick and easy retrievalibility, would not be affected by short title outputs. One of its main disadvantages, namely the restricted storage capacity, would be

reduced by them.

If the original record is a complete one it would be easy to produce for special purposes, like retrospective cataloguing, full outputs, if one wishes to use the data in the own library and does not prefer the retroconversion method offered by UTLAS, i. e. to store those entries to be converted on a disc and to send only the disc to the central agency in order to have it identified from the database with the full records. As more progress will be made in publishing large databases in a standardized form on CD-ROM as more facilities for the individual library will be available for its own retroconversion activity.

If we look at the two outstanding newcomers, i.e. CD-ROM and OSI, and ask what impacts they will have on our libraries and library networks the following can be expected:

library catalogues on CD-ROM will be an interesting option for the individual library;

distribution of network data on CD-ROM will be a must, for some purposes, as inter-library-lending, only as short title versions with location marks.

This has, at least, two consequences:

The individual library catalogues need only small updating facilities so that updating can be done in a way that always the respective inhouse status reflects the very actual status, at least in a preliminary way, until the processing in the network centre has been done, so that the very actual status can be made known to the user.

For user searches normally the network centre will not be approached online in the first step, when the individual library's catalogue does not provide the item searched for, but before online searching the distributed databases will be consulted. So the expensive online communication between the library and the network centre will be reduced to a minimum.

It should be mentioned, in order to avoid usual misunderstanding, that this does not mean that network centres will no longer be needed as processing centres. If a database is needed, it must be built up, kept and distributed somewhere. Many discussions could have been avoided if one would have kept in mind this self-evident insight that recently Peter Rau has described very clearly (15).

On the other hand it seems that, with respect to the planning situation in the FRG, there will be a big change in so far as the redivival of the idea of a national database like the enlarged VK, even if it will be set up via the support of the regional centres, will make a great deal of the work originally attributed to the regional centres superflous. Before the Council of Research put forward the idea of enlarging the VK as a physical database one thought of a virtual national database, namely by linking the regional databases via OSI communication.

As already pointed out, nevertheless OSI will be of interest for the libraries in uture, too. It will be the procedure by which individual libraries will communicate for document ordering and document delivery purposes, because in the national database of the \ K only locations will be found, but not the status of the availability of a document.

4. OUTLOOK: WORM TECHNOLOGY

In order to illustrate that, as said above, the way itself is going to become the destination the following outlook shall deal with a recent optical disc technology that might replace the CD-ROM technology within a relatively short time. Everybody knows that one of the advantages of CD-ROM is comparatively good existing international standardization. The good market placement of CD-ROM goes back to the fact that it is a by-product of the wide audio-visual entertainment industry. But also the existing handicaps of the CD-ROM technology are obvious. So the ADONIS project shows that, due to the restricted storage capacity, CD-ROM is by no means an ideal instrument for big full document storage. Another example for the restriction can be taken from the CD-ROM version of Grolier's

encyclopedia which comprises only the text but not the pictures. So it is not very like that CD-ROM will fill the gap between high speed reference searching and slow document supply - a gap that to deplore has become one of the main standard topics in all our professional discussions.

In comparison with the standardization of the CD-ROM technology the WORM (Write Once Read Many times) technology shows different strings of development in its short life time. Nevertheless it seems necessary to draw more attention to the WORM products than we have done till now. In spite of the lack of international standardization on the usual formal way it might come very quickly from the market.

The different incompatible strings that exist at the moment can be illustrated by a short look at the following products all being WORM discs of 12 inch:

the OSI discs (CD/Philips) based on LASER burnt pints in the upper layer;

NEC/3M discs (Hitachi) also LASER burnt but so that a more reflecting part of the layer is opened;

Gigadisc (Alcatel/Thompson) based on non-reflecting bubbles;

Sony's Writable Optical Disc System based on melting two alloys to a new crystalline unit which reflects more than its surrounding when it is read.

The experts do not expect that standardization in this field will come by the usual organizational and institutional means. If, as a consequence, standardization can be expected from the success in the market, librarians should reflect most carefully what is going on with WORM developments.

It is a remarkable fact that a lot of problems resulting from the handling difficulties of CD-ROM as described above and from their restricted storage capacity can be overwhelmed by the WORM facilities. With respect to some very interesting and already existing library or library-related

applications the following remarks concentrate on the Sony WORM discs with their enormous storage capacity, easy handling and last but not least archive quality. The applications show that the WORM discs are not only suitable to provide storage capacity for very large catalogue databases but also for an incredibly large number of full documents.

As mentioned, "all optical discs use one principle of a change in reflectivity as a means of reading. While traditional recording methods involve burning holes or creating bubbles, Sony's advanced method creates alternating alloys. This allows the discs to be direct sealed and assembled from a polycarbonate substrate. These features make the disc less expensive, more stable and lighter in weight. Sony is able to provide high data integrity by using powerful error correction coding. There is real time data comparison during the write operation and a read after write data comparison to further improve data integrity ... The decision to select optical disc hardware essentially revolves around three criteria: capacity, data integrity and reliability. The Sony Writable Disc Subsystems have been uniquely designed and manufactured to provide up to several hundred Gigabytes of accessible information per single interface at a bit error rate of less than 10-12 with an expected life of more than 100 years (16)".

There are two different methods used: 1. the constant linear velocity (CLV), and 2. the constant angular velocity (CAV). The CLV methods means that the information is written in constant distance and so the turning velocity is changed. CAV uses constant turning and so has a lower density of information in the outer tracks of the disc. A CLV disc comprises 3,2 Gigabytes on both sides and allows an access time of 0,8 seconds, whereas the CAV disc comprises 2,1 Gigabytes with an access time of 0,3 seconds.

Also the juke-box facilities have already been developed. The WDA-300-10 Writable Disc Autochanger "provides quiet, high speed and accurate transport of the discs" (17) and so allows access to 164 Gigabytes maximum storage which can be expanded to 820 Gigabytes by chaining up to five Writable Disc Autochangers.

To turn to the library-related applications, at least the following projects should be mentioned out of a big variety of fields including engineering, legal, medical, historical, insurance, financial etc. matters:

> The European Patent Office decided to rearrange its paper archive of 70 millions of pages to the described optical storage system in a joint venture in which take part Sony, Sletec and Telesystème. The documents are not only to be restored but also to be printed and delivered. The scanning processing is carried out by the Berlin firm Satzrechenzentrum Hartmann & Heenemann.
>
> The United States Patent Office, too, decided to buy ten of the juke-boxes for a similar application.
>
> "The National Archives, a federal repository of U. S. government documents is converting 1,5 million 19th and 20th century documents to Sony optical discs. These documents will include Civil War and pension and bounty land documents which are fragile and difficult to handle. The system is developed by the Systems Development Group of UNISYS, which will scan, digitize, enhance and store the images (18)".

This project of the National Archives is as more important as still in 1986 American archivists denied that optical storage media could fit archival quality. In the report 'Preservation of Historical Records' of the Committee on Preservation of Historical Records/National Materials Advisary Board and other concerned bodies one could read in 1986: "The materials and technical problems inherent in the use of magnetic and optical storage media and the lack of suitable standards for archival quality make their use as preservation media for archival storage inappreciate at the present time " (19). In our country this report, reflecting the situation of 1984/85, has been quoted in 1987 at the German Research Libraries Conference (Deutscher Bibliothekartag), the quotation has been printed in 1987 (20), and will now be assumed as the American state of the art of 1988.

I know that I left behind myself the subject of CD-ROM. But I have done so on the one hand because I am convinced that CD-ROM technology will be

replaced by a more comprehensive disc technology in the foreseeable future, and on the other hand to ask our host to set up an Essen symposium reflecting the whole range of optical disc technology, reflecting the different library applications in the fields of providing information, providing documents, and providing facilities of mass conservation by new media that exceed the possibilities of conserving individual items, in short terms to reflect the new age of optical discs replacing the age of microfilms and microfiches which might become also the age of the return of the self-sufficient local library often predicted by Maurice Line, and most convincingly in his contribution to the Festschrift for Lord Dainton (21).

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has the same basic facilities as the online public access catalogue. Features present in the online version, such as online tutorials, use for function keys and authority control, have all been maintained and in addition sophisticated 'windowing' displays enable users to view references and search for further information on the same screen. A choice of 'easy' and 'advanced' search modes caters for users' varying levels of experience in searching. CD-CAT is available as a single workstation or as a network of workstations accessing a centralised copy of the library's catalogue on compact disc and" [this is the restrictive condition] "is only available to users of the LIBS 100 system." (Aslib. Automation Notes. 1, 1988, no. 2, pp.7-8).

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BEYOND ONLINE? INTERACTIVE PUBLIC ACCESS TO LIBRARY FILES VIA CD-ROM

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UNIVERSITY LIBRARY KONSTANZ

Abstract

An increasing number of libraries is considering the feasibility of CD-ROM for interactive public access to their files. While there is no doubt that CD-ROM is far more attractive than microfiche for back-up purposes, it remains to be seen whether CD-ROM can actually replace the mainframe OPAC. Due to financial constraints, there seems to be only one choice for most research libraries in W.-Germany: mainframe OPAC or CD-ROM.

Konstanz University Library has been developing an OPAC for several years. Arguing from that point of view, CD-ROM and OPAC options (present and forthcoming) are compared in terms of interfacing cataloguing and other files (circulation, acquisition), updating, access points, telecommunication, networking CD-ROM and OPAC for specific retrieval purposes, evaluation of cost issues pertaining to production, operation and equipment.

Excellent retrieval facilities notwithstanding, CD-ROM appears to be best employed for bibliographic or fact databases. Interactive access to the variety of library files, however, is shown to be unfeasible via CD-ROM. The new medium will hardly replace current OPACs, only the back-up catalogue on microfiche; and it seems rather unlikely that W.-German libraries only about to be providing interactive access to their files will employ CD-ROM rather than continue to rely on the mainframe OPAC.

BEYOND ONLINE? INTERACTIVE PUBLIC ACCESS TO LIBRARY FILES VIA CD-ROM

The question mark in the title strikes, as it were, a somewhat sceptical keynote to the present paper. There are, as yet, more questions than answers concerning the specific aspect of CD-ROM application discussed here: the feasibility of interactive public access to the files of a university or research library. The paper will not elaborate, in somewhat abstract or speculative terms, on the virtues of library catalogues on CD-ROM; and it will not repeat assessments of current examples of CD-ROM catalogues (published or forthcoming elsewhere). The focus will rather be on a comparison of interactive access to library files via CD-ROM and OPAC, leading to the crucial question whether library catalogues on CD-ROM are likely to complement or indeed replace the mainframe OPAC. In order to allow for such a comparison in terms of a specific library situation, however, a brief description of the OPAC implemented in Constance University Library will be given later on.

That sceptical keynote may come as a surprise. After all, Constance University Library has been providing CD-ROM, for over a year now, very much the same way it has been providing books, periodicals and non-book material all the time: in open access and to the readers' self-service. Within a research project supported by the Deutsche Forschungs-gemeinschaft, the use of PsycLit on CD-ROM is being investigated, pertaining to hardware and software acceptance, cost analysis, searching behaviour, downloading etc. The results have so far been very encouraging, leading to the implementation of further CD-ROM workstations as well as to the provision of other databases on CD-ROM, such as Medline, Sociofile, PAIS etc. As for bibliographic databases, our library has accepted CD-ROM as a real alternative to conventional publication forms. Further to that research project, Constance University Library held the first seminar within the Federal Republic on the variety of CD-ROM applications in libraries in April of this year, and we felt that seminar to be successful (1).

1. GREAT EXPECTATIONS?

On the other hand, the idea of a library catalogue on CD-ROM has not yet been met with similar enthusiasm. This is due to principal considerations rather than negative test results of current examples of catalogues on CD-ROM, as implemented in the university libraries of Guelph (2) and Bielefeld (3), as well as the library of the Centre Georges Pompidou in Paris (4); another system will be available shortly in a public library network in Rhode Island. These examples may vary on issues such as size of the database, equipment of CD-ROM workstations or design of user interface. More important, with regard to our specific interest in Constance (shared, perhaps, by other university libraries in this country), is the fact that three examples, Guelph, Paris and Rhode Island, permit direct comparison of interactive public access via CD-ROM and online. In fact, the system to be implemented in Rhode Island is reported to be launched by CLSI, complementing online public access in these libraries and to be interfaced with CLSI's integrated library system, LIBS 100 (offering two hardware options of online public access itself, touchscreen and keyboard terminal) (5). The three examples mentioned prove CD-ROM to have the same interactive retrieval structures as the mainframe OPAC, occasionally even more comprehensive ones. Now, improved bibliographic retrieval is certainly required for general or subject bibliographic databases, but it does not appear to be the only important feature of a library catalogue; almost equally important are links between the cataloguing and other files as well as "real time" processing and online update.

The catalogue situation of Constance University Library lends itself to a comparative approach towards interactive catalogues on CD-ROM and mainframe. Besides our experiences in CD-ROM, this is due to the fact that our library has been running on Online Public Access Catalogue since 1984. Our OPAC design is, admittedly, still work in progress; with regard, however, to the present interactive features as well as the current use and acceptance of our OPAC (I am far from saying 'any' OPAC), I hesitate to confirm that access to the variety of our files could be provided as successfully via CD-ROM. I feel that CD-ROM will only be runner-up to online access. That goes for the main catalogue, not for back-up. With

respect to back-up, there can be little doubt that CD-ROM is far more attractive than the conventional microfiche.

'Had we but world enough and time', it would be absolutely no question to have a catalogue on CD-ROM implemented in our library. Following the example of Guelph, the catalogue on CD-ROM would complement the OPAC and replace the microfiche back-up. It would be also facilitate access to our holdings enormously for the numerous people outside our library unable or unwilling to use the packet switch gateway to our OPAC. Regrettably, neither 'world' nor 'time' appear to be enough. And, what is more, they do not seem sufficient for the greater number of university or other large research libraries in this country, either. The question, then, is: since it will be unlikely to attract the resources necessary for mainframe plus CD-ROM in the near future, it will have to be assessed which solution is more feasible. Prices of CD-ROM technology and implementation at large will certainly continue to go down; therefore, the question, CD-ROM or mainframe, can also be stated in more general terms: will there be a chance for CD-ROM to store and present the main and possibly only public library catalogue? Or will CD-ROM rather continue to serve as a significantly more comfortable back-up catalogue?

The answer to these questions bears on the understanding of the interactive catalogue, which is determined by the 'OPAC background'. Before describing that background in more detail, attention should briefly be drawn on managerial and financial issues that may also contribute to an answer to the above questions. Limiting the present paper to aspects of catalogue use and library operation, catalogues on CD-ROM, if they are intended to be the only interactive public catalogue within a library, may appeal to quite a number of libraries. That applies for libraries which have already introduced automation to their cataloguing, using the mainframe of a cataloguing cooperative, but have so far retained conventional catalogues for the public (fiche or even cards). That should also apply for libraries not intending to introduce automation to departments other than cataloguing in the near future (notably to acquisition) and which do not have to make plans for integrating the various aspects of book processing. Library automation still tends to be a two-phase project in this country, with the users deriving benefits from that automation only after a rather

lengthy transitory period characterized by microfiche catalogues. This period of transition is apparently accepted for the near future even by advanced library and information planning (6). The explanation for this delay is rather simple: every step towards automating local library functions (acquisition, circulation, OPAC) will require a local mainframe computer sooner or later. Therefore, the delay in introducing OPACs is very often due to insufficient or yet non-existent local hardware, problems of systems development, difficulties of procurement etc. Furthermore, it touches on very sensitive management issues to introduce fundamental structural changes to departments involved in book processing as a course of or maybe even a precondition to library automation: obvious examples are acquisition or the integration of acquisition and cataloguing. CD-ROM may come as a solution to this assortment of problems: It may keep the administrative organisation of the library very much at what it is; yet it may offer a perspective of having the users participate in the blessings of automated cataloguing by providing correspondent retrieval facilities.

As for finance, it will probably be futile to attempt an abstract calculation comparing OPAC and CD-ROM in terms of implementation, maintenance and possibly enlarging mainframe and periphery on the one hand and CD-ROM workstations (plus production and supply of CDs) on the other. It would certainly require a different paper to investigate the feasibility of catalogues on CD-ROM as a substitute for mainframe OPAC in terms of budgetary law and procurement regulations. Suffice it say, that both strategies inevitably require a method of funding strictly complying with the Hochschulförderungsgesetz. The idea is to split investment costs above 5.000 DM even between federal and state governments in this country. Despite its decreasing price range, CD-ROM technology for public catalogues of large libraries cannot be implemented by pursuing a kind of piecemeal engineering, workstation by workstation. In this context, it may be interesting to know that the investment only for the production of the Bielefeld master CD can be estimated at about 75% of a mainframe implemented in a South German university library in 1987 (7). Of course, this is not a representative example. Yet the prevailing costs for software (premastering, mastering, production of copy disks) as well as hardware equipment (players, "juke-boxes", PCs in nu nbers adequate to meet heavy

library use) are still well above the generally low (and still diminishing) library investment budgets. Calculations are even more difficult for the networking technology, which is presently only about to be launched, but which turns out to be absolutely necessary to provide for the link between bibliographic and other library files and to enrich bibliographic retrieval with information vital for library use.

2. THE OPAC BACKGROUND: INTERACTIVE RETRIEVAL

Enrichment of that kind is usually expected to be provided by OPACs. It may be helpful to recall a neat definition of an Online Public Access Catalogue, which is understood to be "a mechanism for providing real time interactive access to the bibliographic records for a library's holdings. The online catalogue provides for searching the bibliographic records in a variety of ways which need not be stipulated during database creation, and which may be constructed by the user to meet a particular information need at the time the search is conducted" (8). With regard to these criteria, it seems fair to say that a catalogue on CD-ROM can only provide interactive access; real time access, on the other hand, is virtually impossible via CD-ROM, while access to the complete holdings of a library is very difficult to provide, if at all.

First, let me describe very briefly the OPAC of our library. It is part of a system whose functions are at present split between the local level (comprising circulation and OPAC) and the regional, cooperative level (for acquisition and cataloguing). The bibliographic data of the whole collection of about 1 mill. titles (1.4 mill. volumes) are included in the regional cooperative, and a copy of the Constance subset is derived twice a week to form the basis of a local, stand-alone system. The split system situation will change early in 1989, when the acquisition module will be integrated into the local system. The mainframe of the local system will be linked directly to the mainframe of the regional cataloguing cooperative to allow for "real time" access to the complete holdings.

Until that change, the OPAC will remain to be based on the circulation module. That explains for the facts that (a) only about 80% of the library's

titles are currently available via the OPAC , and that (b) the display format is red . ed to a short title. A menu driven user interface to the system has been designed inhouse; it is called KOALA (Konstanzer Ausleih- und Anfrage-System, Constance Circulation and Enquiry System) (9). At present, KOALA provides access via call-number, author and/or title (150 characters from title proper and subtitle) and subject, with the last mentioned still being limited to a class (shelf) number approach. However, subject retrieval will be greatly improved when the index to our comprehensive classification schedules will become available via KOALA in autumn 1988, introducing a retrieval option close to the subject heading approach. Furthermore, the subject headings of the Deutsche Bibliographie as well as the verbal features of PRECIS from the British National Bibliography will be integrated into our OPAC in winter to substantiate keyword searching. Boolean searching is available; yet users are, at present, not explicitly advised to do so (the same goes for truncation of keywords). In fact, Boolean searching is presently reduced to implicit AND in author/title queries. The situation will change in 1989, when hardware appropriate to advanced retrieval, including full Boolean searching, will be implemented. A longer bibliographic display format will then become optional.

The screens allow for easy browsing (backwards and forwards), displaying loan status, call number and short-title in a single line entry. Up to 11 hits are displayed on one screen. Seeing bibliographic details of books (first author's surname, title proper, publication year) requires a subsequent screen. On that screen further information is being provided: for every book being lent the date is displayed when it is due to be back in the library; the user may instantly place a reservation for that book; in case of other reservations already placed on that book, the user will see the position of his/her reservation in that queue. For every book not being lent the location is specified where to find it in our spacious book area (following Anglo-American examples, there is open access to the whole collection, except some 8,000 rare books). Items on order have been displayed since May 1987. Also included in KOALA is an option to suggest books for acquisition (again plus reservation); our library receives some 100 suggestions per day. Beside the option to receive general information on how to use the library, there is also a mailbox facility, which readers

may use for questions, suggestions or complaints about the OPAC or the library in general. More about the mailbox later on.

I am far from saying that our OPAC in its present design is a model one. The display formats are limited, and the present retrieval options are not quite state-of-the-art. Yet I feel that plain and simple retrieval strategies are sufficient for an OPAC of a general university and research library. The same may apply for short-title display formats. This is not to say that with regard to descriptive and subject cataloguing there may be no other retrieval and display options which make the OPAC resemble a database in commercial information retrieval. However, it has yet to be proved that the "expert OPAC", the information retrieval system disguised as a main library catalogue, is not a "golden retriever" or another kind of "white elephant", albeit an electronic one this time (10). Unfortunately, this is not the place to defend the position of short-title OPACs in detail; suffice it to say, the future of OPACs is somewhere "beyond Boolean" (11); that is to say, it will be far more important for OPACs in university or universal research libraries to provide interactive retrieval structures, such as "fuzzy matching", "relevance feedback", automatic synonym generating or spelling corrections ("Soundex" algorithms" (12)). An attempt at interactive structures of this kind will be made in our OPAC by transforming a subject enquiry automatically to a keyword enquiry to avoid zero matches.

Given the present storage capacity of CD-ROM, it seems unlikely that the indexing files necessary to really interactive retrieval options may be accommodated on a reasonable number of disks, when the holdings of a medium-sized university library (some 1 mill. titles) are to be made accessible, let alone the holdings of a whole cooperative. Even if the imminent problem of "juke-boxes" to facilitate simultaneous access to a number of disks is solved in the near future it remains to be seen whether the unavoidable equipment can be implemented at costs meeting the libraries' present budgets and increasing library use. Should the "juke-box"-technology remain outside the financial reach of libraries in this country, compromises regarding retrieval options as well as display formats will be unavoidable; the "short-title" CD-ROM catalogue may then come as technical compulsion, in spite of all "bibliothecal" objections.

3. THE "REAL TIME" ISSUE

Closer to the reality of our OPAC and indeed other comparable OPACs are features which touch on the keynote "real time": "The term real time means performing an operation so quickly that the results are available in time to be used to control some other process" (13). As anticipated by the initial OPAC definition, "real time" pertains to matters of library holdings as well as to matters of library use. The mainframe, obviously, has decisive advantages over CD-ROM, which can be observed in many OPACs both in the UK and in the US. Referring to the first issue, there is simply no point in dealing with CD-ROM options in terms of updating conventional back-up catalogues on fiche. If new disks are issued only twice or three times a year, the library catalogue, despite all retrieval improvements, will be thrown back to a situation resembling the beginnings of library automation, with fiche catalogues issued at intervals mentioned. The obvious alternative is, of course, hard disk update on the basis of networking the PCs of CD-ROM work-stations (14). This solution may, theoretically speaking, be visible very clearly at the horizon - yet we are, apparently, only about to be entering the period of test-runs necessary to establish whether the technically ambitious and very expensive new processing can actually cope with the heavy use of interactive library catalogues. Assuming that networking will become feasible, we may think of weekly or even daily updates. It would then be unfair to insist on the advantages of "real time" coverage of holdings guaranteed by mainframe OPACs: to have a book catalogued does not necessarily imply that the very book is available for use immediately afterwards.

3.1. LIBRARY HOLDINGS

The last mentioned issue alludes, if carefully, to the time that is spent on the intricate daily routines of library administration before use. Yet this issue also points towards a characteristic phenomenon of conventional catalogues that should no longer be noticeable in times of libraries profiting from library automation which comprises not only cataloguing but acquisition as well. Traditional catalogues tend to cover the books which

have actually passed the intricate procedures already alluded to and which are, as it were, ready for use. It is certainly trite to say that the readers' interest in books commences at far earlier a time. Imagine a reader suggesting a book to be acquired by the library he or she patronizes. From the moment that suggestion is made the library interested in serving its clientele as rapidly and comprehensively as possible should take an interest in keeping it informed. Provided the reader's suggestion is accepted and the book is being ordered: it should then only be natural to allow the reader to keep track of what is happening to his or her suggestion. Which leads on to the fact that it is more appropriate to say that the notion of "library's holdings" should also cover the items on order, both in terms of its budget and the readers' interests. There is absolutely no reason why items on order should not be covered in the library's public catalogue. This is by no means revolutionary: about 30% of the online catalogues in the United Kingdom displayed ordered books in 1986/87, and the number is increasing (15). And to continue along this line, the catalogue should be so precise as to distinguish between items on order and items already received.

To tackle this problem within a CD-ROM environment by making use of hard disk updates in short intervals does not seem realistic. An average university library in this country acquires 30,000-50,000 books per year. Gifts, exchange and the special case of serials items apart, some 20,000 - 35,000 individual titles are actually ordered per year and would thus have to be included in the acquisition module. "Real time" processing is unavoidable due to books being continuously ordered by and delivered to the library. Our library has presently about 16,500 records pertaining to individual titles on order, serial titles not counted (plus 2,500 so-called "inactive" records covering requests for gifts, subscriptions or desiderata).

Yet I am afraid that these problems refer to the rather sensitive area of transparency of library administration and book processing. It seems that CD-ROM catalogues, for all interactive structures and technical possibilities of coping with the "real time"-lag, tend to carry on some characteristics of conventional catalogues; or, to take a more positive attitude, it is easier to include the user into a cataloguing environment which naturally offers "real time" structures and which turns out to be

extending the notion of the interactive catalogue form Booleans to the very field of transparency of library administration. Which is why there should be an interactive circle of inviting suggestions for acquisition via OPAC and keeping the user informed about the progress his or her suggestion are making.

3.2. LIBRARY USE

The second issue relating to "real time" is library use. The obvious example to refer to is circulation control. With reference particularly to the UK OPACs just mentioned it would be somewhat illogical to be surprised by the fact that about 80% of the UK OPACs display the availability or loan status of items. After all, a great number of these OPACs are rooted in circulation systems to which a user interface has been attached (see, for instance, GEAC's Public Query). The same is true for our OPAC. We may like it or not that "library use" is mainly measured in terms of circulation. I, for that matter, do not. In terms of interactive catalogues, it may be more significant to state the number of OPAC transactions, which in our library amounts to well over 40,000 per day and over 130 per minute in peak times (only for circulation and OPAC enquiries) (16). Anyway, our library lends about 3,000 books per day (almost 600,000 per year), renewals not included, nor reservations. About the same number are returned every day. Given four weeks as the minimum loan period for books (to be extended automatically to 12 weeks if there is no reservation), the circulation file permanently covers about 20% of the library's holdings.

I wonder how this amount of data reflecting library use is to be dealt with other than by mainframe technology. Assuming, as I did above, that networking technology will enable libraries to feed circulation updates onto the hard disks of every CD-ROM workstation at short intervals, it is unlikely to have the whole circulation data accommodated on a hard disk and it is not feasible to do updates at intervals shorter than a day. Within that solution, which appears to be the optimum in CD-ROM technology, the circulation file would lose precision and reliability. It would become fuzzy during each day, with the degree of fuzziness to be estimated at some 6,000 cases for our library (the number of books issued and returned).

Moreover, tasks which the users have become accustomed to do themselves, such as renewals (not available in KOALA) or reservations, could no longer be handled in the comfortable way, if at all. There seems to be no alternative but to have separate mainframe terminals implemented (i.e. independent from the CD-ROM catalogue workstations) which are dedicated to circulation purposes. Or do we expect the users to abandon the search for literature at the most important point, when the question is imminent whether the retrieved items are actually in the library or not? Do we expect them to take chances and to walk around in spacious book areas or to wait for books being fetched from closed stacks only to find out that the books are checked out at that moment? It may be a matter of years until access to both CD-ROM and mainframe becomes feasible from one PC. Arguing from a mainframe point of view: there is nothing like online update of borrower and item records.

Related to circulation control are (a) inter-library lending and (b) the whole complex of library fees. As for the first, Constance University Library will have to deal with some 40,000 requests and receive some 25,000 items from other libraries in 1988. Books supplied to other libraries by inter-library lending are already being displayed in the OPAC circulation file. There are subsequent plans (a) also to include received books in the borrowers' records, and (b) to provide for inter-library ordering in KOALA. As fas as library fees in general are concerned, the borrowers' records will be amended to account for calculations of processing fees (e.g. inter-library lending) and fines for overdue books (also by individual item categories, e.g. short loans) and incremental fine rates. The account function will be linked to a cash function, possibly including a collection system, to facilitate administrative proceedings. The amendments pertaining to inter-library lending and accounting will (hopefully) be implemented within the next six months.

3.3. COMMUNICATION

The third issue of "real time" relates to communication. For the notion of "real time" is not a one-sided affair, as if the library only had to provide the necessary data and functions. Admittedly to a lesser degree, but more to

the idea of the interactive library catalogue, there are efforts to overturn tables (or should I say: catalogue drawers?) and turn the user from a passive recipient of cataloguing and circulation data into an active communicator. As mentioned above, there is a mailbox facility in our OPAC. Access to the mailbox is either anonymous or via user number (if a reply is expected). Some 30 "letters" are received every day; serious ones are answered by the library, the replies being available online the following day (of course, exclusively to the writer's user number), and they are deleted automatically after the first display on screen. The mailbox has certainly facilitated communication between users and the library administration, and the increase in that communication (for which every library should be grateful) is due to the prompt replies to users' requests or complaints.

It is not old wine in new bottles to create a mailbox, into which library users may place questions or comments to the library administration. A small number of non-sensical or non-quotable messages apart, we find that the majority of contributors to our mailbox perform a very constructive part in making valuable suggestions for library management, collection development or for the design of the OPAC itself. The mailbox is, as it were, complementary to the OPAC, encouraging user reactions, getting and keeping in touch with users, making them continue the interactive part suggested by the catalogue. Now, the medium is not the entire message: what matters is the fact that these messages are answered in detail, employing the very mailbox or old-fashioned letters or indeed spontaneous invitations for a talk, even though that may look like clinging to a relic of pre-online days.

4. CD-ROM: COMPLEMENTING ONLINE

The advantages of catalogues on CD-ROM will not become apparent if the CD-ROM option is seen as an exclusive alternative to mainframe. After all, almost all retrieval facilities of CD-ROM are provided by the mainframe OPACs in the United States (17), the United Kingdom and, if still to a lesser degree, in West Germany (18). Moreover, the complete holdings of a library are likely to remain accessible only via mainframe OPACs (including

titles on order or being processed by the library). Moreover, only mainframe will provide for the vital link to an up-to-date circulation file.

Although decentralised access to catalogues on CD-ROM is certainly an advantage, more and more OPACs are becoming accessible by the various packet switch systems. One obvious example is the Joint Academic Network (JANET) in the United Kingdom; most of the OPACs implemented in West German university libraries are also accessible via Datex-P.

As for in-library use, it seems that there are only two obvious advantages of library catalogues on CD-ROM:

- access to library files escapes mainframe breakdown or maintenance,
- the back-up catalogue necessary to a mainframe OPAC is certainly more attractive on CD-ROM than on conventional microfiche.

With respect to only these advantages, CD-ROM will not replace the mainframe OPAC.

Yet Pearson and MacKinnon are entirely correct in stating that the catalogue on CD-ROM is far more than the fiche of the 21st century. Awareness of CD-ROM confirms the importance of PCs in library use. PCs remain a prerequisite to access a possibly unlimited number of databases, both within local area networks and beyond. All ideas of networking CD-ROM workstations notwithstanding, the really new challenge of electronic data processing in libraries is presented in a different field: the parallel or simultaneous access to mainframe and CD-ROM from just one PC workstation, accessing the CD-Player(s) or a "juke-box" and working as a (dumb) mainframe terminal. Provided that simultaneous access will become feasible, the CD-ROM may become more important, however, for information retrieval than for library catalogues. This is due to the increasing number of computerized subject bibliographies being published on CD-ROM. With respect to information retrieval, CD-ROM is indeed accepted by the users (as we can observe in Constance). The integration of CD-ROM for information retrieval purposes into a mainframe library catalogue environment is still somewhat hazy at this moment: yet

there is a prospect of having the users do information retrieval in special subject bibliographic databases on their own, download titles relevant to their query, and transfer these titles to the mainframe containing the library's catalogue, in order to find out which monograph or serial titles are actually available in that library. This perspective is more likely to substantiate the great expectations concerning the application of CD-ROM in libraries. The same function may be performed, though, by having the users do their own online searches in computerized subject bibliographies, but this strategy will hardly be cost-effective if provided in other than special libraries.

CD-ROM can thus contribute to a very significant function: information retrieval (in the sense of databases searching) could become available even for non-privileged library users in large research libraries. Interactive searching could be extended from the library's holdings to other material, accompanied by the vital option to check whether retrieved items are immediately available on the spot. Information retrieval would, at least in part, be relieved both from printed bibliographies and expensive online searching, and could be performed in the interactive way outlined by OPACs. It seems more profitable to invest in that direction of CD-ROM implementation rather than in library catalogues on CD-ROM, preventing considerable sums from being spent on making a complex and costly network grasp for the variety of library files only the OPAC can actually reach.

In conclusion, the best that can be said for library catalogues on CD-ROM is that they are way ahead of microfiche. Yet library catalogues on CD-ROM are likely to remain well behind the interactive possibilities of a mainframe catalogue to establish a kind of library information system.

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ELECTRONIC LIBRARY? THE CONSEQUENCES OF MICROS ON DATA PROCESSING SYSTEMS IN LIBRARIES IN THE AGE OF CD-ROM

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FEDERAL REPUBLIC OF GERMANY

ELECTRONIC LIBRARY? THE CONSEQUENCES OF MICROS ON DATA PROCESSING SYSTEMS IN LIBRARIES IN THE AGE OF CD-ROM

1. Introduction

A real electronic library is nc library anymore. Already more than 30 years ago when the microform publication started and a bit later when the electronic age started there is an increasing number of voices announcing the age of electronic publications. Quite some of these prophets proclaim the age of print is over and announce the extinction of libraries (Ref. 4). Lancaster has predicted the disappearence of libraries by the year 2000 because there is no paperprint publication anymore (Ref. 2). In the New York Times from the 1981-10-26 the journalist Kleimann has stated: "The library of the future will not have a card catalogue. It very well may not even have books. In fact "it" - as a defined location on a specific block or college campus - may not exist at all".

What he means, is a fully electronic library, only using an access to data distributed in databases around the world without storing any printed or other material. Therefore the library then would be only a service-center for the access to electronic information somewhere else without any bookstacks and even electronic documents.

Elec ronic publishing is getting more importance but there is no sign that it will dominate the whole market in the forseeable future. This type of electronic library is not yet to be seen. It is much more probable that the traditional book information will continue to be combined with electronic information. So still the traditional data processing business in libraries, administration of the library and its services with its traditional parts ordering, acquisition, cataloguing, circulation, serial check in and so on has to be done. But the pure electronic services started long time ago are getting increasing importance by new media as optical discs and by network interconnection etc. But the future will request more and more integration of the traditional data processing procedures in libraries and

the electronic information business. The perfect integration finally will be the "scholar's workstation" (Ref. 3) combining all types of information except the books themselves on one screen. Especially for development and research in industry and universities this type of integration is becoming more and more popular.

For the work of librarians an integrated workstation is necessary, too, which allows to access and input all data necessary for library processing at any workstation without complicated procedures to access different databases and to use different software packages.

2. Development of concepts in library automation

The development of concepts for data processing in libraries is naturally connected to the technical development. The almost classical view of the history of data processing in libraries is dividing the 30 years of development in 3 ages represented by the 3 decades. The first decade in the 60ies is determined by local mainly offline systems. Because of the low capacity of computers at that time a lot of systems only covered parts of library processing as cataloguing, circulation etc. The trend in this decade first went to integrated local systems and to change to online mode. But the fast development of online systems made the 70ies to the decade of online networks. Networking seemed to be the best solution for local library processing problems, too. The trend of the 70ies was first to establish, improve, extend and accelerate networks. The 80ies started to split the development at least in 2 ways. The networks have been improved and increased. Strategies and technical solutions have been developed for network interconnection. But at the same time the introduction of PCs changed the original trend very heavily. Minis and micros made the 80ies the decade of local systems again. Therefore the networks started very early in this development to combine their centralized network with local data processing systems. So the resource sharing and the shared cataloguing concept of networks can be used and all functions which are better done on the local level can be processed in local systems. But naturally the big networks tried to keep their clients as long as possible to the traditonal central network services which are very profitable. The trend

to local systems is encouraged by another technology of the 80ies: the optical disc. Big databases, text and all type of materials can be published in electronic form for online search in local use replacing their host access by telecommunication.

The still fast growing capacity of micros, PCs and the storage media with still heavily decreasing prices is continuing to change data processing concepts in libraries, too. It seems to be that the statement of 1986 is still valid in some kind: "Microcomputer policies which are becoming prevalent in the corporate world are not widespread in libraries but are clearly needed" (Ref. 1). The traditional library systems based on the historical mainframe philosophy seem still not yet to be adapted enough to this technology.

The enormously increasing capacity of micros leads more and more to decentralization and distribution of functions to different autonomous systems connecting different technologies (host, PC, optical disc etc.), operating systems (UNIX, MS/DOS, OS, different mainframe operating systems etc.), networks and local systems. Micros have brought more standards or quasi standards for operating systems (UNIX, MS/DOS etc.). Micros are very communicative among themselves and with other systems. Software for big micro computer networks is available (Novell, 3-COM, NFS, etc.). Single user PCs can be connected to multiuser systems (UNIX etc.) in the same network.

Micros are based on the principle of end-user computing. Their background as personal computer enforces software for end-user systems to be used for selfservice by non-experts, too. The big software packages for mainframe systems are mainly facing expert use. This is evident comparing for example retrieval systems of big information database hosts and PC systems for CD-ROM. The use of a CD-ROM database on PC is much easier than the use of the same database on the host. The amount of help functions may be a small sign for this difference. Sophisticated PC software systems need only few help functions, the big host retrieval systems often 100 to 200.

But one of the big dangers of distributed autonomous systems is the effort

needed for communication itself. Communication is fine but not cheap and needs maintenance. To distribute system functions to different computers needs to define the break even point between centralized and decentralized procedures in terms of communication costs.

3. Concept for distributed systems in library data processing services

Bielefeld University is step by step replacing the overaged mainframe data processing systems of its library. Therefore there have been checked and developed concepts for distributed data processing in a network. It is planning and already partly realising a local library network distributing library functions to different computers integrating optical storage technology, access to the library network from university and public networks and access to public networks for information supply purposes. There are to be divided 2 parts. The first part includes the library network itself with all local services and library administration and the other part the connection and access from and to other systems and networks.

3.1 Local library network (LLN)

Autonomous subsystems dedicated to special library functions are distributed to the different library units. Data input and updating of the different databases are only done in the respective library units. All public data of these databases are to be accessed by the local library network and via links by other networks inside and outside the university. The technology used for each subsystem depends on the size of database and data traffic. Subsystems with high data transfer rates as the circulation system can request another technical solution than for example the serial check in system. Subsystems with heavy data traffic tend to be processed on multiuser computers to avoid overcharge of the LLN. This decision is closely related to the network costs.

The autonomous systems are covering all main functions of library processing:
ordering, acquisition and accounting

serials check in
cataloguing
circulation
OPAC
local use of information databases on CD-ROM.

The principal features of the local network are the following (see Graph 1):

1. Mainframe:

   The mainframe (in Bielefeld a Siemens 7550B with operating system BS 2000) is still needed for the maintenance and updating of the central bibliographic database for catalogue data including all materials still in processing. The access to the mainframe will be totally closed for the public and it is only used for the maintenance of the database. Therefore almost any risk of damaging the main database from outside is excluded. All data needed from the subsystems are transferred to the mainframe and updating the main database. This database is used for any type of catalogue production, OPAC and/or offline catalogues. Only the cataloguing is done directly in the mainframe, all other transactions of staff members or users refer to the subsystems of the LLN. Because of the low access rates the mainframe can be kept quite small. For the same reason the mainframe database can be transferred from the local mainframe to a library network center if it is connected with the LLN in the same way as the local mainframe. The LLN does then not need any mainframe.

2. PC network:

   The PC network is the essential of the LLN. It is going to connect all PCs (at present UNIX and MS/DOS) of the library. . ‹e PCs for internal use by staff members only are additionally directly connected to the mainframe for cataloguing and reference purposes. The mainframe is also connected to the LLN to transfer the data for the catalogue production.

   Multiuser systems and single user PC are combined in the network, according to the present concept UNIX and MS/DOS systems. To protect the subsystems' processing databases against unauthorized changes from outside the input PCs of the subsystems are closed for public access. The public data of these databases are copied and stored

additionally in the server discs for public access.

3. Subsystems:

- Ordering, acquisition and accounting:
  The subsystem will be connected with one copy of each CD-ROM edition of the major Books in Print databases (at present USA, UK and Germany). For ordering the data will be input into the system either from the CD-ROM or from any other source and sent to the booktrade by electronic mail. The ordering record for the library and for the booktrade is done in the same procedure. All type of booktrade information is sent from the booktrade by electronic mail including the account data. When the book arrives all relevant data for the final acquisition processing of the book are already available in the database and can be finished in one procedure.

  The program development has already been started in cooperation with a big book supplier. Electronic communication with the booktrade and the use of Books in Print on CD-ROM is already working.

- Serial check in:
  The connection to databases of serial agents would be useful to check problems with serial issues. The principal procedure is the same as in the previous subsystem. The development of MS-DOS software by serial agents is in progress. At the moment no appropriate software is available at least in Europe.

  The software for the serial check in system is to be purchased, but in Germany there is still no serial check in software available which is ready to be used.

- Cataloguing:
  See 1.

- OPAC: The OPAC requirements are shown in Graph 2.
  Bielefeld University Library has already started the production of its catalogue on CD-ROM. The software available is basicly no CD-ROM software but to be used for any other PC storage media for example

hard disc. At the time being we still consider a CD-ROM based OPAC as effective and cheaper than any mainframe OPAC. If in future any other storage media will be preferable the OPAC can be transferred to this media within the LLN.

There are different concepts for a CD-ROM OPAC. If the OPAC is only done on CD-ROM the updating periods are too long because the CD-ROM production is still relatively expensive. For regular updating - about weekly - a special updating procedure is necessary. Weekly updating can only be done on hard disc additional to the CD-ROM which is containing the main database. The amount of updating data depends on the periodicity of the CD-ROM production. With semi-annual CD-ROM production bigger libraries need 30 MB and more for the additions between the CD-ROM editions. These are 2 concepts to be considered, both using networks.

The size of Bielefeld University Library or bigger libraries need more than 1 CD for data and indexing, in Bielefeld 2 discs. In the first concept the CD drives and the discs are distributed to any OPAC PC, in the case of Bielefeld 2 drives per PC. The updating data will be transferred from a master PC within the network to the hard discs of all PCs involved. Therefore in this concept the retrieval of CD-ROM and updating database is done independently on each PC (see Graph 3).

In spite CD-ROM drives are becoming more and more integrated into the PCs to use 2 CD-ROM drives for any retrieval PC is not very elegant but allows stand alone retrieval within any PC. Technically much more sophisticated is the second concept which keeps the CD-ROM and the updating database centralized within the network attached to the server. Further only 1 CD-ROM is used for the data. The indexing data are transferred to the hard disc of the server (see Graph 4). In this case the CD-ROM at all can technically be easily replaced by hard disc in the server if this is more effective and cheaper. The OPAC in the LLN can be accessed from outside like all other databases in the system via the network server for other networks. This concept is not only more sophisticated and faster but maybe more expensive, too. Bielefeld University Library is going to check the concepts in practice to make the

final decision for its new OPAC.

- Circulation:
  The circulation system is a very busy one with high transaction rates. We have therefore chosen a multiuser system with a centralized subnetwork for a super PC (Siemens MX 500, UNIX) as central computer and 4 smaller multiuser computers (Siemens MX 2 with 4 workstations each) for terminal administration, plausibility control and need run attribute (see Graph 5). The subnetwork is already existing but still using the mainframe as main computer. The UNIX software is in programming and the subsystem as described will be available next year.

- CD-ROM database use
  The prices of information database suppliers for a CD-ROM database are very high. Therefore it is not possible to distribute a lot of copies to any workstations needed. On the other hand the use of these databases is not so heavy that any workstation needs an own CD-ROM copy. Therefore it is planned to supply the network with a CD-ROM server system for the public access to CD-ROM databases. CD-ROM databases can be used in this way only when network retrieval systems are available.

- Connection to other systems and networks
  The library needs connection from the LLN to different other types of networks:
  - library networks for cataloguing and interlibrary loan purposes
  - host networks for online information
  - university network for the use of library services
  - public networks for the use of library services
  - booktrade systems for ordering, serial check in control, accounting and electronic mail.

In the case of Bielefeld these connections refer to 3 systems: the Ethernet system of the university, the library network system and the rest is covered by the connection to the public packet switching system.

4. Conclusion

The decentralization of systems is tending to replace the still common traditional mainframe philosophy in libraries, too. Mainframe systems with complicated integrated software packages are expensive and not very flexible. PC network systems with subsystems for the main library functions are able to run a local library system allowing to combine different types of computers - the best for each solution -, to choose the best software for each function, to easily communicate with other networks and systems. The whole business is working very hard to improve communication and networking. We are looking forward to considerable progress of software and hardware products in this field. A reasonable combination of computers and software for the different functions should be able to avoid the problem of network overcharge and keep the network within reasonable costs. This type of library system seems to present the best conditions to integrate further electronic services coming up in the next years.

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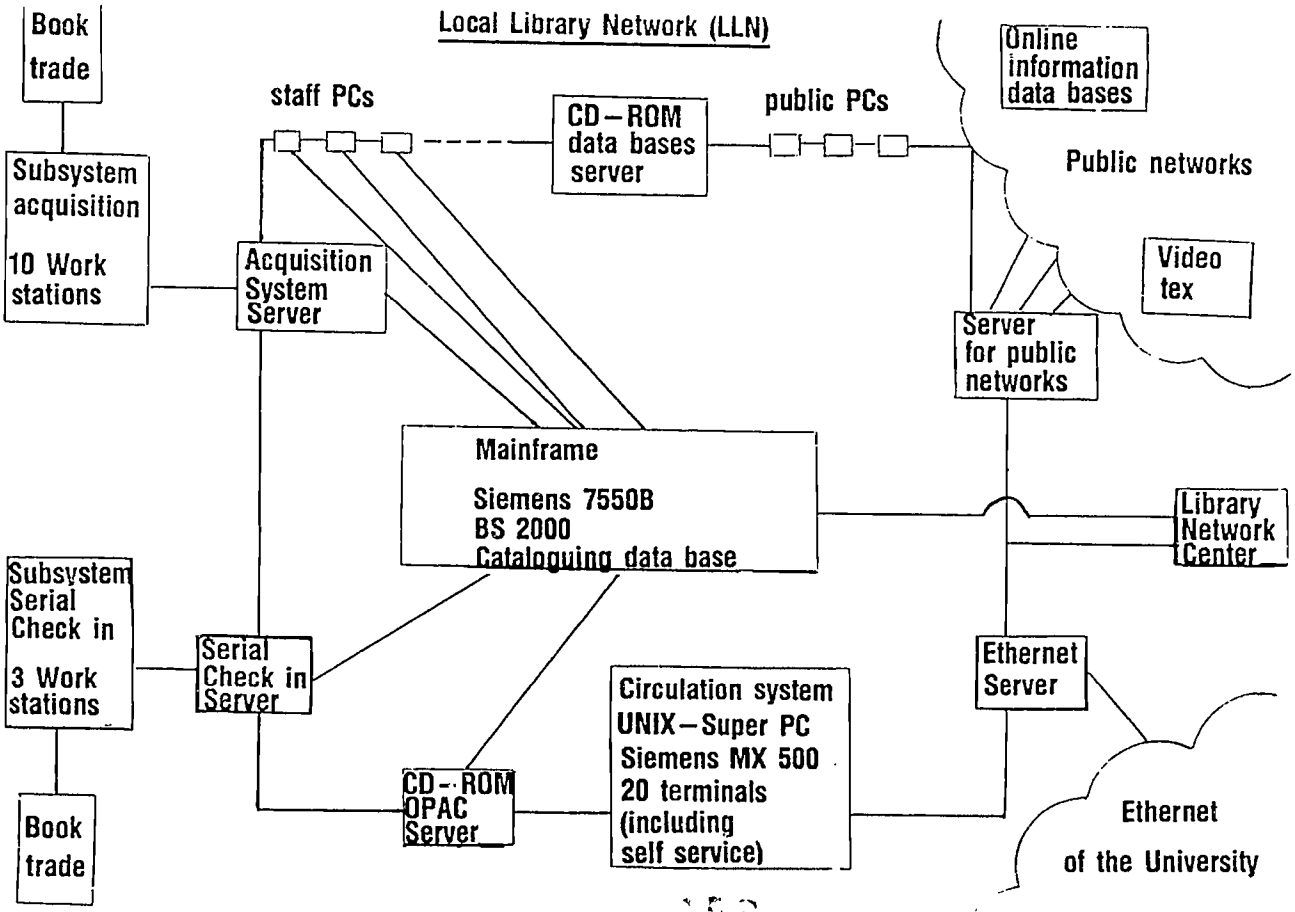
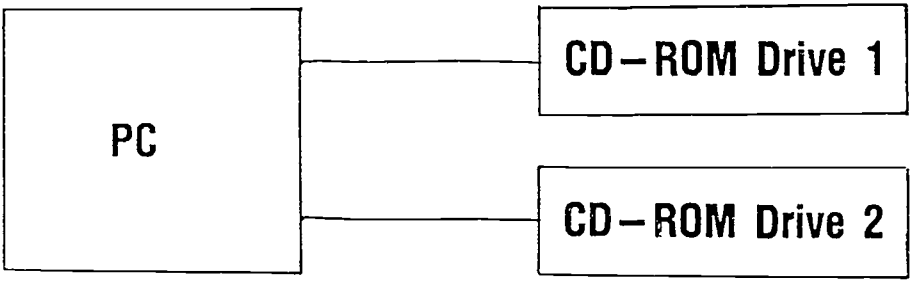

Local Library Network (LLN)
Book trade
staff PCs
CD–ROM data bases server
public PCs
Online information data bases
Public networks
Subsystem acquisition
10 Work stations
Acquisition System Server
Video tex
Server for public networks
Mainframe
Siemens 7550B
BS 2000
Cataloguing data base
Library Network Center
Subsystem Serial Check in
3 Work stations
Serial Check in Server
Ethernet Server
Circulation system
UNIX–Super PC
Siemens MX 500
20 terminals
(including self service)
CD–ROM OPAC Server
Book trade
Ethernet of the University

Graph 1

CD–ROM OPAC with stand alone retrieval. Weekly updating on hard disc via the network.



Graph 2

OPAC requirements

Accessibility of all catalogue data

Availability of Terminals in all parts for example of a university

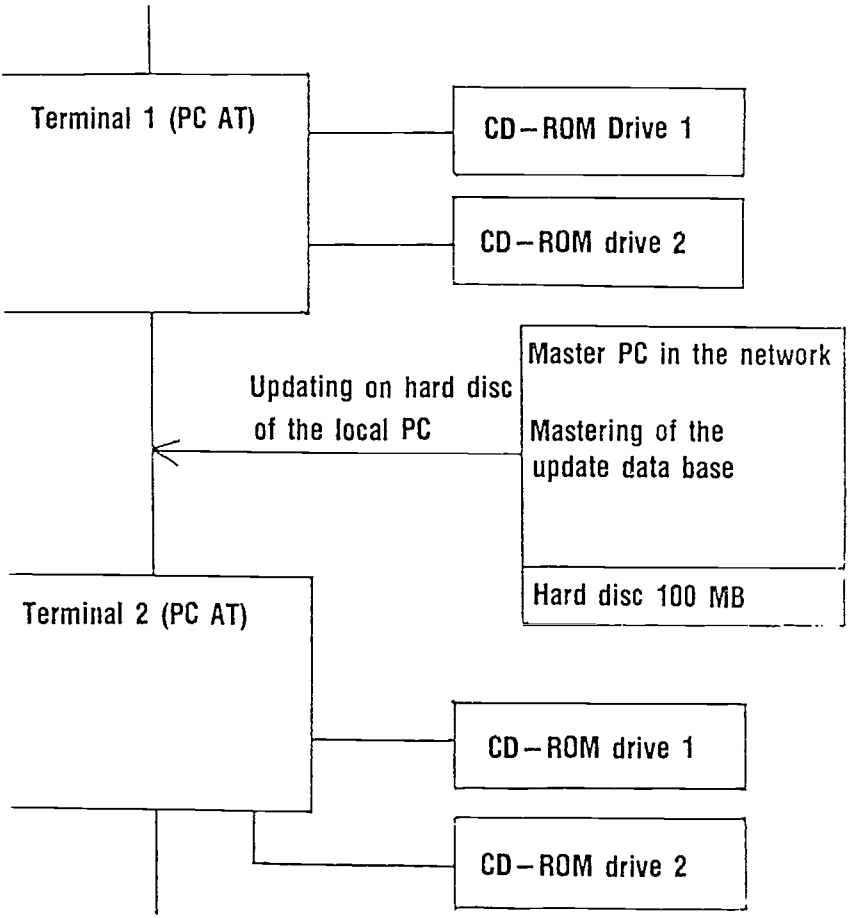
Access by public and local networks

Fast updating

Flexible user surface in expert and menue mode

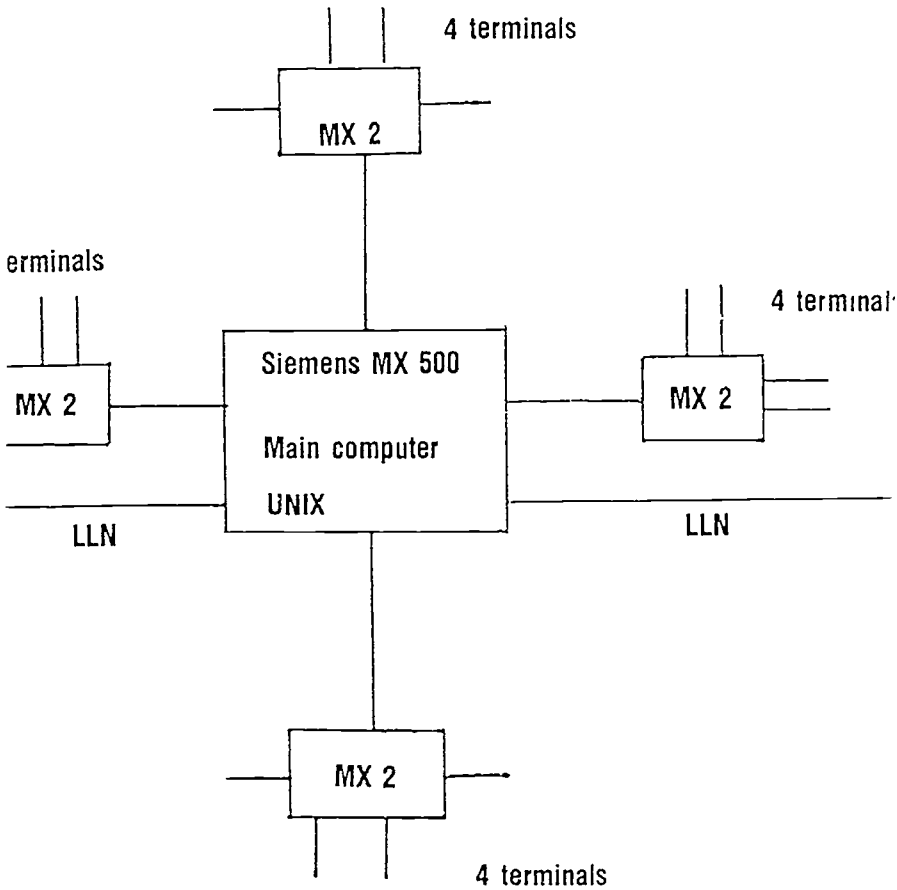
Graph 3

CD–ROM with stand alone retrieval. Weekly updating on hard disc via the network.



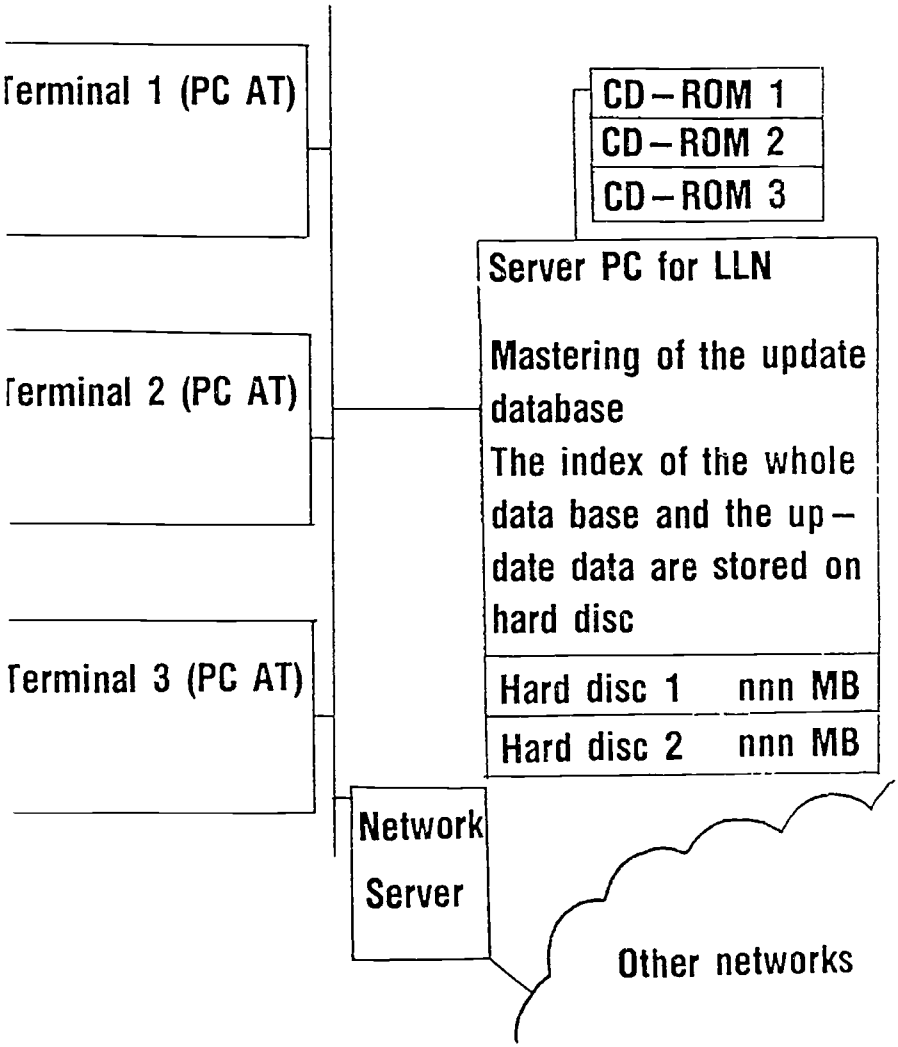
Graph 5

Subsystem circulation



Graph 4

Centralized CD–ROM OPAC system within the network (weekly updating on server hard disc)



THE IMPACT OF CD-ROM ON LIBRARY OPERATIONS: TO BUY OR TO MAKE - ONE LIBRARY'S EXPERIENCE PRODUCING A CATALOGUE ON CD-ROM

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THE IMPACT OF CD-ROM ON LIBRARY OPERATIONS: TO BUY OR TO MAKE - ONE LIBRARY'S EXPERIENCE PRODUCING A CATALOGUE ON CD-ROM

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Abstract

In 1987, the University of Guelph Library produced a CD-ROM catalogue using a full-service bureau. In winter/spring 1988, the decision was made to do inhouse all but the final mastering of the compact disk. This presentation briefly describes the processes (painful and otherwise); with some general comments on the impact of both a CD-ROM catalogue and other CD-ROM services, from a management point of view.

THE IMPACT OF CD-ROM ON LIBRARY OPERATIONS: TO BUY OR TO MAKE - ONE LIBRARY'S EXPERIENCE PRODUCING A CATALOGUE ON CD-ROM

This paper continues my presentation to the Tenth Anniversary Essen Symposium in 1987, describing the application of CD-ROM technology to create the University of Guelph's disk catalogue and user search module. It details difficulties that may be encountered when hiring commercial producers to produce a disk catalogue, and describes the results of our decision to produce in-house the pre-mastering and indexing software for our CD-ROM catalogue. I shall discuss the local demands for such a decision, the ultimate advantages of it, and the relative cost of full commercial and in-house catalogue productions.

In 1986, when we were first seeking a CD-ROM producer, very few library catalogues were produced on disk, and few libraries had more than very slight experience with the technology. The producer we selected offered a full service; that is, we supplied our database on tape, and they compiled the indexes, provided the user interface or search software, and presented us with the completed CD-ROM product. This included the pre-mastering process through to the 100 disks delivered. The first disk was produced in March/April 1987; the database currency was January 1st, 1987. Various inadequacies were identified in this first version - some were ours, and some were the producer's: for example, there were conditions in our database that we should have allowed for; and their handling of data such as 'material type' was inappropriate to our needs.

The number of problems encountered and inadequacies identified led to a second run, for which the data currency date was August 1st, 1987. The second edition disks were delivered late in November. During the March to November period, the producer experienced growing pains: the company was rather understaffed and grossly overestimated its delivery capabilities. Our file, containing more than 790,000 catalogue records, was its first really large database, and we found that the producer's software and procedures were not set up to handle a database of this size. At the same

time, the company began to encounter some financial constraints, to which the response was to raise prices; this action caused us considerable anxiety in respect of continuing the relationship. Nor were we completely satisfied with the human interface software provided; we felt that users' needs and our other requirements were rather more complex than the producer's software could cope with. Throughout the development period, the company was responsive to our requests for changes, when and where our suggestions suited the needs of their other clients. However, for a variety of reasons, the response to our scheduling requirements was not quite as favourable.

During the Fall of 1987, we looked carefully at some other producers, two of which seemed particularly attractive. However, the charges of the first were rather beyond our budget limit, and the product of the second, although very impressive, was hardware specific, which we especially wished to avoid. Thus for these and at least two other reasons, the decision was made to attempt in-house production of a CD-ROM disk catalogue. The first reason was our perceived need to control our own destiny - for flexibility and for price; and the second, we felt that our staff now had enough experience to do it. In-house design would enable us to influence the final product to meet our needs. After specifications were compiled and a draft product tested successfully, the decision to design and write our own product was made in the Spring of 1988.

The Library Systems group wrote and tested the pre-mastering and the indexing software which was completed in mid-July (three analysts were assigned practically full-time from April to July). Processing the data using on-campus computing resources took the better part of a month; the first run required about 600 hours of processing time to prepare the tapes for final mastering. In fact, it soon became apparent that we had insufficient disk space, a situation that was rather reminiscent of our experiences with the full-service producer the year before. Access to more and bigger disk drives would have cut the pre-mastering times significantly. The final disk production was contracted out to a U.S. firm which had considerable experience with compact disk technology. We sent the mastering company 6250 bpi tapes containing the database and its indexes; they then converted the data, first to videotape and then to compact disk.

At the time of the Essen Symposium in September, 1988, a test database of some 25,000 records had been mounted on a micro computer equipped with a hard disk. The search software was installed for testing by members of the staff from both the Public Service and Technical Processing divisions. Based on their responses and suggestions, the Systems group made a number of changes. The interface software had been designed to be modified easily; changes in the database index structure would have presented more difficulty, but none were required at that time.

The full public version of the Guelph-designed CD-ROM catalogue (searchMe) was released for public use on Monday, October 24th, after a week's testing and learning period for staff members. The event was publicized in the campus newsbulletin, and celebrated by Library staff wearing specially designed T-shirts produced for the occasion demonstrating the new catalogue at the microcomputer search stations festooned with brightly coloured balloons!

During November, members of the Systems group identified a number of ways to improve response time even more, as well as a few other changes that would make searching the database easier. At the same time, various 'housekeeping' modifications were proposed that would greatly decrease the pre-mastering processing time. Because we felt the changes would provide significant improvements for the users, a second edition was scheduled for January 1989. Then, in mid-December, we discovered that the firm responsible for the final mastering of our first disk had filed for bankruptcy. Another supplier was found, and the latest and enhanced version of the CD-ROM disk catalogue was installed in all the Library's search stations the week of January 9th.

The Library's CD-ROM product has been approved for non-exclusive licence. The first contract, with Pendragon Optical Media, was signed in December, 1988, and this company will act as a 'full-service' provider to other institutions wishing to produce their library catalogues on CD-ROM.

Future directions include adding a hard disk to each search station, and linking each micro computer to a local area network (LAN). This will enable

daily updating of the database with new records added to the hard disk; the LAN will also permit us to provide circulation status information for each retrieved item record.

TECHNICAL INFORMATION

The searchMe software is written in "C"; the indexing and pre-mastering software runs under Unix on a Sequent S27 mini-computer; MS-DOS is used on the micro computer search stations.

A search station is a 10 megahertz XT/clone micro computer equipped with a 5 1/4 inch floppy disk drive, a 40 megabyte hard disk, and the CD player; some search stations are also equipped with a thermal printer. Users may print their search results immediately, or download the list of items to a floppy disk for later manipulation or editing using a word processing program such as WordPerfect or WordStar, or database manipulation software such as DBase III.

CONCLUSION

Finally, a few comments on the rationale for embarking on a CD-ROM project, whether made or bought. Why would we move from our present minicomputer-supported online catalogue?

First, in 1986/87, we were very concerned about response time for a large number of users on a central database system. We were already experiencing some response time problems during peak use periods with the 80 online terminals.

Second, the Library's minicomputer was then fully loaded, the cost of upgrading to the next generation was beyond our means, and it was not really clear to us that the upgraded machine would handle the higher load level.

Third, although the online catalogue module provided boolean search

capability, we had never been able to make it publicly available. During the previous two years' testing, we found that even a few people using the boolean search module inefficiently or improperly could drastically increase response time for all users over the entire system. CD-ROM technology provides user-specific response time independent of the number of users; the capability to add individual search stations as required and at a manageable cost; and, the very important ability to provide our community with sophisticated user interface software with impressive boolean search capability.

Fourth, although the initial development cost for in-house development was not insignificant, we were able to use available personnel and facilities; including an established Library Systems group with considerable development experience. For each subsequent production run, the external cost to the Library will be only about one-sixth that of the full-service option.

ADONIS -
THE STRATEGIC NEEDS OF PUBLISHERS

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ADONIS - THE STRATEGIC NEEDS OF PUBLISHERS

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Abstract

ADONIS had its inception in the mid-70's when publishers expressed concern at the impact which photocopying of articles was having on periodical acquisitions in research libraries. After a number of inconclusive studies, and open debate in the UK library trade journals between publishers and librarians, Elseviers and a group of other publishers and librarians, joined to look at the possibilities of new technology providing another source of income to publishers through the creation of "separates" publishing in completion with photocopying. The history of ADONIS itself has shown many changes in philosophy and technical design, but the current pilot project is a basis for evaluating how publishers and librarians may work together to create a new information system for the future.

ADONIS - THE PUBLISHERS VIEWPOINT

The format of the proposed presentation on ADONIS, particularly in view of the reshuffling of schedules, deserves some explanation. Basically, the intention by the four speakers is to present a chronological portrayal of ADONIS' development.

a. I shall speak on the early history, up to 1980, and the reasons for ADONIS' creation.

b. Andrew Braid will take over and look at the periods 1980 to 1987 - the "formative years".

c. Ulrich Korwitz will look at the 1988 situation.

d. After coffee, Dr. Maurice Line will then indulge in some stargazing looking at the future for ADONIS.

We are half way through this stimulating Symposium and it is now my duty to add an element of sobriety and sombreness to the proceedings. Because basically ADONIS was initiated, nurtured and matured under the Profit Motive, by a small group of publishers, it would be fatal to think for one instance that ADONIS is an academic exercise or to salve the social conscience of publishers (if they have one!) - there are financial management and accountant's scrutinising costs, investments, payback and protecting shareholders' interests.

ADONIS was created in response to a market threat. It is not a case of some bright spark going away and coming up with an interesting application for advanced technology. It originated in the market-place. It is controlled by concepts of profitability and viability.

What is ADONIS?

ADONIS is:

1. A document procurement system using state of the art technology. The trial which is under way explores aspects of the implementation of digital technology to effect savings and inter library loan that can be shared between libraries and publishers; thereby providing an effective solution to the current conflict between publishers and document delivery systems.

2. ADONIS - the name - has no meaning. I would wish to disillusion those who think it stands for "Automated Document delivery Over Networked Information Systems" - this is rubbish! ADONIS got its name because (at the time of its conception 1979/80) every budding new informatic project acquired the name of a Greek or Roman god to confer respectability. It was developed at the same time as Euronet Diane, Appolo, Artemis, etc.

Who is ADONIS?

Andrew Braid will refer to this in more detail in his presentation. However, I would just like to refer to the owners of ADONIS, which consist of Blackwell Scientific Publications, Pergamon Press, Elsevier Science Publishers and Springer-Verlag.

There are a number of similarities about these companies. Firstly, they are all mainly scientific/technical/medical publishers. Secondly, they are all mainly journal publishers. Thirdly, they are all European based. (This, in part, is due to the strong anti Trust legislation in the United States which prevents membership of a cartel price setting body). Finally, they are all commercial companies subject to the scrutiny of shareholders.

Why was ADONIS developed?

Publishers saw the emergence of a new form of "publishing" which was - in their opinion - threatening to overtake the traditional journal. It was the

distribution of these "separates" which was of concern. They were considered parasitical to the journal publishing system and drew money away from the publishers as a consequence of their survival and growth. Emotions ran high in the publishing fraternity in the late 1970's as they sought for some way to protect their viability.

The stimulus for ADONIS was a market phenomena. The following features were part of this:

1. The Decline in Library Budgets

During the 1970's we witnessed a decline in library budgets from the halcyon days when the United States and UK university libraries could buy what they wanted - when they aspired to being libraries of record. From 1972-1986 there was a growth in total library expenditures in the UK from £16.954 million to £89.8 million. Although this seems a dramatic growth it hides the fact that it has been subject to inflation from - salaries increases - price inflation of published matter - doubling of scholarly information every 10-20 years. The consequences have been that books are cut to the bone as far as library budgets are concerned and journals are also now being cut. The situation in the US is similar with, in the past year, indications of unique subscriptions being cut in considerable numbers for the first time.

In Germany the pressure on book buying has not been quite so intense as there has been more money available for acquisitions. However, with the cessation of the HBFG support in 1990, the question arises on whether, even in Germany, books and journals will be cut.

These cuts are being made at the same time as publishers are required to invest more in editorial, production and distribution services.

2. Decline in Journal Subscriptions

Publishers identified a number of disturbing trends through the 1970's. Firstly, the average subscription to their main journals started falling on a

year to year basis. This figure is corroborated b_ information collected by Don King in his Statistical Indicators Reports for the United States. Secondly, the number of subscriptions to new journals being launched was showing a declining growth profile through the 1970's. A journal started in 1970 could guarantee more than twice as many first year subscriptions as that started in 1979, and similar figures consisted for 2nd, 3rd and 4th year sales. Also, publishers witnessed a decline in their income from reprint sales. This is income which publishers earn from selling more than a standard number of article reprints to the author. When the system existed for authors to supply copies of reprints, this reprint income was a significant addition to publishers revenues. With the growth of photocopying and document delivery services such a structure has deteriorated.

3. The Growth of Other New Media

During the 1970's there was a rapid expansion in online database searching. This led to new esoteric articles being identified from such searches which had to be acquired to handle full text format. This led, in the view of publishers, to a further stimulation in the demand for document delivery as it was the only effective way to prevent frustrations building up by authors and readers of scientific works.

4. Growth of Document Delivery and Photocopying

Publishers viewed the growing traffic being sent by the British Library Lending Division (now BLDSC) as the main cause of the decline in the journal subscriptions. They ignored the problem of declining library budgets as such, or felt it was a lesser contributor to the problem. During the late 1970's BLLD's request rate was growing rapidly not only from UK customers but also from overseas. Similar centres were growing in Germany, Sweden and N. America. Publishers wanted to put a stop to this growth.

In the late 1970's a public debate ensued between Dr. Maurice Line and

Drs. Bart van Tongeren (Chairman of Elsevier Science) to thrash out the issues. The debate conducted in the Journal of Documentation and other trade publications, proved futile and even the results of an ASLIB sponsored research into the causes for periodical cancellations (by Anthony Woodward) provided no further light on the dynamics of journal subscriptions and cancellations.

Publishers resorted to looking at the copyright laws and hoping that these could provide them with the protection they sought from what they felt was unfair infringement through systematic photocopying practices. This legal case was flawed by the fact that most document delivery services, particularly BLLD was able to use "fair use" as the basis for maintaining their photocopying and loan systems. The Williams & Wilkins v. National Library of Medicine case in America in the early 1970's stood as a reminder to publishers that they would have great difficulty in persuading the courts as to the legitimacy of their claims.

This set in motion an alternative procedure. Elsevier felt that they in particular were being seriously affected by systematic photocopying, and appointed an internal consultant who was given an open brief to come up with a technical solution. This resulted after a year of work in a system which incorporated significant new technological developments in the areas of optical publishing (the Megadoc system from Philips), high resolution and high speed facsimile (Group 4 standard from AM International) and satellite transmission of final documents to dishes located in big university libraries. The scheme was far too adventurous, and more to the point, too expensive for Elseviers to pursue on its own. It therefore sought the assistance of other publishers in addressing the basic issue in a concerted manner using the overall design criteria proposed by the consultant.

The consortium of ADONIS was created. It has had a fluctuating membership over the past eight years, but the four main members have been loyal throughout to the concept of using high technology to solve the "separates" distribution problem. They commissioned market studies which showed that there were some 10 million articles in circulation in Europe and a similar number in the United States, and that this created a

potential market which the ADONIS consortium could tap.

What is the Purpose?

The main objective of ADONIS is to wrest the control for the distribution of "separates" away from the library intermediaries and to restore control with the publishers.

In so doing the publishers would pay a royalty to the copyright holders of the article being copied. Each publisher would set its own level of royalties to avoid accusations of collusion.

The main purpose, however, is to work with document delivery services to provide a new way of supplying document requests, which capitalizes on the distribution apparatus established by them, but should make use of new technology to give some element of royalty income in an area which has hitherto escaped the publishers control.

ADONIS - FROM MYTH TO REALITY

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ADONIS - FROM MYTH TO REALITY

JAMES ANDREW BRAID
THE BRITISH LIBRARY DOCUMENT SUPPLY CENTRE

Abstract

The ADONIS project, a two year trial of storing and distributing journals on CD-ROM, has been widely acclaimed as the most ambitious use of CD-ROM in publishing to date. This paper gives the history of the project from the late 1970s to its inauguration in 1987. The project is an almost unique example of cooperation between publishers and libraries from its inception to the present day.

ADONIS was based on the assumption that copies of articles in journals could be made available more cheaply in machine readable form than by conventional, manual, methods of photocopying from printed journals. The publishers agreed with libraries that any savings made would be shared - half for the supplying library and half to the publisher as a use fee. By 1980 it had become clear that although the technology for the high volume storage of scientific and technical journals existed (in the form of optical disks), the costs of the scanning and retrieval and printing operations were far higher than originally estimated.

With the advent of CD-ROM the project became viable although on a much smaller scale, just over 200 journal titles instead of the 3,000 originally envisaged. The paper describes the production cycle for ADONIS article identification number. Use of the system in libraries, of which there are 12 throughout the world, is described in the next paper. This paper concludes with a description of the workstation used for retrieving articles from the ADONIS system and a brief discussion on future developments.

ADONIS - FROM MYTH TO REALITY

INTRODUCTION

As stated in the previous paper the fundamental concept of the ADONIS consortium was that new technology could be used to reduce the cost of retrieving and processing articles in printed journals. Before 1980 the technology to test this concept existed only in experimental form. At about that time the technology was becoming available to put the theory into practice. Large (12 inch diameter) WORM (Write Once Read Many) disks were coming onto the market and with them the associated equipment for reading, writing, duplicating, etc.

The ADONIS Consortium had decided that facsimile encoding was essential for the project. This had important consequences in the volume of data generated for each page that is scanned. The Consortium decided that it was important that a true replica of pages from conventionally printed journals should be produced by the system. In 1980, and even today, it is not possible to do this by any means other than facsimile encoding.

As originally conceived the project failed. This was mainly because the Consortium had got their sums wrong. They decided to play a waiting game until technology could give them what they wanted. It proved to be a long wait. It was not until 1986 that the Consortium decided to go ahead, albeit with a project much reduced in size to that originally proposed. This paper covers the period between 1980 and 1987; the period when the project came to reality.

FACSIMILE ENCODING

Traditional electronic storage, processing and communication of text uses character encoded text. That is, each individual character is represented by a number of bits, typically 8 bits or one byte. There are various

conventions for encoding text in this way. One of the more universally accepted standards is the American Standard Code for Information Interchange (ASCII) format. A typical page in a scientific journal contains anything up to 10,000 characters, equivalent to 10,000 bytes or 10 kilobytes in ASCII encoding. Character encoding in this form has been used ever since computers were invented. It works well and is an efficient means of storing text. However, that is one of its main limitations. It can only cope with text, it cannot cope with diagrams, pictures and any other form of non-textual material that may appear in scientific and technical journals. Often, particularly with scientific publications, illustrations form an integral part of the article.

There are several ways of converting non-textual material into machine-readable format.The method that is most widely used, and one of the few methods that can deal with all forms of images printed on a page, is facsimile encoding. The principle involved is very simple. A page is scanned by a light sensitive device which monitors areas of blackness and whiteness on the page. This information is converted into an electrical impulse which is used to set the value of a bit to either "0" for white areas or "1" for black areas.

The finer the original scanning the more detail that will be captured. However, the finer the scanning the greater the number of bits generated. The bit stream that is generated is often referred to as a "bit-map". A typical resolution of 200 discrete areas per inch scanned in both directions produces about 4 million bits per A4 page (200 lines per inch equates to about 8 lines per millimetre). If the resolution is increased to 400 lines per inch then nearly 16 million bits are generated. 400 lines per inch is the minimum resolution at which the human eye cannot detect any breakdown of image in any direction. Data compression techniques can be used to reduce the volume of data to be stored or transmitted. Compression ratios vary greatly, those used commercially in telefacsimile machines compress by a factor varying between 10 and 20 to 1 for text but are less efficient for illustrations. There are proprietary compression algorithms for illustrations and text which can achieve factors of up to 80 to 1. With standard algorithms encoding typical pages from scientific journals a factor of about 15 to 1 can be achieved. This means that, for a resolution of 400 lines per

inch, a typical page generates about 120 kilobytes of data. This is a magnitude greater than character encoding.

USE STUDIES

The introduction of high volume optical storage media gave the ADONIS Consortium the opportunity to explore their original concept. They quickly realized that, even with the high storage capacity of optical storage, because of the vast volume of data generated by facsimile encoding they would have to find a method to limit the volume of data. Initially they decided to make a compromise on the scanning resolution used. 300 lines per inch was chosen as resolution which was adequate for the sub- and super-scripts in scientific journals and yet did not generate an excessive amount of data. The Consortium also decided to limit the number of journals to be stored on the system. The obvious criteria was to store only those titles which were in greatest demand.

In 1980 the Consortium did not know which journals were in highest demand for inter-library loan and document supply purposes. They approached the (then) British Library Lending Division who carried out a survey monitoring use over a period of time. Use of journals was concentrated on a limited number of titles and use was highest for journals less than 3 years old. The results of a single survey were insufficient so far as the ADONIS Consortium was concerned. They approached other document supply centres to determine if similar request patterns applied. Further surveys were carried out including one international comparison of five centres.

The results of these studies showed that 20% of all demand at the five centres could be satisfied by 514 titles and 80% of demand by 20% of all titles (see figure 1). The problem was that no single publisher published a significant proportion of the heavily used titles. 240 publishers were involved in the top 511 titles in the field of biomedicine. The publishers, who formed the ADONIS Consortium, decided that it would make most sense to serve as many requests as possible from any system that was established.

In 1980 the figure of around 3,000 titles seemed to be an economic number. Much research had taken place using 12 inch diameter optical disks and various types of advanced technology for scanning and printing the images. (In fact much of the pioneering work done by ADONIS can still be seen today in such systems as that installed at the Library of Congress). These proposals failed for financial reasons. The cost of the scanning equipment and the cost of the printing terminal were high - at least $250,000 each. The Consortium had also over-estimated the costs of the supply centres. The project as originally conceived was not economic.

THE INTERIM PHASE

Although the Consortium realized that the project was not viable economically, their original premise was still valid. If a cheaper method of scanning and a cheaper output terminal could be found then the project may become viable.

In the early 1980's various studies were carried out on behalf of the ADONIS Consortium. One suggested the use of a scanning bureau, but no other use for the bureau could be identified at the time. Another study reduced the number of titles to be scanned. Although this reduced the scanning costs it did not reduce the costs of the supply centres, in fact it increased them. At this time the idea of limiting the project to one subject area was discussed. The earlier studies had shown that use of biomedical material was concentrated on a limited number of titles and that much of this use was for current material.

CD-ROM AND SCANNING BUREAUX

The introduction of CD-ROM in about 1985 gave the possibility of low-cost, easy to use workstations for the printing of items stored on CD-ROM. The cost was about 10% that of a workstation for larger WORM disks. This meant that it should be possible for more libraries to be able to afford to use the system. There were two drawbacks to the use of CD-ROM. First,

they are relatively expensive to master and second their capacity is somewhat limited for facsimile encoded pages. The high mastering costs are compensated by the fact that the cost of making multiple copies is far less than WORM disks. The capacity was not thought to be an insurmountable problem if a jukebox could be used.

In 1985 the European, Japanese and American Patent Offices signed a tripartite agreement to exchange patent specifications in facsimile encoded format. The European Patent Office, which had in excess of 60 million pages to scan decided to tender for the work to be done. As a result three scanning bureaux have been set up, in England, France and West Germany. The ADONIS Consortium approached one of these bureaux to scan the journals. The standard to be used was exactly the same. An agreement was reached for the scanning to be done at an economic price.

THE TRIAL

In July 1986 the ADONIS Consortium, who by this time comprised of Blackwell Scientific Publications, Elsevier Science Publishers, Pergamon and Springer Verlag, decided to go ahead with a limited, two year trial. This was on the understanding that the Consortium would also receive some partial funding from the Commission of European Communities. Initially, 300 journals in the field of biomedicine were chosen. For a variety of reasons this was later reduced to 219 journals. One of the reasons was that other publishers wished to become involved in the trial and so it was agreed by the Consortium that journals not with their own imprint could be included. The following publishers have some titles included in the trial - Butterworth, Churchill-Livingstone, Mosby, Munksgaard, Thieme and Wiley.

Various contracts were negotiated for the production of the discs. It had been known for some time that the only way to obtain a true facsimile image of a page was to scan the page after it had been published. In order to do this it is necessary to prepare printed journals for scanning. This is done by the ADONIS Office in Amsterdam. The indexing of the journals is

also done in Amsterdam by Excerpta Medica. The indexing is at a simple level providing details of journal title, volume and year of publication, pagination, authors and article title. The scanning is done in England by Scanmedia. The tapes of the scanned images and the index to those pages are sent to the CD-ROM production facility, Philips-du Pont Optical in Hanover. A diagram of the production cycle is shown in figure 2.

THE ADONIS ARTICLE IDENTIFIER

In any machine-readable storage system it is far easier to refer to individual entries by number. ADONIS is no exception to this. The problem facing the Consortium was that there was no standard method of referring to articles by number. There were two proposals for document identification systems. One, BIBLID (BIBLiographic IDentification), is now an International Standard (ISO 9115). The other, the Serial Issue and Article Identifier (SAID), is now an American National Standard (ANSI Z39.56). Both BIBLID and SAID were developed mainly as library tools and are page dependent. They can be generated independently but are fairly cumbersome to use (up to 38 characters long).

ADONIS has adopted a simpler system which is page independent and as a result can be allocated by publishers in advance of publication. The format of the identifier is -

1234 5678	88	99999	X
ISSN	Yr	No	Check digit

A major disadvantage of the ADONIS identifier at present is that it is allocated at the time of indexing. This means that the number is not known in advance and articles cannot be requested by this means. In a full operational system this number could be allocated in advance of publication and appear on the first page of the article and then be quoted in abstracts, databases, etc. The British Library Document Supply Centre (BLDSC) plans to carry out some comparative trials of the ADONIS

Identifier, BIBLID and SAID.

THE ADONIS WORKSTATION

The BLDSC has had a long association with the ADONIS Consortium. When the Consortium decided to go ahead with the trial BLDSC offered to develop a workstation which would retrieve and print the articles stored on the CD-ROMs. To carry out this work the BLDSC also received partial funding from the Commission of European Communities. It was decided at the outset that, if possible, an off-the-shelf workstation should be used. BLDSC awarded a contract to the French company MC2 for the development of the proprietary workstation developed by Laserdata. This comprises an IBM PC AT or compatible machine with 640 kbyte memory and a 40 Mbyte hard disk, a Hitachi CD-ROM drive, a Ricoh laser printer of 300 line per inch resolution and a high resolution screen capable of displaying a full A4 page at 150 lines per inch.

As each new CD-ROM is received, at a rate of about one every 10 days, the disc is loaded into the workstation and the index information is downloaded. The new index information is then merged with the existing index. In this way a cumulated index of articles is present on the hard disk of the workstation.

As well as the retrieval system described in the next article the software that was developed also provides management information on the use of the system. With this statistics package it will be possible for the first time to obtain data on the use of individual articles within journals.

THE USERS

There are several other centres in the world using the ADONIS system in addition to BLDSC. Four centres are known as core libraries. They were all actively involved with BLDSC in the initial specification of the system. The other three core centres are:

Centre de Documentation de Science et Technologie, Paris
Central Medical Library, Cologne
Royal Academy of Science, Amsterdam

There are other centres throughout the world -

Europe:	Technical Information Library, Hanover
	Institute of Science and Technology, Madrid
	Karolinska Institute, Stockholm
Australia:	National Library of Australia, Canberra
U.S.A.:	Information on Demand, California
	University Microfilms, Ann Arbour
Japan:	Kinokuniya, Tokyo
Mexico:	Universidad Autonoma de Nuevo Leon, Monterrey

All the centres are interested in determining how new technology can be used to improve their internal processes. All are making a financial contribution of about $30,000 as a token subscription for the discs as well as the cost of the workstation. In addition to the subscription fee there is also a use fee paid by some of the centres.

THE FUTURE

The paper by Maurice Line in this issue describes the longer term future of ADONIS. The possible use of a jukebox for CD-ROMs was mentioned earlier. The number of discs at the time of writing is in excess of 70 and still rising. It is becoming increasingly difficult to handle such a large number of discs. Unfortunately, no suitable jukebox exists for CD-ROM although several do exist for WORM disks. The BLDSC has now specified a jukebox and is in the process of procuring one. It should be available by the end of 1988.

A further development concerns the use of a facsimile interface in the workstation. This would allow articles to be transmitted directly from the workstation to standard facsimile machines. Work to develop such an interface is also now in hand.

Further development work is in hand to carry out the automatic matching of citations in machine-readable format with the ADONIS database. The project, called DOCMATCH, is funded by the Commission of the European Communities and is being carried out by BLDSC in cooperation with the University of Bradford.

Once all these developments are operational it should be possible for the system to operate in a much more automated mode. Requests can be downloaded from database hosts, matched against the ADONIS database and those which do match transmitted automatically, by facsimile transmission, to the requesting organization.

ACKNOWLEDGEMENT

Much of the information on the history of ADONIS is taken, with permission, from "ADONIS - The story so far" by R Campbell and B T Stern in the book "CD-ROM: Fundamentals to applications" (Butterworths, 1988).

Distribution of requests over titles

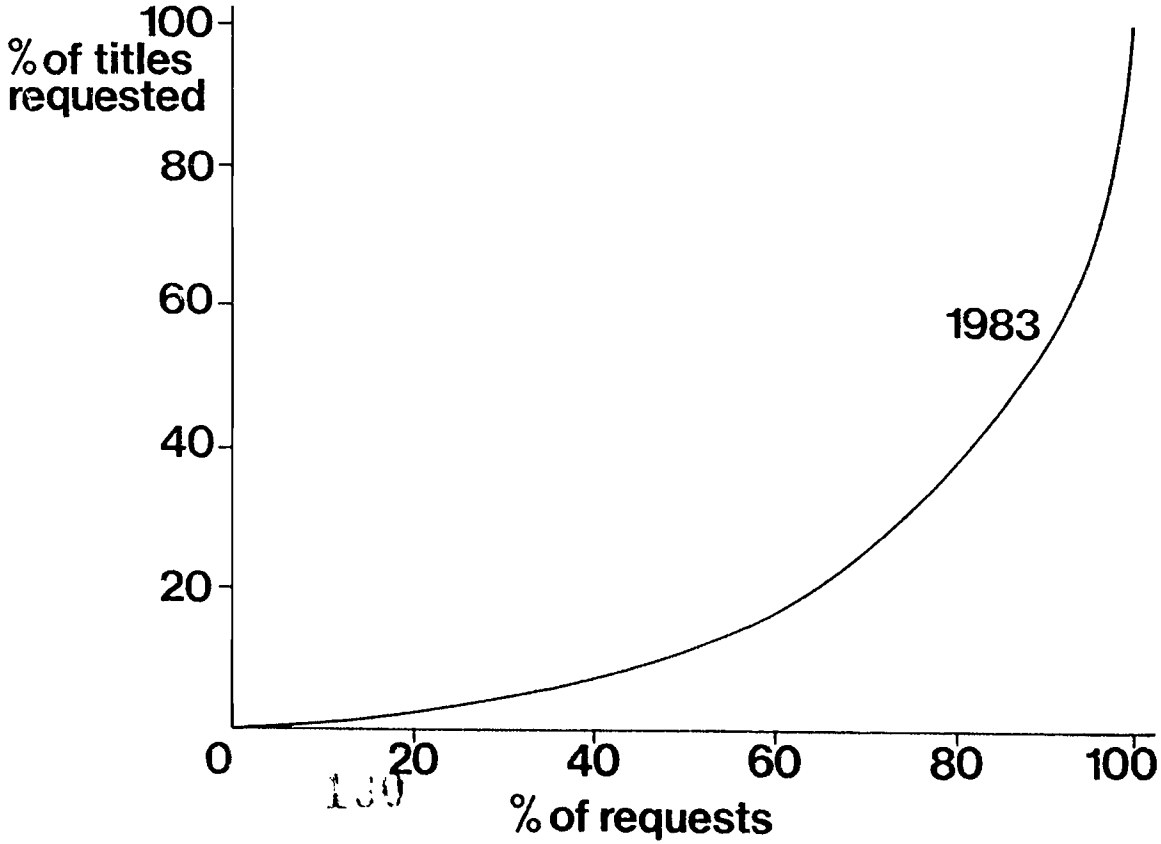

Fig. 1

ADONIS Production Cycle

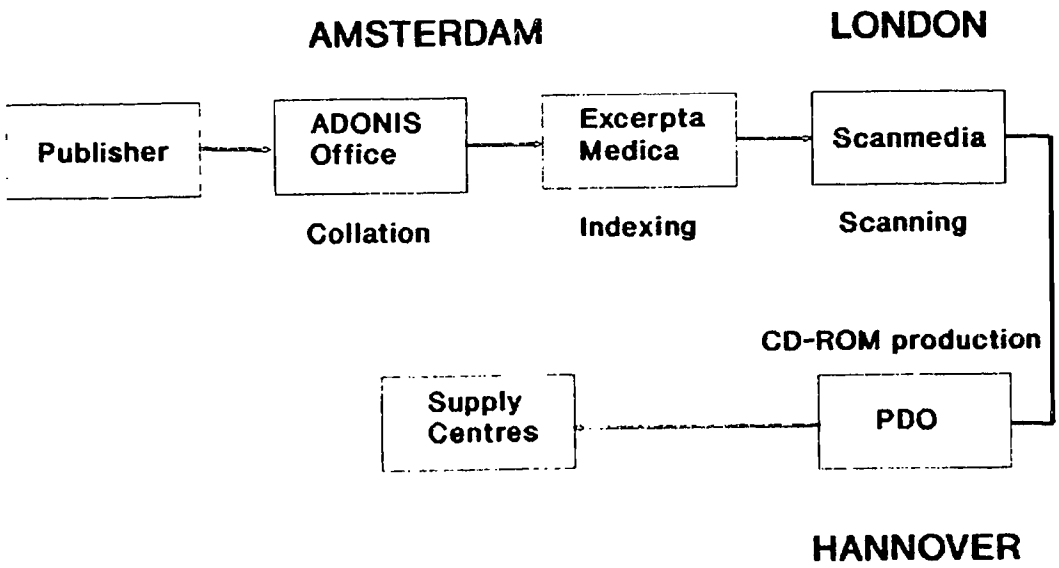

Fig 2

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DSC

THE ADONIS-PROJECT: FIRST EXPERIENCES IN THE CENTRAL LIBRARY OF MEDICINE, COLOGNE

Ulrich Korwitz

MEDICAL CENTRAL LIBRARY COLOGNE
COLOGNE
FEDERAL REPUBLIC OF GERMANY

THE ADONIS-PROJECT: FIRST EXPERIENCES IN THE CENTRAL LIBRARY OF MEDICINE COLOGNE

ULRICH KORWITZ
MEDICAL CENTRAL LIBRARY COLOGNE

Abstract

The Zentralbibliothek der Medizin (Medical Central Library) is one of the 4 core libraries participating in the ADONIS-project since spring 1988. As the national document supply centre for biomedicine in the FRG the library expects to gather experience in the use of new technologies, especially CD-ROM, in a rather conventional working process, the supply of photocopies of journal articles.

On one side we are interested in practical aspects like handling of the workstation, capacity and time behaviour of the system. On the other hand a number of political questions arise:

Can a library live with ADONIS?
Can and should ADONIS replace library staff?
Is the library the right place to collect licence fees for authors/publishers?
Regarding ADONIS and the DOCMATCH-2 project: is there a development by-passing the libraries on the way to fully automatized profit based document supply centres established by the publishers?

The author will report about the experiences with the ADONIS-project and will try to give preliminary answers on these questions.

THE ADONIS-PROJECT: FIRST EXPERIENCES IN THE CENTRAL LIBRARY OF MEDICINE, COLOGNE

1. The History

In November 1985, after the re-emergence of the ADONIS-project the Central Library of Medicine in Cologne and the Technical Information Library in Hannover decided to take part in the trial as core-libraries. The publishers in the ADONIS board had realized that the setting-up of a separate commercial document delivery centre would not establish an economic advantage, the two libraries on the other side recognized that the project could be of great importance for themselves and the whole library community. They accepted the participation in order to learn about the impact of CD-ROM technology on their services and operations; they are well aware that the project has political implications for the relationship between publishers and libraries as well as between libraries themselves (e.g. interlibrary loan policy). As the leading document supplier in the field of biomedicine, the ZBMED plays the predominant role in the project for the German document supply centres.

The Federal Ministry for Research and Technology made a financial contribution for the purchase of two workstations and for the subscriber charge rate for two years in 1986. The stations were ordered in France in October 1987 and delivered in December.

Because of technical problems (defective laser printer and interface) and problems to find maintenance service for the equipment the system was not ready for use until 26th April, 1988. Because of organizational and personal problems the incoming orders were not completely chequed for ADONIS before 21st June, 1988.

2. The Contract

For the core-libraries special conditions of the ADONIS-contract are effective.

They are bound, like all other users, to process all orders for articles in ADONIS-journals by the workstation only but not to cancel any subscriptions for these periodicals. They also undertook the obligation to supply statistical data on the usage of the workstation quarterly in form of a copy of the usage-file which is build-up automatically during the search procedure and to supply on request the details of the operation-costs of the system in comparison to the costs of the conventional service. Costs for the purchase of the workstation and its operation have to be paid by the libraries.

The core-libraries however are not charged for licence-fees during the trial. The other ADONIS-users have to pay 3 75 Dutch guilders per article if all ADONIS-journals are subscribed and 7.50 Dutch guilders if not. Licence-fees have to be paid from the 10.001st article printed-out onward. The contract was signed in Cologne in January 1988 after the staff council had agreed and two librarians working part-time had been employed.

3. Working with the ADONIS-system

The ADONIS-system starts up automatically and the user is offered a main menu of 4 options: "Search", "Print manager", "System maintenance" and "Report generation". The option "Search" will present the user with the search screen (Fig.1). The first parameter to be entered is the ADONIS-number or the journal title (the ISSN is normally not available). At the moment the ADONIS-identifier cannot be used because it is not entered in bibliographical databases like MEDLINE or EMBASE and does not appear on the order-forms of our users. So, the journal title has to be entered. If only a part of a string of data is entered the system will display a list of search results (Fig. 2,a,b). The search entry screen allows to enter author names, title (up to 50 characters), volume, issue and page. As I will show later it is time-saving to use publication year, volume and page only (Fig.3).

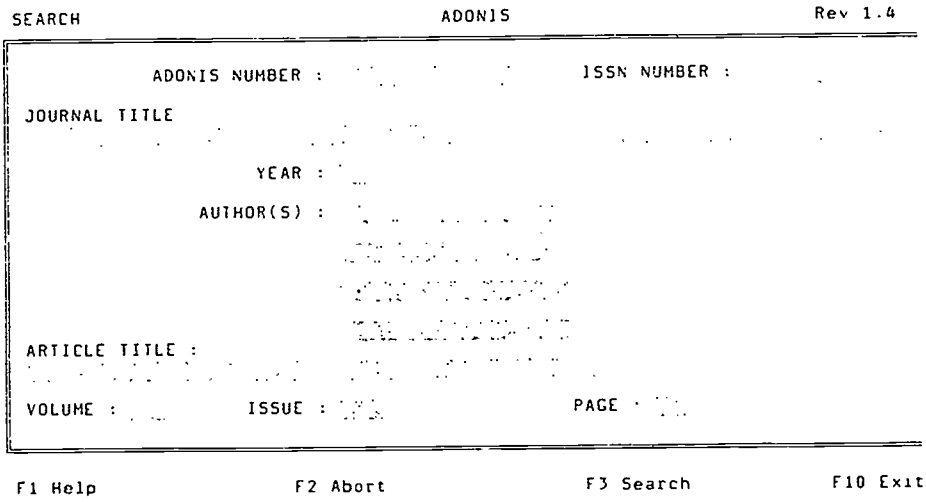

Fig. 1 Search entry screen

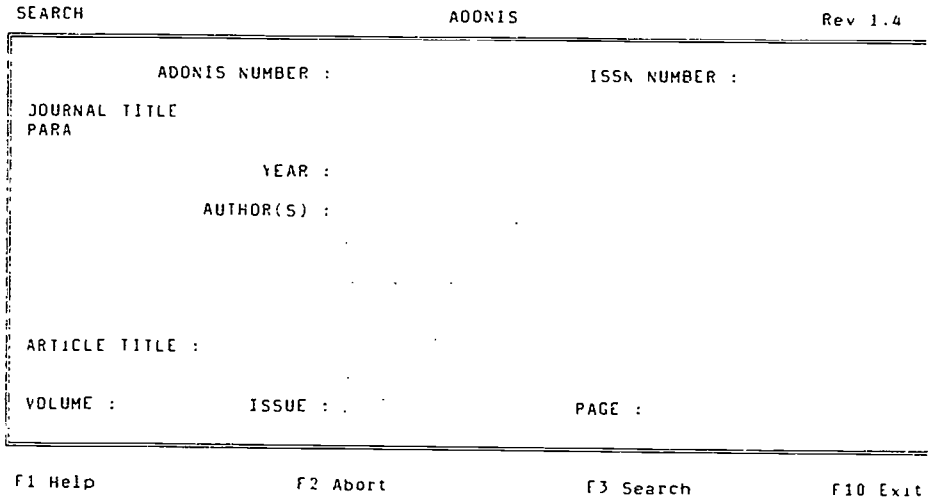

Fig. 2a Search entry screen- part of the journal title entered

SEARCH ADONIS Rev 1.4

PARASITOLOGY RESEARCH
COMPARATIVE BIOCHEMISTRY & PHYSIOLOGY - PART A: COMPARATIVE PHYSIOLOGY
JOURNAL OF COMPARATIVE PHYSIOLOGY A: SENSORY, NEURAL, AND BEHAVIORAL PHYSIOL
JOURNAL OF COMPARATIVE PHYSIOLOGY B: BIOCHEMICAL, SYSTEMIC, AND ENVIRONMENTA
COMPARATIVE BIOCHEMISTRY & PHYSIOLOGY - PART B: COMPARATIVE BIOCHEMISTRY
COMPARATIVE BIOCHEMISTRY & PHYSIOLOGY - PART C: COMPARATIVE PHARMACOLOGY AND
DEVELOPMENTAL AND COMPARATIVE IMMUNOLOGY

Current item : 1 of 7
F1 Help Arrow Keys to browse F4 Select F10 Exit

Fig. 2b List of search results displayed

SEARCH ADONIS Rev 1.4

ADONIS NUMBER : ISSN NUMBER : 0044-3255

JOURNAL TITLE
PARASITOLOGY RESEARCH

YEAR : 1987

AUTHOR(S) :

ARTICLE TITLE :

VOLUME : 73 ISSUE : 1 PAGE : 50

F1 Help F2 Abort F3 Search F10 Exit

Fig. 3 Search entry screen - journal title, publication year, volume, issue and page of the article entered

If the search is successful the system will display full bibliographical details of the article found and the number of the CD-ROM where the digital image of the full-text is stored (Fig.4).

Now, loading that disc, it is possible to display one or all pages of the article or to print it out.

Normally, the document found is not printed out immediately but added to a print queue. In order to do that requestor details must be completed (Fig. 5): it is possible to enter a user address which then appears on the first page. The critical field is the requestors identification number: a code for the user group has to be entered in this field. This code is stored, together with the ADONIS-number and date in the usage-file which serves as a statistical survey and a copy of which is sent to ADONIS four times a year. In order to print articles from the print queue it is necessary to stay at the workstation and to insert the discs requested by the system. This may change in November when a juke-box for 240 CD-ROM will be available.

The option "System maintenance" allows to update the data base i.e. to add bibliographical details of articles on the new disc to the index. This automatically running process lasts between 7 and 27 hours - it is run over-night in Cologne. In the past we have been receiving a new disc every 7 to 25 days.

Using the option "Report generation" lists of journal issues on specific CD-ROM are generated. This can be important in order to identify still missing journal issues or supplements.

SEARCH ADONIS Rev 1.4

ADONIS NO: 0044325587000085 ISSN NO: 0044-3255

JOURNAL TITLE: PARASITOLOGY RESEARCH

AUTHOR(S): KOIE M.

ARTICLE TITLE: SCANNING ELECTRON MICROSCOPY OF REDIAE, CERCARIAE,

YEAR: 1987 VOLUME: 73 ISSUE: 1 PART:

PAGES: 50 TO: 56

NO. OF PAGES: 7 CDROM: 1

F1 Help F5 Print F6 Priority Print F7 Display F10 Exit

Fig. 4 Full bibliographical data of the article displayed after search procedure

```
SEARCH                          ADONIS                          Rev 1.4

      REQUEST FORM NO :
      USER CODE NO    : H 1
      USER NAME       : Hans Hagemann
      ORGANISATION    :

              USER ADDRESS.
      LINE 1          : Welfengarten 1 B
      LINE 2          : 3000 Hannover 1
      LINE 3          :
      LINE 4          :
      LINE 5          :

              DELIVERY ADDRESS.
      LINE 1          : Welfengarten 1 B
      LINE 2          : 3000 Hannover 1
      LINE 3          :
      LINE 4          :
      LINE 5          :

Article added to Print Queue
 Hit carriage return to continue
```

Fig. 5 Requestor details entered for printing-out article found-article added to the print queue

The work with the ADONIS-system differs from the conventional working routine in the library magazins:

CONVENTIONAL	ADONIS
Registration of issues received	Identification and registration of ADONIS-journals
Sorting and shelving new issues	Loading of new CD-ROM (Updating)
Searching the document in the stacks, verifying, using the index	Document search: entering search parameters, browsing in a list of search results, displaying documents (sometimes)
Transport of volumes or issues to the photocopiers	---
Photocopying	Batch print including loading of each disc requested by the system
Transport of volumes or issues back to the stacks, reshelving	---
Processing of orders which could not be fulfilled	Processing of orders which could not be fulfilled
Statistics, accounting and maintenance-service for the photocopiers	Statistics, accounting and maintenance-service for the work-station
---	Data-protection
Preparing of issues for the bindery: gathering issues, transport to the bindery and back, control, sorting, reshelving	--- (At the moment, no subscriptions for ADONIS-journals can be cancelled. The same wort-routines as shown left apply!)

It is characteristic of the work with the ADONIS-system that physical strain like the work between the stacks and at the photocopy-machines is reduced. On the other hand, continuous working at a visual display unit (monitor) must be limited to 4 hours.

4. Facts and figures

Between the 26th April 1988 (the day of installation) and the 20th September 1988, 3.439 orders for articles in ADONIS-journals were identified, 2.760 of them since the 21st June 1988 (the day when the system was completely integrated into the library operations). During this period, our library received and chequed for articles in ADONIS 99.705 orders. This means that only 2,8% of the incoming orders could be fulfilled using the ADONIS-workstation. The following table shows the figures for July, August and September (as far as available):

	ADONIS			CONVENTIONAL		
	July	August	Sept.	July	August	Sept.
- Orders received (total)	826	1.101	756	32.585	36.771	31.761
- Orders received (per day)	39,3	47,9	34,4	1.552	1.598	1.444
- Orders fulfilled (%)	89,2	91,4	90,5		87	
- Orders rejected (%)	10,8	8,6	9,5		13	
Reasons (%):						
-ADONIS-failure or scanning-failures	2,2	1,0	1,5		-	
-Wrong informations on the order-forms	0,5	0,5	0		2,0	
-Issues (articles) not yet available	8,1	7,1	8,0		2,7	
-Issue/volume in bindery	-	-	-		4,4	
-Miscellanous	-	-	-		2,9	
- Working-time per order fulfilled (min)	4,1	3,7	3,8		3,6	
- Orders fulfilled per working-hour	14,6	16,2	15,8		16,7	
- User-groups (%):						
-Academic	34,3	44,8	35,2			
-Industrial	59,8	47,9	51,9			
-Governmental	2,3	3,6	6,3			
-Others	3,6	3,7	6,6			
- Orders from the FRG (%)	96,9	98,7	96,6			
- Orders from outside of the FRG (%)	3,1	1,3	3,4			

The statistical data for May and June are not complete. It may be interesting however that the working-time per order decreased from 7,7 minutes in May to 5,3 minutes in June to 3,8 minutes in September. We do not think however that it will decrease furthermore.

Some characteristic aspects of the work with ADONIS will be pointed out in the following.

4.1 Searching-time

The time for the document search (that is 40% of the working time at the station) depends largely on the parameters entered:

Search parameter	Time for search (sec)	
	Min - Max	Mean
ADONIS-number	2 - 5	3
Author, year	17 - 360	81
Title, year	13 - 380	88
Volume, page, year	10 - 65	23

Obviously, the system is not likely to be a bibliographic retrieval system like an online database. It can be used to identify documents entering minimal bibliographic parameters (volume, page, year) but it is not suitable when searching the publications of an author or for keyword-searching. These searches are too much time-consuming and they are limited to the 219 ADONIS-journals anyway. In addition, Boolean operators cannot be used. Searches without entering the publication year last even 8 to 10 minutes.

Searching for supplemental material is difficult: the system does not accept entries like "S122" of "P56" in the field "page". The time-consuming search by authors or titles is unavoidable. Orders for a complete supplement which we receive regularly cannot be satisfied with the system - we continue to loan the printed issue for browsing.

The searching time depends heavily on the size of the database itself: having loaded disc number 68 we registered an average search time being 111% higher than having loaded disc number 56 (author search-random sample of 20). This may impose problems for the future: the number of articles found and printed out per hour will decrease distinctly especially if ADONIS adds more journals to its database.

The work with the ADONIS-system will change dramatically if the ADONIS-number is accepted by the publisher's community and considered by the international databases. Furthermore, search time may be reduced to only parts of a second if microprocessors working with clock-speeds of 25 or 32 MHz come into use.

As usually, the printer is the weakest point in the hardware system. Printing out two journal-pages on one B4-page may help - when working conventionally we do our photocopying this way.

The working time of the workstation could be decreased by up to 60% if the system were supplied automatically with the CD-ROM which is needed for the print-out. In November 1988, a juke-box will be available which can be connected with the system. Then the employee may leave the system after the search procedure and continue to work somewhere else in the library. It will not be possible to use the workstation as a multi-tasking-system.

4.2 The selection of the ADONIS-journals

The publishers who take part in the trial selected the journals for the ADONIS-pool. The number was decreased from 300 (1985) to 219 at the beginning of the trial mainly because of storage problems on the CD-ROM.

The first ADONIS-project was supposed to incorporate 3.000 journals!

Looking at the journals the criteria for their selection do not become apparent. The usage of the periodicals differs very much from journal to journal: the statistics for the second quarter 1988 show that we made 63 print-outs of the "Journal of the American College of Cardiology", 48 print-outs of "Neurobiology of Aging", and 26 print-outs of "Cancer Letters". Only 35 journals were used more than 10 times, 61 were not used at all!

Looking on a study on journal-usage in our library, performed independently from the ADONIS-project, we find that only 21 of all 219 ADONIS-journals are heavily used in Cologne for interlibrary loans and for the fulfilment of payed orders. Only these 21 journals belong to the group of the 100 mostly requested periodicals.

Finally we should remember that, as I mentioned above, only 2,8% of the articles ordered since the 21st June 1988 could be satisfied with the ADONIS-system. Our ADONIS staff could only work for 4 hours daily at the station because of missing orders.

4.3 Print-out quality / Comment of our users

The print-out quality depends on the material scanned, on the scanning machine and on the scanning resolution. The resolution was fixed with 300x300 pel (=12 lines/mm) for pages containing photographs and 300x150 pel (=8 lines/mm) for text-pages. Pages containing diagrams or drawings are scanned as text-pages. The print-out quality can be generally considered as good but it is often not as good as the quality of a photocopier: the letters are build-up by points. Several users wrote that they do not like this restless typeface, one said that he would prefer photocopies in the future. On the other hand, the comments about the quality of the photographs is enthusiastic - no photocopy-machine can keep up with the ADONIS-system and its laser-printer.

This excellent quality must be paid for with storage space on the discs and with print-out-time: the medium time for printing out such a page is 107

seconds - compared to 14,5 seconds for a text-page. On the other hand, only 5% of the pages contain photographs.

4.4 Unavailability

The number of orders which could not be satisfied by the system was higher than expected: 10,8% in July, 8,6% in August, and 9,5% in September. We had expected a rate of less than 5% for several reasons: no time is lost for binding, the discs do not get lost and they are always available because they are not for public usage. The reason for the high rate of unavailability is the time-lag between the publication of the printed version and the availability of the disc. ADONIS had announced that it would be less than 30 days; actually we recorded an average time-lag of 42 days. It should also be mentioned that not all supplements which have been received conventionally in the library have been received and scanned by ADONIS.

The statistics show that nearly all orders were of domestic origin. The user-group "Industrial" is highly represented - this will be of great interest for the ADONIS-board regarding licence-fees.

Interlibrary loan in the FRG - second largest user group (="Academic") - is free from such fees or charges - will ADONIS change this situation in the future?

5. Costings

One of the main objectives of the trial was "to examine the economics of a new way of supplying STM articles". It was also said that the "key to the project is the reception by and influence on the work of the libraries. From the viewpoint of the libraries the project should save library costs which might be shared with the publishers" (4).

Are there any savings for the libraries?

Costings at this stage of the project must be preliminary but calculations at this early stage are important for both partners - the ADONIS-board and the libraries:

	COSTS	SAVINGS
Present situation	-Workstation: 60.000 DM (12.000 DM/year) -Subscriber charge rate: 56.000 DM (28.000 DM/year) -Display work-station: 3.000 DM (300 DM/year) -Hard- and software maintenance incl. materials (toner, etc)	/. *) *):(1/4 photocopierer (1.400 DM/year) if enough orders can be processed via ADONIS plus corresponding maintenance-costs for it.)
Near future	-Juke-box: 41.000 DM (8.200 DM/year)	- 1/2 employee (25.000 DM/year)
Distant future	-Licence-fees (? DM)	- Subscription-costs for ADONIS-journals: 215.000 DM/year - Costs for binding of ADONIS-journals: 10.000 DM/year - Shelving-space (? DM)

At the moment, in this experimental stage, there are only costs, no savings for the ZBMED. The si'uation may change if we receive enough orders which can be processed by the system and if we install a juke-box (which is not planned because of lacking orders).

In the distant future, if ADONIS survives the trial, the ZBMED certainly will not cancel the subscriptions of the ADONIS-journals even though this would save money. We think that the printed issues must be available for our local users - for their browsing and photocopying. Additionally we will continue to loan supplements and special issues and fulfil orders for photographs. Even if the ADONIS-system were set up for self service for our patrons (we would then surely need 8-10 workstations) we would not change our policy.

6. Conclusion

ADONIS is to be regarded as a trial - we do not think that it can survive in this form. The small number of orders for ADONIS-articles compared to the total number of orders received does not justify the costs even for a part-time employee after the installation of a juke-box. Technical problems will arise if more journals will be added to the ADONIS-stock: the index will grow immensely and consequently search times will grow unreasonably. The number of discs will rise too: at the end of the trial we will have 88 discs (for 219 journals of the publication-years 1987 and 1988). A juke-box could handle them easily. However, not 219 but about 2.000 journals belong to the core of heavily used periodicals in the ZBMED. Additionally, we can prove that not only the last 2 but the last 5 years of these journals are in heavy use. Altogether we would need 2.000 discs. Who could handle these?

On the other side many of the problems mentioned could be solved by developments in computer technology: search times might be reduced by microprocessors with clock-speeds up to 32 MHz; hardware-expansions might be available at low costs improving storage-space; multi-tasking-systems might be introduced.

CD-ROM-technology will develop, too: more pages on one disc?

Higher compression-rates? Or will ADONIS return to 12"-optical discs?

The final table sums-up our opinion about ADONIS at this stage of the trial:

Positive Aspects	Negative Aspects
-Availability is good: -no binding necessary -no material "in use" or "missed"	-No index-search or very-time-consuming
-User friendliness: -good print-out quality of photos	-User unfriendliness: -time-lag -supplements partly missing -no loan of complete issues possible -no reproduction of photographs possible, no colour-photographs
-Staff: physical strain is reduced	
There are more aspects regarding a future situation without printed ADONIS-journals:	
-No subscription costs for ADONIS-journals	-No possibility of working when the system breaks down
-No costs for binding ADONIS-journals	-Complete confidence in the system - no control possible
-Space saved in the stacks	
-DOCMATCH-project: immediate supply of documents	-Only 1 user at the station compared to many in the stacks
	-No browsing in printed issues or indices possible

7. Literature

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ANNEX

On the 1988 ADONIS-meeting in November, the other European test libraries reported about their experiences with the system. These were very similar to those described above. Additionally, several libraries complained about hard- and software problems impairing the daily work continuously.

At the meeting a juke-box with 240 disc capacity and improved software was shown. It was announced by the ADONIS-board that decision was made not to include 1989 journal-issues or other journal-titles in the recent test. During 1989 investigations will be undertaken to improve the technology of the ADONIS-system by increasing the capacity of the discs and the operation-speed as well as by improving the image quality.

The ADONIS users were in doubt, however, if the PC-workstation in use now is able to cope with the needs or if a mainframe-system has to be developed for ADONIS.

THE FUTURE OF CD-ROMS FOR FULL TEXT OF JOURNALS

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THE FUTURE OF CD-ROMS FOR FULL TEXT OF JOURNALS

This paper looks at the potential of CD-ROMs as a medium for the storage and supply of full text of journals. This is not a question of merely academic interest. The present ADONIS experiment, which was planned to last for two years, is due to end some time next year, and decisions will have to be made soon as to the next step. I shall not concern myself with bibliographic databases, since for them CD-ROMs are already proving a valid medium. As other speakers have explained, they have several advantage over online access and printed bibliographic tools, though even here there are limitations; they are not cheap, and problems arise when databases grow beyond a certain size.

We must recognize that the only reason that CD-ROMs are being used at all is that they use the same technology as audio compact discs, and so can be produced cheaply from the same plant by the same processes. Otherwise, no-one would surely think of using them for storing full text; they are too big for some purposes and too small for others. However, any digital or electronic medium that required its own special technology would have to overcome a large economic barrier.

It is not surprising therefore that CD-ROMs are being used, but in the long run they will find a market only if they meet real needs in an efficient way. The present period should be regarded as one of trial (and probably error), to explore what use there may be for them. However, alternatives will also have to be explored; some of them are likely to prove better, but they will almost certainly be much more costly, and then there will be a choice between a good medium that is too costly to find a sizable market and a relatively cheap medium that is relatively poor.

Any system of publication has to satisfy various sets of people and their requirements: authors, publishers, users, and probably in the case of scholarly journals libraries as well, since they constitute the main market for them. To start with authors, it is easy to forget the extent to which scholarly journal publication is author-driven. Most academic authors (and

the overwhelming majority of authors of scholarly articles are academic) publish because they want to disseminate their findings and ideas, because they want to establish priority of discovery, and because they want academic advancement; all of these depend to a greater or lesser extent on a visible product. It is not surprising therefore that they are not easily satisfied with anything but a visible product.

This point is an important one. We know what has happened in the past when authors' requirements have not been met. The best example is that of synopsis publishing. Synoptic journals have enormous potential advantages. They benefit libraries because they are cheaper and save a good deal of storage space. They benefit users because they can obtain the essence of an article much more easily and quickly. They benefit publishers because they are much cheaper to produce and should have larger markets. Why then were experiments with them failures? The only reason was because authors did not want to be published in them; they wanted their full text published, in a visible form.

The same lesson needs to be applied to "invisible" text, whether it is available online or on CD-ROM or in any other form that is not directly readable by the naked eye. It may be that one day journals really will run into an economic crisis and authors will have a stark choice between being published on CD-ROM or in some other invisible form, and not being published at all; but that day has not come yet.

Users also have to be considered; indeed, they should be our first consideration. They want to be able to browse and scan current journals to keep up to date. What seems a rather haphazard, not to say chaotic, process is, I suspect, very efficient. I have observed how I personally use current journals. It takes me about four or five minutes to flip through the current issue of a journal to decide whether I want to read any of it. During that process, I may find an article I think I want to look at in more detail; it takes me another three or four minutes to turn over the relevant pages to see whether it really is of interest, and whether I want to read in more detail. "Detailed" reading may mean ten minutes or an hour. The whole process is very quick. A similar procedure on screen would take far longer, would be less pleasant and easy, and would carry a greater risk of missing

something useful. Screens are not good physical media for browsing. They are too small, and moving forwards and backwards between "pages" is too slow and cumbersome.

There may be a way round this, if articles are designed for screen reading rather than for the printed page. A simple improvement would be to have a synopsis or long abstract, which readers would look at first, moving on to the full article if they needed to. More radically, articles could be totally restructured so that the process of scanning and browsing could be simulated on screen. This would require a fundamentally different way of thinking about information and its presentation. As journals exist at the moment, they cannot easily be presented on screen in a form that suits users, and, as has been discovered in Cologne during the ADONIS experiment, they are not willing to give up their printed journals.

As for libraries, if I am right in believing that the printed versions of currently browsed journals cannot be replaced, any acquisition of CD-ROMs would have to be additional to the acquisition of printed journals. That means that libraries would have to pay twice - for the printed journal and for the CD-ROM. With present trends in the size and purchasing power of library budgets, the idea of paying twice for the same product in different forms would not appeal strongly to libraries; nor would such a system appeal to publishers, because in order for libraries to pay twice for some journals they would have to cancel subscriptions to other journals.

Publishers will not - they cannot - produce something that does not sell, or something that does sell and erodes an existing profitable market. Many conventional printed journals are at the moment highly profitable, and my belief is that the highly rated and prestigious ones will remain so for the foreseeable future. Either journals on CD-ROM are successful, largely at the expense of printed journals (for I doubt if there is a double market of any size), or they are not, in which case they will die anyway. This is rather similar to the situation with online bibliographic databases, where after many years of operational experience machine-readable access is still heavily subsidized by the printed versions. A similar situation with full text would not be economically tolerable for long.

I have already stated my belief that CD-ROMs are generally inappropriate for current journals. One unsatifactory feature of the present ADONIS system should be curable. It is unacceptable for there to be a delay of from two to four weeks between the issue of the printed journal and its appearance on CD-ROM. Although at the moment scanning of the printed text is the most economic way of digitizing it for transfer to CD-ROM, some means will surely have to be found of transferring it to CD-ROM direct from the electronic typeset version.

CD-ROMs have too large a capacity for single discs to be used for separate issues of individual journals. This is of course why the ADONIS package of current issues from a number of journals on one disc was developed. Most of the journals on the ADONIS discs are high use journals, but it may be more appropriate to use CD-ROMs for "fringe" journals - the medium use journals that a library might have to cancel because it was short of money or that were marginal to its needs.

CD-ROMs could of course be used for storage of back runs of journals. One alternative is to store on them back runs of individual journals; would this be more cost-effective for the library than microfilm? There is also the enormous task of converting the printed text of back runs to digital form, though if an ADONIS-type system went on long enough back runs would gradually build up.

Alternatives for retrospective storage are various forms of package, with each CD-ROM containing several journals. One is the ADONIS model, where journals are pre-packed by subject. Journals would be selected for transfer of back runs to CD-ROM on the grounds that they were fairly heavily used or possibley in the medium use range. They could be made available to libraries either through centres like the British Library and Cologne, or they could be sold or leased to individual libraries, though that option raises other problems, some of which are mentioned later.

One major problem with the subject package is the selection of subjects. Biomedicine was a fairly obvious field to choose for the ADONIS experiment, but what others should be chosen? Another problem lies in determining what journals are "high use" or "medium use". It is all very

well to say that medium use journals present a good option, but is there a category of such journals that is generally valid? One library's medium use journals may be another library's high use journals or yet another library's low use journals. It would be possible to find out how much consistency of use there was of different journals across libraries, but it would be a very formidable study.

Another possible alternative for a pre-packaged system is a CD-ROM package cutting across all fields. Journals could be selected from all subjects at different levels of use, e.g. very high use journals, high use journals, medium use journals, and so on - a hierarchical series of packages. The problem of what is "high use" etc. remains, and in any case this does not seem a very attractive option.

A further alternative, which is much more attractive at first sight, is a retrospective selection not of journals but of articles. At present libraries try to optimize their collections of journals. But in fact they are buying a lot of waste paper because many, perhaps most, of the articles in the journals they buy are never used. At the same time they have to use interlibrary loan for articles in journals they do not have. If they had an optimal collection of articles, they would be able to satisfy their users much better for the same amount of money.

It is well known that a high proportion of citations is to a limited number of articles; perhaps 10% or 20% of journals account for 80% of citations, although much of this concentration is due to the much larger size of highly cited journals. However, within journals too a high percentage of cications is to a limited number of articles. If one looks at the whole picture, about 90% of citations may be to about 3% of all articles.

Highly cited articles can be identified through the Science Citation Index (though it would be much easier to do it from the ISI database); if they are highly cited after two years they are likely to remain highly cited. It would in principle be possible to put those articles on to CD-ROMs, probably by subject. Attractive though this concept is, there are problems with it. How closely do citations represent use? Moreover, the concentration of use on a limited number of articles may be much less than the concentration of

citations. Also, there may be much greater variation between libraries in the use of articles even than of journals. This concept too could be tested, not by examining the use of articles in different libraries and comparing it with citations - that would be a massive study - but by a practical test in one subject field.

There is another possibility still: CD-ROMs that were not pre-packaged, but purpose-packaged. This of course would be much more expensive than a pre-packaged system - how much more expensive can only be guessed. Each library would be able to state what journals (or possibly even articles) it wanted. It should not be at all impossible for publishers to arrange for the production of digital masters from which selections could be made and put on to individually packaged CD-ROMs for individual libraries. Some overlap in the needs of different libraries would still need to be demonstrated to make the production of masters viable.

All of these possibilities pose economic problems for libraries because they would have to pay twice, for the current hard copy issues and for the retrospective CD-ROMs, unless they bought CD-ROMs only for fringe or marginal journals and cancelled the hard copy subscriptions. If such a pattern of use and purchase became widespread, presumably publishers would no longer produce hard copies of these journals; either libraries would buy them on CD-ROM or they would use CD-ROM supply centres like the British Library.

The purchase by libraries of CD-ROMs of journals they needed to buy currently in conventional form would be cost-effective only if the cost of the CD-ROMs, plus the work-stations, proved to be less than the cost of binding and storage of the printed versions, which they would presumably throw away after two years or so without binding. The cost comparison would depend mainly on the cost of CD-ROMs and the work-stations; and the cost of CD-ROMs would depend entirely on what publishers chose, or were able, to charge for them.

There are alternatives that do not involve CD-ROMs. For individual journal issues, optical cards might be more suitable, because their capacity is much smaller and they could be produced very cheaply. This might be

satisfactory for individual purchasers, but not for libraries, because large numbers of small cards would be very vulnerable to loss and theft.

Another possibility is to supply digital tape of journals to libraries, which could then select from it titles or articles they wanted and transfer them to their own WORMs. They would have to have the technology to do this, or they could get it done for them. The cost of this has so far as I now not been looked at at all, but it is an option that should not be ruled out without further study.

The supply of articles from CD-ROMs through centres makes full sense in the long run only if the present ADONIS process of printing items and sending them through the mail is replaced by direct transmission from discs to users. That will surely happen if the ADONIS project continues in some form. Then, however, it needs to be asked what advantages such a process has over online access to journals. These comparisons too need to be made.

There are general problems that need to be considered. If many libraries acquired high use journals on CD-ROM, individually they should be quite cheap because sales would be high. But just because they were heavily used there would have to be many copies of them, and many work-stations. Multi-access may possibly overcome the latter problem, but I am doubtful. A sensible comparison cannot be made with bibliographic databases, which can be searched fairly quickly, online reading would occupy far more work-station time, even if users decided to make a print of an article after some minutes. If on the other hand libraries acquired low or medium use journals, the market would be fairly small, and so the CD-ROMs would be expensive. Either way there is an economic problem for libraries.

The problem of handling large numbers of discs has been mentioned by other speakers; it is one of the penalties of the limited size of the CD-ROM. The handling of two or three hundred CD-ROMs is very hard to envisage.

I have pointed out a number of problems and possibilities. What conclusions can one draw? Ideally what is needed is some kind of total

package. If users want hard copy to scan currently, but if for other purposes it is convenient to store material in some form such as CD-ROM, or maybe a bigger optical disc, then a combined package might look something like this. Current journals would not be issued as now, on good and duralbe paper, but in newspaper style: on very cheap newsprint paper, one article per page. Such a format could be scanned very quickly, and the current issue would be thrown away after a year or two (if it had not rotted away by then). At that stage the digital optical medium would become the format in regular use. This is of course only one of many possible combinations of media and forms of access; other combinations need to be identified and examined.

Let me review my main points. CD-ROMs are probably not suitable for material that needs to be browsed and scanned or that is heavily used. They may prove usable for fringe current journals, if these can be identified, though they will have to compete with online access and document supply centres such as the British Library's; or for older journals, where they will be in competition with hard copies of the journals kept locally, with microfilm, with document supply centres, and possibly with online access.

A technology that opens up new possibilities cannot be ignored. CD-ROMs may not prove to be a lasting medium, but we have learnt a great deal by experimenting with them. I hope that our desire to exploit technology will not dominate our concern for users, for whom the whole system should exist and be designed.

DUTCH REFERENCE DATABASES (NRB)

J.M. Feijen

PICA LIBRARY AUTOMATION,
THE HAGUE
THE NETHERLANDS

DUTCH REFERENCE DATABASES (NRB)

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PICA LIBRARY AUTOMATION, THE HAGUE

Abstract

In December 1987 PICA released a CD-ROM under the title "Nederlandse Referentiebestanden (NRB)" (Dutch Reference Database). This disc is the result of a CD-ROM pilot-project; a project initiated by the three Dutch library organizations PICA (Centre for Library Automation), NBLC (Dutch Centre for Public Libraries and Literature) and LBC (National Library Centre). The pilot-project has been set up together with 50 Dutch libraries, including university libraries, public libraries as well as special libraries.

The purpose of the project is to develop know-how and facilities for the production of CD-ROM products and to test the applicability of CD-ROM as an information medium for libraries.

All 50 libraries participated in an evaluation which is both oriented towards technical aspects and to the user aspects.

In the summer 1988 data will be collected and conclusions about the use of this medium in libraries will be drawn. Results of this evaluation are given in the presentation in Essen.

DUTCH REFERENCE DATABASES (NRB)

The Pilot project

PICA, Project for Integrated Catalogue Automation, has been active in the field of library automation for more than a decade. It started as a cooperative project of the Dutch Royal Library and Dutch university libraries. Nowadays it is an organization that renders services to libraries on a non-profit basis, and cooperation still plays a very important role.

In the spring of 1987 the Dutch market knew many foreign CD-ROM products and only 2 or 3 of Dutch origin. Very few libraries used these products and also very few had bought the necessary equipment. In fact, most librarians hardly knew what CD-ROM meant.

On the other hand librarians were confronted with articles about the new media, articles that led to many daydreams especially when CD-WORM was also mentioned. But nobody really knew what the CD-ROM could do in a library. And most libraries couldn't afford to find out on their own.

The only way to find out was a cooperative project. In May 1987 a project proposal was produced by PICA together with two other Dutch library organizations: the NBLC (the Dutch Centre for Public Libraries and Literature) and the LBC (National Library Centre). The proposal formulated 4 project goals:

1. to develop know-how and facilities (e. g. software) for the production of CD-ROM products

2. to develop a CD-ROM disc with relevant files for libraries and their users and to offer this disc in a complete ready-for-use package for 50 libraries: a CD-player, the CD-ROM, retrieval software, documentation, together with adequate instruction and training (the only thing the library would have to do was to obtain a PC)

3. to introduce a new information medium in Dutch libraries

4. to evaluate the use of this package in the libraries in order to draw some conclusions about the applicability of CD-ROM as an information medium for libraries.

The project was financed by PICA, NBLC and the Dutch government. The NBBI, the Dutch Office for Libraries and Information Services, contributed to the third part of the project: the evaluation. The project was named 'NRB CD-ROM: pilot project for Dutch reference files on CD-ROM'.

Only 50 libraries were allowed to participate in the pilot project. Among them were public libraries, university libraries and special libraries.

Part one: CD-ROM production

In June 1987 the Dutch libraries were invited to offer their files for the project. 19 files (see appendix 1) were selected, based on several criteria:

- variety of contents across the files
- uniformity of contents within each file
- availability in machine-readable form
- the file should contain relevant information for libraries and the users of libraries
- the file should contain holdings in order to be useful for interlibrary loan purposes
- the file should not be available (or limited available) elsewhere.

18 files were already present in the large central PICA database. One file was specially converted from an external computer system into the PICA database.

Every file owner was responsible for a short description of his file, to be included as a title page on the CD-ROM. Files contain title descriptions

together with holdings, subject headings, classifications. Some files also contain abstracts.

File organization is according to the High-Sierra Standard. Files are arranged in alphabetically sorted datablocks, first the title description in abridged and full form, and then inverted file records, i.e. index records, arranged as a 2 level index. Index records are located close to datablocks in order to keep search times as low as possible.

The PICA output system was used for selection of the files and conversion from PICA internal format into the data- and indexfiles on the master tape.

Simulation of the final version and final check-up was done by means of the Philips CD-simulator facility in Apeldoorn. In this way one can actually see what the response time will be on the CD-ROM player, and if necessary file rearrangements can be considered in order to improve response time. Also final error checking can be done, so that if the dataset is incomplete or incorrect, adequate action can be taken before the actual mastering starts. Philips Netherlands was responsible for mastering and production of the replica's.

PICA's MICRO-OPC package (see appendix 2) is used as retrieval software for the CD-ROM. MICRO-OPC was released in 1986. The most important goals for designing this package were (and still are): simplicity, transparency and user-friendliness. It is menu-driven, has short presentation for multiple hits and a full presentation for single hits, full text indexes, set expansion or set limitation, truncation, qualified searching (by title, author, subject or classification) or full text searching, phrase searching, index browsing, stopword facility. Most features are easily accessible by the use of a function key instead of difficult command structures.

The software is not included on the CD-ROM but is available on a separate diskette. In this way updates are possible.

Part two: the package

The Philips CM-100 is used as CD-player. The CD-ROM was produced by Philips. The label for the CD-ROM was designed by NBLC and then produced by Philips.

Documentation was divided into a short version to be included in the CD-ROM container and a full version to be used as a separate manual. Libraries were advised to use only those PC's that had been tested together with the CM-100 player, e.g. the IBM XT or AT, the Olivetti M19 or M21, or the Philips PC's. Other PC's (e.g. the Tulip Compact 1) can only be used with the CM-100 after hardware changes in the interface board. Several other PC's are not compatible with the CM-100.

Because of the substantial financial contributions of PICA, NBLC and the Dutch government, the complete package - except for the PC - was offered to the 50 participating libraries at a very low price: f 3,000.-- (equivalent to $1,400.--).

Also included was a special instruction meeting where librarians could learn to work with the hardware and software and where they were instructed about the coming testperiod and evaluation. If necessary extra help was offered for installation on site, but most libraries decided to install the equipment themselves.

Part three: evaluation

In about 5 months the first two parts of the pilot project were completed. In December 1987 the CD-ROM was ready and in January 1988 all librarians were instructed and received their package for use in the library.

This was the start of the actual testperiod that ended in July. A special advisory committee, consisting of librarians and PICA, NBLC and NBBI staff, was formed to help wording the evaluation forms and discuss any problems encountered during the test period. The evaluation should give an answer to questions like:

1. is CD-ROM a useful medium for libraries?
2. what types of datasets are most suitable for CD-ROM distribution?
3. in what ways can hardware or software be improved?
4. what are the expectations of librarians and library-users before and after evaluation?
5. statistics on usage?

Every librarian received a set of evaluation forms. He or she was also expected to keep track of the use of the CD-ROM by means of a log-book. This log-book also records who was using the CD-ROM: the librarian or the end user. In addition several librarians were interviewed after the test period in order to get additional information on the results of the evaluation forms.

Financial aspects

As indicated earlier the package-price for participating libraries is $1,400.--. For other libraries the CD-ROM + software is available for $700.-- and the complete package for $1,900.--.

The project costs can be summarized as follows:

item	expected cost	real cost
software (+development)	$ 53,000.--	$ 55,500.--
CD-ROM production	- 24,000.--	- 12,500.--
coordiantion, support	- 13,000.--	- 32,000.--
hardware	- 52,500.--	- 52,500.--
	$142,500.--	$152,500.--

Package price paid by libraries $1,400.--
Real package price (50 packages) $3,050.--

Evaluation results

Right at the start of the test period librarians were asked to express their expectations.

Most librarians felt that the CD-ROM would be a useful addition to library services and a meaningful extension to the information already available in their library. They also expected to acquire insight in the medium CD-ROM.

It is interesting to see that they anticipated a high involvement rate with the CD-ROM for their personnel and internal users (staff) but a low involvement rate for their visitors.

This attitude is also reflected in the fact that many librarians (almost 50%) made the CD-ROM available to personnel only, and other librarians (40 %) made it available to personnel and general public. The other librarians did not know yet.

One of the things that turned up during the test period was that many libraries had difficulties getting started. Most participants received their package in January. In March only 25 of them (50%) were actually working with the CD-ROM, 35 in April and 40 in May . In August 6 libraries stated that they were still not working with the CD-ROM, and 4 were not able to say what the status in their library was. Librarians in the university library sector had a slower start than other librarians.

Problems encountered in the first months were:

*Slow ordering and delivery of the personal computer to be used with the package.

*Technical problems with PC's in combination with the CM-100. Although librarians were informed about PC's that could be used, many of them tried to use a different type, in most cases because they already had a PC and wanted to use it.

These problems were, to some extent, underestimated by the project management in the first months. Librarians did not complain, so on the surface things seemed in good order.

But, on the other hand, the evaluation results make clear that once it was installed, nobody had difficulties in using the package. Both librarians and visitors were satisfied with the ease of use of the hardware and software.

Some minor problems in this area were:

- driver software start up problems in situations where more than one disc is used, e.g. switching from the Pica disc to some other disc and back

- the inexperienced user has difficulty to understand the set manipulation facilities of the Micro-OPC software (Boolean logic).

Especially this last remark is important. The public libraries in the group of 50 stressed the fact that the user interface should be as simple as possible. Of course this is true for the online catalogue also. The reference library user seemed to have less problems with more advanced retrieval features. So there seems to be a relation between the software and the user of that software. Again this is not a new conclusion, but the effects are often forgotten. Also, the evaluation shows that there is a distinct relation between library type - type of file - type of audience.

The other evaluation results are:

Most files included on the disc were of little value to the users, only the Leiden file (persons) and the special collections of the LBC (music, sound, informatics) were very popular. The evaluation makes clear that the files included on this pilot disc did not meet the expectations of the librarians. At the start of the project almost 70% of them expected the files to be a useful addition to their services. After the test period this percentage dropped to 30%.

The third project goal, introduction of a new medium in libraries, has been achieved.

At the beginning of the project 87% indicated to consider the introduction to a new information medium useful. After the project 97% considered the test as an introduction to this medium useful. More than 87% indicated also that the project was important as preparation for future use of CD-ROM discs.

In many libraries the disc was used by staff only, in other libraries by staff and general public; in this second group the disc was used intensively and there was a high involvement rate.

About 70% of the end users had not used a CD-ROM before. We do not know about their online experience; most of them used the disc for a session of five to fifteen minutes, just out of curiosity or to locate some specific piece of information; in most cases they were able to find the information directly, without the help of the librarian.

Librarians are getting hungry: the pilot project is interesting, some files are very useful, others less useful, but now they want new discs. Most librarians expressed an interest in:

a) catalogue files of other libraries, e.g. a central catalogue for a specific province or region, or a special collection not primarily special in subject but special in information
b) related to this: special information in the form of files that are not available in some other form, so in fact new information
c) The National Bibliography (Brinkman)
d) factual databases for use in public libraries by general public
e) full text databases.

It must be mentioned that there seems to be a lack of interest for use of CD-ROM as a medium for the libraries' own catalogue. For that purpose most librarians prefer an online catalogue, partly because they expect CD-ROM to be more expensive than online.

At this moment librarians think of CD-ROM as an additional tool, as an

extension of their services, rather than as a medium that can replace already existing tools.

Visitors like CD-ROM much better than the card-catalogue. At this moment no data is available about a comparison with online.

Errors to avoid

What can one learn from this project:

*do not forget to spend a lot of time and energy to find out who is going to use the CD-ROM, where, why, when, how, etc.

*do not think that users are satisfied when they do not complain; be active, find out about real live and be prepared.

*do not underestimate technical problems, with PC's start up files, driver software etc. Only believe what you have seen.

*do not underestimate evaluation targets and evaluation time: do not start a test period before you are absolutely sure about what you want to know. Also your test sites need to know what you want from them.

Conclusions:

Apart from the conclusions that have been formulated when discussing the evaluation results (see above), the following general conclusions can be drawn.

First of all, the pilot project has been successful. The goals of the project have been attained.

CD-ROM technology can be used successfully in libraries, as a tool for both librarians and users.

Today 50 libraries have access to CD-ROM as a medium, the hardware is installed and ready for use, the librarians have learned to work with it. This means that the necessary infrastructure is there.

It has been a wise decision to limit the number of participants to 50 libraries. Even with a project of this size project management/user support and the evaluation process are very time consuming. With respect to the evaluation it should be noted that the response percentage, specially for end-users, was somewhat disappointing. Therefore the results should be interpreted as an indication, rather than as an exact statement.

First time CD-ROM production is relatively time-consuming and therefore relatively expensive. On the other hand: making updates of the same CD-ROM takes much less time (although updating was not part of this project).

Appendix 1:

FILES

1. ANTWERP COLLECTION (650 BOOKS)
2. INFORMATICS (1.100, BOOKS)
3. VIDEODISCS (450, VIDEODISCS)
4. BIBLIOGRAPHIC CENTRE (5.000 BOOKS)
5. COLLECTION FOR THE BLIND
   (5.500 BRAILLE, 22.500 SOUND)
6. BOSMAN COLLECTION (500, BOOKS)
7. BRABANTICA (7.500, BOOKS)
8. EDUCATIONAL COLLECTION
   (SLIDES AND SOUND, 1.700)
9. DICKENS COLLECTION (500, BOOKS)
10. CHILDREN'S BOOKS (17.000)
11. JESUITS COLLECTION (11.000, BOOKS)
12. BOOKS ABOUT MUSIC (1.000)
13. DUTCH LITERATURE IN TRANSLATION (250)
14. CATALOGUE OF PERSONS (70.000, BOOKS)
15. CATALOGUE OF SERIALS (11.000, SERIALS)
16. STCN (27.000, BOOKS BEFORE 1700)
17. TACO 1976-1978 (22.000, ARTICLES)
18. THEATRE AND FILM (5.500, BOOKS)
19. WORLD HEALTH ORGANISATION
    (1.600, SERIALS, BOOKS)

Appendix 2:

MICRO-OPC

SINGLE USER
MS-DOS
FULL TEXT RETRIEVAL
MENUDRIVEN, USERFRIENDLY
SET MANIPULATION, TRUNCATION
PHRASE SEARCH, INDEX BROWSING
ONLINE DOWNLOAD, OFFLINE INPUT
PRINTFACILITY
MULTIFILE DATABASE
ALSO FOR LASERVERSION AND CD-ROM

THE DEUTSCHE BIBLIOGRAPHIE AND CD-ROM

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THE DEUTSCHE BIBLIOGRAPHIE AND CD-ROM

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Abstract

In spring 1988 the "Deutsche Bibliothek" in Frankfurt (Main) produced a first Test-CD-ROM (Compact Disk with Read Only Memory) containing some 300.000 bibliographic entries from the "Deutsche Bibliographie" (1986 and 1987).

Indeed, the new CD-ROM-Service may be used for a number of purposes, but we believe that we shall need the other four bibliographic services of the Deutsche Bibliothek, too:

1. the printed national bibliographies
2. the Title-Card-Service
3. the Magnetic Tape-Service
4. the Online-Service "BIBLIO-DATA".

Therefore, the Deutsche Bibliothek will offer all five services, and the user may decide which device they actually need (Five-Finger-Theory).

The most important advantages and disadvantages of CD-ROM products are widely known, and will not be repeated in this paper. There are, however, some difficult problems connected with the aim to standardize applications software.

Nevertheless, such common international and national standards may at last be feasible for similar products (like national bibliographies within the EC and/or lists of "Books in print", Union-Catalogues, national bibliographies etc.).

THE DEUTSCHE BIBLIOGRAPHIE AND CD-ROM

To cut a long tale short: Each hand has five fingers, and the Deutsche Bibliothek is offering five bibliographic services to their clients; the subscribers may decide which device or tool they actually need.

These five services are:

1. The printed National Bibliographies
2. The Title Card Service
3. The Magnetic Tape Service
4. The Online Service "BIBLIO-DATA"
5. The new CD-ROM Service

Those of you who are interested in details may study and check this new CD-ROM tool on the screen in the exhibition area and may take one of those papers with examples in English, French and German.

Here - within the limited time - I want to lay stress on the question: "What is the extra value of this new tool - do we really need a fifth finger?"

Of course, those five bibliographic services are not totally independent or free; they all are output products or by-products from the very same data-pool and connected with this pool like my five fingers are with my hand; it is indeed a rather complex system with more or less strong relationships.

As for the first finger - the printed National Bibliographies - you will perhaps remember that the Deutsche Bibliothek in Frankfurt was the very first national library that produced their printed national bibliographies (since 1966) with the help of a computer. There are weekly editions with a monthly index and semi-annual and five-year-cumulations. As for the five-year-cumulation I want to remind you of the steadily increasing size: From 1976 to 1980 there were not less than 18 heavy volumes, but five years later the new five-year-cumulation 1981 to 1985 had not again 18 but 38 heavy volumes! Our publisher was shocked!

I must confess - it was not only the increasing number of books and periodicals published by publishers - but for the first time we had added the theses, reports, and other grey material to this five-year-cumulation (with the exception of music scores and records).

For the first time our publisher was obliged to reduce the price of each volume of a five-year-cumulation because he was afraid that nobody would buy a Five-Year-Cumulation that is too expensive. The total price of the 18 volumes was about DM 12,000. The total price of the 38 volumes (five years later) is only about DM 19,000 (instead of more than DM 25,000).

As we know that on one single CD-ROM all records and references of all 38 heavy volumes easily may be stored, we felt obliged to offer a CD-ROM as soon as possible at a reasonable price.

We do believe that there are now quite a lot of libraries and other institutions in Germany and abroad that are interested to subscribe a Deutsche Bibliographie on CD-ROM with quarterly updates, especially because the search language is not only German but English and French, too, and because 16 or more access points are offered, and you may even forget the German cataloguing rules while executing your search.

Even for the subscribers of our Semi-Annual Cumulations, there is another nice "extra added value":
As most of you know, after two years you are obliged to use four different alphabets, after three years even six and after four years not less than eight! It is too expensive to cumulate these printed volumes at least every two years or every year - to reduce the search time; but this is no longer a problem, of course, for a quarterly updated CD-ROM.

As for the second finger, it is the Title Card Service: This title card service is produced by a high speed Laser printer, it is true, but as we ourselves had not enough qualified staff to file all title cards in the good old-fashioned Card-Catalogue for our readers in the Catalogue-room, we had a very bad and ugly "one year backlog", and our readers could not get the information and the shelf numbers in due time.

Here I am obliged to remind you that there is an increase in "legal-deposit-publication" of more than 100 % since 1972 whereas the total number of staff is constant. In 1972 we got about 110,000 items and had 323 full-time positions, in 1988 we got about 225,000 items and had only 321.5 full-time positions.

What was there to do? The first step - in 1987 - was to close the card-catalogue for the readers and to offer them a batch-created, Laser printed volume catalogue. The first edition of this Laser printed user catalogue had not less than 48 volumes (though it contained only the titles since 1987 and had not more access points than the old closed card-catalogue). The second edition - in 1988 - is now doubled in size! Of course, a CD-ROM Catalogue (with 16 or more access points) is a better tool - at least in the next five years! This is the second extra added value, and this is also the reason why we added our shelf-numbers to the CD-ROM.

As for the third finger, it is the Magnetic Tape Service: It is true - we are offering our records in machine-readable form (in the German Exchange Format MAB) to German libraries weekly, and we do the same with the tape of the British National Bibliography! But there's still no National Library all over the world that subscribes our tapes, and less than five other institutions abroad!

Perhaps they don't like the MAB-Format and are waiting till we are offering our machine-readable records in the UNIMARC-Format, too. Of course, we know that there are many libraries and other institutions in Germany and abroad with Personal Computers that would subscribe a Deutsche Bibliographie on CD-ROM at reasonable price and with an internationally well-known retrieval software, either for searching or for cataloguing purposes (downloading etc.).

As for the fourth finger, it is the online service BIBLIO-DATA. We have been offering this service for years via our Host (INKA/STN). It is weekly updated and used as a reference tool like BLAISE, it is true, but within the last three days here in our meeting the advantages and disadvantages of those online services were mentioned often enough. There is no doubt the extra added value of a CD-ROM is clear for everybody who has to pay the

telecommunication costs for browsing etc.

As for the finger number five, it is the new CD-ROM-Service. There were at least three main reasons why the Deutsche Bibliothek did not take the famous "wait-and-see-position" but published and distributed a first test-CD-ROM version in April 1988, containing about 300,000 records from 1986 and 1987.

First reason: Our publisher is not only publishing the Deutsche Bibliographie in printed form but also editing the "Verzeichnis lieferbarer Bücher" ("German Books in Print"). Now - as you know and have seen here - the publisher is offering a CD-ROM version with four updates a year of his "German Books in Print" edition. He did a serious competition before with 13 Software-Houses - and decided to take the OCS-Software (BOWKER). As we did not like that the "German Books in Print" is offered world-wide in a printed and a CD-ROM version (to our subscribers, too) and the Deutsche Bibliographie is getting, step by step, the image of a good-old, paper-printed, expensive, heavy and useless "Bible", we decided to get the very same user-oriented OCS-BOWKER-Software like the "German Books in Print" CD-ROM version and to seek (like a twin brother) a close link to booksellers, publishers and librarians in Germany and abroad. We do hope that we may offer the Deutsche Bibliographie on CD-ROM by our publisher in May 1989 after the final tests and evaluation studies (with conditions similar to VLB-CD-ROM).

Second reason: There is a strong movement within the National Libraries of the Countries of the European Community not to offer 10 or 20 CD-ROM versions, which are totally different, but (perhaps) to use the very same standards and methodology. As our next speaker, Mr. Robert Smith (British Library), will present a special paper on this project, I don't want to go into details here. I just want to state that the Deutsche Bibliothek is more than happy that the British Library and the Bibliothèque Nationale has chosen the OCS-BOWKER-Software, too, and we hope that the tests and evaluation studies will be successful and will encourage other libraries to follow us.

The third reason: The last but not least reason that we published our first

CD-ROM on April 28, 1988, was rather simple. On April 28, 1988, Professor Günther Pflug - the Director General of the Deutsche Bibliothek - was retiring and leaving the Deutsche Bibliothek. We urgently needed a really unexpected "surprise" for him (not only a "Festschrift"). When he started his job in the Deutsche Bibliothek in 1976, 12 years before, the first thing he did was to push the "button of our BIBLIO-DATA-Online-Service". Now he finished his job by pushing again the button of the PC to start the first CD-ROM, containing all 300,000 titles from 1986 to 1987 and offering 50 CD-ROMs to his colleagues in Germany and abroad (it was more than a nice public relation action again).

As the date (April 28, 1988) was a fixed date like a strong deadline, we even succeeded to get the CD-ROMs and the OCS-Software in time. As for the results of our test-CD-ROM version, we have sent to all libraries that had got our test-CD-ROM a questionnaire with a deadline end of October 1988. The first results are rather encouraging, but, of course, I cannot yet go into details here. We will publish them in due time.

CD-ROM FOR NATIONAL BIBLIOGRAPHIES: A EUROPEAN PROJECT

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CD-ROM FOR NATIONAL BIBLIOGRAPHIES: A EUROPEAN PROJECT

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Abstract

One of the strongest vertical markets for CD-ROM is based on bibliographic data, yet each product adopts its own solution to the question of data retrieval. The British Library's National Bibliographic Service is jointly investigating with the Bibliothèque Nationale the feasibility of an applications standard for use with national bibliographic data on CD-ROM. Such a standard would enable records from a range of products to be retrieved in the same way, irrespective of the fact that the records may have been produced by different agencies and held in different MARC formats.

The initial project has been undertaken jointly by the British Library in London and the Bibliothèque Nationale in Paris. The result is a CD-ROM containing data from both libraries held as separate databases but accessible in the same way. The databases represent sub-sets of the British and French national bibliographies.

Production of the pilot disc is being followed by an extensive evaluation process to be carried out throughout Europe which will include tests on the pilot disc produced by the Deutsche Bibliothek, Frankfurt in a parallel project. As well as providing the impetus for future national cooperation among national agencies, results from this evaluation will inform planning for future products from these three national libraries. The British Library, in particular, will be looking toward a range of bibliographic products with the BNBMARC database as a likely first candidate.

CD-ROM FOR NATIONAL BIBLIOGRAPHIES: A EUROPEAN PROJECT

1. INTRODUCTION AND BACKGROUND

The British Library and the Bibliothèque Nationale have now jointly produced a pilot CD-ROM which contains bibliographic records from both national libraries. We are intending to produce discs in quantity which will be widely distributed. A major evaluation exercise will follow, to be (at least partly) funded by DGXIII of the Commission of European Communities in Luxembourg. A full report and participative Workshop will result from this evaluation by Spring 1989. The results will be published soon after.

More significantly, we anticipate that this initiative will lead to a major project to run over the next two-three years which will extend the project to other national libraries. We further anticipate that early in 1989 the Bibliothèque Nationale as well as the British Library will be producing CD-ROM products on a commercial basis as a result of information we will have gathered from this disc's evaluation.
Let me first, however, move one step back to put these developments in context.

2. BRITISH LIBRARY INVOLVEMENT WITH CD-ROM

In 1985 the British Library Research and Development Department produced (in conjunction with J. Whitaker & Sons) CD-ROMs containing bibliographic data. The discs have been demonstrated at exhibitions and conferences over the last three years. They represented one of the very first bibliographic applications of CD-ROM and created a great deal of interest in the potential of the new medium. They were, however, intended solely as demonstration discs and have never been commercially available - despite their appearance in a number of CD-ROM directories! We began to look at the feasibility of publishing the British National Bibliography (BNB) on CD-ROM some years ago. We have, however, waited before doing so for a number of reasons

- the market (particularly in the United Kingdom) was not sufficiently developed to make publication viable;
- standards at the logical level were being addressed but had not been fully formulated;
- there was a limited range of front-end applications software; option to choose from;
- CD-ROM drives were expensive.

A lot has happened since that time. There is evidence of a growing market in Europe and, especially, in the United States for library-oriented CD-ROM products. There is a much wider range of applications software suitable for bibliographic products such as the BNB and some of the fundamental standards issues appear to have been resolved.
Incidentally, with reference to the market, our own surveys indicate that there is a considerably bigger installed base of CD-ROM drives in UK libraries than we had thought. It appears that the exponential growth of drives which Janet Mitchell indicated as taking place in the United States is being echoed in the United Kingdom.

3. STANDARDS

Before moving on to discuss the international aspects of our project let me say a few words on the subject of standards.
The CD-ROM industry has been notable for the speed with which it has promoted and adopted standards. (It has even been suggested that the early adoption of standards has inhibited the development of CD-ROM technology.) In the context of this paper I am considering standards at three levels:

(i) the physical level - i.e. the actual size of the discs (standardised at 12 cms in diameter);

(ii) the logical level - i.e. the way files are held and arranged on the disc. It is this level which the "High Sierra" standard addresses;

(iii) the applications level (the front-end) - i.e. the way data on the disc is actually searched, displayed or downloaded by the user.

The first two of these standards issues have in practice now been resolved. The "High Sierra" has become a de facto standard over the last eighteen months or so and will soon be formally recognised as an international standard. It is, no doubt, largely in an attempt to exploit the widest possible market for their products that standardisation has been so enthusiastically tackled.

The third level of standardisation has been under discussion within the library world and it is these discussions which, in part, initiated the current British Library / Bibliothèque Nationale project. Standardisation of applications software is clearly not feasible across the board of bibliographic CD-ROMs: there are simply too many different kinds of product and too many producers who have developed software tailored specifically for their own products. Nevertheless such a standard may be feasible for similar products from a group of organisations with close links and related objectives such as the national libraries represented on the International MARC Advisory Committee.

4. INTERNATIONAL MARC ADVISORY COMMITTEE

It was with this latter possibility in mind that discussions began in 1986 under the aegis of the International MARC Advisory Committee (See Appendix) with the aim of establishing better access by more users to the national bibliographies of Europe. CD-ROM was seen as being particularly significant as a means to such an end and the Committee began to consider the feasibility of a standard for an application software for CD-ROM to be taken up by national bibliographic agencies.

The ultimate aim of such a standard would be to allow the easy interchange of CD-ROM databases from different national agencies. The discs could be accessed, searched and downloaded using the "local" language. Thus a user would be able to switch from, for example, a British Library disc to a Bibliothèque Nationale disc or a Deutsche Bibliothek disc

immediately and continue searching using the same methodology. It should even be possible to carry searches from one CD-ROM to another and combine results.

Following a meeting at the British Library in London in December 1987 where representatives were present from the national libraries of Britain, France, Germany, Portugal, Spain, Norway and the Netherlands a recommendation was put forward that the British Library and the Bibliothèque Nationale collaborate on the production of a single CD-ROM to contain both British and French bibliographic records. One of the key aims of this pilot project was to see whether different record formats with different cataloguing standards could be treated in the same way for CD-ROM interrogation, display and downloading.

5. BRITISH LIBRARY/BIBLIOTHEQUE NATIONALE JOINT CD-ROM

Following the December meeting work began immediately on defining an Operational Requirement for the pilot. Once this was agreed between the two national libraries a full tendering process was undertaken and the contract awarded to Online Computer Systems Inc. of Germantown, Maryland U.S.A.

The pilot disc contains some 60,000 catalogue records - i.e. about 30,000 from each national library and so is very small in CD-ROM terms. The British records represent a sub-set of the whole of the BNBMARC database on the subject of European history. (The BNBMARC database comprises full catalogue records for all books published in the United Kingdom and deposited with the British Library since 1950. It now comprises over one million records.) BNBMARC records were provided in UKMARC exchange format and can be displayed and downloaded in that format from the CD-ROM. The French records represent one year of French accessions input to its own national bibliography. They were provided and can be downloaded in UNIMARC format.

The two databases are held separately on the CD-ROM but can be searched in identical ways. Because of the international importance of the project the user interface can be switched between English, French, German or Italian. The data are indexed in depth and in addition to the MARC display format there are several other including catalogue card.

6. DISTRIBUTION

The first copies of the pilot disc were pressed a fortnight ago. Following exhaustive testing at the British Library and the Bibliothèque Nationale the full "print-run" of 1000 discs will be completed. The pilot discs have been offered to many organisations in the United Kingdom and elsewhere in Europe, the United States, Canada, Australia and New Zealand. Over three hundred organisations are participating in the project.

7. EVALUATION

A full evaluation is to be undertaken with two distinct strands which will ultimately be brought together. Each country has a national evaluation - i.e. the British Library, the Bibliothèque Nationale and the Deutsche Bibliothek will be receiving information from its own country's libraries - in our case we will be particularly interested in reactions from libraries who already use the BNB, whether in print, online or on tape. This evaluation is also being extended to non-EEC countries, including Australia, New Zealand and the United States. The EEC side of the evaluation is being funded by DGXIII who will be employing a Consultant. This exercise will look in detail at about sixty EEC libraries and their use of the joint pilot disc as well as the Deutsche Bibliothek disc.

Among the aspects to be considered during the evaluation are specific elements of the indexing (value of different parts of the record for retrieval); general functionality and ease-of-use of the technology; possible uses for such a product as the BNB on CD-ROM in a library; and any advantages or disadvantages over printed products or online services.

8. THE INTERNATIONAL INITIATIVE

I have already mentioned the DGXIII-funded evaluation exercise. We are hopeful that this will lead into a broader European project for national bibliographies on CD-ROM to be carried out over the next two-three years. The Commission is being approached again with a proposal which suggests a number of directions in which future cooperation may lead us. The key aim is to further the compatibility and exchange of bibliographic

records in Europe. The proposal covers twelve separate but linked projects and includes reference to the development of a micro-based MARC conversion utility; multi-lingual interfaces; links from CD-ROM to a variety of online hosts; and links to library systems.

9. APPLICATIONS FOR NATIONAL BIBLIOGRAPHIES ON CD-ROM

We anticipate that one of the positive results of the projects run by the British Library, the Bibliothèque Nationale and the Deutsche Bibliothek and any further expansions will be that CD-ROMs become more widely accepted and used in libraries throughout Europe. Further, if the move towards defining a standard for applications software is successful national agencies will have a readily expanding market in which to position their products. Moreover the subsequent possibilities for the interchange of bibliographic data between national agencies might actually fulfil some of the objectives of the International MARC exchange programme which have, at least up to now, been limited. In particular, if the above-mentioned MARC conversion utility can be successfully developed there is likely to be considerable demand for CD-ROM as an exchange medium. This becomes even more likely if the networking of CD-ROMs moves from the experimental (and relatively expensive) toward practical application.

From the British Library's point of view CD-ROM will, at least initially, be aimed at the librarian rather than the end-user. The National Bibliographic Service has traditionally supported the cataloguing operations of UK libraries and at present we see CD-ROM as an extension of this role. For cataloguing purposes the librarian will select records from the CD-ROM using a wide range of search keys. Once the catalogue records have been selected they can be downloaded into the local system with, if required, full MARC coding. Alternatively they can be dumped to a local printer in catalogue card format.

We do not believe, at least for the foreseeable future, that CD-ROM is likely to replace either the printed BNB, the Exchange Tape Service or the

BNBMARC database on BLAISE-LINE. The addition of CD-ROM to the family of products coming from the National Bibliographic Service will give more choice to the library community in the way in which it receives records and will assist in promulgating a new and exciting technology to the library world in general.

APPENDIX

INTERNATIONAL MARC ADVISORY COMMITTEE

The 16 members of the International MARC Advisory Committee are as follows:

Australia - National Library
Belgium - Bibliothèque Royal Albert 1er
Canada - National Library
Denmark - Royal Library
France - Bibliothèque Nationale
West Germany - Deutsche Bibliothek (3 reps)
Japan - National Diet Library
Malaysia - National Library
Netherlands - Royal Library
New Zealand - National Library
United Kingdom - British Library (2 reps)
United States - Library of Congress
Venezuela - National Library

TWO MAJOR BRITISH CATALOGUES ON CD-ROM

Sir Charles Chadwyck-Healey

CHADWYCK-HEALEY LTD.
LONDON
UNITED KINGDOM

TWO MAJOR BRITISH CATALOGUES ON CD-ROM

SIR CHARLES CHADWYCK-HEALEY
CHADWYCK-HEALEY LTD. LONDON

Abstract

In late 1988 Her Majesty's Stationery Office (HMSO) and Chadwyck-Healey Ltd are publishing a CD-ROM catalogue of all British official publications issued since 1980. British official publications divide into 8,000 HMSO publications and 10,000 non-HMSO publications each year. The latter are publications issued directly by more than 400 government agencies. The bringing together of both these groups creates the first complete catalogue of British official publications ever published.

The catalogue is designed to be used for acquisitions as well as reference and includes information on availability (in print/out of print) and price changes for HMSO publications.

Specially designed software allows searches on subgroups such as Parliamentary Papers, Statutory Instruments, and the International Publications distributed by HMSO. Searches by keyword and by subject term are also possible. Searches by publishing body include acronyms and colloquial names.

In spring 1989 Saztec and Chadwyck-Healey are publishing the first of four CD-ROMS containing the British Library Catalogue of Printed Books to 1975. It is taking a team of 127 people in Scotland four years to key the greatest catalogue in the world which has more pre-1914 imprints than any other library. It will mean that the catalogue can now be searched not only by author or heading but by keywords in titles and notes, by date, imprint, place of publication and shelfmark.

For many libraries, in the United Kingdom especially, these two catalogues will be the first CD-ROM publications they buy.

TWO MAJOR BRITISH CATALOGUES ON CD-ROM

Ladies and Gentlemen, Dr Line, Dr Helal, I am going to finish this afternoon's session by talking about two commercial CD-ROM publications which when they are published in the first quarter of 1989 will make an enormous impact on the CD-ROM buying habits of libraries in the English-speaking world, and in particular in Britain.

They are the Catalogue of United Kingdom Official Publications, to which we have given the acronym UKOP, and The British Library General Catalogue of Books to 1975. You will appreciate that one cannot really have two more fundamental bibliographies than the catalogue of the country's national library, particularly when it is one of the greatest libraries in the world, and the catalogue of the country's government publications.

I would like to start with the Catalogue of United Kingdom Official Publications. It has been said, correctly, that to be successful, a CD-ROM publication must be more than a simple transfer of information from one format to another. It must have some demonstrable additional usefulness in this new format for it to succeed and I believe that this is certainly so with UKOP. Let me therefore explain something of the background of the confusion that has reigned over British government publications for many years.

Users of British government publications have had to contend with the major problem of there being two main sources. HMSO (Her Majesty's Stationery Office) is generally thought of as the main source and in many people's minds the only source of government publications, but over the last 30 years there grew up another source of government publications, the departments and agencies themselves which published on their own account and attempted to distribute their own publications - usually very ineffectively.

By now this has swelled to half of all British Government Publishing, so we are talking about some 10,000 publications a year coming through HMSO

and 10,000 coming from the 400 or so various publishing bodies. Research stations for example and other types of agencies which come under the umbrella of the main departments of state.

Before 1980 this was uncharted territory because there was no catalogue which listed these publications, and the British National Bibliography did not include this material.

In 1981 Chadwyck-Healey published the Catalogue of British Official Publications Not Published by HMSO - and it has been published bi-monthly ever since. It starts at the beginning of 1980 and identifies some 95% of all such publications, many of which are quite ephemeral and difficult to track down in any other way. We also, incidentally, publish most of these publications on microfiche.

Returning to the more familiar territory embraced by HMSO, this too is not without its complexity because HMSO's publications are sub-divided into several categories. Most important are the parliamentary papers of the House of Commons and of the House of Lords. Then there are non-parliamentary papers which can be general material emanating from different departments on subjects of public interest or can even be HMSO's trade publications such as calendars, travel books and the catalogues of national museums and so on. Then there are statutory instruments through which acts are administered. And then there is an important third category of publications for which HMSO is the agent and these are the publications of international organisations, such as the EEC, the UN, UNESCO, FAO, World Health Organization, Council of Europe, OECD, and four other such organisations.

HMSO's publications are covered by HMSO's daily, monthly and annual printed catalogues and the non-HMSO publications by our catalogue. Both these catalogues are produced from databases but only non-HMSO is presently available online and that is via Dialog.

UKOP on CD-ROM brings these two databases together for the first time and means that for the first time it is not necessary to know the difference between an HMSO and a non-HMSO publication or for that matter to know the difference between parliamentary and non-parliamentary in order to be

successful in finding a British government publication. Furthermore, I believe that this is the first CD-ROM catalogue to include current publications of international organisations, and I think that for non-British libraries in particular this is going to be a very important attribute of UKOP.

HMSO and Chadwyck-Healey are producing UKOP in partnership. The idea was first put forward to John Dole, Controller of HMSO, propitiously perhaps, on election day last year (June 11th). In a commendably short time, 5 weeks in fact, an agreement in principal had been reached and jointly we started to look at the problems and possibilities. Before being able to merge the databases HMSO had a major problem relating to the updating and cleaning-up of their data and this took until April this year to complete.

In the meantime cataloguers at Chadwyck-Healey and at HMSO worked together to apply the MARC-tags used by HMSO in its MARC format cataloguing to the non-MARC Chadwyck-Healey records. We have also had to make sure that the name of every publishing body used by either ourselves or by HMSO over the last eight years are now uniform and the only areas that have not been merged are the two subject indexes which are too diverse in their approach to allow realistic or useful merging.

We spent many months talking to software suppliers and eventually chose Online, the US based company owned by the British Reed Group. Online have of course already provided their software for CD-ROMs produced by the Library of Congress and now the British Library and the Bibliothèque Nationale and for Bowker's Books in Print. However, we have found that to accommodate all our rather specialist needs the software in its existing form is being stretched to its limits and is requiring a lot of new development by Online.

Now, HMSO will have the sales brochure for UKOP on their stand at the Frankfurt Book Fair next week. You will not see any pictures of CD-ROMs in that brochure or extolation of its technical wonders because in our view it is not the CD-ROM that makes the CD-ROM technology interesting, it is the personal computer and the power and flexibility of the software that you can use in that PC to access and manipulate the data taken off the CD-ROM that makes the availability of large databases on CD-ROM so

interesting. You can compile bibliographies, of course, and you can download your lists in a variety of exchange-formats to interface with whatever software you are using. You can transfer records into sub-files for ordering, by direct tele-ordering to HMSO or to dump the data into your own acquisitions system. Then there is software becoming available to enable you to connect your PC and CD-ROM to a fax machine to fax your lists to another site.

The records themselves are presented on the screen in various formats - either very short title when you are scrolling through lists of titles, a standard format adapted by On-Line, MARC format with MARC-tags or traditional catalogue-card format much loved by American libraries.

The restrictions on availability of information about government activities and policy in the UK has been well publicised in recent years. Yet there are many hundreds if not thousands of government publications which are designed for public circulation but which are virtually inaccessible to the public because of the difficulty of finding them. The non-HMSO catalogue was designed to help solve this and generally has but UKOP will do so to an even greater extent because of its ease of use and its comprehensiveness since it not only includes HMSO and non-HMSO publications but cumulates from 1980 on every update.

We were therefore encouraged that when we presented UKOP to a group of librarians in London in May we found that the majority of them intended to use UKOP for public access (and we have built in a novice mode which UKOP can be locked into). In this way UKOP can fulfil its objective of making government publications more accessible to a wider public

And what will the public want to do with all this data when they find themselves in front of the keyboard perhaps in your library? They can search by publishing body or personal author or title or key word taken from the indexes, and from the title or the note field, and they can search by ISBN. They can search the complete file or they can choose only to search the various components such as parliamentary papers or international publications. When they are in parliamentary papers they are offered a separate menu with special categories to search on such as parliamentary session and command numbers. Session is the session of

Parliament in which that publication has been ordered to be printed; the publication date itself may occur some months later.

They can limit their search by date later than/date earlier than and prices greater or lesser than. This is important for government publications when so many are free and when the acquisition process for free publications may be very different from priced publications. They can browse the whole file listed alphabetically by publishing body and we are building into it a mini-government organisation manual so that they can find out what bodies come under the umbrella of a major department like the Ministry of Agriculture, Fisheries and Food or if someone has the name of a body he can find out what department it belongs to. Similarly, we are building in colloquial terms and acronyms to search on such as DOE, DTI or even words like tax and army, they will eventually be able to key in such words and will be told under which appropriate department to search.

UKOP will be quarterly, issued within 4 weeks of the end of each quarter and because each issue cumulates back to 1980 you do not even have to know when the publication was published. It will cost £800 per annum and will be marketed both by us and HMSO. We have had a very positive response and I believe that it is going to be one of those catalogues which once they have it people will wonder how they ever managed without it.

I would like to move on to the British Library Catalogue since I believe the reaction to this will be the same as for UKOP and certainly the anticipation is already there, we began talking about it to librarians at IFLA and have already had a tremendous amount of interest.

Dr Frank Robinson compiler of the Nineteenth Century Short Title Catalogue, can read through the entire 360 volume British Library General Catalogue in six months, but few of us have time to do this nor do we necessarily have Frank's energy and application. Generations of scholars have of course used the catalogue in its various editions, but in searching for what they want they have been limited to searching by author or by somewhat idiosyncratic general headings like: The Bible, England, London, Periodical Publications, Congresses and so on. The thought of having this great catalogue in its 360 volumes occupying 15 metres of shelf space on just three or possibly four CD-ROM disks, searchable through an

ordinary PC, is I think absolutely extraordinary and I believe that the immediate beneficiaries are going to be those scholars who have the wit to realise what this new power is going to give them and who in the early years of the catalogue's existence in this new format begin exploring it in a way that has never been possible before.

They will be able to compile bibliographies and explore relationships in a completely new way and certainly those historians of publishing and the book trade will have a field-day in compiling lists of titles, for example, creating a bibliography of all books and pamphlets published in Norwich between 1820 and 1840. All this will be possible because every element of the relatively short record will be searchable and this includes the shelf-mark. Now, there is an interesting point about this, in that last year we published a booklet compiled by Robin Alston who had discovered from documents in the British Library that the shelf-list was organised in a nineteenth century subject arrangement. This of course means that the shelf-marks correspond with subjects and our booklet lists these subjects. With this list and with the power of the CD-ROM publication it will be possible, therefore, to search the British Library Catalogue on a subject basis in a way that has never been possible before simply by searching on a particular shelf-mark. This too, I believe, will result in some very interesting discoveries and I can assure you that this is practically possible because our 19th Century microfiche programme in which we are microfilming 19th century books on a systematic subject basis is being done by using the British Library shelf-list itself and by selecting from the different subject groups so that each year we publish a complete cross-section of the different subjects that we are covering.

I ought to explain something about how the CD-ROM edition of the catalogue came into being. The British Library Catalogue is a bibliographical 'Grand Canyon' in that the deeper you get into it the more obvious are the strata and the discontinuities of different cataloguing ages stretching back to the time of Panizzi in the nineteenth century. Now, many of these features result from the continuing reproduction through different editions of unrevised entries from earlier editions, and then there are the features due to the introduction of the AACR system in the very early 1970s.

In more recent times, in 1967 to be precise, two assistant keepers John Joliffe and A M Laine recommended use of computer controlled typesetting to produce the conversion of the whole of the general catalogue into machine-readable form. The late John Joliffe of course went on to become librarian of the Bodleian Library. Maurice Line also recommended conversion as part of a larger initiative in 1971.

Two years ago the British Library awarded a contract to Saztec Europe Ltd, a company that specializes in data input to key the entire catalogue and this is being done in Scotland in Ardrossan, south of Glasgow. There is a team of 127 people involved in this work which will continue for four years so it really is an enormous operation.

This year we entered into an agreement with Saztec to market a CD-ROM edition of the catalogue throughout the world and the first disc will be published in April 1989 with completion in 1991. It is important to understand exactly what the general catalogue consists of and, of course, what it omits.

The catalogue that is being keyed by Saztec is the Bingley-Saur edition which started publication in 1979. It is a complete catalogue of books published before 1971 which were catalogued in the Department of Printed Books before the end of 1982. Then there are books published in the period 1971-1975 which were catalogued in time to be included in the 1971-1975 supplement. Now, while the original contract does not include the keying of the supplement my personal view is that the supplement will eventually be included.

It is obviously important that librarians understand clearly what this catalogue contains, since the British Library itself is publishing the sequel The British National Bibliography on CD-ROM which Robert Smith has just talked about. The omissions are well known to anyone who has used the British Library but perhaps not so obvious to those who haven't. So the holdings of the newspaper library in Colindale are not included, nor are oriental languages, maps, atlases, and music, nor are a number of scientific and technical publications deposited in the copyright receipt office since 1966.

It should be pointed out that English language publications only represent 53% of the entire catalogue. The next largest representation is French, with 14% and German with 6% which is almost half a million records. Most entries (97%) are in the Roman alphabet, but Saztec are keying Cyrillic, Greek and Hebrew, and to see this done in Scotland by young women who cannot read these alphabets but key them faster than you and I can type to an extraordinary level of accuracy is very impressive.

A broad subject breakdown shows that Literature represents 20%, History and Technology 20%, Social Science and Law 15%, Theology 14%, and Biography 6%. Given that the British Library has the greatest collection of pre-1914 books in the world, I think that the availability of its catalogue in its entirely new form which allows such searching of any element in the record is one of the most important contributions to scholarship in the humanities in recent years. I also think that the British Library must be congratulated on the decision to go ahead with this major investment because keying a catalogue of this complexity on this scale is a very expensive exercise, but I believe that it represents the best value for money of probably anything that the British Library has done in recent years. For other libraries I hope that it will also be perceived as good value for money. The introductory price for the complete catalogue on CD-ROM will be £8,000. This is less than the pre-publication price for the printed edition 10 years ago so I think that demonstrates pretty clearly its real value.

I can't say anything in detail about the software at the present time but I can assure you that it will have much the same attributes as UKOP, Bowker Books in Print and other major bibliographies that are already available and will include such things as the ability to download records in different formats to suit word-processing software and other software packages that the user may want to apply.

I believe that 1989 will be the year that CD-ROM will really take off in many libraries. I know we have all been hearing this for the last two or three years but I think that the availability of these two publications in particular will result in the whole-hearted commitment to CD-ROM in many academic libraries which has been lacking until now.

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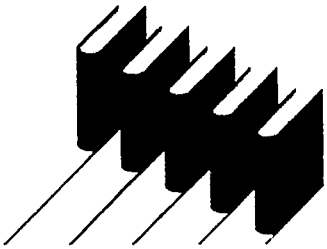

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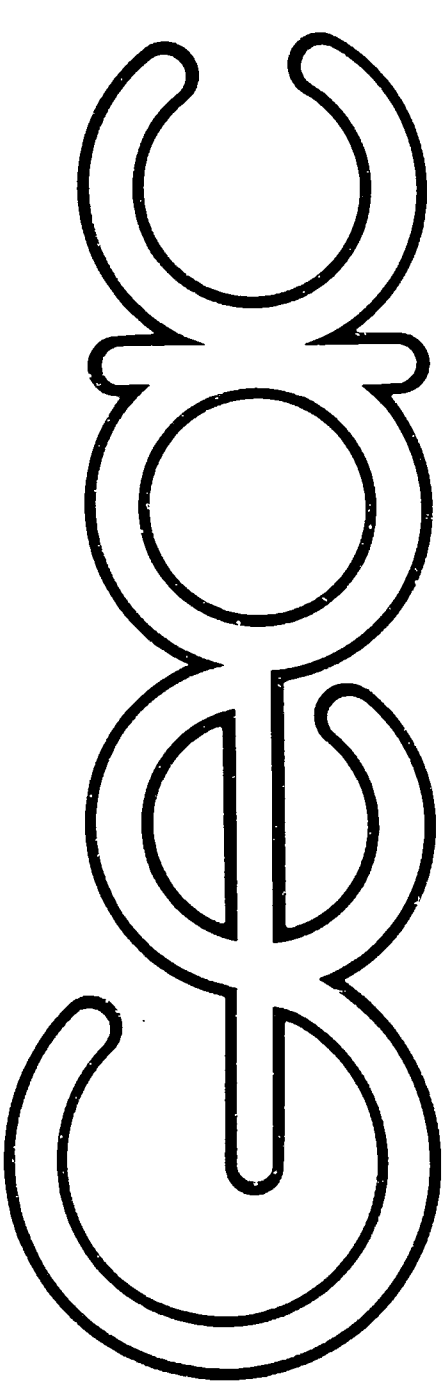

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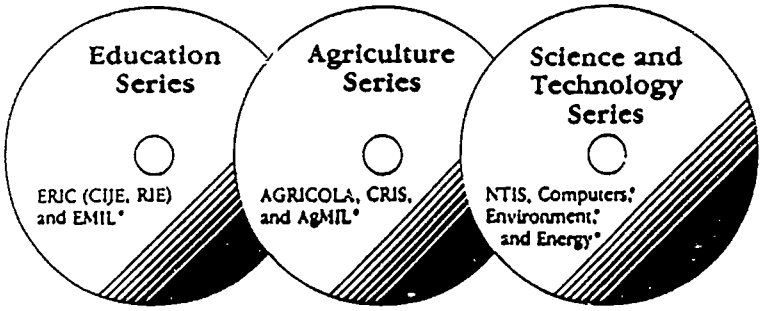

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