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From Microfilm to Digital Imagery

On the Feasibility of a Project to Study the Means, Costs and Benefits of Converting Large Quantities of Preserved Library Materials from Microfilm to Digital Images.

**A Report of the Yale University Library
to the Commission on Preservation and Access**

DONALD J. WATERS
Yale University Library

COMMISSION PREFACE*

In a previous Commission report, Michael Lesk, a member of the Technology Assessment Advisory Committee, asserts that the conversion from microfilm to digital image for preservation of and access to deteriorating library materials is desirable in the long run and is currently technically possible and relatively cheap to accomplish (Image Formats for Preservation and Access, July 1990, page 8). However, document imaging technology is still under development, standards for hardware and software continue to evolve, and the conversion of microfilm to digital image format is largely untested in actual library settings.

It seems critical at this stage that research and investment be directed to the development of systems for managing digital conversion, storage, and access that can be used by university and research libraries. It is to the development of such systems that Yale University Library directed its efforts in this planning study.

The study, conducted under contract to the Commission, explores the feasibility of a project to study the means, costs and benefits of converting large quantities of preserved library materials from microfilm to digital images. The effort identifies requirements for a major, multi-year project to convert materials from film to digital

* *This article was originally published as a report of The Commission on Preservation and Access, 1785 Massachusetts Avenue, Suite 313, Washington, DC 20036, USA. It is one of a series of reports on the Commission's initiative to assist in the interinstitutional use of digital technologies to preserve and enhance access to deteriorating library and archival materials. The Commission welcomes inquiries on its activities.*

format, to provide both intra- and inter-institutional access to the stored images, and to investigate the broader implications for enhanced intellectual access to digitized scholarly materials. The Commission expects the results to make an important contribution to our capacity to utilize the new digital technologies for preservation purposes. Complimentary copies of this report have been distributed to the Commission's mailing list.

Introduction

From Microfilm to Digital Imagery*

Over the last three decades, microfilm has become the medium of choice for preserving deteriorating library materials. Microfilm is durable, given an controlled environment. Libraries and archives follow standard procedures and specifications and even share common facilities in the filming process. The cost of the process are predictable, ranging from 10 to 15 cents per page, not including the costs of administrative overhead and of selecting the material to be filmed. Moreover, the technology for gaining access to microfilm is stable and unlikely to change significantly in the future. In short, for the solution it provides to the "brittle-books" problem now plaguing all repositories of material printed on acidic paper, microfilm is essentially risk-free.¹

Michael Lesk, Division Manager of Computer Science Research at Bellcore, in a recent report to the Commission on Preservation and Access, affirmed the use of microfilm for preservation today. However, he took a relatively cautious view of its future role, arguing that microfilm is not likely to be the end of the preservation process. Rather, he argued, it is "a reasonable intermediate step to

* **Acknowledgements:** In preparing this planning report, I received much help from many people in many private and university institutions. They are too numerous to name; I am grateful to them all. However, I do want to acknowledge my colleagues in the Yale University Library Systems Office, Merri Beth Lavagnino and Greg Kaisen, for their considerable help. Also I thank the Commission for Preservation and Access for its support in contracting the Yale University Library to prepare this report.

¹ Nancy E. Gwinn, ed., *Preservation Microfilming: A Guide for Librarians and Archivists* (Chicago: American Library Association, 1987), p. xxvi. John C. Mallinson, "On the Preservation of Human- and Machine-Readable Records", *Information Technology and Libraries*, 7:1 (March 1988): 22.

getting digital imagery", which is a process of scanning books into computer storage.²

Although Lesk acknowledged that digital imaging technology is costly and "has not yet settled down", he argued compellingly that the technology holds a promise that is critical to the library mission of generating, preserving and improving access to recorded knowledge. He observed that conversion from microfilm to digital image is today technically possible and he argued that library readers will, in the long run, demand the results of such conversion. He predicted that digital image technology, including the ability to convert from microfilm, "will be within the reach of most libraries within the decade", and he called for research and investment today in the "development of systems that can be used by ordinary libraries" in the future.³

The Yale University Library, one of the early developers of preservation microfilming practices, is today engaged in the first stages of a long-term and comprehensive effort to develop practical systems for the conversion of microfilm to digital image, and thereby to develop an understanding of the appropriate relationship of the two technologies in future preservation practice. This report summarizes the results of the initial planning phase of the larger project. In the next section, it begins to articulate a vision of the place of digital technology in a research library such as Yale's. Then it outlines an economy of choices and organization in which the conversion of microfilm to digital imagery might emerge as a viable preservation option. The report maps the architecture of a digital imaging systems and identifies critical issues of feasibility. Finally, it presents a plan of work for a demonstration project, which will fully investigate the costs and benefits of conversion in the process of building a digitized library of 10,000 books from microfilm copy.

Vision

For a long view of the future role of research libraries in the university, one must look closely and carefully at the ways that scholars work to create and disseminate knowledge. Several recent studies emphasize that the quality and quantity of scholarly productivity in all disciplines depend critically on ready and timely access to relevant information. The library of the future for such scholars will not necessarily be an "electronic library", nor will its mission be simply to preserve recorded knowledge. The library of the future will aim rather to generate, preserve and improve for its clients ready access - both intellectual and physical - to recorded knowledge. Emerging technologies, like digital imagery,

² Michael Lesk, "Digital Imagery, Preservation and Access," *Information Technology and Libraries*, 9:4 (March 1990): 307.

³ *Ibid.*, 308.

will find a critical place there to the extent that they help support the general library mission.

The Value of Access

Beginning in 1985, the Research Libraries Group established a special Program for Research Information Management (PRIMA). The program resulted in a detailed assessment of information needs in over 20 disciplines in three broad groupings: the humanities, the social sciences and the sciences. Among the various needs that emerged from these assessments, many were specific to the disciplines under study. One theme, however, runs through all the studies and applies to all the disciplines. Scholars, in the words of the report on information needs in the humanities, "prefer the familiar and unsystematic methods of consulting footnotes and colleagues".⁴ No evidence is supplied in the records to support the characterization of these methods as "unsystematic", but it is clear throughout that the value to scholars of consulting footnotes and colleagues is that these methods are readily and easily accessible.

A study sponsored by the Faxon Institute for Advanced Studies in Scholarly and Scientific Communication and presented at a conference in April 1991 makes the same point regarding scientists even more compellingly. The study examined the behaviour of a significant sample of scientific professionals as they acquired and used information in their work. It focused on information use by junior, mid-level and senior professionals in the disciplines of chemistry, genetics and computer science in academic, private and government institutions. Relying on diary accounts of so-called information encounters, which are defined as "any use or acquisition of informations, ideas, or data that relate to the substance of your profession," the Faxon Institute study contains much valuable and revealing information about the perceived "information competence" of the surveyed professions, the type of content sources they use to gather information, the frequency with which they use the sources, the time they spend in gathering information, the use to which they put the information, and particularly their methods, or modes, of gathering needed information.⁵

⁴ Constance C. Gould, *Information Needs in the Humanities: An Assessment*, (Mountain View, Ca.: Research Libraries Group), p. 51. Constance C. Gould and Mark Handler, *Information Needs in the Social Sciences: An Assessment*, (Mountain View, Ca.: Research Libraries Group, 1989). Constance C. Gould, *Information Needs in the Sciences: An Assessment*, (Mountain View, Ca.: Research Libraries Group, 1991).

⁵ Eric Almquist, "An Examination of Work-Related Information Acquisition and Usage among Scientific, Technical and Medical Fields," results of a study commissioned by the Faxon Institute for Advanced Studies in Scholarly and Scientific Communications, presented at the 1991 Faxon Institute Annual Conference, *Creating User Pathways to Electronic Information*, April 1991, Reston, Virginia, Exhibit 2.

Table 1 summarizes some of the results of the Faxon Institute study and indicates clearly how heavily scholars in the sciences depend for their productive work on sources of information that are readily at hand. The participants in the study found the library to be as useful as consulting one's personal library and as face-to-face discussions. They nevertheless used the library much less frequently than the other modes, presumably because it is relatively time-consuming to get there and use. Moreover, consulting the material at hand in one's own personal library figured in far more "information encounters" than any other single method and was, next to electronic mail, the most frequently used mode. In addition, if all methods of consulting one's colleagues - face-to-face discussions, telephones, written communication, electronic mail and fax - are combined, the Faxon Institute survey suggests that one's personal network of colleagues ranks first and the library a distant third in the percent of times it is utilized to solve an information gathering problem.

Information Mode	Percent of Total Information Encounters in which Mode was used	Average Number of Times used in Past Week	Perceived Usefulness of Mode (average rating on a 10-point scale)
Personal Library/Files	45.0%	9.7	7.9
Library	31.0%	2.8	7.9
Face-to-Face Discussion	29.0%	7.7	7.9
Telephone	15.0%	9.5	7.2
Written Communication	7.0%	4.4	5.9
On-Line Database	6.0%	2.6	6.8
Electronic Mail	5.0%	14.7	6.2
Fax	4.0%	2.6	6.8
CD ROM	2.0%	1.6	5.1
Computer Bulletin Boards	0.3%	3.6	4.3

Table 1. Use of Modes of Information Acquisition⁶

The Accessible Library

The results of the Research Libraries Group and the Faxon Institute studies generally reinforce the findings of almost two decades of research on the

⁶ Ibid., Exhibits 9, 22 and 25.

information seeking behaviour of scholars.⁷ There is still much room for additional work to refine and test these findings rigourously across disciplines and discipline groups. In particular, more detailed information is needed in the context of these studies of the ways that scholars in various disciplines actually use libraries. However, if, as these studies suggest, scholars highly value and tend to favour information that is readily at hand, then a critical measure of success for libraries charting a course into the future is how readily they steer information into the hands of their clients.

A model of the access-oriented library might be depicted schematically as it is in Figure 1. This model is, of course, a simplification. It does not adequately represent all features of the library, and it certainly is not the only way to characterize the system. For the sake of discussion, however, it does highlight the key functional components and their interrelationships.

In this model, collections and services are the two primary components of the library. The library administration is the third major element. The administration supports and undergirds the collection and access services functions by organizing and providing services within the library, such as facility, budget, personnel and technology management, and by representing the library to its clientele and other external agencies. It is also the job of the administration to formulate and articulate the library's mission in the local institutional context.

⁷ See, for example, F.W. Lancaster, *The Measurement and Evaluation of Library Services* (Washington, D.C.: Information Resources Press, 1977), p. 313. Lancaster refers to a series of studies which support the argument that "selection of an information source is based almost exclusively on accessibility, the most accessible source (channel) being chosen first; considerations of quality and reliability are secondary, although these factors are important in influencing the degree to which the user is willing to accept information supplied from a particular source."

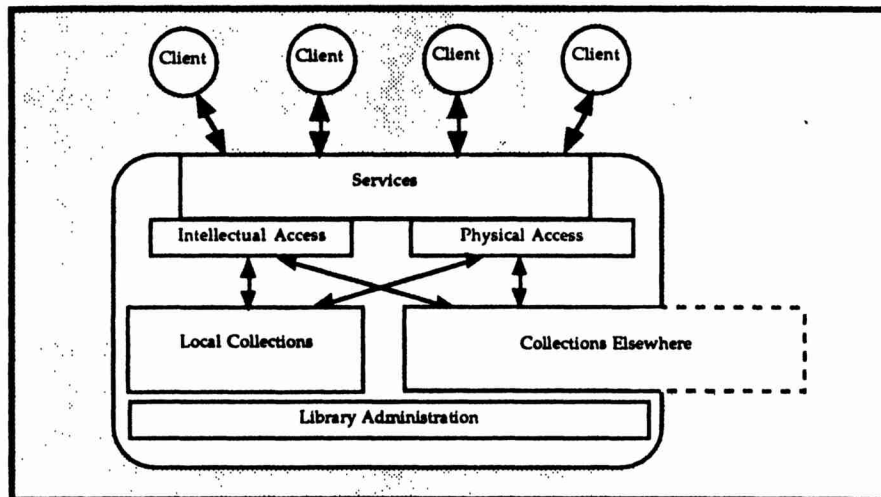


Figure 1. Model of the Access-Oriented Library

The mission of the access-oriented library is to generate, preserve, and improve access to collections of recorded knowledge. This mission guides the fundamental relationship between the access services and the library collections. Access services provide the points of contact between the library and its clientele and are of two kinds.

Intellectual and Physical Access

Intellectual access services, such as cataloguing, describe and organize for the library's clients the information and recorded knowledge held in collections locally and elsewhere. The descriptions of a work generally refer in standard ways to such features as author, title, place and date of publication, publisher and format; the organization is typically by subject. Given a subject organization, collocation of materials in the collection by subject makes a range of related material available to library readers and is an intellectual access service that is particularly valued in the humanities and interdisciplinary studies where associative methods make the serendipitous results of browsing the library shelf a critical aspect of research.⁸ Other dimensions of intellectual access include the availability of the content structure of the material, often represented in a table of contents, and the availability of word indices to the full text of the material. Physical access services, such as circulation and interlibrary loan, refer to the

⁸ Lawrence Dowler, "Conference on Research Trends and Library Resources," *Harvard Library Bulletin*, 1:2 (Summer, 1990): 8.

methods of distribution that libraries use to put the information and recorded knowledge held in both local and distant collections directly in the hands of their clientele.

Collection and Collection Renewal

The notion of library collections refers to the arrangements and modes of storage of selected information and recorded knowledge. For the library's clients, the collections housed locally are the most relevant. Of course, the collections of any single research library represent only a small fraction of the total reservoir of information and recorded knowledge. Thus, responsibility for the local collections necessarily includes responsibilities both to distinguish them from and relate them to collections elsewhere.

Within the university, the library's collections represent a large, perhaps the largest, capital investment. Like all capital, a library collection is subject to distinct and constant processes of depreciation and renewal (see Figure 2). Material is lost or missing and has to be replaced. New acquisitions expand the collection. The collections are weeded and material is discarded. Existing material deteriorates and needs to be fixed or otherwise conserved, or it is preserved by copying it or by converting it to another format, say from paper to microfilm.

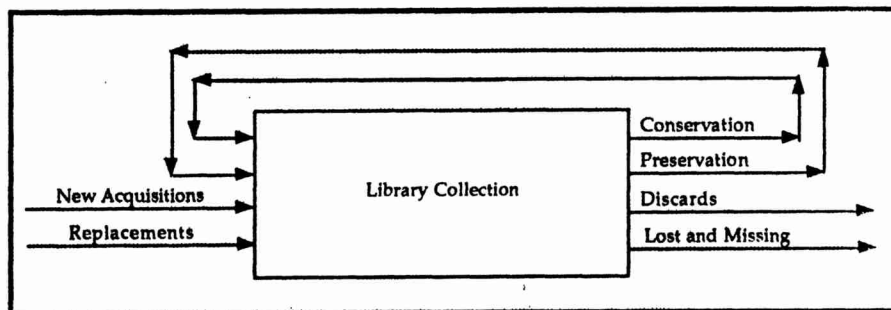


Figure 2. Process of Collection Renewal

In an access-oriented library, each of the various collection renewal processes is subject to rigorous evaluation against the service mission of the organization: How well do they generate, preserve or enhance intellectual and physical access to the collection? For purposes of this discussion, we focus on one of the renewal processes, namely preservation microfilming.

Preserving Access through Preservation

Deterioration of a document from age, acidic content, or heavy use limits both physical and intellectual access to it. When a deteriorated item is selected for preservation, it is typically prepared for microfilming (see Figure 3). A photographic process, microfilming faithfully reproduces the original printed material, including stains, discolouration, faded ink, reader notes, and the unsightly borders of overlapping page edges. The process generates a 35 mm film of high contrast, black and white images at a given reduction ratio, depending on the size of the original. The practical limits of using a high contrast, black and white medium mean of course that microfilming cannot adequately reproduce material with color content, shaded gray scale illustrations, or extremely fine printed detail. To avoid loss of information today given current technology, material with such content must be, whenever possible, conserved in its original form.⁹

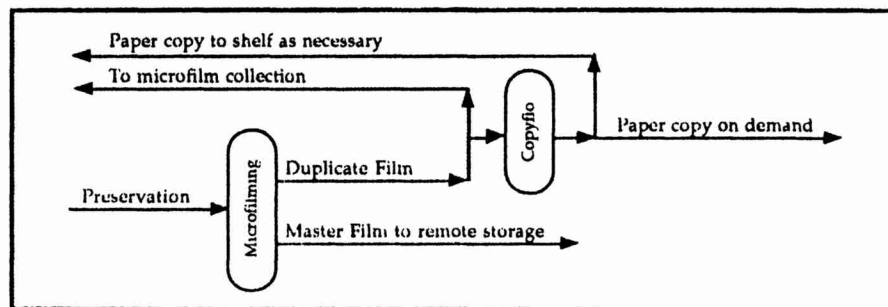


Figure 3. Preservation Microfilming

After filming a master copy of the film is kept remotely from the library in a controlled environment where, according to some estimates, it will endure for up to 500 years without significant deterioration. A positive and negative copy of the film are stored in the microfilm collection of the library. The film can be further duplicated from the negative copy with relative ease at a cost of approximately \$20 per reel and the Copyflo process can generate a paper copy at a cost of approximately \$0.15 per page. For high use items, the library may decide to return a paper copy to the library shelves. Library readers may obtain a full paper copy on demand, or they can print selected pages at a microfilm reader/printer.

⁹ Lesk, *op. cit.*, 303.

Faced with the total loss of intellectual content in a deteriorating document, the library realizes distinct advantages from preservation microfilming. The content is saved for the collection in a durable and compact form using a technology that is relatively simple and well established. However, readers lose a significant measure of intellectual and physical access to the material in the bargain.

Unlike a book, which one can carry away and use virtually anywhere, microfilm confines the reader to use special projection equipment at a specific location. A reader can learn of the intellectual content of a document in microform, in part, through the bibliographic entry created for it during the preservation process but, by converting paper to film, the process splits a collection apart so that one cannot as readily benefit intellectually from the physical association of a volume on the cumbersome to browse and difficult to read. With a microfilm reader, one cannot as readily as with a paper copy use the internal structural apparatus of the volume - its table of contents, chapter summaries, prefaces, footnotes, indices, etc. - to gain rapid and efficient access to the intellectual content of volume, be it a fact, page, chapter or some combination of these.¹⁰ Finally, printed copy from microfilm sources using either the Copyflo or reader/printer technologies has won little praise for its qualities of clarity and resolution.

Not surprisingly, given these deficiencies, readers complain intensely about using microfilm. In one sense, these complaints about the deficiencies of microfilm seems unfair: without preservation microfilming, substantial portions of library collections would be lost entirely. The inconvenience of using microfilm in this context seems a small price to pay. However, given the value to scholars of information accessibility, the library is obliged to insure that it can apply no better and cost-effective mix of technology than microfilming to save the intellectual content of rapidly deteriorating materials and, at the same time, preserve or improve scholarly access to the material. For its reason, libraries like Yale's, in which over 80% of the collection is currently or potentially brittle, must investigate the means, costs and benefits of adding to its preservation toolkit new and promising tools, including the technology of digital imagery.

¹⁰ Blipping, the placement of special markings on selected frames, can facilitate the use of microfilm, especially if the markings are coded and indexed in a system for computer-aided retrieval. The technique, however, has been applied primarily to 16mm film. UMI reportedly has defined blipping guide-lines for its internal use of 35 mm film. Whether the guide-lines will become widely available and applied more generally to the use of 35 mm preservation microfilm in libraries remains to be seen.

Digital Imagery

Digital image technology provides the means of digitally encoding scanned documents in image form for computer-based storage, transmission and retrieval. The digital images produced using the technology contain text, but the text is not converted to and is not accessible in alphanumeric form. The potential exists for such conversion, in whole or in part, by applying character recognition technologies to the digital images. The use of digital imagery envisioned here is designed to anticipate the eventual application of character recognition but it does not presently incorporate it.¹¹

Digitization holds the promise of greatly improving the accessibility of preservation materials compared to microfilming (see Figure 4). Physical access to the library of digital images, like access to microfilm, requires special equipment. Compared to microfilm readers, however, digital image equipment - a powerful computer workstation with a relatively high resolution monitor - is general purpose technology for which access to the digital library might be only one application. Moreover, the scholar who is outside and possibly even off the campus of the library holding the images can gain access to them relatively easily and quickly because the digital images can be transmitted over the high-speed networks that many university campuses have already installed and interconnected. The scholar also has the opportunity, using digital image technology, to add all or part of the image document to his or her own personal

¹¹ Character recognition from digitally scanned images raises a challenging set of issues. First, although recognition algorithms are constantly improving, the accuracy of the current technology has been disappointing. Second, much work still needs to be done to improve the ability of character algorithms to deal with the wide variety of typography and languages that one encounters in library preservation materials. Third, given successful recognition of the alphanumeric characters which compose a text image, one needs for purposes of storage and retrieval to relate the characters to the structure and layout of the original document, including any pictures, drawings, diagrams or other graphic images that may be embedded in it.

How these issues are ultimately addressed and resolved will greatly affect the accessibility of documents stored in electronic form. We intend to be mindful of and informed about the implications of the decisions and choices we make in the current project for the future application of character recognition technology. Indeed, we intend to take every reasonable precaution to insure the success of such an application to the digital images we produce. However, given the complexity and relative immaturity of character recognition technology, we regard its application as related to but essentially out of scope of the present project.

For a useful discussion of some of the issues associated with applying character recognition to library materials, see Stuart Weibel, John Handlex and Charles Huff, "Automated Document Architecture Processing and Tagging," in Donald L. Blamberg, Carol L. Dowling, and Claudia V. Weston, eds., *Proceedings of the Conference on Application of Scanning Methodologies in Libraries*, (Beltsville, Maryland: National Agricultural Library, 1989), pp.3-14.

library by requesting a printed copy. The printed form is likely to be of better quality and higher resolution than similar output from microfilm, and it may even be substantially cheaper, again because the underlying technology serves a general purpose.

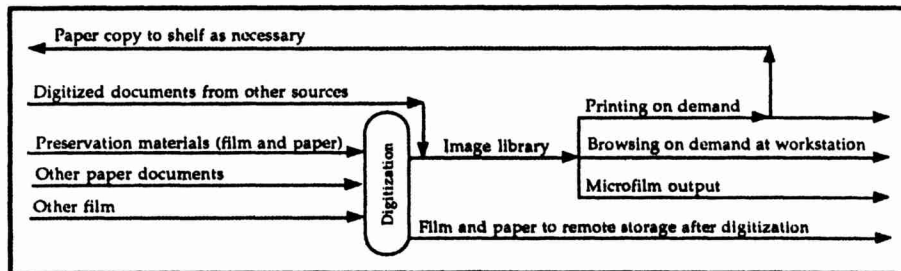


Figure 4. Digital Imagery in the Library

Digital imagery also promises to substantially improve intellectual access, compared to microfilm. The ability of the technology to put a high quality, relatively inexpensive paper copy of the original document into the personal library of scholars on demand makes the standard intellectual apparatus - the table of contents, index and so on - directly accessible. Moreover, unlike the current practice with images on 35 mm microfilm, digital images can be indexed by page numbers and, if resources permit, by higher order document structures such as section, chapter, and part. Given such an index and the software to use it, scholars can move quickly through the digital document and browse its intellectual contents much more efficiently than they can with documents preserved on microfilm.

In the forms outlined here, digital imagery affords no substantial improvement over microfilm in providing an effective substitute for shelf browsing. However, recent studies suggest that by adding supplementary information, such as transcriptions of tables of contents, to online bibliographic descriptions, one may be able to provide even more fruitful opportunities for intellectual associations and serendipity than is possible from the traditional methods of subject classification and collocation of paper material by subject on library shelves.¹² As content material is added to online bibliographic records and

¹² See, for example, Karen Markey, *Subject Searching in Library Catalogs: Before and after the Introduction of Online Catalogs* (Dublin, Ohio: Online Computer Library Center, 1984), pp. 75-117; Richard Van Orden, "Context-Enriched Access to Electronic Information: Summaries of Selected Research," *Library Hi Tech* 8:3 (1990): 27-32; and Martin Dillon and Patrick

the resulting benefits of improved intellectual access to materials in all formats become apparent, it may be possible to achieve substantial intellectual leverage from material in digital image format by creating direct electronic links between the supplementary information in the bibliographic record and the digital images of the document to which it refers. The creation of such links will require considerable work, particularly in the online bibliographic system, but the vision of their possibility means also that one must carefully and creatively design the page number and document structures indices within the digital image system so that the digital images can be easily and reliably related to the content information stored in other machine-readable forms, such as the online bibliographic record.

Our vision of the library of the future hinges on the central distinctions and interrelations that we have posited among

- the library collections, which comprise the modes of storage for selected information and recorded knowledge;
- physical access, which comprises the modes of collection distribution; and
- intellectual access, which comprises the principal modes of collection use.

Just as we expect digital image technology to introduce more flexibility into and otherwise enhance the modes of collection use and distribution, particularly compared to microfilm, we also expect the technology to exert similar effects on the modes of storage in the collection. In this context, it is critical to distinguish between archival storage and storage for use and distribution.

In the library of the future, we presume that microfilm will continue to play an important role, perhaps still as the preferred medium for storing an archival version of preserved documents.¹³ For the use and distribution of preserved materials, however, digital images will likely become the preferred storage medium. Depending on costs, microfilming may remain a preliminary step in a preservation process leading eventually to digitization, or film may be generated from the digital image. In either case, we expect the digital technology to accept as input on demand the substantial base of documents already preserved on microfilm and now available only in that form.

Wenzel, "Retrieval Effectiveness of Enhanced Bibliographic Records," *Library Hi Tech* 8:3 (1990): 43-46.

13 On the continued usefulness of microfilm in industry, see Whitney S. Minkler, "Optical Disks vs. Micrographs. Is it an Adversarial Problem," *Micrographics and Optical Technology*, 7:4 (1989): 141-149; and John Blake, "War over Optical Disk or Microfilm Ends, Future Contains Multiple Media," *Micrographics and Optical Technology*, 8:3 (1990): 141-143.

Finally, our vision of the use of digital image technology suggests several wider effects. Although we expect to establish the digital library out of a primary impulse to preserve and improve access to the huge quantities of deteriorating and brittle books on library shelves, we also expect the library to be enriched over time with documents in digital image form that have been created for various other reasons both in and out of the library. In addition, digital image technology will likely have a significant, perhaps profound, effect on the ways in which the library of the future views, organizes and values its spaces and staffs. For example, to the extent that the digital library arises as a way of renewing and replacing large stocks of paper and microfilm materials, and to the extent that the digital library is stored and accessible remotely from the library proper, the use of the central stack space of the library will almost certainly change and the balance of staff functions traditionally associated with circulating and shelving collections stored in paper will likely shift to modes of delivering documents generated on demand from electronic formats.¹⁴

An Economy of Choices

Libraries of the future will not attain in one quick step the vision articulated here of the use of digital technology in preserving and improving access to recorded knowledge. The promise of service benefits and possible cost savings will move libraries toward the technology in various ways. Budgets and other organizational impediments will constrain them from investing in it in still other ways. If the promise justifies the investment, most will incorporate digital imaging technology just as they have adopted and assimilated other technologies in the past: through a series of particular and incremental decisions and choices tailored to the mandate and needs of their specific institutions.

Those who develop digital image technology for use in library preservation need to be mindful of the principle of incrementalism and of its power and influence in organizational change. The economy for managing and administering library resources, like that of most large institutions, is an economy of incremental choices, even about potentially revolutionary technology. Development work in the application of digital imagery thus needs to yield results about the means, cost and benefits of digital imagery that will facilitate and inform, not distort and mislead, the operation of such an economy.

This section attempts to identify a critical set of functional choices, which will likely govern the incorporation of digital imagery in library preservation processes. The next section outlines many of the detailed technical requirements

¹⁴ See, for example, Clifford A. Lynch and Edwin B. Browning, "Library Applications of Electronic Imaging Technology," *Information Technology and Libraries*, 5:2 (June 1986): 100-102.

for a system architecture that can flexibly accommodate the types of choices libraries will likely make. The final section lays out a plan of work to develop the architecture and to generate the information that libraries will need to make prudent choices about the costs and benefits of image technology.

The Focus on Conversion from Microfilm

Cornell University, an early pioneer in the use of digital imagery for library preservation, chose to investigate ways of overcoming the limitations of preservation microfilming by scanning deteriorating documents directly into image form, rather than microfilming them. Additional work still needs to be done to expand the means of direct input, including methods for handling oversize, coloured and other kinds of special documents. Moreover, because they can be enhanced electronically to eliminate stains and other markings and to heighten the contrast of fading ink, digital images might ultimately prove a better quality source for microfilm copy than the original paper source. The means of generating microfilm output from digital image thus also needs to be explored systematically.

Paper, however, is not the only possible source of input in the creation of a digital library of preserved materials. The Yale University Library seeks to demonstrate for the wider library community the viability of one alternate source by developing the means and identifying the costs and benefits of scanning preserved materials from microfilm sources. Although it will take input from microfilm rather than paper, the imaging system developed in the Yale project will otherwise provide the same basic functional capabilities as the one being developed at Cornell. In the fully developed system, library readers will be able to browse the image library from a computer workstation (see Figure 5). They will also be able to obtain a printed version of the digitized document on demand; the library may itself generate a paper copy of the preserved document to return to the library shelf. Moreover, the image library will be stored remotely from the shelf collection. Because of the presumed accessibility of the digital library, both in and out of the library, the microfilm version of the digitized documents can ideally be moved out of the library to more remote and cheaper storage.

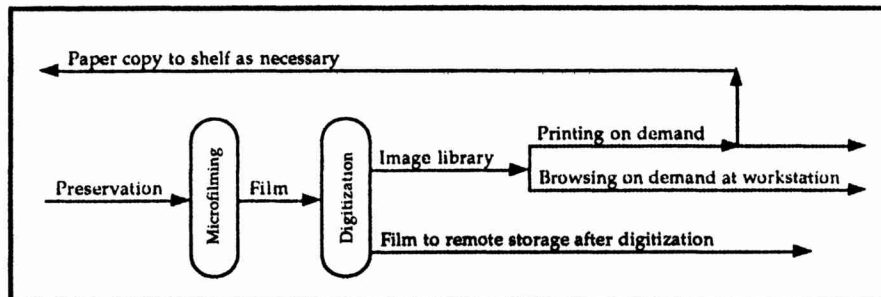


Figure 5. Conversion of Preservation Microfilm to Digital Image

The system at Cornell is being developed initially to handle an image library of 1,000 volumes. In addition to developing an alternative source of input, the Yale project will test the scalability of imaging systems like that at Cornell by increasing the digital library an order of magnitude to 10,000 volumes. The size of the digital library at Yale, compared to that at Cornell, will help demonstrate the economies of scale in the system and help insure for the library community that realistic measures are made of the costs both of adding components incrementally to the system and of maintaining them over time.

A Model of Incremental Investment

The costs and benefits of an imaging system depend largely, though not exclusively, on the major functional components of the system and on the method and timing of their implementation. One does not have to adopt all possible components to create a working system. Given the mission the system is intended to serve, some components are essential, and one must implement them; others are less critical, and one can install them optionally or later on an incremental basis. The following analysis distinguishes the major functional components of a preservation imaging system, orders the components in relation to the purpose of the system, and arrays them in a cumulative sequence of steps. The sequence suggests a plausible strategy offering choice at each level for a library investing in imaging technology. To support and inform the choices, the development of the imaging project at Yale must be designed to measure the incremental costs and benefits of the system components identified at each stage in the sequence.

The Basic System

If the aim of preservation is to preserve and improve physical and intellectual access to deteriorating printed material, and assuming that the material has already been microfilmed, then the simplest and most straightforward imaging system is one that produces from microfilm a high quality printed copy of the original document for the library to return to its shelves. The essential components of such a system would be:

- a microfilm scanner;
- a temporary storage device to hold the digitized images;
- a quality control station to review the images, enhance them if possible and rescan the film if necessary;
- a high speed network for transferring the images to the print service;
- a print service, for queuing and otherwise controlling the print job; and
- a high quality digital printer.

A service bureau could, of course, provide all or part of these functions. It could scan with quality control and print the document; it could scan with quality control and return the set of digitized images to the library for printing; or it could accept the digitized images from the library for printing. It will be important for the Yale demonstration project to gain sufficient in-house experience with digitization so that one can fully convey to a service bureau the standards and expectations for conversion and indexing and so that one can fully compare the costs of an in-house process with the costs of hiring a service bureau to perform the same functions.

Because the Copyflo process is already capable of producing printed copy directly from microfilm, a library will likely find this basic imaging system attractive if and only if the costs of digitization and printing are less than the costs of Copyflo, or the output from the digital printer is of higher quality. Assuming, as is likely, that the resolution of the digital image generated from microfilm is in the range of 300 dots per inch (dpi), then the print quality will surely match or beat Copyflo quality. Michael Lesk has estimated, moreover, that the cost of a simple conversion from microfilm to digital images is approximately \$0.02 per frame.¹⁵ Early estimates from Cornell suggest that the costs of printing a document from image form will be approximately \$10.00 per 300-page-book (unbound) or \$0.033 per page.

¹⁵ Lesk, *op. cit.*, 307.

These estimates carry with them assumptions about labor costs, productivity, volume and methods of equipment financing and amortization that may or may not hold in all circumstances. However, recognizing the limitations of the estimates, compare them still to the present cost of \$0.15 per page (unbound) for the Copyflo process. An imaging system stripped to its essentials and capable simply of digitizing and printing microfilm images not only will produce higher quality output but also may yield more than 60% in savings over the current means of printing from microfilm. Of course, with added components, an imaging system can deliver much greater function than the basic system described here, but the stakes of the investment rise correspondingly.

Print on demand

If a basic imaging system gives the library the ability to preserve access to a deteriorating document by generating a high quality, relatively low cost facsimile copy to return to the library shelf, then one may legitimately wonder what additional investment it would take to produce the printed copy on demand for a scholar to put in his or her own personal library. An imaging system capable of on-demand printing would need to add the following components to the basic system:

- a permanent storage mechanism for the document images in digital form;
- a title level index to the document in image form, so that one can distinguish one document in the storage medium from another;
- an entry in a new or existing bibliographic statement, presumably recorded in the library's online catalog, which indicates to the reader that the document is stored in digital form and is available for printing on-demand;
- a print request service; and
- an image service that extracts the images under the unique identifier and transmits them to the printer.

For the incremental benefit of on-demand printing, one also incurs substantial costs, particularly in the storage mechanism. The storage of digital images is technically complex and will be treated in greater detail in the system architecture discussion in the next section. It is important to note here, however, that the notion of "permanence" in digital storage implies the cost of periodically renewing the image files - and relatively more frequently than books and microfilm - as storage media, file formats and the equipment used to gain access to the files all change. It is possible, but not yet proven, that savings in space from

denser and more compact storage and other efficiencies gained from the changing technology could balance the costs of renewing image files and thus make the renewal process self-sustaining.

The indexing system at this stage is simple to create and use. It consists of applying a classification number or other unique identifier to the collection of images that comprise the digital document. The unique identifier provides the key that links the bibliographic entry in the catalog to the title in the digital library, much like a call number enables a reader to go from the catalog to a book on the shelf or to a microfilm roll in a specific cabinet drawer.

A scholar cannot, of course, always tell from the catalog entry whether a document is relevant to the problem or research at hand. Before requesting a printed, personal copy, one still may need to browse the microfilm document in the library to determine its relevance. Investment in an imaging system that provides a print-on-demand service this incurs the costs of storing and indexing the documents in digital form while still requiring the library to maintain the microfilm version of the document for the reader to browse.

Online Browsing

Given permanent storage for a print-on-demand service, another natural extension of the imaging system would be to enable the reader to browse a document online directly in digital image form. The capacity for online browsing requires, in addition to those already identified, the following components:

- a computer workstation and printer at which a reader can retrieve, display, move back and forth through, and print selected images from the document; and
- a presentation service that tailors the image presentation to the particular type of browsing workstation being used.

The incremental investment in these components of the imaging system affords the reader functional capabilities that, in at least one respect, resemble browsing a document in microfilm form. Because the image document at this stage is indexed only at the title level with a unique identifier, one cannot go automatically to a specific page or section of the document. As with a microfilm reader, one must, in effect, crank back and forth through the document image by image. The major functional difference from microfilm use at this stage is that the reader does not have to find and load the film manually, but rather depends on the system software to find and load the document automatically. In addition, after browsing, the reader can request that the system generate a high-quality, printed copy of the document for personnel use.

It is incumbent on the system developers to insure that the browsing and print-on-demand features incorporated in the imaging system at this stage of

investment are compelling and sufficient for the scholar to use instead of microfilm. Assuming that they are, the library can begin to accrue at least modest savings in space and service costs by eliminating the on-site microfilm copy of the document. The library can also contemplate significant extensions of the browsing capability.

Remote Access

The library could extend the browsing capability of the image system in one way by making it accessible remotely from the library. Within the library, presentation of the browsing functions can be controlled by limiting the type of workstation used. Remote access, however, would require an enhanced presentation server to support the variety of image-capable workstations that scholars use outside of the library. The image server and the local campus network would also need to be able to bear the increased traffic. Whether the browsing function can practically be extended beyond the campus network is a subject of considerable interest that will require additional research and much testing.

Browsing at Page Level

The library can also extend the browsing capability of the image system by making the images of a document directly accessible by page number. The incremental investment in page level browsing depends directly on the costs of generating, maintaining and supporting in the browsing software a page level index to the image document. One cannot issue a command to go to a specific page in a document until and unless someone deliberately takes the time to create an index linking an image with a document page number. The pages may be numbered in roman or arabic notation. On the other hand, some pages may not even be associated with specific number in any form of notation. The indexing and retrieval system needs to reflect nevertheless these distinctions, variations and peculiarities.

Browsing at the Document Structure Level

The library can extend the browsing capability of the image system even more deeply by making the images of a document directly accessible by its own internal structural divisions, such as title page, table of contents, part, chapter, section, and index. That is, without moving page-by-page through the document, the reader could issue a command to go immediately and automatically to the third chapter, to part three, or to the title page. Again, the incremental choice to implement an imaging system with this level of functionality depends directly on

the library's interest in creating an index linking an image or set of images to a particular structural element or elements of the document. A slight variation on the theme would provide the reader the capability of temporarily structuring the document during the browsing process with placeholders or bookmarks. An even more ambitious variation would enable the reader to structure the document completely or partially in his or her own terms and save the resulting structural index under his or her own name for later use.

The analysis presented here of a library imaging system that is intended to preserve and improve access to deteriorating materials and is derived from the conversion of microfilm to image format does not exhaust all possible uses of such a system. For example, one might elect to digitize an entire collection of material on the grounds that the intellectual coherence of the material justifies the effort to make it more accessible. Alternatively, to help mitigate the costs of storage and indexing, one might opt to digitize only heavily used materials, as an intermediate step, or even as an alternative to putting a paper copy back on the shelf. Or one might opt only to digitize materials as they are requested for use, leaving the unused portions of the collection in microform.

Nor does this analysis exhaust all possible features of a preservation imaging system. For example, once character recognition technology sufficiently matures, additional enhancements to the imaging system will become possible. All or part of a document in image form may be converted to a text file of alphanumeric characters and the document images could potentially be linked to a portion of the text file, such as the table of contents, which is stored in the bibliographic description of the image document, or to a keyword index generated from the entire text file. Advances of these kinds could greatly enrich the intellectual value of the image library.

The analysis in this section does, however, highlight the major function dimensions of a preservation imaging system. It also suggests a plausible array of incremental choices that might motivate a library to invest economically in such a system. Of course, one must distinguish motivation and functional need from both the underlying technical architecture of the imaging system, which serves the library purposes and meets its requirements, and from the plan of work for a demonstration project, which is designed to develop a fully articulated system within the architecture and to generate sufficient information about the system so that libraries can make prudent, practical decisions about its costs and benefits.

System Architecture

The architecture - the overall design and structure - of a system for creating, storing, retrieving and printing library documents in image form has evolved gradually over the last decade. Early research and the development of pilot projects, particularly, at the Library of Congress and the National Library of

Medicine, have tested, refined and validated key design ideas as the imaging technology has emerged: workstations perform imaging functions; they are distributed over a high speed network; and they use needed resources on the network and interact with each other in a client/server fashion.¹⁶ In its digital preservation project, Cornell has incorporated a distributed workstation, client/server design in its system architecture, and Yale will also.

Other, more general design principles also apply to the architecture of imaging systems. Several of these principles will govern the system being developed at Yale, and one needs to articulate, rather than assume, them. First, the data, both the images and the indices to them, will comprise the primary asset generated in the Yale project. The software and hardware needed to create, store and use the data will change and be replaced. The data will remain, however, and must be readily and easily convertible from one system to another. Second, building on the argument in the previous section about the need for choice, the system components must be developed in modular form so that they can be readily and easily added, eliminated or changed as needed. Third, to insure flexibility when adding to, eliminating from or changing the imaging system at Yale, the components used must conform to official or de facto industry standards, or be built to standard interfaces.

Invoking these principles in reverse order, this section identifies the relevant standards for the imaging system at Yale, reviews the system components and the technical issues associated with them, and addresses the overall feasibility of the design by highlighting areas where concern for the data might warrant special attention to specific system features.

Standards

The relevant standards that apply to the design and construction of the digital imaging system at Yale fall into three groups: communications, storage and application standards.¹⁷ As most major research universities in the United States have done, Yale University supports a variety of networking protocols, but has targeted the so-called ethernet standards, including TCP/IP, as the protocol suite of choice for network communications. Components of the system may operate

¹⁶ Felix P. Krayeski, "Transition of an Image System: From Paper to Microfiche to Optical Disk," Congressional Research Service, The Library of Congress, June 1990. Frank L. Walker and George R. Thoma, "Access Techniques for Document Image Databases," *Library Trends*, 38:4 (Spring 1990): 751-786. Frank L. Walker, "Issues in Document Conversion," in Donald L. Blamberg, Carol L. Dowling, and Claudia V. Weston, eds., *Proceedings of the Conference on Application of Scanning Methodologies in Libraries*, (Beltsville, Maryland: National Agricultural Library, 1989), pp. 45-60.

¹⁷ For a useful overview of relevant standards, see Gerry Walter, "Standards Help Advance Document Management System Progress," *Optical Memory News*, (May, 1990): 25-27.

in a subnetwork of the campus network using a different standard protocol suite, for example token ring at the data link level. However, the subnetwork must supply a reliable and well-behaved gateway to the central ethernet-based network spine for communication with other components of the system.

For the storage of image data, the system at Yale will support the Tagged Image File Format (TIFF), which provides the header level standardization that is needed to allow for the exchange of images. Because image files are so large, a standard is also needed for compressing the files to some fraction of their original size in order to store and transmit them economically. The CCITT Group 4 compression standard is deficient in some respects because it does not cover pages that are larger than letter-size, nor does it handle well images with extensive gray scale or color. Standards groups are currently cooperating to develop more adequate compression standards. In the meantime, the CCITT Group 4 standard should serve the needs of this project.

At the applications level, bibliographic information referring to a document in image form will be entered in the library's online catalog in standard machine-readable cataloging (MARC) format. Existing MARC conventions are not completely adequate for describing a digital image version of document, but the appropriate standards organization has drafted a suitable revision of the standard. Yale will adopt a temporary solution until the revised standard is accepted.

Two other standards are also appropriate at the applications level. First, indices that open an image document to browsing at the title level, at the page level, and at the document structure level depend on work that describes the contents of the images and defines and makes it possible to exchange and present a particular set of images as a set of higher order entities (e.g. a book, a chapter, a set of pages). Standards covering document content need to apply (or be appropriately extended so that they apply) to the creation, storage and use of the various levels of structural indices. Several vendors, including IBM, have promulgated their own internal document content standards. However, ISO 8613, entitled "Information Processing - Text and Office Systems - Office Document Architecture (ODA) and Interchange Format (ODIF)", is the prevailing international standard, and the Yale project will seek to conform to it.

Second, the structure files, which describe the content of image documents in conformance with ISO 8613, need to be stored in and retrieved from a database file linked referentially to the files of document images. We would expect the database to be relational. We would also expect it to incorporate and conform to the Structured Query Language (SQL) standard.¹⁸

¹⁸ Presenting a document structure index in a standard relational form will eventually help facilitate the creation of links between the digital image document and any content

System Components

A general representation of the system architecture for the preservation imaging project at Yale appears in Figure 6. The components all are linked to the campus high-speed ethernet network, which has a fiber-optic core and current transmission speeds of up to 10 megabits per second. The key components of the design are a conversion subsystem, a reproduction (or printing) subsystem, a storage subsystem, and an access subsystem.

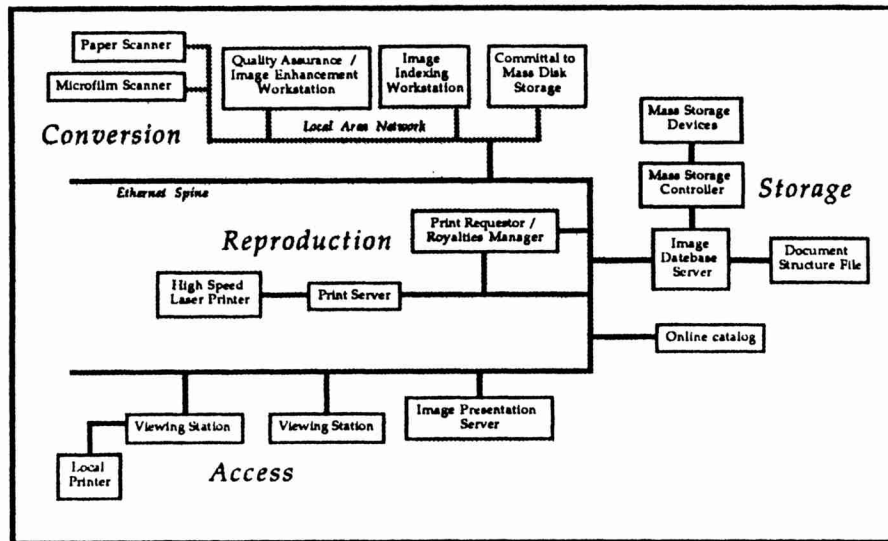


Figure 6. Imaging System Architecture

Conversion

The purpose of the conversion subsystem is to accept as input a series of microfilm frame images that constitute a document (book, pamphlet, or periodical), and to take a "digital photograph" of each frame so that the image is stored as a computer file and can be displayed on a computer monitor. The conversion process assures the physical quality of the digitization, which includes controlling resolution as well as image content, contrast, skew and sequence. The

information stored in other machine-readable sources, such as the online bibliographic description of the document.

process also serves to characterize, or index, the set of image files so that they retain their identity as a single document for subsequent storage and retrieval. The final step in the process is to commit the set of files as a document entity to permanent storage.

The conversion subsystem includes a microfilm and paper digitizer and, at minimum, a controlling workstation at which an operator can perform the quality control, indexing and commitment functions. To provide maximum flexibility, the workstation and digitizer should be linked via a high speed local network. With the network interconnection, additional workstations could be added to divide the labor, but each function could still be performed at every station. Alternatively - and this may be necessary for maximum efficiency - the digitizer may be directly linked to a controlling workstation, at which an operator performs the quality control functions. Upon completion, the operator could then hand off the files, using a network (or "Sneakernet") file-sharing mechanism, to another workstation for further conversion processing.

The digitizer must accept negative or positive 35 mm roll film in comic or cine mode at various reduction ratios. It should provide an automatic feed mechanism allowing unattended operation. It should be equipped with sensors to detect the beginning and trailing edge of each frame and to correct automatically for framing skew. If possible, it should detect the beginning and trailing edge of each page on frames filmed with two pages per frame. For the effort expended in digitizing, the Yale project will seek output at the highest resolution that is technically possible. The digitizer should nevertheless be capable of scanning at different resolutions and, to prevent labor bottle-necks, it must be capable of generating its highest resolution output at a rate per frame of 2 seconds or less. Finally, the digitizer should present an open set of interfaces that would allow it to work with DOS, UNIX or Macintosh workstations. A high-speed paper digitizer should be on hand with a similar set of features to allow for controlled comparisons of speed and quality in cases where the paper copy of the microfilmed materials is still available.

To work with the digitized images, each workstation in the conversion process needs the processing ability to read and expand a compressed page image and to compress and save a displayed page image to disk. All the workstations need to be able to move backward and forward through the sequence of images files and to jump to a specific image relative to the current image. Each workstation also needs a high resolution monitor capable of displaying a readable page image. Each workstation should provide general image manipulation functions such as zoom, shrink, pan, scroll, and rotate. Finally, all workstations in the conversion process need access to a local printer for printed copy of selected pages.

The workstation controlling the digitizer and the quality of its output should enable the operator both to initiate a completely automatic scanning process and to intervene in that process cleanly and robustly. It should afford the operator the

ability to adjust and set the scanning resolution, perhaps producing one set of images at a high resolution for printing and another set at lower resolution for browsing. The workstation should support techniques for automatic image enhancement, including fixed and dynamic thresholding and peak detection, which help to improve poor print-to-background contrast. In addition, it should permit the operator to crop image borders and perform other real-time image enhancement functions, as well as to rescan an image completely as necessary. Finally, the workstation should automatically create files from the digitizer in TIFF, compress the scanned images by the CCITT group 4 two-dimensional technique and assign sequential names for the images files.

The indexing application in the conversion process should guide the operator through a process of providing information about certain key aspects of the structure and content of the set of images comprising the converted document. In one window, it should display the image set and enable the operator to move backward and forward through the sequence of images files and to go directly to any specific image. In another window, the indexing application should prompt the operator to verify that the sequence of images is correct and to supply a unique document identifier under which the set of images can be stored as a single entity. When supplying the identifier, the application should check for uniqueness against the online list of existing identifiers.

In a third window, the application should give the operator access to the local online catalog, create an appropriate entry for the document in its digital form, and indicate the unique identifier by which the digital document may be found. When the bibliographic work is complete, the operator may optionally supply information that relates the image sequence to a page number notation and sequence. He or she may also index the significant structural divisions within the document. The operator then should be able to save the structure and content information in a database file, which is distinct from, but points to, the set of images that constitute the preserved document. If two copies of a document exist in different resolutions, the structure file should accurately point to the copies as different instances of the same document with the same structure.

Once the structure file is created, and even after it is permanently stored, the indexing operator should be able to recall and modify it. Moreover, once the operator has created a page number index for a specific document, he or she could be able immediately to issue a command to go to a specific page. Similarly, once he or she has created an index to the internal structure of the document, the application should make it possible immediately for the operator to request to go to the image at the beginning of each structural division. The interface should provide the operator with a special "bookmark" function, which would mark a specific image and allow a direct return to it at any time; the location of operator bookmarks, however, should not be saved in the permanent version of the structure file.

In applying the committal function, an operator verifies that the conversion process is complete and that the resultant set of digital images may now be stored. The function assumes, as a matter of security and user convenience, that the image documents and the associated structure file database are stored in a central, network-accessible, storage facility; not, by analogy to microfilm, in cabinets near the browsing workstations. In the event that the purpose of the conversion is not to create a permanent copy of the document in digital form but to print it, the committal function may close the process by transferring the images by removable media or over the network to the high-speed digital printer.

With respect to disk storage in the conversion process, each workstation that controls the digitizer needs sufficient working magnetic disk space for the operator to store and manipulate the uncompressed, scanned images of at least two books (approximately 600 megabytes). At each workstation that performs the indexing and committal functions, there needs to be magnetic disk space to store the compressed images of at least two books (approximately 100 megabytes). At workstations performing the committal function, there should also be a portable storage medium, such as an optical WORM (write once, read many) drive holding a disk platter, to which the compressed document images can be written and then physically moved to the permanent disk storage site. Alternatively, there needs to be the capability to write to a mass storage facility via the high-speed network.

Storage

The purpose of the storage subsystem is to provide a high capacity reliable and responsive medium (or mix of media) in which to store a collection of documents that have been preserved in digital form. A conversion operator must be able to transfer a digital document to the storage subsystem, and from it one must be able to retrieve documents either to print or to browse at a computer workstation. The components of the storage subsystem include the mass storage devices, the mass storage controller, the document structure file and the image database server.

Assume that the conversion process creates each images file at a resolution of 400 dpi and that in compressed form each image occupies 150 kilobytes of storage. Assume also that each book that is converted consists of 300 pages. It follows by simple multiplication from these assumptions that a digital library for the 10,000 books slated for conversion in the Yale project will require approximately 450 gigabytes of mass storage.

One assumes that optical WORM is today the most cost effective medium for storing this volume of information.¹⁹ However, if a second copy of each

¹⁹ Lesk, *op. cit.*, 306.

document is created at a lower resolution for browsing purposes, the storage requirements may be substantially less for the second copy (about 125 GB) than for the first, and use may be frequent enough to justify the costs of storing the image files on magnetic disk, which boasts of faster access times than the optical medium. The WORM cartridges holding the higher resolution versions for printing may be mounted in a jukebox, or held off line requiring an operator to intervene to mount them when requested. Data on magnetic storage would have to be regularly backed up to tape as a precaution against data loss from a disk failure; data on WORM media would have to be periodically copied to new media as the formats or access equipment become obsolete and are replaced.

The mass storage controller in the subsystem provides an interface between the disk storage and the image server. It translates requests for images into commands which locate and retrieve document images from the magnetic storage device or the optical jukebox, as appropriate. In the event that the document is stored offline the controller will generate a request to the operator to mount the appropriate cartridge. For requests to store image documents, rather than to retrieve them, the controller will locate space, appropriately store the files and update the file directory.

The document structure file contains information indexing aspects of the structure and content of each image document. It is an integral component of the image library and information from it must accompany each request for a document; conversely, any image document being newly stored must bear an index component for storage in the structure file. The file is a relational database conforming the SQL standard. As an online file, it requires regular back-up.

The image database server links the document structure file through the storage controller to the document images files. It is network accessible and responds to requests for images by retrieving the relevant information from the structure file and the relevant files from the image library and then spooling them for delivery to the access subsystem or the printer as appropriate. The server also responds to requests to store image documents by insuring that the structure file is updated and that the image files are spooled and transferred to the appropriate mass storage device. The server needs a substantial amount of memory to cache the inbound and outbound documents. A critical function of the server in this process is to deliver status data to its clients, including information regarding transmission progress, and errors in storage or retrieval.

The purpose of the access sub-system is to provide a facility for individuals to retrieve and use the library of documents preserved in image form. The

components of the subsystem include the image presentation server and the image viewer stations. In the simplest case of the subsystem, image documents need to be presented for viewing at a single type of workstation which the library provides and the selection of which it controls. The more complicated case results when the library opens access to the image documents to scholars across the campus who use different kinds of workstations with varying image display capabilities. In either case, the minimal functions provided by viewing station should be the same. The station should enable the reader to retrieve an image document depending on the way that it is described in the structure file.

In order to be "image-capable", each viewing station needs the processing ability to read and expand for display a compressed page image. The stations require a high resolution monitor capable of displaying a readable page image. Each workstation should provide general image manipulation functions such as zoom, shrink, pan scroll, and rotate. Finally, viewing stations should be able, if the equipment is available to them, to transfer images to local laser printers for printed copy of selected pages.

From the access workstation, the reader must be able to search the online catalog to determine a document's unique identifier. Given the identifier, he or she then should be able to request the document from the image server and have it available for viewing on the screen. In the absence of any additional index information, the reader should be able to move backward and forward through the sequence of images files and to go directly to any specific image relative to the current one.

However, if a page number index exists, he or she should be able to issue a command to go to a specific page. Similarly, if an index exists to the table of contents, the parts and chapters of the document and other major parts of its internal structure, the software should afford immediate access to the image at the beginning of each structural division. The interface should also provide the reader with a special bookmark function, which would mark a specific image and allow an immediate and direct return to it at any time; the location of reader bookmarks, however, would exist only for the duration of the browsing session.

The image presentation server separates these various access functions, which all viewing stations must provide in common, from the different ways that the operating systems of various workstation platforms (DOS, UNIX, Macintosh) enable them to be presented effectively to the reader. At the beginning of a browsing session, the server will interrogate the particular viewing station to determine its type and capabilities. It may be that the station is not adequately equipped for viewing images and the server will respond accordingly. Otherwise, when the image server responds to a request for a document, the presentation server will spring to life. It will take the document structure file, which describes critical aspects of the document and using the conventions of the Office Document Architecture, will provide a high-level set of directions for how

document content should be presented. The server translates these directions into a format and set of program instructions that are suitable for the particular workstation. Using a driver it obtains from the server, the viewing station, in turn, processes the programmed instructions and generates a presentation format in which the reader can easily browse the image document.

Reproduction

The purpose of the reproduction subsystem is to generate very high quality printed copy of all or part of selected documents that are stored in digital image form. Components of the subsystem include the printer, a print server and a print requester. The printer must be able to take as input image files with very high resolutions (600 dots per inch or better). It must generate printed output at the same resolution. For greatest economy, it should operate at very high speeds (100 pages per minute or better is a current benchmark criterion) and provide built-in collation and binding capabilities.

The print server manages the queue for the printer, providing various operator controls including the ability to set job priority, inquire about job status, and cancel jobs. It should provide a substantial spooling capability, and it must accept TIFF files compressed according to the CCITT Group 4 standard. It may need to reformat such files to an internal format, but should do so with no loss of quality or information. To accommodate print requests directly from the conversion subsystem, the print server may need to have a compatible WORM drive for direct input of the document to be printed.

Users who want to print all or part of a particular document will typically do so by invoking a network service to submit print requests. An individual can request a printed copy of an image document by the unique identifier specified in the online catalog. The request service will retrieve the structure information regarding the document and ask the individual to determine what portions or what pages to print and whether binding is required. The print request services should have built-in accounting capabilities so that individuals can be billed for the copies that they generate. General use of the request service on the network for billing presumes that there is a way to authenticate users and verify that they are who they say they are. Assuming the authentication issue is addressed, a natural extension of the print request service would be to use it to collect appropriate charges for the reproduction of royalty bearing documents, such as recent journal articles, which may eventually be added to the digital library.

Feasibility Issues

As we have seen, a suite of standards is emerging to govern the architecture of imaging systems. Moreover, a general understanding is growing about the

nature and interrelation of system components in the architecture. Together, these factors generate confidence in our ability to achieve the vision of a large-scale preservation imaging system at Yale, in which material converted from microfilm becomes, in image format, much more accessible and valuable to the scholarly community.

Optimism about the overall feasibility of creating a viable system on the basis of a 10,000 volume image library, however, should not obscure the attendant risks. Not all aspects of the systems components and their interrelationships are as well-understood as other parts; there are still many unknowns and uncertainties about the technology and its operation. By invoking a principle of design that we cited earlier - that the data created and stored are a library's principal asset in an automated system - and by asking how the data will be most at risk in this particular architecture, we can identify at least four areas of concern that might limit or impede the development of the system and so require extraordinary attention.

First, the area of principal concern is the integration of the mass storage devices. The technology of optical WORM storage is generally well-understood, but standard formats for the media have not yet emerged. In addition, experience in the industry is not yet very rich about the actual use of the technology and, in particular, about how to optimize the mix of optical and magnetic storage for particular applications and thereby to improve access time and to relieve contention for the drives in a multiuser environment.

On the face of it, the application that the library expects to develop seems special. Imaging applications have taken hold in office environments where the model document is a file folder, which contains a few items that one consults rapidly and moves on. The model document in the library, however, is the book of several hundred pages, over which one may pore for some time occasionally moving rapidly back and forth through the text to consult related points, citations, and so on. It seems reasonable to expect that the different patterns of document use in the library will stress the storage mechanisms in new and different ways that require solutions that may not yet be available. The question is: will experience bear out this hypothesis or not?

Second, the issue of periodically refreshing the data on optical storage media also remains a concern. Computer centers and computer vendors have now gone through many cycles of technical change in magnetic media, requiring data periodically to be recopied. The cycles of change in optical technology, however, have only begun to hit large production data centers. Because the technology is different and the volume of data stored on optical disk is orders of magnitude larger than on magnetic media, the familiar paradigms of data refreshment may not hold. Vendors will undoubtedly play a key role in promulgating appropriate and practical solutions, but, when asked, few are yet able to articulate such solutions.

The third major area of concern is the so-called document structure file. To the extent that the library indexes its image documents by page number or by the internal structure of the document, a major portion of its labor and investment is tied up in this structure file. The Office Document Architecture (ODA) and the SQL standards seem appropriate to govern its nature and organization and to make the data embedded in it transferable to another system or implementation as necessary. However, it is already clear that this mode of indexing the content of images will require some revisions and extensions in the ODA standard. The investment in the image library and in the various indices incorporated in the document structure file will no doubt warrant the active participation of the Yale library not only in the specific implementation of the Office Document Architecture, but also in its extensions and development.

Finally, a fourth issue of potential concern emanates from the quality control process. The library community has expected for years that, given the right technology, microfilm will be easily convertible to digital form. The Yale project will surely generate much useful information about the technical ease (or difficulty) of the conversion process. But the quality of the product that results from the process will depend not only on the mechanics and technical wizardry of the conversion process itself, but also on the quality of the microfilm, on the quality needed for the digital images to serve as input for subsequent technical processes such as optical character recognition, and on the quality standards asserted by the library readers who will use the digital images in their scholarly work. It will be important in this project, therefore, to capture and evaluate the ways in which preservation microfilm can or should be changed to generate a better digital image. Similarly, it will be important to find ways to evaluate the quality of the digitization process from the standpoint of related technical processes, such as character recognition, and it will be absolutely essential to evaluate the process from the standpoint of user satisfaction.

Plan of Work

The Yale digital preservation project will build on related work at the Library of Congress, the National Library of Medicine, Cornell University, and other library and archival institutions by focusing on the conversion of microfilm to digital imagery and by attempting to build a 10,000 volume digital library in the process. Much of the equipment and application software needed to construct a system at Yale is already available on the market from vendors or is in advanced stages of vendor development. The principal exception is the image presentation manager described in the previous section, which Yale has special expertise to develop and which will be generated as a specific product of the system work at Yale.

Of course, concerns about various ambiguous and uncertain aspects of the architecture of imaging systems highlight the risks of investing in relatively new and expensive technology and at the scale contemplated for the Yale project. However, those concerns also focus attention on the areas of opportunity that a project of Yale's scope and breadth offer for advancing our understanding of the potential and limits of the technology, for developing certain aspects of the technology and, overall, for measurably reducing the risks on investment for those libraries that follow on the imaging path. To mitigate the risks of the project and to enhance its prospects of yielding a valuable return, one solution is a deliberate and careful implementation plan with clear goals, measurable results and a phased approach in which all is not lost, or even necessarily at stake, if one encounters a problem or other obstacle.

Project Goals

The digital preservation project planned for the Yale University Library has three broad goals:

- Identify, develop and evaluate the means of creating and storing a digital library of preserved materials by converting images from microfilm to digitized form on a production scale of 10,000 volumes.
- Identify, develop and evaluate the means to provide, preserve and improve the distribution of, or physical access to, preserved materials in digital image form from both within and outside of the library.
- Identify, develop and evaluate the means to provide, preserve and improve intellectual access to library materials in digital image form.

Project Scope

The project will be divided into 6 phases over three years (see Figure 7). The first phase will extend from months 1-4 and will establish the overall organization framework for the project. During the second phase, which will extend from months 5-8, the initial setup of hardware and software will occur. Phase three will establish a production level process for converting microfilm to digital images. It will begin in month 9 and end in month 18. The fourth phase of the project will also begin in month 9 but will end in month 21 when the digital image documents are made accessible to readers within the Yale library. The fifth phase will extend from months 22-23 and will establish access to the digital image documents from outside of the Yale library. The project will conclude in the sixth phase, during months 34-36, with completion of the 10,000 volume conversion and a final tuning and evaluation of all system components.

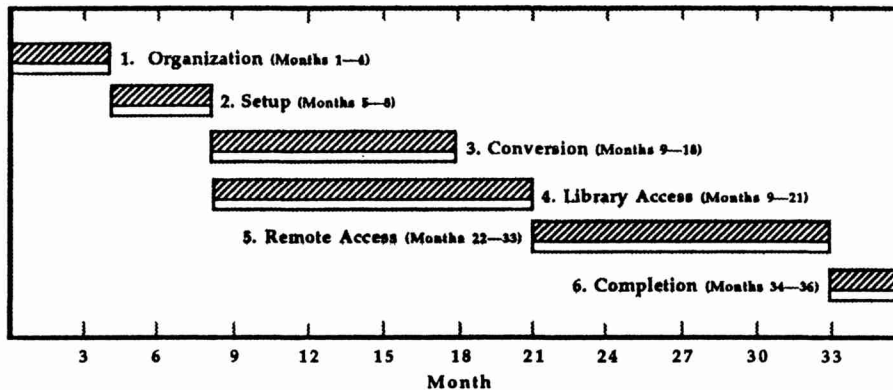


Figure 7. Project Phases

At each stage, a report will be generated to summarize the results to date and to evaluate the overall merit of the project. Because the digital image technology being investigated and demonstrated is still subject to rapid change and development, it is possible, though unlikely, that the results being sought here will emerge elsewhere or that the capabilities of the technology itself will overtake the assumptions on which the project is founded. Each report, therefore, will treat the end of phase as a milestone in which to ask and answer the question: is it worth continuing this project?

Phase 1: Organization

Objective: The objective of phase 1 is to create the overall organizational framework for the project and to prepare for work in subsequent phases.

Time Frame: Months 1-4.

Activities: During Phase 1, a Steering Committee will be created to provide general oversight and direction for the project. The committee will consist, at least initially, of the University Librarian, the Deputy University Librarian, the Associate University Librarians for Technical Services, Public Services and Collection Development, the Head of the Preservation Department, the University Director of Computing and Information Systems, the Director of Academic Computing, the Project Manager and four selected faculty members. The committee can adjust its membership over time as necessary.

The initial agenda of the committee will include the following items:

- establish the criteria for identifying which portions of the preservation microfilm collection will be converted to digital images.

- assists the Project Manager and members of the project team in establishing appropriate partnership relationships with vendors of document imaging equipment and applications.
- review the proposed budget for the project and assist in identifying and securing sources of funding.

The project manager will be the Head of the Systems Office in the library. The project team will consist initially of the Head of the Preservation Department on the library and the Associate Director for Systems, Technology and Planning in the Computing and Information Systems Department. During this phase, the project team will:

- identify the specific hardware and software that will be acquired for the project.
- establish appropriate partnership relationships with the vendors of the document imaging equipment and applications that will be acquired in the project.
- prepare a staffing plan for all subsequent phases of the project.
- prepare a budget for the entire project and work with the Steering Committee and other appropriate sources to obtain funding.

Prerequisites: This document, "From Microfilm to Digital Imagery", will provide the background and planning foundation for the initial work of the Steering Committee and the Project Team.

Products:

- A project budget.
- A funding plan.
- A report summarizing the results of work in this phase.

Phase 2: Setup

Objective: The objective of phase 2 is to begin setting up the working environment needed for the project.

Time Frame: Months 5-8.

Activities: The project team will:

- apply the criteria established by the Steering Committee and begin to select the portions of the microfilm collection to be converted.
- create and begin to implement a plan for evaluating whether the criteria used to select material for conversion creates a digital library that library clients find intellectually valuable.
- hire needed staff.

- acquire, install and test the hardware and software for the conversion sub-system.
- acquire, install and test the document structure file component of the storage subsystem, and begin to acquire, install and test the other components of the storage subsystem.
- prepare the design and initial specifications for the image presentation server.

In addition, the team will contract with a service bureau to convert from microfilm to digital image form up to ten volumes that will be selected largely at random. The contract will establish a base line of costs against which to compare the costs of in-house processing. It will also provide experience in formulating and applying acceptance criteria for the in-house quality control process. Presumably, at this stage, the documents will be returned in image form without any indexing.

Prerequisites: In order for this phase to begin, there has to be an approved budget supplied with requisite funds to cover staff costs, the acquisition of hardware and software and the service bureau costs.

Products:

- 10 volumes will be available in digital form and ready for the indexing process within the conversion sub-system.
- A report summarizing the results of work in this phase, including an analysis of the service bureau experience and a plan to evaluate systematically throughout the duration of the project the merits of in-house conversion versus the use of a service bureau.

Phase 3: Conversion

Objective: The objective of phase 3 is to establish a production level process for converting microfilm to digital images.

Time Frame: Months 9-18.

Activities: The principal tasks for the project team in this phase include:

- develop procedures and train the operator(s) in the use of the digitizer and the quality control workstation, including its image enhancement features.
- select for digitization early in this phase a sample of microfilm reels that reflects variations in the quality of the microfilm process. Devise a method to use this sample both to exercise the quality control process and to begin to formulate conclusions about the ways that microfilming techniques affect the quality of the digitization process.

- devise and implement a quality control standard that accounts, in particular, for the future possibility of applying character recognition technology to the images generated in this conversion process.
- create an ongoing process for measuring user satisfaction with the quality control processes and standards.
- review the design of the page number index and the document structure index to insure that links can be created at some future time between these indices and supplementary contents notes that might be stored elsewhere in machine-readable form.
- develop procedures and train the operator(s) in the use of each of four different document indexing functions. The operator(s) should be able to (1) assign a unique identifier to the set of converted images that constitute a single document entity, (2) index the image document by page number, (3) index the image document by the internal structure of the document, and (4) create a bibliographic entity in the online catalog at Yale that describes the image document and identifies it in the digital image library by its unique identifier.
- devise methods of structuring and altering the indexing workflow to isolate the costs of each of the four forms to document indexing.
- develop procedures and train the operator(s) to commit the image document and the document indices to permanent file storage using, at this stage, a portable WORM drive.
- review criteria for selecting high use preservation materials for which a printed copy will be bound and returned to the shelf.
- develop procedures for and train the operator(s) to transfer the images of selected documents directly to the high quality image document printer. The preferred mode of transmission is via the high speed network.
- devise a method of structuring workflow to isolate the costs of digitization, quality control and printing, with no indexing.
- devise a method and an ongoing procedure for comparing the costs of in-house versus service bureau costs for digitization, quality control and indexing.
- index and commit to storage the 10 volumes digitized by the service bureau in phase 2.
- digitize, enhance, index and commit to storage 490 volumes.

Prerequisites: In order for this phase to begin, the conversion subsystem, the printer and print server and the document structure file component of the storage subsystem all have to be installed and tested.

Issues to be investigated: Work in this phase is designed to produce critical measures of quality and cost along several dimensions, including:

- the possible effects of microfilm quality on the quality of digitization.
- the implications of possible future character recognition for the quality control process in microfilm digitization.
- user satisfaction with the quality control processes and standards.
- the relative costs of in-house versus service bureau costs for digitization, quality control, and indexing.
- the varying costs of the different levels of indexing.
- the costs of simply digitizing and printing without indexing.

It will be important to collect and monitor these various measures on an ongoing basis throughout the project.

Products:

- Operation of the conversion subsystem at production levels.
- 500 volumes digitized and fully indexed.
- A report summarizing the results of work in this phase, including an analysis of costs.

Phase 4: Library Access

Objective: The objective of phase 4 is to make the growing digital image library accessible to readers at workstations within the Yale library.

Time Frame: Months 9-12.

Activities: The principal tasks for the project team in this phase include:

- complete the acquisition, installation and testing of the storage subsystem.
- specify, acquire, install, and test the access work-stations in the library.
- develop and test a prototype image preservation server capable of interacting with the access workstations in the library.
- design and implement a study to measure the value to library readers of each of the index tools available for the digital document compared to microfilm access.

- create and implement a plan for backing up data stored on magnetic media and for periodically refreshing data stored in optical and magnetic media.
- transfer all digitized volumes to the permanent storage system.
- devise a method for assessing the costs of adding the storage subsystem and of maintaining it on an ongoing basis.
- establish and implement methods and ongoing procedures for assessing the effects of access load on the performance of the image storage subsystem.
- devise and implement methods and ongoing procedures for tuning the performance of the image storage subsystem.
- establish and implement methods and ongoing procedures for monitoring and tuning the effects of image transmission on network performance.
- devise methods for assessing the costs of creating and maintaining the access subsystem.
- acquire, install and test the print requester.
- devise methods for assessing the costs of creating and maintaining the printing subsystem.
- after the completion of phase 2 and during months 16-18, digitize, enhance, index and commit to storage 1,300 volumes.

Prerequisites: In order for this phase to begin, the printer and print server and the document structure file component of the storage subsystem have to be installed and tested. The initial design and specifications for the image presentation server also have to be complete.

Issues to be investigated: Work in this phase is designed to produce critical measures of quality and cost along several dimensions, including:

- the incremental cost creating and maintaining the storage subsystem.
- the costs of backing up data stored on magnetic disk and of periodically refreshing data stored in optical and magnetic media.
- the incremental costs of creating and maintaining the access subsystem.
- the incremental costs of creating and maintaining the printing subsystem.
- the effects of access load on the storage subsystem.
- the effects of transmission load on the network.

- the value to readers in the library of the document indices.

Products:

- Image storage subsystem operating at production levels.
- Printing subsystem operating at production levels.
- Prototype image presentation manager.
- Access subsystem operating at production levels in the library.
- Print request server.
- 1300 volumes digitized and fully indexed.
- A report summarizing the results of work in this phase, including an analysis of costs.

Phase 5: Remote Access

Objective: The objective of phase 5 is to establish access to the digital image documents from outside of the Yale library.

Time Frame: Months 22-23.

Activities: The principal tasks for the project team in this phase include:

- extend the operation of the image presentation server to be capable of interacting with selected types of workstations outside the library.
- make the imaging access subsystem available through the image presentation server to selected types of workstations that are connected to the campus network.
- devise methods for assessing the startup and ongoing costs of adding access to the image system from outside the library.
- design and implement a study to measure the value to users outside of the library of each of the index tools available for the digital document.
- digitize, enhance, index and commit to storage 7800 volumes.

Prerequisites: In order for this phase to begin, the prototype version of the image presentation server has to be complete and operational.

Issues to be investigated: Work in this phase is designed to produce critical measures of the value to readers outside of the library of the document indices. It will be important to collect and monitor these measures on an ongoing basis during this and the last phase of the project.

Products:

- Production level image presentation manager.

- Operation of the access subsystem on workstations outside the library.
- 7800 volumes digitized and fully indexed.
- A report summarizing the results of work in this phase, including an analysis of costs.

Phase 6: Completion

Objective: The objective of phase 6 is to complete the 10,000 volume conversion and perform a final tuning and evaluation of all system components.

Time Frame: Months 34-36.

Activities: The principal tasks for the project team in this phase include:

- review and assess all measures of quality and performance in each of the subsystems.
- digitize, enhance, index and commit to storage 400 volumes.

Prerequisite: In order for this phase to begin, the production version of the images presentation server has to be complete and operational.

Products:

- A final report.
- 400 volumes digitized and fully indexed.

Conclusion

The Yale University Library envisions a future in which digital image technology comprises a critical tool in the process of preserving access to the deteriorating materials in its rich and valuable collections. Just at a time when the deterioration of documents composed of acidic paper is accelerating at an alarming rate at Yale and at other major research libraries across the country, the architecture of digital image systems is becoming well understood and established, and the system components are increasingly well-integrated and readily available. The Library of Congress, the National Library of Medicine, Cornell University, and other library and archival institutions have in various ways made major contributions to the development of imaging technology and in applying it to preserve and improve general access to the national and international major step toward making digital imagery a practical library tool.

The Yale digital preservation project will build on related work elsewhere, particularly at Cornell University, by focusing on the conversion of microfilm to

digital imagery and by attempting to build a 10,000 volume digital library in the process. Much of the equipment and application software needed to construct the imaging system at Yale is available or in final stages of vendor development. However, the Yale preservation imaging system will be both capital intensive and, particularly in the indexing phases of the conversion process, labor intensive. Its success will require major support from funding agencies and significant and productive partnerships with members of the vendor community. The outcome for all participants in the project will be a substantial body of information about the costs and benefits of digital imagery. Libraries, and the vendors who work with them, will depend on such information in the future to make prudent, practical decisions about incorporating imaging technology into the daily routine of library work and of scholarly access to library materials.

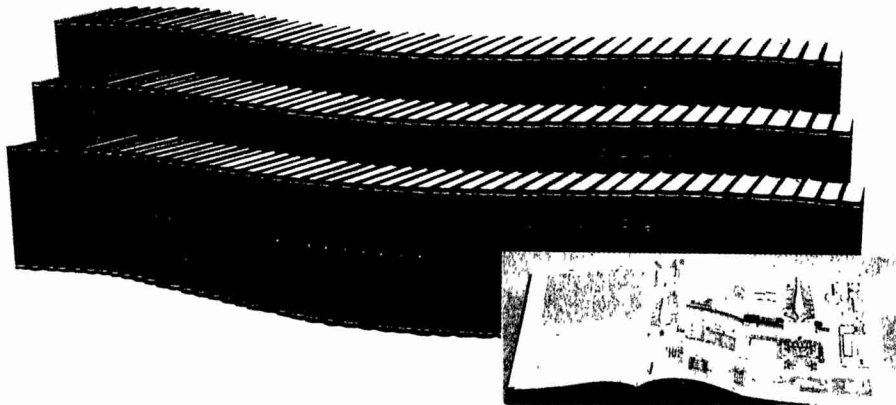
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Report on the 'Inquiry into Map-Use and User-Habits in Europe'

JAN SMITS

Koninklijke Bibliotheek, The Hague

History and development

During the meeting in October 1986 of the representatives of Liber-institutions in the Rathaus in Wien it was decided that "... a questionnaire on user-habits has to be developed, based on an example by Monique Pelletier, and be distributed by the National Correspondents to all relevant institutions in their respective countries". For some time the Bibliothèque Nationale de Paris had used a questionnaire to examine the use of its collections.

The Secretary used the French form as a basis for a questionnaire which could be used in all participating countries. After consultations with the Board of the Groupe de Cartothécaires and several National Correspondents the form as shown in Appendix 1. was evolved. The form was divided into four sections: general information about the user-background; information about documents required; information about access systems, reference-works and map room; information about reproduction requirements.

As the results had to be comparable between countries, National Correspondents were issued with guidelines as how to use the questionnaire. These referred to the organization of the national form, the gathering of data and how to develop reports from them. Correspondents were requested to distribute the forms to all relevant collections (libraries, archives and map producers) and to begin the inquiry on the 1st of August 1987. We hoped that the inquiry would last for 6 months, but in most instances this was too much. Results were to be discussed during the conference in Sweden in 1988.

General remarks

The inquiry was carried out in 15 countries. Some, like Italy, could not respond because map curatorship was not formally organized. Others were too small, lacked staff or couldn't see the need, as map curatorship was a marginal activity. Eventually eight countries responded.

Country	Number of Institutions	Responses	Time Used
Austria	4	160	3 months
Belgium	1	72	8 months
Denmark	11	102	3 months
France	7	400	3 months
Netherlands	15	1.312	6 months
Spain	17	177	3 months
Sweden	23	227	3 months
United Kingdom	18	397	2 weeks
TOTAL	96	2.847	

To give some weight to the comparison we have compiled a table of participating institutions according to their nature:

Country	nat. lib.	univ. lib.	special lib.	archive	map-organ.	public lib.
Austria	1	1		1	1	
Belgium	1					
Denmark	1	2	4	2	2	
France			4		1	1
Netherlands			4	5	6	
Spain	1	5	8	1	2	
Sweden	1	2	8	7	4	1
UK	2	2	2	9		3
TOTAL	8	16	31	26	10	5

Under 'special libraries' are included those of university departments, under 'map organisations' are IGN's, map producers, cadastral and geological surveys. The amount of 'maps' in these institutions range from 12,000 to more than 1,500,000. The larger collections are mainly national libraries, university libraries or map organisations, but this varies widely between countries.

The inquiry lasted from a fortnight (UK) to 8 months (Belgium), according to the way it was organized. The disproportionate amount of responses in The Netherlands is not only due to the length of time devoted to the inquiry. The map curator of the University of Utrecht, Mr. Roelof P. Oddens, had been so kind as to ambush every client who visited his collections time and again over the 6 months, resulting in 2/3 of all Dutch answers.

This may have led to some unkind thoughts and/or unspoken curses of users, but they give us a good insight into relevant questions. Though it was possible

that the results here would have less variety, this proved not to be the case. Frequent users seem not to be limited in their interests to a specific subject once they know the possibilities of a map collection.

Unfortunately, not all countries filed a full report, so not all results were comparable. In Spain there was a report from Madrid and from Catalunya. Mostly, the National Correspondents or a working group of map curators had selected a number of collections where the inquiry would take place. Where this was not the case (Denmark, Netherlands, Sweden) the amount of responding institutions was between 12,5 and 50%.

All results are approximations, as the number of questionnaires cannot give a total overview; also, most multiple users were asked to fill in the form only once. In respect of this we are aware that the results show trends, but do not tell absolute truths. Where the amount of non-responses is high it is difficult to interpret the results. Though some results can be interpreted from absolute numbers, those deriving from question six require further explanation. Subject categorisations are always arbitrary, and the one used for this inquiry is no exception. However, as this question would yield important information, we developed the list as shown in Fig. 1. Specific comparisons only could be made between Austria, Catalunya, Denmark, Netherlands and Sweden, as they returned complete statistics. (1,782 responses in total). Their reports are used as a basis for the conclusions (see appendix 2) augmented by written reports from Correspondents. To be on the safe side, the National Correspondents of the eight countries involved were asked to augment this report. Responsibility for the final report, however, rests with the Board of the Groupe de Cartothécaires.

1. agriculture/forestry/horticulture/cattle breeding	19. geography - history of
2. anthropology/etnography	20. geology
3. archeology	21. geomorphology
4. architecture	22. glaciology
5. art-history	23. history
6. astronomy	24. hydrography
7. bathymetry/oceanography	25. land use/soil maps
8. biogeography	26. language/toponymy
9. cartography	27. law
10. cartography - history of	28. military geography
11. climatology/metereology	29. mining
12. demography	30. politics
13. ecology	31. recreation/tourism
14. economy	32. religion
15. education	33. remote sensing
16. genealogy	34. topography
17. geodesy	35. town- and country planning/urbanisation
18. geography	36. traffic

Fig. 1. Subject-index used in the 'Inquiry ...'

The users

Montserrat Galera wrote that the type of user in any given map library depends, in principle, on the nature of the library; this may also somewhat be valid for countries. Map use and knowing the way to map libraries may depend on historical trends, availability of map collections or technological innovations; e.g. when the cartographic database OPALINE becomes available in France on Videotext, the number and nature of map users there may well change.

[2] The number of foreigners visiting map collections is between 0% (Catalunya) and ca. 10% (France), while the Bibliothèque Nationale de Paris capped everything with 33%, representing 19 different nationalities. These came generally from neighbouring countries or related language areas. Obviously the National and University collections are attended by more foreigners than the more locally-oriented collections.

Whether map-collections are more or less internationally-oriented than other scientific collections cannot be ascertained due to the lack of data. In general people in age ranges 21-30 and 30-50 are the most frequent users, which may point to students, postgraduate students, researchers and staff at universities. Using cartographic documents for private use or research (history, genealogy, travel) furthermore may come at a later age. In Catalunya, Denmark and Sweden 40-50% of the users were between 30 and 50 years old. In Denmark and Sweden about 30% of users were over 50 years old. Whether this means there is more leisure or that interests change in old age cannot be said. Some institutions in The Netherlands have more than 5% users under 20 years of age, because undergraduates of geography and some tertiary professional schools visit the map collection as part of their curriculum. In Belgium the minimum age, except for university students and the like, is 21 years.

[3 + 21] Between 50 and 70% of the clientele are regular customers, though there is variety when one compares separate institutions. In France the IGN and the Bibliothèque Nationale have about 50 % regular readers, while at the Centre Pompidou and the Sorbonne this becomes 80 to 90%. In the Belgian Bibliothèque Royale there are about 7% regular users of long standing. Many of the principal collections have customers who almost 'live' in the library. On the other hand, the Royal Tropical Institute of The Netherlands does show a surprisingly small amount - 3% - of regular customers, though this is one of the few institutes in the region specializing in tropical countries. Of course there is the possibility that multiple-users fill in the form only once. In the UK in general, special and academic libraries have a fairly regular clientele, whilst the public libraries have more 'one-off' users.

At the same time about 20 to 50% of respondents visit other map-collections more or less regularly. Notably high responses came from Catalunya (57.7%), France (100% for the Ecole Nationale supérieur des Mines de Paris) and Spain (67.6%). The audience of the Bibliothèque Nationale attends the IGN in Paris

inversely. Accordingly one may wonder if that 'common part' is not composed of the same persons having answered the questionnaire in the two institutions.

Nearly one third of users in the UK were first-time users. This, Jim Elliot feels, has important implications for the design of student rooms and reading areas, and places an onus on the curator to consider how to make these welcoming and inviting. All the time one has to keep in mind that users who for the first time visit a collection may become regular users of the same or other collections.

[4] The question about the type of map user may have confused some of the clientèle. Some divided the reasons for consultation into groups of professional reasons, studies or leisure, others didn't know whether to classify a 'local historian' under 'professional researcher' or under 'leisure'.

Roughly a third stated they were scientific researchers (Catalunya 61.5%), while another 30 to 40% were put down as students (Austria 51%). That leaves about a quarter to a third to the other categories.

In Denmark about 15% stated they were educational researcher, while in Sweden ca. 10% stated they were map amateurs. This may have something to do with the fact that about 30% are over 50 years old. As in other countries, this group was mainly occupied by local history and genealogy. In France, professional researchers mainly visit the scientific and professional institutions (university-collections, IGN, Intergéo etc) while 'leisure'-users tended to go to the Centre Pompidou, suiting the aims of this library, and the IGN and Bibliothèque Nationale. In the UK professional researches used mainly special libraries, while public libraries are more used from private interest.

The documents

[5] In general two thirds of the users needed more than one document to satisfy their interest. In conjunction with the responses to questions 8 (area) and 9 (documents) one may draw the conclusion that most users ask for specific information; this is contrary to experience in collections with more traditional book and serial material where they mainly ask for documents. This discrepancy cannot be emphasised enough as this has a bearing on the means of accessing a collection and on the general and specific knowledge of mapcurators. In the use of more than one document per user Austria is the exception with 18.1%. This number is true for all 4 Austrian institutions which cooperated in this inquiry.

[6] Some subjects are more sought after than others, namely history of cartography (5.2%), Geography (5.4%), geology (3.9%), history (6.1%), topography (15.3%) and town/country planning (10.1%). However the foregoing percentages came by because of the predominance of the subject in one or more countries. If we enumerate the predominance of certain subjects in several countries we come to the following table:

- Belgium:** history (15.3%), history of geography (10.9%), agriculture (11.1%), architecture (9.7%), urbanisation (9.7%), no answer (4.1%)
- Austria:** town/country planning (25.7%), geology (18.4%), topography (14.5%), history of cartography (10.1%), no answer (14%)
- Catalunya:** history of cartography (15.1%), geology (9.4%), recreation/tourism (9.4%), cartography (7.5%), topography (7.5%), no answer (11.3%)
- Denmark:** topography (22%), town/country planning (15%), landuse/soil maps (13%), history (10%), geography (6%), no answer (1%)
- The Netherlands:** topography (17.6%), education (13.8%), town/country planning (8.2%), cartography (5.5%), history of cartography (4.7%), history of geography (4.7%), no answer (12.3%)
- Spain (Madrid area):** history (35%), geology (20.2%), geography (19.6%), town/country planning (10%)
- Sweden:** history (16.4%), geography (10.8%), archaeology (8.6%), geomorphology (8.2%), geology (6%), genealogy (5.6%), town/country planning (5.6%), agriculture (5.2%)

In the case of geology (Austria, Spain) and education (The Netherlands) the high percentage derives from the fact that one of the cooperating institutions specializes in this topic. However this reason is not valid for the topic of landuse/soil maps in Denmark.

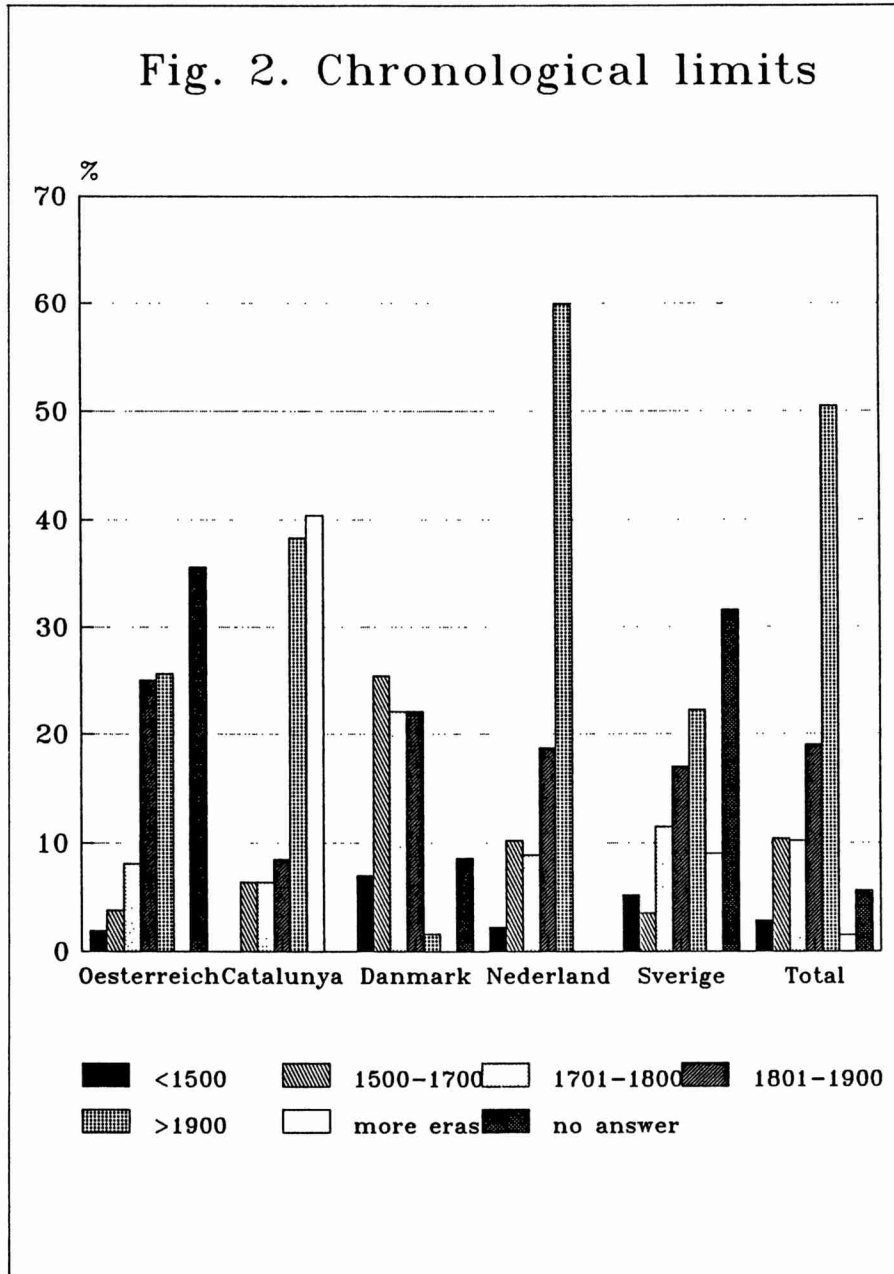
Pierre-Yves Duchemin wrote that "it seems that the type of consultation is often linked with the alleged 'specialization' of the library ... Concerning this matter, it is interesting to note a rather significant ignorance of the collections: thus, only a few people look for [old] maps in the IGN or for recent maps in the Bibliothèque Nationale whereas these two map libraries do not confine their collections to documents, the image of which is fixed in public feeling. This obvious lack of information should be attenuated in a large proportion by the use of a computerized network. Indeed, the localization of the documents will allow a reader questioning the system to know the inventory of collections in each [institution] and thus to discover unexpected aspects ..." If a country cannot afford itself a computerized network one always can try to publish a Guide to Map-

collections which gives enough details to direct the user to the collections relevant for his researches. When a country cannot afford such a publication one can use for this purpose the 'World directory of map collections' published by IFLA.

In general it seems that more specialized collections seem to be better known by their potential users than more general ones. Subjects hardly mentioned included astronomy, bathymetry/oceanography, demography, ecology, economy, geodesy/triangulation, glaciology, law, military geography, mining, politics, religion and remote sensing (all less than 1%). What surprises me is the low demand for maps concerning demography/ecology/economics, but maybe these occur as illustration in other documents rather than as separate maps, so they are not sought after in mapcollections (And if so, in how far have these maps been accessed already?). Some may find it surprising that art history was mentioned only by 2% of respondents at the university libraries of Amsterdam and Leiden.

[7] As might have been expected most demand was for 20th-century maps, though there is much variety per country as shown in Fig. 2.

Fig. 2. Chronological limits



E.g. in Denmark this was only 14.8%. In Austria, Catalunya and Sweden the figure was between 22.2% and 38.3%, but the amount of 'no answer' or 'longer periods' ranges between 31.6% and 40.4%, which makes comparisons difficult. In The Netherlands 20th-century maps take up 59.9%, of which about half are published after 1980. In the UK the demand for up-to-date mapping ranged from 42% to 55%. Demands for older materials were mainly directed to national libraries and record offices. Nevertheless it is surprising that there is such heavy demand for older material, as they form only a minor part of all available cartographic materials. Here as with question 8 the comment of Duchemin is probably valid. As bibliographic data on older material is probably more complete, they seem to incur more demand than mere numbers might suggest. Even if all modern collections are available online, demand may drown in the enormous numbers in which cartographic materials nowadays are produced, unless a customer is sure that he can ask specific questions of the available system.

[8] The demand for certain areas seems evenly divided between town/city, province and country. In Denmark and Sweden there was only some 15% demand for town/city areas, in Austria only 11.7% for provinces (Sweden 39.6%) and in The Netherlands demand for country maps was lowest with 14.7%; in Austria this was 38.5%. The demand for maps depicting more than one country or parts of several countries was in general some 14%. Unfortunately the questions were not formulated in such a way that demand for maps of local or foreign content could be ascertained. In The Netherlands this was, however, done for the University of Utrecht. Fig. 3. shows the clientèle's preference. If there are profiles from other institutions one can create maps which show overall demand as well as the whereabouts of the institution which can meet it. The demand for maps of domestic versus foreign content for the whole of the UK was as follows: local area 46%; rest of the UK 28%, overseas 15%, not specified/not relevant 11%. As the paper of Mrs. Clement-van Alkemade showed, there are areas served by too many institutions as well as those served by none. Especially for budgeting the acquisition of foreign maps, this might be a good tool.

Continent Geogr. entity	Netherlands	Europe	Asia	Africa	America	Oceania/ Australia	Total
town	26.08	5.19	1.57	.12	.36	.12	33.44
province	23.67	3.02	1.33	.24	.48	---	28.74
country	9.66	7.13	2.54	1.09	1.93	.72	23.07
other	-----	1.81	.24	.12	.12	2.17	4.46
total	59.41	17.15	5.68	1.57	2.89	3.01	89.71
world-maps or charts of (parts of) oceans							10.02
Grand total							99.73

Fig. 3. Distribution of areas requested by customers of the map-collection of the University of Utrecht, The Netherlands

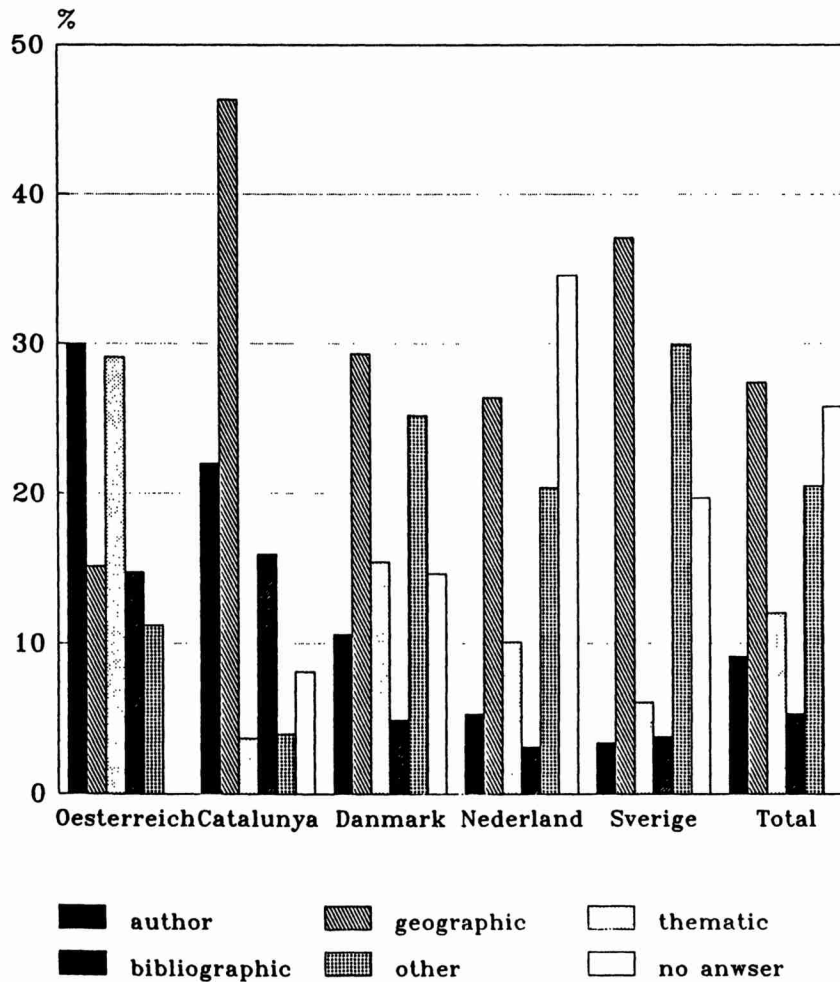
[9] As with questions 7 and 8 the totals arrived at are higher than the number of respondents of the inquiry, showing the tendency to ask for a package of information instead of certain documents. Most requests are for atlases (except Sweden at 7%), topographic maps (21.3% to 35.5%) and town plans (8.1% to 17.4%). Globes were required in 28 cases, but none of these were at the Globe Museum in Wien. I presume that they have been enumerated under 'other' in the Austrian report. Little insight can be gained as to what kind of thematic maps are requested and where. As with other questions pertaining to national coordination of map acquisition, this issue should be more thoroughly researched. Where conclusions can be drawn, it seems that demand is evenly distributed between physical and social geography. Because no former inquiries on this scale have taken place it cannot be ascertained whether there is a shift in demand from topographic to thematic maps.

One of the most remarkable questions was put to the Bodleian Library in Oxford by a user who wanted to see all documents on all subjects relating to all time periods! Maybe he was a descendant of Ortelius who wished to maintain his ideas of what an atlas should be about!

Reference and staff

[10] The results show that there are remarkable differences between European countries (fig. 4.). Though the geographic catalogue is the main means of access for users, I am surprised to find that author's catalogues are much asked for. Austria seems a little erratic compared with the other countries, as the author and thematic catalogue score 30%, while the geographic catalogues score a mere 15%.

Fig. 4. Means of access used



Bibliographies are not well used or not available, as there are not many bibliographies of national, local or collection-related importance. However, in view of the recent profusion of national map bibliographies which are currently produced or which will be produced in the near future, it may well be that such tools may become more significant in the future.

'Other' aids mentioned were index-maps and staff. Jim Elliot mentions that only 20 enquirers used graphic indexes, wondering whether we should make these more usable. According to him these are as unfamiliar to most users as the maps themselves. Maybe in future some of the Cartonet-like programmes will help us herewith. It was not possible to ascertain to what extent a combination of search tools was used. However, the ratio research-tool to user ranges from 1,1 to 1,6. There were no computer based catalogues in existence at the time of the survey.

[11-13] A library without staff is almost unthinkable, but a map-collection without staff is a disaster, or so one could conclude from this inquiry. More than two thirds of the respondents needed staff assistance. Users not only have the impression that staff are more reliable in answering a request than the search tools, but also that a direct approach may save a lot of time. Of course a reason may be the inadequacy of catalogues as in the Belgian case or the non-availability of these to the public as is the case with the IGN in France. We may ask ourselves whether we are not too eager to help our clientèle or that there is a deeper question behind this. It may be the case that such complicated visual documents as maps cannot easily be explained in search tools, except when quick cross-reference is available. In certain understaffed map collections it is often the question of the chicken and the egg. Less access to documents puts greater pressure on staff to assist users directly, while leaving less time to access the documents. Roughly a third of the clientèle used reference works. Why a lot of users found the reference works not adequate was not answered. It is advisable to ask users what they expect in the reference library, whether these requests are justified, or whether they should be left to more general departments of the institutions.

[14] This question should only have been asked of regular visitors. As this was probably not the case, those whose use is given as 'always' and 'hardly' have to be counted as first/one-time and regular visitors, while those who find them 'sometimes' must be regulars. The 'no answer' may be mostly qualified as multiple users or as users who didn't find what they were looking for. All in all most map-collections may be satisfied with this response, as this may convert many users into regular customers. It also says something about staff, as they seem to be well trained in converting queries from users into questions answerable by their institution.

[15-16] Most users seem to be satisfied with the accommodations offered. Lisette Danckaert of the Belgian Royal Library suspects that no trained practical cartographers used the library as there is no special equipment such as light tables. But, she says, the space provided for the readers is generous, which probably is the key to the massive 'yes'. It indeed may be that spaciousness of accommodations makes people feel comfortable by themselves, and not only because they need the space to consult large documents. Margareta Lindgren reports that Swedish users are content with the accommodations. However she personally thinks that they ought to complain more, as she has herself been in contact with so much out-of-date equipment both in her own department and elsewhere. She wonders if it could be that the enthusiasm shown over the kindness and helpfulness of the staff is so overwhelming that the visitors forget the negative impressions made by other things?

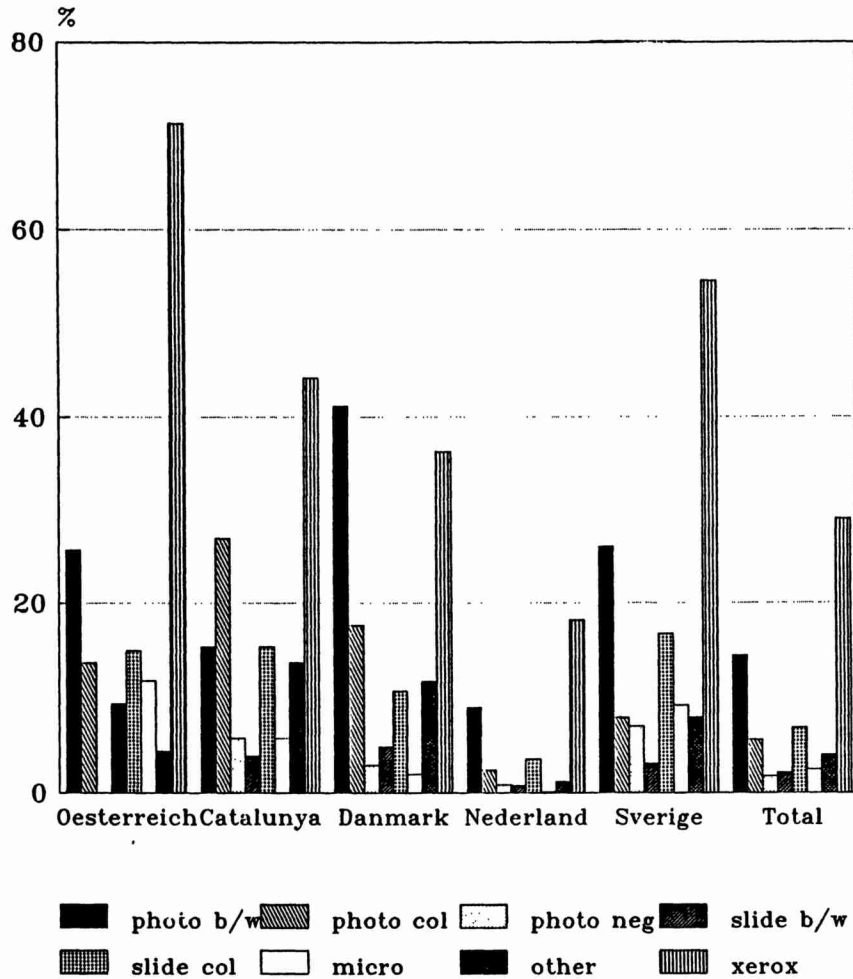
In Spain and Denmark users were not always satisfied with opening-hours. In Catalunya hours of opening of over 5 hours a day were considered normally advisable, but anything under this number of hours was found to be insufficient. As far as I can make out from the Madrid report, services are available on Saturdays but not in the afternoons, while users would like to have it the other way round.

Reproduction

[17-19] Cartographic materials are not as readily available as other documentary materials, though specialized map-shops etc. alleviate the situation a little. We know how difficult it can be to obtain topographic and other maps, because of the unwillingness of government services to make them available. To a lesser extent this is also true of local maps.

Fig. 5 shows this need for reproduction. In all countries, except The Netherlands, the demand is very high. The figure shows the amount of orders from users and not the amount of copies required. One should also bear in mind that a lot of reproductions are sent by mail order and that some researchers ask for reproductions only after they have finished their researches. The comments received from users on aspects of xerox copying depends on whether the user is allowed to copy him/herself or whether staff have to serve them. Because of the nature of the documents involved the latter is most often the case. This probably makes the copies costlier than elsewhere. One should also keep in mind that users probably don't xerox maps at commercial reproduction bureaux, but compare prices of A4- or A3-copies. Sometimes students, because of their low income, ask for reduced rates, but as governments take a more businesslike stance on the question of reproduction facilities, these requests probably cannot be met. When staff have to make xeroxes this takes more time, especially if there is no machine in the map room itself.

Fig. 5. Reproduction needed



Comments were made about poor quality. For some years there has been the possibility of colour xerox copies, but as the machines are expensive and reasonable costs depend on economies of scale (e.g. some 20 or more copies) these will only be used by map producers etc. Some users wanted them to be

acquired by the map collections, but probably have no idea of the financial resources of a (sub-)department!

Some documents, because of their age or fragile state, may not be xeroxed. If a user still wants a copy they have to ask for a higher quality reproduction, which is of course costlier. Some users require more collections of negative microfilms etc., which make reproduction easier. (Of course these could as easily be used to browse physically through collections.)

Remarks

[20] Some users demanded specific additions (e.g. town plans, charts, aerial photographs etc.) to the collections they visited, or a systematic microfilming of certain old collections or parts thereof, especially if these are cross-border collections (e.g. town plans by Jacob van Deventer of the 16th Century). Some wanted to borrow maps or atlases which, to quote Jim Elliot of the British Library, "... [is] not an easy condition to fulfil for any institution specialising in large, flimsy, delicate and often rare and irreplaceable objects". However what was requested most were 'guides to map collections' and 'union map catalogues'. Both these finding aids, when not available, are hard to fulfil, though one harder than the other. Guides to map collections have been published more or less recently in France, The Netherlands and the United Kingdom. Furthermore they are in the process of being published in Denmark, Sweden and Austria and hopefully some other countries. The creation of 'union map catalogues' takes quite some doing, as it involves a lot of investments in hardware, software and staff. The problems concerning these catalogues will be discussed at the next conference in Paris in 1990.

Discussions

As the results of the inquiry were to be discussed during the conference in Sweden the Board of the Groupe des Cartothécaires decided to have workshops relating to the subject matter. For this purpose a paper was issued with questions around which these workshops could be built (see Appendix 3).

Of course the discussions overlapped the separate workshops. Also some of the comments can be found in the paragraphs above. However it may enlarge the insight into the problems if a synopsis of those discussions is given here.

The User

The user need more support than is usual in conventional libraries. Cartographic researchers are in pursuit of an idea or concept in which the answer is not known, while in conventional research the idea is given a more

concrete definition through references to specific sources. This means that staff are burdened heavily with requests. This may lead to financial charges if too much of pre-research has to be done by staff. Before this happens some institutions put limits on staff time. Furthermore telephone and written inquiries take up quite some time, especially as communication with the inquirer is hardly possible.

In those countries where 'guides/directories to map collections' have been published, direct and indirect use has increased considerably. This increase definitely is not only a result of more social and scientific demand, but also results from the fact that the map market has become more transparent by these guides. They are especially important in countries where distance is an important factor. One also feels clearly that automation, of catalogues and in networks, will increase requests from users considerably.

Research

Unfortunately there was no written report supplied during the conference so there can be no synopsis of the discussions of this topic. From other discussions one could glean the following: Is there a necessity, given the scarcity of time and labour, to make a difference between professionals and amateurs? This controversial question was answered neither in the negative nor the affirmative and may depend heavily on the nature of individual map collections.

Catalogue - Reference Library - Curator

In small map collection a traditional catalogue will be sufficient. However when a certain critical mass of documents is reached then only online catalogues can assuage the needs, because more entries can be made and these in turn give the possibility of using boolean operators for cross-reference. For researchers national networks are needed, though this wasn't a clear result of the inquiry as most users could find the documents they were looking for, apparently!.

Map in books/periodicals are generally not catalogued, due to lack of resources. However, especially in the thematic maps, their value cannot be denied and they are under-used because of this obscurity. Even with an automated catalogue the mapcurator's help is indispensable. He/she has to give advise about the kind of documents the user needs in relation to his research (e.g. a map, a gazetteer, a map in an atlas or travel-guide or research-report). However they are severely restricted by lack of resources.

Earlier, it was stated that map curators do a lot of research for their clients. Such tasks are often not listed in the official job description. Apart from the need for 'standards for map libraries' there is a need for 'standards for map curators'. The reference library should not only include 'guides/directories to map

collections', but also guides to archives and guides for local geography and history.

Map-Use and Acquisition

There is some consensus that the user must have an indirect influence on collection policies, i.e. acquisitions. Therefore it is necessary to have good records (besides the memory of the mapcurator!) of map use. However, one must keep in mind that leading topics or periods of interest are also dependent on fashion or historical development. Furthermore, informal networks for coordination of acquisition and exchange of surplus material should be formed regionally or nationally. The latter could be done by a simple newsletter which circulates between participating institutions (in future one even could use an 'electronic news-bulletin' for this purpose).

The problems become larger the more general profile an institution has, e.g. national libraries are more dependent on historical trends for their acquisition policy than university collections who rely on the developments in their sciences.

Map-Use and Reproduction Facilities

The Groupe des Cartothécaires should recommend to LIBER that the LIBER member libraries should promote more actively their conservation and reproduction pricing policies to their users. This should help the user to understand why there are differences between institutions and should make them better satisfied with the photocopying and photographic services. Where preservation considerations prevent institutions making copies available, these should be explained.

Professional users (e.g. publishers, advertising agencies, newspapers etc.) are less easily satisfied by reproductions than nonprofessional users of map collections. We have to ask ourselves why the user wants so many reproductions: is it because the user has a natural expectation of obtaining reproductions of articles etc. or is it because most cartographic materials are not for loan?

Conclusions

In her report Montserrat Galera of Catalunya notes that the number of people attending map collections is small. At the same time the opinion of the users acquainted with such services is highly positive. She says it is clear that the map curators are responsible for the promotion of their collection. This can be done by word of mouth advertisement when services provided are well but also in other ways. One, which happens in several collections, is to get in touch with teachers/professors in map-related fields of teaching, who'll send their students

on a reconnaissance visits to a map collection to get to know the possibilities of such a collection for future studies. There should be more training in map curatorship for practising map curators, i.e. more general and specific courses in fields related to map curatorship or in new and innovating techniques.

To make map collections more accessible, guides and directories of map collections' are needed in those countries where they haven't been published yet. These should be comprehensive enough to give users a good insight into the possible information a collection can yield and which services can be rendered. To make more widely available knowledge of the documents in the collections, map librarians should automate their cataloguing procedures, at the same time using innovating techniques to drain more information from the documents than is possible in traditional cataloguing. Automated catalogues should be linked to networks or union catalogues, as information needed by researchers are not deposited in a certain collection unless these collections have been founded with the specific aim of serving a certain science, area, subject or era.

Last, but not least, managers should evaluate staffing levels in order to optimise use of automated catalogues etc. It may be necessary to employ more staff to overcome the bottleneck of backlog cataloguing or recataloguing without disrupting present service levels; also as one feels that catalogue automation may lead to and stimulate more requests for information.

Acknowledgments

I would like to thank those organizers and reporters of the countries in which the inquiry has taken place, to be more specific Franz Wawrik, Lissette Dankaert, Inger-Grete Uldal, Pierre-Yves Duchemin, Dirk de Vries, Teresa Reyna, Montserrat Galera, Margareta Lindgren and James D. Elliot, who have helped to make this report possible.

APPENDIX 1

Questionnaire

INQUIRY INTO MAP-USE AND USER-HABITS IN EUROPE

The Mapcuratorgroup of LIBER tries to improve the exchange of information between map-collections in Western Europe, thereby also hoping to improve their functioning. To achieve these goals the group organizes two-yearly conferences and in between these conferences gathers information and data, which then can be discussed and be resolved upon. We hope you will assist us in this by filling in this questionnaire.

1. Number: ..-...-.....-
 2. Nationality: _____ Domicile: _____ Country: _____
 Profession: _____ Age: 16-20 21-30 31-50 over 51 *
 3. Have you used the services of this map-collection before? yes no*
 If yes, how many times (appr.)?
 4. Are you: a. Scientific researcher
 b. Student (specify level)
 - c. Documentalist
 d. Educational researcher
 e. Map-amateur
 f. Collaborator of exhibitions
 g. Other (specify)
-
5. Does your research concerns a single document
 a group of documents
 6. Can you describe the subject of your research:

 7. Please give chronological limits of the document(s) to be examined:

 8. Which area(s) do these documents concern: a.(town/city)
 b.(province etc.)
 c.(country)
 d.(other)
 9. Documents to be examined: a. atlas
 b. topographical map
 c. chart
 d. town-plan
 e. topographical view
 f. globe
 g. thematic map (specify)
 h. other (specify)

10. Means of access used: a. author's catalogue
 b. geographic catalogue
 c. thematic catalogue
 d. bibliographies (specify)
11. Did you need assistance of the staff in searching? yes no*
12. Did you use the reference-works present in the map-room? yes no*
13. Were the supplied reference-works adequate to your needs? yes no*
 If not, specify:
14. Do you find the objects of your search always mosttimes hardly*
15. Are you satisfied with the accommodations of the map-room? yes no*
16. Are you satisfied with the hours of opening? yes no*
-
17. Did you use the photo-copy facilities? yes no*
18. Do you have remarks about: a. costs
 b. ease of use
 c. speed
 d. quality
 e. other (specify)
19. Do you need: a. photo - black and white
 b. photo - colour
 c. photo - negative
 d. dispositive - black and white
 e. dispositive - colour
 f. microfiche/film
 g. other (specify)
20. What kind of facilities do you need which are not provided with our services?
 If you have any other remarks please state here!
21. Do you visit other map-collections regularly? yes no*
 If yes, which?

* Mark which is appropriate

Please do not write here

1										6										11						16							
2										7										12						17							
3										8										13						18							
4										9										14						19							
5										10										15						21							

APPENDIX 2

Results of the Inquiry in Figures

NUMBER	COUNTRY QUESTION	AUSTRIA	CATALUNYA	DANMARK	NEDERLAND	SVERIGE	TOTAL
1	Total questionnaires	160	52	102	1312	227	1853
		8,6%	2,8%	5,5%	70,8%	12,3%	100,0%
2a	native	147	52	94	1267	222	1782
		91,9%	100,0%	92,2%	96,6%	97,8%	96,2%
2b	foreign	13		6	32	5	56
		8,1%		5,9%	2,4%	2,2%	3,0%
2c	no answer			2	13		15
				2,0%	1,0%		0,8%
2d	16-20 years	6	3	2	121	6	138
		3,8%	5,8%	2,0%	9,2%	2,6%	7,4%
2e	20-30 years	86	18	20	707	55	886
		53,8%	34,6%	19,6%	53,9%	24,2%	47,8%
2f	30-50 years	42	21	50	345	92	550
		26,3%	40,4%	49,0%	26,3%	40,5%	29,7%
2g	over 50 years	26	10	28	139	71	274
		16,3%	19,2%	27,5%	10,6%	31,3%	14,8%
2h	no answer			2		3	5
				2,0%		1,3%	0,3%
3a	used before	98	40	63	892	154	1247
		61,3%	76,9%	61,8%	68,0%	67,8%	67,3%
3b	not used before/no answer	62	12	39	420	73	606
		38,8%	23,1%	38,2%	32,0%	32,2%	32,7%
4a	scientist	50	32	47	395	97	621
		31,3%	61,5%	46,1%	30,1%	42,7%	33,5%
4b	student	82	12	20	611	55	780
		51,3%	23,1%	19,6%	46,6%	24,2%	42,1%
4c	documentalist	6	3	4	23	7	43
		3,8%	5,8%	3,9%	1,8%	3,1%	2,3%
4e	educational researcher			16	19	12	47
				15,7%	1,4%	5,3%	2,5%
4f	map-amateur	3	3	7	58	23	94
		1,9%	5,8%	6,9%	4,4%	10,1%	5,1%
4g	exhibitions	5		5	34	2	46
		3,1%		4,9%	2,6%	0,9%	2,5%
4k	other	14	2	18	148	31	213
		8,8%	3,8%	17,6%	11,3%	13,7%	11,5%
4l	No answer	9		3	24		36
		5,6%		2,9%	1,8%		1,9%
5a	single document	116	4	11	431	52	614
		72,5%	7,7%	10,8%	32,9%	22,9%	33,1%
5b	group of documents	29	47	88	830	158	1152
		18,1%	90,4%	86,3%	63,3%	69,6%	62,2%
5c	no answer	15	1	3	51	17	87
		9,4%	1,9%	2,9%	3,9%	7,5%	4,7%
6.1	agriculture	5	1	4	9	12	31
		2,8%	1,9%	4,0%	0,7%	5,2%	1,7%
6.2	anthropology/etnography		1		4	3	8
			1,9%		0,3%	1,3%	0,4%
6.3	archeology	1		1	9	20	31

6.4	architecture	0,6%		1,0%	0,7%	8,6%	1,7%
		1			8	4	13
		0,6%			0,6%	1,7%	0,7%
6.5	art-history				26		26
					2,0%		1,4%
6.6	astronomy			1			1
				1,0%			0,1%
6.7	bathymetry/oceanography				4		4
					0,3%		0,2%
6.8	biogeography				12	6	18
					0,9%	2,6%	1,0%
6.9	cartography	2	4	1	72	1	80
		1,1%	7,5%	1,0%	5,5%	0,4%	4,3%
6.10	cartography, history of	18	8	1	62	9	98
		10,1%	15,1%	1,0%	4,7%	3,9%	5,2%
6.11	climatology/meteorology	3		1	13	1	18
		1,7%		1,0%	1,0%	0,4%	1,0%
6.12	demography	1		1	4	2	8
		0,6%		1,0%	0,3%	0,9%	0,4%
6.13	ecology	1			7	9	17
		0,6%			0,5%	3,9%	0,9%
6.14	economy			3	11		14
				3,0%	0,8%		0,7%
6.15	education		1	3	181	4	189
			1,9%	3,0%	13,8%	1,7%	10,1%
6.16	genealogy				14	13	27
					1,1%	5,6%	1,4%
6.17	geodesy/triangulation				2	1	3
					0,2%	0,4%	0,2%
6.18	geography		1	6	70	25	102
			1,9%	6,0%	5,3%	10,8%	5,4%
6.19	geography, history of	8	1	4	62	1	76
		4,5%	1,9%	4,0%	4,7%	0,4%	4,1%
6.20	geology	33	5	4	17	14	73
		18,4%	9,4%	4,0%	1,3%	6,0%	3,9%
6.21	geomorphology	2	3	1	22	19	47
		1,1%	5,7%	1,0%	1,7%	8,2%	2,5%
6.22	glaciology	1		1		2	4
		0,6%		1,0%		0,9%	0,2%
6.23	history			10	67	38	115
				10,0%	5,1%	16,4%	6,1%
6.24	hydrography	2		2	24	4	32
		1,1%		2,0%	1,8%	1,7%	1,7%
6.25	land use/soil maps		1	13	21	7	42
			1,9%	13,0%	1,6%	3,0%	2,2%
6.26	language/toponymy	2			11	6	19
		1,1%			0,8%	2,6%	1,0%
6.27	law				4		4
					0,3%		0,2%
6.28	military geography	1		3	2	1	7
		0,6%		3,0%	0,2%	0,4%	0,4%
6.29	mining					4	4
						1,7%	0,2%
6.30	politics		2		3		5
			3,8%		0,2%		0,3%
6.31	recreation/tourism		5	1	9	4	19
			9,4%	1,0%	0,7%	1,7%	1,0%
6.32	religion				2		2
					0,2%		0,1%

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6.33	remote sensing				7	1	8
					0,5%	0,4%	0,4%
6.34	topography	26	4	22	231	4	287
		14,5%	7,5%	22,0%	17,6%	1,7%	15,3%
6.35	town/country-planning	46	7	15	108	13	189
		25,7%	13,2%	15,0%	8,2%	5,6%	10,1%
6.36	traffic	1	3	1	32	4	41
		0,6%	5,7%	1,0%	2,4%	1,7%	2,2%
6.37	other				20		20
					1,5%		1,1%
6.38	no answer	25	6	1	162		194
		14,0%	11,3%	1,0%	12,3%		10,3%
6.39	total	179	53	100	1312	232	1876
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
7a	<1500	3		17	50	15	85
		1,9%		7,0%	2,2%	5,2%	2,8%
7b	1500-1700	6	3	62	232	10	313
		3,8%	6,4%	25,4%	10,2%	3,5%	10,4%
7c	1700-1800	13	3	54	203	33	306
		8,1%	6,4%	22,1%	8,9%	11,5%	10,2%
7d	1800-1900	40	4	54	425	49	572
		25,0%	8,5%	22,1%	18,7%	17,0%	19,0%
7e	>1900	41	18	36	1360	64	1519
		25,6%	38,3%	1,6%	59,9%	22,2%	50,5%
7f	longer periods		19			26	45
			40,4%			9,0%	1,5%
7g	no answer	57		21		91	169
		35,6%		8,6%		31,6%	5,6%
7g	total	160	47	244	2270	288	3009
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
8a	town/city	62	19	36	464	50	631
		29,1%	25,3%	16,5%	32,7%	15,6%	28,1%
8b	province etc.	25	25	52	443	127	672
		11,7%	33,3%	23,9%	31,2%	39,6%	29,9%
8c	country	82	24	32	330	71	539
		38,5%	32,0%	14,7%	23,2%	22,1%	24,0%
8d	other	44	7	21	184	56	312
		20,7%	9,3%	9,6%	12,9%	17,4%	13,9%
8e	no answer			2		17	19
				0,9%		5,3%	0,8%
8f	total	213	75	218	1421	321	2248
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
9a	atlas	133,1%	144,2%	213,7%	108,3%	141,4%	121,3%
		29	25	24	532	26	636
		12,6%	21,2%	12,4%	24,6%	7,0%	20,7%
9b	topographic map	49	38	57	769	131	1044
		21,3%	32,2%	29,5%	35,5%	35,3%	33,9%
9c	chart	3	7	15	114	13	152
		1,3%	5,9%	7,8%	5,3%	3,5%	4,9%
9d	town plan	40	12	24	256	30	362
		17,4%	10,2%	12,4%	11,8%	8,1%	11,8%
9e	topographic view		9	11	68	19	107
			7,6%	5,7%	3,1%	5,1%	3,5%
9f	globe		2	2	24		28
			1,0%	1,0%	1,1%		0,9%
9g	thematic map	63	21	35	338	43	500
		27,4%	17,8%	18,1%	15,6%	11,6%	16,2%
9h	other	46	4	22	66	94	232

9i	no answer	20,0%	3,4%	11,4%	3,0%	25,3%	7,5%
				3		15	18
				1,6%		4,0%	0,6%
9j	total	230	118	193	2167	371	3079
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		143,8%	226,9%	189,2%	165,2%	163,4%	166,2%
10a	author's catalogue	75	18	13	70	9	185
		29,9%	22,0%	10,6%	5,3%	3,4%	9,1%
10b	geographic catalogue	38	38	36	346	98	556
		15,1%	46,3%	29,3%	26,4%	37,1%	27,4%
10c	thematic catalogue	73	3	19	133	16	244
		29,1%	3,7%	15,4%	10,1%	6,1%	12,0%
10d	bibliographies etc.	37	13	6	41	10	107
		14,7%	15,9%	4,9%	3,1%	3,8%	5,3%
10e	other	28	10	31	268	79	416
		11,2%	4,0%	25,2%	20,4%	29,9%	20,5%
10f	no answer			18	454	52	524
				14,6%	34,6%	19,7%	25,8%
10g	total	251	82	123	1312	264	2032
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		156,9%	157,7%	120,6%	100,0%	116,3%	109,7%
11a	staff help	98	39	82	1103	149	1471
		61,3%	75,0%	82,0%	84,1%	65,6%	79,5%
11b	no help	58	12	14	209	74	367
		36,3%	23,1%	14,0%	15,9%	32,6%	19,8%
11c	no answer	4	1	4		4	13
		2,5%	1,9%	4,0%		1,8%	0,7%
11d	total	160	52	100	1312	227	1851
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
12a	reference	99	34	50	260	62	505
		61,9%	65,4%	49,0%	19,8%	27,3%	27,3%
12b	no reference	50	14	28	1052	147	1291
		31,3%	26,9%	27,5%	80,2%	64,8%	69,7%
12c	no answer	11	4	24		18	57
		6,9%	7,7%	23,5%		7,9%	3,1%
12d	total	160	52	102	1312	227	1853
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
13a	adequate reference	106	28	39		90	263
		66,3%	52,8%	37,9%		39,6%	48,4%
13b	not-adequate reference	22	15	16	64	25	78
		13,8%	28,3%	15,5%		11,0%	14,4%
13c	no answer	32	10	48		112	202
		20,0%	18,9%	46,6%		49,3%	37,2%
13d	total	160	53	103		227	543
		100,0%	100,0%	100,0%		100,0%	100,0%
14a	always	23	4	33	507	31	598
		14,2%	7,7%	32,4%	38,6%	13,7%	32,2%
14b	mosttimes	118	38	50	505	166	877
		72,8%	73,1%	49,0%	38,5%	73,1%	47,3%
14c	hardly	21	6	2	9	3	41
		13,0%	11,5%	2,0%	0,7%	1,3%	2,2%
14d	no answer		4	17	291	27	339
			7,7%	16,7%	22,2%	11,9%	18,3%
14e	total	162	52	102	1312	227	1855
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
15a	satisfied	121	32	71	918	185	1327
		75,6%	61,5%	69,6%	70,0%	81,5%	71,6%
15b	dissatisfied	23	17	14	24	18	96
		14,4%	32,7%	13,7%	1,8%	7,9%	5,2%

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15c	no answer	16	3	17	370	24	430
		10,0%	5,8%	16,7%	28,2%	10,6%	23,2%
15d	total	160	52	102	1312	227	1853
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
16a	satisfied opening	115	27	65	867	193	1267
		71,9%	51,9%	64,4%	66,1%	85,0%	68,4%
16b	dissatisfied opening	12	22	26	36	16	112
		7,5%	42,3%	25,7%	2,7%	7,0%	6,0%
16c	no answer	23	3	10	409	18	463
		14,4%	5,8%	9,9%	31,2%	7,9%	25,0%
16d	total	160	52	101	1312	227	1852
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
17a	photo-copy used	114	23	37	239	124	537
		71,3%	44,2%	36,3%	18,2%	54,6%	29,0%
17b	photo-copy not used	33	29	55		91	208
		20,6%	55,8%	53,9%		40,1%	11,2%
17c	no answer	13		10	1073	12	1108
		8,1%		9,8%	81,8%	5,3%	59,8%
17d	total	160	52	102	1312	227	1853
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
18a	costs	3	1	9	25	20	58
		2,6%	4,3%	24,3%	10,5%	16,1%	10,8%
18b	easy use	5	3	4	41	16	69
		4,4%	13,0%	10,8%	17,2%	12,9%	12,8%
18c	speed		4	8	25	15	52
			17,4%	21,6%	10,5%	6,3%	9,7%
18d	quality	3	4	4	35	20	66
		2,6%	17,4%	10,8%	14,6%	16,1%	12,3%
18e	other	6	4	5	26	19	60
		5,3%	17,4%	13,5%	10,9%	15,3%	11,2%
18f	no answer	97	7	7	87	34	232
		85,1%	30,4%	18,9%	36,4%	27,4%	43,2%
18g	total	114	23	37	239	124	537
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
19a	photo b/w	41	8	42	118	59	268
		32,0%	13,3%	45,2%	50,4%	33,3%	38,7%
		25,6%	15,4%	41,2%	9,0%	26,0%	14,5%
19b	photo colour	22	14	18	32	18	104
		17,2%	23,3%	19,4%	13,7%	10,2%	15,0%
		13,8%	26,9%	17,6%	2,4%	7,9%	5,6%
19c	photo negative		3	3	11	16	33
			5,0%	3,2%	4,7%	9,0%	4,8%
			5,8%	2,9%	0,8%	7,0%	1,8%
19d	slides b/w	15	2	5	10	7	39
		11,7%	3,3%	5,4%	4,3%	4,0%	5,6%
		9,4%	3,8%	4,9%	0,8%	3,1%	2,1%
19e	slides colour	24	8	11	47	38	128
		18,8%	13,3%	11,8%	20,1%	16,2%	18,5%
		15,0%	15,4%	10,8%	3,6%	16,7%	6,9%
19f	microfiche/film	19	3	2	1	21	46
		14,8%	5,0%	2,2%	0,4%	11,9%	6,6%
		11,9%	5,8%	2,0%	0,1%	9,3%	2,5%
19g	other	7	22	12	15	18	74
		5,5%	36,7%	12,9%	6,4%	10,2%	10,7%
		4,4%	13,8%	11,8%	1,1%	7,9%	4,0%
19h	total	128	60	93	234	177	692
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		80,0%	115,4%	91,2%	17,8%	78,0%	37,3%
21a	other collections	32	30	37	305	95	499

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Jan Smits

		20,0%	57,7%	36,3%	23,2%	41,9%	26,9%
21b	no other collections	116	22	57		104	299
		72,5%	42,3%	55,9%		45,8%	16,1%
21c	no answer	12		8	1007	28	1055
		7,5%		7,8%	76,8%	12,3%	56,9%
21d	total	160	52	102	1312	227	1853
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Percentages under question 1 are related to the total amount of questionnaires.
 Percentages under question 2 to 6 inclusive and second percentages in later questions
 relate to absolute numbers per country in question 1.
 Percentages under question 7 to 21 relate to the totals of these questions

Statistics are made with PlanPerfect 3.0

APPENDIX 3

Discussion Themes

In relation to the 6th working session the GdC-Board has seen fit to present you with the following topics and relating remarks and questions as a guidance for discussions:

A. THE USER

- knowlegde of the existence and contents of collections: what part do 'Guides/directories to map-collections' play herein?
- is use related to a certain age-bracket or is there a much bigger variety?
- is it possible to prove a relation between the user and the institution in which a map-collection is incorporated?
- which share of use do foreigners have? are clients mainly concentrated in the direct vicinity of the map-collection or is there a remarkable regional spreading?

B. RESEARCH

- do researches have a specific nature or do they seem more general in historical or geographical tendency?
- are there preferences for maps of certain areas?
- can it be shown that there are predominant periods of interest? Can there be a relation with the profile of map-collections?
- what role do special research-project play in map-use?
- is there a relation between the kind of research and the number of maps requested?
- is there a relation between research and the cartographic material (e.g. atlas, topographical map, chart etc.) requested?

C. CATALOGUE - REFERENCE LIBRARY - CURATOR

- what is the role of the reference-library with regard to the map-use of a collection?
- does the catalogue-apparatus answer the need for information?
- is the mapcurator (in)dispensable? To what extend is the mapcurator an intemediator between the map-user and map-use with regard to the interpretation of user-queries?
- is there an increased demand on a mapcurators knowlegde, the more specific a search for information is?

D. MAP-USE AND ACQUISITION

- what is/should be the influence of map-use on acquisition?
- is there a need to coordinate the acquisition of cartographic materials on a nationwide basis? And if so, who will/must take the initiative?
- in how far is acquisition dependent on a collection-profile versus map-use?

E. MAP-USE AND REPRODUCTION FACILITIES

- can maps be loaned? Is so, all or only specific categories?
- are there restrictions on the xeroxing of maps? May/can clients xerox themselves?
- can only costs of reproduction be recovered or is there room for a certain profit?
- is there a possibility/need for a differentiated tariff-structure for internal and external demand?
- to what extend can collections impose fees/duties?

Swedish University Libraries: a Decade of Development

PETER DUREY
University of Auckland Library

In 1979, at the invitation of the Swedish Ministry of Foreign Affairs, I visited most Swedish university libraries. In 1990, again with the assistance of the Ministry, I was able to visit all Swedish university libraries and to note the many changes which have occurred in the intervening period.

My previous visit took place soon after a far-reaching reform of the Swedish system for higher education. This happened in 1977 when the government resolved to create a single and coherent system of tertiary education. To this end, it was decided to decentralize decision making, broaden admission policies, improve the geographic distribution of programmes, strengthen links with research and create closer ties between education and other areas of society. The uniform organization adopted for the management of higher education institutions in the 1977 reform was modified in a resolution passed by the Swedish Parliament in 1984 aimed partly at adapting planning and management to local needs and at improving the co-ordination of undergraduate studies and research.

The 1977 reform has not really settled matters. There is still a considerable amount of argument over the role of the universities and whether there is a distinction between the universities and the university colleges. (The colleges are smaller institutions with university status covering a limited range of subjects. Most of them have no recurrent funds for post-graduate education and research.) The government has said the the quality of education should be the same in all forms of tertiary institution, but the resources certainly differ. One unexpected effect of the reform has been to create competition among the universities (which did not really exist before in Sweden) as, for example, to attract good students.

There were some major implications for university libraries in the 1977 act. While their major function was to continue to serve research and teaching at their parent university, they also had new roles as the central library of a "region of higher education". Administratively, this caused major problems for some institutions and the regions of higher education have now been abolished as formal administrative concepts. In 1985 a further act outlining a national research policy urged universities to review local provision of literature, work out plans for informatin services and pay special attention to the relationship

between the university library and independent departmental libraries. Lund is probably the most complex. The university absorbed a number of other institutions in the region. As well as the two central libraries, UB1 and UB2, there are a large number of independent libraries and administration of the university system has been decentralized to nine very independent area boards. The problems this creates in running a co-ordinated library service are Byzantine in their complexity. Göteborg is almost as complex having absorbed no less than 10 previously independent colleges in 1977. It now consists of 5 libraries organized in 4 units with staff working at 8 of the more than 100 otherwise independent departmental libraries. Uppsala also has expanded the system of branch libraries manned by University Library staff. They now have about a dozen of these.

In 1979, the majority of Swedish university libraries seemed to consider themselves almost entirely as research institutions and, with some notable exceptions, undergraduates were not well served. However, the '77 reform emphasized undergraduate education and during the eighties there has been considerable development of library services specifically tailored to undergraduate needs.

In 1979, the Swedish government established the Delegation for Scientific and Technical Information provision (DFI) as a permanent consultative body for libraries. Lars Erik Sanner, the director of Stockholm University Library, has chartered its history from 1979 to 1988 (when it was abandoned).¹ Although the disbanding of the DFI was part of a general Swedish governmental move towards decentralization, it was recognised that there was still a need for a co-ordinating body for university libraries. Paul Hallberg, director of Göteborg University Library, has described the complicated sequence of events which eventually resulted in the Royal Library being given this responsibility.² The Royal Library has set up a Secretariat for national planning and co-ordination (BIBSAM). It began operating in July 1988, has a staff of three and so far has carried out special studies on the charging of fees for library services, the establishment of central libraries for different subject areas and the future development of the national bibliographic network LIBRIS. BIBSAM is responsible for the distribution of an annual government grant of approximately SEK (Swedish Crowns) 6 mill. in the form of grants to national resource libraries, projects of interest to research libraries, and travel allowances. It also arranges seminars, extension courses, etc. One university librarian commented to me that BIBSAM

¹ Lars-Erik Sanner, "The rise and decline of a Swedish R & D body," *Outlook on Research Libraries*, 9 (1987), no. 11, 4-6.

² Paul Hallberg, "Co-ordination, reorganization, automation: Swedish academic libraries facing the 1990s," *Outlook on Research Libraries*, 11 (1989), no. 1, 3-6 [part 1], no. 2, 8-10 [part 2].

had begun rather cautiously, but was now becoming more definite in its recommendations - a development much welcomed.

BIBSAM's responsibilities appear to overlap to some extent with those of the UHÄ (the National Board of Universities and Colleges) which, among its many responsibilities, has been charged with supporting the development of academic libraries in Sweden. It is, for example, the UHÄ which has provided over SEK 50 mill. as a major contribution to the cost of developing automated systems in academic libraries. However, the UHÄ itself is now being restructured and considerably reduced. It is not known at this time what will become of its current support of academic libraries.

Management

The 1977 Act permitted each university to choose either a system which placed managerial responsibility on a chief librarian or one in which the responsibility is vested in a "nämnd" - a committee drawn from the teaching staff, the university administration, the students, the unions and the library staff, with the chief librarian as chairman. In 1979 not all universities have revised their systems, there were strong feelings among some library staff about the need for participatory management and some concern about the relationship between "biblioteksnämnd" and the unions. In practice, the general practice of Swedish university libraries now appears to be along very similar lines to that employed in their counterparts in Britain or Australasia, except that there is more consultation with the unions. The role and composition of the "biblioteksnämnd" varies among institutions, but generally the "nämnd" is concerned with policy matters, while implementation is dealt with by regular meetings of library staff and separate meetings with union representatives. The senior library staff mainly belong to SACO (the Confederation of Professional Associations), the assistants to TCO (the central Organization of Salaried Employees) and blue collar workers such as bookbinders and porters to LO (Swedish Trade Union Confederation). A chief librarian commented to me that he found meetings with union representatives particularly stimulating since the more junior members of the library staff involved in these discussions often had an entirely fresh viewpoint on the problems under discussion.

Among the current international buzzwords for librarians we have "strategic planning", but no Swedish university library has developed the concept very fully. In 1990 the Swedish University of Agricultural Sciences Library produced a document on goals and organisation. The university operates on a number of sites throughout Sweden so it was necessary to bring staff together for 2 days to discuss objectives and the methods of achieving these and then to set up a working party to produce the document. However, there does not appear to be a

mechanism to translate this into an annual plan although it is hoped to bring the staff together every second year to revise the document.

Göteborg University Library took a rather different approach. Moving into a major extension and planning for automation made a review of the library appropriate. Ann Beate Bakke of Habberstad Management Consultants was commissioned and the results were considered so successful that she has now been engaged by Lund University and by the Royal Institute of Technology Library. This is that of planning secretary - a senior librarian without a department. He functions as secretary of the library committee and of the management group of senior staff. His responsibilities include monitoring developments in the library world at large and suggesting new projects for the library. The Swedish University of Agricultural Sciences Library also has a planning librarian, although his duties seem to be mainly project based - as for example, the production of an acquisitions policy.

Finance

From 1978 funding for university libraries ceased to be given as earmarked grants directly from government and through the UHÄ and moved to the system prevalent in British and Australasian state supported universities where library funding has to be negotiated locally from university income. A complicating factor in Sweden is that funds are allocated to the universities in the form of separate appropriations specific to either undergraduate or postgraduate education in a number of faculty areas. In some universities the decisions on library funding have continued to be made centrally, in others they have been devolved to faculty level, and there are variant opinions on the merits of this. One of the reasons for making this change was that it was supposed to bring the library and its clients closer together. Not unexpectedly this has worked well in some instances but not in others, when, as one librarian commented to me, people have selfish and short term views. With devolution of funding there have been some problems in financing central services and also problems caused by faculties wanting to make sharp reductions in finance in times of economic hardship. One result is that the budget process is very much more complex and timetaking. It seems clear that academic library finance cannot be completely devolved and a substantial proportion of library finance must come from a central source because of the difficulties in apportioning costs, and particularly in view of the local and national role which all Swedish university libraries are required to play.

All Swedish university libraries receive funds from research income generated by the university. In one institution I was told that although the library received SEK 3 mill. from this source, it was in fact set against normal income so that the library is not really a gainer. However, more common was the case of the library

which currently receives 2 % of university research income as a substantial addition to its funding and which expects this to be increased in 1991.

Staffing

There have been major changes in the organization of staff. The main thrust has been to move away from functional organisation to subject teams. Stockholm began to make this change in 1985 and now has two thirds of its staff in a team situation, i. e. 4 teams for 4 faculties. No new staff were recruited but development was encouraged by an extensive internal training programme. Umea in 1983-84, was the first Swedish university to attempt subject specialisation among staff and has recently re-organised its staff again, with three senior staff having dual responsibilities: Humanities and Acquisitions; Science and Cataloguing; Social Sciences and Deposit Collection. The senior staff involved commented that they had too much work to deal with all aspects adequately but they thought the new system a great improvement on the previous one. Göteborg completed a major extension to its building in 1985 and at the same time re-organised the staff. Here, too, there was a move away from functional organisation to user oriented groups. In addition to the Lending Department there are departments of Humanities and Social Sciences, and within these groups staff are involved in acquisitions, liaison with faculty, cataloguing, processing and reference services. One major feature of re-organisation was to develop a system of contact librarians to work closely with library liaison officers in departments.

The main reasons for these changes is to improve services to readers, and this change in emphasis has not only involved changes in administrative structure but also an enhancement of the services offered. Emphasizing service rather than stock requires more staff, and the libraries are still not staffed at a level which would allow them to carry out this role comprehensively. Chief librarians now have more flexibility in utilising the funds at their disposal. In particular, it is possible to move funds from library materials into staffing, although it is easier to create temporary project oriented posts than those of a permanent nature. A recent complication has been a decision by government not to give full compensation to the universities for salary increases. This has resulted in libraries encouraging early retirement, not filling vacancies, and reducing services.

In Swedish academic libraries the distinction between library assistants and fully qualified librarians has become more and more blurred. Possibly there are two major factors. Automation is gradually reducing the number of routine tasks and unemployment of qualified librarians has meant that many have been employed as library assistants with the agreement of local unions. In Sweden a candidate for a post cannot be disqualified for over-qualification. As far as salary

scales are concerned these are less likely to lead to friction than in some other countries because in Sweden the scales for librarians and assistants overlap and workers at lower levels are compensated at comparatively high levels.

Professional education

Professional education for academic librarians is still not satisfactory. The only course is run at the Swedish School of Library and Information Science at Boras, an institution which does not have full university status and which has had a public library bias to many of its study programmes. The School has reorganised its courses to make them more attractive to academic librarians. It also introduced a two-term course for candidates with doctorates but the results were disappointing in that those who undertook the course could not find jobs and the course has now been suspended.

In the Swedish system of higher education most subjects can be studied at undergraduate and postgraduate level. Library Science has been an exception. A UHÄ investigation by Professor Emin Tengström recommended that a Centre for Library Research be set up at the University of Göteborg, the closest university city to the School of Library and Information Science at Boras. Although the UHÄ received the report favourably, financial support was not forthcoming. Nevertheless, the University of Göteborg, Chalmers University of Technology and the School of Library and Information Science in Boras decided to establish a preliminary centre but could only provide a very slim budget, so it began in a very tentative fashion. FRN (Council for Research Planning and Coordination), in 1989, produced a further report and, as a result of this, Parliament decided to create a professorship in library and information science at Göteborg from 1 July 1991. While this could have some useful results for academic librarians, it is a great pity that education in library science in Sweden should be split in this way between two institutions. The siting of the Swedish School of Library and Information Science in a country town with one public library seems no less extraordinary now than it did in 1979. If the School had been concerned with distance learning, then perhaps its location would not have mattered. Since it is an institution offering conventional full-time courses, its location is important. To site the School in an area where there are no major libraries close at hand and in an institution with no mandate for research, is a major defect. The decentralised courses offered at Umea in collaboration with Boras, are only aimed at public librarians. It is most unlikely that Sweden will get a really satisfactory, comprehensive programme of professional education for academic librarians until a course is offered at both basic professional and doctoral level at one institution of university status in a major city. Early in 1991 a UHÄ committee produced a report on the Boras School which has caused considerable controversy. It condemned the location of the School and suggested

that library education should be decentralised to perhaps 3 universities. While this might be convenient for students it seems unlikely that Sweden could provide adequate resources for teaching academic librarianship in more than one centre.

Staff development

Staff development and appraisal are topics of international concern, and they are also matters under consideration in Sweden. Linköping, for example, has a committee for staff development appointed by the "biblioteks nämnd." The committee has arranged seminars and study tours and there is an introductory programme for all new staff. The university administration arranges seminars for senior staff only. However, while most institutions offer similar facilities, these are generally uncoordinated, and Swedish university libraries need to put more thought and resources into their programmes of staff development. Concern was expressed to me about one particular aspect of staff development: before its demise the DFI had a scheme for sending library staff abroad on short study tours, and it is not yet clear whether BIBSAM will carry out a corresponding role. There needs to be either a local or national source of funding to enable senior staff to study abroad if Sweden is to remain abreast of current developments.

A serious lack is the absence of any structured management courses tailored to the needs of academic librarians. Sweden is not alone in this deficiency, but it is definitely at a disadvantage in that it has no local equivalent of the courses organised by the Office of Management Studies (O.M.S.) of the (American) Association of Research Libraries. These have been replicated and developed in Australasia by the Australian Information Management Association and have been of very considerable benefit to us in this part of the world. This is something which BIBSAM might investigate. With the majority of Swedish academic librarians being fluent in English, it might even be possible simply to import a course or courses from O.M.S. direct.

North America has long been accustomed to systems of staff appraisal, but these have been slow to become established elsewhere. However, many governments are now requiring state supported institutions to be more accountable and this has led to more interest in this area. In Sweden there is no national system of appraisal and, as a result, some university libraries have none while others have fairly simple systems - most having been introduced relatively recently. The Library of the Royal Institute of Technology introduced personal development talks or "utvecklingssamtal" in 1990, largely as a result of the current Director's familiarity with systems of this kind in industry. The talks were preceded by a two-hour seminar on the methods and intentions behind their introduction. Stockholm University Library has annual development discussions which are called "planeringssamtal". These are held for all staff and are

conducted by their immediate heads. Stockholm University Library has used a form to structure these discussions although its use has now been abandoned. As part of the major re-organisation of the staff at Göteborg University Library, it was decided that there should be regular planning conversations with all staff. Particular care was taken to define who should take part in these discussions. An attempt was made to distinguish between responsibility for staff in a management sense and responsibility for staff as a "mentor". In most cases these coincide but not inevitably so. Göteborg sends a form to staff members in advance of the discussion to give an idea of likely topics. The form does not have to be adhered to. The introduction of any appraisal system is likely to be greeted with a certain amount of suspicion by the staff as a whole. When, three years ago, I decided that it would be useful to explore the possibility of introducing our own system at Auckland before we had one imposed upon us, I did not feel that I personally should be the prime mover; I did not have enough knowledge of the alternatives available to us, and the motives of a library director in canvassing the introduction of a system of appraisal may be suspect. Fortunately, we were able to call on the services of a very experienced consultant, Mrs. Margaret Trask, Executive Director of the Australian Information Management Association. She conducted a very successful two-day workshop on performance appraisal, and on the basis that we saw that it would be possible to introduce a system (which we called development review) which would be non-threatening and which would be an important factor in staff development. Three years later this has certainly proved to be the case. The discussions between staff members and their supervisors have brought up a number of issues which would not otherwise have surfaced, and a great deal of both individual and general developmental activities have taken place. Sweden faces many of the same problems as we do in New Zealand. One of these is the need to develop the skills and continue to motivate a staff which, at senior level, is relatively static. From our experience, the appraisal system has proved to be an essential part of this process. Swedish academic libraries need to give more thought to appraisal of staff as a means of development. The involvement of an experienced specialist would greatly facilitate building a non-threatening, useful system.

Accommodation

In 1979 I expressed my disappointment at the low standard of accommodation in Swedish university libraries. Since my last visit there has been considerable improvement. Stockholm University Library has moved into a major new building designed by Ralph Erskine, a Scottish architect active in Sweden since the 1940s. Externally, the building is somewhat industrial-looking. It has an impressive portico and entrance lobby with a very attractive café. The actual entrance to the library is an anticlimax. A fairly narrow passage leads to the main

doors underneath a staircase which runs backwards over your head as you enter. Once inside the library there are extremely attractive reading areas with a striking striped carpet, reading tables in birch, and distinctive chairs and armchairs from Alar Aalto and Bruno Mathson. Wells bring a great deal of light into the centre of quite a deep building. The general impression is one of comfort. There are a variety of types of reading space with seating in large reading rooms, in group study rooms, in single carrels and in less formal lounge areas. While readers come off well, the technical areas are not so successful. There is a small and badly situated circulation department, and although some staff offices are pleasant, some unfortunates appear to have to work for part of the time in corridors. Apart from the actual information points, the staff areas are not designed to make senior staff easily available to library users. This is a pity since bringing library staff and their clients closer together was a major motive in staff re-organisation. Two of the five floors are open stacks, two floors are closed stacks and one floor is administration. Göteborg University Library has had a major extension, completed in 1985 which has doubled its central building in size. Instead of attempting to extend the very complicated floor levels of the original library, the extension has been constructed as a separate building, linked to the original by a covered atrium. The extension is extremely pleasant with high quality furnishings and a most unusual main information desk. This has creeper-covered white trellis work at each of four corners. High quality brick work is a feature of the extension - even the main circulation desk is in brick which, while it looks good, is not exactly flexible.

The Swedish University of Agricultural Sciences Library dates from 1975. I did not see the library on my previous visit, which was unfortunate because at that time it would certainly have been the most attractive looking of the academic libraries. It appears to be a building which has stood the test of time. It is colourful and comfortable with strong accents of red and green which go well with light wood.

A smaller but very successful library is that of the Hälsouniversitet at Linköping. The Library is only 3 years old, it is both good looking and practical, and it comes as no surprise to discover that the library staff played a very full part in developing the plan and in the design of furnishings. The library has a particularly successful modular issue desk and this feature has proved its usefulness since the units have already been re-arranged since the library opened, to provide a more efficient work-flow.

While there have been some notable improvements in the quality of Swedish university library buildings, the majority of libraries are still short of space. The Library of the Royal Institute of Technology has one third of its stock in the cooperative storage facility - the Statens Biblioteksdepa - at Balsta between Stockholm and Uppsala. To complicate matters it is difficult to select material for storage when the library does not have an issue system which creates lasting

records of usage. Uppsala uses Balsta, and also has a number of storage areas within the city. The two oldest university institutions (Uppsala and Lund) both have excellent collections inconveniently housed and difficult of access. Uppsala has plans to coordinate its storage space and has established an undergraduate library. Its central building is "historic" and has been extended and reconstructed. It badly needs further extension but to achieve this in any logical fashion will be extraordinarily difficult. However, plans have been completed for rebuilding the lending department, the catalogue room etc. at a cost of approximately SEK 10 mill. They hope to implement the plans during 1991. Uppsala does, at least, have some very attractive areas for rare books, which is more than can be said for Lund, where the main building, UB1, seems even worse than when I saw it eleven years ago. UB2, the Lund Science Library, has worn reasonably well, but UB1 is long overdue for major reconstruction and refurbishment.

Swedish university libraries have noticeably fewer places for readers than institutions of comparable size in North America, Britain or Australasia. At Chalmers University of Technology in Göteborg I was told that one of the reasons for this is that the pattern of Swedish education is different, that the curriculum is more library based overseas (particularly in North America and Britain), that undergraduates' quarters are much better in Sweden, that they tend to use course books at home, and that when they come to the library it is for group study. I was interested that this comment came from a technical university, because the engineering students in my own university show a similar pattern of library use. However, usage by their colleagues in the humanities is quite different, and it would seem to me that the situation may not be too different in Sweden. Where, as in Stockholm University Library, a more generous supply of reader places is available, then those are heavily used.

Automation

In 1979 there was considerable dissatisfaction with the major Swedish library automation project, LIBRIS, based at the National Library. A great deal of money had been spent on the system with rather limited results. While it was originally intended as a comprehensive system, its role is now seen as being more restricted, and it currently operates as a source of cataloguing data for books and serials and for the output of a number of catalogue products including the national bibliography. As it contains holdings records it is also an essential component of the inter-library loan system. At present, 33 research and special libraries catalogue their holdings of primarily foreign literature in the database. The Royal Library itself catalogues holdings of foreign literature for about 40 other similar research and special libraries and is also responsible for the cataloguing of newly published Swedish literature. In all, there are about 2.4 million records in the database.

One of the major bones of contention in the past was that the supposed comprehensive development of LIBRIS was acting as a brake on the development of local automation in university libraries. With the recognition of a more limited role for LIBRIS this restriction ceased to apply (the UHÅ set aside substantial sums from its investment income to support library automation) and now all Swedish university libraries have purchased automated systems. Their choice has been varied: the library of the Swedish University of Agricultural Sciences went for the Danish RC system at an early stage, largely because the university was already using their hardware. Most installations have been relatively recent. Stockholm University Library decided in 1984 to acquire Geac, an example which was followed by Linköping. Göteborg, Uppsala and Lund have bought VTLS, Umeå DOBIS, and the Royal Institute of Technology, Chalmers and the Caroline Institute, Libertas. In the past, the choice of so many different systems by a relatively small group of libraries might have caused raised eyebrows, but since there is a national bibliographic network, and protocols to allow convenient access from one system to another are being developed internationally, it perhaps will not matter in the long run. There has, however, been some concern expressed about the cost of developing a number of different interfaces to LIBRIS.

In common with many institutions outside Sweden, the cost of converting catalogue information into machine readable data is a real deterrent to retrospective conversion, particularly for the larger, older collections. Major national projects will be the conversion of the Swedish national bibliography for 1926-1955 by the Royal Library while BIBSAM is to begin converting part of the National Union Catalogue of Foreign Accessions. Local institutions are likely to press ahead with retrospective conversion, principally using data extracted from LIBRIS. This is currently the cheapest method of conversion for Swedish academic libraries but inevitably they will be forced to look for other and more expensive sources, since LIBRIS is not all embracing. Complete conversion for the largest libraries is likely to be many years down the track.

One unexpected by-product of automation was reported by the Library of the Swedish University of Agricultural Sciences. They commented that their local system, RC-LUKAS, is so user friendly that faculty locate and order material utilising the terminals in their offices. They are so seldom seen in the library that the staff were trying to think of methods of encouraging them to visit the library in person.

Acquisitions

With the existence of a national bibliographic network it is possible for individual institutions to discover whether material - particularly expensive material - is already available in Sweden. The cooperative plan for rationalising

acquisitions, the Scandia plan, has collapsed, and there is no national plan for rationalising specialities in university teaching and research. BIBSAM has funds for allocation to national resource libraries,³ but these are unlikely to benefit university libraries generally. Coordinating the selection policies of the Royal Library and the university libraries has not been resolved. This may be partly due to the fact that the Royal Library functioned as a university library from 1956-76 and still retains responsibility for the provision of material in some subjects in the Stockholm region.

More attention is being paid to the needs of undergraduates. Uppsala established an undergraduate library in 1988 and provides one copy for every 10 students of every book which is required in the humanities, social sciences and law. Umea has a student library with three copies of every book which is required reading, for all subjects except medicine. However, it comes as something of a surprise to be told at the Royal Institute of Technology that there are no acquisitions at undergraduate level.

Funding is a problem. Several libraries have undergone serials cancellation exercises, and budgets have deteriorated in real terms in a number of institutions. Undoubtedly the largest single purchase has been the Leufsta collection by Uppsala. This 18th century collection of Charles De Geer, an eminent entomologist and member of a number of learned societies and academies, was bought in 1985 for SEK 23 mill., half being supplied by the Swedish government and half from private donors. The collection remains in the Leufsta Ironworks 70 km north of Uppsala. It contains music and engravings as well as books and archival material related to the estate.

There has been some interest in *Conspectus* as a method of collection development and work was undertaken under the auspices of DFI. LIBER has also been attempting to encourage the use of *Conspectus* throughout Europe. Uppsala is planning the development of certain subject areas in its collections, not by directly using *Conspectus* but by using its concepts. In other universities the main emphasis on collection development seems to be on encouraging greater cooperation between library and faculty, in particular by the employment of contact librarians (librarians who liaise with academic departments).

Reader Services

The past eleven years have seen a very considerable development in the services available to the users of university libraries in Sweden. In 1979 there were sophisticated services offering access to computerised databases and at least one good example of reader education. Generally, however, information

³ Kjell Nilsson, "A national system of resource libraries: the Swedish experience," *Outlook on Research Libraries*, 12 (1990), no. 8, 1-4.

services to readers were poorly developed and undergraduates in particular were badly served. Today there is much more emphasis on user needs, and in actively attempting to find out what these needs are. Göteborg University Library, for example, undertook a survey of users in 1988,⁴ and the Library of the Royal Institute of Technology is also surveying its readers. Information desks are a very visible feature in new and redesigned buildings. A major reason for the reorganization of staff into subject groups in a number of libraries was to enhance information services as staff accumulate subject expertise. Sweden is maintaining good access to computer based information services and is abreast of international developments (The Royal Institute of Technology, for example, is one of a small number of libraries involved in evaluating an experimental service being offered by Engineering Index). CD-ROM is being used everywhere. Two libraries mentioned their interest in locally mounted databases on their networks. Stockholm would like to mount the ISI data bases, and Uppsala is considering installing the VTLs gateway which would allow it to do this. This is an area where cooperation among the university libraries might be very advantageous. In Britain, the Combined Higher Education Software Team (CHEST) has managed to negotiate a deal with ISI to install all the ISI databases at the University of Bath, and this can be accessed through the academic network JANET. Unlimited access is available to any university library which pays a subscription of £ 5.000 per annum. Since local purchase of the databases is extremely expensive, Sweden might well consider a similar venture, particularly since it already has an academic network - SUNET.

Several libraries have good programmes of reader education but the emphasis tends to be on the education of senior students. Chalmers University of Technology has a long history of reader education, and its importance is emphasized in the staff hierarchy, where the department of user education and system development is given equal ranking with the three other main divisions of the library. Chalmers began with courses for Engineering undergraduates in the mid 1970s and extended the programme in the late 70s and early 80s to include courses for students for higher degrees and external users. The department now has good teaching accommodation, seminar rooms and a range of equipment. It is worth noting that in these days when academic libraries are being encouraged to be more entrepreneurial, Swedish university departments charge other departments for service courses given to their students. This means that the Chalmers Library charges the Engineering departments for the courses which it gives to their students. The income generated can be used for personnel, equipment, computer time etc. Courses given to external users are charged at

⁴ Erna Roos, *Vem? Varför? Vad? Något om användningen av Göteborgs Universitetsbibliotek*. Göteborgs Universitetsbibliotek, Rapport 1, 1989.

normal commercial rates. It is a measure of the success of these courses that the client departments continue to request and pay for them.

There has been much controversy in Sweden over charging for services. There have been the same kind of discussions which have occurred in many other countries, with those who believe in the philosophy of free information opposed to those who see themselves as being funded principally to fulfil a local role. In 1977-8, it was decided to cease providing funding for university libraries in the form of direct grants from central government. Once funding was being supplied from local resources, then the concept of the university libraries as part of a national resource was weakened. Gradually the feeling grew that charges should be levied, particularly among those libraries which had a large number of clients outside the academic world. Eventually the DFI made an investigation and suggested that basic services should be free, but that additional services be charged for (this is what we in New Zealand have tended to call the Price Waterhouse syndrome, since it is exactly the philosophy articulated by that international accounting firm when it reported on our National Library). However, at one of the conferences for large research library directors it was agreed that interlibrary loans (including photocopies) should be free when supplied between government funded libraries. This lasted until Chalmers broke ranks, and decided that they could not sustain the burden of interloans and introduced charges for copies. Interestingly, this was exactly paralleled in Australia where it was a technological university library, the University of New South Wales, which was the first Australian academic library to introduce charges.

In 1987, Stockholm University Library was facing an extremely difficult financial situation. Having retrenched in a number of areas, it needed additional income and it decided to charge libraries within the "free circle". This triggered off a major discussion. BIBSAM undertook an investigation and originally recommended that the free circle should be abandoned. This proved to be so controversial that BIBSAM undertook another rather thorough investigation, and this time recommended that state supported research libraries should only charge external users within the group the same charge (if any) levied on internal users. This seems to have been more acceptable, although Chalmers was not particularly happy that its charges to external users of SEK 50 per article would have to revert to SEK 20. Currently the six universities and the Royal Library are not charging each other for photocopies. Otherwise practice varies.

Among Swedish University Libraries, that of the Swedish University of Agricultural Sciences is undoubtedly the one which takes the most entrepreneurial attitude to its services to external users. This is perhaps not surprising given the decentralised nature of the university with centres and libraries in various parts of Sweden. The library has been planning since 1982 to appoint a Marketing Librarian and eventually made an appointment in 1990. The

person appointed will be undertaking a great deal of market research, targeting groups such as farm advisory officers and forestry advisers. Reference services will be offered and the library will be marketing its local database. Base level reference services will not be charged for, but more individual services, photocopies, fax, etc. will be charged.

Library research

Research normally requires funding and between 1979 and 1988 the main source of funding for library research in Sweden was the DFI. It started two major research programmes, INFORSK at Umea University and LIBLAB at Linköping. Both are now being supported by FRN (Council for Research Planning and Coordination). INFORSK describes its major research theme as studies of information processes and information technology with special reference to the use of knowledge among individuals, organizations and societies. LIBLAB's aims are not too dissimilar since its stated aim is to study the possibilities of information technology and its effects on library and information work. It has one major long term project - HYPERCATalog - its goal being to design a document catalogue that serves the information needs of the research community better than the traditional library catalogue. At least this group seems to have a sense of humour, since the small prototypes built to test design options have been labelled HYPERKITTens! Although both groups have now been in existence for a number of years, their impact on practical academic librarianship appears to have been minimal.

It might have been expected that the School of Librarianship at the University College in Boras would have been a national centre for research. Unfortunately its siting in a tertiary institution without a research role has meant that research has been limited in quantity and concerned with school and public libraries.

FRN is sponsoring a number of individual research projects. Several of these are related to academic libraries although some, from their titles alone, would seem to be of dubious relevance. At least two would appear to be of possible interest to libraries outside Sweden. Birgitta Olander of Lund University Library has started a project with the aim of supplying a basis of various scenarios and routes of development for information provision within universities.

Jon Erik Nordstrand of Umea University Library is investigating the introduction of new technology in university libraries, working from the hypothesis that this adaptation process is markedly slower than what seems technically rational.

Finally, the Information Technology Centre (ITC) was started in 1987 at Chalmers University of Technology in order to provide advice, education, training and evaluation of hardware and software in order to help libraries to choose appropriate technology for their needs. Although its main target groups

are people working in medium sized and small libraries in the academic, public, hospital, school and industrial library sectors, it seems likely that some of its work will be of relevance to academic libraries generally.

Conclusions

In the eleven years between my two visits, a considerable number of developments have taken place in Swedish university libraries. Probably the most important change has been in the attitude to users and their needs. Much more attention is being given to establishing what these needs are and trying to provide services to meet them. This has not been particularly easy for Swedish academic librarians whose institutions are not conspicuously well financed, and it is to their considerable credit that so much has been achieved. Integrated automated systems have been slow to arrive in Swedish academic libraries, but all university libraries now have them, although complete implementation is still some years away. It was a particular pleasure to visit a number of recent buildings and to see that high standards of furnishing and equipment, which have long been a feature of Swedish public libraries, are now also a feature of some parts of the academic library scene. However, the two oldest university libraries, Lund and Uppsala, need considerable capital expenditure on their central facilities in order to bring them up to international standards. It is disappointing to find that library staff as a whole are still not compensated at a rate which matches their responsibilities. Sweden is world famous for its enlightened work practices, but academic libraries need to devote more thought and resources to staff development and, in particular, training in management skills. A major defect is the unsatisfactory nature of professional education for academic librarians although there may be changes to this in the near future. Academic librarians in Sweden face a number of challenges. These are not unique as their colleagues elsewhere can attest. Problems of coordination, finance, adoption of developments in information technology, accountability, etc. are familiar themes. Swedish academic librarians now seem better equipped to tackle them than they were eleven years ago.

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University Library, not only gave up a considerable amount of his own time in trying to make sure that I understood the Swedish academic library scene, but has also read and commented on this paper and coordinated the comments of other Swedish university library directors. I, alone, am responsible for the opinions expressed and for any errors which remain.

National Library Role: Automation Policies and Networking

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One of the more obvious aspects of our time is the increasing value of information. Away of a former concept, thousands of books lined up for miles of stacks are no longer enough to define information. As a matter of fact, information is mainly due to circulate: instead of remaining under its original form on the stacks waiting for its potential readers, information must now be processed electronically in order to come across with its users, being made available through systems and/or networks.

This picture may have been drawn in a naive mode, but whether naive or elaborated, two very important aspects still lay behind. Those aspects are *standardization* and *automation*. It is my belief that for the success of both aspects, the existence of an effective bibliographic agency is fundamental, and more often than not this agency is the national library.

Automation does not go without standardization; conversely, standardization becomes the pillar for an automation process of quality. Due mainly to continuous budget cuts (and also because a growing number of less industrialised countries is getting involved), time for experimenting automation in libraries is now gone. Libraries cannot afford any longer the implementation of solutions which do not guarantee the portability of data, or the direct transfer of information, and these specifications demand the application of certain international principles, and rules which, for their and our own sake, have to be developed and monitored by authoritative agencies. Both acquisitions, and conservation have become very expensive, requiring thus that their bibliographic processing, and exchange are very carefully planned. All libraries have huge responsibilities in pursuing these tasks, but due to a set of circumstances, the National Library seems to have yet a major responsibility.

The national bibliography

The acquisition, processing and distribution of the national bibliography seems to be the first of those circumstances. Being the largest representation of each country's intellectual written output, the national bibliography becomes naturally the candidate number one for the international exchange of data. This exchange to be cost-effective - in the view of manpower involved, time required, geographical influence - cannot any longer be provided on hardcopy, but it has to

be ensured online. It is the electronical environment determining the fulfilment of a function, somehow demanding or imposing the existence of a similar environment among potential users, and partners. Both for libraries processing the national bibliography, and for libraries receiving that information, it is neither feasible nor desirable the maintenance of multiple processing systems, when the automated one is faster, more cost-effective, far reaching in its aims, and in its effects.

In other terms, because all libraries are potential users of the national bibliography, on the whole or just partially, procedures adopted by the national library will sooner or later affect the whole library community.

The creation of bibliographic resources

Due to the production of the national bibliography and also due to the repository that national libraries generally speaking are, the volume of bibliographic data being processed daily becomes a major source of information. This processing can be guaranteed by one single library, or it can be the result of coordinated work among several units. One way or another, its processing, and dissemination to be effective requires an automated system operational, whether a stand alone one, or integrated in a network, in order to avoid duplication of work; in order to guarantee consistency, and quality of information processed; and in order to make available a critical mass of bibliographic information as fast as possible ready to be exchanged both at the national, and at the international levels.

Duplication of work, and effort have to be avoided at all costs. It would be a waste of time and money to have several libraries processing same items when one of them is in charge of doing that task. The national bibliographic agency imposes certain rules, but cannot ignore the pressure coming from its counterparts. One would say that the ruling function has quite a high price.

It is also up to the national bibliographic agency the creation of authority entries for the country's written production. The consistency, and the credit of these authority entries depends on the assumption that in each country there is only one bibliographic agency. Authority entries must be uniform, consistent, and permanently monitored. A high standard which cannot be reached without the intervention of computers.

The creation of bibliographic resources can be more diversified than the linear creation of original records. This means that national libraries have to widen up their activity, and that they have to consider many streams, trying to harmonize and maximize them.

National libraries ready to export original records are also in the position to import original records prepared at similar organizations making them available through their computer facilities. National libraries can become privileged

distributors of foreign records in a given country, making the most of their capability to exchange, and also of existing technological, and technical solutions adopted, since the format option is not a minor condition here. The existence of conversion programs with all the required pre-requisites which turned international contacts into reality, can be applied in both directions. That is to say, national libraries gather in themselves conditions to be a sort of gateways providing interfaces which allow indeed a mutual flow of information.

Apart from original records, there is yet another set of records to be considered, and which also have a prior role to perform at the national level. Those are the ISSN records which do not need to be processed more than once, and which added value relies on their multiple applications regardless the size or the type of library. The matching of ISSN records to local library holdings enhances the potential of a remarkable source of information, and in this process the role of national libraries as union catalogues are of utmost importance.

Adoption of standards

The adoption of standards is of maximum importance to ensure effectiveness of work being carried out. But the adoption of international standards constitutes a step forward though, and it can be the key for a national library to play a major role both at the national, and international levels.

Either under a library viewpoint, or a computer one, standards are always a major concern; their development, and monitoring take a reasonable number of staff, and these tasks are time consuming.

Cataloguing and formatting tend now more clearly to a stabilized standardization. AACR2 and UNIMARC are gradually spreading out. The need for national cataloguing rules or for national formats, is being questioned after successful implementation cases of UNIMARC as an internal, and exchange format.

Authoritative work in what relates to personal and corporate authors does not raise that many problems, and a bibliographic agency eager to play a strong role has plenty of opportunity within this scope.

Subject indexing is the remaining problem. Here indeed remains the big challenge, but technology is available, and a centralized online management of a subject indexing language is feasible since a flexible system is provided, and a network of key libraries in a given country has been established. These sort of key libraries must agree upon a common methodology, and they have to define, and allocate record creation, and validation levels. Once these pre-requisites are established, subject authority entries can be created in each field by specialised libraries, and they can be applied by the whole community. This work has its difficulties, but they are not technological ones. Difficulties have to do with

individual, and institutional attitudes, and with the way urgency is perceived in each country.

On the computer side, the solution remains nowadays with the open systems option which will allow libraries to line computers sooner than later. National libraries aiming to play a decisive role in the field of libraries have to accept that a considerable part of their role will depend on the technology to be adopted. The production of tapes or the production of a printed bibliography, or the implementation of OPAC's, is no longer enough. The variety, and the volume of information requires more sophisticated solutions at the central level. There are solutions acceptable in libraries at the periphery, but the nucleus of a library system has to be ready to face daily technological developments, or library technicality adjustments. At the core of a system, anticipation is the rule.

A national library does not become a core library within a library system because by law it is the repository of the national written production. It is the wide use, and dissemination of that repository which grants that honour to a national library. In other words, the fulfilment of a national library's duties is also a question of a hard fight.

Cataloguing in publication

A national library is in a good position to establish agreements with publishers in order to anticipate information or titles in the process of being published. This dissemination is relevant "per se", but if it is established making use of an operational network, then the Cataloguing in Publication can become an important tool for readers. A C.I.P. record is always a provisional one, demanding an update as soon as the title is out in the market. In the meantime though is a priceless contribution for the community of end users, and also for library and information professionals.

The availability of such information, generated on a close cooperative line between libraries and publishers, encourages, and allows libraries somehow to pursue an acquisitions policy. In the past it has proved hard to establish such a policy, but the frightening booe price rising, the growing number of titles to purchase, and the growing variety of information sources which libraries have to get hold of, as well as the existence of a more responsive technology, all these factors together are pushing libraries to re-evaluate the situation. Sharing resources can also become true with this preliminary cataloguing, and quite ironically the preliminary cataloguing can bring a new impetus to the establishment of a collection building policy among different libraries.

National libraries producing preliminary records are fulfilling this major commitment of approaching different information producers through the efficient use of telecommunications, but in what concerns collections, the national library will have its borders very well defined. It is likely to happen that

its attention, and effort will focus on the national bibliography, whereas others libraries will define their own areas according to specific fields of interest.

Interlibrary lending is just a consequence of what has been described, becoming more diversified and more cost-effective as open systems technology develops. Interlibrary lending, acquisitions policy, information or conservation and preservation, existing microforms on collections availability, are the visible aspects of added value resulting from cooperation among libraries.

It would be difficult to define a model for automation, and it remains to know whether it would be desirable. Developments achieved so far, the size of a given country, the level of cooperation dictate the model to be chosen. One thing seems, nevertheless, irrefutable: national libraries must play a central role in order to save, and to share resources. Their automated systems have to offer configurations enabling transfer of information, as they ensure portability, and compatibility of data. Existing systems still do not answer to all our requirements, and specifications, and it might be that they will not ever. Nevertheless, national libraries have to continue very much as focal points for the existing information in a given country; national libraries have to perform their duties at a very high standard carefully respecting a borderline between themselves and other information producers; national libraries must have the courage to define priorities, and their main partners, so that information being processed whichever the place, the time or the field of interest is readily, and consistently available.

National libraries are by functions attributed the nucleus of the information system, and the level of acceptance among the community will depend on mutual benefits, and on the capability of using effectively the real, and potential information resources scattered, or not yet identified.

Managing the Library: a Scholarly Approach

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An instinctive reaction to this theme might be "plus ça change, plus ç'est la meme chose". Yet, on consideration, it is not quite the same subject as that which has been a recurring theme in British librarianship for the best part of a century and a continuing interest to me, namely, the role of the scholar-librarian in an increasingly professionalised environment. I have commented elsewhere on various occasions¹ on the origins and progress of this somewhat unhappy issue and it is not my purpose to repeat it all again here. Suffice it to say that ever since librarianship became a "profession" in Britain, more precisely, ever since the founding of the Library Association in 1877, there has been a certain tension, even incompatibility, between the scholar librarian and the "professional", between the old established and the newly formed, between what Pacy as long ago as 1928³ identified as the "black-letter school" and the "modern municipal". Even at a local level, let alone national or international, this was hardly promising for co-operation between libraries. However, the title seems to suggest a change in the role of the scholar-librarian, perhaps signalling the end of one of the most futile arguments in British librarianship, and it comes significantly in an international conference devoted to cooperation. Without reading too much into a form of words, the concept of the leading role of the "scholar-librarian" is modified to "a scholarly approach", perhaps one of the consequences of establishing an all-graduate library profession in Britain. With this change in emphasis are to be found different attitudes to management. The sum of scholarship has always been more than the total of its collected parts.

However specious that interpretation may be, few would disagree with the notion that the profile of librarianship has changed in the last fifty years

* Lecture presented at the LIBER Annual Conference 1992 in Padua.

¹ Cf. F. W. Ratcliffe, chapters in *The Art of the Librarian* (Joan Gladstone Festschrift). Newcastle upon Tyne: Orel Pr., 1973, pp. 140-146; *Middle East studies and libraries: a felicitation world of books and information: essays in honour of Lord Dainton*. London: British Library, 1987; *Preservation and scholarship in libraries* (the MacKenna Festschrift), *Library Review*, 40 (1991), Nos. 2/3, pp. 52-62.

³ F. Pacy. *Early days: a retrospect. Proceeding of the fiftieth anniversary conference of the Library Association*. London: Library Association, 1928, p. 54.

nationally and internationally. This is reflected clearly in the changing terminology and there has been an unseemly, not to say, embarrassing, haste to cast off old, well worn garments and put on new, to exchange traditional descriptions of great antiquity and respectability for terms more obviously appropriate to the exciting developments now evident in our institutions. Librarians are becoming resource centres, catalogues databases, librarians themselves information officers. There is talk of line management, team activities, leadership and the like. This is not exactly the case in Cambridge University where the office of librarian pre-dates virtually all the other offices in the University, including the Regius Professors, the so-called principal administrative officers of the University and many others of very long standing. It will surprise no-one that the very thought of relinquishing a title which has with only occasional variants so successfully served my fifty-four predecessors from the thirteenth century onwards hardly commends itself to me, to my Syndics or to my colleagues. It will also surprise no-one that Cambridge librarianship has always been a deeply scholarly affair but, none the less, always 'professional'.

There are many examples of such changes of nomenclature in Britain. The reorganisation of local authorities in the early 1970s led to a variety of new titles among county and municipal librarians, in part as a result of their determination to appear more 'relevant'. It was highly successful in one respect because, whilst it may have undermined the concept of librarian, it undoubtedly improved their salaries as "chief officers". The most obvious example of change is to be found, however, not in the public library world but in the British Library which celebrated its birth in 1973 by a clean sweep of the old British Museum Library titles. The celebrated title of Librarian and Principal Keeper, which somehow or other always brings Panizzi to mind, disappeared into Chief Executive and Directors General headed Divisions in the born-again library embracing so much that had been traditionally 'English'. Change has not been quite so obvious in the university, academical library world although 'information officer', 'information manager', 'director' and various other titles are finding their way into common usage whilst the University Library Schools hurried more than a decade ago to become more explicit by changing their titles, with only one exception, to Library and Information Schools. That exception, too, the oldest established in University College, London, now bears the title "School of Library, Archive and Information Studies". All these changes, of little consequence in themselves, betray a deep, in my view distasteful, desire to be considered something more than just 'librarians'.

Although the question of the scholar librarian and the professionally qualified has been debated for over a century, it was not until long after the Second World War that any real change in the evidence and argument could be detected. It can be dated fairly precisely to the introduction of the new technology, to the immense changes which this precipitated in the library world, and to a growing preoccupation with management science, all of which was grist to the

'professionals' mill. No librarian would dissent from the view that the libraries of to-day are very different from those of the sixties, that the new technology has transformed the base on which they work. The prime importance of this new technology to librarians must lie in the fact that it facilitates Information Science, and this in turn has had quite distinct, massive implications for the management of libraries in the day-to-day sense. The capacity of this innovation to manipulate the most extraordinary quantity of information at high speed and with great accuracy, the flexibility of approach it confers on catalogues and finding lists, which all too frequently lack any kind of subject access, its seemingly inexhaustible potential - the new technology offers solutions to hitherto insoluble problems for librarians struggling as never before to contain intake and meet accelerating use. Moreover, for reasons which are still not altogether clear, costs have not seemed to stand in the way as they did usually in normal library developments. To add to the many advantages which the new technology brought, terminal access proved easy to master both for library staff and for readers. In fact, so adept did librarians become in using the new technology that some in Britain were inclined to equate information science itself with librarianship until the University Grants Committee, the former main funding agency for British Universities, disabused them of this belief by excluding university libraries from support under this head when Information Science received special funding incentives. In those few libraries where it might be said to obtain, it reflects a decision to recruit computer scientists to provide the software and to design systems in-house. The Cambridge experience here is both of interest and (to me) of concern since it shows that it is easier to recruit computer scientists and teach them librarianship than it is to take librarians and teach them computer science. This quite clearly was a management decision which has not met with the approval of all LIS lecturers. In a quite fortuitous way it also endorses the recruitment of a certain kind of scholar, quite untrained in librarianship, to work in libraries and suggests that in one respect, at least, the scholar librarian debate may still not have run its full course. The advent of the new technology had obvious implications for libraries going far beyond information retrieval. Almost inevitably it focussed attention on services and processing, on issue systems, ordering, accessions, finance, cataloguing and periodicals departments on all those aspects of librarianship which might be regarded as routine management. The absurdity of individual cataloguers across the country cataloguing the same material, a "waste of people's lives", as Douglas Foskett⁴ so graphically described it, has been lamented by librarians since the first World War. It gave quite extraordinary meaning to the phrase 'man management'. Now a means of avoiding this presented itself and shared

⁴ D. J. Foskett, "The intellectual and social challenge of the library service," *Library Association Record*, 70 (1968), No. 12.

cataloguing became a way of library life. This development, perhaps more than any other, had and will have enormous implications for recruitment of graduate staff, striking at the heart of the library's scholarship, the Cataloguing/-Classification departments. The consequences are not, however, confined to that area alone and the scholarly implications for the staffing of other areas of library activity are no less serious.

The new technology was not alone in changing the ways of librarians. As information science was penetrating the library world, management science was also beginning to achieve the kind of respectability in the academic world for which it had so long been striving and which, for library science in Britain at least, is still a distant goal. It has to be remembered that it took the Social Sciences the best part of seventy years to establish themselves as an acceptable university discipline and there are still many scholars in universities who would question this use of the term 'discipline'. Management science has taken even longer to achieve the same order of academic respectability. The fact that only in this decade, essentially because of large benefactions, an Institute of Management Studies is being launched in Cambridge is one belated signal that Management Science seems finally to be accepted by even our most elitist scholars.

The impact of management science on librarianship has been in part a kind of exercise in retrospective conversion, the introduction of new terminology to describe established practices, and in that respect it is, in the real sense of the world, superficial. At the same time, it had new ground to break in accommodating the impact and developments of the new technology. Inevitably, the area most immediately influenced by this new development in librarianship was the teaching of professional librarianship, in Britain still in its infancy and a fragile flower. Management science and the new technology quickly dislodged traditional concerns like preservation, or book-binding as it used to be called, from their place in the curricula of Library and Information Schools. The History of the Book, one of their main claims to scholarship, seemed suddenly less 'relevant' to the aspiring librarian than the developing new technical skills and the old was quickly abandoned for the new. This reflected the neglect already shown by practitioners in their libraries and confirmed it, to the new recruits to librarianship, as it were, at the very outset of their theoretical training, with those consequences which turned the eighties into the preservation decade. Paradoxically, by the end of the eighties, preservation became an essential part of core management subjects in LIS schools.

During these years of hectic development, the question of the scholar-librarian was quietly slipping away, seemed to be no longer a matter for real concern. If it is not quite the burning that it once was, this is due not so much to the fact that it no longer has validity but rather to the gradual disappearance of its representatives from the professional simply through the passage of time. For

myself, having been recruited by a distinguished scholar librarian, Dr. Moses Tyson, to my first post in the 1950's, it is difficult not so much to contemplate the demise of a way of life to which professionally I owe so much but to lose something, in a profession at present dominated by technological change, which is still so full of potential. Dr. Tyson was a redoubtable figure in the University of Manchester, possibly, in the post-second world war library world, one of the most successful University Librarians in Britain. Despite his many scholarly achievements as a mediaeval historian, he spent his entire working life from choice in academic librarianship, first as the Keeper of Western Manuscripts in the John Rylands Library and then for thirty years as the University Librarian of Manchester. During that time he was also the University Reader in Palaeography, sometime Dean of the Faculty of Arts, Chairman of numerous University Committees including Professorial Chair Committees, in short, a very senior member of the University. If career success and promotion of the library is any guide, he must also have been an outstanding library manager.

Before the Second World War, he had already achieved academic parity for his graduate staff in the widest sense, pay and status. Harrison Bryan⁵, later the National Librarian of Australia, recorded in his 1957 visit to the Library: "It must be hard for professors to resist the blandishments or deny the just claims of a colleague and former dean. This factor is surely responsible, at least in part, for the generous degrees of academic equation given the library itself". After the war Tyson built the first post-war University Library extension in Britain, secured for most of his tenure one of the best accessions grants in the country and laid the foundations, on which I as his successor was later able to build, for the continued survival of the John Rylands Library by meeting its regular shortfall in funding via the University Library grant. This can only be described as extraordinary since the Rylands was not a University institution but a private library. He also fell foul of the Library Association in a way that seems incomprehensible now and perhaps highlights how far the Association itself has come in the last forty years. His advertisements for good Honours graduates with research experience or library qualifications seemed to anger the Association, which tried to insist that the University cite professional qualifications alone as essential. Their letter of complaint to the Vice-Chancellor betrayed total ignorance of how the University worked and, more importantly, any idea of the standing of the Librarian. All subsequent advertisements removed any reference to professional qualifications until his retirement in 1965.

I refer to Dr. Tyson in some detail in the hope of gleaning information from his example. He is hardly well-known even in Britain. His librarianship in Manchester, however, illustrates so well the potential of the old style scholar-

⁵ Harrison Bryan, *A critical survey of university libraries and librarianship in Great Britain*. Adelaide: Libraries Board of South Australia, 1966, p. 167.

librarian and his attitudes to management. It is important to note that he did not apply for the post of university librarian. The University, a very different institution from the huge place it has become to-day, made a decision as to the sort of librarian it needed and he was invited to the post. It is clear from their choice that they were not looking specifically for a manager. As a fact he replaced a 'professional' librarian who had a largely 'professional' staff. On his first day, and it must have been a condition of his appointment, he took what was clearly a management decision of considerable importance: he discharged all the subject allocations committees on the grounds that such committees led either to underspending or spending for the sake of using up allocated funds. He had no doubt that funds were an essential element in executive authority which he determined should rest with him. almost immediately he took another important management decision. Meetings of the Library Committee were reduced in number and distanced from any day-to-day running activity of the Library but at the same time its representation was strengthened not by enlarging it but, more significantly, by targeting important members of the University. His minutes of meetings were models of brevity: they were concerned essentially with the outcome of deliberations and virtually no record of individual contributions, however important the person, was made. He subscribed to the old principle, "least said, soonest mended" and gave few hostages to fortune. Through such means, and by the recruitment of highly qualified graduates as vacancies arose, he tied the Library into the teaching and research activities of the University in such a way as to make it indispensable to future generations. This was a step of immense importance in the years ahead. It recognised that whilst the technical apparatus of librarianship might change, its scholarly base would not and consistently he strengthened links with scholarship.

His approach to the management of the University Library had none of the benefits of a study of management science of which, it has to be said, he would have been as sceptical as he was openly and tactlessly of the Social Sciences. Instead he brought to the post a mind highly disciplined through historical research, capable of assessing situations, weighing the evidence, and making decisions. It never occurred to him to question the fact that in an academic community an academic librarian was more likely to be successful in major policy issues than one who was not. For him it was axiomatic. His own standing amidst his academic colleagues grew as the Library progressed and he purposely recruited graduate staff with similar credentials to his own with that foremost in his mind. By involving them in the departments of the University, he deliberately exposed them to academic colleagues, confident that they could hold their own. His experience of scholarship was complemented by his wide experience of university committees and university administrations. He was first and foremost a university man. He preached a deep understanding of the parent institution as the essential prerequisite to professional university librarianship, which went with

an absolute commitment to it. His first loyalty was to the University, his second to its library, and to librarianship qua librarianship only as it served the institution and for this he was not always popular with fellow librarians. His belief that to build a great library was in itself also the greatest service he could make to librarianship was reflected in his willingness to put it at the disposal of scholars from outside the university. In so doing he also sharpened the profile of library and institution nationally. He subscribed to the concept of "a community of scholars" and, as a result, influenced university librarianship far beyond Manchester. His conception of the Library's priorities and its well-being was the basis of his management practices.

The stock, or as it would now be called "collection building", was his chief concern, his main priority and he insisted that it was the chief priority of his graduate staff. His recruitment of highly qualified staff was essentially to secure their minds, not their subject speciality, although they were expected to indulge the latter in building the stock. Recommendations from staff or users to buy items, however expensive, were very rarely refused. His attitude to inter-library lending would be difficult to maintain now. If books were needed once, they were likely to be needed again and the instruction was to borrow only if purchase proved impossible. Lending, however, was a very different matter and he promoted that in a totally uninhibited way. If the Library had it, it would lend it. His purchasing initiatives led virtually to the establishing of some disciplines in the University, for example, in American History. Many of the areas of current rare book interest, such as the History of Science or Medicine, he more or less pioneered with certain booksellers. Knowledge in depth of the strengths of the Library's holdings was expected of all graduate staff and in this, as in so much else, he led by example. Perhaps the need for conspectus underlines how far we have slipped from such basic standards. It is important to know how to manage: it is more important still to know the subject of the management exercise.

His attitude to services was basic: it reflected the experience of the users, of his staff and of himself. He considered that the view from the other side of the counter was of paramount importance so great weight was attached to it. It is important to understand the depth of irritation felt by readers when a book is at binding, a periodical part has not been received, when a book is on loan and such understanding affects management attitudes. By and large, users are only unreasonable, he argued, if treated unreasonably and the exceptions are all to easily identifiable. At the same time, he believed that compiling bibliographies, manual literature searches as they are now called, or time spent by readers scouring the shelves for the relevant books were an essential part of the learning process. If this was anything it was education and the on-line literature searching now so widely available he would have regarded with suspicion, even as counter productive in the making of scholars. Like most bookmen he saw serendipity as

an essential ingredient in scholarship. He promoted open access with that in mind.

These comments are not a belated tribute to a great librarian. They aim only to put the career of a scholar librarian of distinction into the context of those management practices which are so highly regarded to-day. It is possible to glimpse through the scholarly perspective which such a long and successful tenure of the office of librarian provides how his priorities and management practices would fare in to-day's library world, at both national and international level, how they would respond to the new technology and accommodate, or be accommodated by, management science. His twin priorities of stock and service would be without doubt still the priorities of everyone at this Conference [LIBER Annual General Meeting 1991, Padua]. Whether we would achieve them in quite the same way or, indeed, in to-day's world achieve them at all, is a different question. His managerial policy was as simple it was calculated. Secure the support of those who matter and who run the university and the rest will follow. It is one of the most obvious lessons to be drawn from history, one all librarians might remember. It is uncomplicated by funding formulae, questionnaires, user surveys or so many of those numerous aids to management now available to librarians. G. L. Brook, sometime Professor of English in Manchester University, and Tyson's contemporary there observed shrewdly in 1965⁶ on Tyson's retirement that the 'librarian who spends a good deal of time in the (academic) staff common room is not necessarily wasting his time'. Tyson transacted more library business in such sessions than was ever minuted in the Library Committee.

It may be argued that this is politics not management. The art of good management, I believe, is politics, whether dealing with senior academic colleagues, junior library staff or readers. When I left the University of Manchester in 1980, already by then the largest unitary University in Britain, the University Library was regarded as an extension of every major department in the University and it received universal departmental support. It had little to do with overt library professionalism, although the library was extremely efficient professionally: it was simply a matter of identifying completely with university departments and their needs. It is only when libraries are seen simply as another department competing for resources in an institution that their position is in jeopardy, as is being made all too clear in current resource allocation exercises in British Universities. In this regard it is more difficult in a federal university like Cambridge than it was in a unitary university like Manchester, not only because the Copyright Deposit and the quasi-national standing of the library confer a dimension on the Library which can stand between the Library and the departments. The federal nature of the University means that autonomy

⁶ G. L. Brook, *The modern university*. London: Deutsch, 1965, p. 92.

proliferates and that certainly does not help a central service. The main trust of my librarianship in Cambridge has been to bring the Library out into the departments, to convince them that the University Library is their library and not an autonomous institution standing somewhat apart from and above the rest of the University. The use of new technology to establish an on-line union catalogue of departmental libraries based on the University Library has been of immense importance in promoting this aim.

There is little written on these lines in management text books and certainly very little taught in Library and Information Schools which reflect this political activity. The Committee structure which is to be found in most British university libraries can be viewed as an exercise in such political activity: it has to be exploited to the full for the good of the library. It was evident from a paper which I delivered at a Conference of the University College and Research Section of the Library Association⁷ in the late sixties that librarians were largely passive in regard to their committees. They had learned nothing from the references in Parkinson's Law⁸ and more than one librarian looked to committees of SCONUL or the Library Association rather than to their own committee to put right what they saw as university 'wrongs'. I am sure that things have hardly changed in this regard. Properly used, the committee is the most powerful weapon in the librarian's armoury. No amount of posturing by outside bodies can genuinely influence institutional decisions. Management, its quality and its success, is determined almost entirely by those leading what is now often called the "management team", by their handling of their committee and by their understanding of their clientele. Whilst good managers may learn from management science, they cannot be created by it and bad managers usually cannot learn at all. The hallmark of the successful scholar is usually a mind which has been shaped, moulded by a discipline. The reason why distinguished scholars so frequently find themselves in high administrative office, not simply in libraries, but as Vice-Chancellors, Rectors and the like, is because successful management needs such disciplined minds.

Management in libraries is, however, more than successfully reaching collection building, service and policy goals. It is also to do with staffing matters, with public relations, with all those numerous day-to-day administrative routines which make libraries work. These involve consultation, trust, delegation as well as recruitment policies. The only way for the librarian is to regard all staff in some respect as deputies. And if personal contacts are difficult in the large library like Cambridge, senior staff meetings are regular and are concerned to bring as many as possible into committee business and policy making. Meetings of the entire staff are rarely feasible for all those reasons which opening hours in

⁷ F. W. Ratcliffe, "Committees and librarianships," *Libri*, 22 (1972), No. 3, pp. 232-248.

⁸ C. N. Parkinson, *Parkinson's Law*. 4th impression. London 1958, p. 31.

libraries determine, but large gatherings can be assembled to air views and give progress reports on the health of the Library. In the extension currently being built, planning has been carried out in consultation with a representative group of ten senior staff who in turn consult their colleagues. The frequent social events now organised by the Library bring Faculty and Departmental librarians and, more importantly, academic staff together with library colleagues in the University Library, with objectives that transacted the purely social. Staff management is a combination of mutual trust and shared responsibility, but it can also benefit from a regular if modest social input.

I can only convey a broad picture of the management principles which Tyson practised. His standing, not to say power, within the University left him somewhat unkindly with the reputation for being an authoritarian, autocratic librarian and it is not difficult to see how that was acquired. Power has no respect for boundaries: his opinions became highly regarded and his influence sought in most areas of university activity. It has to be recognised that he would have had little time for much that now comprises management science since almost by its very nature it could obstruct or hinder the direct actions and initiatives which he and his staff made in the interests of the library. He drew a sharp line between government by consultation and government by consent. There can be little doubt that in the huge institution which the University of Manchester has become to-day, he would be forced into more open government, into advisory and consultative bodies, and the morning coffee sessions with senior academic colleagues would have become impossible, as they gradually did in my time there as librarian. The main management initiatives behind that informality and sociability, the direct contacts between the university's decision makers and the librarian would, however, certainly have been maintained and their importance most likely have increased.

With regard to new technology and its numerous applications in libraries, I have no doubt that Tyson would have seized upon them not simply because they remove so much drudgery and improve 'output', which he was always concerned to show to the University, but because they joined the departments within the University so much more effectively together and nowhere more so than in the libraries field. He would also have supported any development, such as JANET (Joint Academic Network), which promoted the University to the outside world and which strengthened the standing of the Library in the eyes of others. I am also sure that he would be as concerned as I am about the implications of technology for his recruitment policies of graduate staff, for the continuing need to employ scholars in those crucial areas of library administration. The largest concentration of such staff, as already noted, used to be in the cataloguing/classification department: shared cataloguing can only remove the need for many of these. The recruitment of good graduates cannot be justified to carry out key-punching. In some smaller libraries in the USA the effects of this

could be seen already a decade ago and even in a library the size of Cambridge there is an uneasy correlation between the reduction of graduate staff, albeit small in numbers, over the last ten years and the exploitation of new technology. Any reduction in the numbers of good graduate staff employed in libraries has to be a bad thing for librarianship. Is this the real price of the new technology, of information science?

This is a theme which I have addressed elsewhere on various occasions. To some librarians it points to the inevitable substitution of professionally qualified staff for the 'old-fashioned' scholar, to the final victory of the "modern municipal". Others, I regret to say, simply do not care. To me it is changing the nature of libraries, and will eventually affect their standing and the status of their staff radically. Technicians abound already in universities and they have consistently been denied academic status. There is no reason to believe that technicians employed in libraries will be treated differently. Nor is this confined to University Libraries. It is affecting all kinds of library, even private ones. The British Library is not the British Museum Library for more reasons than the amalgamations which formed it in the early seventies. Formerly the hub of bibliographical scholarship in Britain, it is now subject to a civil service bureaucracy, enmeshed in committee structures. Bureaucracy is no substitute for management, though sometimes mistaken for it. It was designed out of its distinguished scholarly ways by a government committee into a world to-day of performance indicators, income generation and management science relevance. It has lost those scholars, formerly so numerous, who, it was sometimes said, the Library could not afford, but who did so much to establish the great scholarly reputation of the Library. To-day they are overshadowed by administrators and I am sure that our President [of LIBER] would have much to say about that. In the course of this massive upheaval a Library Board replaced Trustees which by its composition looks inward and lacks the political 'clout' or will of its predecessors. Beyond that it has generated so many Advisory Bodies and Committees as to put in jeopardy not only the management but the scarce finances of the Library.

I believe, with Tyson, that the greatest long-term contribution I can make to librarianship lies in building my library, its collections, wherever possible and, as far as I can, in making them available not only to the scholars in Cambridge but to the wider community. We are about to explore very close co-operation with a German University Library of comparable standing to promote that end. Nevertheless, meeting at this Conference in Padua, a town so immersed in classical antiquity, I am minded to think of the current journey in librarianship in terms of Scylla and Charybdis. The new technology beckons but the pull of the scholarly past and present is very strong.

It is difficult to forget that the success of libraries has depended essentially in the past on their scholarly resources and their availability. This was made possible by the scholars who worked within them and by the uncomplicated

management structures they evolved. Yet, the new technology has undoubtedly promoted the availability of stock nationwide on an hitherto unknown scale and has enabled libraries to contend with, if not altogether contain, the massive surge in published output librarians are now witnessing. It has turned co-operation into more than an empty promise, which - if British Librarians are honest - is what it was for many years, lip-service which can now be replaced by the real thing. In Britain, the six Copyright Deposit Libraries are working increasingly together toward a national library network, the Consortium of University Research Libraries is forming a joint database which was formerly impossible, inter-library lending percolates every library. Moreover, these activities, like so many more which could be cited, have an international potential. It is impossible to ignore the benefits the new technology has brought and continues to bring.

The main beneficiaries so far have been the clientele of academic libraries, scholars and scholarship. In the course of these developments the new technology has also introduced into libraries another hitherto unknown species, the information technician, whose interests lie almost exclusively in their systems and their machines and for whom traditional library priorities are, if not unknown quantities, more of a challenge to their strength than the scholarly capital of the library. Perhaps this is the way that libraries must inevitably go but the implications for librarianship should at least be recognised.

Libraries have survived as storehouses of information/knowledge in the past and the library keepers have provided the key to it. Holding on to that key will involve more than management expertise. Indeed, the logic of it may well suggest to management scientists that the key should be held by those providing the technology, the obvious means of access. It is a fact, moreover, that some enterprises of a purely scholarly bibliographic or informational interest are already to be found located outside libraries, not within them, and are managed by subject specialists, other than librarians, who increasingly regard librarians as assistants, finding the substance of their scholarship for them. That was formerly the librarian's job. No less a matter for concern should be the fact that, increasingly, scholarly communication is by-passing our libraries and the signs are that, with desk-top publishing, the trade too will be left high and dry along with any pretension to bibliographic control.

This erosion of the librarian's position and standing will continue unless the danger is recognised and steps are taken to contain it. The strength of libraries hitherto has been their place in, and hold on, scholarship and all my instincts tell me to "hold fast to that which is good". Despite that the widespread use of the new technology, its immense potential for good, has also persuaded me to spend very large sums in its implementation and to construct within a decade an Automation Department in Cambridge University Library, comparable in size with the Department of Printed Books which reaches back over the centuries. I take comfort from the fact that in recent years in Britain there have been

examples of scholarly, library-based developments which have actually promoted librarianship in scholarly terms. For example, the American Studies Library Group, now a SCONUL Advisory Group, had initially almost as many non-library specialists in its membership as librarians and its successes were notable. It was a firm alliance with scholarship which represented increased influence of librarians. The presence of Professor Bernhard Fabian at the previous Conference of LIBER points also in the right direction. On the other hand I am not so sanguine about my friend, Henry Schneider, whilst appreciating what he has done for the ESTC. Is he doing a librarian out of a job? To compound the situation we all know of institutions where directors of computing services are also taking charge of libraries. There are many conflicting pieces of evidence but they all suggest an urgent need now to strengthen the scholarly base of our profession, to tie ourselves more firmly into academic affairs, to restore that sense of the indispensable, if the management of our libraries and our calling itself is not to deteriorate into a simple technological exercise. Perhaps I am too pessimistic, but librarians really should read the small print of the writing on the wall and turn again to scholarly values before it is too late.

I am sure that I am preaching to converted. We all want librarianship to prosper and do well. I feel I should be addressing these remarks to those on whom we ultimately all depend, our users, inciting, them not to mistake the means for the end. Deep down inside, I wonder - as the fifty-fifth University Librarian of Cambridge - whether we shall ever reach sixty, not forgetting that two of my predecessors were burned at the stake in Oxford, but for reasons that have little to do with our profession.

Conspectus in Europe

ANN MATHESON

National Library of Scotland, Edinburgh

The Conspectus methodology, which developed in the United States in the early 1980s, is a technique for assessing in the subject strengths and weaknesses of library collections, either within a single library or among a group of libraries linked by function or by geography. Conspectus information, when obtained, can be used not only as a means of increasing internal staff awareness of a library's collections, but as a foundation for further co-operative action among a consortium of research libraries. The technique has become widely used in the United States research libraries through the work of the Research Libraries Group (RLG),¹ which has mounted US Conspectus information on its RLIN network, and the Association of Research Libraries (ARL), which introduced Conspectus into its North American Collections Inventory Project.² Conspectus has been adopted in Canada through the Canadian Association of Research Libraries (CARL), and more recently the technique has been introduced in Australian research libraries.³

The first use of the technique in Europe was by the British Library,⁴ which applied Conspectus to its own collections in 1985, and published the results in 1986 in microfiche form, with an accompanying text.⁵ The eleven Scottish research libraries (comprising the eight Scottish university libraries, the two major public reference libraries in Glasgow and Edinburgh, and the National Library) decided to apply Conspectus as a group, using a 'fast-track' approach in order to obtain Conspectus information within a reasonable timescale, in

¹ N E Gwinn and P H Mosher. 'Co-ordinating Collecting Development: the RLG Conspectus', *College and Research Libraries*, 44 (1983), 128-40.

² D Farrell and J Reed-Scott. 'The North American Collections Inventory Project: Implications for the Future of Co-ordinated Management of Research Collections', *Library Resources and Technical Services*, 33 (1989), 15-28.

³ 'The RLG Conspectus and Collection Evaluation: an Australian Perspective', *Australian Academic and Research Libraries*, 20 (1989), 1-50.

⁴ S Hanger. 'Collection Development in the British Library: the Role of the RLG Conspectus', *Journal of Librarianship*, 19 (1987), 89-107.

⁵ B G F Holt and S Hanger. *Conspectus in the British Library: a Summary of Current Collecting Intensity Data as Recorded on RLG Conspectus Worksheets with Completed Worksheets on Microfiche*. London, 1986.

1986/87).⁶ A programme of voluntarily accepting co-operative collecting responsibilities (CCRs) is now in progress among the eleven Scottish research libraries, and the Conspectus information is also being used to assist groups of subject specialists. The national Library of Wales has also carried out a Conspectus assessment of its own collections, and some other libraries (the National Art Library, the University of London, and the Bodleian Library, for example) have either carried out pilot surveys or have completed Conspectus in draft. The Conspectus information from the British Library, the eleven Scottish research libraries, and, shortly, that from the National Library of Wales - has been mounted on an online search system developed on behalf of UK research libraries by the British Library.

In 1987, J M Smethurst, Director General, British Library, presented a paper on Conspectus to the *Ligue des Bibliothèques Européennes de Recherche (LIBER)*.⁷ The Executive Committee considered that LIBER should take an appropriate role in advancing Conspectus in continental Europe, although they also recognized the complexities of introducing Conspectus into a multi-lingual and multinational environment. It was therefore anticipated that it would take some considerable time to adapt Conspectus appropriately for use in a continental European context.⁸ Nevertheless, the Executive Committee decided to establish a Conspectus Working Group, to which it assigned the following remit:

1. To promote the use of Conspectus for resource sharing in the fields of collection development and retrospective conversion as well as conservation and preservation.
2. To map and assess this use.
3. To consider the demand for translations of the existing Conspectus worksheets.
4. To consider the need for European, national, regional and local adaptations of the schedules and look for their respective compatibility and common standards.
5. To advise the Executive Committee on the development of infrastructural elements (eg relating to networking, Conspectus databases) in Europe.

⁶ A Matheson. 'The Planning and Implementation of Conspectus in Scotland', *Journal of Librarianship*, 19 (1987), 141-51; 'The Conspectus Experience', *Journal of Librarianship*, 22 (1990), 171-82; and 'Conspectus in the UK', *Alexandria*, 1 (1989), 51-59. R Milne. 'Conspectus at the Coal-Face', *British Journal of Academic Librarianship*, 3 (1988), 89-98.

⁷ *LIBER News Sheet*, 22 (1987), p. 39.

⁸ H J Heaney. 'Western European Interest in Conspectus', *Libri*, 40 (1990), 28-32.

6. To gather and promote information among European research libraries concerning the use and development of Conspectus.

The Working Group has representatives, at present, from a total of ten European areas (France, the Netherlands, Switzerland, Austria, Portugal, Sweden, Catalonia, Spain and the UK), with the prospect of representation from Italy, Belgium and Ireland. In due course, it is hoped to include representation from countries in Eastern Europe. The Working Group has met on a total of twelve occasions so far: the frequency of meetings has had to take into account the financial pressures currently faced by most European research libraries. LIBER has not been in a position to meet the travel costs of members of its Working Groups, and, consequently, it has been important to try to arrange meetings of the Conspectus Group to coincide with other international meetings. The lack of financial support for the Group's activities, of which LIBER is aware, makes it difficult to ensure that all the members of the Working Group are able to attend every meeting. It also underlines that the progress achieved so far is all the more significant since it is based on the voluntary contributions of staff members from a small number of European research libraries, who feel that, the Conspectus technique, properly adapted, can be applied usefully in their own libraries and countries, and who are committed to the ideals of closer European integration, and the international exchange of information.

Within Europe, individual countries, and individual libraries, have varying priorities in a national context, and these priorities are, of course, subject to alteration in the light of national events. For example, the plans for the new *Bibliothèque de France*, and the preparatory work for its opening, is exercising an influence on the priorities within the context of French research libraries as a whole. In its work, the Working Group on Conspectus recognizes that the priority that individual countries can assign to Conspectus will be bound to be influenced by national priorities, and also, of course, that research libraries in individual European countries may be at different stages in their development of collaborative links with other research libraries to which they are linked either by function or by geography. The emphasis of the Working Group's activities so far has been focused, therefore, on identifying and implementing the amendments to the existing Conspectus documentation that is essential if Conspectus is to be used effectively in European research libraries.

The Group's work up to the present has centred on the following main areas:

1. The adaptation of the Conspectus work-sheets for the main subject divisions (ie history, religion and philosophy, literature and law) that require, first, alternation to reduce the existing 'Anglocentric' emphasis

and, second, expansion to ensure that they adequately European history and civilization.

2. The translation of the work-sheets, once amended, into the languages of the countries represented on the Working Group, where is felt to be important, or necessary, in an national context. The translations of the work-sheets into French is now well advanced; such translation as is felt to be necessary in the Netherlands has already been carried out; and arrangements are in hand for the translation of the work-sheets into German. As countries join the Working Group, of course, arrangements will have to continue to be made for such amendments as are felt to be necessary in each national context, and for the translation into the relevant language.
3. The redefinition of the language codes to suit a multi-lingual environment. A solution to adequately describing the linguistic breadth of library collections, based on a proposal from the French representatives, has been agreed; and the question of how the national language, or languages of each library, should be denoted (ie LC MARC or ISO) is currently being investigated by the representative from Germany.

In adapting Conspectus for use in Europe, it has been felt to be very important to maintain contact with the Research Libraries Group (RLG) and the Association of Research Libraries (ARL). A very welcome connexion has recently developed between the European Conspectus Group and the Research Libraries Group (RLG), not only at the practical level (all adaptations to the work-sheets are referred to RLG for approval, for example), but also at the level of international policy development, since RLG has recently consented to act as a 'clearing-house' for international Conspectus developments in North America, Europe and the Antipodes. A representative from RLG now attends meetings of the Conspectus Group, and, in turn, representation from the Group has been invited by RLG's Conspectus Sub-Committee. When European libraries, and countries, reach the stage of requiring active training programmes in Conspectus implementation, it is hoped to involve the Association of Research Libraries (ARL), with their extensive experience of training 'conspectors' in the United States, Canada, and Scotland, etc. Contact of this kind is vital, since although Conspectus must be adapted for use in a European context in a way that will enable it to be used successfully in European research libraries, it is most important that we continue to maintain links with the originators of the Conspectus system.

We have some common aims. Both LIBER and the Council of European Librarians (CENL), which has established a European National Libraries Con-

spectus Group, would welcome the development of an international Conspectus database, or a network of linked databases, to which European Conspectus information would make a major contribution, representing, as it does, the rich collections of long countries of a shared European printed heritage. The Research Libraries Group's interest in co-operating with European Conspectus Group, and the decision of the RLG Conspectus Sub-Committee in 1990 to 'establish an international base level for the Conspectus, with the broadest template' are welcome steps forward to this eventual goal.

The first continental European country to proceed with a full Conspectus programme is the Netherlands, which has appointed a National Conspectus Officer. Forty Dutch research libraries have agreed to a collaborative programme, in which the initial step is to add Conspectus codes to the national classification numbers in their national database (PICA). Three libraries in Sweden (The Royal Library, Stockholm University Library, and Uppsala University Library) have carried out a part Conspectus of their holdings, although no national decision to apply Conspectus has been taken. In France the Bibliothèque Sainte-Geneviève, Paris, and the Bibliothèque Nationale are both interested in the development of Conspectus, and the Bibliothèque Sainte-Geneviève is playing a central part in the Group's work. The Deutsche Bibliothek is taking a leading role in Germany. Portugal, which has also appointed a National Conspectus Officer, Spain and Catalonia see potential for Conspectus in their countries. For linguistic reasons Austria and Switzerland are keen to see Conspectus documentation translated into French and German.

The Conspectus Group's primary responsibility is to facilitate the changes that are necessary to enable Conspectus to be used in European research libraries, and to solve the new challenge of how Conspectus can be used to assess collections in the rich multi-lingual culture of European research libraries. The task of 'Europeanizing' Conspectus documentation will lead on the need to devise training programmes for 'conspectors' in European research libraries, and investigation of how European Conspectus information, once obtained, can most effectively be made available online, both nationally and internationally.

The decision to apply Conspectus in a national context, however, will be made by library directors and appropriate Ministries, and so the Council of European National Directors (CENL) has an important role to fulfil in promoting the benefits of a European Conspectus. In many European countries the experience of active collaboration among research libraries with common aims is comparatively new. Collaboration in resource sharing involves a long and complex process of learning how to combine the needs of an individual library with those of others, or 'acting locally and thinking nationally'. Conspectus can provide the means to encourage realistic collaboration among research libraries, which can benefit both libraries and researchers; and, at the level of the individual library, Conspectus can help to make library staff better informed

about the contents of their collections. If Conspectus is to find its full potential in Europe, it is essential that the existing documentation is suitably adapted for European use as soon as practicable, so that the amended 'European' Conspectus is ready at the point at which individual libraries, or groups of libraries, wish to implement it. It is equally important, bearing in mind the international needs of scholarship and research, and the increasing availability of global information, to try to ensure that European modifications are also compatible with international use of Conspectus.

LIBER CONSPECTUS GROUP

Membership

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July 1991

Book Review

Hofmann, Christina: *Die Flugschriften der Universitätsbibliothek Eichstätt.* Wiesbaden: Harrassowitz, 1990 (Kataloge der Universitätsbibliothek Eichstätt; 6). ISBN 3-447-03086-0.

The Archiepiscopal seminary library at Eichstätt, affiliated with Eichstätt university library, possesses a remarkable collection of pamphlets and leaflets from the middle of the 19th century up to the end of World War II. They have been registered in a catalogue published now as volume 6 of the Eichstätt university library's catalogue series.

The greatest part of these documents, about 600 out of more than 700, dates from the era of National Socialism, and most of them, again, come from the town and district of Eichstätt. Therefore, they represent a comprehensive and unique collection of specific local historical sources. To have them made accessible to the public is a merit to be appreciated very much.

In her introduction to the register the editor gives a vivid description of events typical for Eichstätt's history during the Third Reich. This background information is based not only on an interpretation of the sources registered in the book, but also on methods of oral history. The editor wants to emphasize the result of former historical studies that Eichstätt's population was comparatively strongly resistant to all kinds of National Socialist policies and propaganda. This cannot be doubted, the criteria for defining the phenomenon of resistance, however, are at least questionable: "Für ein totalitäres System ist Widerstand nicht nur eine offensive Bedrohung. Alles, was den totalen Anspruch eines solches Systems auf alle Lebensbereiche in Frage stellt, ist für den Totalitarismus bereits eine Form des Widerstands. ... Schon allein regelmäßiger Kirchenbesuch und die Teilnahme an religiösen Veranstaltungen wie Wallfahrten und Prozessionen macht deutlich, daß die Betroffenen auf geistigem Gebiet nicht mit dem Nationalsozialismus konform gingen" (S. 11). A statement like this does not reflect the arguments and results of very intensive discussions in the field of historical and political science during the last ten years¹. Respective studies as

¹ Steinbach, Peter. "Widerstand gegen den Nationalsozialismus. Geschichte und Deutung im Spannungsfeld der Traditionsbildung." In: *Machverfall und Machergreifung. Aufstieg und Herrschaft des Nationalsozialismus.* Wolfgang Altgeld.... München: Bayerische Landeszentrale für politische Bildungsarbeit, 1983, S. 305-338. - Löwenthal, Richard. "Widerstand im totalen Staat." In: *Widerstand und Verweigerung in Deutschland 1933-1945.* Hrsg. von Richard Löwenthal, Patrick von zur Mühlen. Berlin: Dietz, 1982, S. 11-24. - Steinbach, Peter. "Gruppen,

well as other basic works on the history of the Third Reich are missing in the bibliography.

The introductory article is followed by a more technical introduction characterizing the collection as a whole and explaining the principles and criteria underlying the listing and description of the documents. They are arranged according to a rough classification. There are two main sections: *Ecclesiastica* and *Politica*. The section *Politica* is subdivided chronologically according to the periods of modern German history: German Empire, World War I, Weimar Republic, Third Reich (including World War II). The last section, to which the majority of documents belongs, is further subdivided by subjects. The main criteria for relating a document to a subject defined section or subdivision are its content and purpose. The pamphlets and leaflets listed in the section *Ecclesiastica* are said to concern merely religious themes or events. They include, however, some documents whose purpose can hardly be defined as merely religious especially when considering the historical and political background. The pamphlet no 8, e.g., explains the idea of the encyclical "Quadragesimo anno" dealing with essential political and social questions. 56 documents out of the whole of 64 listed under *Ecclesiastica* have been published during the Third Reich. At that time almost every public statement had a political meaning, too. This is the case, e.g., with document no 17 describing a vision of Germany menaced by armies of the neighbouring countries, no 31 lamenting the fate of German emigrants (in 1936!), no 32 discussing the question of landed property (in 1937!), no 46 which reminds that All Saint's Day is only an ecclesiastical but no longer a legal holiday (in 1941!).

The first three subdivisions of the *Politica* section comprise only 44 documents dating from 1895 up to 1933 which are not especially significant in themselves.

The last part relating to the period of the Third Reich is further subdivided into: National Socialist Propaganda, National Socialist Propaganda by the Catholic Church, Resistance in general, Catholic Resistance, Protestant Church, Allied Propaganda, Way of Living during World War II.

The subject heading "Nationalsocialist Propaganda by the Catholic Church" is somewhat misleading because most of the documents are produced by individuals of which only some have been identified as clerics as indicated in the name index.

Most important is the part Catholic Resistance with more than 170 documents registered. It contains official, individual and anonymous statements against National Socialist rule. Some documents listed here, however, seem to

support National Socialist positions. Without further explanation it is not evident if and why they are to be seen as examples of indirect ("grey", "black") propaganda mentioned in the introduction (p. 4).

The scheme for recording the pamphlets is more or less limited to formal or bibliographical information: author (if named), title, brief description of the main features with extracts of significant parts, document type (typoscript or print), place of publication, publisher, size. Documents which have already been described in other publications are only listed. This is the case with many leaflets of war propaganda. Therefore, the catalogue primarily represents an inventory of this special collection. Besides, it leads to rich and unique source material of the history of the Third Reich and should therefore encourage further studies in that field, too.

ULRIKE EICH (Hamburg)

News Section

ANNOUNCEMENT
CULTURAL HERITAGE COLLECTED IN LIBRARIES OF
GEOSCIENCE, MINING AND METALLURGY - PAST, PRESENT
AND STRATEGY FOR THE NEXT MILLENNIUM

The libraries of Geoscience, mining and metallurgy in Europe (as well as on other continents) contain a rich cultural heritage consisting of "old" books, manuscripts, sketches, maps and unpublished works, sometimes also coins, medallions, pewter figures, carvings, etc. The importance of these collections is well known to librarians, historians, restorers, antiquarians, academies, scientific societies and associations, curators of monuments, and many more ...

In September, 1993, an international symposium of several days will be held on the above subject in Freiberg, Saxony. This symposium is jointly organized by the Department of reserve précieuse of the Library of Bergakademie Freiberg and the University Library of Montanuniversität Leoben. The first announcement is to be distributed in mid-1992.

In order to efficiently prepare the symposium, we request all those interested to send us their wishes, comments, suggestions for papers, etc. now.

We thank you in advance for your answer.

Yours sincerely - Glückauf!

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EUROPEAN LIBRARY / INFORMATION EDUCATORS FORM
A NEW ASSOCIATION

Twenty-six heads of departments from fourteen countries met in Stuttgart on the 5th and 6th of October and agreed to set up a new association, to be called

EUCLID: the European Association for Library and Information Education and Research.

Membership of EUCLID is open to tertiary level educational institutions which offer courses in librarianship, information science and/or information management in any country which has membership of the Council of Europe. It was felt that adoption of the Council of Europe criterion would avoid difficulties in defining "Europe" either geographically or geo-politically. The Board of EUCLID will be considering the possibility of "Affiliate" membership for institutions not entitled to full membership.

EUCLID will be managed by a Board, made up of representatives from different areas of Europe. The first Board is composed of Dr. Geza Fülöp, Department of Library Science, Elte University, Budapest; Ole Harbo, Rector of the Royal School of Librarianship, Copenhagen (Chairman); Professor Merce Bosch Pou, Escola Universitaria de Biblioteconomia i Documentacio, Barcelona; Professor Peter Vodosek, Fachhochschule für Bibliothkswesen, Stuttgart; and Professor Tom Wilson, Department of Information Studies, University of Sheffield. The Board will have its first meeting in Budapest in April 1992 and the first general Conference will be held in 1993.

The meeting began with a presentation by Professor Tom Wilson on the need for a European Association, in which he identified three main sets of functions: encouraging collaboration in the European programmes or by other bilateral or multilateral arrangements through the general conference, invitations of EUCLID members to national and regional meetings, and by other communication means; information and data gathering to provide a more detailed source of information than that offered by the various directories of organizations in the field; and information dissemination by means of a newsletter. The newsletter might be transmitted electronically over the COSINE (Cooperation for Open Systems Interconnection Networking in Europe) network.

The focus of discussion, on the second day of the meeting was in academic and other links under the various programmes of the European Commission, particularly ERASMUS, COMETT, and TEMPUS. Presentations on experience in using ERASMUS and TEMPUS were given by Professor John Feather of Loughborough University and by Mr. Ian Johnston of Robert Gordon's Institute, Aberdeen and there was much informal discussion on establishing links. These discussions alone clearly confirmed the need for an Association like EUCLID to provide a focus for the exchange of experience and the building of links. Other presentations were given on: the educational networks of the Nordic countries, by Rector Tor Henriksen, School of Library and Information Science, Oslo; the AIESI network of the Francophone countries, by Professor Y. Estermann, Institut d'Etudes Sociales, Geneva; and the national research support system of Germany (DAAD), by Professor Peter Vodosek.

Institutions wishing to become members of EUCLID are invited to write to Ole Harbo, Rector, Royal School of Librarianship, 6 Birketinget, DK-2300 Copenhagen S, Denmark, or to approach any member of the Board.

**BAU- UND NUTZUNGSPLANUNG VON WISSENSCHAFT-
LICHEN BIBLIOTHEKEN. BEARB. VON ROLF FUHLROTT UND
ROBERT K. JOPP MIT DER BAUKOMMISSION DES
DEUTSCHEN BIBLIOTHEKSINSTITUTS.
BERLIN; KÖLN: BEUTH 1988 (DIN-FACHBERICHT 13).**

The aim of the paper: The DIN Special Report is intended to be an assistance for both librarians and architects for the planning of library buildings. The given standards have been developed from analyses and experience as a basis for the quantitative assessment of requirements for use, thus for the planning of university and research libraries, that is, for small collections in university institutes and in administrations, as well as in great and independent libraries, and also for new and old buildings, i. e. in the case of the adaption of an existing building to be used as a library. The DIN Special Report will help to assess space needs for the specific uses in libraries, and to calculate the necessary bearing capacities of ceilings, as well as to prepare lump cost estimations for new buildings. For this purpose a number of standard dimensions and patterns has been established for furniture, technical equipment, and uses, which, on the other hand, are flexible enough to meet most different and special conditions of all kinds of libraries.

Technology: The DIN Special Report contains a dictionary of library terms which might help to eliminate misunderstanding between architects and librarians, considering this to be a main obstacle to reasonable planning.

Organizations of, and areas of use in, libraries: Another concisely formulated chapter of the paper describes the different organizational patterns of libraries, such as university and research, public, and special libraries. University and research libraries collect literature for research and teaching purposes, i. e. national, regional, university and special libraries, which are used by patrons with special interests. Public libraries collect literature in all fields of information, further education, and entertainment; they aim at a general public.

Usable areas: This chapter contains a considerable number of tables and figures about experienced and established standards on furniture, i. e. shelving for books and other media, catalogs, reading places, working places, computer and terminal working places, as well as working places for staff. In addition, a

number of formula will permit the calculation of space needs i. e. for shelving under other than standard conditions.

Necessary bearing capacities: Based on the German DIN Standards, the paper indicates guidelines for the calculation of the minimum bearing capacity of ceilings in different usable areas in libraries. Annex: At the end of the paper there is a checklist of all rooms and/or spaces occurring in libraries, this giving an adequate elp for control, a list of key literature referred to, and a subject index.