IFLA/UNESCO

Survey on Digitisation

and Preservation

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on behalf of

UNESCO

<u>CONTENTS</u>

<u>Introduction</u>

"There is a demand for knowledge about digital sources, particularly humanities texts which have been digitised from analogue form" [1]

At the time of writing, a comprehensive worldwide listing of important digitised collections in libraries and other major cultural institutions does not exist. This has been recognised by UNESCO as a major gap in our knowledge and awareness of accessible cultural heritage collections, and a major worldwide survey on digitisation and preservation has now been undertaken in an effort to fill that gap.

This report presents the results of that survey, and an analysis of the responses. The report provides a snapshot picture of the state of digitisation activity worldwide, and gives an indication of the rapid growth in this area in recent years. A website is also being developed which aims to offer a comprehensive listing of all major collections of digitised materials and on-going digitisation programmes worldwide, in order to offer a single focal point for information on digitised collections. When fully operational, the website will act as a "virtual library" by offering direct access to those collections (where permission to link has been granted) over the Internet.

IFLA PAC and UAP

The survey on digitisation and preservation has been carried out on behalf of UNESCO by the IFLA Core Programmes for Preservation and Conservation (PAC) and Universal Availability of Publications (UAP) within the framework of UNESCO's Memory of the World programme.   IFLA, the International Federation of Library Associations and Institutions, encourages international co-operation among libraries and acts as a focal point for libraries everywhere. While a range of IFLA sections and committees focus on different aspects of library activity, there are five 'Core Programmes' which concentrate on the wider issues, encompassing between them all of the major concerns of libraries and indeed other cultural institutions.

The goals of the two IFLA Core Programmes which have worked together on this survey (PAC and UAP) coincide precisely with the main reasons normally quoted for digitising material: the preservation of documents, and the improvement in access to those documents. IFLA PAC aims to ensure that library and archive materials, published and unpublished, in all formats, will be ***preserved*** in accessible form for as long as possible. Since 1986, the

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[1] Fresko, Marc. Sources of digital information. London, British Library Research & Development Department, 1994. (British Library R & D Report 6102)

programme has set up a network of regional centres in order to deal with preservation issues around the world, and has a strong interest in the challenges presented by digital preservation. IFLA UAP aims to improve *access* to published material whenever, wherever and in whatever format it is required. This work can be concerned with publishing patterns, book supply, interlibrary lending and document delivery, copyright issues, and retention of last copies. Access to published material needs to be underpinned by access to bibliographic information about that material, and the development of directories and finding tools is a key area of UAP work. The UAP Programme's remit extends beyond traditional printed publications, and the Programme is keen to see the development of a web-based directory of digitised collections in order to improve access to, and increase awareness of, those collections.

UNESCO Memory of the World

The need to create a worldwide register of important cultural heritage has already been recognised by UNESCO in its "Memory of the World" programme, which aims to assist countries in preserving and digitising documentary heritage which meets the selection criteria for world significance. The two main principles of the Memory of the World programme are the preservation of documents and collections, and the improvement in access to them, and it is with these two concepts in mind that the UNESCO/IFLA survey on digitisation and preservation has been carried out.

UNESCO are acutely aware of the urgency to record the existence of culturally important documentary heritage: its "Lost Memory" database, an inventory of library collections and archive holdings which have suffered irreparable destruction or damage since 1900, indicates that in some cases, it is too late. Another UNESCO database, "Endangered memory", a world list of endangered library collections and archive holdings, highlights the fragile nature of some of the world's existing collections, and several organisations working in the area of digital preservation have indicated that already, vast amounts of digital material have been lost or irretrievably damaged, even before the issues of long-term preservation of digital collections had been recognised. Digital preservation is perhaps one of the most neglected areas in the management of electronic material, and this survey has also gathered some information on how the preservation issues have been handled by the libraries and other institutions which have responded.

The urgent need to create a worldwide, comprehensive database of digitised collections is therefore clear. More and more library collections are being digitised in this rapidly growing area, and it is the task of this project to record digitised collections of national and international cultural importance. At the same time, it will also try to identify collections of world significance which might be suitable for inclusion in the Memory of the World register.

The project: IFLA/UNESCO Survey on Digitisation and Preservation

The IFLA/UNESCO Survey on Digitisation and Preservation has three parts:

- The survey on digitisation and preservation, and resulting report
- The web-based directory of digitised collections
- The report on digital preservation issues

The survey

In order to establish the level of activity in the area of digitisation, a worldwide survey was carried out, and the results are presented in this report. Between August and December 1998, questionnaires were sent to over 150 national libraries and other institutions. The questionnaire was also available in electronic format via the IFLA UAP and PAC web pages, and information about the project and an invitation to submit a completed questionnaire were widely publicised. The questionnaire, and a complete list of institutions which responded can be found at Appendices I and II. The questionnaire contained sections on the following areas of interest:

- Existing or planned digitisation programmes and policies
- Selection of material for digitisation
- Co-operation with other national institutions
- Staffing and costs
- Digitisation techniques
- Format of digitised material
- The documents themselves
- Access to the digitised collections, charges, reproduction and copyright
- Products produced from the digitised documents
- Policies for the preservation of the digitised documents
- Future developments

One of the most significant findings from the survey is the clear lack of firm policies in this area, and the complete lack of consistency in all of the above areas among all the libraries which responded. Information about digitisation techniques is not in short supply, nor is there a shortage of organisations which can offer advice in this area, but different organisations appear to use different sources of advice and there appears to be a lack of co-ordination and information exchange between organisations. A full discussion of the issues raised from the findings forms the major content of this report.

Since the project aims to concentrate on cultural collections of national significance, questionnaires were initially distributed to the national library (where one exists) in each country. It quickly became clear, however, that many important digitisation programmes are also underway in universities and other institutions, and that these could not be ignored if a true picture of major digitisation programmes was to be drawn.

As a result, most of the responses have been received from national libraries, with a small number coming from university and other academic libraries. It is envisaged, however, that the web-based directory of digitisation programmes will expand greatly to include a very much larger number of university-based digitisation programmes than are represented here. National archives are also known to be active in the digitisation of major archival collections, and questionnaires have also been sent to a small number of such institutions.

The web-based directory

As well as surveying activity in the area of digitisation, the project will compile a full listing of important digitised collections. This second aim is being answered by the creation of a web-accessible database of all significant digitised collections in libraries and other national cultural institutions. The database will be available via the UNESCO website. Records will exist for each major collection, and clickable links will take the user direct to the entry point for access to the collection itself. Brief information at each record will describe the collection and the holding library, and where relevant, links will allow access to the website of the holding institution and to the national digitisation policy if one exists.

Although the directory will be small in the first instance, there are plans to increase the number of records listed, until it truly represents a worldwide, comprehensive list of the world's major digitised collections. There are plans to allow libraries to submit details of their digitisation programmes via the website, and these records will be added after approval by a validation panel from IFLA and UNESCO.

Information about the development of the website can be found at http://www.ifla.org/VI/2/uap.htm.

Report on digital preservation issues

It has been said that digital preservation is the most neglected area in this arena, with large volumes of data already lost because of a lack of knowledge about long-term preservation issues. The survey has investigated current practice in this area, and a separate report will discuss the findings and many of the general issues in this important area.

The scope of the project

Digital material can take many forms, and it must be beyond the remit of any one project to undertake a full listing of *all* digital documents. Such a listing, if one existed, might include all electronic journals, all Internet websites, all commercial CD-ROMs, computer disks, bibliographic databases, paper-based collections which have been digitised... The list is endless, and there clearly needs to be some limits to any project of this type.

There are many catalogues and directories listing such products as commercial CD-ROMs, and information about journals, for example, which have been published only in electronic format is relatively easy to trace. On the other hand, many libraries and institutions have - relatively recently - joined in the trend to digitise some or all of their original paper-based collections, in order to make them more easily accessible to their end-users and others, to preserve the original, or for a number of other reasons. Typically, the manuscript collection of a famous writer, held by a major university library, might be thought to have wider appeal, and there have been many projects to digitise this type of collection. The resulting digital files will be made available on the library's website, and access open to anyone with Internet access, either free, or for a fee. The production of the digital collection may be publicised at the time, and the digital documents listed in the library's regular catalogues. Hyperlinks will probably be in place to connect the collection to a variety of other relevant websites so that its existence is publicised to a wide potential user base.

What does not exist however is a comprehensive listing of this type of digital collection, a central resource which would act as a focal point, or baseline, by offering bibliographic information about a wide variety of digitised collections. This project aims to fill that gap.

The criteria, then, for inclusion in the IFLA/UNESCO Directory of Digitised Collections are:

Original format: The main criterion for inclusion in the Directory is that the works have been digitised from a non-digital original copy. Typically, original works will include manuscripts, printed journals and monographs, photographs, letters, drawings and paintings, although this list is not exhaustive. The Directory will exclude "born-digital" works.

Digitised format: The digital collection might consist of a website, CD-ROM, diskette, or other digital package. Commercially-produced collections are not specifically excluded, but it should be remembered that the aim of the Directory is to improve access to major heritage collections and information about those collections. Digital items produced wholly for commercial gain are unlikely to fit the criteria, and the majority of items included in the Directory are likely to be available for consultation over the Internet for free or for a small subscription fee.

Content: There are no specific exclusions to the subject coverage or content of the digital collections to be listed. Again, however, emphasis is on cultural heritage, and most collections to be listed will fall into the subject area of the humanities, arts and literature. Historical studies, travel writing and photographic collections, and manuscript collections of classic writers appear to be typical of the collections often selected for digitisation projects.

Date: There is no cut-off date for inclusion in the Directory, either for the digital item, or for the original material. Many of the original collections are very old - digitising in order to preserve the original item is a common objective, and most projects tend to concentrate on out-of-copyright material - and of course most of the digital collections have been produced very recently.

Links with the Bibliotheca Universalis Project

In many respects the IFLA/UNESCO Survey on Digitisation and Preservation has very similar aims to the *Bibliotheca Universalis* Project, and it is therefore appropriate to discuss the links between the two projects.

The principle objective of Bibliotheca Universalis is to provide access to the world cultural heritage digitised by libraries. The Project was launched in February 1995 in the framework of the G7 activities on the Information Society. Eleven partners, mostly national libraries, are now involved in the project, which has as its goal the establishment of a common digital library from existing digitisation programmes. The main objective of Bibliotheca Universalis is "to make the major works of the world's scientific and cultural heritage accessible to a vast public via multimedia technologies, hence fostering the exchange of knowledge and dialogue over national and international borders."[2]

Bibliotheca Universalis also aims to strengthen the function of libraries and improve the international availability of digitised resources, through improved access to both bibliographic records and information content (integrating text, graphics, still images, sound and video information). It will encourage the definition and adoption of global standards. Furthermore, it aims to demonstrate how integrated digitisation techniques can support long term preservation as well as enabling immediate access to the information digitised. All documents included in the Project would belong to the public domain.

These aims are clearly similar to those expressed by the IFLA/UNESCO Project on Digitisation and Preservation, although there are some differences too. While the IFLA/UNESCO Project aims to be comprehensive in its coverage, including as many countries as possible in the Directory, Bibliotheca Universalis involves only libraries from the G7 Group of countries, plus four further countries which have made considerable progress in developing national digitisation policies. These are: Bibliothèque nationale de France and Ministère de la Culture et de la Communication (France), National Diet Library (Japan), The Library of Congress (United States), The National Library of Canada (Canada), Discoteca di Stato (Italy), Die Deutsche Bibliothek (Germany), The British Library (UK), Bibliothèque nationale de Suisse, Biblioteca Nacional (Portugal), Biblioteca nacional (Spain), Bibliothèque Royale Albert 1er (Belgium), the National Library of the Czech Republic.

Research under the Bibliotheca Universalis project established that several principles already applied to the creation of digital collections, which could generally be described as

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[2] Zillhardt, Sonia. Bibliotheca universalis : a G-7 global information society pilot project. Paper presented at the IFLA General Conference, August 16-21 1998, Amsterdam. Paper 031-98-E. http://www.ifla.org/IV/ifla64/031-98e.htm

encyclopaedic, thematic or historic. For Bibliotheca Universalis, it was recognised that the selection of a theme common to all partners would facilitate creation and access to a coherent digital collection. Such a Bibliotheca Universalis collection could be part of an existing digital collection or be created specifically for Bibliotheca Universalis purposes. The theme selected by the partners was "Exchange between people". This theme was considered large enough to enable a significant contribution by each partner (travel writings, explorations, immigration-emigration, scientific and technical exchanges etc), while introducing a manageable limit to the type of digitised material to be included in the collection.

Since Bibliotheca Universalis and the IFLA/UNESCO Survey are complementary in their nature, it was originally decided not to include in the IFLA/UNESCO survey those countries already participating in the Bibliotheca Universalis project. This explains why those libraries are, in the main, missing from the survey results in this report. However, because of the complementary nature of the two projects, it has been recognised that the IFLA/UNESCO Survey would not be complete without the inclusion of the G7 countries, and with this in mind, there are plans to cooperate with the co-ordinating partners of Bibliotheca Universalis in order to build links between the two initiatives.

The website of Bibliotheca Universalis can be found at http://www.konbib.nl/gabriel

Results of the survey

A copy of the questionnaire can be found at Appendix I. Between August and December 1998, questionnaires were dispatched to national libraries, universities, archives and other major cultural institutions. Responses were received until the cut-off date of 28 February 1999, and these replies form the basis of the results which follow. A list of organisations can be found at Appendix II.

The questionnaire listed 82 questions, and asked for a very detailed level of information, which is likely to have required input from more than one area of responsibility in the organisation. Replies were received from a wide cross-section of institutions and form a good basis for discussion.

The sections outlined below correspond to the sections in the questionnaire. The tables relate directly to the questions asked, and are followed by a discussion of the issues uncovered by the responses.

Section 1: Digitisation programmes and policy

The returned questionnaires came from all parts of the world including national libraries, university libraries, archives and governmental libraries. These gave a broad view of different digitisation programmes and policy decisions, and offered varied reasons why different institutions do not have digitisation programmes in place.

Does the library/archive have a programme for digitising collections?

YES	NO
48%	52%

Approximately half of all respondents already have some form of digitisation programme in place, a remarkably high number considering the relative infancy of this activity in the library world. Of the 52% of libraries/archives who do not have a programme for digitising collections only 3 had no plans to develop such a policy. This was mainly attributed to a lack of resources. Many of the libraries without a programme have definite plans to implement such a programme within a set timescale.

For example, the Austrian National Library has definite plans to have its digitisation policy in place within 3 years. The National and University Library of The Republic of Macedonia has no digitisation programme but does have a research project which will aim to develop multimedia databases of digitised medieval Slavonic manuscripts in the library's collection.

The National Library of the Philippines has no programme in place but has included the topic in its 1999 Conservation and Preservation Project which should lead to a programme starting in the near future.

When did the digitisation programme begin?

Before 1995	1995-1996	1997-1998	1999-2000
8%	42%	33%	17%

Ninety-two per cent of programmes have started since 1995, with the majority beginning in the four years from 1995-1998. These figures indicate clearly the very recent trend for digitising cultural collections. Already, a number of projects have been reported as beginning as recently as 1999, and it has already been shown that many more are planned.

How many items are included in the programme?

The number of items included in the different programmes varied greatly. The minimum number included is 25 items and the maximum number included is 525,000. These figures reflect the different start dates, timescales and investment each institute has chosen. Materials selected for digitisation include maps, government publications, theses, manuscripts, journals and monographs.

Is there a research programme dealing with digitisation?

YES	NO
67%	33%

Two thirds of libraries/archives surveyed had a research programme for digitisation in place, once again indicating the growing importance of digitisation in managing access to, and preservation of, library materials.

In the Republic of Korea, the National Assembly Library is co-operating with five other Korean government institutions on the 'National Digital Library Project'. The institutions will digitise materials according to their speciality. The project is divided into three stages and is totally funded by central government. Stage one is the 'establishment stage' and runs from 1998-2000. Stage two is the 'development stage' and will run from 2001-2003. The 'finishing stage' will then run from 2004.

The National Library of the Czech Republic has released the CD-ROM 'Digitization of rare library materials'. This CD-ROM concerns the rules for the structure of digital copies of rare documents as used by the Czech National Library. The format of the CD ROM has just been recommended as a UNESCO Memory of the World standard for digital output concerning rare material.

Section 2: Selection of materials for digitisation

The libraries/archives were asked which criteria guided selection of materials for digitisation. Institutions were asked to select as many of the criteria listed as they thought matched their reasons for selecting particular material for digitisation. This is a particularly interesting question since so much digitisation appears to be carried out for experimental reasons or because it seemed a "good idea". The choice of materials to be digitised sometimes appears to be done on an ad hoc basis, and to be an area where little co-ordination takes place.

What criteria guide selection of materials for digitisation?

Criteria	Percentage of libraries/archives choosing each criterion
Historical/cultural value	100%
Increase access	100%
Academic importance	92%
Reduce damage	69%
Preservation	69%
Provide document delivery services	46%
Save space	15%
Research into digital processes	15%
Commercial exploitation	7%

The results show that all the libraries/archives surveyed found that historical/cultural value and an increase in access were the criteria that guided which materials were selected for digitisation. Nearly all also thought that academic importance was essential to selection. UNESCO's Memory of the World Programme also cites improvement of access to material, and historical value as the two most important reasons for digitising library collections.

Commercial consideration was only chosen by 7% of those surveyed indicating that access to materials and preservation of materials is generally considered more important than making money from the collections.

Section 3: Co-operation

This section aims to ascertain the level of co-operation between organisations developing digitisation programmes, with whom they co-operate and the form that co-operation takes.

Is there any co-operation with other organisations to develop the digitisation programme?

YES	NO
85%	15%

Of the libraries/archives surveyed 85% co-operated with other organisations to help develop their digitisation programme, with only 15% choosing to work alone.

With which organisations does this co-operation take place?

Academic libraries	54%
Private companies	54%
Archives	31%
Public libraries	23%
Private libraries	15%
Government institutes	15%

The results show co-operation occurs with many different types of organisations. Just over half of those surveyed chose to co-operate with academic libraries with the same proportion choosing private companies. It is interesting to see how successful partnerships have developed in the interest of good digitisation projects, a good example being the UK-based Internet Library of Early Journals (ILEJ). This eLib project has been carried out by a consortium consisting of the research libraries of the Universities of Birmingham, Leeds, Manchester and Oxford, and provides user access to digitised images from three eighteenth century and three nineteenth century journals. Web servers were mounted at both Leeds and Oxford, and while the initial entry point is the Oxford Web interface, a transfer is made to the Leeds server wherever fuzzy matching is required. The link between the servers is transparent to the user, but indicates how co-operation between partners might work.

At what level does co-operation take place?

National	62%
International	38%
Local	15%

As might be expected, the majority of programmes enjoy co-operation on a national level, although the very nature of the work allows networking to take place between any locations. Thirty-eight per cent co-operate on an international level, but only 15% have a local level of co-operation. Some libraries/archives have different levels of co-operation for different projects.

How does the co-operation work?

Equal partnership	77%
Buying services and products	15%
Offering services commercially	8%

Only 8% of those surveyed said the co-operation consisted of offering services commercially and only 15% said it consisted of buying services and products. However 77% said that their co-operation consisted of an equal partnership between themselves and other organisations. Some libraries/archives found that more than one answer applied to their programmes. The Korean National Digital Library Project is managed by the National Assembly Library, in co-operation with the National Library of Korea, the Supreme Court Library, Korea Institute of Industry & Technology Information, Korea Research & Development Information Center and the Korea Research Information Center. In equal partnership, each institution is responsible for digitising materials relating to their own special subject areas.

Do you digitise material for other libraries?

YES	NO
15%	85%

Eighty-five per cent of the libraries/archives digitise only their own collections with just 15% digitising material from other organisations. One of these is The National Library of Norway which digitises materials from other national libraries, broadcast companies, museums, archives and private companies. The National Library of the Czech Republic also digitises for archives and public libraries, research libraries and special libraries.

Section 4: Staffing and costs of digitisation

How many staff work on the digitisation programme?

There is a wide range in the number of staff different institutions employ to work on their digitisation programmes, and some hire external contractors for specialist work. Survey responses ranged from 22 (National Assembly Library, Korea) to two (Biblioteca Nacional, Brazil, and National Library of Malaysia). Clearly, some major digitisation programmes will have staff dedicated to the project, while other projects may be carried out in the context of the normal work of the library and may find it more difficult to assess just how staffing is allocated to digitisation work.

The average number of full time staff employed by the libraries/archives which replied to the survey is seven.

How much is the digitisation estimated to cost?

	Maximum	Minimum	Average
Per page	US$15	US$0.12	US$7.72
Per book	US$154	US$28	US$70.66
Per serial issue	US$14	US$14	US$14

The cost of digitising items varies greatly in different digitisation programmes, partly because much digitisation is carried out by a third commercial party under contract which may make it difficult for the responding library to determine unit costs. The costs provided in the questionnaires are estimates and include staff, equipment, space, energy and any other related costs. Several respondents felt unable to offer even an approximate estimation, saying that costs varied too widely depending on what was being digitised. At the National Library of Korea it costs on average US$154 to digitise a book, whereas at The New York Public Library the cost was estimated to be US$28. The average cost among the libraries/archives surveyed is US$70.66.

Similarly the cost of digitising one page at the National Archives and Records Administration in the USA is US$15 compared to the National Assembly Library, Korea where the cost was estimated to be US$0.12. The average cost is US$7.72 per page.

The National Assembly Library, Korea, is the only library/archive to give the estimated cost of digitising microfilm where it costs US$1.50 per page. They also gave their total cost for their 10 year programme at US$10 million.

Respondents were also asked to estimate the cost of migration. This was particularly difficult to estimate and few respondents were able to offer a reply. Costs will naturally vary depending on what exactly requires conversion, the document structure, and on what process is carried out: for example, refreshment may be less costly than wholesale migration in some instances.

Section 5: Digitisation techniques

Who carries out the digitisation?

The Library	An outside body	Both
36%	28%	36%

Who prepares the documents?

Library staff	Outside staff	Both
73%	0%	27%

Thirty six per cent of libraries/archives in the survey carry out the digitisation themselves compared to 28% who use an outside organisation. Thirty six per cent use both themselves and an outside organisation to carry out the work. The fact that 72% of all institutions do some or all digitisation in the library rather than hand it over to an outside organisation is surprising, since economies of scale would suggest it to be more cost-effective to hand over the process of digitisation to an outside body. Reasons often cited for retaining the work within the confines of the library are consideration for the safe handling of the material and security issues surrounding the transportation of valuable documents.

While much of the digitisation process is carried out by outside companies, the preparation of the documents is almost always carried out by library staff, who are likely to be more familiar with handling the material. None of the libraries/archives used only staff from outside organisations to prepare their documents although 27% used a mixture of their own staff and outside staff. The majority, 73%, used only staff from their own organisation without outside assistance.

From what is the digitisation carried out?

The original	Reproductions	Both
27%	0%	73%

Twenty-seven per cent of libraries/archives used only the original item from which to make the digitised copy. Seventy-three per cent used a combination of the original item and reproductions, but none used only the reproduction for digitising the images.

If reproductions are used what type of reproduction is made?

Those libraries/archives which said they used reproductions from which to make the digitised copy were asked which forms of reproduction were used.

Photographic	55%
Microfilm	55%
Slides	45%
Photocopies	36%
Microfiche	36%

There is a fairly even split between the different forms of reproductions. Photographic and microfilm are the most popular and photocopies and microfiche the least. There is clearly a wide range of formats from which digitised images can be made, and different forms of reproduction will be appropriate for different types of original material.

Section 6: Format and consultation of digitised materials

Which resolutions are used for digitisation?

Various	300dpi	400dpi	600dpi	2000x3000	6000x7500
23%	45%	8%	8%	8%	8%

There are many different resolutions that can be used in digitising material. The returned questionnaires reflected this, some using several different types depending on the material being digitised. A resolution of 300dpi is by far the most popular resolution used, there being an even spread amongst the other types.

Which digital image formats are used?

Colour	85%
Black & white	69%
Grey level	46%

Colour format is the most popular type used, with 85% of the libraries/archives using it. Sixty-nine percent use black and white format and just under half use the grey level format. Many of the libraries/archives use all or a combination of these.

Which file format is obtained?

TIFF	85%
GIF	46%
PAL	8%

The TIFF format is the most popular with 85% of libraries/archives using it. Almost half the libraries/archives chose the GIF format but only 8% chose PAL.

Which image processing software is used?

Photoshop	80%
Other	20%

The vast majority of libraries - 80% - use Adobe Photoshop as their image processing software. Of the 20% who do not use Photoshop, the National Library of Korea have

developed their own system and the National and University Library of Iceland also have their own special software.

Are documents digitised which contain non-Latin characters?

YES	NO
50%	50%

The survey shows that exactly half the libraries/archives are digitising only documents containing characters from the Latin alphabet and half are also digitising materials containing non-Latin alphabet characters.

Some of the non-Latin alphabets used and the libraries/archives which use them include: the National and University Library from the Republic of Macedonia which has digitised Slavonic documents; the National Library of the Czech Republic which has digitised Arabic materials; the National Library of Malaysia which uses Campa scripts; the Royal Library, National Library of Sweden which has digitised documents containing Runes; the University of Pennsylvania which uses Hebrew and Greek; and the National Assembly Library in Korea which uses Korean characters.

Do you digitise sound recordings?

YES	NO
50%	50%

Half the libraries/archives include the digitisation of sound recordings in their programmes and half report that they do not. Some of the methods used include DAT, Real Audio, Sonic Studio and CDA.

Do you digitise film or video?

YES	NO
25%	75%

Seventy-five per cent of the libraries/archives do not digitise video and film in their programmes.

Is OCR software used for texts?

YES	NO
55%	45%

Just over half the libraries/archives use OCR software for texts. Among the software used are Adobe Capture, Omnipage and Recognition.

Do the documents undergo special treatment prior to OCR processing?

YES	NO
40%	60%

Forty per cent of documents undergo some kind of treatment before OCR processing leaving 60% that do not.

For what purpose is OCR processing used?

Automatic indexing	100%
Computer assisted reading	60%
Other	20%

All libraries/archives which use OCR use it for automatic indexing. Just over half, 60%, also use it for computer assisted reading and 20% use it for other purposes, such as text search and tagging into Unimarc format.

What OCR recognition rate has been obtained?

Maximum	Minimum	Average
99%	70%	90%

The maximum OCR recognition rate achieved is 99% and the minimum rate is 70%. Overall the average rate obtained is 90%.

Which image viewing software is used?

There are many different types of image viewing software available. Some of the ones used by the libraries/archives in the survey include Netscape and Explorer, Dynaweb, Informix and tiffviewer/sgml browser.

Have any workstations been developed specifically for consultation of digitised collections?

YES	NO
45%	55%

Forty-five per cent of libraries/archives have developed workstations especially to consult the digitised documents. Among those that have been developed are UNIX, Macintosh PC and 21" screen and true colour and 100mb ram.

Which navigation software is used?

There was a great range of answers to this question. The most common software used is Netscape Explorer, but also included in the replies were Excalibor retrieval ware and fileroom; Saros/Panagon, and other standard web browsers. It is clear that different file formats and document make-up may require different navigation software. This, coupled with the need to make access paths to digitised collections as compatible as possible with accessing other library collections, such as collection catalogues, will determine the requirements or otherwise to provide dedicated workstations for digitised collections.

Section 7: The documents themselves and related catalogues

What documents are being digitised?

Isolated single documents	Collections
0%	40%

As expected, most digitisation projects aim to digitise collections of works, rather than single isolated documents, although 60% do state that single documents are digitised in addition to collections. The remaining 40% report that only complete collections are digitised, with no isolated single documents being selected for digitisation.

What type of documents are included?

Rare books	49%
Photographs	44%
Manuscripts	39%
Books (monographs)	35%
Music	30%
Works of art, cartoons	15%
Serials	9%
Report literature	5%
Newspapers	5%
Maps	1%

The above table shows the type of material that is being digitised and the percentage of libraries/archives that are digitising that particular type of document. Not surprisingly, the digitisation of rare books is the most popular with nearly half the libraries/archives choosing to digitise them. Photographs and manuscripts also prove very popular when deciding which type of material to digitise.

Maps proved a very unpopular choice of material with only 1% deciding to digitise them. Newspapers, report literature and serials were only marginally more popular.

Are any of the following digitised?

Prints	58%
Engravings	42%
Posters	42%
Films & videos	25%
3D objects	8%
Fabrics & textiles	0%
Lithographs	0%
Drawings & water-colours	0%

Fifty-eight per cent of the libraries/archives have undertaken the digitisation of prints. Forty-two per cent of respondents state that they digitise engravings and posters, and 25% digitise sound recordings. Eight per cent are digitising 3D objects but none of the libraries/archives surveyed have chosen to digitise fabrics and textiles, lithographs, drawings or water-colours.

Where are the catalogue records for digitised material kept?

Included in main catalogues	In separate catalogue	Both
40%	20%	40%

Only 20% of the libraries/archives have the catalogue records for their digitised materials only in a separate catalogue. Forty per cent include them only in the main catalogues and 40% choose to hold the catalogue records in both the main catalogues and in a separate catalogue. It might be thought that location finding for digital collections will automatically be via electronic finding tools, rather than through more traditional library catalogues, but it is clear that if digitised collections are to be made available on the same basis as traditional library materials, then the existence of those collections must be recorded in a similar way to other materials. Inclusion of bibliographic records for the digital collections in mainstream catalogues is essential if access to the digital collections is to be regarded as 'normal' use, and it is refreshing to see that 60% of respondents report that records for digital material are

included in the main catalogue, whether or not they are also included in a separate 'digital' catalogue.

What form is the catalogue?

Electronic	83%
Internet or Website	75%
Intranet Server	16%
Paper	8%

Is digitised material catalogued to a recognised standard?

YES	NO
64%	36%

Sixty four per cent of responding libraries catalogued the digitised material to a recognised standard and 36% did not. Of those that use a recognised standard, the Royal Library, National Library of Sweden uses LIBRIS Marc; the National and University Library, Republic of Macedonia uses UNIMARC; the National and University Library of Iceland uses UK MARC and the National Library of Korea use KOMARC. These are the normal standards used for non-digital catalogue records, and as such indicate that the recording of digital documents is well on the way to being integrated into normal library activity.

How are the records for the digitised document and the original document co-ordinated?

The same record	Records are independent of each other	Both apply
64%	18%	18%

It is an interesting question as to whether the catalogue record for the digitised document should be combined with that of the original document, or consist of a separate record, describing as it were a totally different item. The survey results show that most institutions produce only one catalogue records which provides bibliographic information for both the original and the digitised image. On the other hand many libraries also produce separate records for the two items, or a combination of both procedures is employed.

Section 8: Access to the documents, charges, reproduction and copyright

Any library collection is only as good as the access which is provided to that collection, and this section of the survey aims to establish the extent to which digitised documents are

available, and through what channels. Questions also related to copyright issues, and charges which may be in place for accessing the electronic documents.

Where are the digitised documents available?

Only on-site	Only in Library	Only in institution	Through a website
41%	33%	8%	83%

One third of the libraries/archives make their digitised material available only in the library, while 41% provide access on a site-wide basis. However by far the most common channel for the provision of access to digitised collections is via a website. Eighty-three per cent of respondents said that access was provided in this way.

Which functions are included in the browsing/viewing software?

Hypertext links	75%
Highlighting	41%
Other (see below)	33%

Hypertext links are a popular function in the browsing/viewing software, with three quarters of the libraries/archives surveyed using this function. Forty-one per cent provide highlighting in their software, and one third use other functions not specified on the questionnaire. These include: the National Library of New Zealand which offers full-screen and shopping basket options; the National Library of the Czech Republic which uses indexing and image editing; and the National and University Library of the Republic of Macedonia which uses key term searches.

Is the workstation equipped with an access control mechanism or billing software?

Access control mechanism	Billing software	Neither
41%	0%	49%

Just under half of the responding libraries/archives have some sort of access control mechanism on the workstation. It is one of the benefits of electronic document provision that access can be monitored and, if necessary, controlled.

Billing software was not provided by any of the respondents which may indicate the low priority given to commercial exploitation of the digitised collection. As discussed in Section Two of the survey, which relates to the criteria guiding the selection of materials for digitisation, in which just 7% listed commercial exploitation, the major reasons for digitisation of documents in an institution's collection are to preserve the original item, and to improve access to that material.

Nearly half the libraries/archives indicated that neither access control nor payments were managed by their system.

What is the workstation connected to?

The Internet	67%
An intranet	41%
Internal library servers	33%

Can users use OCR software on documents in image mode?

YES	NO
60%	40%

Do users have to pay to use digitised material?

YES	NO
36%	64%

Only 36% of libraries/archives make users pay to use their digitised material compared to 64% who make no charge. Some libraries/archives, such as the National Library of New Zealand, make no charge for viewing the digitised documents but make a charge for any reproductions, including downloading or printing.

Is copyright material digitised?

YES	NO
75%	25%

Three quarters of libraries/archives digitise copyright material leaving just one quarter who do not. For those who do digitise materials in copyright, the table below sets out the provisions under which this was done.

Under what arrangement is the digitisation of copyright material carried out?

Under legal provisions for libraries	67%
With owners agreement	55%
Without formalities	22%
By paying the owner a fee	-
Under licence	-

Of the options available none of the libraries/archives surveyed digitised copyright material under a licence agreement or by paying the owner a fee. Licence agreements tend to exist for access to material which is "born digital", for example, where electronic journals are available direct from the publisher's website, and this type of document has not been considered by this survey.

Twenty two per cent say they digitised material without formalities. Over half, 55%, digitised copyright material with the owner's permission and 67% digitised using the legal provisions for libraries.

Does the library own the copyright in the digitised form of the document?

YES	NO
73%	27%

Seventy-three per cent of libraries/archives own the copyright of the digitised form of the document. Of the 27% who do not own the copyright, the majority state that the copyright for the digitised document is owned by the original copyright owner. This is a very complex area, which cannot be answered simply by a single question, since many more than one copyright may be involved: copyright in the original item (which itself may involve several copyright owners), copyright in the microform if a microform copy is made from which to make the digital copy, and copyright in the resultant digital file. Nevertheless, it is an essential and difficult consideration, and many projects steer clear of in-copyright material for that very reason.

What are users allowed to do with the digitised material?

Make printouts	67%
Download to a PC	67%
Download to a Local Area Network (LAN)	58%
Download to a general network (WAN)	58%

The libraries/archives chose one or more of the options available. Sixty seven per cent allow users to make printouts and download to PCs. Fifty eight per cent allow their users to download to a local area network, or to download to a general network (WAN).

Are electronic management systems used to control copying?

YES	NO
36%	64%

Only 36% of the libraries/archives use an electronic management system to control copying, compared to 64% who do not employ such a system. Some of the libraries/archives, including the National Library of Norway, use these systems to control the copying of restricted materials.

Section 9: Products produced from the digitised documents

Do you produce any products from the documents digitised?

YES	NO
58%	42%

Which products are produced?

CD ROM	Photographs	Audio CDs	Paper documents
86%	29%	14%	71%

The table above shows that CD ROMs and paper documents are the most popular product to be produced from the digitised materials. Photographs and audio CDs are far less common, but are produced nevertheless by some libraries/archives, including the National Library of Norway which produces CD ROMs, paper documents, photographs and audio CDs.

Section 10: Preservation

Is there a preservation policy for documents in digital form?

YES	NO
64%	36%

Sixty four per cent of libraries/archives that digitise materials have a preservation policy for the digitised documents. This means that 36% have no preservation policy for their digitised documents.

If a document is digitised, is access still allowed to the original?

YES	NO
83%	17%

A large majority of the libraries/archives, 83%, still allow access to the original document when it has been digitised, but 17% only allow access to the digitised document and not the original. While digitisation is sometimes carried out in order to improve access to the document, with the intention of reducing the number of requests to view the original item (particularly in the case of very old or rare material), there is plenty of evidence to show that demand for access to the original material can actually increase when a digitised image is available. Awareness of the existence of the document is increased through the easy access to the digital copy, and this in turn increases interest in the original, even though sometimes a more detailed study can be made from the digital image than from the original item.

How are the originals stored?

In special conditions	67%
In the same way as other library material	58%

Sixty seven per cent of the libraries/archives surveyed store the original copy in special conditions. Fifty eight per cent store them in the same way as any other material. Some libraries store the material under either condition depending on the nature and condition of the material.

A climate-controlled room is a popular way of storing materials. The National Library of Norway store their originals in a mountain vault which has a constant temperature, constant low humidity and a filtering system to remove dust from the air. The National and University Library, Republic of Macedonia does not use a special room but stores its manuscripts in special metal boxes.

Is there a policy for migrating data to more recent technological platforms?

YES	NO
55%	45%

Just over half the libraries/archives have a policy for migrating data to more recent technological platforms. The time-scale on which this is done varies, some carrying out migration annually and others when it is necessary. All of the libraries/archives which say they migrate data, migrate all the data and do not select specific materials.

Is migration automatic, based on fixed criteria (eg. date)?

YES	NO
50%	50%

Half the libraries/archives have a system where migration is carried out automatically, and half do not. All the libraries/archives who have a migration policy undertake the migration themselves and do not involve outside organisations.

Section 11: Future Development

Would you allow your digitised documents to form part of a virtual library?

YES	NO
83%	17%

The majority of libraries/archives who have a digitisation policy, 83%, would allow their collections of digitised documents to become part of a virtual library.

Would you permit the database of such a library to be linked to your website to permit access to your digitised documents?

YES	NO
91%	9%

An overwhelming 91% of libraries/archives are willing to let a virtual library be linked to their websites for access to collections of digitised materials. Only 9% are unwilling to do so, although it is not clear why this response was given in those cases.

Conclusions

There is an overwhelming amount of work taking place in the field of digitisation of printed documents and other paper-based material, so much so in fact, that a survey such as this can only begin to scratch the surface of what is available. It is true however that no comprehensive record yet exists of exactly what is available, and it is to be hoped that this report goes some way to filling that gap.

What does exist in abundance is a range of advisory bodies, organisations, websites and other resources which should go a long way in offering help and advice to libraries and other institutions embarking on a digitisation project for the first time. Websites such as IFLA's pages which list organisations, projects, journals, conferences and other publications in the area of digitisation[3] are a very valuable jumping off point for more detailed advice elsewhere. Advisory bodies like the UK's Arts and Humanities Data Services (AHDS)[4] offer extremely valuable advice in areas such as best practice, standards, digital preservation and technical processes, while more specialised bodies such as TASI, the Technical Advisory Service for Images[5], or the Commission on Preservation and Access (CPA)[6] can offer clear advice on more specialised issues such as image digitisation.

One conclusion to be drawn from the present survey is the almost complete lack of consistency in the handling of digitisation projects, from the type of material selected for digitisation, through the technical processes used, to the methods of consultation and the handling of the digitised collections. It is recognised that standards which might be applied will vary according to the type of material to be digitised, and that this is still a relatively new area in which best practice continues to evolve and to be defined. However standards are a crucial area, and it behoves any library embarking on a digitisation project to consult advisory bodies in this area, not only on what is considered to be best practice for a particular set of circumstances, but also in order to avoid possible duplication of effort.

Although the present report will not in itself eliminate duplication of effort in this area, it is hoped that the establishment of the related website will be pivotal in this aim. As a single point of reference for all digitisation projects, the website aims to become a central listing for all major digitisation programmes, both national and regional. In particular the website will provide information and links to the digitisation programmes of all national libraries, and many national archive and other major institutional collections.

There has been a great deal of interest in the IFLA/UNESCO Survey on Digitisation and Preservation, with many libraries enthusiastic in their support for the development of the website. Many nations are not yet in a position to begin national digitisation programmes, but have nevertheless shown interest in the project, and have provided information about their own plans for development in this area.

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[3] http://www.ifla.org/II/diglib.htm
[4] http://ahds.ac.uk/
[5] http://www.tasi.ac.uk/
[6] http://www.clir.org

Digitisation of printed documents is clearly an area which will remain active for a long time to come, and will develop as new techniques and standards become apparent. It is hoped that this survey and related website will play a part in improving awareness of the issues surrounding digitisation, and awareness of the need not to work in isolation, but to take account of the many hundreds of small, possibly similar, projects taking place around the world.

QUESTIONNAIRE ON DIGITISATION AND PRESERVATION

ADMINISTRATIVE QUESTIONS

About the Library/institution
Name of Library: ....

Director...

Person   responsible   for   digitisation/electronic
collections...

Address: ....

....

....

Telephone Number: ....

Fax Number: ....

E-mail: ....

Digitisation programme and policy
1. Do you have a programme for digitising collections? Yes/no
2. If "yes" go to question 4. If "no" please answer question 3.
3. If "no", do you plan to develop such a policy? Yes/no

4. If "yes" what is the timescale of the programme?..

5. When did the programme begin?..

6. How many items are included in the programme?...

7. Do you have a research programme dealing with digitisation? Yes/no
8. If "yes" please provide any details separately.

Selection of materials

9. Which of these criteria guide selection of materials for digitisation? (check all relevant)

☐ Historical/cultural value ☐ Save space
☐ Academic importance ☐ Research into digital processes
☐ Reduce damage ☐ Preservation
☐ Commercial exploitation ☐ Increase access
☐ Provide document delivery services
☐ Other reasons (please specify)..

Co-operation

10. Do you co-operate with other organisations to develop your digitisation programme? Yes/no

11. If so, which kind (please tick all appropriate)

☐ Other libraries - public ☐ Archives
☐ Other libraries - academic ☐ Private companies
☐ Other libraries - private

12. Is your co-operation ☐ national ☐ international ☐ local

13. Does co-operation consist of

☐ equal partnership ☐ buying services and products
☐ offering services commercially

14. Do you digitise material from other libraries? Yes/no

15. If "yes", which libraries/institutions?
....
....

Staffing

16. Who is the person responsible for the digitisation programme?
....

How many staff work on the programme? (please give full-time equivalents)............................

Costs of digitisation

17. What do you estimate are the costs of digitising documents? (please include staff, equipment, space, energy and other related costs)

Per page......................... Per average book...
Per average serial issue................... Other items (specify)....................................

18. How do you estimate the costs of migration?..

TECHNICAL QUESTIONS

Digitisation techniques

19. Is digitisation carried out by ☐ the Library ☐ an outside body
20. Are documents prepared by ☐ library staff ☐ outside staff
21. Is digitisation carried out from ☐ the original ☐ reproductions
22. If reproductions are used are they ☐ photocopies ☐ photographic
☐ microfilm ☐ microfiche ☐ slides

Format of digitised materials

20. Which resolutions are used for digitisation.......................................

21. Digital image formats used ☐ black and white ☐ grey level ☐ colour

22. File format obtained ☐ TIFF ☐GIF ☐PAL ☐ other (specify).............

23. Which compression methods are used. Specify.............................

24. File size obtained after compression ....kbytes/Mbytes

25. Average compression rate by image types
black/white...............grey..............colour..........

26. Image processing software used...

27. Do you digitise documents containing characters other than the Latin alphabet?
If "yes", which other scripts (please list the most important)
....
....

28. Please give details of any special software used to digitise non-Latin alphabet scripts
....

29. Do you digitise sound recordings yes/no
If   "yes"   what   methods   are   used?
....

30. Do you digitise film or video? Yes/no

31. If   "yes"   what   methods   are   used?
....

32. Have you used OCR software for texts? Yes/no

33. If "yes" which software was used?..

34. Have documents undergone special treatment prior to OCR processing? Yes/no

35. For what purpose was OCR processing used?
☐ automatic indexing ☐ computer-assisted reading
☐ Other (specify)..

36. What OCR recognition rate have you obtained (by document type)
....

37. Which image viewing software do you use?...

38. Have you carried out any post-digitisation improvements in image mode or text/OCR mode?

39. If so, which ones...

Consultation of digitised materials

40. Have you developed specific workstations specially to consult the digitised collections? Yes/no
If "yes" which type?...

41. Which navigation software is used?...

THE DIGITISED DOCUMENTS

The documents themselves

42. Are the documents ☐ isolated single documents ☐ collections

43. What type of documents are included in the digitisation programme including percentage (%) of total digitised
☐ ____% books (monographs) ☐_____% serials ☐_____% manuscripts

☐ _____% report literature ☐_____% maps ☐_____% photographs
☐ _____ other (specify)................................

44. Do you digitise any of the following:

☐ engravings ☐ prints ☐ lithographs
☐ posters ☐ postcards ☐ Drawings and water-colours
☐ three-dimensional objects ☐ fabrics and textiles ☐ sound recordings
☐ films and videos ☐ other (specify)..

Catalogues

45. Are the catalogue records for digitised material
☐ included in the main catalogue ☐ in a separate catalogue

46. Is the catalogue ☐ in paper form ☐ electronic form ☐ on an intranet server
☐ available on the Internet or Websites

47. Are digitised materials catalogued to a recognised standard? Yes/no
If "yes", which one?...

48. Are the records for digitised documents and the original ☐ the same ☐ independent of each other

Access to digitised documents

49. Are the digitised documents available ☐ only on-site ☐ only within the library ☐only within the institution ☐ through a Website

50. If available through a website please give URL...

51. Which functions are included in the browsing/viewing software
☐ Hypertext links ☐ highlighting ☐ other...

52. Is the station equipped with ☐ access control mechanisms ☐ billing software

53. Is the workstation connected to ☐ internal library servers ☐ an Intranet ☐ the Internet

54. Can users use OCR software on documents in image mode? Yes/no

Charges

55. Do users have to pay to use the digitised material (tick all appropriate) Yes/no

56. If "yes" ☐ on-site ☐ outside the library ☐ when accessed through the Website

57. If charges are made how are these calculated?
☐ single charge ☐ by time ☐ by volume of material ☐ by intended use (commercial/academic/students) ☐ other (give details).....................................
....
....

58. If charges are made how are they collected? ☐ invoice ☐ cash at point of use ☐ credit card ☐ electronic accounting ☐ other...

Reproduction and copyright

59. Do you digitise material in copyright? Yes/no

60. If "yes" is this done ☐ under legal provisions for libraries ☐ with the owner's agreement
☐ by paying the owner a fee ☐ under licence ☐ without formalities

61. Does the library own the copyright in the digitised form of the documents? Yes/no

62. If "no" who does?...

63. Are users allowed to do any of the following:
☐ make printouts ☐ download to a PC ☐ download to a local network (LAN)
☐ download to a general network (WAN)

64. Are any electronic management systems used to control copying? Yes/no

65. If "yes" which ones...

Products produced from digitised documents

66.Do you produce any of the following from the documents digitised
☐ CD-ROM (how many?.........) ☐ photographs ☐ audio CDs ☐paper documents

Preservation and digitisation

67.Do you have a preservation policy for documents in digital form? Yes/no

68.If a document is digitised, do you still allow access to the original? Yes/no

69.Are the originals stored ☐ in the same way as other library materials

☐ in special conditions

70.If in special conditions, please describe these...

....

....

IFLA Office for UAP

c/o The British Library

Boston Spa

Wetherby, LS23 7BQ

UNITED KINGDOM

> more recent technological platforms? Yes/no

....

ed materials

selection   made..

....

fax: +44 1937 546478

Is migration automatic, based on fixed criteria (for example date) Yes/no

76.Is migration undertaken ☐ by the library ☐ an outside organisation

77.If   an   outside   organisation,   why   is   this?...

Future developments

78.Would you be prepared to allow your digitised documents to form part of a Virtual Library? Yes/no

79.Would you permit the database of such a library to be linked to your Website to permit access to your digitised documents? Yes/no

80.If   you   would   not   allow   this,   please   explain   why
....
....
....

Digitisation programmes of other institutions in your country

81.This questionnaire has been sent to National Libraries in each country. Do you know of other libraries/archives in your country which have digitisation programmes that would fit into this survey? Yes/no

82.If   "yes"   please   give   their   addresses
....
....
....
....

APPENDIX II

LIST OF RETURNED QUESTIONNAIRES:

ORGANISATION	COUNTRY
National Library of Australia	Australia
Austrian National Library	Austria
National Library of Belarus	Belarus
Biblioteca Nacional	Brazil
Biblioteca Nacional de Chile	Chile
National Library of the Czech Republic	Czech Republic
National Library of Greece	Greece
Nunatta Atuagaateqarfia	Greenland
University of Hong Kong	Hong Kong
The National and University Library of Iceland	Iceland
National Library of Indonesia	Indonesia
National Library of the Islamic Republic of Iran	Iran
Jewish National and University Library	Israel
National Diet Library	Japan
Kenya National Library Service	Kenya
The National Library of Korea	Korea
National Assembly Library, ROK	Korea
National Library of Latvia	Latvia
National Library of Lithuania	Lithuania
National Library of Malaysia	Malaysia
National Library of Malta	Malta

The State Central Library of Mongolia	Mongolia
European Patent Office	Netherlands
National Library of New Zealand	New Zealand
National Library of Norway	Norway
National Library of the Philippines	Philippines
National and University Library	Republic of Macedonia
National Library of Serbia	Serbia
Slovak National Library	Slovakia
South African Library	South Africa
Royal Library, National Library of Sweden	Sweden
The Wellcome Trust	United Kingdom
Colorado Digitisation Project	USA
National Archives Records Administration	USA
University of Pennsylvania	USA
The New York Public Library	USA
Princeton University Library	USA
National Library of Serbia	Yugoslavia
National Library of Zimbabwe	Zimbabwe

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