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STATE OF THE ART OF THE APPLICATION OF NEW INFORMATION TECHNOLOGIES IN LIBRARIES AND THEIR IMPACT ON LIBRARY FUNCTIONS: A REASSESSMENT

Report

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**State of the art of the application
of new information technologies in libraries
and their impact on library functions:
a reassessment**

UNITED KINGDOM

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LIB/2 update Report

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Preamble

I have been pleased to obtain the collaboration of the Centre for Bibliographic Management at the University of Bath (CBM), Manchester Polytechnic and the Library Association — the institutions which participated in the original LIB-2 study.

In the case of CBM and Manchester Polytechnic the contributors to the report are the same people who worked on the original study. Philip Bryant, Director of CBM, provided valuable advice on machine-readable record resources and the network access section, with Tony Wood, Head of Department of Library & Information Studies at Manchester Polytechnic, doing all the hard work of writing Section 2 of the report. The Integrated library housekeeping systems section has been compiled by Joanna Wood of the Library & Information Technology Centre (LITC) at the Polytechnic of Central London. The expert eye cast by Juliet Leeves, Library Consultant, on this section is gratefully acknowledged. The IT-based user services of Section 4 is the work of Ray Templeton, Assistant Director, (Information Technology Officer), of the Library Association.

Finally my thanks to the whole team who had to put up with my impossible time-scale in compiling the final report and to Katrina Bloxham of the LITC who was responsible for producing the final report on Ventura.

The LITC and CBM are funded by the British Library Research & Development Department (BL R&DD); however, the details included in this report are solely the responsibility of the compiler.

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Editor
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1.0 Executive summary

This report has been prepared by, and under, the auspices of the Library and Information Technology Centre and the Polytechnic of Central London at the request of the CEC. It provides an update of the information in the report on the 'State of the Art of the Application of New Information Technologies in Libraries and their Impact on Library Functions in the United Kingdom'. The report of the original study was published in 1987 (LITC 1987).

1.1 Scope of the report

The CEC identified a need to update selectively the information gathered for the original LIB-2 studies in order to provide a current knowledge base for actions and to help provide additional start-up information for developing projects under the Action Plan for Libraries (CEC DGXIIIB 1987).

The report covers four key areas:

- machine-readable record resources
- network access to machine-readable record resources
- integrated library housekeeping systems
- IT-based user services

The study covers significant change since 1986 and identifies new trends in these four areas.

1.2 Methodology

Information was collected as follows:

- a) **Desk research**
By studying the published literature and statistical sources where appropriate.
- b) **Questionnaire**
In some areas it was appropriate to obtain new or updated information via letter and questionnaire to candidate organisations.
- c) **Semi-structured Interview**
Information was gathered on all four areas of the study from documentation supplied by organisations in response to requests. After studying the documentation, in a number of cases, there were follow-up semi-structured interviews over the telephone or site visits to the organisations.

1.3 Main machine-readable record resources

1.3.1 Library catalogues

Since the original study, several major developments have taken place at the BL and at national level:

- The BL NBS has implemented an Action Plan designed to reduce costs and cut the backlog of un-catalogued items.
- The BL catalogue conversion programme is now nearly complete with an estimated four million records in machine readable format.
- The catalogues are increasingly available on CD-ROM.
- Retrospective conversion has resulted in a variety of catalogues accessible online covering printed books, oriental manuscripts, printed music and cartographic materials.

In many UK academic and public libraries, the past four years has seen the continued growth of OPACs attached to integrated library systems. More systems now incorporate an ILL module as a feature. The trend has been towards providing easy access to OPACs via local area networks and increasing co-operation between libraries for co-operative access to OPACs via national networks like JANET. There is evidence of growth in the UK in the use of networked resources as a means of obtaining machine-readable records, selected online and downloaded. The commercial sector is a growth area for the supply of machine-readable records.

Limited information was available on the cost of library automation and the costs attributable to the production of machine-readable catalogues.

1.3.2 Utilities and co-operative library networks

The main activity under this heading, since 1986, has been one of consolidation, with the continuation of retrospective conversion of catalogue records at national and local levels. The utilities and co-operatives have been playing a large part in this process with the commercial sector also making an impact on developments.

Since the original LIB-2 study, one organisation, SCOLCAP no longer exists. The emphasis of the co-operatives has been on the quality control of the machine-readable records, improved currency and coverage, and improved network access.

1.3.3 Resources available from the commercial sector

Since the original LIB-2 study, two new services have emerged; BOOKBANK produced by J. Whitaker & Sons Ltd which contain Whitaker's (British) Books in Print on CD-ROM and Book Data from Book Data Ltd. The latter company was set up in 1987 to provide an enhanced bibliographic record service to publishers and booksellers and for librarians who require bibliographic information for book selection and acquisitions. These services are of increasing significance to libraries.

In the UK a number of library suppliers and booksellers have made machine-readable records available so that libraries can exploit this facility when acquiring new materials. The availability of machine-readable records at the time of publication is regarded as high priority by many libraries.

With the spread of good data communications the trend has been towards EDI transactions with book suppliers.

The most significant development in the booktrade over the last four years has been the establishment of the Booktrade Electronic Data Interchange Standard (BEDIS) Committee. The work of the BEDIS Committee was recently taken up by BTECC, the Book Trade Electronic Communications Committee of the Associations representing Librarians, Booksellers and Publishers. BEDIS and BTECC have merged to form Book Industry Communication (BIC) Incorporated in March 1991, with its own Secretariat.

One supplier, Saztec Europe Limited, has been operating in the UK for the last five years, not as a supplier of machine-readable records, but providing a service for converting paper based manual records into machine-readable format.

1.4 Network access to machine-readable record resources

The UK national telecommunications infrastructure provides the backbone for wide area networking with libraries often having dedicated lines to support their library system needs. A more recent development is the use of carrier based X.25 services to provide 'virtual private networks'. A variety of value added services are being exploited, ranging from e-mail to online databases.

In academic libraries the growing use of the Joint Academic Network (JANET) is a significant development, mainly for access to machine-readable records for catalogue creation, from utilities and co-operatives. A further trend is towards networked OPACs, as a means of identifying records for interlending.

The use of local area networks continues to grow. Several libraries in the academic sector base have developed sophisticated systems including a range of in-house services such as OPAC access, CD-ROM services and e-mail. The use of LANs offers greater connectivity, for libraries and readers alike, to an increasing range of online search services, OPACs, interlending and other information services.

The move towards international standards is slow. However there has been some progress through the CEC funded ION project (OSI pilot/demonstration project for interlending). In the UK, LASER is participating in this project.

1.5 Integrated library housekeeping systems

Currently there are 43 systems being used or distributed in the UK by 40 suppliers covering one or more of the library housekeeping functions such as cataloguing, OPAC, circulation control, acquisitions, serials control and ILL.

Since the last study, there has been little change in the suppliers of the larger systems. However, there has been an increase in the number of suppliers and products of smaller systems. The distinction between larger and smaller systems has become more difficult to define with the increased portability and greater functionality currently offered by some of the smaller systems. The number of single application packages has declined in favour of integrated systems.

The installed base, as obtained from the suppliers data, is currently 243 for the larger systems and 1325 for the smaller systems, reflecting the substantial growth of small systems users.

The functionality of the various modules offered by suppliers of integrated systems has not changed significantly since the last study. Suppliers have generally concentrated on consolidating existing modules with enhancement to OPACs and development of areas such as interfaces to CD-ROM mainly for cataloguing purposes. More modules are now offered such as acquisitions and serials control where these had not already been developed. Most systems offer increased parameterisation by the libraries and library-defined report generation and management information is more widely available. A major new function to be automated since the last study is ILL and a number of systems now offer this as part of their integrated system. There has also been an increase in the number of stand-alone ILL systems.

There has been a general trend away from systems running on proprietary hardware which is typified by the development of new systems (or conversion of existing systems) running on IBM PCs and compatibles and under the UNIX and PICK operating systems.

1.6 IT based user services

Four years on from the last study, IT based services are no longer a novelty in libraries. They are regarded and provided as part of the portfolio of services a user expects of a library.

Online services are an integral part of library services and the availability of CD-ROM has so far not affected the use of online searching. A new initiative in the UK academic sector has been the introduction of access to the Institute of Scientific Information databases on the JANET network. This, like CD-ROM, has the potential to change the style and mode of searching as there are no costs for the search, only an annual fee incurred by the participating institution for unlimited access to the database.

The use of the national viewdata service, Prestel, has not increased significantly since the last study. However, private viewdata systems appear to have a greater level of interest.

The use of e-mail in libraries is now well established in academic libraries but the growth in public libraries has been much slower. With the decrease in prices and greater availability of fax machines, demand on fax bureaux services has dropped.

There are indications of a wide variety of other services which are necessarily one-off but show the innovative approach to meet the users information needs.

1.7 Conclusions

Investment in information technology in libraries has continued to grow as reflected in the marked increase in the installed user base of integrated library housekeeping systems. This trend is despite the economic climate in the UK when resources available for public and academic libraries have been decreasing in real terms.

The librarian and information specialist are becoming more discerning and more critical about the shortcomings of systems in use or available, especially in relation to OPACs. Such criticism is normally a sign of maturity.

Networking continues to play an increasing role in the provision of access to catalogues, shared resources of cooperatives, as well as new services available on CD-ROM. There has been a convergence of library and commercial interest with major new services like BOOKBANK and Book Data becoming of increasing importance with the potential of BEDIS yet to be realised. In this update the following positive points can be highlighted.

- Information Technology is an integral part of a large proportion of the academic and public libraries in the UK.
- There is a large number of systems supplied in the UK for library housekeeping functions such as cataloguing, OPAC, circulation control, acquisitions, serials control and ILL. Greater emphasis is placed on integrated systems which are available in modular form allowing libraries the option of phased implementation of each of the library's functional requirements. Systems range from those suitable for smaller libraries to the very large.
- New systems are placing greater emphasis on portability across hardware platforms.
- The problem of retrospective conversion is being actively addressed although millions of records remain to be converted.
- Co-operatives continue to provide an important source for catalogue records. However, there is a growing tendency for the commercial sector to offer library records along with book purchases especially to the public libraries market.
- Networks now play an important role in libraries. A number of services are available as value added services and libraries, especially academic ones, are beginning to see the traditional services enhanced by developments such as CD-ROM over the local area network and major databases like those from ISI available over the JANET wide area network.
- There is a trend towards greater integration of the information industry through the use of reliable data communication facilities.
- The integration of information sources covering all media will begin to appear as development projects and technology advances move to cost-effective hypermedia solutions.
- There has been slow progress in capitalising on information technology as applied to document delivery services although greater use is being made of new technology for ILL requests.

2.0 Main machine-readable record resources

2.1 Methodology

Information on library catalogues was collected in a number of ways. For the main machine-readable library cataloguing update, a questionnaire was distributed in November 1990 to the 32 libraries surveyed in the original LIB-2 study so that updated information could be obtained. In addition Belfast Public Library was included as Northern Ireland was left out in the original LIB-2 study. A list of these libraries is given in Appendix A.1. The response to the questionnaire was disappointing, and much chasing was required, especially for certain key institutions. By mid-January only 50% had responded, though eventually 75% of the questionnaires were returned, but some too late for inclusion in the report. Because of these delays more reliance was placed on desk research, and in some instances semi-structured telephone interviews were used.

For the utilities and co-operatives letters were distributed in November 1990 to the seven candidate organisations identified; that is, BLAISE, BLCMP (Library Services) Ltd, CURL, LASER, OCLC Europe, SCOLCAP and SLS (Information Systems) Ltd. Of these, SCOLCAP was discontinued in 1990, following 17 years of operation. Replies were received from all organisations and these were followed up where required by semi-structured telephone interviews, and desk-research

The commercial sector posed more of a problem. In addition to contacting the major organisations such as Book Data, HMSO, Saztec Europe Ltd and Whitaker, who make a particular contribution to the commercial scene, letters were distributed in November 1990 to booksellers, library suppliers and to 'third party' commercial services. Not all the major suppliers replied and considerable chasing was carried out. Information is given in Section 2.4 on Book Data Ltd, HMSO, Saztec Europe Ltd, Teleordering and J. Whitaker & Sons Ltd; and to give a clearer picture of the commercial sector further information is provided in Appendix B on four library suppliers. Together they provide a representative range of services for the supply of machine-readable records to libraries. These suppliers are James Askew & Son Ltd, B.H. Blackwell Ltd, John Menzies Library Services (JMLS) Ltd and Morley Books. A list of organisations to which the letter was distributed is given in Appendix A.2.

To gather information on network access letters were distributed to a number of libraries identified as having access to operational networks. A list of these libraries is given in Appendix A.2. Information was also based on returned questionnaires, responses from utilities and co-operatives and from the commercial sector. This information was supplemented by considerable desk research. Semi-structured telephone interviews were held with selected libraries. Letters were also sent to British Telecom, Mercury and the Joint Network Team (JNT), the body responsible for JANET.

2.2 General national overview

The impact of information technology and automation on library functions in the UK over the past five years has been considerable. The salient factors have been the rapid growth in the installation of integrated library systems — especially the implications of the acquisitions modules and OPACs; convergence of library and booktrade interests in electronic data interchange (EDI) and the bibliographic record; growing use of networking at all levels — from local area networks (LANs) to PSS; exponential growth in the use of CD-ROM; and the proliferation of fax. All the developments related to these

technologies have to be considered within the context of the economic constraint which has been an ever present feature of the UK library scene over the past five years.

The significant increase in the number of integrated library systems, with their associated acquisitions modules means that bibliographic records are required at a much earlier stage than has been the case in the past. Because of this there has been a growing readiness in the UK to take records from a variety of sources, and book trade sources have become increasingly important in this respect. In turn the book trade is aware of its own need for timely effective bibliographic records and of the importance of information technology in the dissemination of bibliographic information, especially in the export market where British books are competing with other English language publications for sales. At a major seminar held at Newbury in November 1987 (Greenwood 1988) entitled *Bibliographic Records in the Book World* a well-known export bookseller commented on the fact that the lack of records in a UK catalogue database, or the inclusion of records of less than a satisfactory standard, could lead to UK booksellers losing sales.

There has been a great deal of talk in the UK over the past five years of the need for bibliographic record supply to be regarded as a continuum which should extend, as nearly as possible, from the time a new title is a scribbled note on a publishers desk to the time the relevant record is required by a bookshop, or consulted in a library OPAC. It is rare for publishers in the UK to have their own established computerised bibliographic databases and in 1987 Book Data was set up. This independent UK company was established to meet the needs of publishers, booksellers and their customers for product and market information at an early stage as possible. One of the side effects of the establishment of Book Data was an improvement in the performance of the BL CIP programme. This was because one of the conditions for publishers subscribing to Book Data services was that they had to ensure that all their output was submitted for BL CIP entries to be created.

In 1988 the recommendation that assistance would be needed by the British Library National Bibliographic Service (BL NBS) if it was to be able to provide timely records for the UK national imprint resulted in a suggestion that the five other copyright libraries entitled to receive legal deposit copies of books published under UK copyright should also be able to provide records to the BL NBS. The Copyright Libraries Shared Cataloguing Project was implemented in a pilot form in the autumn of 1990.

In late 1990 the results of the BL R&DD "Delphic" forecasting exercise was published as *Information UK 2000* (Martyn 1990). The study was concerned with what the library and information world will be like in the year 2000 and beyond. Eleven task forces reported and the exercise resulted in seven predictions. In relation to cataloguing, the increased use of electronic publishing including CD-ROM and multi-media, remote electronic browsing, increased networking through improved telecommunications, and customer-led systems and services are all consistent with the developments outlined in this report.

2.2.1 British Library National Bibliographic Service (BL NBS)

There can be little doubt about the progress made in the UK at both national and local level. Since 1986 several major developments have taken place at the BL and at national level generally. At national level the BL has made major contributions to library cataloguing in a number of areas. Following the publication of the Strategic Plan (British Library 1989) a new centralised processing policy will allow for all acquisitions and record creation for English Language material to be handled at a new central processing unit to be based at BL DSC. The BL NBS began operating there as from January 1991.

Records will be designed mainly for use online and will be created using direct data entry, direct authority control, and derived and shared cataloguing (Section 2.2.3).

The implementation by the BL in 1988 of their Currency with Coverage policy (British Library 1987) is designed to reduce costs, and cut backlogs. By the mid-1980s the backlog of items waiting for records to be created for the British National Bibliography (BNB) and the BLAISE database has risen to over 40,000. Although much effort has been put into attempting to improve the 'hit-rate' for the UK MARC record service it had failed to respond. Between 1981 and 1985 it hovered between 59 and 64%. A target was set by the BL within its first five-year strategic plan to increase the hit-rate to 85% by 1990. In order to reduce the backlog, and to deal with the rapidly increasing output of titles published in the UK, decisions were taken to reduce by half the cost of current record creation by the BL BS. To this end, Currency with Coverage provided for the introduction of AACR2 Level I description for 50% of BNB MARC records. The categories and material proposed for this treatment were modern English fiction, children's books, items with 32 pages or less, and works on science, technology and religion. The hit-rate has risen significantly and now averages over 80% for academic libraries and over 70% for public libraries. The overall combined average is 77%. At least half of the improvement can be attributed to the introduction of the new policy, although other factors also played a part, e.g. better performance by publishers in providing input to the Cataloguing in Publication (CIP) programme.

2.2.2 Licence to use BL MARC records

Libraries acquire BL MARC records on different media and through several suppliers for their automated library systems. The BL supplies records on exchange tape through the BLAISE records supply services, and increasingly via BNB on CD-ROM. Cataloguing utilities and networks maintain databases including BL MARC records which can be accessed by their members.

In the UK and Eire the use of BL MARC records has been regulated by the Licence to Use and Utility Licence for online and tape supply and by the conditions of use for BNB on CD-ROM. Licence fees, independent of records costs and charges, have been payable by libraries who use BL MARC records on a scale related to their UK book acquisitions with no fees payable by utilities and networks. The intention of the licencing scheme was to enable more libraries to use BL MARC records and the licence fees were based upon potential rather than actual use of records. The scheme has been operating fairly successfully for the past four years.

Outside the UK and Eire the use of BL MARC records has been regulated by database agreements made with organisations who operate databases and networks where member libraries may download records into their own systems. The fee structure of these agreements has been based on an annual payment for each member library or a minimum fee whichever is the greater.

The policing and administration of licensing has become more difficult due to many factors. The increasing use of CD-ROM as a means of supply and the growth of networks and utilities has meant that BL MARC records are more available but the bureaucracy of regulation has grown less cost effective.

The major emphasis behind the review of licensing arrangements was to ensure that any regulatory mechanism enabled any library to acquire and use BL MARC records easily and at a known unit cost. The other main aspect of the review was to introduce the concept of added value where an organisation acquired BL MARC records for redistribution to several members of a network.

From January 1991 new arrangements are being introduced for licensing the use and redistribution of BL MARC records. The new User Licence will be very similar to the existing Licence to Use. The most important difference is that all User Licences will be issued free of charge to libraries who use records solely for their own internal purposes. The new Licence will cover all BL MARC records obtained from the Library on exchange tape or downloaded online. A new feature is that the User Licence will now cover records obtained from BNB on CD-ROM. It will also cover any records originating from the BL obtained from any other supplier.

The new Licence will enable libraries to obtain records from any source, and store them in their own automated systems and to use them for any internal purpose such as production of bibliographies or for inter-library loan purposes. Limited exchange of records with other licencees will still be permitted but if libraries wish to exchange or sell large numbers of records originating from the BL they will need to obtain a Redistributor Licence.

The Redistributor Licence is similar to the arrangements for overseas customers. The aim is to put the onus for regulating the re-use of BL MARC records on the primary customer rather than the secondary subscriber. The 1991 fee for the Redistributor Licence will be £4,000 or £15 per member library whichever is the greater.

In parallel with the licensing changes, a new two-tier concept will be introduced to the price structure for the weekly BNB Exchange Tape Service. Charges for the service will reflect the use that libraries and other organisations make of the records. The lower tier price of £3,000 per annum will be for libraries who use the exchange tape records solely for their own internal purposes.

For organisations buying in tapes which will be used to redistribute BL MARC records the annual subscription will be £6,000. This differential reflects the added value of a tape which is made available through a network to a group of subscribers. Organisations who use exchange tape records in this manner will also be required to take out a redistributor licence.

2.2.3 Copyright Libraries Shared Cataloguing Project

The pilot phase of the "Co-operative Cataloguing Programme" of the Copyright Libraries was introduced in November 1990. This initiative aims to develop a mechanism for a comprehensive programme of shared cataloguing for the purpose of maximising timeliness and minimising costs amongst the participants. Each library is allocated a section of the alphabet and will catalogue the titles of those publishers falling within that alphabetical allocation to AACR2 and UK MARC standards. Authority control will be by use of the BL Name Authority File (BL NAF). On receipt of bibliographic records on magnetic tape, formatted according to the exchange tape specification published in the UK MARC manual, the BL will make these records available to all users of its record supply and online service. When the BL receives the title, other data will be added and a record will appear in the BNB.

2.2.4 OPACs

In most UK academic and public libraries the major cataloguing development over the past four years has been the introduction of OPAC modules to their automated systems. In many cases the "future plans" of the original LIB-2 report have become reality. Increasingly libraries with OPACs have become largely dependent on using networking to obtain machine-readable records for their files. Significant too, in spite of restrictive financial policies, is the continuing use of AACR2 cataloguing rules to create

records in UK MARC format, often with BL NAF authority files. A few examples are indicative of these trends:

- **Manchester University** added an OPAC with some 600,000 records in October 1990 to their long established in-house system and at the same time switched to AACR2, UK MARC and the downloading of records from CURL and OCLC. Note though that DC13 and 14 are still used.
- **Reading University** switched from SWALCAP to CLSI, and introduced an OPAC in 1989, with about 350,000 records. JANET is used to access CURL, OCLC and BLAISE. External users can access the OPAC via JANET. The OPAC can be accessed by 50 library terminals as well as by the University Cambridge-Ring network.
- **Hatfield Polytechnic** use the SLS LIBERTAS system, with an OPAC containing 180,000 records, dating from 1989. JANET is used to obtain records from the SLS database. The OPAC can be accessed via a campus wide Ethernet LAN, and from the Hertfordshire County Council private network COMNET.
- **Manchester Polytechnic**, a BLCMP member, have since 1988 had an OPAC which now includes some 500,000 records, replacing a fiche based system. Besides 49 library terminals, the OPAC can be searched via a fibre-optic link to the Polytechnic PRIME network of about 200 terminals. Twelve ports are available. Some 80% of machine-readable records are downloaded from the BLCMP network; the remainder are created in-house, using BLCMP MARC, AACR2 and recently, DC20.
- **Essex County** have transferred their monographs catalogue from a council mainframe to an in-house GEAC 9000. Following this an OPAC was introduced in October 1989 giving online access to 600,000 records for titles in the largest 43 libraries in the county. Some 25,000 new accessions are added annually. Records are created in AACR2 standard, with MARC records being changed to the compatible GEAC short-form catalogue format. Besides in-house record creation, Essex use magnetic tapes supplied by John Menzies Library Services. Records are made available to LASER.

The first UK OPACs were introduced into academic libraries in about 1982; by 1988 some 50% of British university and polytechnic libraries had operational OPACs; and by June 1990, 58 OPACs could be accessed via JANET. Many more OPACs are available in other academic institutions such as institutes of higher education and school libraries. The spread of OPACs in public libraries has not been so rapid as in the academic sector. In 1987 some 28 public library OPACs were operational. Surveys (Batt) published by the Public Library Research Group of the 167 public library authorities show growth rates as follows:

Public Library Catalogues

	1985	1987	1989
Online (staff only)	45	51	66
OPACs (public)	7	24	38
Fiche/Film	68	85	84
Hardcopy	17	23	25

Other surveys of 1987 and 1988 (Slack & Wood) show how access points in the OPACs vary in academic and public libraries; keyword access to those fields being shown in parentheses:

Access Point	Academic Libraries	Public Libraries
Author	35 (15)	21 (3)
Title	42 (21)	22 (6)
Author/Title	30	11 (1)
Corporate Name	31 (14)	15
Conference Name	29 (13)	14
Series Title	29 (15)	14 (1)
Subject Heading	13 (12)	13 (2)
Class Number	36 (7)	20
Total OPACs	47	26

2.2.5 CD-ROM

Since 1986 a major BL product has been the CD-ROM version of the entire BL General Catalogue of Printed Books to 1975 published by Chadwyck-Healey. This product is described in Section 2.2.7. Not only is the catalogue available on three CD-ROM discs, but the machine-readable records created by Saztec Europe Limited are the major part of the BL Catalogue which is currently available as the BLC Preview file on BLAISE-LINE and which is being used to create the new BL OPAC together with the Current Catalogues of BL H&SS and BL SRIS.

In 1989 the BL NBS produced BNB on CD-ROM. The whole of the BNB database is available as two products. The first is the back file on two discs which contain the first 36 years of BNB (1950-1985). The second product is the "current" file from 1986, which is being produced quarterly on a fully cumulating disk. Further information can be found in Section 2.3.

In the European context it is important to appreciate that the CD-ROM software employed is also used for the databases of the Bibliothèque nationale of France and the Deutsche Bibliothek of Germany. During 1990 a consortium of seven European national libraries has been developing a common approach to enable an exchange of bibliographic records on CD-ROM. The project is being coordinated by the BL NBS. The other members of the consortium are the national libraries of Denmark, France, Germany, Italy, the Netherlands and Portugal. This project will focus on ways of standardising strategies, applications and formats. The resulting improvements in compatibility will make the databases of the various libraries attractive and more accessible to users throughout Europe and the rest of the world.

At Boston Spa the BL DSC has published their first CD-ROM product — Boston Spa Serials which contains some 300,000 titles.

In public libraries some 40 authorities were reported in the PLRG Survey (Batt 1990) as using CD-ROM in 1989. The large majority of these offered Whitaker's BOOKBANK.

2.2.6 Retrospective conversion

The 1986 LIB-2 report highlighted retrospective conversion as being of primary concern to all major libraries. (Section 3.4.11). Information provided by Law (1987) for the Centre for Bibliographic Management on the state of retroconversion in university libraries in the UK gave some idea of the scale of the problem. Only two universities were reported as having converted all their records — Bath and Hull. More than 30 million records remained to be converted into machine-readable form. Even allowing for duplication, it is clear that a substantial investment of resources is required if all catalogue records are to be retroconverted. There is some indication that not all libraries are planning total conversion, apparently being content to operate a split-catalogue service.

Since 1986 considerable progress appears to have been made in retroconversion, utilising in particular utilities and cooperatives, though many of the major libraries still have large conversion requirements.

Nevertheless it is becoming clear that a significant trend towards networked access to machine-readable records is being established; by academic libraries making increased use of the JANET network; and by public libraries making use of utilities and cooperatives through PSS, and obtaining records from the commercial sector. At the national level the BL General Catalogue of Printed Books to 1975 is being converted into machine-readable form as part of the BL conversion programme. Details of the new CD-ROM products are given in Section 2.2.7, and further information can be found in Appendix C1 under individual libraries.

In academic libraries several large scale retroconversion projects have been undertaken. Edinburgh University reported a large-scale conversion programme in 1986, and 50% of their catalogue is now in machine-readable form. There still remains though a substantial part of their antiquarian books awaiting conversion. More recently cooperation between libraries and the utilities and cooperatives is beginning to make some impact on the retroconversion problem. A joint project between BLCMP and OCLC is underway to convert records for the Guildhall Automation Project (GAP) at the City of London. One of the main aims of GAP is to create a fully integrated analytical catalogue to include all items in the collection of monographs, periodicals, maps, manuscripts, engravings, pictures, reports and directories. The project will involve the conversion of some 175,000 mainly monograph titles by early 1992. OCLC creates monthly MARC tapes, which are sent to BLCMP for conversion into UK MARC format. Other materials will be converted on-site. A 1991 contract between BLCMP and Queens University, Belfast, for a similar project via OCLC will involve 600,000 records.

At Oxford the Bodleian Library has created some 150,000 records since 1986 as part of the University library OLIS programme, which has so far resulted in a total of 350,000 machine-readable records. Data is obtained from BLAISE, CURL and OCLC. At Manchester University some 600,000 in-house circulation records have been converted into MARC-compatible format for a new online catalogue, using mainly CURL and OCLC. Birmingham University still has the larger part of a stock of over 1,200,000 items awaiting retroconversion, even though all post-1972 acquisitions are available via a campus-wide OPAC.

SLS (Information Systems) Ltd provides a "database building" service. This is being used to create a new unified catalogue for the University of London Library. Brief circulation records from the Union Circulation File are being enhanced from the SLS databases. Existing LIBERTAS users typically make use of the SLS "database building" service to meet their ongoing retroconversion needs.

CURL is also playing a major role in retrospective conversion. Batch files of 80,000 records have been supplied to Leeds University; London has taken 33,000. Edinburgh University is downloading records for retroconversion on a continuing basis. Many Polytechnic libraries have machine-readable catalogues on fiche or as OPACs. Several, such as the Polytechnic of the South Bank and Manchester Polytechnic have been able to convert all their records and include them on their campus wide OPACs.

The public library scene appears to be somewhat less clear. Although the PLRG Survey (Batt 1990) identifies the extent to which public libraries have automated their ordering and cataloguing systems, it does not provide information directly on retrospective conversion. Comparative data from previous surveys shows a continuing trend towards computerised catalogues and the introduction of OPACs; though OPAC development has been comparatively slow compared with the academic sector. Some of the larger urban systems like Leeds and Manchester have been slow to introduce automation, and their large reference collections present considerable retroconversion problems. In most cases machine-readable catalogues are limited to the lending stock as at Belfast Public Library. In these cases records for retroconversion programmes are being obtained from LASER and the VISCOUNT Service, as well as from the commercial sector, where records may be available at low cost or free of charge.

2.2.7 The main machine-readable catalogues

The original LIB-2 survey of the main machine-readable catalogues was limited to the national libraries and certain major academic and special libraries, though information on other important libraries was included in the general overview. This Update follows that pattern as far as possible, providing information on new main machine-readable catalogues and indicating future trends. Further data on these machine-readable catalogues is given in Appendix C.1.

The BLC conversion project was set up early in 1987 to make the 360 volumes of the BL General Catalogue of Printed Books to 1975 available in machine-readable form. This catalogue is based on the new edition of the General Catalogue (which included supplementary additions to the 1966 General Catalogue) published in printed form by K.G. Saur and completed in 1987. Conversion of this catalogue has been carried out by Saztec Europe Ltd., and the machine-readable records produced have formed the basis of the BLC Preview file available on BLAISE-LINE; the new BL OPAC being developed for the move to St Pancras (site of the new BL); and are also being published as a CD-ROM catalogue.

The converted BLC is one of the largest bibliographic databases in Europe. So far nearly 3.9 million records in UK MARC format have been mounted on BLAISE-LINE as the BLC Preview file. Standard search keys are available though, as this is a test file, not all facilities are available. This Preview file, together with the current catalogues of BL H&SS and BL SRIS form the basis of the new BL OPAC which is being developed to provide access to the catalogue for readers using both the St Pancras and Bloomsbury Buildings, this will be implemented for the opening of St Pancras in 1993. Library users will be able to search under authors, titles, words and phrases from titles, pressmarks and classmarks, and standard numbers such as ISBNs. On-screen explanations of how to use the system will be available in several European languages as well as English. The OPAC will display a full extended Roman alphabet, as well as Greek, Cyrillic and Hebrew characters. An experimental version of the OPAC was installed in April 1990 at Bloomsbury, Holborn and Aldwych for use by BL H&SS and BL SRIS staff, and should become operational at Bloomsbury in 1992 so that readers can become familiar with it before St Pancras opens.

The CD-ROM catalogue published by Chadwyck-Healey as the BL General Catalogue of Printed Books to 1975 is being issued on three discs. By January 1991 two discs had been published, the third being due later this year. Access to the data can be by author, truncated author, any word in the title, any truncated word, publisher, publication data, bibliographic description, shelf marks for subjects and place of publication. Several choices for displaying the results of searches are available, including MARC format, customised format, or the standard Modern Language Association citation format for use in creating bibliographies. It is also possible to display records in printed catalogue entry format (as in the 1987 printed version).

2.2.8 Costs of main machine-readable files

A limited amount of information was made available on the cost of library automation, and to a lesser extent on the costs attributable to the production of machine-readable catalogues. Many libraries throughout the UK have clearly incurred considerable costs by the introduction of OPACs, often supported by updated hardware configurations and by the installation of more networked terminals. Continuing retrospective conversion and networked access to machine-readable records have also incurred regular expenditure. The cost data given in Appendix C.2 should be treated with some care as it is often based on different and partial criteria. Any comparative conclusions require knowledge of local circumstances and costing methodology.

2.3 Utilities and co-operative library networks

The period since 1986 has been largely one of consolidation, though there are certain identifiable trends that are likely to have a significant impact on the future supply of machine-readable records. Of the organisations described in the original LIB-2 study, SCOLCAP no longer exists, and a new co-operative, the Consortium of University Research Libraries (CURL) is beginning to have an impact on record provision in the university sector.

Consolidation has meant the continuation of retrospective conversion of catalogue records at national and local level. The utilities and co-operatives are playing a large part in this process, though much is being done in-house. The commercial sector too is playing an increasingly important role in record supply. This particular mix of in-house record creation and the use of external record providers is becoming dependent on the existence of a networking infrastructure on which these various value added services can operate. This trend is clearly identifiable by the growing level of use by libraries of those suppliers of machine-readable records, as evidenced by this LIB-2 Update study, and by surveys carried out by the Public Libraries Research Group (Batt 1990).

Of particular interest is the impact at all levels of the UK MARC record format and AACR2 cataloguing rules, which continue to be the standards for the providers of machine-readable records in the UK, and even those in the commercial sector are adopting this approach. Standardisation, not only of bibliographic records, but of the telecommunications networks necessary to make them available, is clearly of major concern at both national and European level.

These resource sharing activities, well developed as they are in the UK, are being challenged by the availability of bibliographic information on CD-ROM. At national level the BL is making most of its records available on compact disk, often as an alternative to online access or even printed sources. It

is likely that within a few years all the utilities and co-operatives in the UK will make their records available in this way.

2.3.1 BLAISE

Developments since 1986

Within the Marketing and Support Group BLAISE now forms part of the BL NBS. As such it now operates from Boston Spa in Yorkshire. Marketing and Support provide a variety of printed and CD-ROM bibliographies and online services. Databases include the catalogues of the world famous collections of the BL, and the holdings of the US Library of Congress (LC) and the University of London. Other databases give details of official publications, conferences, grey literature, serials, maps, music, AV materials and antiquarian material. Fiction is also included. Overall, BLAISE-LINE offers extensive coverage in the arts, business and sciences. BLAISE-LINK is an online service offered in collaboration with the US National Library of Medicine (NLM). The service provides a transatlantic link to the NLM databases in the biomedical fields. It also makes available PC based online searching software GRATEFUL MED, which is designed to simplify searching and provides for automatic downloading. BLAISE-LINK provides access to some 14 million records of journal articles and books, and to the NET databanks of hard data on hazardous substances. The BLAISE-LINE is the responsibility of the Information Services Section providing online access to 20 machine-readable databases at January 1991. These are listed in Appendix C.1. Major new files are HMSO publications (HMSO), UK National Serials Data Centre (NSDC) and the Register of Preservation Microforms (RPM)

The BLAISE Records Service launched in January 1988 offers MARC record supply facilities from BLAISE-LINE databases, and in addition under a Joint Service Agreement, signed in 1988, OCLC records are made available to subscribers of the Service, making a total resource of over 30 million records. BLAISE Records subscribers taking OCLC records on magnetic tape can have the records connected to UK MARC format at no extra cost. Records can be downloaded on line from the OCLC database via BLAISE-LINE using appropriate software such as the BLAISE RECORDER software.

The Marketing and Support Group, through Product Development, began to supply in 1989 the BNB (already available of course as a printed service and online through BLAISE-LINE) as a CD-ROM product. Besides being used by libraries as an alternative bibliographic search tool it is also being used increasingly as a source of record supply for the creation of catalogues at a local level.

BNB on CD-ROM represents a guide to British publishing and contains over one million records for items published in the UK since 1950. Records can be displayed, printed and saved in various formats, including full MARC and catalogue card (corresponding to the content of printed BNB). Records can also be saved in UK MARC exchange format for downloading into local cataloguing systems. BNB on CD-ROM is published as two distinct products; a back file of some 900,000 records on two compact disks, available separately, and a current file containing records from 1986 to date available on a subscription basis. It is updated quarterly and is fully cumulating.

Users of the BLAISE services

The following selective data are taken from the BL 17th Annual report and give an indication of the usage in 1989 of BL record supply services.

Service	Users
UKMARC exchange tapes	39
BLAISE records	82
Method of Supply	Records Supplied
MARC records requested online and delivered on tape or downloaded	154,334
MARC records supplied via offline SRS	45,474

2.3.2 BLCMP (Library Services) Ltd

Developments since 1986

BLCMP's databases have grown from the 7.5 million records reported in 1986 to 10 million in 1991. They act as a source of information for user libraries in selection, ordering, cataloguing and ILL. The databases include:

BL BNB cataloguing since 1950	1,190,162
LC cataloguing since 1970	2,254,077
BLDSC monographs and conference catalogues	774,748
Whitaker's British Books in Print	1,269,115
Union Catalogue	4,308,357

Included in the Union Catalogue are nearly 4 million monographs, some 86,000 printed music records, over 100,000 sound recordings, and nearly 10,000 maps and atlases.

A number of retrospective cataloguing projects have been carried out at several universities including Birmingham, East Anglia, Sheffield and Warwick, as well as public libraries at Birmingham and Glasgow. The most recent projects are described in Section 2.2.6.

Records are available to BLCMP members. Access is governed by the BLCMP Membership Agreement. All members have online access to the BLCMP database, either directly or through the BLS Local Library System. The selective Record Service is now little used.

All users will either run the BLCMP local library system, BLS, or the shared bureau service, BOSS. Both sets of users contribute local cataloguing to the same agreed standard, and create c200,000 MARC records per annum (this figure excludes large retrospective projects). There are nearly 20 million holdings represented on the databases.

Online access to the databases is via a dedicated communications network. BLCMP maintains kilostream concentrator lines between Birmingham and Manchester, Belfast, London and Bristol, and individual lines from these regional hubs to all user libraries. Line charges are included as part of an annual subscription. X.25 access will be provided in 1992, and this will include JANET access where appropriate.

BLCMP'S policy is to improve its database services to users by increasing the number of files available and by providing more effective and sophisticated searching techniques. A "shopping list" of desirable

additional files is maintained and reviewed by users on a regular basis. The next file to be added will be the British Catalogue of Music, and other files will be added in 1991/92. Similarly, significant changes in searching will be introduced over the same period.

Users of the databases will normally search all files in a pre-determined order. The user does not need to specify which files are to be searched, although an individual file may be specified if required.

Local cataloguing is added to the database immediately. In the case of users taking the bureau service, the central UNION database serves as the master file for the production of their catalogues. BLS users' catalogues, especially OPACs, will be produced from their local BLS catalogue files. In the great majority of cases the catalogue records in BLS will be in exactly the same form as the central UNION database, although it is possible to vary bibliographic data in BLS as part of a post-creation editing process.

Quality control of the UNION database is maintained by a team of editors. Input records from all sources are monitored for variations from the agreed standard, and errors and changes in practice are notified to users. Similarly, user libraries will monitor data and notify BLCMP of errors and changes. The relationship of authority control systems and procedures between local BLS systems and the central database will be developed further in 1991/1992.

BLCMP regularly monitors the "hit-rate" from the databases for its users. The hit-rate will typically vary from the 70% to in excess of 95%, dependent upon type of user. The majority of users achieve a hit rate in excess of 80%. BLCMP also monitors the perceived quality of records on the databases, and is to commence further work in this area in 1991.

New developments over the next three years

During 1991 the OPAC module will see the introduction of a multiple index facility, which allows users to access discrete indexes for identifiable categories of material in member libraries. Other developments should allow users to place reservations online. In cataloguing a BLS authority control system will be introduced together with developments to allow BLS cataloguing to take place with or without a link to the BLCMP database.

BLCMP will be introducing electronic data interchange (EDI) facilities to allow the transmission of information from libraries to suppliers and vice-versa. This will cover orders, and potential requirement files. The facilities will conform to the recently adopted Booktrade EDI Standards (BEDIS).

Following the launch of the BLCMP ILLs module, further enhancement will appear in 1991 and 1992. Later in 1991 a new community information module is to be launched. This will provide facilities for the maintenance of local information records and public access facilities via the library OPAC.

2.3.3 CURL

Developments since 1986

CURL was set up as a consortium of seven large academic libraries. Members include the Universities of Cambridge, Edinburgh, Glasgow, Leeds, London, Manchester and Oxford. The intention was to enable members to search for and extract records from the machine-readable catalogue of all member libraries, so that they could achieve some of the cost benefits of a co-operative, while maintaining the

independence of their individual cataloguing functions. All CURL libraries had established their own automated housekeeping systems and either operated, or were planning to introduce, MARC based cataloguing systems with records conforming to AACR2. Most were buying in MARC records from BL or OCLC.

A two year pilot project was set up in December 1987, to establish the CURL database. By the end of 1989 however, a fully operational record sharing system had been established at the Manchester University Computer Centre, which had offered to act as host to the new project, and facilitate the setting up of a single joint database. It is accessed via JANET from microcomputers in member libraries, running the KERMIT terminal emulation program. The Cambridge University Library CATS OPAC software is used, modified to suit CURL requirements.

As each library has been able to do so, it has dumped its records onto magnetic tape in standard MARC exchange format. On receipt in Manchester, records are converted from MARC exchange format to MARC tagged, fixed format suitable for loading onto the database.

There are two main ways by which libraries take records from CURL. Downloading is the preferred method, in that the whole online session is logged onto disk. The downloaded file is then edited off-line, ready for uploading into the library database. The alternative is to use a SRS service where records are selected online, saved, then supplied to that member library in exchange format on magnetic tape. Records supplied in these two ways are used both for current cataloguing and for retrospective conversion projects. Some 2.5 million records are currently held on the CURL database, a percentage of these are duplicated across files.

New developments over the next three years

Since January 1990 CURL has been financed entirely by the seven member libraries. This has caused a change in approach to the use of CURL and some 40 University libraries now use CURL to access the file, and select and download records free-of-charge. Some use is also made of CURL as a Union Catalogue for interlending. It seems likely that free access to other University libraries will be withdrawn and a charge levied for downloading of selected records. Such a policy it is hoped will allow other libraries on JANET, such as the polytechnics, to make use of CURL for catalogue creation.

During 1991 it is likely that CURL will be reloaded under new software providing additional access points.

2.3.4 LASER

Developments since 1986

Since 1986 LASER has developed an operational online network for interlending and bibliographic research — VISCOUNT. A total of 65 terminals access the system at the present time representing major LASER libraries, the regional headquarters in Bristol, Edinburgh, Leicester, Birmingham, Manchester and Wakefield and test-site libraries in the North, South West and Scottish regions. The network activity on the system during 1989-90 was 2,083,021 (relates to the access to the system for bibliographic verification, location retrieval and messaging).. This figure excludes the 1.1 million items catalogued onto the VISCOUNT system in 1989-90. The former manual union catalogues of material published post-1950 have been computerised for the East Midlands, North West, South West, West Midlands, Yorkshire & Humberside Regions and the national Library of Scotland Lending Services, by adding

records to a shared existing bibliographic database at LASER HQ. which contains some 2.75 million titles and access to some 60 million associated volumes of locations. This database supports bibliographic checking for interloans work and cataloguing as well as providing location information for items held in the seven regions. Monograph holdings for post-1980 items at the BL DSC have also been added to the file.

Records on the database are maintained in the UK MARC format. UK MARC records are added weekly and location and extra MARC input from members can be on magnetic tape, online or keyboarded at the seven regional headquarters from manual records.

LASER provides from VISCOUNT a SRS and retrospective record service, the charges for which are available from LASER H.Q. Output is in MARC exchange format. LASER also provides ISBN/BNB location fiche with information for ILL purposes.

New developments over the next three years

LASER is actively involved in the formulation of ILL and Search And Retrieve Protocols (SR) for OSI (Open Systems Interconnection) and is participating in the ION project, an OSI Demonstration project between library networks in Europe for interlending services which involves the Netherlands and France, and is financially supported by the Commission of the European Community (CEC).

LASER is currently replacing and expanding its VISCOUNT system with a UNIX based system which will be compatible with the CEC OSI project. This new system which is being supplied by MODCOMP AEG Computers Ltd will be installed by March 1991. It will enhance the services which LASER will be able to offer to its existing VISCOUNT users and enable it to extend its services to libraries in other regions.

2.3.5 OCLC Europe

Developments since 1986

The current (January 1991) size of the OCLC database is 23 million bibliographic records.

The database holdings consist of:

Books	18,610,026
Serials	1,213,247
Sound Recordings	637,509
Audiovisual Media	536,036
Scores	529,185
Maps	258,150
Archives & Manuscripts	122,504
Machine Readable	32,992

National Library files covered include: Library of Congress; British Library; National Library of Medicine; National Agriculture Library; National Library of Canada; national Library of Australia.

Authority Files: The OCLC online system now provides online access to both LC name and subject authority files. The OCLC database is maintained in the USMARC format; conversion services to other formats are available.

OCLC began the re-implementation of its entire online system in 1990. Phase 1 - the re-implementation of searching and cataloguing was implemented on 12 November 1990. OCLC's new online system is called the PRISM Service. The PRISM service allows for the export of full MARC records, new searching capabilities and full screen editing. OCLC continues to provide MARC tapes, COM microfiche catalogues and catalogue cards, where required by customers.

OCLC has introduced both cataloguing (CAT CD450) and reference (Search CD450) databases on CD-ROM.

IN January 1990 OCLC introduced EPIC — an online reference service. The EPIC service currently makes available the following databases: OCLC Online Union Catalog; ERIC; Book Data; ABI/INFORM; Dissertation Abstracts; Business Dateline; PNI (Pharmaceutical News Index); EasyNet.

Since 1988 the OCLC database has been one of the databases available through the British library BLAISE RECORDS Service. Records are available under the OCLC Standard Agreement, and can be downloaded without charge.

OCLC Europe network

The OCLC Europe network has been upgraded to X.25 standard. There are dedicated links to Dublin (Ireland), Paris and JANET. In 1991 the JANET connection will be extended to include the international IXI gateways. The OCLC transatlantic link has been upgraded to a fibre-optic cable running at 56,000 bits per second. OCLC Europe continues to operate as an IPSS host.

OCLC Europe membership

Since 1986, OCLC Europe's full and partial membership in the UK has grown to a total of nearly 100 libraries. In Europe the membership figures are as follows: Ireland (7 libraries); Belgium (3 libraries); Denmark (13 libraries); Finland (2 libraries); France (27 libraries); Germany (10 libraries); Greece (3 libraries); Italy (1 library); The Netherlands (96 libraries); Norway (3 libraries); Spain (14 libraries); Sweden (3 libraries); Switzerland (1 library); Yugoslavia (4 libraries) and Middle East/Africa (4 libraries).

Since 1988 the OCLC database has been one of the databases available through the BL BLAISE Records Service. Since 1986 OCLC Europe has undertaken a number of important retrospective conversion projects for UK libraries including: National Library of Wales; National Library of Scotland; University of Oxford; Kings College; Cranfield Institute of Technology; London School of Economics; University of London Senate House; Wellcome Institute for the History of Medicine; Edinburgh City Libraries; Humberside County Libraries; Guildhall Library; National Art Library and Queens University Belfast.

In 1990 OCLC announced an alliance with SLS (Information Systems) Ltd. SLS has completed development of a PRISM interface to LIBERTAS system which is now available to LIBERTAS users in the UK and other European library communities.

Within the UK OCLC also works in association with BLCMP (Library Services) Ltd to provide retrospective conversion services and LASER to provide a secondary resource for the Regional Library Bureaux. Outside the UK, OCLC Europe works in association with PICA in the Netherlands, BTJ in Sweden and DBJ in Germany.

New developments over the next three years

OCLC will complete the migration from the OCLC Online System (the first system) to the PRISM service by early 1992. The OCLC US network upgrade to X.25 will be completed in the same time-scale.

In Europe the IXI gateway will be implemented early in 1991. Future developments for the reimplementation of the Interlibrary Loan Subsystem; Union List Subsystem and support for the US MARC Holdings Format and Authorities Products in the PRISM environment are scheduled for 1992 and beyond.

2.3.6 SLS (Information Systems) Ltd

Developments since 1986

Member libraries have access to the SLS database, representing the holdings in a Union Catalogue File of some 25 universities, polytechnics and colleges. The UCF has grown from over 2.5 million records in 1986 to 4 million in June 1991. Major european languages account for about 12% of the records. Nearly all member libraries are LIBERTAS users. The database is growing rapidly, and includes many new records from the University of London Library, as well as special collections such as the London Library. Recently an alliance has been formed with OCLC which allows SLS customers to access the OCLC database; for SLS libraries mainly via JANET. Access to OCLC is facilitated by the development by SLS of a new PRISM interface, so that users in the UK and Europe can access full MARC records, with new search facilities and full screen editing.

The SLS database is available via JANET and PSS, online; Monday to Friday 8.30-22.00, Saturday 8.30-18.00, Sunday 8.30-12.00.

Records are catalogued to UK MARC standards using AACR2. The bibliographic standard of the database is enhanced via an automatic procedure for selecting the "best" record from the LIBERTAS user base.

LIBERTAS users are charged for the transactions used in accessing and browsing the SLS database, and a charge per record transferred. As well as a source of cataloguing data, the SLS database is actively used as a tool for ILL. Records acquired by LIBERTAS users from the database cannot be passed on to a third party without agreement from SLS.

Records are available to customers in the following standard formats: online, UK MARC exchange tapes, microfiche, catalogue cards and printed catalogue.

New developments over the next three years

Within the next 12 months the old SLS shared Catalogue system, with four remaining users, will be withdrawn, and all SLS customers will be LIBERTAS users.

LIBERTAS is expanding into Europe, with customers in Spain, Sweden and Iceland. New members of LIBERTAS are also from the college and special library sector.

2.4 Resources available from the commercial sector

The last few years have seen a growing use by libraries of bibliographic records marketed in a variety of ways by the commercial sector. In the UK a number of library suppliers and booksellers have made machine-readable records available, so that libraries can use them for the ordering and acquisition of new materials. For many librarians, especially those in public libraries, an external source of machine-readable records available on publication is regarded as being high priority. The timeliness or currency of records in the national bibliography is therefore of some importance. In the UK, at least, the use of CIP entries in BNB has only partly solved the problem; and this has led to library suppliers setting up record supply services at considerable expense. It is likely that this collaboration between libraries, publishers and booksellers will continue, and that the commercial sector will play an increasingly important part in record supply.

Following a meeting in October 1986 of booksellers, librarians, publishers and service suppliers, the BEDIS Committee was set up — the Book Trade Electronic Data Interchange Standards Committee. A discussion paper (BEDIS 1988) was published in 1988 which inter alia identified some six different bibliographic standards in use by the book trade. The BEDIS Committee until recently had been working under BTECC, the Book Trade Electronic Communications Committee. BEDIS and BTECC merged in March 1991 to form Book Industry Communication (BIC) with its own secretariat. It is supported by the Publishers' Association, the Booksellers' Association, the BL and the Library Association. BIC is developing a new business plan which, besides continuing the work of BEDIS and BTECC, will deal with machine-readable codes and distribution standards.

In 1990 the BEDIS report (BEDIS 1990) was published which contains recommendations made by five Working Parties. What the Report attempted was to encourage the UK Book Trade to follow standard practices. Amongst these was the Working Party recommendation on Publisher Bibliographic Databases which established what bibliographic elements are required in publishers (and library suppliers) databases for supplying bibliographic information to other sections of the book trade and the library community, and how these might be accommodated in the UK MARC format. Other recommendations included the production of software packages for UK MARC conversion for publishers. Other working parties addressed issues concerned with standard short title records for use in ordering, commercial messages in the TRADACOMS format, sales data and the setting up of a Standard Address Numbering System (SAN).

An important seminar was held at Newbury in 1987 which explored the provision and exchange of bibliographic records by the book world. The seminar addressed the requirements of booksellers, librarians and readers for bibliographic records, particularly for subject content and access. (Greenwood 1988)

It also highlighted the continuing requirement for bibliographic currency in record supply, especially when linked to the concept of an "all through" record, that can be used for ordering from library suppliers and for catalogue creation.

Though there has been some discussion since about enhanced MARC records, the national bibliographic agencies and utilities do not appear to be doing much work in this direction. Organisations in the

commercial sector however, are now offering enhanced records on their databases of current bibliographic information, including a brief description, contents pages or abstracts. Book Data, for example offers a subject classification, keywords, a brief description and contents list, available online and as a CD-ROM product. Further development work is currently being undertaken at the Centre for Bibliographic Management at the University of Bath where, in collaboration with the Department of Information Science at the City University, a BL sponsored project is examining the effect of record enrichment on retrieval using a Book Data enhanced subset of the university library catalogue.

It is difficult to judge at this stage the current uptake of commercial record services by UK libraries. What is known is that many public libraries such as Essex County, tend to rely on a single library supplier; others like Tameside and Knowsley obtain their services from a range of suppliers. For example, a library may use Holt Jackson for adult books, Askews for childrens books and TC Farries for audio-visual material.

Some libraries make use of "third party" commercial services, such as Book Data and Teleordering, who provide bibliographic services electronically to subscribing publishers and booksellers, and to libraries. The 1989 PLRG survey (Batt 1990) revealed 16 public libraries with automated ordering systems using direct links to their suppliers. Of these three, Croydon, Hertfordshire and Walsall were experimenting with Teleordering. Since then Teleordering has expanded and Book Data has come on stream. Other public libraries in the survey were using networked access to library suppliers; usually on some kind of experimental basis.

Many more libraries are using CD-ROM as a source of bibliographic information. The 1989 PLRG survey (Batt 1990) identified some 49 public libraries as CD-ROM users, all of whom were currently using the Whitaker BOOKBANK CD-ROM service. Other public libraries are now using BNB on CD-ROM and UKOP from Chadwyck-Healey.

This new section describes services provided to libraries from the commercial sector in the UK, including two "third party" companies. Information is given on Book Data, HMSO, Saztec Europe Ltd, Teleordering and Whitaker. Further information is available in Appendix B on four library suppliers, Askew, Blackwell, JMLS, and Morley Books.

2.4.1 Book Data Ltd

Current activity

Book Data Ltd is an independent UK company set up in 1987 to meet the needs of publishers, booksellers and their customers, such as libraries, for book and market information through a computer database. It operates a subscription service to booksellers and publishers, and for libraries who require bibliographic information for book selection and acquisitions.

Records and standards

The database uses the DM package from Information Dimensions; a relational text retrieval package. For each title added five different types of information content have been identified:

- bibliographic detail
- subject indicators

- descriptive text
- trade data
- housekeeping and publisher specific information

Bibliographic detail needs little comment, except to say that Book Data claim a considerable level of compatibility with UK MARC practice.

Subject indicators include the Book Data classification scheme, which has been revised to carry in the order of 1,000 headings. All records created so far have been re-classified where necessary to fit the expanded scheme, and this policy will be continued with future additions or amendments.

In addition, by arrangement with the BL, CIP information is supplied on behalf of subscribing publishers, with Dewey, PRECIS headings and (when available) Library of Congress subject data assigned by the BL. This arrangement will continue to the end of 1991, when a new contract with J. Whitaker & Sons Ltd will come into effect.

Descriptive text includes some or all of a short description (up to 300 characters), a longer "abstract", and an edited version of the contents list, presented as running text rather than as a tabulation.

Trade data relates primarily to price, availability, and distributor information, and may include details of major market exclusions.

The final category, "housekeeping" and publisher-specific information, means the record content which is used either to manage the communication between Book Data and the subscribing publisher or to hold data which is there specifically in connection with the use which the publisher wants to make of his own title records — for example an internal subject or sales analysis classification.

The full record described here is created for new and forthcoming titles: most backlist records carry only basic bibliographic details, subject indicators, and trade information.

Services, availability and media

The principal service so far has been the supply of bibliographic data records; available online through OCLC, on floppy disks which can be customised for library use, and since January 1991 as a monthly CD-ROM service. BookFind-CD as the CD-ROM service is known, provides enhanced bibliographic data for acquisitions and reference. Besides the full product service BookFind-CD ALL, subsets are offered as BookFind-CD ADULT, BookFind-CD CHILDREN AND SCHOOLS, BookFind-CD MEDICAL and BookFind-CD BUSINESS AND LAW. These packages include short entries for all titles on BookFind, allowing access to title, author, publisher, price and availability; but full entries are limited to the scope of each individual package.

BookFind is targeted at booksellers, at librarians and at the subject specialist. Selected entries can be output to a wordprocessor or desktop publishing system for final editing and layout. The subscription includes an open and feasible downloading policy for libraries so that selected records can easily be included in indexing or cataloguing files. Some 250,000 titles are already on the database, covering the bulk of the UK publishing output, with about 60,000 of these being full records carrying enhanced descriptive information. It is anticipated that over 35,000 new entries will be added in 1991. Though

this may represent only around 50% of UK publishing output, the titles covered are likely to represent a large part of library requirements, especially in the public library sector.

Searching can be by word or phrase, with truncation, and with keyword access to titles, descriptions and contents list. For the first time, it is claimed, library users have access to a database of UK publications that can be searched meaningfully by subject using online text retrieval facilities, without having to acquire advanced bibliographic skills.

The BookFind-CD prices are for twelve monthly issues. Annual subscription prices range from £295 to £995 for single copies, single user systems. All prices include mailing costs to any part of the world, and exclude VAT where applicable.

2.4.2 HMSO

Current activity

HMSO has operated as an executive agency since December 1988. During 1989 the publishing and bookselling business with some 500 staff, contributed over £56 million to HMSO's annual turnover of £362 million. HMSO's aim is to provide a complete publishing and distribution service geared to the needs of clients both large and small, ranging from government departments to national museums. The publishing business is self-supporting and with the single exception of subsidisation of Hansard production costs, there is no central government funding for publishing ventures. Even that Hansard subsidy is to be phased out over the next two years. The publishing risk falls to HMSO not the client department, those for whom HMSO publishes are not tied and are free to put their business elsewhere.

Records and standards

Machine-readable records available from HMSO are either data files captured by computer typesetting processes, files downloaded from database systems, or bibliographic records.

Typesetting files of statutory material (Bills, Acts, SI's etc.) are archived and normally offered for sale in converted form so that they may be read under MS-DOS. Where data files are made and retained for non-Statutory material they may be available for sale only in typesetting format. It is not possible readily to quantify the number of records owing to the sheer volume of statutory and non-statutory material, which amounts to some 9,000 new titles in hard-copy each year.

The bibliographic database consists of records of all HMSO titles and those agency titles which HMSO sells on behalf of international organisations such as UN and EC. There are at present some 180,000 titles on the database ranging from 1976 to date. About 50,000 of these titles are in print.

Documents are catalogued to AACR2 standard onto a MARC database and held in MARC format.

Services, availability and media

Data files are available to any prospective purchaser who is prepared to enter into an appropriate licence agreement for the use of the data, which is Crown copyright. Charging policy combines a data purchase price, usually based on the number of printed pages in the hard-copy, and licence fees determined by

the commercial use to which the data is to be put. Data can be supplied on either floppy disk or magnetic tape.

Bibliographic records can be accessed through BLAISE (file HMSO) and DIALOG (file No.227 British Official Publications: HMSO). The database from 1980 onwards has also been combined with Chadwyck-Healey's database of non-HMSO official publications and published on a CD-ROM Catalogue of UK Official Publications (UKOP). An annual subscription to UKOP is £800 and the CD-ROM is updated quarterly.

Discrete areas of data files such as statutory instruments, Parliamentary debates (Hansard) and directory databases such as DTI QA Register are being developed for CD-ROM publication. HMSO has recently installed an optical disc document image processing system for scanning and retrieving customer orders and EC documents. Extracts from these EC documents can be faxed from the optical disc direct to customers. This service, launched in the Autumn of 1990, is called SCANFAX.

Technological development interest is very likely to continue with CD-ROM and other optical systems over the next three years.

2.4.3 SAZTEC Europe Ltd

Current activity

Saztec Europe is a wholly owned subsidiary of Saztec International of the USA. It is not a supplier of machine-readable records as such, but a convertor of paper-based manual records to machine-readable format, with some 15 years of experience world wide, five years in the UK. The market specialisation has been libraries, though conversion projects for commercial companies and government organisations have been carried out. Saztec also work with suppliers of machine-readable records such as UTLAS to provide libraries with customised solutions.

Services, availability and media

Many retrospective conversion tasks require keyboarding of records from 5 x 3 cards and other paper originals. OCR facilities and imaging equipment are also available. Data converted from paper records is supplied typically on magnetic tape, but can be supplied on floppy disk, cassette or CD-ROM.

Experience has shown that OCR performance cannot yet achieve the accuracy levels and cost effectiveness of keyboarding. Saztec always double key and they claim and guarantee a 99.95% accuracy, of consistency of data, files and record format.

Saztec carry out all retrospective conversion activities away from the library premises to avoid disruption to services as well as avoiding the equipment, staff and supervision expenses of in-house methods.

In order to work with an entire catalogue, a microfilm copy is made of the shelflist or main entry catalogue to provide a portable version of the file for shipment to the Saztec production facilities.

Saztec can arrange for the filming or the library can provide this service themselves. Alternatively, some libraries have chosen to photocopy the shelflist cards while others have sent the actual cards, printed catalogues or microfiche.

Production commences with the receipt of the copied catalogue. If using the microfilm of the catalogue, Saztec first makes full size paper copies of the file to enable data to be coded ("tagged").

The data elements on the cards are then coded to the agreed format specification. For a full "tag and key" service all catalogue records are captured by keying.

Many libraries prefer to have an entire "tag and key" conversion to maintain the integrity of the existing catalogue. This also avoids both the expense of search key construction and matching and the compromises that can arise from this approach.

For libraries wishing to match against bibliographic databases, such as BNB, UTLAS, OCLC and REMARC, search keys are created according to the input format of the chosen vendor. Records from these sources are converted to the specified format and local data are incorporated. Records for which there are no matches are coded and entered by keyboard.

Saztec also offers

- conversions from one format to another
- matching against databases for batchmode authority control
- record enhancement, such as inclusion of local data and building of added entries and fixed field data

Actual costs depend upon the services provided, the number of titles, the turnaround time and the nature of the catalogue.

2.4.4 J. Whitaker & Sons Ltd

Current activity

J. Whitaker & Sons Ltd are a supplier of bibliographic information to booksellers and libraries. They publish the UK weekly booktrade journal *The Bookseller*, and are the owners and managers of the UK Standard Book Numbering (SBN) Agency. Whitaker has established customers in nearly 100 countries world wide.

Records and standards

The major bibliographic database offered by Whitaker is a file of over 1,200,000 machine-readable records, held in UK MARC format. It includes titles which were either in print in 1970, or have been published since that date. Over 500,000 records are for titles currently in print. The file includes the output of some 17,000 publishers active in the UK and is increasing at the rate of around 75,000 titles each year.

Services, availability and media

The major publication, *Whitaker's Books in Print* is available annually in printed form (£148.00), on fiche as a monthly service (£525.00), on CD-ROM monthly (£1050.00) and CD-ROM bi-monthly (£710). Prices shown are for an annual subscription. The Whitaker file is also available online through BLAISE-LINE, and as a tape service. Annual sales were at £6.3 million for the 1989/90 year. The

CD-ROM service BOOKBANK has been available to libraries since 1988, and as the PLRG 1989 Survey (Batt 1990) shows is used by all 49 public libraries who have access to CD-ROM facilities; indeed it seems likely that the very existence of BOOKBANK has encouraged some public libraries to purchase a CD-ROM drive. BOOKBANK now has over 700 subscribers in over 50 countries.

The BOOKBANK CD-ROM includes more than 550,000 books which are in print, plus forthcoming, provisional and recently out of print titles. BOOKBANK uses the BRS/SEARCH software, which in addition to offering access to most data fields in the bibliographic record, allows downloading of data onto disc, and consequently integration with the library acquisition system, with Teleordering, and other suppliers.

In May 1990 BOOKBANK OP CD-ROM was set up; an annual service which lists some 640,000 titles from the Whitaker database. The first product lists titles that were out of print at March 1990. BOOKBANK OP is available at £350.00 annually.

The Whitaker file on BLAISE-LINE contains brief bibliographic records for British books and English-language titles published overseas but available in the UK from a sole stock holding agent. About 1,200,000 records are currently available. The file is particularly useful for identifying book prices, and for determining whether an item is in or out of print. It includes forthcoming titles and is updated monthly.

The Bookseller with 16,000 subscribers reaches an estimated 80,000 readers in over 90 countries.

Future plans include the enhancement of bibliographic records by the inclusion of contents lists on the CD-ROM and magnetic tape services, the inclusion of DC20 on the majority of entries, and the introduction of weekly updating services via Teleordering. A new contract has been signed with the BL to supply advance information in MARC format to the CIP programme of the BL NBS. It is expected that at least 30,000 titles will be provided each year under the new contract.

Teleordering Ltd

Teleordering Ltd, now acquired by Whitaker, was set up in 1980 to facilitate the supply of book orders by electronic means to subscribing booksellers. The service has grown considerably in the last few years with several libraries participating directly. By using an IBM PC a library or bookseller can collect orders, and typically, send them online to Teleordering at night, via direct dial PSS. Continued orders are returned electronically for printing out locally the following day. Teleordering then sends orders to participating publishers, wholesalers or library suppliers.

The Teleordering database uses the current file of Whitaker's Books in Print. Some 750,000 machine-readable records are held. The record includes author, title, publishers, ISBN, price, in-print status.

The Teleordering PC is used by libraries and booksellers to collect orders made during the day, and input data is automatically collected electronically by the Teleordering central computer, and checked against the database. Order confirmations are sent by return automatically for printing out. Book orders are then sent by Teleordering to publishers, wholesalers and suppliers; either electronically, or in case of non-automated smaller publishers by printout. By using Teleordering as a central clearing house for book orders publishers and suppliers are removing their small orders surcharge for orders sent. Libraries and booksellers can also now make use of the BOOKBANK CD-ROM where this is locally available.

Many UK bookshops and all the multiples are now subscribers. The service is also expanding its links with Europe; recently links have been made with Switzerland and the Netherlands, and further plans are being made to link up with Austria, Denmark, France and the USA.

2.5 Network access to machine-readable record resources

The original LIB-2 study reported on a number of networking developments that were then in place. Since that time technological innovation has led to improvements in the networking infrastructure. In the UK libraries have begun to make significant use of wide area networks (WANs) for access to machine-readable records. At the organisational level local area networks (LANs) are being used by libraries to provide an alternative means by which readers can access the services that libraries provide, such as OPACs. However networks have grown in a somewhat piecemeal fashion with individual libraries leasing private telecommunication lines, or using networks set up by academic institutions, local authorities, and private companies. This pattern has led inevitably to a wide range of systems using proprietary hardware and software. These networks are usually close-coupled to specific library applications such as circulation control, or OPAC access. The early 1990s are likely to see a trend towards the use of generic (or public) data networks with sufficient customisation to provide "virtual private networks", on which a whole range of services can be based. The problem of disparate systems, both hardware and software, still remains.

The solution would appear to be the use of OSI, described and standardised by the OSI model, published by the International Standards Organisation. This type of standardised network model enables communication between different types of system running in a multi-vendor environment, an essential pre-requisite for successful library networking. Standards are necessary both for the kinds of services that need to be provided by the telecommunications companies like British Telecom and Mercury, and for the systems and services that the library community require.

To assist in addressing this problem and to consult widely with the library community the BL set up in November 1989 the UK Office for Library Networking (UKOLN).

The UKOLN works with the existing Centre for Bibliographic Management at the University of Bath. The primary goal of UKOLN is to enable the production of a common and cohesive national and international strategy for the use of networking by the UK library and information community. This will involve a series of activities designed to increase the awareness of the UK library and information community concerning the possibilities of networking and will stimulate the production of a series of documents on the requirements of specific areas.

2.5.1 Wide area networks (WANs)

In the UK there are at present two major public services provided by private companies: British Telecommunications plc (British Telecom) and Mercury Communications Ltd (Mercury). Other licensed Public Telecommunications Operators (PTOs) are Kingston Communications (Hull) plc — which provides the Hull public telecommunications system — and two cellular phone companies, Telecom Securicor Cellular Radio Ltd (Cellnet) and Racal Vodafone Ltd (Vodafone). In March 1991 the government announced that it was prepared to open up the UK telecommunications marketplace.

British Telecom and Mercury operate public switched telephone networks throughout the UK. British Telecom (BT), who bought the US-based Tymnet Corporation, an international data networking company, in 1989, have recently set up an updated data communications system called Global Network Services (GNS), which includes Tymnet, Telecom Gold and PSS Dialplus. Libraries are able to use dedicated connections to public X.25 WANs, private networks such as JANET, or use direct "dial-up" access services to the public networks through PSS Dialplus.

The public telecommunications wide-area networks, British Telecom and Mercury, and the many private data networks, set up by commercial and industrial firms, provide not only an operational infrastructure, but in many cases also offer value added services. These services include e-mail, such as Telecom Gold, online information services, transactional services and the like. Many of the online search services like DIALOG and PROFILE may be regarded as value added.

The availability of LANs in libraries linked to these value added services appears to be one area where substantial growth is likely over the next few years. With suitable front-end software it is now possible to access a range of information services, including those that supply machine-readable records, from any PC linked to a LAN node. The development of PCs as workstations, such as those designed by Dawsons, will offer a "one-stop shopping" resource for the librarian and reader alike.

The provision of network services within Europe has altered significantly since the original LIB-2 study. The changes derive partly from improvements in digital networking technology but also reflect major developments in operational capabilities and commercial strategy. These latter changes are further influenced by the changing regulatory positions — primarily within the UK but increasingly throughout Europe.

The performance of "public" X.25 networks, both in terms of speed and quality, has improved to a point where consistently high standards of service availability are normal and contractually guaranteed by the network operator.

From a user's complete "end-to-end" viewpoint, service reliability has also been enhanced by improvement of local access networks, by the introduction of error correction technology embedded within modems and effective in the dial-up "local loop", and by the widespread availability of better applications software for PC's, Local Area Networks and Transaction Processing systems.

The cost of using public network platforms has fallen relative to dedicated (private circuit) networks as a result of the introduction of bandwidth sharing techniques — making capacity available dynamically in response to needs rather than building in reserves of spare capacity to meet the occasional peak loads of specific applications.

The introduction of Access Services at the entry point to public data networks has enabled service providers to control and manage the presentation of their services. Dialplus, for example, provides the corporate customer of British Telecom's Global Network Service with an ability to design a menu of service choices that is available to the individual users within specific library and information communities.

a) British Telecom

British Telecom operates a Global Network Service (GNS) which provides access to over 100 countries world-wide. GNS offers a full integration of the Tymnet Corporation network in the US, the Tymnet world-wide network, the PSS network in the UK, the PSS gateways and Telecom Gold.

PSS Dialplus supports the new CCITT international standard for error correction V.42, so that Dialplus data transmissions are automatically error-corrected.

Libraries can access the GNS network by using a variety of different protocols, either by dedicated X.25 connections directly linked to GNS nodes, or by dial-up connection to GNS nodes over the public switched telephone network (PSTN).

b) Mercury

Mercury 5000 operates an International Network Service (INS) which provides an international link to some 40 countries world-wide. Mercury 5000 offers a UK packet-switched X.25 public network service. Libraries can link to the UK and international services by dedicated X.25 connections, or by dial-up. Mercury 7500 or Easylink, operates the MERCURY e-mail service, which provides e-mail, telex, mail-gram and dial-a-gram service, also provides an X.25 gateway to online databases such as FT PROFILE.

2.5.2 Local area networks (LANs)

Although there are many LAN products in the market place, the LIB-2 Update study suggests that nearly all LAN's currently in use at the national and local level are Ethernet based. Whilst there are other systems in use they represent a small proportion of the installed base; among these are the IBM Token-Ring system and Cambridge-Ring.

Ethernet is a packet-switched LAN which uses shielded coaxial cable, fibre optic cable, or the recently introduced data standard unshielded twisted pair-cabling (UTP). Ethernet can be connected in a variety of ways around the library, the organisation, or the campus. The most commonly supported operating system (OS) is Novell Netware, though several other systems are used. The latest OS on the market place provides for a flexible network strategy allowing for a mix of file-servers, CD-ROM servers, printers, and bridges and gateways to X.25 networks. As libraries introduce microcomputer-based access to their resources, they are increasingly linking up machines on LANs, rather than simply replacing dumb terminals. It is important therefore that as more LAN-based services are brought into being that these LANs interconnect with available WANs thus facilitating the exchange of bibliographical data, e-mail and other information services.

The British Library

The BL has a long established CASE DCX network with five main nodes, four in London and one at Boston Spa, linked by 2Mbps leased lines from British Telecom. Other sites use 64Kbps leased lines to the appropriate node. The future of the CASE DCX network is currently under review. There is also a link to the JANET network.

In 1988 the BL published The BL Automation Strategy, which was intended to provide a development path within the overall strategic review. Clearly the data created by library processes such as acquisitions and cataloguing is used by library services such as reader services, document supply, and bibliographic services. All these rely on the underlying technical infrastructure. The Automation Strategy is designed to put into place this infrastructure to support the services that will be offered in the new building at St Pancras and the new developments taking place at Boston Spa. These services have already been described elsewhere in this study, in Sections 2.2 and 2.3.

Since 1989 the BL has been installing a number of LANs. The first was at the Sheraton Street site using Novell Netware running on a thin Ethernet LAN, linking up IBM PC AT compatible microcomputers. By the end of 1990 some 46 machines were installed. The LAN is connected to BLAISE by a CASE IBM SNA/SDLC gateway. A 64Kbps leased line connects to the DCX network and thus to Boston Spa.

Further LANs have been installed. At SRIS a CASE Series 6000 LAN has been installed at Holborn, with 32 nodes, and links to Sheraton Street. The LAN will assist SRIS with their acquisitions. There is also a small 6 user CASE Series 6000 LAN at Bloomsbury, also linked to Sheraton Street, used primarily for e-mail.

A series of Ethernet LANs, running Novell Netware, is planned for the new St Pancras building; though this is still subject to tender. This will be the largest BL LAN with some 1,300 nodes planned.

Costs for LAN development so far has been put at £280,000. The St Pancras LAN may well cost of the order of £1,000,000.

2.5.3 JANET

In the UK many of the interesting developments in providing network access to machine-readable resources have taken place in the academic library sector. To some extent this is because academic libraries have been able to build on networking infrastructures set up for the academic community generally, especially the Joint Academic Network (JANET). JANET now connects every university, polytechnic and Scottish central institution. It also has links to the research councils, which provide research funds to academic institutions, to the BL, and to a growing number of service suppliers, such as BLAISE, OCLC and CURL. In effect JANET provides a networking infrastructure on which the UK academic community makes use of a developing range of networked services.

JANET is a packet-switched X.25 wide area network, using dedicated leased lines from British Telecom. When JANET was set up in 1984, it was originally designed to provide university researchers with high-speed access to data processing facilities at regional university computing centres, at places such as Manchester, London and Bath, and to various research council computing centres like Rutherford Appleton Laboratory. Since 1986, however, the academic library community have begun to use JANET for library purposes, with a growing number of services specifically for library use.

Because of the way JANET is financed the service is free to universities, and to the research councils; other organisations such as polytechnics and colleges have a bulk charge for the sector paid for by the Polytechnics and Colleges Funding Council. By using JANET, instead of relying on the PSS service of British Telecom, libraries can make considerable cost-savings. For example, libraries can use JANET to connect to the BL DSC at Boston Spa using ARTTel, the BL DSC Automatic Request Transmission Service, to transmit their ILL requests. Libraries can also use JANET to link to suppliers of bibliographical records, such as BLAISE, OCLC

and CURL, for the online selection of record supply, either using downloading or the supply of records on magnetic tape or disk. Some of these networked services are already described in Section 2.3.

One of the earliest library resources available on JANET or indeed available to any user of the PSS-JANET link, is the ability to search OPACs of other JANET members. In many academic institutions local area networks (LANs), which often act as campus networks, are linked to JANET. The introduction of OPACs linked throughout the campus inevitably led to connections with remote OPACs via JANET. Some libraries have made such resource sharing directly available to their readers. At Hull University, for example, OPAC terminals offer a "one-stop shopping" facility so that readers can select more than 30 academic OPACs from the appropriate menu.

In 1986, the library of the University of Sussex was asked by the Standing Conference of National and University Libraries (SCONUL), to produce a directory of those university libraries catalogues available on JANET. Some 16 library OPACs were listed. The directory is updated at intervals, and currently some 60 OPACs from universities and polytechnics are included.

The future development of networked OPACs is unclear. Any real changes are likely to depend on OSI-based systems for catalogue searching and downloading of records. The use of OPACs for interlending and document supply will require further investigation to clarify problems associated with copyright, and further technical advances with Group 4 fax.

There are currently four types of network services available on JANET, these are described in Appendix D.

To enable libraries to obtain benefits from JANET and from the various services being developed, the academic library community has set up the JANET User Group for Libraries (JUJGL). Among the services provided by JUJGL is the Directory of Library Information on JANET (Stone 1990), which lists around 450 libraries and 400 services.

Among recent developments are:

- 1) The provision of access to online hosts on the public networks, through three multi-channel gateways. Itemised accounts and mnemonic names are used to call up the main services, such as DIALOG, DATA-STAR and ESA.
- 2) The provision at Bath University of the online databases of the Institute of Scientific Information (ISI) which allow academic libraries unlimited access to ISI's range of online citation indexes, on payment of an institutional subscription of £6000 per annum. This service is known as the Bath ISI Data Service (BIDS).

In July 1990 OCLC Europe implemented a link to JANET. The link is a 64KB X.25 circuit provided by Mercury Communications Ltd. The JANET link connects to the TAT-8 fibre optic cable which links OCLC Europe in Birmingham to OCLC in Dublin, Ohio, USA.

The JANET link is being provided to allow libraries in the research and academic community greater choice of access to OCLC services.

The JANET OCLC link will be used by users of the OCLC shared cataloguing service, by libraries who access the OCLC database under a British Library BLAISE RECORDS agreement and also by

LIBERTAS users and other SLS customers who will use the SLS X.25 OCLC interface currently being developed by SLS (Information Systems) Ltd.

The SLS JANET link is now the major mode of access to the SLS database to member libraries. This X.25 link gives libraries in the academic sector improved access to 3.5 million MARC records on the SLS database.

2.5.4 Examples of network integrated services

a) Academic libraries

In the UK many universities, polytechnics and other colleges have set up a variety of networked resources, campus-wide, on which academic libraries are developing services of particular relevance to their own needs. These campus networks are usually linked via X.25 gateways to JANET, to make use of the services described in the previous section, but especially for the supply of machine-readable records from utilities and co-operatives. The 1988 COPOL survey (Ellard 1989) showed that 23 polytechnic libraries obtained their catalogue records from BLAISE, BLCMP or from SLS; in 1990 these services (with the addition of OCLC) are increasingly being obtained by networked access. The findings of the Update study supports these changes, the switch to networking has become quite clear.

Machine-readable records are also obtained from a large number of remote online hosts such as NLM, MEDLINE, DIALOG or FT Profile, or obtained through CD-ROM services. CD-ROM networks running on Ethernet LANS have been established at several institutions, including Birmingham University, Polytechnic of the South Bank, University of Warwick and Manchester University.

b) Public libraries

The public library sector in the UK has been comparatively slow in the development and use of networked services to access machine-readable records. Most networking so far has been through the use of dedicated lines to support circulation control systems; in some cases they rely on local authority networks, Essex County for example use the countywide private X.25 network EDNET. Other examples include the Hertfordshire COMNET network.

Of particular interest is the VISCOUNT network set up by LASER and described in the Section 2.3.4. The 1989 PLRG (Batt 1990) Survey reveals that some 11 public libraries claim to be using the machine-readable records of the VISCOUNT database.

Many public libraries are known to be using commercial organisations as a source of bibliographic records. Few are actually using networked access to do so, relying mainly on paper systems or floppy disk.

Local authority private viewdata networks have been set up by several public libraries. LASER has recently produced a directory of these systems. Examples include KINGTEL the Kingston Upon Thames Viewdata Service, THEMIS described in Appendix E.2, and services provided by Suffolk, Cheshire, Bexley and Gateshead. Data provided by the 1989 PLRG Survey (Batt 1990) gives some idea of the growth of services

	1985	1987	1989
Videotex (Prestel)	83	84	88
Private Viewdata	15	24	33

Other information from the survey suggests a heavier pattern of use of private viewdata, reflecting library provision of information of more direct use to the client communities.

Details of networking at a sample of university, polytechnic and public libraries are given in Appendices E.1 and E.2.

2.6 Trends and conclusions

The original LIB-2 report identified three dominant trends which were seen as affecting the further development of machine-readable records resources and machine-readable catalogues. These were:

- The development of more powerful integrated library systems
- The use of OPACs in a networked environment
- The retrospective conversion programme

Of the new information technologies, the growth of CD-ROM was seen as having the most significant potential.

The LIB-2 Update tends to confirm these trends across all types and sizes of library. The past four years have seen an increasingly large number of libraries acquiring new or updated integrated library systems (Section 3) which invariably include an OPAC module. The introduction of an OPAC (sometimes linked with a retrospective conversion programme) requires an enhanced computer hardware and software configuration to cope with the demand for increased disk memory and processing power. This results in considerable capital expenditure and a consequent increase in recurrent costs.

At the same time libraries, especially academic libraries, are using networked resources as a means of obtaining machine-readable records. Libraries are often members of co-operatives or use utilities to obtain records (BLAISE, BLCMP, CURL, OCLC, SLS); some are using online access to select and download records or files. The results of the Update show a clear trend towards networking in this way, though libraries are typically relying on a variety of methods to obtain machine-readable records; in-house creation, MARC tape services and in some cases the use of CD-ROM services. Increasingly commercial record suppliers are being used for book orders and the supply of machine-readable records, particularly by public libraries.

The growing impact of CD-ROM on IT-based user services in libraries is noted in Section 4. Today CD-ROMs are being used as a means of distributing machine-readable MARC services (OCLC, BNB, HMSO); and for a wide range of bibliographic databases (MEDLINE, ERIC). At present the uptake of these services for cataloguing is somewhat limited, and the use of CD-ROM by individual libraries as a means of distributing catalogue records is largely at the planning or discussion stage in the UK, except of course at national level. The BL catalogue (that is the General Catalogue of Printed Books to 1975) is becoming available on three CD-ROM discs. BNB is now available on CD-ROM, as is the DSC Serials collection. It is likely that the next few years will see some of the other main machine-readable catalogues

become available in this way; and lower pricing should lead smaller libraries to consider CD-ROM catalogues.

There is some evidence in the academic sector of a trend towards LAN based CD-ROM services, sometimes linked to campus wide networks and X.25 gateways. In public libraries such developments are still largely at the planning stage.

Any sustained growth of network access to machine-readable records would appear to be dependent on the availability and increasing use of standards. At the record level the Update study confirms the continued use in libraries of AACR2 and the UK MARC format. Under the impetus of BEDIS these cataloguing standards are now being introduced by the commercial sector, a trend directly of benefit to libraries. At a more technical level the use of the OSI model is likely to facilitate networking access to a wide range of installed proprietary library systems, helped further by the switch by some suppliers to a UNIX platform.

3.0 Integrated library systems

At the time of the original LIB-2 report, library automation was already well underway in many UK libraries. There was definite movement away from central, mainframe-based systems towards stand-alone systems often dedicated to library procedures. These stand-alone systems were developed and supplied predominantly by commercial suppliers. Since 1986, this trend has continued with an increase in the number of suppliers and systems on the market. Concentration has been on integration of library systems with a general reduction in single application systems other than those covering serials control. Most integrated library systems are supplied on a modular basis and many systems now have all the major functional modules operating (Appendix J.1 and J.2). Suppliers are now consolidating these systems and looking at other areas of development, such as extending access to the system and developing further communications facilities, providing CD-ROM interfaces etc, together with the development of new modules such as ILL.

Most systems allow for library definition using parameters and the extent of this has increased over the last four years. Early systems usually allowed for this parameterisation in the circulation function. Now library definition might include, for example, fields used in the bibliographic record, indexing options, displays, menus, help texts, dialogue and text of printed outputs.

Changes in hardware generally have had an impact on the integrated library systems which have seen a move away from proprietary hardware towards industry standard hardware and operating systems.

3.1 Methodology

For the purposes of this study, an integrated library system is taken to be a system operating online and capable of supporting all or most of the following applications: cataloguing, catalogue access, circulation control, acquisitions, serials control and ILL. Since serials control and ILL are specialist applications which do not necessarily have to be integrated with the main library catalogue, systems offering just these functions have also been included. Some of the smaller library housekeeping systems available do not offer the same level of functionality and integration as the true integrated systems, but, they have also been included in this study for the sake of completeness. Text retrieval systems which are often used, particularly in special libraries for cataloguing only, have not been included within the scope of this study. However where text retrieval systems have been developed to include complementary library housekeeping functions, they have been included.

Information for this section on integrated library systems was collected from the following sources:

a) Desk research

This topic is well documented in various reports, journals and statistical documents as listed (see Sources and materials consulted). A large amount of information on the extent of take-up of integrated library systems in the various library sectors was obtained from these sources. Where information has been obtained from a specific source, this has been referred to in the text of this report.

b) Questionnaire/Survey

To supplement the above sources and bring information obtained from them up-to-date, it was proposed that a questionnaire should be sent to each of the suppliers identified in Appendix F.

Given that a substantial amount of the information required was obtainable from desk research, this strategy was modified. The questionnaires were filled in for the suppliers and information entered was supplemented by a telephone survey/interviews with each of the suppliers listed. This survey was carried out at the end of November 1990. Information obtained from this survey was entered onto a database at the Library & Information Technology Centre and analysis of the data collected has been incorporated into this report. A customer list with breakdown of modules implemented where available was also requested from each supplier. Information obtained from this survey will be referred to as: 'Supplier Survey, December 1990' in this report.

c) Semi-structured interview

A semi-structured interview was carried out with a library consultant in this field to obtain opinions on trends.

3.2 Commercial systems marketplace

There are currently 43 systems being used or supplied in the UK by 40 suppliers covering one or more of the library housekeeping functions of cataloguing, circulation control, acquisitions, serials control and ILL. These products are listed in Appendices F and G. In 1986 37 systems were identified (including 11 single application packages). Since 1986 there has been little change in the suppliers of larger systems but a general increase in the number of suppliers and products of the smaller systems. The number of single application packages has declined in favour of integrated systems.

The distinction between larger and smaller systems is becoming more difficult to define as systems become more portable and smaller computers become more powerful. However the commercial systems marketplace can be roughly categorised in this way: 'larger' systems which are typically those suitable for public libraries, and libraries in universities and large polytechnics; 'smaller' systems cater for the smaller academic sector (smaller colleges and institutes of higher and further education, schools) and special libraries (in the fields of government, business, medical, education etc.).

3.2.1 Larger systems

There has been relatively little change in the suppliers of larger integrated systems since 1986. The suppliers of larger systems are given in Appendix H.1. There have been five new entrants into this market sector. Geac have extended their product range with the introduction of the PICK-based system — Advance, a good example of the general trend away from proprietary hardware. In 1987, some interest in the market was shown by hardware manufacturers, notably ICL, Norsk Data and IBM. Of these, there is in fact only one new supplier — Lychgate Associates plc with BOOK Plus which runs on IBM hardware. There has been an increase in interest and availability of UNIX hardware platforms and this is having an impact on library systems at the larger and smaller end. CLSI has transferred the LIBS 100 system onto UNIX while two new entrants into the larger systems market — DDE and Fretwell Downing, both offer UNIX-based systems written in ORACLE. DDE's Supermax Library System is a Danish product which has been marketed in the UK since late 1989. DDE plans to establish marketing and support staff for their library product in the UK in the near future. Fretwell Downing's Reflexion is due for release in early 1991. The VTLs Library System is marketed and supported in the United States and was installed at the National Library of Scotland in October 1987.

Two systems available in 1986 are no longer supplied, Oriel Metatalogue and OCLC's LS 2000.

3.2.2 Smaller systems

This area of the market has seen considerable change and expansion since 1986 reflecting in particular the increase in availability of cheap microcomputers and an increase in interest in automation in the special libraries (Ramsden et al 1990) and college libraries sectors. The suppliers of smaller systems is given in Appendix H.2. The implementation of integrated systems in the college marketplace has increased over the last four years and although funding is short in this area, it has generally been recognised that library automation is beneficial particularly where colleges have multi-site libraries. A recent survey (Blunden-Ellis 1990) identified that 47.7% of respondents with multi-site libraries possessed some form of automation as opposed to only 26.3% of respondents with single site libraries. Further stimulus in this area has come from a recent trend towards the merging of colleges, though the effect of this is still to be felt in many organisations whose merging plans have yet to be finalised. The schools sector is a further marketplace which has seen an increase in automation of library functions since 1986. This has been stimulated by increased emphasis on research with the GCSE examinations taken at age 16 and local management of schools encouraging computerised schools administration systems. A number of low-cost library housekeeping systems are now available for the schools market offering some of the functionality seen in the larger housekeeping systems (Leeves & Manson 1988).

Several of the systems in this group offer comparable functionality with the larger systems, with modules for all the library functions, whilst others are more limited and are consequently often lower in cost. Full details of the functional modules available with all the library systems is provided in Appendix J.2.

The hardware and operating systems on which the smaller systems run vary, with some limited to particular hardware platforms and others available on a wide range. Details of these are listed in Appendix K.2. The 1980s has seen a growing interest in the use of portable operating systems, PICK and UNIX being good examples and the trend towards the use of these has been felt in the integrated library systems marketplace, for example Appendix K.2 shows there are now 19 UNIX systems, in 1986 there were none.

Most of the microcomputer systems work on IBM PCs and compatibles running MS-DOS as standard. Some run under PICK or UNIX. Several new packages have recently become available running on the Apple Macintosh. Details of hardware platforms on which the different integrated library systems run are provided in Appendix K.1., 2 and 3.

3.2.3 Application specific systems

In 1986 there were a substantial number of application specific systems offering particularly circulation, acquisitions or serials control. The numbers currently available are given in Appendix I. The four years since then have seen a trend towards integrated packages many of which are available on a modular basis so that specific applications can often be met using the appropriate modules. This applies particularly to modules which can stand alone such as serials control and ILL, examples being the Soutron Library System serials control module and TINlend for ILL (which integrates with TINlib). Of the circulation control systems in existence in 1986, only the Telepen Library System is still supplied. None of the acquisitions only systems are now available. Stand-alone serials control packages have however seen some expansion with several subscriptions agents offering automated systems usually geared to their subscriptions customers. Blackwells' Pearl is now marketed as ISIS and is available on micro- and mini-computers. Dawsons' SMS is now part of OASIS, an integrated library housekeeping

system launched by Dawson Technology during 1989. Faxon has produced Microlynx and Swets have a system under development.

A new application area which has seen some development is the automation of ILL procedures. Several stand-alone systems have been developed, notably the ILL system from the University of Lancaster and AIM from Leicester Polytechnic (now incorporated into Dawsons' OASIS).

3.2.4 Changes in suppliers since 1986

Some changes in products and suppliers will briefly be clarified here:

- **Adlib** was supplied by Databasix and is now supplied by Adlib Information Systems.
- **Adlib2** from Digital Design is now marketed under the name Equilibrium.
- **CARS/CLASS** was supplied by G&G and is now supplied by Fretwell Downing as Lending Library.
- **Data Trek** formerly supplied by Dawson Technology, is now supplied by Data Trek UK.
- **Sydney Micro Library** is now known as the Soutron Library System and supplied by Soutron Ltd as the result of a management buyout.
- **Bookshelf's** multi-user rights were sold by Logical Choice to Specialist Computer Systems and Software.

John Blunden-Ellis has carried out some studies into the saturation of the commercial library systems marketplace (Blunden-Ellis 1989, 1990 and 1991). He estimates that the polytechnic market is fully saturated (or 77% where Scottish central institutions are included); universities are approximately 85% saturated; public libraries are also approximately 85% saturated and colleges of technology/education are approximately 17.9% saturated. These figures are based on a supplier survey and reflect the market situation in to January 1990. No figures are available for the special library sector.

3.3 Functionality

The functionality of integrated library systems was very well developed when the original LIB-2 report was produced. Much of the recent development work has related to consolidation of the basic modules (cataloguing, circulation and acquisitions) with enhancements to OPACs and development of new areas, such as interfaces to CD-ROM mainly for cataloguing purposes. New modules covering acquisitions, serials control and ILL are being offered by more systems. A full description of the basic modules will not be included here, as they are well documented in the original LIB-2 report, but new developments and trends will be described and new modules detailed.

The extent of integration of the different modules has continued to increase since 1986. Many of the integrated systems operate using relational database techniques and a core catalogue record is used as the basis for the different functions. Most of the systems are sold on a modular basis (exceptions being DOBIS/LIBIS and Bookshelf PC which are usually supplied as a single package incorporating all modules). It is, however, usually necessary to purchase the cataloguing module in order to run loans or acquisitions. Serials control and ILL modules are often available stand-alone without the need for the cataloguing module.

The range of functions offered by the systems surveyed varies partly reflecting the different marketplaces for which they are designed. Appendix J.1 and J.2 provide details of the modules available on each of the integrated systems. Of the 15 larger systems listed in Appendix J.1 the distribution of modules available is as follows:

	Number	%
Cataloguing	15	100
Circulation	15	100
Acquisitions	14	93
Serials	10	67
OPAC	13	87
ILL	2	13

Of the 24 'smaller' systems listed in Appendix J.2, the distribution of modules available is as follows:

	Number	%
Cataloguing	24	100
Circulation	23	96
Acquisitions	17	71
Serials	12	50
OPAC	12	50
ILL	3	5

3.3.1 Library ordering and acquisitions management

As can be seen from the above figures, acquisitions modules are now available in a large number of systems. They are, however, in some cases still in the process of being implemented and there are sometimes unfinished links between serials control and acquisitions where data is shared e.g. fund files.

One significant area of interest has been the links between acquisitions modules on local systems with databases maintained by the book trade. An increasing number of systems provide for holding a potential requirements file as part of the module, allowing records from book suppliers to be loaded to the potential requirements file usually by magnetic tape. Booksellers are increasingly making their records available in MARC format and 'enriched' records are becoming available from this source. In particular Book Data supply very detailed records and is already engaged in experiments with libraries to provide records containing greater subject and content information than is found in the MARC record. Interfaces have been developed to load CD-ROM records into the potential requirements file commonly from Whitaker's BOOKBANK.

There has also been a great deal of interest in the possibility of electronic transfer of orders, invoices, etc, direct to book suppliers from a local library system. Many of the library systems suppliers surveyed expressed an interest in creating the facility for electronic data interchange (EDI) between libraries and their book suppliers. However, the majority are waiting for a standard interchange format to be reached before offering this as a standard facility in their systems. Some suppliers have developed interfaces with specific book suppliers for example Geac with JMLS and T.C. Farries; others are happy to customise interfaces with specific suppliers on request, for example Bookshelf. Work on developing standards for EDI has been undertaken by the BEDIS (Book Trade Electronic Data Interchange Standards)

Committee made up of representatives from publishers, booksellers, libraries, library suppliers, systems suppliers (to both libraries and publishers), and organisations such as Teleordering, Whitaker, and the Article Numbering Association. The final recommendations of the BEDIS Committee have been recently published and many of the library suppliers are awaiting the establishment of its recommendations before implementing suitable interfaces.

Usage of acquisitions functions

In the public library sector Batt (1990) has noted a marked increase between 1987 and 1989 in the implementation of automated acquisitions linked in with other modules in an integrated library system. He provides the following figures:

Automated ordering	1985	1987	1989
Integrated with circulation	11	19	31
Direct link to supplier	7	7	16
Inhouse microcomputer	7	3	8
Inhouse mini/mainframe	24	22	28
Other	2	6	2

Note that the classes of method of ordering in the above table are not mutually exclusive with a number of libraries using several methods indicating that standard solutions have not yet evolved. There is still quite a high level of use of the inhouse mini/mainframe combination which links back to use of systems in operation before the integrated library systems became available.

Information from returns collected by COPOL (Ellard 1989) indicate that approximately 46% of the 35 polytechnics surveyed had implemented acquisitions as part of an integrated library system and a further 26% intended to implement acquisitions by 1990:

	Number	%
Acquisitions implemented	16	46
Acquisitions planned by 1990	9	26
In-house system used	5	14
Manual	5	14

The acquisitions function is generally not as important to special libraries as to the academic and public library sectors. The special library sector is not well documented and information on the uptake of acquisitions modules by special libraries is not readily available from published sources or from suppliers themselves. However, a supplier of an integrated library system typically used by special libraries indicated that 48% of its customers had installed acquisitions modules.

Lower priced systems offered to the schools and smaller college market do not usually include acquisitions modules as this function is not normally required by customers in this sector.

3.3.2 Cataloguing

An increasing number of systems provide for downloading bibliographic records rather than loading them from tape. Many systems have established interfaces with CD-ROM to allow for downloading from

this medium. Several systems offer interfaces to BLAISE RECORDER for downloading records from BLAISE. The format in which records are generally accepted is MARC and the majority of integrated systems both large and small are able to read MARC records. Two of the cataloguing co-operatives — SLS and BLCMP — offer stand-alone integrated housekeeping systems (LIBERTAS and BLS respectively) which incorporate a link for downloading from the co-operative databases and uploading for maintenance of these databases.

Retrospective conversion of library catalogues still represents a major problem to all categories of libraries wishing to automate their catalogues. CD-ROM represents a potential source but is not used in a significant way yet. The cataloguing co-operatives provide a useful source of records for many libraries but remain too expensive for some of the smaller libraries especially in the public sector (eg education). Recognising the problems involved with retrospective conversion, a number of the library systems suppliers now offer retrospective conversion services of their own for example Dawsons (OASIS), Specialist Computer Systems and Software (Bookshelf) and IME (TINIlib).

Most systems now provide authority control which may be a separate authority file controlling headings linked to the main bibliographic file or bibliographic records which are derived from data held on authority files (i.e. the data is held only once). The latter is particularly common in systems based on relational database technology. In some systems the decision as to which fields should be authority controlled can be library defined. A number of systems provide a thesaurus which is available during data entry incorporating broader, narrower and related terms etc. This is the case both at the small and large system level.

3.3.3 Online public access

A major development over the last four years has been the provision of some form of public access catalogue by many system suppliers. Most incorporate some form of user definition for wording and screen layout and for help texts. Separate enquiry facilities sometimes exist for staff to carry out more sophisticated searches. However few of the systems have incorporated changes to the structure of their retrieval mechanisms in order to take into account the requirements of end user searching, i.e. some of the changes are purely cosmetic. This may be due to commercial pressures and it would seem that some financial encouragement is required to ensure implementation of the findings of those working in OPAC research. In a recent seminar held in London on OPACs (Feeney 1990) it was felt that while more work needs to be done on the OPACs, many of the commercial suppliers have moved onto other areas of development considering their OPACs to be complete. It is encouraging to see that some of the new systems such as Reflexion from Fretwell Downing are putting priority on the design of their OPAC at an early stage in the development of their system. Another constraint on OPAC development lies in the fact that they are often part of integrated library housekeeping systems and can be limited by the requirements of the other functions. As a result there has been some interest in keeping the OPAC separate from the rest of the integrated functions. For example, CLSI has developed CD-CAT which provides an OPAC facility on CD-ROM (mainly used in USA). This may indicate a trend for the future. However, a 'static' OPAC of this nature does have the disadvantage of not containing up-to-date status information.

Many of the more recent enhancements which have been carried out on OPACs include offering the reader extra facilities such as making reservations from the OPAC, putting in requests for photocopies or items on closed stacks, viewing a reader's circulation file (i.e. items on loan, reservations, etc) and provision of library news. Subject access still provides a challenge, with many systems offering access

only via subject headings or classmarks. Some systems, for example, Advance and Dynix, now provide for searching on related works following the display of the record.

3.3.4 Circulation control

Circulation control functions were well developed at the time of the last report in 1986. Consolidation and extension of these functions has taken place over the last four years. Developments include: the facility for more parameterisation by the libraries themselves; inclusion of short term loans functions in more systems; inclusion of collections management and bookings facilities within the circulation function; and development of more comprehensive loans functions in the smaller systems.

3.3.5 Serials control

The functionality of serials control systems has not changed greatly in the last four years. Serials modules are increasingly being offered as modules available with integrated systems and are becoming more and more integrated with the cataloguing and acquisitions functions. There has, however, remained a demand for stand-alone serials control systems supplied by the serials subscriptions agents.

Not all suppliers of integrated library systems which incorporate a working serials control module were able to give an indication of the number of customers actually using this module. Of those who were able to supply this information, the take-up ranged from 14% to 80%. However, the majority were less than 50%. This is obviously a function which still has potential for automation in the future.

3.3.6 Inter-library loans

The automation of ILL procedures is a library function which has experienced some interest in the UK in recent years although the extent of automation is still considerably lower than many of the other library functions. Some reasons for the slowness of automating this aspect of library work were provided by Braid (1990). He identifies the main reason to be the strong inter- and intra-regional library loans system that has developed in the UK together with the existence of the BL DSC. This was established just before the process of automation began in libraries and it developed non-automated procedures which were very fast and cost-effective but did not expect any degree of automation on the part of its users.

ILL systems are designed to automate the manual procedures used for requesting and receiving ILL. Their benefits include the reduction of paperwork, improved and more easily accessible management information and faster delivery times of loans. Marks (1990) has identified an additional gain in the improved accuracy of electronic requests which may be a consequence of having to key-in the bibliographic information at a terminal. This in turn results in fewer requests by the BL DSC for further information.

A number of micro-based systems are now available as stand-alone packages (Appendix I) while several of the ILL suppliers offer an interlending module or plan to develop one within the next two years (Appendix J.1 and J.2). All these systems automate the requesting procedures at the borrowing library's end and the majority are designed to send requests electronically to the BL DSC.

The BL dominates interlending in the UK receiving almost 3.3 million requests each year. 22% of the BL DSC's requests are received via its automated request system, ARTTel, use of which has grown by

11% since 1987. Requests can be sent in this way to the BL DSC via e-mail. The text of the requests incorporates the necessary bibliographic details of the loan (similar information to that provided on the BL DSC's manual forms) together with a request number which provides the basis for payment by the requesting library. Most systems allow for the sending of requests to other libraries either via hard-copy print-out or e-mail.

The functionality of most ILL systems includes entry and transmission of requests, receiving items and lending them to the relevant requesters, sending chasers and recording reasons for delays, re-applying, browsing facilities to identify the status of a particular request, return of items, management information and statistics, automatic generation of standard letters and reports, and archiving of transactions. ILL systems are usually made up of two distinct parts — the communications software and the ILL database. The communications software is necessary to actually send the requests via e-mail and can be standard communications software. In some cases a particular communications package is supplied. The database contains bibliographic citations and records of transactions (transmission, receipt, return etc) and this is usually regularly archived.

In terms of use of automated ILL systems, the majority of users seem to prefer to use a stand-alone system running on a microcomputer. This is well illustrated by the development history of IME's inter-library loans module which used to be available as a stand-alone package called TINlend (note that it must now be purchased with at least the cataloguing module of TINlib). The development of the package was instigated by members of the Geac Library System Users' Group who opted for a microcomputer-based solution to their ILL automation requirements. The market leader in ILL automation is the OASIS module from Dawsons (formerly AIM) which has over 80 users and is particularly favoured by special libraries. The ILL Management System from the University of Lancaster is the next most used system with over 35 users, the majority being university and polytechnic libraries. Few of the integrated library systems include ILL modules (BLS, LIBERTAS, TINlib and CAIRS-LMS being those that do) and data was not available to identify the number of customers actually using these modules (as opposed to simply having them installed).

It would appear that developments in ILL generally will encourage the use of automated systems in the future. The BL DSC's own internal systems are becoming more automated and there are signs of merging of the separate elements of the regional ILL organisations. For example, the VISCOUNT system has combined searching and requesting and this will be developed further as part of the CEC OSI pilot/demonstration project between library networks in Europe for interlending services of which LASER is the UK participant. In addition, as part of the ADONIS project, BL DSC has experimentally combined the requesting, processing and delivery operations, which may have implications for automation in the future.

3.3.7 Management Information

Management information and statistics are now available from many of the systems both large and small. LIBERTAS, for example, provides a range of management information tools including facilities for transaction analysis and loan analysis. The library may define up to 50 selection profiles for any report, using a wide range of operators, including truncation and Boolean logic. Sorting and output parameters may also be library defined. There are also facilities for producing statistics and selective listings from the MARC file and for production of detailed fund reports from acquisitions.

3.3.8 Report generation

An increasing number of systems provide a report generator. This can be used to produce standard, library-defined and ad hoc reports. Several systems incorporate a query language which can be used to formulate searches against the database and to output results in a desired format. Increasingly, users can have control over the types of report that are produced, particularly where they have access to a Standard Query Language, a facility which is more common where the hardware and operating environment is industry standard. For example, Urica users may have access to the ENGLISH query language; users of PICK library systems are able to use the reporting facilities available in PICK itself and users of systems running on the IBM AS/400 can use Query, a query language/report generator.

3.3.9 Community Information

A number of systems now offer a community information module, for example, BOOK Plus, CLSI, Dynix, GLIS and System 88 while some other suppliers of systems surveyed, such as Galaxy and BLS, indicated that such modules were under development.

The community information facility enables local information to be made available to the library's users and as such is of particular relevance to systems supplied to public libraries. Functionality is often similar to that provided by the OPAC in the system. In the case of GLIS from Geac for example, the community information module is similar to the public query facility in terms of searching and display of records. Access to local information may be by name of organisation or keyword within name, or by a subject category assigned by the library. Records contain a free text field for entry of data such as addresses, members, etc. 'See' references may be entered. System 88 can offer a community information facility via the Browser terminals used with the system and it also uses similar techniques to its OPAC.

3.3.10 Office automation

General office automation facilities such as word-processing, spreadsheets and e-mail are often provided alongside integrated library systems. This is particularly so with some of the larger turnkey systems (but rare with the microcomputer systems). Often the office automation functions are standard facilities offered with the hardware being supplied and can be made available to libraries. Examples include: Urica which offers e-mail interface and teleconferencing; Geac's Office Automation System (GOAST), which includes word processing, spreadsheet, and e-mail; BLS, which runs on Data General hardware on which 'Comprehensive Electronic Office' (CEO) is available providing e-mail, electronic diary, word processing and spreadsheets; Bookshelf has various facilities for refining output from the report generator and for using the system for communications which depend to some extent on the processor, and include word processing, graphics, spreadsheet, e-mail, memorandum and diary, word processing is included with all Dynix systems and it offers an e-mail facility. Other systems such as System 88 and Dobis/Libis offer e-mail facilities.

Office automation functions are rarer amongst micro-computer based packages. However, Dawsons Technology recently launched their Integrated Workstation (IWS) which is a turnkey system providing office automation and library functions all on one micro-computer workstation.

3.4 Future developments

The supplier survey carried out for this report identified a number of future developments planned for the various integrated library systems currently on the UK market. A number of systems are being re-written to allow for greater portability and particularly to enable them to run in the UNIX environment. New integrated modules planned include serials control, ILL and community information (see Appendix J.1 and J.2). Enhancements cited include OPAC improvements, closed access circulation facilities, further development of CD-ROM interfaces, binding control, event and media scheduling, enhanced statistics and management information, document image processing, enhanced communications facilities, mobile libraries functions and online transfer of records to book suppliers.

3.5 Expenditure on library automation

The costs of implementing the integrated library system described in this report can be divided into two categories: capital costs for hardware and software; and recurrent costs covering hardware maintenance, software support and software upgrades. Other costs incurred by a library during automation include training of staff.

The majority of suppliers prefer to supply customers with both hardware and software i.e. they supply a turnkey solution. However, with the trend away from proprietary hardware systems and the increase in software running on industry-standard operating systems (such as UNIX, PICK, MS-DOS, VAX/VMS, etc), this is not always the case. Costs of software vary significantly and depend on a number of factors:

- hardware platform chosen
- number of concurrent terminals installed
- modules installed
- size of catalogue and/or number of transactions (loan issues, orders etc)
- networking requirements
- marketplace (e.g. several suppliers offer significant educational discounts to schools and local education authorities)

In addition to hardware and software, there are other costs of automation such as retrospective conversion, which continues to represent a major cost, and staff training.

Because of the above factors it is only possible to give very generalised expenditure figures based on price ranges provided during the supplier survey.

3.5.1 Micro-based systems

The lower priced micro-based systems are those targeted particularly at the schools and very small library market. Prices typically range from £350 to £2000 and are particularly influenced by educational discounts and networking arrangements. More expensive are the micro-based systems typically used by special libraries and small colleges and offering comparable functionality to some of the larger integrated library systems. Prices for systems incorporating all modules tend to be less than £10,000 with additional charges for networking (usually on an additional concurrent terminal basis).

Recurrent costs are normally based on a percentage of the cost of the hardware and software. These range from 10% to 15% per annum.

3.5.2 Larger systems

The prices charged for larger systems suitable for larger special and college libraries, polytechnic, university and public libraries are mainly influenced by the size of the library concerned (number of concurrent terminals required or size of collection) and the type of hardware being used. Prices based on terminals quoted by a typical supplier in this category were as follows: for an entry-level system suitable for 20 concurrent terminals, the cost for hardware and software would be in the region of £50,000; a system with more than 100 concurrent terminals would cost around £260,000. Prices quoted by a typical supplier based on size of collection were as follows: for a minimum configuration suitable for up to 300,000 records, hardware and software would be around £160,000; a larger system networked over 6 sites and suitable for up to 750,000 records, hardware and software would be around £300,000. With the larger networking configurations, communications costs begin to form a significant part of the overall costs (as much as one third of costs in some instances).

Recurrent costs for the larger systems are also often charged on a percentage basis, again around 10% to 15% of total cost. For some systems the initial cost of software or hardware is relatively low with the main cost being a revenue item charged on an annual basis.

3.6 Trends and conclusions

The original LIB-2 study identified a number of future trends with respect to integrated library systems:

"A consolidation of the current generation of integrated library systems with more sophisticated interaction between the functional software modules."

This has been a clear trend over the last four years. Many of the developments expected in the future will be in the form of enhancements to existing modules rather than major changes to the approaches of the systems or development of significant numbers of new modules.

"The emergence of online public access catalogues will have a considerable influence on subject access, on the source data required in a record, on the way which libraries organise themselves, and on the amount of computer processing power required to support them."

OPACs have not in fact developed as much as might have been expected. Subject access is still often limited to classification schemes linked to subject headings lists. This is particularly the case with the larger systems. Interest is increasing in more detailed and richer source records but this has yet to make a real impact on many larger automated catalogues.

"The potential of CD-ROM as a storage and exchange medium .. is likely to have an impact on the development of in-house databases and on the balance between the use of internal and external information services."

Most integrated library systems offer interfaces to CD-ROM and such data is being used particularly as source records at the acquisitions stage and for retrospective conversion.

"Greater integration of the various parts of the information industry, i.e. publishers, booksellers, libraries, documentation centres, information brokers and end users, as full text and multi-media text becomes

cost effective in electronic form."

This trend continues with the recent decisions on BEDIS standards for electronic interchange of book records.

4.0 IT-based user services

4.1 Methodology

The information in this section was collected by two main methods. The first was by desk research, using a wide range of published and unpublished sources (see Bibliography); this provided the general background information, statistics regarding penetration and usage, etc. The second was by direct information gathering; this amplified and expanded upon the basic data with further, more detailed information about specific applications, as well as considerable anecdotal information and projections for the future. A selection of libraries in the public and academic sectors was identified as illustrative of developments in the country as a whole — twelve public library authorities, seven university libraries and five in polytechnics. These were chosen based on a permutation from the following factors:

- a proven record of technological innovation
- a representative geographical spread
- a mix of academic subject emphases
- a mix of sizes of institution
- a mix of sizes and types of local authority

It was not considered appropriate in this area to use a questionnaire, as the information we were seeking would necessarily be multifarious; also, we were looking for some subjective comment, speculation and judgement. Furthermore, librarians frequently complain that they receive too many questionnaires to complete. Therefore, a letter was sent to each of the libraries identified, which allowed for a variety of different responses. The initial response was a little disappointing, and more than half of the libraries had to be chased; some of those who were chased said that they would have replied earlier had the approach been in the form of a questionnaire (proving only that you cannot please everybody). The information received, therefore, was in the form of letters (both in note form and continuous prose, as well as copies of previously published documents) and from telephone conversations. In the end, of those approached, the following responded: public library authorities in Berkshire, Devon, Enfield, Essex, Glasgow, Hillingdon, Leicestershire and Suffolk; the university libraries at Aston in Birmingham, Glasgow, Kings College London and Sussex; the polytechnic libraries at Hatfield, Kingston, Leicester, Sheffield and Teesside.

4.2 General points

4.2.1 Overall penetration

Whereas the introduction to this section of the original LIB-2 report gave the impression of IT-based user services as a comparative novelty in libraries, five years or so on such services can be regarded as more or less commonplace. There are nevertheless some gaps in coverage. Batt (1990) states that in 1989 there were still nine (out of a total of 167 in the UK) public library authorities which had no IT applications of any kind and no plans to implement any. These can be identified as mainly very small authorities and predominately rural (although one of the London boroughs is included in the nine), a trend that is borne out elsewhere in Batt's report. Also, many authorities have IT implementations at a

limited number of service points. On the other hand, Batt also comments that “. . . some libraries are so committed to IT for their services that it would be impossible for them to operate without a range of technologies.” As for larger academic libraries, in universities and polytechnics, it is quite clear that they would not be able to function without considerable investment in technology — virtually all offer a variety of IT-based services, fully integrated as part of the library and information service. Many small college libraries do not yet offer any IT, and the same is true of many libraries in schools, although there is evidence of considerable innovation and activity in both those sectors. In the Aslib Survey, which covers a wide range of types of libraries including many in industry, government etc., only 4% of respondents were not using some form of technology. The response rate was only 20%, so the figure needs to be treated with some caution; there is, however, no more accurate measure available of the penetration of IT in the many special libraries and information services in industry, commerce, government etc.

There has been increasing use by the academic community of services available on JANET, and these are described in Appendix D.

4.2.2 External factors

A number of respondents stressed the importance of the effect of the wider political context on the provision of IT-based services in the public and academic sectors. The point was made more than once that in education the pressure on resources is much more intense than it was in 1986 — libraries are expected “to deliver more for less” — making the effective deployment of IT crucial to the delivery of services of all kinds, courses as well as information and resources. Also, recent changes in educational administration have had a significant effect in this respect; for example, polytechnics (previously run by local authorities) now have corporate status and are therefore becoming more competitive. The effective exploitation of advanced IT services is certain to be a major factor in institutional competition. In schools, the National Curriculum (which specifies a very high IT-based content) and Local Management of Schools (which also promotes competition) are likely to be an influence to the growth and development of IT services associated with school libraries. In public libraries, there is increasing political pressure to charge users for computer-related services.

Another factor identified in universities and polytechnics is increasing interaction between the library and other services, including computing, educational technology and course development; indeed, a number of institutions have merged library and information services with the computing services. In such an integrated information service, it becomes more difficult (or, perhaps, less meaningful) to talk about the application of new information technologies in libraries *per se*. Where the computing services and the library are effectively one and the same service, the number of public access terminals or PCs is likely to be very much greater than where the library is separate. In general, this is surely a very significant development for the ways in which library and information services function in an educational institution.

4.3 Services

4.3.1 Online information services

58% of public library authorities offer access to online databases, usually only at a limited number of service points in an authority; this shows a significant increase on the percentage noted in the previous report (39%). BLAISE is the most used host, with Dialog second, although Batt (1990) notes that,

compared with previous surveys, "The growing number of services means that it is no longer meaningful to produce a core list which most will use". The extent to which such services are used seems to vary greatly, and indeed, one authority which has developed a very highly integrated IT service reports that it carries out only one or two online searches for business in a week. The conflict regarding charging policies, cited in the original report as a possible hindrance to the availability of online services in public libraries remains unresolved, or at least the overall situation is unclear.

Online services are now well established and integral to academic library services. All of the polytechnic libraries offer online information services of some kind (as they did in 1986), even when other IT-based user services are few. The same is now true of the university libraries, although some of the smaller college libraries of the federal universities of Cambridge, London and Oxford may have to rely on the library of the parent institution. The spread of hosts seems broadly similar to that in the previous survey (although obviously there is a number of new ones), with Dialog and BLAISE still clear leaders; as in public libraries, the large number of other hosts makes detailed analysis difficult. A recent publication predicts that the number of online searches in polytechnic libraries will increase from under 10,000 in 1987-88 to over 22,000 in 1999-2000.

Reports from specific libraries, particularly in the academic sector, suggest that growth in the use of databases on CD-ROM (which were too new to feature other than in passing in the 1986 report) has been responsible for halting, or at least slowing down, the growth in the use of online searching. In many cases mediated searching has reached a plateau, even if it is not yet clear whether it will in fact begin to decrease, whereas self-service searching is very much on the increase. One library reported that students are content to join a week-long waiting list to carry out their own searches, rather than request a mediated search from library staff. Another stated: "Readers not usually given access to computerised data retrieval (undergraduates) have had their information retrieval strategies completely changed by CD-ROM".

It is evidently too early to tell (a phrase used by more than one respondent) exactly how the advent of CD-ROM will effect online use in the long run, but it seems clear that the effect will be considerable. In public libraries, this trend is far less discernible, probably due to the fact that most CD-ROMs are used by staff for stock management purposes (Whitaker's BOOKBANK, BNB etc.) rather than for public use; in other words they are used for quite different purposes to online searching, so there is less scope for clash. Nonetheless, one public library authority reported that: "We use online for information that needs to be up to date (e.g. newspapers, market prices) but are moving towards CD-ROM for heavily used, but less date-sensitive information (e.g. bibliographies)".

One recent development that is likely to have a major effect on the use of online databases in academic institutions is the arrangement between CHEST and the Institute of Scientific Information (ISI). This will make all of the ISI online databases available to the academic community via JANET, resulting in a situation where literally thousands of end users throughout the country will be able to access these indexes directly, using simple menu-driven interfaces. This BIDS service was described in Section 2.5.3 on page 34.

Users retrieving information from both online and CD-ROM systems can benefit greatly from the ability to download the information, take it away and manipulate it for their own purposes. A variety of work in this area is taking place. For example, a number of university libraries have implemented a facility whereby users have access to software that enables them to reformat business information retrieved from databases into spreadsheets and word-processor documents. One polytechnic library is co-operating with a hardware manufacturer to develop a workstation that will enable users to search online

databases, CD-ROM databases and the Library's OPAC using a common front-end (possibly using Hypercard), and download data in a common format.

4.3.2 Public and private videotex services

a) Prestel

As stated in the previous report, the national viewdata service Prestel has never had the impact on the domestic market that some anticipated when it was launched. Although the situation is not entirely clear, it would appear to be safe to say that in the last four years the use of viewdata in libraries has not developed much. The lack of clarity arises from the fact that, regarding the number of public library authorities offering this facility, Batt's figures show a very slight increase from 83 (49%) in 1985 to 85 (50%) in 1989, whereas the original LIB-2 report stated 95 (56%), suggesting a marked decrease. Batt's figures show that the mean number of terminals has decreased.

In the academic sector, Prestel is far less popular; only four university libraries report usage, but the figure is higher in polytechnics, 12 (31%), although one respondent stated that "... Prestel has been a great disappointment and has all but been abandoned". One polytechnic reports that it offers access to the French Minitel system, and at least one university and one further polytechnic intend to trial this service. Increasing Euro-awareness in academic institutions may well lead to a wider spread of this and other viewdata services from other countries. It will be interesting to see whether this might have some kind of knock-on effect on use of Prestel. (Note: there were no figures for academic use of viewdata in the previous report).

The Aslib survey shows a decline in Prestel use from 40% to 30% of respondents.

b) Private viewdata

While use of national viewdata seems at best moribund, there is a great deal of activity in the field of private or local viewdata systems. 33 (19%) public library authorities offer some form of private or local viewdata. In the previous report this was 27 (16%), but a further 11 claimed that they were intending to provide such a service. Why the actual increase is only about half as many is unknown. Both the extent and the administrative arrangements for such services vary enormously, but in most cases it involves getting access to a system provided by the local authority as a whole, and covering information from a wide range of departments. Whereas several authorities have only a single terminal, one has installed dedicated terminals in 38 out of 41 libraries giving access to a database of some 15,000 frames of current local information. Yet another, as well as having 80 terminals across the authority's libraries, offers a public viewdata service that the public can dial into from home; at present the library service provides booklists and other relevant information, but it is intended that the public will be able to access and use the county OPAC through this facility. One library authority is installing "through the glass" terminals, to deliver a 24-hour service.

In Batt's survey (1990) where authorities were asked to give some idea of the level of use of their viewdata services, Prestel tended towards "seldom" or "steady", whereas private viewdata was more likely to be "constant".

In 42% of polytechnic libraries and 24% of universities, there is a wide range of viewdata-style services, so wide that it is impossible to give any useful detailed analysis. Some are very limited

in scope, some are run by the library but available throughout the institution, others run in conjunction with the computer centre or (in one case) the press office. The content varies from a single microcomputer, through a facility built-in to the library OPAC, to a cable TV channel. One polytechnic library offers access to a public viewdata service run by the local authority. One Scottish university runs a videotex service for all of the postgraduate medical centres in the west of Scotland.

It is worth noting, too, that viewdata services are being used to provide IT-based services for staff. One such service in a public library authority provides an internal stock management newsletter, an expertise and contact file and interactive ordering for branch libraries.

c) Teletext

Teletext (i.e. the BBC's CEEFAX and the IBA's ORACLE services) is available in 40% of public library authorities; no figures were given in the previous report, but Batt's figures show a fluctuation from 41% in 1985, through 33% in 1987 to the most recent figure. As with Prestel, there would also seem to be a decrease in the mean number of terminals. Only three university libraries and six in polytechnics report use of teletext, but in practice it may be that more have it available as the facility to decode these transmissions is increasingly provided as standard on television sets. The Aslib survey shows a decline in the use of CEEFAX and ORACLE from 28% to 20% of respondents.

4.3.3 Fax and electronic mail

Use of e-mail has developed significantly over the last few years, particularly since the launch of the Library Association's network for libraries, LA-net, which runs on the Dialcom system BT Gold and has just under 200 mailboxes active. Penetration in the academic sector has been very substantial, with all polytechnic libraries and many university libraries having a mailbox; this was greatly helped by the existence of COPOST, a similar system that ran on BT Gold before LA-net came along. In other sectors, growth has been much slower, with only about 20 public library authorities having a mailbox; there is also a broad selection of special libraries and other library-related organisations in membership. LA-net is used for a variety of purposes, but its strength is in the facility it offers to trawl a wide range of other users with a single message; this can facilitate the gathering of information, as well as its dissemination. There is also a number of internal e-mail systems in libraries and library authorities, often built-in as part of a circulation or cataloguing system. One academic library reports the development of Eurokom, an e-mail link between European Information Centres around the EC.

Fax transmission is perhaps having a much more direct influence on user services in libraries. Its use is reported for functions as diverse as ordering books and journal articles; urgent communication in general; communication between sites; delivery of information for requests. Most common, however, seems to be the development of fax bureau services in libraries. In the public library, it can be a significant method of income generation, and one authority even reports that some small businesses locally have put a library fax number on their stationery. In academic and special libraries, offering a fax service throughout the institution from the library is seen as another important demonstration of the library's central information and communications role.

However, in the last year or so, fax hardware has become inexpensive enough for most users who really need it to buy their own, with the result that demand in some libraries has significantly reduced. This makes fax perhaps the only new facility to come to, and begin to go from, libraries since the last report.

It does, however, emphasise the pioneering role that libraries are increasingly playing in promoting and disseminating new technology.

4.3.4 Community information services

Electronic-based community information services provided in public libraries often use the medium of viewdata, so the information in this section should be taken in conjunction with that under section 4.3.2(b). Around half (83) of the public library authorities have some form of automated community information service which is a significant increase since the original LIB-2 report (of a further 38 authorities planning to implement such a service would seem to be exactly correct!). The delivery methods have not changed much, with the most common still being the microcomputer (sometimes the data being maintained locally, sometimes centrally), and private viewdata next. One authority, however, is working towards delivering community information via a cable television network.

Although the expression "community information" is not used as such in libraries other than public, it would seem clear that academic libraries do provide information through the medium of IT that is broadly analogous, insofar as it relates to the academic community, but no figures are available. One polytechnic library, however, is planning to allow access to the community information provided by the local public library service, through its OPAC, while others use the OPAC to deliver library news pages.

4.3.5 Public access to microcomputers

Although figures suggest a significant increase in the number of public libraries offering public access to microcomputers, 34% as against the 20% cited in the previous report, Batt (1990) suggests that this has very much slowed down in recent years, saying "These days there can be few libraries who can find the resources to provide sufficient machines and give satisfactory training". It might also be added that the necessity for libraries to promote computer literacy is not as acute as it was five years ago, as more and more machines are in people's homes, as well as in schools and places of work. The provision of hardware in libraries in Bedfordshire, singled out in the original LIB-2 report as a result of a grant from Government, is now no more significant than in any other authority; the project was not continued when the support ended, and the machines were not replaced. This supports Batt's implication that authorities cannot afford to support this kind of activity from their own resources. One authority specifically stated that their experiment with public access microcomputers had not been successful and was withdrawn. Another reported that it continues to offer some BBC microcomputers for use by children, but it remains to be seen to what extent such provision is renewed when current hardware becomes obsolete.

As has been pointed out earlier, the trend towards the merger between libraries and computer centres in higher education, may make it more difficult to make meaningful observations regarding public access to hardware in academic libraries. In some institutions where there has not been such a merger, there has been some very close cooperation between the two services, even to the extent that the computer centre has placed microcomputers in the library and provides the necessary maintenance and support. However, in most if not all of those institutions where no such relationship has been established — and they are, of course, still in the majority — the library has taken the responsibility for providing at least some microcomputers for users' use. These range from a few BBC micros to a specially designed roomful of varied equipment including PCs, Macintoshes, etc. The use of such hardware is equally varied, and includes word-processing, computer assisted learning, desktop publishing and training.

4.3.6 Desktop publishing

User access to desktop publishing (DTP) facilities is mentioned in the previous section, but it is worth recording also that DTP is increasingly used by staff to produce such materials as bibliographies, accessions lists, notices, library guiding, information leaflets etc. Respondents in the academic sector made the point that with the coming of corporate status, there is an increasing requirement for printed material to look professional and to appear with a corporate image. DTP facilities have provided an economical and attractive way of making this possible. Some libraries in the polytechnic sector report that they are offering a publication and production service, using DTP facilities, to the rest of the institution. It is worth noting however, that DTP left in the hands of an untrained user greatly increases the opportunities for badly designed publications.

4.3.7 Other services

It is impossible to cover all IT services offered by all libraries; the above are essentially those that fall into measurable categories. A general impression is that IT use in libraries and information services is restricted only by the limits of the imagination of the staff responsible — and that would appear to be boundless, and continually growing. The other important limiting factor is, of course, financial restraint, although again the skills employed in overcoming such hurdles would seem to be quite extraordinary. Noted below are some of the many other IT-based user services offered in various libraries, not covered under the headings above. That information concerning such a variety of exciting and interesting work has been collected in what has been a limited and necessarily restricted survey is an indication of the breadth and scope of the initiatives that are being taken in the library and information community as a whole.

a) Interactive video

Many libraries eagerly seized the opportunity to make interactive video available to users, when the BBC's Domesday package became available, but for many, initial expectations have not been met. One respondent in a public library authority thought that the technology was simply not yet good enough, while from a polytechnic library came the comment that it had "...not been a great success with little constructive use made of the information". One polytechnic library is host to a centre offering information on advice on interactive video applications on a regional basis.

b) Hypertext, multimedia systems

A great deal of interest is expressed in the potential of hypertext and multimedia systems, but there is not much evidence of practical applications in libraries as yet, although one university library reports having implemented a hypertext library guide designed by a student, running on an IBM PC.

c) Satellite communication

A number of initiatives in satellite communication demonstrate considerable interest in the potential of this medium. For example, one polytechnic library is embarking on a project to use satellite television as a means or providing distance training for online searching. Two public library authorities are co-operating in a project whereby databases held on CD-ROM will be updated

automatically by data broadcast via satellite and downloaded onto hard disk in the CD-ROM computer; the updated data will be searched transparently by the user.

d) Miscellaneous

A polytechnic library has developed a database of European Community information, and uses it to produce a regular current awareness newsletter. Four universities are co-operating on a video conferencing project that enables them to share lecturing facilities in minority subjects that they might not otherwise be able to offer to students. A polytechnic library plans to replace its slide collection with an image bank. A public library authority is working on an electronic newspaper project in conjunction with the Royal National Institute for the Blind. Another plans an ambitious long-term scheme whereby reading terminals will be integrated with the bookshelves, carrying databases corresponding to the books, offering further information — bibliographic, factual and graphic.

4.4 Advantages and disadvantages

The section headed as above in the original LIB-2 report attempted to make some observations regarding “the relationship between traditional library services and electronic information services”. In the early 1990s, it is no longer possible (if it ever was) to make any such clear-cut distinctions. Effective libraries have always used the best technology available to deliver their services; the fact that nowadays that means computer-based technology is neither here nor there. Libraries and information services of all kinds, public, academic, and specialist, use technology to deliver a wide range of services, some new, some long-established. Those that do not, by and large, would do so if they could; that is if financial restraints to developing IT-based services were removed.

The particular characteristics of information technologies, however, do enable those responsible for delivering library services to adopt new approaches. One such approach can be described as a shift from building a collection of materials to developing an infrastructure to enable users to gain access to the information and resources they need. Clearly IT is an essential component of such an infrastructure, because it can give access to remote information sources and because it can allow sharing and more efficient use of locally held sources. Also, it can allow users to do things with information that they were never able to do before — complex retrieval, graphic manipulation and downloading, for example.

Whereas the previous report pointed to shortcomings in professional awareness and professional education as a major obstacle to IT development in libraries, this is no longer the problem it was. All library and information science/information studies courses available in the early 1990s are largely IT-oriented or include substantial IT content. Continuing education opportunities, in the form of short courses as well as higher degrees, are widely available and have proved very popular. There are far more staff in senior management positions with a strong IT-orientation; indeed advertisements in the last few years make it clear that it is now considered a vital qualification for any such position, and the subsequent appointments bear this out. The concern has probably shifted from the awareness and competencies of staff towards those of users, and a number of respondents have particularly drawn attention to the tasks of user education and user support, as more OPAC and other self-service facilities become available.

The phenomenon of the merging of library and computer centre services has already been mentioned more than once. This has been particularly explicit where a single manager has been appointed as head

of both, but other respondents have pointed out that the increasing requirement for IT support in library and information services has led to a merging of jobs at lower levels, or at least to increased collaboration and co-ordination between the two services.

It should be evident from the above that planning for IT is no longer, as was suggested in the 1986 report, ad hoc and largely led by the technology rather than the user needs, although the fascination for playing with new toys will probably mean that there will always be a certain amount of this.

4.5 Trends and conclusions

Another suggestion in the previous report was that there was "...no coherent view, as yet, as to which technologies will become dominant in the field". Five years on, it is perhaps still too early, or the situation continues to be too fluid (probably a bit of both) to be much more confident about this. However, the extent of use of online services and the fact that they are now long-established in libraries of all kinds would appear to suggest that they represent a very prominent (if not dominant) technology. It remains to be seen to what extent this prominence is undermined by local access through CD-ROM. National viewdata never really established itself very firmly, and what grip it did have is probably now slipping, but local and private viewdata services appear to be booming. Public access to microcomputers seems to be less of a priority in public libraries, but has assumed greater importance in the academic sector. The range of new possibilities, and the readiness of library and information workers to embrace them, continues unabated.

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Glossary of acronyms used in this report

AACR	Anglo American Cataloguing Rules — a standard for bibliographic description. AACR1 published 1967, AACR2 published 1980, AACR2 revised 1987
ANA	Article Numbering Association
ARTTel	Automatic Request Transmission by Telephone — the electronic interlibrary loans requesting service operated by the BL DSC
BEDIS	Booktrade Electronic Data Interchange Standard, see BICC
BIC	Book Industry Communications — formed from the merger of BEDIS and BTECC in March 1991
BL	The British Library
BLAISE	The British Library Automated Information Service — online retrieval system operated by The British Library
BLC	The British Library Catalogue
BLCMP	Birmingham Libraries Cooperative Mechanisation Project — known as BLCMP (Library Services) Ltd
BL DSC	The British Library Document Supply Centre
BL H&SS	The British Library Humanities and Social Sciences
BL NAF	The British Library Name Authority File
BL NBS	The British Library National Bibliographic Service
BL R&DD	The British Library Research and Development Department
BL SRIS	The British Library Science Reference and Information Service
BNB	British National Bibliography
BT	British Telecom
BTECC	Book Trade Electronic Communications Committee, see BIC
BUBL	British Universities Bulletin Board
CAL	Computer Assisted Learning
CBM	Centre for Bibliographic Management, based at Bath University
CD-ROM	Compact Disk — Read Only Memory

CEC	Commission of the European Community
CEO	Comprehensive Electronic Office
CCITT	International Consultative Committee for Telegraph and Telephones
CHEST	Combined Higher Education Software Team
CIP	Cataloguing in Publication — pre-publication cataloguing run by the Library of Congress, BL NBS and others
COMPASS	Computer Aided Subject Search
CURL	The Consortium of University Research Libraries
DC	Dewey Decimal Classification
DTP	Desktop Publishing
EC	European Communities
EDI	Electronic Data Interchange
e-mail	Electronic mail
ESTC	Eighteenth Century Short Title Catalogue
GNS	Global Network Service, operated by British Telecom
GOAST	Geac's Office Automation System
HMSO	Her Majesty's Stationery Office
HUMBUL	Humanities Bulletin Board
ILL	Inter-library loans
IMPACT	Information Market Policy ACTions — the five year programme of the European Commission to promote the information industry
IPSS	International Packet Switched Service
ISBD	International Standard Bibliographic Description
ISBN	International Standard Book Number - a (theoretically) unique number assigned to each new book on publication
ISI	Institute of Scientific Information
IPSS	International Packet Switched Service
ISSN	International Standard Serial Number—as ISBN but for serial titles

ISTC	Incunabula Short Title Collection — a machine readable file available on BLAISE
IWS	Integrated Work Station
JANET	Joint Academic Network — a wide area network serving primarily the UK higher education community
JRULM	John Rylands University Library of Manchester
JNT	Joint Network Team — the body responsible for JANET
JUGL	JANET User Group for Libraries
KINGTEL	Kingston Upon Thames Viewdata Service
KIST	Keyword Index To Serial Titles
LAN	Local Area Network
LA-Net	Library Association Network
LASER	London and South Eastern Library Region — a regional cooperative established to facilitate ILL and other cooperative activities
LC	Library of Congress
LCSH	Library of Congress National Union Catalogue
MARC	Machine Readable Cataloguing — a tagging scheme for bibliographic databases, used in the production of UK, US (and other) national bibliographies. Now the standard exchange format for records
MARS	Monograph Acquisitions and Record System
MS-DOS	MicroSoft Disk Operating System — operating system commonly found on IBM compatible PCs
NISP	Networked Information Services Project — an e-mail services project, based at Newcastle University
NISS	National Information on Software and Services
OCLC	Online Computer Library Centre — represented in the UK by its subsidiary OCLC Europe
OCR	Optical Character Recognition
OPAC	Online Public Access Catalogue
OS	Operating System

OSI	Open Systems Interconnection—refers to a framework for communications which links computer systems, both within an organization and between organizations, irrespective of the nature of the computer systems involved
NLM	National Library of Medicine
NISS	Network Information Systems Service
OPAC	Online Public Access Catalogue, same as PAC
PAC	Public Access Catalogue, same as OPAC
PSTN	Public Switched Telephone Network
SAN	Standard Address Numbering System
SCOLCAP	Scottish Libraries Co-operative Automation Project — now discontinued
SLS	SWALCAP Library Services Ltd, now known as SLS Ltd
SR	Search and Retrieve
SWALCAP	South Western Academic Libraries Co-operative Automation Project — now SLS Ltd
TRADACOMS	Trading Data Communications
UCABEL	Union Catalogue of Art Books in Edinburgh Libraries
UK MARC	The British MARC tapes produced by the British Library Bibliographic Services Division
UKOLN	UK Office for Library Networking
UKOP	Catalogue of UK Official Publications (CD-ROM)

Appendix A.1

Library catalogue update questionnaire: list of libraries to which it was sent

National Libraries

The British Library
 Document Supply Centre
 Humanities and Social Sciences
 Science, Reference and Information Service
 National Library of Scotland
 National Library of Wales

University Libraries

Birmingham University
 Cambridge University
 Edinburgh University
 London University
 Manchester University
 Newcastle University
 Oxford University
 Bodleian Library
 Reading University

Polytechnic Libraries

Hatfield Polytechnic
 Manchester Polytechnic
 Polytechnic of the South Bank

Public Libraries

Avon County Library
 Belfast Public Library*
 Birmingham Public Library
 Camden Public Library
 Edinburgh Central Library
 Essex County Library
 Glasgow Public Library
 North Yorkshire County Library
 Somerset County Library

Special Libraries

BBC Film and Videotape Library
 ICI (UK) Pharmaceuticals Division
 Ministry of Agriculture, Fisheries and Food
 National Film Archive
 Science Museum Library
 UKAEA Harwell
 Unilever Research Laboratory, Port Sunlight

* Additional to original LIB-2 study

Appendix A.2

List of organisations from which information was requested

Utilities and Cooperatives

BLAISE
 BLCMP (Library Services) Ltd
 CURL
 LASER
 OCLC Europe
 SCOLCAP
 SLS (Information Systems) Ltd

Commercial Sector

Askew
 Blackwell
 Book Data
 Bowker-Saur
 Chadwyck-Healey
 Farries
 Heffers
 HMSO
 Holt-Jackson
 JMLS
 Morley Books
 Saztec
 Whitaker

Network Access

Aston University
 The British Library
 British Telecom
 Hatfield Polytechnic
 JANET
 Manchester Polytechnic
 Mercury
 Norfolk County Library
 OCLC Europe
 Polytechnic of the South Bank
 Polytechnic of the South West
 SLS (Information Systems) Ltd

Note: All utilities and cooperatives have been interviewed by telephone. Certain utilities and cooperatives are also listed under Network access because they offer newer networking services.

Appendix B

Library Suppliers

The following are a few examples of library suppliers who supply bibliographic records only with book purchases.

James Askew & Son Ltd

Current activities

James Askew & Son Ltd are a major supplier to the book trade and a major library supplier. The company provides displays of large stocks of books, all types of book servicing, book reinforcing for many types of books, as well as a wide range of bibliographic and book availability information, using online and magnetic tape services.

Records and Standards

Askew's in-house system allows for books to be catalogued to AACR2 standards. The file contains over 80,000 records for titles which are in stock, plus some 500,000 records from Whitaker's Books in Print database, and other sources. Machine-readable records contain information on author, title, ISBN, DC19, date of publication, age, range and publisher.

Services, availability and media

Askew's online book ordering service allows librarians to use PSS to search for availability under author, author-title acronym, ISBN or DC19 class number. There is no charge for this service, which provides printed confirmation of orders by return of post. It is also possible to download forthcoming titles. A magnetic tape service is available, including provision of library class numbers and the provision of Askew stock titles. Items not found online on the database can be sent to the publisher via Teleordering, or sent printouts by post.

A batch ordering system uses e-mail system via Telecom Gold, supplying Askew with customer details, ISBN, quantity and any extra title instructions such as local class number. Confirmation of the order is sent by e-mail, which may be printed or downloaded onto the library computer.

BOOKBANK ordering is a development of the batch ordering system in conjunction with Whitaker's BOOKBANK CD-ROM service. Records retrieved from the CD-ROM can be transferred automatically by the library to the batch ordering system.

Magnetic tape based services include automatic classification of replacement books, provision of book selection lists of items available at Askew but not at the library, a new title service in MARC or non-MARC format. In addition libraries can be provided with databases on magnetic tape in MARC exchange format, including new title information.

B.H. Blackwell Ltd

Current activity

B. H. Blackwell Ltd are well known Oxford booksellers, who are also academic library suppliers. Blackwell now serve the international academic community, supplying books, journals, and associated products and bibliographic services to academic and research libraries world wide.

Records and standards

The Firm Orders Service has a database of 1,200,000 titles and 74,500 publisher records, covering material from trade publishers and university presses, learned societies and professional bodies, and international and government organisations. Each entry uses AACR2 cataloguing rules and ISBD, and is made up of information from BNB MARC records, Whitaker's not-yet-published information, publishers' advance information and Blackwell's own records. The primary name authority source is L of C, and BL NAF for entries not covered by the LC.

For Standing Orders a series database of over 25,000 records of active titles is maintained, with another 5,000 of completed or discontinued series.

The Retrospective Collection and Development Service has a database of over 100,000 titles published between July 1979 and the present.

The New Titles Announcement Service covers about 14,000 titles a year using records based on AACR2 and ISBD.

Services, availability and media

The Firm Order Service is based on comprehensive bibliographic information, automated ordering, and a stock of over 200,000 titles. Over half the titles ordered can be supplied from stock. Orders can be made by post, by telephone, by telex or Dialcom. The minimum information required for ordering includes author, title, publisher and edition, as well as customer order number and date. An on approval service is offered from stock. For out-of-print material, orders are transferred to the Search Department, with action according to customer requirements.

The Retrospective Collection Development Service is designed for libraries who need to build a core collection for specific areas, or to extend their existing collections. Titles in the database are matched against a profile of library interests using the Blackwell Thesaurus subject code. The service is free of charge to customers who place subsequent orders with Blackwell.

The New Titles Announcement Service provides up-to-date information on new publications, matched against the library profile, with information despatched at publication on multi-part stationery. The Thesaurus contains over 5,000 terms and over 100 non-subject descriptions. The service is run on a weekly basis. Coverage is essentially from UK publishers, though if required this can be extended to imprints from the USA and Canada using Blackwell North America.

Blackwell's will accept standing orders for any series title published anywhere in the world. The 25,000 record database is based on standard UK bibliographical services such as British Book News, Books of the Month and The Bookseller, on daily contact with publishers giving comprehensive coverage of UK and European material.

A Standing Order Message Bulletin is issued monthly and is designed to eliminate the need for routine claims. In addition a Standing Order listing of all serials that a library has on order can be produced by the Blackwell automated system.

John Menzies Library Service (JMLS) Ltd

Current activity

JMLS Ltd is owned by B.H. Blackwell Ltd, supplying monographs, continuations and bibliographic information to public libraries worldwide. Parkers is the specialist academic supply division of JMLS Ltd. which offers similar services to academic libraries.

Records and standards

A database of some 1,300,000 title records is held in UK MARC format, covering Adult Non-Fiction (ANF), Adult Fiction (AF), Junior Non-Fiction (JNF) and Junior Fiction (JF) in both paperback and hardback format.

The database has been created from advanced information from publishers, and is subsequently updated when further detail becomes available, i.e. an increase in price or change of status to OP (Out of Print). The source of this "update" information is either:

- Purchase of new titles for stock — on publication
- Processing orders from libraries
- Processing reports from publishers
- Processing tapes from publishers
- Processing data from other commercial databases

Titles are not deleted from the database — facilitating early reporting to libraries of current status and current price and availability of backlist titles.

The records on the database are maintained in UK MARC format with extensions including JMLS specific codes and subject headings to allow electronic transfer of data to libraries to be used and manipulated further in their systems.

Where records are transferred by magnetic tape the ISO 2709 standard is followed, where transfer is by e-mail or IBM PC disc the format does not follow an externally recognised standard.

Services, availability and media

Service description	Frequency	Media	Coverage	Category
New and forthcoming titles	Weekly	Paper list Paper slips Magnetic tape/disc E-mail	3 months in advance of publication	AF, ANF JF, JNF

Profiled forthcoming titles	Weekly or fortnightly	3 Part Slips E-mail Magnetic tape/disc	3 months in advance	ANF
New books received to stock	Weekly	Paper lists Paper slips E-mail Magnetic tape/disc	Cover titles Coming into JMLS Stockdeemed suitable for public library	AF, ANF JF, JNF
Books on approval	Weekly or fortnightly		Covers titles deemed suitable for public library as above	AF, ANF JF, JNF
Profiled approvals	Weekly or fortnightly		As above but profiled to match library needs	AF, ANF
Subject bibliographies	Upon request	Paper lists E-mail Magnetic tape/disc	Usually backlist - can include Library has sequencing options	AF, ANF NYP, JF, JNF
Catalogues	Twice per year	Paper catalogue	All JMLS stock titles	AF, ANF JF, JNF
Catalogue tapes for use	Upon request	Magnetic tape	All JMLS titles by library	AF, ANF, JF, JNF

There are other services, e.g.

1. JMLS can also provide the library with software to facilitate printing of bibliographic data shown on hardcopy which can allow the library to choose the format to best suit management needs — multipart slips with complete records; title, author and price lists only, or a combination thereof.
2. JMLS can compare the stock catalogue with that of a library by running catalogue tapes from the library through JMLS computer. This will identify areas in the library which are deficient of JMLS stock titles. This can be done for the whole library or single subject areas i.e. comparison of the gardening section. The titles available from JMLS which are not available from the library may be reported on hardcopy, magnetic tape or disc or via e-mail. The library may then order them if required.
3. JMLS can provide bibliographic records of titles invoiced by extracting them from the JMLS system and transferring them to tapes in MARC format, these are then sent to the library.
4. JMLS can receive orders and commercial messages via e-mail. Confirmation of those titles in stock can be sent back to the library via e-mail before picking them from stock to fulfil the order.

All the above services are available free of charge and are offered to overseas libraries.

Morley Books

Current activity

Morley Books are library booksellers supplying public libraries and school library services in the UK. In addition a small amount of college and overseas business is undertaken.

Records and standards

Bibliographic details on new titles are available online using the MIRACLE system. Records can be supplied in UK MARC on non-MARC format as agreed with customers. The database of around 110,000 titles reflects active titles only and includes prepublication, to-follow and unavailable titles. Machine-readable records may also be supplied for other business transactions, such as invoices. Data is held in a fixed field format, but can be output in MARC format. AACR2 is used to create bibliographic records, with DC20 being used for adult titles. For children's material the DC schools library service is used.

Services, availability and media

Online access to the database is available via PSS using the MIRACLE system running on an IBM system 38 computer. MIRACLE is an online interactive search and order service. Records appear to be MARC compatible covering some 21 bibliographical elements, the usual data plus some elements such as form class for fiction, availability status, current stock level, pagination, illustrations, book size and descriptive annotation. Items can be ordered directly online. An order confirmation list is supplied to the subscribing library on the following day.

Hardcopy printout is available in a variety of formats, including: selective title listings, outstanding orders listings, and analysis of library spending. Magnetic tapes or floppy disks may be produced in a variety of formats to suit most computers. Machine-readable records can be downloaded from the database to enable a library to maintain a potential requirements file. The MIRACLE system also enables a magnetic tape of a library catalogue to be held on file, for matching against the database to discover titles not in the library catalogue.

Following the BEDIS report Morley Books anticipate a growth in EDI applications between libraries, Morley Books and publishers.

Appendix C.1

Main machine-readable catalogues — developments since 1986

BLAISE

BLAISE-LINE provide online access to 20 machine-readable databases.

Filename	Records	Period	Content
AVMARK	22,653	1950—	Audiovisual material
BLC	3,756,553	15thC—	BL Catalogue Preview
BLISS	27,415	1976—	Library and Information Science
BNBMARC	599,344	1977—	British books and serials
BNBMARC71	194,083	1971—76	Backfile
BNBMARC50	366,990	1950—70	Backfile
CONF	275,108	1964—	Conference proceedings
DSCM	534,189	1980—	DSC book catalogue
ESTC	313,468	1701—1800	18th Century materials
HELPIS	7,281	c1980—89	Audiovisual materials
HMSO	138,564	1976—	HMSO publications
HSS	1,164,645	1971—	BL HSS acquisitions
ISTC	24,041	Pre 1501	Incunabula
LCCMARC	1,102,518	1984—	LC books acquisitions
LCCMARC77	981,258	1977—83	Backfile
LCCMARC68	561,793	1968—76	Backfile
MAPS	13,540	1974—	Cartographic materials
MUSIC	19,567	1981—	BL Music Library
NSDC	32,618	1665—	UK National Serials DC
RPM	61,504	1460—	Microform material
SIGLE	220,430	1981—	Grey literature
SRIS	278,670	1974—	SRIS catalogue
UCL	578,688	1977—88	London Univ. catalogue
WHITAKER	224,415	Mid 1960—	British books

Humanities and Social Sciences (BL H&SS)

The BL H&SS Current Catalogue for monographs and first issues of serials published since 1975 is now maintained in machine-readable form. About 1,150,000 records are currently held, with some 90,000 records being added annually. Cataloguing is based on AACR2, and makes use of the BL name authority list. Note that the BL has introduced a new subject indexing system, COMPASS — Computer Aided Subject System — which came into use early in 1991. Catalogue data is mainly created in-house with some use of online record selection of LC records on BLAISE-LINE, and since 1988 from OCLC. Records are input to the catalogue in standard UK MARC. As the BL H&SS current catalogue is available to others through BLAISE-LINE, libraries using the BL NBS Record Supply Service are able to download from BLAISE the records they require.

Oriental and India Office Collections

The Oriental Collection and India Office Library Collections have now been merged. The Oriental Collection and India Office Collections Current Catalogues have been combined as one since June 1989. The name will soon be changed to the India Office and Oriental Collections Current Catalogue. Together the collections contain more than one million monographs and 68,000 oriental manuscripts. In this catalogue AACR2 and LCSH are used. Records are mainly created in-house using UK MARC on the LOCAS system. Some records are downloaded from OCLC, record by record. These machine-readable records also form part of the BL "Preview file" OPAC.

A Summary Catalogue of Oriental Manuscripts covers the 68,000 manuscripts in the Collection. It is an online file for staff use which started in 1988. Public access is planned at a later date. Records are created in-house via LOCAS UK MARC format with local variations.

Music

The printed Catalogue of Printed Music in the British Library to 1980 is being converted retrospectively to machine-readable form in a MARC compatible format. This together with two other automated music catalogues will be available on CD-ROM towards the end of 1991. The same catalogues are being added to the BL "Preview file" and as such will form part of the new OPAC.

Eighteenth Century Short Title Catalogue (ESTC)

The ESTC is an automated catalogue which contains records in UK MARC format, for eighteenth century British and British colonial printing. It was begun at the British Library in 1976, is now an international project with editorial centres in Britain and America, and holds about 285,000 records. Continuing on from the short-title catalogues of Pollard and Redgrave (1745-1640) and Wing (1641-1700), its ultimate aim is to record the total output of the press within its defined scope. A recent development is a scheme to expand ESTC to include these earlier bibliographies, and it should eventually contain full MARC records for the entire national printed archive to 1800.

ESTC is a union catalogue as well as a retrospective bibliography, and libraries have been encouraged to work through their collections and report their holdings to the project. These locations are added to the database; over 1,000 libraries and repositories, from all over the world, now contribute. Volunteer libraries are offered one complete copy of their holdings, as recorded on the file, in any format (e.g. printout or exchange tape), at cost price. No library has yet taken up this option, but the completion of the processing of pre-1986 receipts and the publication of the file in October 1990 may prompt requests. For large libraries with extensive holdings of ESTC material, this will present an opportunity to acquire high-quality retrospective converted records for a major proportion of their stock. Although ESTC is mounted on BLAISE, ESTC records have never been available for purchase as catalogue records to be downloaded into individual library catalogues; it seems likely that this policy will remain in force in the foreseeable future but it is not clear whether it will eventually change.

The ESTC version of UK MARC now differs somewhat from the current standard. The full range of subfields in field 245 is not used, and the notes fields between 500 and 534 are not used. There are some locally defined fields, e.g. 269 and 960. The revised version of the ESTC rules moved practice towards AACR2, but there are considerable divergences between strict AACR2 practice and present ESTC usage in many fields. Provision of added entries is much lower than that called for by AACR2. ESTC headings, however, are constructed

according to AACR2, and the establishment of an authority file of over 40,000 personal author headings in strict AACR2 form is a major achievement of the project. ESTC holds very little copy-specific information, and it could never be a satisfactory substitute for the catalogue of an individual library. Any library downloading ESTC records into a cataloguing system will need to cope with problems of conversion and editing, but despite these qualifications the advantage of acquiring such records in bulk is considered to be readily apparent.

Cartographic materials

While no new cartographic machine-readable file has been introduced since 1986, the BL Cartographic Materials file of 13,000 records (incorporating all accessions to the Map Library catalogued since 1975) was made available on BLAISE-LINE in 1988. It was included in the Bowker-Saur Catalogue and was also made available on fiche by the BL.

By 1986 it is planned to retrospectively convert to machine-readable form the Catalogue of Printed Maps, Charts and Plans to 1964, the Ten-year Supplement 1965-1974, and the Catalogue of the Manuscript Maps, Charts and Plans and of the Topographical Drawings in the British Museum. These records together with the Cartographic Materials File and other records will form a complete file of all records of Cartographic Materials in the BL. These records will then become part of the new BL OPAC.

Other machine-readable files

The Incunabula Short Title Catalogue (ISTC) has been available on BLAISE-LINE since 1984, and contains some 24,000 editions. More recently ISTC material has been made available overseas. MARC tapes are sent to RLIN in the USA and PICA in the Netherlands. Floppy discs are sent to the Bayerische Staatsbibliothek in Munich for loading onto the PC based Census of Incunabula in Germany. All BL created input is in MARC format. Input from external sources can be handled as PC-readable ASCII files, and these are edited, adding MARC tags so that they can be loaded into ISTC, using LOCAS.

The Nineteenth Century Collection of Microfiches was set up as a machine-readable file in 1988. Some 10,000 titles are read in MARC format using AACR2 and LCSH. Records are created in-house. Records can be made available to others via OCLC or as magnetic tapes direct from the BL. The file is available on BLAISE-LINE.

The Register of Preservation Microforms contains some 100,000 items, with some 3,500 new items added annually. In addition up to 12,000 items are retrospectively catalogued each year. The Register began in 1986 and some 62,000 records are available for searching on BLAISE-LINE as from September 1989. Note that downloading of these online records is not permitted. MARC tapes have been sent to Chadwyck-Healey for inclusion on the CD-ROM of Preservation Microforms. The machine readable file is also available on Microfiche to participating libraries in the Mellon Microfilming Project.

British Library Science, Technology and Industry

This includes the BL SRIS, the BL DSC at Boston Spa and, since 1991 the BL NBS.

British Library Science, Reference and Information Service (BL SRIS)

Since 1989 the SRIS Catalogue has been available as an OPAC as part of the BL "Preview file". Some 196,000 titles (out of the collection of 296,000 items) are in machine-readable form, using a MARC compatible format and AACR2 cataloguing rules with an internal classification scheme. The LOCAS system is used. At the SRIS Archimedes microcomputers on an ECONET LAN are used for creating machine-readable records.

British Library Document Supply Centre (BL DSC)

All records for monographs published from 1980 onwards are included in the Monograph Acquisitions and Record System (MARS). This online system acts as a staff OPAC. It is an integrated system, and besides monographs includes 210,000 Conference Index records, 10,000 cross-references and about 20,000 on order records. The monographs file is also available online on BLAISE-LINE, as a magnetic tape service, and as Books at Boston Spa annual fiche service. The Conference Index is also available on BLAISE-LINE and is published separately.

The Serials File includes entries from the rest of the BL, Cambridge University Library, the Bodleian Library and the Science Museum Library, as well as BL DSC stock. The file provides the basis for various products. The keyword index to serial titles (KIST) is published quarterly on fiche. The DSC serials collection of about 440,000 titles is available on the staff OPAC, and was published in October 1989 as a CD-ROM product. Some 300,000 individual titles, together with more than 100,000 alternative titles are listed. Known as Boston Spa Serials the service is published semi-annually in Spring and Autumn.

Further CD-ROM products are planned. The BL DSC monographs file is likely to be made available on CD-ROM in early 1992, and the conference file later in 1991.

The National Library of Scotland

The Bibliography of Scotland includes all relevant material published since 1976; that is, items that appear in BNB, major periodical articles and books published abroad, which can be said to give coverage of Scottish life and culture, including art, literature and music, and of the activities of the Scots at home and abroad. Originally published in 1979 covering 1976-1977, it is now published in a series of annual printed volumes, and since 1988 it has been available as an OPAC as part of the National Library's Online Catalogue of books accessioned since 1978. So far some 3,500 records, created using AACR2 and LCSH, are available online.

The Union Catalogue of Art Books in Edinburgh libraries (UCABEL) has been available since the 1950s on slips. Since 1988 those records added to UCABEL have been available as an OPAC. Records may be searched by author, title; subject or keyword.

The National Library of Wales

The Department of Printed Books Catalogue has been available online since July 1986. Out of a total collection of over 3 million titles some 388,040 are in the machine-readable catalogue. Records are mainly created in-house (but some use is made of the MARC tape service of BLAISE records via JANET and CD-ROM) using the URICA integrated library system. Some 4 terminals are available to readers in the Catalogue Room for

OPAC access. There is also access to the OPAC via JANET. Serials titles are now available on fiche to member libraries of the Wales Regional Library Scheme.

In 1987 the Bibliography of Wales, consisting of 17,356 bibliographic records became available as an OPAC. Records are created in UK MARC format mainly in-house, but some records are downloaded by file transfer. From January 1991 one terminal has become available to readers in the Catalogue Room. Discussions are currently taking place to consider offering access to others on a wider basis. However from 1991 annual volumes of the Bibliography will be available for purchase.

Cambridge University

A new machine-readable catalogue for material published before 1978 and made available for loan was introduced in Spring 1990. Some 570,000 records are included in this OPAC. These records are created in-house from the existing manual shelf-list.

Records for the new catalogue have been available as a separate OPAC since 1983. Cambridge is a founder member of CURL and records are obtained both in-house and through the BL NBS via JANET using the MARC Tape Service, MARC SRS and online record selection. Records are downloaded record by record. All the file is loaded on CURL and are available to CURL members. Since 1986 printed music has been added to the OPAC. Hardware changes include the installation of a new VAX cluster allowing for interactive online record creation and an increase in the number of public OPAC terminals to 29. The OPAC is available to external users via JANET.

Oxford University

The University Library pilot project based on the OCLC LS 2000 ILS did not materialise. Subsequently a DOBIS/LIBIS integrated library system was installed, and a University wide OPAC became operational in February 1989. Work already done on retrospective conversion was added to the new programme (OLIS) so that there is currently a total of 350,000 machine-readable records. To assist in the OLIS programme several sources are used to obtain machine-readable records. OCLC is still used for online selection and transfer of records. BNB tapes are loaded weekly. Increasing use is made of the CURL database, to which Oxford also contribute records by tape. CURL is searched and records are downloaded (screen dump). The MARC format is used for input, although this may be either UK MARC (CURL, BNB tapes, Copyright Library Project tapes) or OCLC MARC (OCLC, EBSCO CD-ROM for serials). Since, internally, OLIS uses OCLC MARC format all incoming data is modified where required to OCLC MARC.

Hardware includes an IBM 9370 Model 90. Some 110 OPAC terminals are available in libraries, with about 260 staff terminals/ microcomputers. A very large expansion of DOBIS/LIBIS is planned for 1991/92.

The Bodleian Library contributes about 150,000 records to the OLIS file, with a retrospective conversion programme well under way.

Edinburgh University

Since 1986 the number of records available on the OPAC has increased to 370,000. Records are held in UK MARC format. Besides in-house record creation records are obtained via the MARC tape service and online

record selection from CURL, from BLAISE-LINE (where there are charges for connect time, for cost of tape, and a consultation fee and despatch fee for each record), and through BLAISE to OCLC (where there is a charge for each record consulted, but no extra charge for records despatched, and no charges for connect time or tapes). OCLC MARC records are converted to UK MARC by BLAISE.

The library is a member of CURL, and contributes records to it on tape. Although the library was formerly a participating member of OCLC and has contributed records to it, at present the library searches OCLC under arrangements made by the BL and does not contribute records.

A new hardware configuration has been installed. A GEAC 9000 with an increase in disk capacity of about 170%. Approximately 100 terminals, including microcomputers, are directly connected to the 9000.

A second copy of the OPAC is held on the University computer system, and is called EULCAT, which is accessible on about 30 terminals connected to the University network EDNET. Both the library OPAC and EULCAT can be accessed externally via PSS and JANET.

A current serials file of about 12,000 titles is maintained in machine-readable form, using a locally created fixed field format. Thus serials are included in the local Edinburgh "Union list of current serials".

Archival material in the Koestler Collection, approximately 50,000 records are due to be catalogued in 1991, using a database package on a micro. Later the catalogue will be transferred to a mainframe, and it is hoped to develop it into the Catalogue of Manuscripts using the earlier Index of Manuscripts data.

University of London Library

In October 1989 a new online catalogue became available. Some 350,000 records are now in this UK MARC based catalogue. Records are created mainly in-house with some online record selection, records being downloaded record by record and by file transfer. LIBERTAS was installed in the summer of 1989 and records are obtained online from the SLS Database and OCLC. Records are also made available to CURL via magnetic tape, to BLAISE via LOCAS and to SLS users via SLS.

Access to the OPAC is provided by terminals in the library and via the Campus network, and to other libraries through JANET.

Birmingham University

A University Library OPAC was made available in June 1988. Some 500,000 separate titles are included, covering monographs, serials, music, non-book materials and various special collections. About 22,000 new titles and 4,500 converted records are added each year. A fiche back-up for monographs and serials is maintained. The MARC II format is used in accordance with the BLCMP MARC manual, with AACR2 cataloguing and subject processing using LCSH and the LC classification. Both BLCMP and the University Library hold BL licences for the supply of records using the MARC tape service and online record selection. Records are made available to other members of BLCMP. Use is made of BLCMP and JANET networks.

The OPAC is available on the Campus network and externally via JANET. The fiche catalogue is available to campus departments and libraries, and externally to local colleges, institutes and hospital libraries.

Appendix C.2

Main machine-readable catalogues — some sample costs

1. The BL DSC estimates that costs for automation, including development of a request receipt system and automated serials check-in, is as follows:

	Capital
1986/87	£614,000
1987/88	£936,000
1988/89	£452,000
1989/90	£1,053,000

No further breakdown is available.

Some Unit cost data is available however and includes:

Record creation

Monographs	— automated	£3.18	book catalogued
	— manual	£1.19	book catalogued
Serials		£1.38	new and amended entries
Conferences		£5.68	entered

The BL H&SS Division have estimated that costs of record creation for the BL H&SS current catalogue as follows:

	Capital
1988/89	£2,690,000
1989/90	£2,905,000

Unit costs for record creation for the BL H&SS Current Catalogue, including costs of subject indexing, amendments and catalogue research, are estimated at £10.45 per record.

BL H&SS Capital expenditure costings for BL Catalogue conversion from the 1987 General Catalogue of Printed Books to 1975 to machine-readable forms are given as follows:

	Capital
1987/88	£457,865
1988/89	£633,126
1989/90	£464,259

A unit cost estimated for this activity is given as £0.54 per record, including overheads.

2. The **National Library of Wales** provides figures for capital and recurrent costs of library automation as follows:

	Capital	Recurrent Staff	Materials
1987/88	£166,000	£52,000	£71,000
1988/89	£101,000	£55,000	£85,000
1989/90	£110,000	£92,000	£107,000

For machine-readable catalogues the 1987/88 capital expenditure was £88,000. Recurrent expenditure for 1988/89 was £570,000, and for 1989/90 £600,000.

3. University sector

In the university sector **Birmingham University** estimate capital expenditure on library automation for the three years 1987/88 to 1989/91 at about £400,000. Staffing costs are thought to have increased in real terms by around £40,000 since 1986. The subscriptions to BLCMP (Library Services) Limited amounted to £56,000 for 1988/89, and £41,000 for 1989/90. The cost of materials for COM fiche production has dropped from £12,000 per annum in 1986/87 to £4,663 for 1989/90.

At **Cambridge University** capital costs for library automation since 1986 are estimated at some £300,000.

Edinburgh University provides a detailed breakdown of library automation costs as follows:

	Capital	Recurrent Staff
1986/87	£278,000	£56,000
1987/88	£61,000	£58,000
1988/89	£22,000	£60,000
1989/90	£136,000	£64,000

At **London University**, because of its size and federal nature, it has been necessary to install seven LIBERTAS systems; each of which typically cost the University about £130,000 for a licence to use; and around £40,000 for annual support. The University of London Library at Senate House makes use of one of these LIBERTAS systems, and estimates 'local' automation costs as follows:

	Capital	Recurrent Materials Processing	Overheads	
1986/87		£5,000	£40,000	£2,500
1987/88		£5,000	£45,000	£2,500
1988/89	£35,000	£5,000	£35,000	£2,000
1989/90	£15,000	£10,000	£45,000	£1,000

For the production of machine-readable records, costs are:

	Capital	Materials	Recurrent Processing	Overheads
1986/87		£1,000	£40,000	£1,500
1987/88		£1,000	£45,000	£1,500
1988/89	£25,000	£1,000	£35,000	£1,000
1989/90	£10,000	£5,000	£25,000	£500

At Oxford University capital expenditure on library automation for the three years 1987/88 to 1989/90 amount to some £750,000. Recurrent costs for the same period amount to some £400,000. Enhancement of hardware and software over the next three years is likely to cost around £200,000.

Appendix D

Network services available on Janet

There are currently four types of network services available on JANET.

- 1) E-mail can be sent on the JANET network. By the use of mailbox addresses, staff can send e-mail directly to the appropriate address. Even if staff do not have their own micro or terminal with JANET access, they may still obtain their own mail box address which only they can access, via a shared machine.

By use of a listserver it is possible to store a list of addresses to which all copies of e-mail can be sent. Through a JANET project known as NISP, the Networked Information Services Project at Newcastle University, new e-mail services are under development.

NISP has recently set up MAILBASE a prototype e-mail system to manage the membership of mail distribution lists. Further enhancement are planned. At the moment e-mail is being increasingly used in the academic library world. Clearly there is considerable potential on JANET for personal communication, the sending of questionnaires, files of records, or any other kind of digitised information.

- 2) Bulletin boards are also available on JANET. Bath University hosts two "maintained" bulletin boards. The NISS Bulletin Board — the National Information on Software and Services — has information on IT in higher education, including the availability of cheap software for the academic community, which is maintained by the Combined Higher Education Software Team (CHEST). Also available is the Humanities Bulletin Board (HUMBUL) which is of interest to Humanities academics, researchers and librarians.
- 3) Document delivery is a service that is available to libraries on JANET. For example, a document that has been word processed can be converted for uploading and sent as an e-mail message. Another service is to request the electronic delivery of documents listed as available on bulletin boards such as NISS, HUMBUL or BUBL. There is also the use of file-transfer, available as a separate protocol on JANET, which allows files to be transferred quickly and reliably. These files may be files of records in ASCII format, or long "electronic" documents.
- 4) Software may also be transferred on JANET. It would appear that this service is little used by libraries, but clearly there is considerable potential, particularly now that many academic libraries provide PCs for use by readers, often on a library LAN.

Appendix E.1

Examples of networking development in academic libraries

Aston University

A campus-wide backbone LAN has been installed, providing LAN-data and LAN-Video services. The LAN is used by the Library and Information Services for a wide range of services, including access to the GEAC OPAC, the Video Bulletin Board and Central Mail Service. There is an X.25 switch giving access to JANET, and via a gateway to PSS to remote users in North America and Europe. JANET is used to access bulletin boards and OPACs of a number of academic libraries and other services.

A CD-ROM network is planned for 1991 for the library, with a bridge to the Campus LAN likely. Other LANs planned for the library include an Appletalk LAN linked to the Campus LAN, and a network of PCs and Macintoshes in the library linked also to the campus LAN.

Hatfield Polytechnic

Hatfield Polytechnic Library and Media Services makes extensive use of PSS to access a wide range of online hosts. Until recently, a direct line was leased to PSS for this use. This use has been transferred via JANET to the PSS gateway at ULCC. Prior to the installation of the LIBERTAS system, PSS provided the main link to the SLS (formerly SWALCAP) database in Bristol. Hatfield are now able to access this running DECNET over JANET, SLS having secured permission to connect to JANET.

The Library and Media Services makes full use of the Polytechnics Academic Network to provide access to the LIBERTAS system. Hatfield are also involved in a project sponsored largely by Apple Computers UK. This centres around the integration of various sources of bibliographic/textual data on a Macintosh platform, and the manipulation of this data into databases and/or desktop publishing output.

Leicester Polytechnic Information Centre

The Information Centre uses both PSS and JANET to access online databases such as Dialog.

BT Gold is used to run the LANET service which the Centre provides for the Library Association, principally for e-mail Services, but which does allow access to some databases.

JANET access is available by the Polytechnic Campus Network, and, therefore, the full range of JANET services are available to the Information Centre and Polytechnic wide.

There is an X.25 network using CAMTEC pads. This is being replaced by a GANDALF network using fibre optic technology. This will replace the existing network in 1991. While all major buildings are attached to X.25, not every office is linked in. This will be upgraded by the GANDALF installation. When the GANDALF network has been completed in its initial stage, each office and administrative area will have access to the academic network.

Classrooms are not linked in this phase. There is a separate administrative network which operates on the same technology. The future of this type of separate configuration and the applications which each runs is under review.

There are a number of Ethernets running on Novell software in-house and the GANDALF structure would join these.

Manchester University

The John Rylands University Library of Manchester (JRULM) is connected to the Manchester University Campus Network by X.25 links, and thence to JANET.

Cataloguing, Circulation and Acquisitions systems make use of the Datapoint ARCnet system, configured with eight linked processors. Also attached to this network are eight office automation processors used mainly for word processing. The Library is the operational centre for the CURL (Consortium of University Research Libraries) joint bibliographical database. Many UK university libraries make use of JANET to access and download records from the database, which is held on the Amdahl 5890 in the Manchester Computer Centre, and the project staff are based within the Library building and use the network to access the Amdahl in order to manage the database.

The Information Centre CD-ROM network is to be converted to a thin-wire Ethernet and connected to the Manchester Campus Ethernet to permit users around the campus to make CD-ROM information searches.

JRULM intends to participate in the EC sponsored EDIFACT project which aims to establish file and communications standards for X.400 links between libraries and booksellers.

Appendix E.2

Examples of networking developments in public libraries

Gloucestershire County Council

Gloucestershire has used a locally based private viewdata system, THEMIS, running on the County Council mainframe since 1983. The service provides access to local and community information and the county library catalogue. The library is the largest of the local information providers within the County with over 30% of the 15,000 viewdata frames available.

"Bookfinder", operational since 1986, is a THEMIS based library catalogue, allowing searching under any word from author and title. Subject searching is available via a chain-indexed subject index using keywords, which gives a subject heading and Dewey class number display. Entering the chosen class number allows for classified catalogue searching.

Norfolk County Library and Information Service

The only bibliographic network provided at present is the private network dedicated to the running of the Geac 9000 Library Information System. This is currently operating in 16 libraries using a network of leased BT lines. The network is managed by the in-house Network Services Group and is restricted to those libraries using the Geac system.

Under PLDIS funding Norfolk are investigating with Geac sites in Holland and France the networking potential between libraries in the three countries. The report on this feasibility study (which includes a study of the level of need) will be submitted to the Office of Arts and Libraries in March 1991.

Westminster City Libraries

The Library has developed a link with the library supplier TC Farries, based on the Westminster GEAC 8000 and Farries own software. Forthcoming book title information is loaded weekly by Farries into the GEAC system in advance of publication, against which pre-publication orders can be placed. This potential requirements file is updated regularly and is interrogated by library staff using standard search keys. Orders flagged for Farries are captured during overnight processing. The link between Farries and Westminster has been operational since late 1989, and uses Telecom Gold mailboxes on a weekly basis for downloading, and daily for ordering.

Appendix F

Library systems by supplier

	Supplier Name	Product(s)
1.	20-20 Electronics	Mandarin
2.	Adlib Information Systems	Adlib
3.	Amtek Computer Systems Ltd	LIBMAN
4.	Automated Library Systems Ltd	System 88
5.	Blackwell's Periodicals Division	ISIS
6.	BLCMP Library Services Ltd	BLS
7.	CLSI Ltd	LIBS 100
8.	Dansk Data Elektronik A/S	Supermax Library System
9.	Datatrek UK	Data Trek
10.	Dawson Technology	OASIS
11.	Digital Design Ltd	Equilibrium (Formerly ADLIB-2)
12.	Dolphin Computer Services	Dolphin Library System
13.	DS Ltd	Galaxy
14.	Dynix Library Systems Ltd	Dynix
15.	Eurotec Consultants Ltd	Librarian
16.	Faxon UK Ltd	Microlynx
17.	Floyd Ratcliffe Consultancy Services Ltd	Licon
18.	Fretwell-Downing Data Systems Ltd	Lending Library; Reflexion
19.	Geac Computers Ltd	Geac Library Information System; Advance
20.	IBM UK Ltd	DOBIS/LIBIS
21.	Information Dimensions UK Ltd	TECHLIB PLUS
22.	Information Management & Engineering Ltd	TINlib
23.	Information Systems Design	LibraryPac
24.	Leatherhead Food Research Association	CAIRS-LMS
25.	University of Lancaster	ILL Management System
26.	Logical Choice	Bookshelf PC
27.	Lychgate Associates	BOOK Plus
28.	McDonnell Douglas	URICA
29.	Merlin Associates Ltd	The Easy Librarian
30.	MES Business Equipment	MES Library System
31.	Micro Librarian	Micro Librarian Professional
32.	Pyramid Computer Systems Ltd	CALM
33.	SB Electronics	Telepen Library System
34.	SIMS Ltd	SIMS Library Management System
35.	SIRSI Ltd	Unicorn Collection Management System
36.	SLS (Information Systems) Ltd	LIBERTAS
37.	Soutron Ltd	Soutron Library System; BiblioMac
38.	Specialist Computer Systems & Software Ltd	Bookshelf
39.	Top Tech Systems	Micro Library System
40.	VTLS Inc	VTLS

Appendix G

Library systems by product name

	Product Name	Supplier Name
1.	Adlib	Adlib Information Systems
2.	Advance	Geac Computers Ltd
3.	BiblioMac	Soutron Ltd
4.	BLS	BLCMP Library Services Ltd
5.	BOOK Plus	Lychgate Associates
6.	BookshelF	Specialist Computer Systems & Software Ltd
7.	BookshelF PC	Logical Choice
8.	CAIRS-LMS	Leatherhead Food Research Association
9.	CALM	Pyramid Computer Systems Ltd
10.	Data Trek	Datatrek UK
11.	DOBIS/LIBIS	IBM UK Ltd
12.	Dolphin Library System	Dolphin Computer Services
13.	Dynix	Dynix Library Systems Ltd
14.	The Easy Librarian	Merlin Associates Ltd
15.	Equilibrium	Digital Design Ltd
16.	Galaxy	DS Ltd
17.	Geac Library Information System (GLIS)	Geac Computers Ltd
18.	ILL Management System	University of Lancaster
19.	ISIS	Blackwell's Periodicals Division
20.	Lending Library	Fretwell-Downing Data Systems Ltd
21.	LIBERTAS	SLS (Information Systems) Ltd
22.	LIBMAN	Amtek Computer Systems Ltd
23.	Librarian	Eurotec Consultants Ltd
24.	LibraryPac	Information Systems Design
25.	LIBS 100	CLSI Ltd
26.	Licon	Floyd Ratcliffe Consultancy Services Ltd
27.	Mandarin	20-20 Electronics
28.	MES Library System	MES Business Equipment
29.	Micro Librarian	Micro Librarian Professional
30.	Micro Library System	Top Tech Systems
31.	Microlynx	Faxon UK Ltd
32.	OASIS	Dawson Technology
33.	Reflexion	Fretwell-Downing Data Systems Ltd
34.	SIMS Library Management System	SIMS Ltd
35.	Soutron Library System	Soutron Ltd
36.	Supermax Library System	Dansk Data Elektronik A/S
37.	System 88	Automated Library Systems Ltd
38.	TECHLIB PLUS	Information Dimensions (UK) Ltd
39.	Telepen Library System	SB Electronics
40.	TINIib	Information Management & Engineering Ltd
41.	Unicorn	SIRSI Ltd
42.	URICA	McDonnell Douglas Information systems
43.	VTLS	VTLS Inc

Appendix H.1

Users of larger integrated systems

Firm & Product	Public	University	Polytechnic /College	Special	School	Total
Adlib Information Systems Adlib			Breakdown not supplied			22
ALS System 88	9					9
BLCMP BLS	15	12	27	2		56
CLSI LIBS 100	10	3	5			18
DDE Supermax			Installed in 18 sites in Denmark			
DS Galaxy	*20					20
Dynix Dynix	4	3	10	4		21
Fretwell Downing Reflexion			Being Beta-tested at 3 sites			
Geac Advance			1	1		2
Geac GLIS	19	9	3			31
IBM Dobis/Libis		3		3		6
Lychgate BOOK Plus	2					2
McDonnell Douglas URICA	14	6	6	3	1	29
SLS LIBERTAS		18	7	1		26
VTLS	**1					1

* includes 4 Module 4 customers (Module 4 was a forerunner of Galaxy)

** No agent in UK. One site — National Library of Scotland installed in October 1987

Appendix H.2

Users of smaller integrated systems

Product	Public	University Polytechnic /College	Special	School	Total	
BiblioMac			2		2	
Bookshelf	8	60	32	6	106	
Bookshelf PC		Figures not supplied			76	
CAIRS-LMS		Figures not supplied			120	
CALM		30	56		86	
Data Trek		8	10		18	
Dolphin		4		79	83	
Easy Librarian		4	3	13	20	
Equilibrium		1	4		5	
Lending Library		22	1	4	27	
Libman		1			1	
Librarian		Breakdown not supplied			80	
LibraryPac		22	32	11	65	
Licon		Figures not supplied				
Mandarin		Figures not supplied				
MES Library System	1				1	
Micro Librarian		Breakdown not supplied			115	
Micro Library System		5	18	35	58	
OASIS		Breakdown not supplied			150	
SIMS				*17	17	
Soutron		1	7	99	4	111
TECHLIB PLUS			**12		12	
TINlib			For breakdown see ***			
Unicorn			2		2	

* Figure represents LEA licences

** Includes 8 TECHLIB/STACS (forerunner of TECHLIB PLUS) users and 4 TECHLIB PLUS users

*** 170 TINlib customers split into 33% professional; 21% corporate; 16% government; 13% academic; 9% public/museums; 2% medical.

Source: Supplier Survey December 1990

Appendix I

Application specific systems

Product	Application	Public	University	Polytechnic /College	Special	School	Total
ILL Management System	ILL	2	18	13	2		35
ISIS	Serials Control	1	2	2	41		46
Microlynx	Serials Control			Breakdown not supplied		8	
Telepen	Circulation Control			Figures not supplied			

Appendix J.1

Functionality of integrated library systems — larger systems

Package	Cat.	Circ.	Acq.	Serials	OPAC	ILL
Adlib	*	*	*	*	*	
Advance	*	*	*	Due 1991	*	Due 1992
BLS	(1)*	*	*	*	*	*
BOOK Plus	*	*	*	*	*	
DOBIS/LIBIS	*	*	*	*	*	
Dynix	*	*	*	*	*	
Galaxy	*	*	*			
GLIS	*	*	*	*	*	
LIBERTAS	*	*	*	*	*	*
LIBS 100	*	*	*	*	*	
Reflexion	*	*	*	U/D	U/D	
Supermax	*	*	Due 1991	Due 1991	*	
System 88	*	*	*	U/D	*	U/D
URICA	*	*	*	*	*	
VTLS	*	*	*	*	*	

U/D = Under Development

(1) Stand-alone cataloguing due Easter 1991

Appendix J.2

Functionality of integrated library systems — smaller systems

Package	Cat.	Circ.	Acq.	Serials	OPAC/ Enquiry ¹	ILL
BiblioMac	*	*		*		
Bookshelf	*	*	*	*	*	
Bookshelf PC	*	*	*	U/D	U/D	
CAIRS-LMS	*	*	*	*	*	*
CALM	*	*	*	*	*	
Data Trek	*	*	*	*	*	
Dolphin	*	*	*			
Easy Librarian	*	*	*			
Equilibrium	*	*	*	*	*	
Lending Library	*	*	*	*	*	
Libman	*	*	*	Due 1991	*	
Librarian	*	*	*	Due 1991	*	
LibraryPac	*	*	U/D			
Licon	*	*	*			
Mandarin	*	*	U/D	*		
MES Library System	*	U/D	U/D			
Micro Librarian	*	*				
Micro Library System	*	*	*			
OASIS	*	*	Due 1991	*	*	*
SIMS	*	*				
Soutron	*	*	*	*	*	
TECHLIB PLUS	*	*	*	*	*	*
TINlib	*	*	*	*	U/D	*
Unicorn	*	*	*	*	*	

U/D = Under Development

1 On a number of these systems, access is via an enquiry module which is used by staff and users alike

Appendix K.1

Hardware & operating systems — larger integrated library systems

Package	Micro-based hardware	Mini/Mainframe based hardware	O/S
Adlib		Prime	
Advance	386-based IBM PCs & compatibles	Prime, Fujitsu, Ultimate, C. Itoh, ICON, Geac, DEC, IBM RS 6000	PICK
BLS		Data General MV Series	Data General AOS/VS
BOOK Plus		IBM System 38, IBM AS/400	
DOBIS/LIBIS		IBM 4381, 308X, 3090, 9370	IBM DOS/VSE, OS (MVS)
Dynix	386-based IBM PCs & compatibles	Ultimate, Tandem, IBM, Hewlett Packard, Prime, McDonnell Douglas, MIPs	PICK, UNIX
Galaxy		Proprietary based on Concurrent Computer Corp. 3200 Series	Proprietary
GLIS		Proprietary based on Geac 8000 or 9000	Proprietary
LIBERTAS		DEC VAX from Micro VAX 2000 to VAX 6340	VAX/VMS
LIBS 100		Sequent, Altos Series 2000	UNIX
Reflexion	486-based IBM PCs & compatibles	IBM RS 6000, ICL DRS 6000, Sequent, hardware supporting ORACLE	UNIX
Supermax		Supermax	UNIX
System 88		Proprietary	Proprietary
URICA		McDonnell Douglas Series 19	PICK, UNIX
VTLS		HP 3000 Series	

Appendix K.2

Hardware & operating systems — smaller integrated library systems

Package	Micro-based hardware	Mini/Mainframe based hardware	O/S
BiblioMac	Apple Macintosh		Apple
Bookshelf	IBM PCs & compatibles	Prime & other PICK-based machines	PICK, UNIX
Bookshelf PC	IBM PCs & compatibles		
CAIRS-LMS	IBM PCs & compatibles	IBM, DEC, PRIME, Data General, Texas Instruments	MS-DOS, UNIX etc
CALM	IBM PCs & compatibles		MS-DOS
Data Trek	IBM PCs & compatibles	DEC VAX	MS-DOS, VAX/VMS
Dolphin	IBM PCs & compatibles		PICK
Easy Librarian	IBM PCs & compatibles Apple Macintosh		MS-DOS, Apple
Equilibrium	Any UNIX machine supporting INFORMIX		UNIX
Lending Library	386-based IBM PCs & compatibles	HP 9000, IBM 6150, ICL DRS 300	UNIX
Libman	IBM PCs & compatibles		MS-DOS, UNIX
Librarian	IBM PCs & compatibles		MS-DOS
LibraryPac	IBM PCs & compatibles		MS-DOS
Licon	IBM PCs & compatibles		MS-DOS
Mandarin	IBM PCs & compatibles		MS-DOS
MES Library System	IBM PCs & compatibles		MS-DOS
Micro-Librarian	BBC Master, Acorn Archimedes		BBC
OASIS	IBM PCs & compatibles		MS-DOS
SIMS	IBM PCs & compatibles		MS-DOS
Soutron	IBM PCs & compatibles	DEC VAX	MS-DOS, VAX/VMS
TECHLIB PLUS		DEC VAX, IBM, Sun, Hewlett Packard	VAX/VMS, UNIX, MVS/TSO, VM/CMS
TINlib	IBM PCs & compatibles	IBM RS 6000, Sun Sparc, ICL DRS 6000, HP 9000, DEC	MS-DOS, UNIX
Unicorn	386 -and 486- based IBM PCs & compatibles	IBM RS 6000, Pyramid, Arix, Unisys, NCR, Altos	UNIX

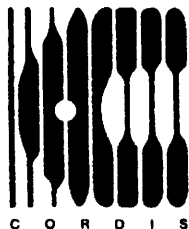
Appendix K.3

Hardware & operating systems — application-specific systems

Package	Micro-based hardware	Mini/Mainframe based hardware	O/S
ILL Management System (Inter-Library Loans)	IBM PCs & compatibles		PICK
ISIS (Serials Control)	IBM PCs & compatibles	DEC VAX	MS-DOS, VAX/VMS
Microlynx (Serials)	IBM PCs & compatibles		MS-DOS
Telepen (Circulation)	Proprietary		

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