LIBRARY COMPUTERIZATION IN THE UNITED KINGDOM

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Library automation in the United Kingdom has evolved rapidly in the past three years. Imaginative, innovative development has produced novel techniques, some of which have yet to be put into practice in the United States. Of greatest importance is the growing cadre of highly effective librarians engaged in development.

When the Brasenose Conference in Oxford convened in June 1966, there were represented only two operational library computerization projects from the United Kingdom: W. R. Maidment, Britain's pioneer in library computerization, had introduced his bookform catalog at the London Borough of Camden Library in April 1965 (1); and M. V. Line and his colleagues at the University Library, Newcastle-upon-Tyne, had introduced an automated acquisitions system just a year later (2). During the three years following the summer of 1966, British librarians moved rapidly into computerization and have made novel contributions which their American colleagues would do well to adopt. In the spring of 1969 there were more than a couple of dozen major applications operating routinely with perhaps another score being actively developed. The most striking development in the United Kingdom is computerization in public libraries, whose librarians are considerably more active than their colleagues in the United States; at least nine public libraries have computerization projects that are operational or under active development, and as already mentioned, it was a public library that led the way.

The sources for this paper are published literature and an-all-too-brief visit to the United Kingdom in April 1969 to see and hear of those ac-

tivities not yet reported. The principal literature source is *Program: News of Computers in Libraries,* now in its third volume. R. T. Kimber, of The Queen's University School of Library Studies at Belfast, edits *Program,* which he first published as a gratis newsletter in March 1966. Kimber has published the only reviews of library computerization that have contained adequate information on activities in the United Kingdom; the first appeared in *Program* (3), and the second, an expansion of the first, is in his recently published book (4). *Program* became an immediate success, and beginning with the first issue of Volume 2 in April 1968, it became available on a subscription basis. A year later, Aslib assumed its publication, with Kimber still as editor, and *Program* will undoubtedly continue to be the major source of published information about library computerization in the United Kingdom. *Information & Library Science Abstracts,* formerly *Library Science Abstracts,* is the one other major source of published information about British library automation. It abstracts articles appearing in other journals and report literature as well.

Most library computerization in the United Kingdom has been a genuine advance of technology, in that computerization has introduced new methods of producing existing products or products that had existed in the past, such as bookform catalogs. To be sure, relatively more British libraries than United States libraries have maintained catalogs in bookform, but the pioneer project at Camden produced a bookform catalog to take the place of card catalogs. The time has come, however, when it is fruitful to think of products with new characteristics or of entirely new products unknown to libraries heretofore. British librarians have already begun to think in these terms. One example (and others will be reported later in this paper) is the pioneering W. R. Maidment, who feels that the problem of application of computers to produce existing products has been solved intellectually. Maidment is giving serious thought to development of management information techniques, and automatic collection of data to be used by librarians, sociologists and others as a data base for research. Such research could produce many findings, including knowledge of effectiveness of formal education programs as revealed by subsequent public library usage, as well as better understanding of the social dynamics of public libraries within their communities.

CATALOGS

Although users searching by subject may find more material by going directly to classified shelves than by any other subject access (5,6), the library catalog is nevertheless a major and indispensible tool for making books available to users. Taken together, descriptive cataloging, subject indexing, and subject classification constitute the bridge over which the user must travel to obtain books from a library. In libraries that are user-oriented it can be expected that the greatest gain will be achieved by computerization of the cataloging process. Moreover, acquisitions activities,

as well as circulation procedures, are essentially based on, and must be interlocked with, cataloging products.

It is, therefore, of much interest that the first routine British computerization was of the catalog at the Camden Borough Library (1). Impetus for this event occurred several years earlier when the London metropolitan Boroughs of Hampstead, Holborn and St. Pancras were combined to become the Borough of Camden. The problem thereby generated was how to combine catalogs of three public library systems so that users of the new system could take advantage of the increased number of books available to them. Maidment decided to cope first with the future, and introduced a bookform union catalog in 1965 listing new acquisition in all Camden libraries and giving their locations. Of course, users have consulted both the bookform catalog and older card catalogs, but with the passage of each year, the card catalogs become less useful.

H. K. Gordon Bearman, who directs the West Sussex County Library from its lovely new headquarters building in the charming little city of Chichester, is another imaginative pioneering public librarian. Bearman has keenly evaluated potential contribution of computerization to public libraries, and has amusingly assessed the opposition of some to such advances (7). The West Sussex County Library possesses more than a score of branches, for which Bearman has introduced a computerized bookform union catalog (8). In April 1969 this computerized catalog contained nearly 23,000 entries.

The library at the University of Essex produces computerized accession lists, departmental catalogs, and special listings for its science books (9). At least four libraries are putting out computerized alphabetical subject indexes to their classification schemes or to their classified catalogs: the Library of the Atomic Weapons Research Establishment (AWRE) at Aldermaston; The City University Library (10), London, formerly the Northampton Technical College; the Loughborough University of Technology (11); and the Dorset County Library (12), which may be the first library in the United Kingdom to use a computer, for it issued a computerized catalog of sets of plays in 1964.

One of the most exciting cataloging computerization projects in the United Kingdom is the British National Bibliography MARC project under the extraordinarily skillful leadership of R. E. Coward (13,14). The BNB MARC record is entirely compatible with MARC II, and Coward has introduced worthwhile improvements to it. For example, he uses indicator positions to record the number of initial characters to be omitted when an entry possessing an initial article is to be sorted alphabetically.

In April 1966, the British National Bibliography was using its MARC records in its process for production of cards for sale to British libraries. BNB intends to use the same records for production of the British National Bibliography. In addition, BNB is fostering a pilot project, quite like the MARC pilot project, among a score of British libraries. F. H.

Ayres (15) has published perceptive suggestions for use of BNB MARC tapes for selections, acquisitions, and cataloging.

Although Coward was able to take full advantage of work done at the Library of Congress, it is enormously to his credit that he did take that advantage, and that he has moved so far ahead so rapidly. Since British book production somewhat exceeds American, Coward has doubled the size of the pool of machine readable cataloging records available at the present time.

The Bodleian Library at Oxford will be an important early user of BNB MARC tapes. Robert Shackleton, who became Bodley's Librarian shortly before the Brasenose Conference, has worked wonders at that ancient and honorable institution, and his principal wonder is Peter Brown, who became Keeper of the Catalogues late in 1966. Brown is one of the few members of classical librarianship who has trained himself in depth in the programming and operation of computers. Oxford possesses no fewer than 129 separate libraries acquiring current imprints and has no instrument that remotely resembles a union catalog. Hence, each user must guess which library out of 129 is most likely to have the book he wishes to use — a guessing game of which Oxonians notoriously tire. Brown has developed a system for bookform catalog production which will place a union catalog of Oxford's holdings in each of its libraries.

CONVERSION

The Bodleian is also the scene of the most ambitious of retrospective conversion projects. Involving 1,250,000 entries, it is by far the largest conversion project in either the United States or the United Kingdom. Entries being converted constitute the Bodley's so-called "1920 Catalogue," which includes the Bodley's holdings for imprints of 1920 and earlier. For some years the manuscript bookform slip catalog that houses these entries has been in advancing stages of deterioration, and indeed since 1930, entries have been revised in anticipation of printing the catalog. To reprint the catalog would require keyboarding the entries to prepare manuscript copy for the printer, who in turn would keyboard the entries again in setting type. There would be only one product from this process, namely a printed catalog. Bodleian officials wisely decided to do a single keyboarding that would convert the entries to machine readable form from which a multiplicity of products could be had, including a printed catalog. Brown has worked out details of schedules and procedures whereby conversion will take place during the next five years. A contractor employing optical character recognition techniques performs actual conversion, but the contractor does not edit, code, or proofread the entries, although he is responsible for accurate conversion. Brown has skillfully developed techniques to diminish the number of keystrokes required in conversion, and what with labor costs being lower in the United Kingdom than in the United States, the contractual cost of 4.17 pence per record is certainly low enough to

attract work from outside the United Kingdom. The most significant part of this operation is, however, the identification by computer program of the individual elements of information in the text. This puts into practice the concepts of John Jolliffe of the British Museum on the conversion of catalog data (16); it was Jolliffe who programmed Oxford's KDF 9 computer to convert the text coming on tapes from the contractor to true machine records that are compatible with the MARC II format.

Despite the fact that these entries contain no subject heading tracings, they will constitute the first major source of retrospective machine readable cataloging records.

The West Sussex County Library in Chichester and the University Library at Newcastle-on-Tyne have already converted their catalogs to machine readable form, the former having done somewhat less, and the latter somewhat more, than 200,000 entries. At Chichester, former library employes did the job on the piece-work basis; at Newcastle the Computer Laboratory employed a special group (17).

The large number of records produced by these conversion projects forces urgent consideration of files designed to house huge numbers of entries. Approaches to solutions of this problem have begun at the level of individual records or of file design as a whole. Nigel S. M. Cox, at Newcastle, one of Britain's most widely known library computer people and co-author of the best-selling *The Computer and the Library* (it has been translated even into Japanese), has developed a generalized file-handling system (18) based on individual records. Cox has demonstrated that his system is hospitable to demographic records as well as bibliographic records. His file handling will surely play a role in future library computerization.

CIRCULATION

Britain's first computerized circulation system went into operation in October 1966 (19) at the University of Southampton. Books contain eighty-column punched book cards which are passed through a Friden Collectadata together with a machine readable borrower's identification card. Punched paper tape is produced that is input to the computer system. The principal output is a nightly listing of charges having records in abbreviated form, with a print-out of the complete records being produced once a week. The Southampton circulation system works well, and obviously the staff finds it easy to use. Borrowers also enjoy the system; when the Collectadata is down, as it occasionally is, circulation volume also goes down, for borrowers avoid filling out charge cards manually.

F. H. Ayres and his colleagues at the AWRE Library at Aldermaston are a productive group in research and development. Aldermaston has a partially computerized circulation system wherein the computer segment of the system maintains control features of the circulation record file, but the master record is maintained manually (20).

It is understood that the library of the Atomic Energy Research Estab-

lishment at Harwell is developing an on-line circulation system, but the West Sussex County Library is the only British library to have on-line access to a circulation file (8,21). The circulation system in Chichester is both experimental and operational. The punch-paper-tape reading devices at the circulation desk and in the discharge room were specially designed by Elliott Computers for experimental application for library purposes. However, it appears that the experimental period is ending, and that the production of a new model is about to be marketed by Automated Library Systems Ltd. The experimental equipment at Chichester was to be replaced during summer, 1969, and six further installations introduced at the major regional branch libraries during the next two years.

The on-line circulation records are housed on an IBM 2321 data cell in the Computer Centre in an adjacent County Council building. There is an IBM 2740 terminal in the Library from which special inquiries are put to the file. For example, overdue notices are sent out by computer using the same records to which inquiries can be made, but there are sometimes lag periods, particularly over weekends, so that an overdue notice may be sent on a book already returned. When the borrower reports that he has already returned the book, the file is queried from the terminal. Processing of these special and time-consuming tasks is thereby greatly facilitated. On-line circulation files are a rarity, and the West Sussex County Library and the County Computer Centre are to be congratulated on their achievement.

ACQUISITIONS

The already mentioned acquisition system at Newcastle (2,22) has been in continuous and successful operation for over three years. Although the system does not handle large numbers of orders, there being only slightly more than a thousand active orders and four thousand inactive orders in the file at any one time, there is no reason to think that it could not cope with a larger volume. Output from the computer consists of purchase orders, the order file, claim notices, a fund commitment register, and an occasional list of orders by dealers.

The City University Library has computerized its book fund accounting (23), its general library accounts, and its inventory of over 350 categories of furniture and equipment (24). The last procedure is unique.

AMCOS (Aldermaston Mechanized Cataloging and Order System) appears to be the British pioneer integrated acquisitions and cataloging system (25). The IBM 870 Document Writing System originally used for output became overburdened after it had produced the second bookform title catalog with classed subject and author indexes. A title listing is employed in the main catalog because the Aldermaston group found in a separate study (26) that users as they approached the catalog possessed less than seventy-five percent accurate author information, while their information about titles was over ninety percent correct.

SERIALS

The University of Liverpool Library (27) and The City University Library (28) produce periodicals holding lists by computer. At Liverpool the list is restricted to scientific serials but contains 7,600 entries of holdings in 28 libraries, not all of which are university libraries. With each entry are holding information, the name of the library or libraries possessing the title, and the call number in each library. Similarly, The City University Library list contains holdings information and frequency of appearance for each title. The computer program at City University also puts out a list of titles for which issues may be expected during the coming month as well as of all titles having irregular issues. However, this procedure for checking in issues did not prove to be wholly satisfactory and is not currently in use.

The Library of the Atomic Energy Research Establishment at Harwell also puts out a union holdings list for the several sections of the Library (29). In addition, the Harwell programs, which run on an IBM 360/65 and are written in FORTRAN IV, produce for review annual lists of current subscriptions taken by each library; it also produces annual lists of periodicals by subscription agencies supplying the periodicals.

Dews (30,31) has described computer production of the *Union List of Periodicals in Institute of Education Libraries.* This union list first appeared about 1950, was republished annually, then biennially, as magnitude of effort to revise it increased. Both the manipulation and typesetting programs employ the Newcastle file handling system.

ASSESSMENT

The most gratifying development in library computerization in the United Kingdom during the last three years has been the rapid expansion of numbers of individuals who have made themselves competent in the field. Among the British participants at the Brasenose Conference were barely a half-dozen who had had first-hand experience in library computerization. The group has increased considerably more than tenfold and has brought quality of British library computerization to a level surpassed by none. Continuing advances depend on the calibre of those advancing; the competence of the present cadre assures exciting future developments.

Perhaps the most distinguishing characteristic of library computerization in the United Kingdom as compared with that in North America is the relatively larger role played by public libraries. Indeed, it was the public libraries at Dorset and Camden that first used computers. American public librarians would do well to follow the lead of their British confreres. In general, Americans can learn from British imagination and accomplishment, can learn of exquisite refinements and major achievements.

British librarians, particularly of large British libraries, have not been a notoriously chummy group. It is, therefore, interesting to observe com-

puterization bringing them together. The new style in solving problems made possible by the computer has suddenly made it clear that libraries heretofore deemed to have nothing in common now seem surprisingly alike. For example, bookform union catalogs at the Camden and West Sussex Public Libraries and at the Oxford libraries can now be seen to be essentially the same solution to the same problem.

Although library computerization in the United Kingdom is but half the age of that in the United States, the quality if not the quantity of British research, development, and operation has rapidly pulled abreast of, and in some areas surpassed, American activities.

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