EARLY DEVELOPMENTS IN THE AUTOMATION OF HIGHER EDUCATION LIBRARIES

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Examines the development of automation in higher education libraries from the mid-1960s until around 1975. During this period the automation of processes in academic libraries progressed from being an experimental activity, often called a research activity, engaged in by few, to being a commonly accepted phenomenon. The period also witnessed a shift away from the collaborative exploitation of computer resources among different departments, academic and administrative, of a single university, towards collaboration among university libraries. Discusses the application of computers in terms of circulation control, catalogues and cataloguing, acquisition and administration. Praises the vision and enthusiasm of librarians who, in the face of opposition from fellow professionals and users alike, pioneered the application of computer technology in libraries.

Context

This paper considers the development of automation in higher education libraries up to about 1975. By that date, the emphasis was clearly shifting, away from the collaborative exploitation of computer resources among different departments, academic and administrative, of a single university, and towards collaboration among university libraries, sharing the use of computers by function among themselves. In effect, this acknowledges the triumph of the library co-operative as a concept, by 1975, even though individual developments did continue in some libraries.

In describing these early developments, it is useful to begin with some remarks about the context. Harold Wilson, in his first two administrations, 1964–1970, was fond of talking about 'the white heat of the scientific and technological revolution'. The Robbins Report[1] offered formal validation for a massive process of university expansion, which was already getting under way when the report was published. The Flowers Report[2] had offered the Wilson government 'a full-scale review of the computer requirements of universities and research councils, which would lead to a new five-year programme of procurement'. In the early 1960s, the University College (London) School of Librarianship and Archive Administration was already offering an optional course on

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the use of computers for library administration and information retrieval, though only a minority of the students chose to take it. In 1967, however, the Parry Report[3] demonstrated that, as yet, there was no consensus. In the main body of a text of 165 pages, only two pages were devoted to the possible implications for libraries of computer technology, though there was also reference to MEDLARS, the computerized medical information service of the US National Library of Medicine. Dominated by university teachers and librarians of a more traditional frame of mind, the Parry Committee ranged exhaustively over the *status quo* of academic libraries, yet, despite some warning, left almost unnoticed the factor which has increasingly dominated academic libraries over the forty years which have followed.

Signs of changing times

The warning appeared in the form of four cyclostyled pages which were despatched from Belfast to a few chosen recipients a few months before the Parry Report was published. Dated March 1966, these modest pages were issue 1 of *Program: news of computers in British university libraries*. Despite the indifference indicated by the Parry Report, this new publication did not shy away from hyperbole: 'A new wave of enthusiasm is sweeping over the world of libraries in Britain: librarians see that it is possible to use computers for most clerical operations in libraries.'[4] Within three years, *Program* had given evidence that something dramatic was afoot. The gangling and emaciated pages of the first eight issues were already in the past. Volume 3, the first issue of which was dated April 1969, was in a more conventional format. The scope had been extended to cover all British libraries (that is, not just university libraries), and the subtitle changed to reflect this. Publication had been moved from Belfast to Aslib in London, where links with the well-established and prestigious *Journal of Documentation* (1945–) could be vigorously pursued. Volume 3, Number 1 consisted of forty-six pages. Two more issues appeared in 1969. As it matured into the full-blown professional journal which is now so well known, it left a space for a newsletter which would concentrate on reporting progress — and possibly delays in progress — in automation projects rather than the rounded accounts of developments which *Program* was able to comment on. Into that space stepped *VINE*, a Very Informal NEwsletter, produced by the Information Officer for OSTI Library Information Projects, based at Southampton University Library.

OSTI, the Office for Scientific and Technical Information of the Department of Education and Science, played an indispensable role in the development of library automation in the UK academic sector. At the time, OSTI-funded projects were to be found at Birmingham, Bristol, Loughborough, Newcastle, Southampton, and Surrey universities, and also at the British National Bibliography (BNB). The Information Officer's job was to report on the various OSTI-funded projects and to circulate reports to the other OSTI-funded projects. By 1973, the remit and the circulation of *Vine* had been significantly extended: 'Its [VINE's] object is to provide an up-to-date picture of the activities of the OSTI projects *and occasionally to feature other automation work of special interest not already reported elsewhere*' (italics supplied).[5]

Pre-eminence of the technological base

The first issue of *Program*, in 1966, recorded the establishment by ICT (International Computers and Tabulators — the British computer firm) of a University Library Working Party. It was chaired by Graham McKenzie, founder Librarian of the recently established Lancaster University and later Librarian at St Andrews University, and members included Richard Kimber (Queen's University, Belfast), Michael Lynch (University of Sheffield), and Bruce McDowell of the University of Southampton, together with two people from ICT. The opening manifesto was bold and far-sighted: 'The group's ultimate aim will be to design a complete on-line library system, but, where necessary, off-line systems will be developed immediately, in such a way that on-line working could be introduced later with a minimum of change.'[6] By the time such a comprehensive system was in use, ICT had lost its leading place on the UK computer scene.

The formation of this group reflected the fact that, in the earliest days, systems had to be much more dependent on a specific machine — which would normally have been bought by the parent university with other objectives mainly in mind, possibly administrative computing or, more likely, academic and research applications. So working parties also quickly emerged for other manufacturers' machines. The Elliott Automation group was led by P. J. Flavell of the University of Kent (another new university). Maurice Line, at the time Deputy Librarian at Newcastle University, was the leading light in the English Electric group, that being the choice of computer at Newcastle University. The IBM group was led by Harry Callaghan, later Deputy Librarian at University College London, where the IBM 360/65 had not long been installed.[7] However, notwithstanding the initial pre-eminent importance of the locally available hardware, interest in particular library operations quickly cut right across the machine-focused user groups. Different libraries found their own particular reasons for concentrating their attention on a specific area of library operations, namely, acquisition, cataloguing, circulation and serials administration, and they sought out other libraries which were equally keen to address the same tasks. The remainder of this article therefore concentrates on the different library applications rather than the different makes of hardware.

Circulation

Following the work of the pioneers in the late 1960s, the adoption of an automated approach to circulation control really took off in the first half of the 1970s. Dick Young of Sussex University Library estimated that the number of systems almost doubled — from 33 to 59 — in the period 1973 to 1975.[8] But that was across all types of libraries, not just academic libraries.

Circulation systems clearly needed two types of data: stock data, over which the library could reasonably claim complete authority, and user data, which in principle was of much wider significance, that is, to the university as a whole. Just as some libraries were taking no steps to automate any of their systems, some administrative departments had not even begun to think in terms of machine readable student data. This meant that some libraries had to deal with that need as they saw fit, notwithstanding the risk that the data, and the data formats, they created would not necessarily suit a wider range of

applications. However much they might have appreciated the farsighted aspirations of the ICT Working Party, libraries were seriously constrained, by the eighty-column card, by the limitations of available machines (especially the paucity of dynamic memory) and also by restrictions on machine use imposed by the university, as it sought to give every potential user some access to this scarce and expensive facility. Data collection devices were initially punched card based (such as the Friden Collectadata) but this period did later see the emergence of barcode technology and ALS, Plessey and Telepen emerged as the leading companies in offering this innovative method of data capture.

Circulation is arguably the most dynamic area of library operation since it constitutes the most active interface between the library user and the staff. So the inability to use online working from an early stage was a real difficulty. The circulation file itself was rarely more up-to-date than the close of the previous day's transactions, if that, and the risk of failing to trap borrowers who had exceeded their allocation, and, more importantly, returned books which had been reserved by other users, was very real. So the trapping store offered by some systems, provided in some instances by a library-dedicated mini-computer, while it can be regarded as a compromise between the desirable goal of fully online working and the restrictions arising from limited machine availability, was also a significant advance in its time.

Catalogues and cataloguing

Giving priority to the needs of stock circulation had the important effect of legitimizing the production of stock data which fell short of the standards routinely applied by trained descriptive cataloguers. They were often substantially shorter, accepting the severe limits imposed by the eighty-column card, and the quality control was by no means so rigorous as traditional cataloguing departments considered necessary. How much did this matter? As one writer in *Program* said: 'So little is know about what precisely is wanted of catalogues, that any attempt to design a system was at present guided mainly by intuition.'[9] And in 1969, Maurice Line, in his best waspish form, said of the catalogue: 'A computerized white elephant may be more ornamental than an ordinary one, but is not significantly more useful.'[10]

One of the originally unintended consequences of these short records, created for the support of circulation, was the appearance of abbreviated catalogues, such as MICROCAT at Southampton University or MINICS at Loughborough University. Even if the content did fall well short of the traditional catalogue in quantity and in quality, ran the argument, if it helped the user, was that not sufficient justification? It was probably as a consequence of these mini-catalogues that Bath University Library was funded by OSTI to carry out the British Universities Comparative Catalogue Study — to which we are eventually indebted for the emergence of UKOLN, the UK Libraries On-Line Networking Centre.

One early discussion in *Program* ran as follows: 'Concern was expressed at the prevailing practice of university libraries each creating cataloguing copy for the books which they themselves acquire, and it was felt that it will become continually more difficult to justify this practice as numbers of accessions and unit cataloguing costs both increase.'[11] In the United States, the Library of Congress (LC) catalogue card service had

already been in operation for over half a century, and it was commonplace to see LC cards interfiled with internally produced cards in US libraries. In Britain, BNB had been offering a card service for more than ten years, but this related only to newly published British books and academic libraries felt that this was inadequate for their needs. However, in the second half of the 1960s, there was considerable excitement about the possibility of producing machine-readable catalogue entries.

It was generally appreciated that the key was to agree on the format of the records as the Parry Report had noted. The LC was leading the field with its development of the MARC format. It is difficult to recreate today the kind of atmosphere surrounding that development. Led by Richard Coward, BNB, then an independent, private sector organization but later subsumed into the British Library, was a welcome participant in discussions, but was always being drawn along in the slipstream of LC's advance. In 1967, A. J. Wells, the head of BNB, and Coward went to the annual conference of the American Library Association in San Francisco and, immediately on their return, in July 1967, reported back to a UK seminar convened to discuss the organization and handling of bibliographic records by computer Program.[12] A BNB MARC Record Service was promised, and the first tapes were distributed in May 1969.

But it would be a mistake to think that the future path was clear and straightforward. The lack of currency of BNB tapes was an issue from the start, and the MARC format was being brought into use with some questions about the compatibility of UK and US MARC unresolved. There were also ongoing uncertainties about forms of catalogue output and about the implications of the new techniques for existing manual catalogues. A specialized instance of retro-conversion, the pre-1920 catalogue of the Bodleian, was attracting the attention of Peter Brown, but otherwise this major problem was mainly in the future, and most people were quietly leaving it there, notwithstanding Tom French's[13] study of options for the conversion of card catalogues for BLCMP. Still, by 1972, Ruth Irvine, of Southampton University Library, was able to write: 'MARC has become an internationally recognized exchange format with enough authority to ensure that records exchanged through the system are compatible and useful to recipients.'[14] This has to be seen as a remarkable and crucial achievement.

Acquisition

If the currency of the BNB MARC record service was important for cataloguing, it was potentially just as important for the stage before cataloguing, namely acquisition. Standard Book Numbers began to be issued in 1966 in the UK and the system became an international standard in 1970. This should have made it possible to call up an authoritative bibliographic record from a BNB tape, simply by inputting a number, and to attach this record to all subsequent transactions, whether acquisition, cataloguing or circulation. But, of course, the usefulness of the facility depended on the currency of the tapes. As a result, one of the most potentially beneficial features was largely unavailable until the advent of Cataloguing in Publication, which began in the UK in 1975, and made a standard catalogue record, effectively, part of the bibliographical entity. Prior to that, temporary bibliographic records, analogous to the circulation records in being truncated and of doubtful authority, often had to suffice until superseded by the nationally or internationally prepared standard record.

It is also worth noting that, since acquisitions systems necessarily have an interface with the book trade, whether publishers or book dealers, the systems requirements had an additional level of complexity. So a good deal more task analysis was required. In 1969, a transatlantic observer, Fred Kilgour noted that the Newcastle University Library acquisition system had already been in operation for three years and was generating purchase orders, an 'on order' file, claim notices, a fund commitment register, and an occasional list of orders by dealer. But other special applications he noted, such as book fund accounting, were essentially ancillary, and did not address the main activities of the acquisitions system[15]. In a 1971 survey, Duchesne and Phillips[16] reported only three operational automated book acquisition systems, and it is not clear from their report whether these were in academic libraries or not, though one of these (Newcastle's) obviously was.

Serials administration

So far as serials were concerned, this concentration on ancillary functions was even more marked. The use of computers to produce lists of serials became increasingly common, but the mainstream requirements of serials administration were, and are, particularly complex and a satisfactory attack on this topic had to wait for some years, though Lancaster was drawing up a specification for a system as early as 1966.[17] The need to input large quantities of precise data into the system in order to phase out the precursor manual system was also a drag on progress.

Signs of consolidation

To summarize, within ten years, say by 1975, the automation of processes in UK academic libraries had progressed from being an experimental activity, often called a research activity, engaged in by few, to being a commonly accepted phenomenon, and those libraries with no automated systems mostly had a firm intention to automate some aspects of their administration as soon as the particular obstacles they were experiencing could be overcome. Even as early as 1969, Fred Kilgour remarked on 'the growing cadre of highly effective librarians engaged in development'.[18] In various committees, the protagonists of automation were meeting regularly, and they were also addressing seminars and conferences at which the word was spread among the profession. A report in *Vine* of August 1972 described a one-and-a-half-day course on library automation, given by practitioners, for lecturers from ten library schools, a major step forward from the picture ten years earlier. The list of topics discussed rings bells even today: the danger of using cost as the sole criterion in the assessment of the success of library services; the apparent conflict between the role of the librarian as a 'bookman' and as a manager; whether a computer system should aim to reduce costs (e.g. in staffing) or to provide extended and more efficient services; the value of computer-produced management information in stock control; and the prediction of the likely usage of new books.[19]

One of the most important consequences of the development and introduction of these systems was the change it gradually brought about in the thinking of some library

staff. As J. D. Dews wrote in an early contribution to *Program*, 'The computer does exactly what the programmer instructs it to do, and never displays anything remotely resembling common sense. It is not easy to appreciate the precision and completeness with which it is necessary to specify the operations to be performed, but the effort to do so may well have a beneficial effect on all our library routines, *not only those we may wish to automate*' (italics supplied).[20] In fact, it was not long before the more expert librarians were using flow charts and critical path diagrams to illustrate their analyses of library operations which many library staff had long taken for granted — and some perhaps still do. Maybe this display of skill was just a practical demonstration of the remark made by one contributor to *Program*, to the effect that 'programmers do all the work, but librarians write the articles'.

Further evidence of consolidation is provided by the emergence of a black humour associated with these initiatives, as evidenced by Fred Ayres,[21] Deputy Librarian of Bradford University. His Law of Reciprocal Incomprehension said that, for every word of jargon in librarianship, there is an equivalent word in computer science with a totally different meaning. His two Laws of Bibliodynamics offered equations basically indicating that any library mechanization project can be expected to take twice as long to develop as predicted (or four times as long if it is an online system) and to deliver half the promised benefits. His Law of Costing predicted that the less a librarian knows about the cost of his own conventional system, the more he will want to know about the cost of someone else's mechanized system. His Law of Reasoned Inertia said that delay in introducing mechanization can only be beneficial since it will enable one to profit from the experience of others. And the longer the delay, the greater the profit. And, by contrast, his Law of Biblioincompatibility stated that a mechanized system used in one library will not work in another.[22] As is often the case, there were grains of truth within the humorous comments. Libraries and the profession might have come a long way in ten years, but many still had a long way to go.

Against the tide

Despite the optimism of the first issue of *Program*, there were many librarians in this period who were suspicious of or opposed to this professional trend. Most notable of these was F. G. B. Hutchings (City Librarian of Leeds). In his presidential address to the Library Association in June 1967, he described the experiments with library automation as 'playing around with expensive toys'.[23] The following year, the Library Association submitted five pages of evidence to the National Libraries Committee, without making any reference to computers or automation. And when Line and Grose trailed their coats on the topic of automating library catalogues with an article entitled 'On the construction and care of white elephants',[24] the excited replies were almost all hostile. But Line and Grose and their supporters had their arguments ready. Automating library processes would offer added value by way of additional management information. It was stimulating the close analysis of many library staff activities. It was ensuring that libraries would not be forgotten when the potential advances, made possible by computers, were being discussed. Above all, the major protagonists had a sense of the enormous potential of computers, even then.

In the early days of electricity, Michael Faraday was once challenged to say what was the use of his new technology. His reply was: 'What use is a baby?' By 1975, although many librarians were still not convinced, the movement to automate libraries had accumulated a wealth of experience and a growing number of articulate protagonists, who were capable of defending the usefulness of their 'baby'. The automation of libraries is sometimes characterized as a movement promoted entirely by librarians themselves, in the face of indifference or even opposition from some of their professional colleagues and many of their users. Considering the critical importance of computers today for information storage, retrieval and transfer, it has to be acknowledged that the vision and enthusiasm of some librarians of those early days has been amply vindicated.

[1] Committee on Higher Education, *Higher Education. Report of the committee appointed by the Prime Minister under the chairmanship of Lord Robbins 1961–63* [The Robbins Report], CMND, 2154 (London: HMSO, 1963).

[2] Joint Working Group of the University Grants Committee and the Research Councils, *Report of a joint working group on computers for research* [The Flowers Report] (London: HMSO, 1966).

[3] UGC Committee on Libraries, *Report of the committee on libraries* [The Parry Report] (London: HMSO, 1967).

[4] *Program* 1 (1966).

[5] *Vine* 6 (1973).

[6] *Program* 2 (1966).

[7] *Program* 3 (1966).

[8] R. C. Young, United Kingdom computer-based loans systems: a review, *Program* 9:3 (1975) 102–14.

[9] Libraries and Computers Group, Report, *Program* 6 (1967).

[10] M. B. Line, A note on the use of MARC, *Program* 3:3–4 (1969) 104–05.

[11] ICT Working Party, Report of the meeting held in November 1966, *Program* 4 (1967) 10.

[12] *Program* 2:1 (1967) 34.

[13] T. French, Conversion of library card catalogues, *Program* 5:2 (1971).

[14] R. Irvine, MARC tagging structure: local variations at Southampton University Library, *Program* 6:4 (1972) 286–94.

[15] F. G. Kilgour, Library computerization in the United Kingdom, *Journal of Library Automation* 2:3 (1969) 116–24.

[16] R. M. Duchesne and A. B. Phillips, Automation activities in British university libraries: a survey, *Program* 3:3 (1971) 129–35.

[17] ICT Working Party, Report, *Program* 3 (1966).

[18] Kilgour, Library computerization.

[19] *Vine* 4 (1972) 7.

[20] *Program* 6 (1967a) 25–34.

[21] F. H. Ayres, Some basic laws of library automation, *Program* 4:2 (1970) 68–69.

[22] Ayres, Some basic laws.

[23] F. G. B. Hutchings, Presidential address to the Library Association, *Library Association Record* (June 1967) 186–87.

[24] M. W. Grose and M. B. Line, On the construction and care of white elephants, *Library Association Record* (January 1968) 2–5.