An Leabharlann. The Irish Library, Vol. 4, No. 2, Summer 1975, pp. 45-57

Library Automation : Experiences and Reflections

BARRY WINTOUR
Deputy Librarian,
New University of Ulster

For the last three years a considerable proportion of my duties has involved directing the automation of 'housekeeping' routines relating to ordering, cataloguing, and circulation at NUU. As my previous training and experience had been in purely conventional and highly orthodox areas of librarianship, my entry into the world of automation requires a few words of explanation.

My interest in library automation arose out of continuous association over the years with many soul-destroying routines, which seemed to be inescapable, even for quite senior staff, and which often diverted me from the educational and reference functions I ought, and would like, to have been performing for the benefit of readers. How vividly I remember, as an assistant in a public library in London, coping with seemingly endless queues of readers borrowing and returning books, filing and unfiling transaction cards for hours on end, sifting and counting large quantities of issues at the end of the day, and ploughing day after day through acres of Browne issue trays to discover books which required flagging for the purpose of reservation. When I entered university librarianship I soon realised that circulation routines in academic libraries were just as tedious and time-consuming as they were in public libraries. Instead of Browne there was the traditional system based on an issue slip filled in and signed by the reader. I doubt whether any university librarian who has the misfortune to handle masses of flimsy issue slips would deny that countless hours are wasted trying to decipher readers' handwriting, checking erroneous information, and searching fruitlessly in the issue files for books which have been misfiled, or recorded under the wrong heading. Manual issue systems spring instantly to my mind as a prime source of frustration, but I found scarcely less frustrating many of the routines associated with cataloguing, book ordering, accounting, stocktaking, and book list production, not, I hasten to add, because I was basically shy of hard work or disinterested in these aspects of librarianship, but because I came, increasingly with advancing years, to doubt whether these routines were being performed by the simplest and most efficient methods. This doubt became particularly strong when, as a cataloguer with the rank of Assistant Librarian in a college library in London, I had to write catalogue cards in a meticulously neat printing style so that they would be legible; to readers, and file them, together with the cards produced similarly by four other cataloguers, in the public catalogues. Even now my handwriting bears the influence of this enforced style of writing and I recollect with horror the hours I spent agonisingly filing mountains of catalogue cards in a very complex catalogue.

As my doubts about the efficiency of the manual methods I had experienced grew, I became more and more aware of the various automated methods which were being developed in precisely those areas of librarianship with which I had become so disenchanted. When I moved to Essex University Library at the end of 1963 I had an opportunity in the ensuing years to see one of these methods in actual operation. At Essex the initial area chosen for automation was cataloguing. A pilot project, confined at this stage to science books only, was established and run in parallel with the conventional methods. For each book catalogued in this subject area a machine-readable record was produced on a paper-tape flexowriter and stored in the computer. The stored records were used to provide departmental catalogues, accessions lists, and special listings from the Computer Centre's line-printer, but were also envisaged as the basis of a potential computerised cataloguing system and of a machine-readable file to which an automated circulation system could be linked when the population of the university made this justifiable. As an assistant librarian in charge of Reader Services I was not involved in this project, but I watched its progress with great interest and the hope that one day I would be able to participate in it in an active way when the automation of the circulation system came under consideration. I was also encouraged by the fact that the project was the brain-child of the Sub-Librarian in charge of Acquisitions, a librarian with highly developed research interests in 'wheel' and 'herring-bone' bindings, and a background of training and experience in the Bodleian Library! This demonstrated for me in a very real way that a librarian, however humanistically trained, can cope satisfactorily with the techniques and demands of automation.

As it happened, I never saw the fruition of the pioneering work done at Essex because, just as it was beginning to reach a significant stage in 1969, I moved to the New University of Ulster. The move, however, was destined to provide me with a unique opportunity to introduce a series of automation projects for improving the 'housekeeping' routines with which I had become so disillusioned over the years. The potential for automation had been established at the New University of Ulster long before I arrived, when the wise decision had been made to employ a flexowriter for reproducing catalogue cards and to store the by-product punched paper tapes containing the catalogue data. From my observations of the work done at Essex, I realised that these paper tapes could be manipulated by computer and be used as a basis for a host of automated activities. Immediate computerisation, however, was out of the question, because at that time the University had neither a computer nor any computer personnel. Automation, of course, does not necessarily involve the use of a computer. Reading back paper tapes through a flexowriter to produce multiple sets of catalogue cards is an example of a form of automation which is independent of the computer. There are ways of automating other 'housekeeping' routines like ordering, circulation, and periodicals control, with equipment and stationery that does not require recourse to the computer. I considered the various machine and machine-manual alternatives (including the flexowriters we were already using), as anyone contemplating automation should do, but, like many other people who have done this, I eventually came to the conclusion that automation by these means held fewer prospects for success than automation involving the use of the computer.

Preparing the ground for the introduction of computerised routines in the Library was a daunting task for a librarian, as I was, with experience primarily in the realms of cataloguing, reader services, administration, and only rudimentary knowledge of computers. With positive encouragement from the Librarian, who was himself interested in automation, particularly of circulation routines, and the stimulus of the imminent installation of the University's computer, I began tackling the task by immersing myself in the literature of computer librarianship. I progressed from Kimber's *Automation in libraries,* unrivalled in my opinion as an introduction for the layman, to a series of influential books of the day such as *Use of mechanical methods in documentation work,* by H. Coblans, *The Computer and the library,* by N. S. M. Cox, *Organisation and handling of bibliographic records by computer,* edited by N. S. M. Cox and M. W. Grose, *The Brasenose Conference on the Automation of Libraries,* edited by J. Harrison and P. Laslett, *Interface,* edited by C. K. Balmforth and N.S.M. Cox, and *UK MARC Project,* edited by A. E. Jeffreys and T. D. Wilson. This background reading, associated with frequent consultation of various reference texts on computers, was supplemented by a perusal of the ever-increasing number of articles that were appearing in various library journals, particularly in the *Journal of Library Automation* and *Program,* the latter being especially useful for what was happening in British libraries. While reading up the literature of library automation is important, it is equally important to see in actual operation some of the automated systems which have been featured in the literature and to speak with the people involved in installing them. With this in mind, I visited a number of libraries such as Southampton University Library (famous for its pioneering work in automated circulation, ordering, and MARC cataloguing), Sussex and Surrey University Libraries (early academic library users of the ALS automated circulation system), and AWRE, Aldermaston (pioneers in automated integrated ordering and cataloguing). These visits were valuable not only for what I saw but also for the useful contacts I made with people in the field of library automation. In this exploratory period I also attended as many appropriate conferences as I could to hear the experts speak.

With a background of reading, visits, and attendances at conferences, I was fairly well equipped by 1972 to visualise a line of automation development at NUU. It would, of course, have been pointless to formulate any definite plans unless the Library was going to be granted access to the full range of the University computer's facilities. Fortunately, the Computer Manager, who was appointed a year after my own arrival, with the task of setting up a Computer Centre, had come from the world of commercial computing and was sympathetic to library and administrative applications of the computer. Not only was he prepared to listen sympathetically to the Library's possible use of the computer but he provided useful advice and guidance, and even found time to accompany me to Southampton University Library for talks with staff involved in library automation there. This was the beginning of a valuable relationship between the Library and the Computer Centre that was to play an important part in the successful inauguration of a programme of library automation. By the time the University's computer was installed, in the middle of 1972, the Computer Manager had assessed

the potential requirements of the Library in relation to the requirements of all the other computer users in the University, and was able to assure me of the sort of access to the computer that the Library would require.

With computer access assured, one final, crucial decision had to be made, and that was whether to start automating the Library immediately or whether to hold back until developments in library automation had produced the perfect standard system. Waiting to acquire such a system seemed unrealistic to me, because the idea that a system can be perfect struck me as being based on a fallacy. As anyone who has ever purchased an item of household equipment will know, there is always a later model which is an improvement on the one you purchased. I was also aware that the longer one delayed automation the greater and more complex would be the work involved later on as library operations, the book stock, and the student population expanded. I was convinced, and the Librarian agreed, that a start on automating the Library should be made at the earliest opportunity. The next step was to establish an automation team. Initially a systems analyst, shared by the Library and Administration, was appointed, and later, as automation plans took shape, a library programmer was also appointed.

Once committed to automation there are two main approaches to be considered. There is the total systems approach, where all the interrelated library operations to be automated are considered together from the outset as parts of an integrated system, and the evolutionary approach, where these various library operations are considered and automated individually with the aim of drawing them together into a total system at a later stage. The written brief I produced for the systems analyst when he arrived in October 1972 was based on the evolutionary approach, with which he was in entire agreement. In chronological order of their introduction, automated systems relating to ordering, periodicals, circulation, and cataloguing were each individually established between 1972 and 1975 and the first step was made towards an integrated system with the development in early 1975 of a certain degree of linking between the ordering, cataloguing and circulation systems.

The radical changes in library organisation made necessary by the introduction of automated techniques can have a traumatic effect on library staff used only to traditional methods of librarianship. Awe, fear, scepticism, downright hostility, are some of the emotions which can be aroused in staff exposed to automation for the first time. Lack of knowledge of automated techniques and their objectives is the basic reason for these types of reaction. With some librarians the reason goes deeper and is more complex. In their case it is based on an instinctive aversion to all things mechanical and a feeling that involvement in the paraphernalia of automation - the punched book cards, bar-coded labels, paper tapes, punch forms, computer print-outs, and technical jargon - are beneath their dignity as librarians. Before launching a programme of automation in a library it is obviously most important to cushion the staff as much as possible from its alarming effects by acquainting them as clearly and simply as possible with its content, aims, and implications. At NUU I attempted to prepare the ground for each new step in the process-by-process development of automation by circulating a series of typed instructions and by organising seminars designed to explain new operations, their objectives, and their beneficial effects. Because I was not satisfied that these methods were entirely satisfactory, I also recently produced a tape-slide guide to the Library's Plessey automated circulation system as an experiment in staff communication and in-service training. I believe that tape-slide guides used for this purpose have great possibilities, and I intend to produce further guides of this sort to cover all the other library operations which have been automated. The task of involving library staff in an extensive programme of library automation would be very much easier if this aspect of librarianship was given more prominence in the curricula of library schools. The development by Southampton University Library and the library school of the Polytechnic of North London of a teaching package designed "to stimulate computer-aided acquisitions, cataloguing, and circulation systems through a series of machine-readable files of book titles, controlled by suites of programs"[1], and the involvement of the Association of British Library and Information Studies Schools in the planning stages of this project, represent an encouraging sign that the education of librarians in the practical techniques of automation is beginning to be taken seriously.

Automating a library is a highly complex and exacting task requiring very careful

[1] *Vine*, no. 11, Nov., 1974, p.15

planning, detailed costing and a microscopic examination of how library processes work. It is *a* task which is not ideally suited to the practice, which has in the past been quite common in academic libraries, of relying on an enthusiastic member of the library staff introducing automated operations with the help and co-operation of members of the local computer centre's staff. This amateur approach is not liable to produce very significant results because the staff involved are only engaged in automated activities as a sideline. The days of the enthusiastic amateur are over. Now that library automation has passed the pioneering stages no librarian in the future ought to contemplate automating his library without being in the position to employ a team of experts. Whether the experts should have been trained in librarianship or in computing has been a matter for considerable debate. The essential point is that the expert trained in the one discipline requires a good knowledge of the other discipline as well. At the present time there are very few experts who measure up to these requirements. It is much easier at the moment to create an automation team divided into two distinct groups, one consisting of systems analysts and programmers and the other consisting of librarians with a special responsibility for automation, under the overall direction of a librarian. Fusion of the groups will occur as they gradually familiarise themselves with each other's particular field of knowledge. There is a strong case for having the two groups housed in the library in order to foster the maximum amount of co-operation between them and to facilitate a continuing dialogue with the rest of the library staff, who need to be consulted and kept informed of developments. In practice it may well be more convenient for the systems analysts and programmers to be housed in the computer centre, where a great deal of their work has to be done and where they will feel more at home. There is the danger of their becoming isolated in such a situation, but as long as they maintain a close liaison with the library-based section of the automation team and vice versa the harmful effects of isolation can be avoided. This is our experience at NUU where, although the Library's systems analyst and programmer are accommodated in permanent offices in the Computer Centre, there is a constant interchange of visits between the two sections of the automation team, with combined meetings usually taking place in the Library. In my opinion, the ideal situation is for all the members of an automation team to be housed in the library, but for the specifically computer-trained members to have, in addition, offices in the Computer Centre so that, while they have the opportunity to become completely at home in a library environment and thoroughly acquainted with library processes and their problems, they can also maintain close contact with the world of the computer and their professional colleagues.

In the development of library automation, keypunches, paper tape typists, and other machine operators play a very important role. The success of an automated system often depends vitally on the quality of the data produced by these machine operators for input to the computer. Accuracy is the key to a high standard of input and this is to a large extent dependent on whether an operator is conscientious and interested in the work. It is my belief that an operator is more likely to be conscientious and properly motivated if, as a vital part of the automation team, this person is accommodated in the library close to the library staff who prepare the source documents from which the input data is punched, and is kept fully informed of the details of the automation programme. The alternative is to have input data punched centrally in the local computer centre by operators employed to handle work of all the departments of an institution. This practice is not to be recommended, because it weakens supervision, reduces control over the work-flow, and produces a purely mechanical and impersonal relationship between the operator and the originator of the source document. I have experience of both the centralized and decentralized methods of organising keyboard operations at NUU. The bulk of our data preparation is performed by three operators (one of whom is part-time) on flexowriters housed in the Library, but a certain amount of data, requiring the use of a keypunch machine, is also punched by operators centrally employed in the Computer Centre. A library has to organise its keyboard operations in the most economical way that available resources will allow but, when circumstances permit, it is best to establish a self-contained data preparation unit within the library and to associate it closely with the automation team, because this helps to create an 'esprit de corps', which is an important element in the development of successful automated operations.

In terms of the staff, equipment, stationery and computer-time required, automating a library is an expensive undertaking. Before embarking on such an undertaking it is obviously desirable to analyse all the costs involved, to compare them with the costs of the manual systems to be replaced and to relate the findings of such factors as efficiency, amount of staff required, time expended, and scope for

expansion. I attempted some analyses of our automation plans along these lines, and the conclusion I drew from them was that, although the introduction of library automation was unlikely to produce any significant savings in costs, it would undoubtedly provide more dependable records and systems which would enable the Library to cope with the increased workloads of the future much more efficiently and with a smaller increase in the total size of the staff than would have been possible in the manual systems, most of which were incapable of any real expansion and adaptation. On the costing side, the most important element was related to the fact that our automation plans envisaged the use of some existing equipment, and involved the development of entirely new systems only in the case of circulation. Our intention was to use the flexowriters that we already possessed for the bulk of our computer input, and to obtain three program packages - Southampton University Library's acquisition system, the ICL MARC handling system, and Loughborough University's periodicals system - all of which, while being neither perfect nor complete, were compatible both with the Library's internal routines and the configuration of the University's computer. It was the fact that this would create significant savings in development costs (especially as the Southampton and ICL packages were free at that time and Loughborough's package cost only £250) which placed our automation plans on a viable financial footing. I believe events have borne this out. In the period sincel our plans were launched, the routines relating to ordering, periodicals, circulation, and cataloguing have all been automated, with heavy expenditure being confined to the purchase of Plessey circulation equipment (for which an earmarked grant from the University Grants Committee was obtained), Plessey equipment maintenance expenses, and the salaries of a programmer and a systems analyst, the costs relating to the latter person being shared with Administration. Although automation costs have been kept within very reasonable bounds at NUU, the effect of automation has probably been to increase marginally the total cost of providing a library service, but it has undoubtedly raised the service to a far higher level than ever existed under the manual systems, in terms of costs and results, I believe the decision to automate was correct, but I would not suggest, on the basis of this belief, that NUU's 'going-it-alone' approach to automation is to be recommended in all circumstances. I have reservations about whether, in the climate of extreme financial stringency that is liable to prevail for years to come, automation should be undertaken by individual libraries, especially the smaller ones, in the future. While my instinctive preference is for the individual approach, I can not deny the logic of those who argue that the best hope for library automation lies in co-operative projects involving shared facilities (like BLCMP and SWULCOP) on the grounds that they will produce the greatest possible savings in terms of finance and other resources.

Entry into the world of library automation is neither simple nor straightforward. The first steps tend to produce problems and disappointing results, and involve the library staff in more rather than less work. Manipulating bibliographical data in the computer presents greater complexities than originally realized. Computer programs fail to run satisfactorily at first and have to be debugged. Equipment breakdowns occur. The library staff have to learn to handle computer print-outs, familiarise themselves with the strange equipment, and generally adapt themselves to a whole series of drastic organizational changes. The early stages of an automation project are undoubtedly fraught with difficulties but, nevertheless, with patience and persistence on the part of the members of the automation team, the project will gradually produce promising results and progress steadily to the point where Ms beneficial effects will become more and more apparent for all, even the sceptics, to see. I believe that this point has been reached at NUU. The acquisitions system is providing a variety of outputs as, for example, lists of books on order, arrivals lists, progress reports, financial statistics, booksellers chasers, lists of standing orders, general statistical analyses, and is capable of providing other types of information, on demand, with very little extra programming. From the Plessey circulation system, installed in October, 1974, are being derived a variety of loan records and statistics, computer-produced recall, overdue, and over-borrowing notices, and automatic monitoring of reservations, the combined effect of which has been to raise circulation routines to a high level of accuracy and efficiency. MARC has been introduced into the cataloguing routines and is enabling us not only to obtain pre-sorted catalogue cards and accessions lists from the Computer Centre's line printer, but also to create a machine readable magnetic tape record of all the Library's currently received books and at the same time to update automatically a short title catalogue, which is being stored in the computer as a back-up file for the circulation system. Automation of routines relating to periodicals has been progressing steadily in respect of the holdings list, a list of titles arranged alphabetically by sponsoring body, a shelf list,

and a subject index listing titles under descriptors. Such a rapid transformation of all the Library's major 'housekeeping' routines could only have been achieved with the highly professional expertise of our systems analyst and his programmer, both of whom adapted themselves with impressive competence to the unfamiliar world of librarianship and liaised with the library staff with immense patience and understanding. In the final analysis, the successful development of library automation is very dependent on the attitude of those members of the library staff who have been exposed to its disturbing effects for the first time. What success has been achieved so far at NUU can be attributed in great measure to the spirit of forbearance and co-operation shown by its library staff during a period of intense upheaval.

As I am often to be seen these days clutching a computer print-out in one hand and a punched paper tape in the other, peering with a worried look at a piece of Plessey equipment, or tinkering with a flexowriter, my colleagues could be forgiven for judging me to be oblivious to the human side of librarianship. Nothing could be further from the truth. I am basically more interested in the human aspects of librarianship than anything else. It has long been my belief that librarians in academic libraries spend far too much time on routine operations and far too little time on exploiting the stock for the benefit of the readers. The experienced librarian should be spending a far greater proportion of his time right out in the centre of the library, seated at the reader's advisory desk where readers can consult him, and in the seminar room teaching readers to conduct a literature search. He should be spending more time producing bibliographical lists for readers, providing current awareness services, assessing and improving the relevance of the stock in relation to the user's needs, organizing exhibitions of books, and generally thinking of ways of creating a better library service. In my opinion, little progress in this direction can be achieved while manual library operations have such a stranglehold on the librarian's time and on his power for creative thinking. For me, library automation is, above all, the means by which the librarian can be released from this stranglehold, which has paralysed librarianship for so long, and be afforded the necessary time and facilities to provide a much more positive service to readers.