Adaptation of Machines to Book Charging

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Records of books on loan from a library are essentially simple, consisting of an identification of the book, the borrower, the date borrowed and the date due, and in large systems the unit from which borrowed. Compared to the number of transactions recorded in other fields they bulk quite large. The inherent simplicity of the record and the low cost of hand maintenance limits the need and opportunity for mechanical operations. Only in the past quarter century has there been a significant trend toward mechanization of charging methods. The earlier experiments and discussions had centered on the definition of purposes of circulation records; answers have never been found to satisfy all librarians.

Prior to 1876, when the formation of the American Library Association gave a forum for discussion, each library followed its own methods with little opportunity for exchange of ideas. Actually, the size of libraries and the volume of circulation were so small that in many libraries the most informal systems would suffice. Some librarians treated their loans in the manner of accounts using double entry bookkeeping systems, others preferred a single entry system, while still others used only blank slips of paper on which were noted the books issued to a borrower. There was, however, much objection to any record system not kept in a book, the same objection raised by accountants of the time. The danger of loss, theft, or misplacement of a separate piece of paper weighed more heavily in the library mind than the convenience, speed and flexibility of a slip record.

From 1876 forward, the Library Journal gave an opportunity for the exchange of ideas, and during its first years of existence, many articles and letters appeared in discussion of circulation record systems. In fact the quarter-century from 1876 to 1900 might be described as a period of experimentation and cross fertilization of ideas. As this interchange progressed, there began the quest for a "perfect" system. In 1880 Jacob Schwartz described as perfect a system which would

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show: (1) where every book is that is absent from the shelf; how often every book has been issued, and the character of each day's issue; (2) the number of books taken out by each reader, with dates of issue and return, and should provide the reader with indication of dates due and with receipts for return of books; (3) the number of books issued each day, and the books overdue each day, so that notices may be sent.

Perhaps in the minds of many librarians this perfect system was represented by counterparts in accounting: a journal or daybook recording transactions in sequence, a ledger recording books issued to each borrower, and a ledger recording the borrowers of each book. Even with small circulations, this "ideal" system was difficult to maintain; aside from the cost, it entailed waiting by borrowers to have their loans recorded.

It was only a natural development to combine features of the slip systems and the ledger systems to form card systems. Many card systems were originally merely separate ledger sheets similar to those previously used in bound volumes. One early card system consisted of a file of cards for each volume, kept in book number sequence until a volume was issued when the card was transferred to a date file.

The importance attached to limiting the number of books which a borrower might have at one time hampered the development of an expeditious system. The borrower ledger was in time transferred to the borrower's custody in the form of the borrower's card on which was recorded the books on loan. The filing and finding time of maintaining the borrower ledger was eliminated, and the borrower was provided a record of his loans and a receipt for their return. But the system was slow both in the issue and in the return of a book.

One system proposed in 1895 by Nina E. Brown, Librarian of the Library Bureau, and which was rather widely adopted in the next five years, employed a borrower envelope (or pocket) rather than a card. In this system each borrower was issued the number of envelopes (or pockets) equal to the number of volumes he could have on loan at one time. To issue a book, the library attendant inserted the book card into the envelope of the borrower; the card projected above the top of the envelope and could be filed by call number behind a date guide. There was thus no writing of borrower number on the book card nor of book number on the borrower card; there was adequate date and borrower control, and fair book control.

By 1900 librarians seem to have found satisfactory substitutes for the perfect system. About that time the Newark system was unveiled,
and in time it became the standard for public libraries. A single book card, now standardized at three inches by five inches, and capable of recording some fifty loans, was the basis. Cards for books on the shelf were kept in the book pocket; for books on loan in files by call number under each due date. Each borrower also carried a card of the same size. Each transaction was recorded by a library attendant’s writing the borrower’s registration number on the next line of the book card; by stamping the date due on the same line of the book card, on the next blank line of a date due slip in the book, and on the next blank line of the borrower's card. Cancellation of the charge was effected by stamping the return date opposite the due date on the borrower’s card in the book pocket, and by returning the book card from the file to the book.

All superfluous information had been eliminated from previous systems. Date control was effectively achieved; borrower control was good, even if subject to some error; and book control fair, requiring search through some fifteen separate files to locate any specific item.

In college and university libraries, where better book control was considered essential, and where closed stacks were the rule, a double charge system became the standard at about the same time. A book card filed by call number, and a call slip filed by date constituted the record.

During this experimental period the contest between bound volume circulation records and slip or card records had been decided, but the contest had not been limited to these two systems alone. Some, which were tried and stoutly defended, appear to us now as odd and even inconceivable. One type proposed and used mostly in England was known as the Indicator system, of which there were numerous adaptations. One of the most interesting, perhaps, was the Leeds Indicator, which involved use of banks of very small pigeon holes, one-third inch high by two and three-fourths inches wide, and three inches deep. The front of this unit was covered by a glass door, and was similar to post office boxes. Each book in the library was assigned a separate pigeon hole; each borrower carried a card which entitled him to one book at a time. When a book was issued, his card was inserted into the pigeon hole for that book. Thus safe from pilferage through the glass, the record of the book was visible to the library attendant. And to other borrowers too, who did not need to ask the librarian if the book was in!

In another indicator system, the shelf-list was on shipping tags, strung on a wire above the charging desk. Each tag was also im-
printed with consecutive numbers from one to ten; when a book was issued the lowest odd number was punched out with a conductor's punch; when returned, the lowest even number. Thus the library attendant and the customer could consult the "tag indicator" with ease.

Even in 1880 the daybook record had long since given way to the ledger because it became increasingly difficult with larger circulations to find the original entry for cancellation when the book was returned. Although the idea was to lie dormant for another half-century, a significant contribution using the daybook system was made in 1886 by W. K. Stetson. In this system each loan was recorded in sequence in a daybook, each page and line of which was numbered. At the time of issue this number was written on the borrower's card which was inserted in the book, thus providing an index to the record to facilitate cancellation at the time of return.

After 1900 charging procedures receded from the focus of attention for a quarter-century; but changing conditions, especially the increase in size of libraries and library circulation, eventually led to concern with the cost of circulation records. These first rumblings did not involve mechanization, but reflected the trend in grocery stores to self-service. The Detroit Self-Charge system, introduced in 1929, was essentially the Newark system with the borrower writing his own number on the book card, and was a reaction against mechanization. Incidentally, the borrower card was reduced to the status of identification card and the limit on number of books to a borrower disappeared.

It was only at this point that the mechanization of charging books began. The Dickman book charging machine, first used in 1927 in the Washington, D.C., Public Library, made possible the mechanical imprinting of borrower number and date due on the book card. Otherwise the Newark or Detroit system was left untouched. An improvement occurred in 1931 in the Gaylord machine, which accomplished the same end but more readily. With the Dickman machine the card had to be hand placed, so that imprinting would occur in the next blank position; with the Gaylord machine this became automatic.

There was extensive adoption of these machines in public libraries, but only a scant reception in college libraries. The necessity of a double charge limited the advantages of the machines over the system already in use. The first change of significance in college and university library methods was in the adoption of a punched card call slip at the University of Texas in 1936. With punched card machines it
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became possible to maintain, with a single card file, control by book, borrower, and date. According to Helen Coer, this was the first record of a library's achieving multi-dimensional control from a single record.

This system was soon followed by similar adaptations using other mechanical devices. A McBee Keysort system, using marginal notched cards, was introduced at Harvard University in 1938. A tab card system at North Carolina Women's College in 1939 achieved date control by use of vari-colored call cards, with tabs in different positions to indicate dates due. Home made adaptation of the marginal punched card have been installed in a number of institutions.

The next step in mechanization occurred in 1940 when photo-charging was introduced in the Cary Public Library. In this system, of which a number of variations developed, the record of the loan consisting of a transaction number, the book identification, and the borrower identification is photographed on a roll of film or paper. A numbered transaction card placed in the book is the index to the record which permits easy cancellation of the record. Basically, this procedure is simply a mechanization of the indexed daybook system introduced by Stetson in 1886, with a roll of film replacing the handwritten daybook. Library thinking on the purpose of charge records had gone full circle; book and borrower controls were dropped.

Having accepted the limitations of the system as immaterial, other librarians began making adaptations and improvements. First, a library used the call slip instead of the photographed record; then other libraries experimented with audio charge, using an office dictating machine instead of a camera. A machine was developed for making the photographic record in reduced size, yet readable without enlargement.

The next step was, quite naturally, the use of punched cards for the numbered transaction cards. By this means the photographed or audio record of the loan was indexed for mechanical arrangement, cancellation of returned loans, and identification of overdue loans.

If there has been a trend in this second great period of experimentation, it has been to a punched, notched, or tabbed call slip (actually a card) in college and university libraries, and to a transaction card (with photo, audio, or hand-written record) in public libraries. Neither of these systems is yet the "perfect" system. With punched call cards, there is relatively adequate control on all three facets; but the preparation and cancellation of the record are far from automatic. The transaction card system, with punched transaction cards, is as nearly com-
pletely automatic as can be conceived at present. The record is mechanically made, there is no filing, the cancellation of the record is completely mechanized. But control of borrower and book is entirely abandoned.

A system, which combines the complete control envisaged in the "perfect" system, with completely mechanized preparation and cancellation of the record, has never been offered to the public, but a trial installation made in the Montclair Public Library in 1941 is still in use. For two reasons it will probably never be widely used: first, the expense involved in the preparation of a punched identification card for each book; and second, the fact that it is feasible only in large units, and not in small branches.

While the Montclair system may never be extended, there is no reason to believe that further automation will not take place. A new piece of equipment, known as the Transceiver, may make possible recording of loans in a central office from any lending unit in a library on perforated or magnetic tape. Random access electronic machines, which eliminate the need for arrangement of records to obtain control of any element (such as the number of books on loan to any borrower), are already in existence and are capable of more automation of charging procedures than can be readily conceived. But use of them for this purpose would be like sending a jet-powered strato-cruiser to deliver a prescription across town. Even the smallest of the general purpose computers now available cost in the neighborhood of $25,000 per year in rental, not including the personnel to operate it.

In this, as in so many other cases, libraries must await the construction of machines for other purposes which will be adaptable to circulation uses. The day may well come, however, when new machines will provide the perfect charging system: economical, complete, and without delays.

References

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