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Charging Machines

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COMPARATIVELY SPEAKING, the development of the use of charging machines in libraries has been a slow process. It took many years before librarians themselves were aware of the possibilities of their use in circulation procedures, although in some instances, especially in the college and university field, many office routines in these institutions had been mechanized with satisfactory results. It was only when library administrators realized that machines could not only speed up the charging process and reduce some of the clerical work involved, but also pay for themselves through the resultant saving in staff time and salaries that they began to experiment seriously with their use. This in turn has led equipment manufacturers to develop charging machines which have met at least some of the requirements laid down by librarians.

Although it was not until the late 1920's that any charging machine was put on the market, it is interesting to note that librarians began to explore the possibilities of mechanized circulation procedures as early as 1900. It was in this year that E. W. Gaillard of the New York Public Library constructed a machine for this purpose at a cost of $3,500, but it proved to be unsuitable.[1] The mechanization of charging routines seemed to be almost forgotten after the failure of this experiment, probably due to the introduction in public libraries of the Newark system of book charging which, because of its simpler routines, was a marked improvement over the Browne system generally found in libraries prior to this time.

However, in the late 1920's G. F. Bowerman, librarian of the District of Columbia Public Library, appealed to the U.S. Bureau of Efficiency for assistance in finding a machine, simply constructed and operated, and low enough in cost to be of use to both small and large public libraries. Various companies submitted models, but it was not until 1927 that the Dickman Book Charger, manufactured by the Library

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Efficiency Corporation was chosen as the one which met all specifications, including a reasonable operational cost. This is a manually operated machine which stamps on the book card the date from a special plate inserted in one side and the borrower's number from the borrower's number plate attached to his card, placed in the other side of the machine. Many large public libraries installed the Dickman Book Charger and found it to be satisfactory for circulation procedures, especially since none of the routines involved in the Newark or Detroit self charging systems, then in use, needed to be changed.[2] Despite the inconvenience caused by the fact that adoption of the new system required the reregistering of all borrowers, since each had to be provided with the new borrower's card equipped with the number plate, librarians and patrons alike felt that libraries were now being run more efficiently. The machine, which was simple to operate, produced accurate, legible records, saved staff time and supply costs, and suggested to administrators the possibility of further separating clerical from professional duties, thus making available more time for the librarian to give advisory help to library patrons. This last factor is of course, a primary advantage of all good machines.

Although the Dickman Book Charger was used in many large public library systems in the 1930's, it is not in general use today. In 1941 the company which manufactured it, brought out an electrically operated machine,[3] which did not prove to be completely satisfactory, however, and the company itself did not recommend it unqualifiedly. It is quite possible that the Library Efficiency Corporation, now a division of Bro-Dart Industries, will eventually bring out a satisfactory electrical model of the Dickman Book Charger.

The first electrically operated machine used in circulation procedures was the Gaylord Electric-Automatic Book-Charger. This machine, was introduced in both public and college libraries in 1932. Like the Dickman Book Charger, it performs the same routines formerly done by the desk assistant in the Newark charging system, thus making it simple for any library to install. As with the Dickman machine, reregistration of borrowers is necessary because of the special borrower's card equipped with a metal plate embossed with the registration number. Date plates indicating the loan period are also necessary with this machine. The Gaylord machine, which is simple to operate, contains a slot into which the borrower's card is placed, and a chute into which the book card is pushed for recording the transaction. With this procedure the date due and the borrower's number are printed automatically on the book card.[4]

The Gaylord machine offers many advantages to both college and public libraries where it has been widely installed during the past twenty-four years. The accurate and legible records it produces, the simplicity of its operation, the saving in time and supplies, its adaptability to various sizes and types of library, its relatively low cost, and the ease with which it can be installed without changing basic routines, have made the Gaylord charging machine particularly satisfactory for small and medium sized libraries.

The next major development in the field of mechanical charging systems occurred with the introduction of the photographic charger. Its importance lies in the fact that it opened up an entirely new concept of machine charging and the use of a numbered transaction card which served simultaneously as a date due card. By filing these cards by number, after the books in which they have been placed are returned, it is easy to ascertain from the missing numbers which books are overdue. Many charging systems subsequently developed, some of which use machines, have been based on the photographic system.

The idea of using microfilm and photographic paper on which to record each charging transaction was conceived by R. R. Shaw while he was librarian at the Gary Public Library. His first experiment for this purpose was carried on with the Recordak Junior Microfilmer, a product of the Recordak Corporation. This was in 1940. Seven years later, Shaw, who has long been interested in the use of machines for the improvement and simplification of library routines, with the help of the Library Bureau Division of the Remington Rand Corporation, developed the Remington Rand Photocharger which uses photographic paper rather than microfilm on which to record the transaction.[5] Remington Rand has also another machine, called the Film-a-Record, which could be used for circulation purposes, although it has not been adopted as yet by any library.

Recently another photographic machine, using microfilm, has been developed by the Flofilm Division of Diebold, Incorporated, of Norwalk, Connecticut. This machine is known as the Diebold Portable Microfilm Camera and is beginning to be used in public libraries for charging operations.

The Remington Rand Photocharger and the Recordak Junior Microfilmer operate in much the same way. Briefly, the borrower's identification card, the book card, and a prenumbered and predated transaction card, are placed on the copying stage of the machine. When the switch is closed, the complete record is made on either the photographic paper [6] or microfilm [7,8] depending on the machine used. The

Diebold Portable Microfilm Camera, a small, compact machine, operates somewhat differently. Instead of placing the borrower's identification card, book card, and prenumbered and predated transaction card on a copying stage, these three items are pushed through the microfilm area of the machine until they emerge into a collection tray at the rear.[9]

As libraries gained experience in the use of these photographic chargers, they developed means for simplifying the routines and making the whole operation smoother. Serially numbered punched cards are used frequently with these machines, although a hand numbered 3″ x 5″ card can also be used. Visible records of one sort or another have helped to handle reserves, always a problem in any transaction card charging system.

In general, photographic charging machines give a complete and permanent record of all books withdrawn from the library. Savings in operations, records, and supplies are effected and the charging and discharging procedures are faster and more accurate as compared with the older type of manual charging methods. The installation of these machines is fairly simple and is accomplished without major changes in supplies. The disadvantages connected with this type of machine are, for the most part, only those that are present in any system using a transaction card for a date due card, such as difficulty in handling reserves and inventory procedures.

Each of the three machines described—Remington Rand Photocharger, Recordak Junior Microfilmer, and Diebold Portable Microfilm Camera—present advantages and disadvantages, which should be weighed carefully by librarians who are considering the purchase of this kind of equipment.[10] The Remington Rand Photocharger, for instance, requires no reading machine, as do the Diebold and Recordak. Although the latter has a built-in reader, most large libraries feel that a second reader is necessary since the first machine is too constantly in use. Changing the film in the Diebold charger is a simple procedure, but more complicated in the other two. Because of its size, the Recordak is felt to place a barrier between the library assistant and the patron, whereas the smaller Remington Rand Photocharger and particularly the Diebold machine are less likely to create this public relations problem. The charging routines are easy to handle in the Recordak and Photocharger, but are apt to be slower with the Diebold machine when a borrower withdraws more than one book. The expense of photographic book chargers is another item to be considered. The Recordak can be rented and a purchase-lease arrange-

ment can be made with Remington Rand, but the Diebold camera and microfilm reader must be purchased. However, its price is not exorbitant.

The Recordak and Photocharger have been used quite extensively in public libraries, whereas the College of Steubenville Library is the only college library which has used a photographic charging machine to date. The Diebold machine, being comparatively new, is perhaps still in the experimental stage so far as libraries are concerned, although installations are constantly being reported.

Closely related to the photographic book charging machine is the Audiocharge, which uses standard office dictating machines. From experiments made in 1948 by S. W. Smith in the St. Louis County Public Library, it was found that of all the dictating machines and tape recorders on the market, the Soundscriber and Gray Audiograph were best suited to the making of charging records.

The charging procedure involved is much the same as with other systems using transaction cards for date-due cards, except that the record of the charge is audible rather than visible. The transaction card number, author and title of the book, and classification number, accession number or copy number, and the reader's name and address, taken from the borrower's card, are dictated into a microphone and recorded on the disc which has been placed on the machine.[11] Special playback equipment is available, thus eliminating any processing of the recording medium for carrying out overdue routines. Each disc can be used several times by having it reprocessed.

Librarians have found the audio-charging machines particularly useful on bookmobiles where they can be operated by means of an inverter with 6 volt electric power systems. On the whole, however, Audio-Chargers have not been popular in libraries, although reports show they are used in some small and medium sized ones.

Another important development in charging machines took place in 1940 when the Montclair, New Jersey Public Library in cooperation with the International Business Machines Corporation installed four IBM machines for the purpose of experimenting with automatic book charging equipment involving the use of punched cards. The experiment has worked exceedingly well in the main library, but the company is still attempting to develop a low cost unit card with smaller capacity for use in branches before putting this system on the market.[12]

The main piece of equipment used in this system is a record control unit, which consists of two slots for the insertion of the punched book card and the punched borrower's identification card, and a keyboard,

which resembles a cash register, wired to a punching machine. When the punched book and borrower's identification cards have been put in the appropriate slots of the record control unit, a key on the keyboard is depressed, thus releasing an electric current which flows through the holes in the cards and is transmitted to the punching unit in order to produce another punched card. This second card gives data from the book and borrower's cards and any other information needed, such as branch from which issued, assistant, date of issue and due date, and the serial number of the transaction. Other phases in the control of the circulation procedures are also mechanized and can be performed by specially trained assistants.

When books are discharged, a return card is reproduced by inserting the book card into the record control unit and depressing a key to indicate the type of transaction. With sorting machines and a collator, the transaction cards are sorted by call number and matched against the basic file of charges; the return card makes it possible for the original card to be pulled from the file; and new loan cards are merged with the basic file. Thus the following new files result: a new and up-to-date file of books on loan; a file of return cards; and a file of loan cards matching these return cards.

Various kinds of information can be ascertained by sorting and resorting the return cards and the displaced loan cards—such as statistical data, control of fines and charges, and conducting of circulation studies. A punched tracer card can be made for handling reserves.[13] This automatic book charging equipment, as worked out by the International Business Machines and the Montclair Public Library, presents many possibilities in circulation procedures.

Out of this experiment at Montclair, the International Business Machines Corporation, in cooperation with the Detroit Public Library and the Stockton and San Joaquin County (California) Free Library, developed a simpler method for charging out books with IBM machines. This is known as the IBM Circulation Control System.[14] A time stamping machine is used for stamping the transaction number, date due, and name and number of the branch issuing the book on a loan slip previously filled out by the borrower. The transaction cards are sorted and filed by branch name or number in a card sorter. By using a master deck of numbered cards, the collator can sort out the transaction cards that represent overdue books. A reproduction punch is used for punching new cards and a card interpreter for translating into print the information punched on the cards.

Much the same IBM equipment, with the addition of the Alphabetic

Duplicating Key Punch, are found in large college and university libraries using punched transaction and call cards. The same procedures for sorting as described above are used with the collator and sorter. Date due and special charges are first punched on a pattern card by the Alphabetic Duplicating Key Punch and can then be duplicated on all call cards.

Except in the case of the time stamping machine, assistants must be specially trained to run these machines. This IBM equipment, however, can do many routines, such as filing and sorting, formerly done by hand, and produce many kinds of information which formerly took many hours of study and handling of cards.

IBM equipment utilizing punched cards is best suited to large university libraries which necessarily have large circulations. The endless possibilities for punching various types of information on the cards and the sharing of these machines with other departments of the institution have made it possible for many university libraries to purchase this expensive equipment. In the public library field, probably in only the very large institutions could the purchase of these machines be justified. However, it is possible for the routines done on the expensive machines to be performed at a local IBM office. It is interesting to note that the two public libraries in which IBM equipment is used—Detroit and Stockton—vary greatly in size of circulation, but can still use the same machines for charging procedures. Detroit circulates over four million books per year, whereas Stockton lends approximately six hundred thousand in the same period.

The McBee Keysort system is another punched card system applied by college and university libraries to circulation procedures. A hand-slotting punch or foot groover is used to punch date due and special charges on McBee Keysort call cards and book cards. McBee Keysort punched cards are sorted by means of a special sorting needle, called a "tumbler." The Selective Sorter, holding one or more needles, can be used for the same process, by selecting one or more classifications from a group of marginal punched cards.[15] The cost of McBee equipment and supplies is relatively low as compared to IBM machines. The equipment consists of a punch and a sorting needle; maintenance costs are negligible, and no trained personnel is needed. Reports show that an increasing number of college and university libraries are using McBee equipment with punched cards for circulation procedures.

Mention should be made of the innumerable punches, numbering machines and miscellaneous items that can be used either in addition to the machines mentioned or in place of them. These are used

especially in connection with punched cards and can simplify and perform more quickly the routines involved in the various charging systems. For instance, an alignment block is helpful in sorting McBee Keysort cards with a needle; a film rewind device is available for use in connection with the Remington Rand Photocharger; numbering machines similar to the kind used for accessioning purposes will facilitate procedures; and a hand punch is a convenient tool for punching McBee Keysort cards.

Of interest among machines applicable to circulation routines is also the Photoclerk, which is a copying machine designed by Shaw and built by the Remington Rand Corporation. Based on the principles involved in the Photocharger, this machine, as it was used in the libraries cooperating in an experiment from 1950 to 1952, was found to cut costs considerably in many circulation routines. Of particular interest were those in which the Photoclerk was used to prepare over-due notices, and in handling special charges and interlibrary loan requests.[16]

Within the past year three companies have experimented with still different types of machines. The Addressograph-Multigraph Corporation of Cleveland has been investigating the possibility of adapting the credit plate, as used in department stores with charge accounts, to library circulation procedures. This company now has available the Bookamatic charging system, which uses a plastic book card embossed with the name of the author, title and classification number, a plastic borrower's identification card embossed with his name and address, and a charge imprinter, a machine similar to that used in department stores but having a larger printing area. The plastic book and borrower's cards, which have the added feature of being permanent, are embossed in the Graphotype machine, manufactured by the Addresso-graph-Multigraph Company. The keyboard on this machine is that of a standard typewriter, with the usual space bar, and operates in the same way. When a key is pressed, the embossing is accomplished automatically by electric power. The company installed the Booka-matic charging system in the Midland, Michigan Public Library as a pilot project during the summer of 1956.[17]

In the operation of this system a punched date due card and "expendable" transaction cards, numbered consecutively are used. When a book is charged out, the plastic embossed book card is placed in the imprinter space with the borrower's plastic embossed identification card above it. The date due and transaction cards are pulled from the file. The latter is placed over the two cards already on the

imprinter and by pushing the handle of the machine down, the author, title and classification number of the book, and the name and address of the borrower are printed on the transaction card. The transaction card, which later serves as an overdue notice to be inserted in a window envelope, is turned over for printing on the other side. The plastic book card and punched date due card are placed in the book pocket; and the identification card is returned to the borrower, thus ending the charging out process.

Particularly good features of this new equipment are the compact, sturdy construction of the machine, the simplicity of its operation, and the convenience of using the transaction card as an overdue notice and its top portion as a means of locating the charge in the circulation file. Altogether, the Bookamatic charging machine appears to hold considerable promise for all sizes and types of libraries.

At the American Library Association conference in 1956, the Bro-Dart Industries showed for the first time another type of machine to be used for circulation purposes. This machine, now called "Brodac," uses a special heat and infra-red sensitive paper on which the transaction is printed. Additional copies of this transaction also can be made on the machine. This machine is still in the experimental stage, but the company hopes to have it available for sale or rental during the early part of 1957.

During 1955, the Telecomputing Corporation of Burbank, California, experimented with the idea of using some of their punched tape recording devices for circulation procedures.[18] However, the operation seemed both complicated and costly, and recent word from this company indicates that the equipment is no longer available for this purpose and that the experiment has been abandoned.[19]

In tracing the development of charging machines as used in libraries, certain factors and trends stand out as being significant. From the very beginning, the use of these machines was based on the desire to relieve the librarian of necessary clerical duties at the circulation desk, to simplify the routines involved, and to make library operations generally more efficient. The mechanization of charging procedures came at a time when the emphasis on library services was shifting rapidly from those that were essentially clerical and routine in character to those making fuller use of the professional and scholarly skills of librarianship. This shift in emphasis, therefore, played an important part in the mechanization of various routine library operations of which the application of machines to circulation processes is an outstanding example.

Charging Machines

Five charging machines stand out as being particularly significant in the general development of the mechanization of circulation procedures: The Dickman Book Charger, Gaylord Electric-Automatic Book Charging Machine, Photographic Charging Machines (Recordak and Remington Rand Photocharger), IBM Charging Equipment, and the Bookamatic. The Dickman Book Charger, was the pioneer in the field and was popular in many large public library systems, but is seldom seen in libraries today. The Gaylord Electric-Automatic Book Charging Machine was also a pioneer, since it was the first to be operated with electricity. Without necessitating any change in the supplies used in the Newark system, this machine was able to take over circulation routines formerly performed by the desk attendant and has done so successfully in many libraries since its initial introduction in 1932.

Photographic charging machines opened up an entirely new concept for performing circulation routines. With these machines, a file of serially numbered date due cards, serving as transaction cards, were substituted for the file of book cards, arranged by the date due. Making use of this novel idea, a number of manufacturers have developed photographic chargers which are being increasingly used by both college and public libraries in the mechanization of their circulation processes.

IBM equipment, as used in the Montclair, Detroit, and Stockton public library systems, and in some college and university libraries, is of significance in the over-all development of charging machines. Of particular importance are the almost unlimited possibilities for punching all sorts of useful information into the cards used with the machines, and the speed with which the cards can be sorted into various categories. International Business Machines have helped considerably in saving many hours formerly spent in filing and refiling manually the numerous cards comprising large circulation files.

And finally, the Bookamatic, the newest development in the field, is of special importance because of its potential usefulness in all sizes and types of libraries—public, college, school, and special. It is one of the simplest to operate and could be used cooperatively by various offices of the same institution as well as in business establishments of the community. A single charge plate issued to a resident for use at both the library and a local department store, or such a plate issued to a high school or college student which could be used for registration and identification purposes as well as for the withdrawal of books from his public, school, or college library, is not outside the realm of possibilities.

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All of the developments mentioned in this article have come within the past thirty years. What more is there to be done in further mechanizing circulation routines or perhaps in improving the machines already in existence? What new charging machines will be developed within the next decade or so?

There are still many problems relating to charging methods for which librarians and manufacturers have not yet found the answers. How can photographic charging be adapted to college and university libraries? Shaw has suggested that the Remington Rand Photocharger can be used effectively in scholarly libraries which first send call slips to the stacks before a search for the desired books are made in the charge files at the loan desk.[20] H. G. Bousfield recommends that college and university librarians should give more thought to the use of transaction cards and to consider even giving up the standard circulation file,[21] which offers the principal obstacle to the use of photographic charging in college libraries.

Can anything be done to handle more easily the reserved book problem in libraries using transaction cards? A number of schemes are now being used, but the failure to find a completely satisfactory solution to this problem continues to be a drawback of all transaction card systems, although many librarians deny its importance.

A welcome improvement on the Gaylord charger would be an automatic counter which would reveal at a glance the total number of books charged out, eliminating thereby the tedious and time consuming special counting of the day's circulation. Another need often suggested is the use of an embossed plate, attached to the borrower's card, giving the name and address of the borrower instead of just his number. The Addressograph-Multigraph Corporation's Bookamatic is already using such a plate. If the Gaylord and Dickman machines could be adapted so as to use an embossed borrower's plate the handling of overdues could be greatly facilitated.

Could the size of the Recordak machine be reduced so as to help minimize the public relations problem sometimes pointed out by librarians? How soon can the IBM equipment as set up in the Montclair Public Library be perfected and made available to libraries generally? Can tape recording devices, perhaps as suggested by the Telecomputing Corporation, be developed for circulation procedures? These are some of the questions which are often asked or come to mind as one thinks about further developments in the mechanization of circulation procedures. The answers will be found through the cooperative efforts of librarians and manufacturers.

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