A LOCAL MARC PROJECT: THE GEORGIA TECH LIBRARY

The final report on the MARC II format describes the MARC Project as follows:

The MARC (Machine-Readable Cataloging) Pilot Project was an experiment to test the feasibility of distributing Library of Congress cataloging in machine-readable form to a variety of users. This project grew out of the conviction of many librarians that automation was becoming necessary if libraries were to keep up with the rising tide of new materials and the mounting demand for rapid information. Although there were other library procedures which stood to profit from mechanization, it was felt that devising a method of recording bibliographical information in machine-readable form was basic to the solution of other problems. . . .

Essential to such an exchange of data is a standardized "communications format." It is recognized that each institution may have an individualized local format tailored to its own needs. Many kinds of machines will probably be used. But if an institution is to send or receive data, only a single translation program should be necessary to convert the local format from or to the communications format.1

Distribution of MARC tapes began in November 1966. The pilot project phase ended officially in June 1967, but since that time the Library of Congress has continued distribution of tapes to the participating libraries. These libraries have written reports on their experiences in the pilot project and these reports have been published by the Library of Congress as a part of the final report on the MARC Pilot Project.

The Information Systems Office at LC has designed a new MARC II format based on the experience gained in the MARC Pilot Project and
continued study and consultation. A report on the MARC II format and an announcement about the services to be offered on a subscription basis should be released soon. It is expected that the subscription service will begin about October 1968.

The Price Gilbert Memorial Library at the Georgia Institute of Technology was one of the sixteen libraries selected for participation in the Pilot Project. I will describe our use of the MARC records as one input to a catalog production system at the Georgia Tech Library.

ENVIRONMENT OF THE SYSTEM

The Georgia Institute of Technology offers no degrees in the humanities or social sciences. Restriction of the curriculum to courses in science and technology, except for a few survey and introductory courses, is reflected in the holdings of the Price Gilbert Memorial Library and in the Library's data processing requirements. Serials are used to a greater extent in our Library than in many others, and they present numerous processing problems. The Library currently receives over ten thousand serials, about 75 percent of which are in scientific and technical fields. We have produced a computer printed and maintained list of our serial holdings, and we think this list will eventually replace our serials catalog in card form. We are delaying work on a more comprehensive serials system until the National Serials Data Program is developed. The experience of other libraries with serials check-in systems has discouraged us from proceeding at this time with a comprehensive serials system. We are hoping that by the time we begin work on a serials system we will be able to incorporate an on-line file that will be updated from a visual display console.

Our Library is usually well filled with students, faculty, and research personnel, and in-library use is high. The circulation of books for use outside the Library is, however, relatively small and presents no great problem. The acquisition and cataloging of monographs is the most time-consuming of the tasks suited to automation. Currently, seven librarians and nine clerks are assigned to these activities. In the last fiscal year 8,000 titles were cataloged. During the first three quarters of this fiscal year about 10,000 titles have been cataloged.

In planning our system for catalog production we have made several assumptions about the needs of our users. First, we have assumed that while the ability to use the catalog to locate items by various subject and added entries is as important to our users as to the users of other libraries, many of the fine points of descriptive cataloging are of no interest. Consequently we are using somewhat abbreviated descriptive cataloging in our book catalog. Most of the notes which LC uses do not appear in our book catalog, and the collation is abbreviated for many titles. We expect that the infrequent user who does need the full descriptive cataloging will be able to find it in the published National Union Catalog. On the other hand, each entry is complete enough that the user can, in most cases, get all the information in which he is interested rather than needing to refer to the main entry. This seems particularly desirable in the subject catalog, which the typical patron uses not to determine the call number of a specific book, but to select a book or books
from those which the library has on a subject. The entry should be complete enough to permit a reasonable selection to be made.

We have also assumed that the use of an all-upper-case character set without diacritical marks will not inconvenience our users. Many of the filing complexities which computers can handle least well are not significant problems in our case, because we have relatively few entries under prolific authors or headings such as "Bible." Filing in our card catalog has always been done according to rules that include fewer exceptions to alphabetical order than either ALA or LC filing rules. Almost all of our faculty members and students are computer users and are familiar with computer sorting. I believe that they will find items more easily in our computer-filed book catalog than they would in a catalog filed by normal library filing rules, with all their exceptions to alphabetical order.

In deciding to produce an experimental book catalog we were aware that several academic libraries have reached the conclusion that it is not economically feasible. We are not planning to continue cumulating and reprinting our book catalog indefinitely. We plan to cumulate and reprint annually for five years. The fifth cumulation will be a permanent edition and will not be reprinted. We will then begin another five-year cycle. Recataloging and withdrawal of titles after the five-year cumulation is printed will present some difficulties. If we decide to continue the book catalog and to discontinue our card catalog, we will very likely retain either a card shelflist or an on-line master file with real-time access through a remote terminal. We will not discontinue the card catalog unless we become convinced that we can provide better service by using the book catalog.

We began conversion from the Dewey Decimal classification to the Library of Congress classification on July 1, 1966. We are keypunching records for those titles classified by the LC system which did not go through our Flexowriter or MARC systems. Hence our book catalog will include entries for all our LC collection. As titles are reclassified, we produce new cards through our Flexowriter system rather than altering the old cards. This provides the input to add the reclassified titles to our master file and book catalogs. We project that by July, 1971, after five years of LC classification, we will have about 70,000 titles in our master file and book catalogs. If staff is provided for a reclassification project, this would greatly increase the total. We hope that since our users are usually interested in the latest materials on a subject, they will not find it inconvenient to have the catalog divided by date of acquisition, into five year blocks.

Until July 1966, a duplicate catalog was maintained for the science/technology materials on the third and fourth floors, in addition to the main catalog on the first floor. With the beginning of construction of a new building and our shift to the LC classification, we discontinued duplicate catalog listing of the materials classified in the Dewey 500's and 600's. The new building and the shift to LC classification required a rearrangement of materials, so that the duplicate catalog was no longer needed. We will occupy our new building addition, which is larger than the present building in the fall of 1968. The addition has seven floors with provision for adding five more floors. With five floors in one part of the building and eventually twelve in
the other part, we feel that the convenience of having more than a single complete catalog will be greater than ever.

The Tech campus until recently has been a compact area with no academic buildings located more than a block or two from the Library. In this situation there has been little pressure for decentralization of the Library with a proliferation of departmental libraries. In fact, the departmental libraries which did exist in an earlier period were, with the exception of Architecture, brought into the main Library in 1953. Campus expansion is now very rapid, however, and new academic buildings are being constructed as far as half a mile from the Library. As these new buildings are occupied, the justification for departmental libraries will increase. We have regarded the provision of book catalogs for serials and monographs in each department along with good telephone and delivery service as a means of providing users with convenient library service without the wastefulness involved in maintaining numerous departmental collections. The book catalog system will also enable us economically to provide catalogs of the main Library’s holdings, as well as catalogs of their own holdings, for the Library at the Southern Technical Institute and for our Architecture branch, whose materials are processed by the main Library.

The Library is fortunate in the service provided by the Rich Electronic Computer Center at Tech. Located conveniently next door to the Library, the Center has two powerful computer systems. The Center has cooperated with the Library in every way possible, providing programming assistance and, at times, priority handling for our programs. We have used the Burroughs B 5500 computing system for our MARC project. Our B 5500 has two central processors, 32,000 forty-eight bit words of core storage, 28.8 million characters of disc storage, and ten 7-level magnetic tape drives. It is ordinarily operated in a multiprocessing mode and all of our programs except one are regularly multi-processed. Since we began participating in the MARC Project, the Computer Center has acquired a UNIVAC 1108 computing system.

DESCRIPTION OF THE SYSTEM

Figure 1 is a flow chart of our system for producing catalog cards and book catalogs. Part 1 shows the preliminary work done by clerks in the cataloging department to locate cataloging copy if available, and to determine whether a record for the item is available on the MARC file. More than half the books received in the cataloging department are accompanied by LC deposit cards which are attached to the routing slip during the acquisition cycle. The card number listing provided by LC is checked to determine whether those titles which meet the criteria for inclusion on the MARC file have in fact been included. A search is made to locate cataloging copy if the LC deposit card does not accompany the title. If the cataloging copy is not found and the LC card number is not determined, the author/title MARC listing may be checked to determine whether a record for the title is included on the MARC file.

The steps leading to the production of catalog cards for titles included on the MARC file are shown in Part 2 of the flow chart. If cataloging copy is
Figure 1.
Catalog Production System
Part I: Preliminary Steps
Review catalog copy. Indicate corrections. Add initials, acquisition-code, location.

Keypunch select cards & corrections

Select cards & corrections

2. Selection Prog.

Proof listing records for which cataloging copy has been edited by cataloger

Proof listing records for which cataloging has not been edited by cataloger

Select and reformat records

Additions for Master File

B-5500

Make Corrections

Teclimarc File

Check for errors in making changes

Review for needed changes

Keypunch Additional Corrections

Completed

Proof Listing

Corrected Additions for Master File

4 Card Print Prog.
Generate, sort & print catalog cards

IBM 063 Convert to paper tape

Book card & pocket data

SPD Flexowriter Type cards pockets & spine labels

Prepare cards for spines

Book Cards Book Pockets Spine Labels

Nikor Card Cutter

Ready-to-file cards

Catalog Cards

PART 4

Check for errors

PART 4

Figure 1.
Catalog Production System
Part II: MARC Card Production
available, the cataloger makes any needed additions or changes on the copy
and sends it on to the data processing department. If she does not have copy,
she merely sends a form with the card number and enough of the entry and

*The eight computer programs used in the system are briefly described in
title to identify the item. The LC card number along with several local use
Appendix A. All programs are written in COBOL for the Burroughs B 5500.
data items and any changes or additions to be made to the LC cataloging are
punched. The punched cards are used to select the required records from the
MARC file. The same program converts the character codes to those used by
the B 5500, eliminates shift codes, coverts the records to our local format,
makes any indicated changes or corrections, and prints the records for proof-
reading.* The printed output is proofread against the LC deposit card or a
print of the NUC entry if either has been sent to the data processing
copy of the NUC entry if either has been sent to the data processing
department. Otherwise the proof listing is returned to the cataloger for
derpartment. Otherwise the proof listing is returned to the cataloger for
checking against the book. Changes are punched and run against the tape file
of selected records. The corrected tape output is used to print catalog cards
and as input to the book catalog subsystem. The correction program also
produces punched card output which can be converted to paper tape and used
to produce book cards, book pockets and spine labels on a Flexowriter. The
punched card output has not been used except for test purposes at this time.

The card print program provides the option of printing the cards in sets
for each title or in presorted and alphabetized order for each of the catalogs
into which they will be filed. Until the week of April 15, 1967, the cards
were printed in sets so that they might be conveniently checked by the
catalogers. Our confidence in the card print program has increased to the
point that we are now eliminating this final check by the cataloger and
printing the cards in the order required for filing.

The format of the cards produced varies from conventional card
format. The main difference is that the collation is printed as the last element
of the title paragraph rather than as a separate paragraph. This practice was
adopted as a space saving device both on the cards and in the book catalogs.
Words of more than six characters may be hyphenated in a rather arbitrary
manner. The resulting word segments are occasionally strange looking but we
have had no complaints from anyone confused by them.

A few other variations from conventional card format have been
adopted. The cards produced are not unit cards but vary according to the
requirements of the various catalogs. Cards for the Union Catalogue of the
Atlanta-Athens area, for example, omit the call number, tracings, and all notes
except the series notes, but include a symbol for the Tech Library. The
makeup of sets for titles going to different locations also varies. Each title
cataloged for the Architecture Library produces a complete set of cards for
the main Library as well as a set for the Architecture Library, while only an
extra shelf list card is produced for titles going into the archives collection or
to the Southern Technical Institute.

Part 3 of the flow chart shows the steps for processing titles that are
not included on the MARC file. Assistance in designing the Flexowriter

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*The eight computer programs used in the system are briefly described in
Appendix A. All programs are written in COBOL for the Burroughs B 5500.
subsystem was received from both the University of Missouri Library and the Washington University Library. A proof copy of the catalog card is typed on a 2201 Flexowriter with an auxiliary punch and an auxiliary Selectadata reader. Programming for standard requirements is read from a program tape in the number 1 reader, and programming for special circumstances is read from a program tape in the Selectadata reader as it is required. For example, the main program provides for up to four tracings; if a card requires more than four tracings, programming for the additional tracings is provided in the Selectadata program tape. As the data are typed, two tapes are produced which are later used for the automatic typing of card sets. Before these tapes are run, however, the proof copy is checked and any necessary corrections are made.

The tapes which produce the card sets are usually run at night or on weekends by a student assistant who is able to operate both Flexowriters, the tape-to-card converter and the card cutter simultaneously. As the cards are typed, two by-product tapes are punched. One of these is run through an IBM 047 Tape-to-Card Punch which converts the data to card form for input to the B 5500. The other by-product tape is used to type book cards, book pockets, and spine labels on the Flexowriter. We have stopped using the Flexowriter for spine labels since the small type has been found to be more difficult to read than the three-sixteenths inch size type produced by the SE-LIN labeling system presently being used by the Library. We have not yet decided whether it will be economical to convert one of our old SFD Flexowriters to a larger type size for the typing of spine labels.

Part 4 of the flow chart shows the steps in the production of the book catalogs. The same magnetic tape file that is used to produce the catalog cards is also used as one input to the program that updates the master file and generates entries for the print files. Data from the Flexowriter subsystem, along with keypunched changes or deletions to the master file, go through an edit program that produces another magnetic tape file which is the second input for updating the master file. The update-generate program is the largest, most complex, and most time-consuming of the system. It updates the master file with records from both the Flexowriter and MARC subsystem. It generates print records for additions, deletions, and changes of entries in the print files, and sorts the generated print records. We find that it is more efficient to maintain print files containing entries formatted and in order for printing than it is to generate and sort print entries from the master file repetitively. This approach does, however, complicate the programming logic for updating, since changes to records in the master file must generate records to delete all of the old print entries as well as new corrected print records.

We are attempting to operate the system on a weekly cycle. All of the programs to this point are run once a week, if all goes well. We will soon begin printing supplements to our book catalogs on a regular weekly schedule. These supplements cumulate until the end of the month, when a monthly print program will be run. The monthly supplements cumulate until the next printing of the full catalog, which we expect to produce annually. In looking for a title during the first five years, the user need use only two sequences: the latest annual edition and the latest monthly supplement. The weekly lists
Review cataloging copy. Indicate changes.

Books with work slips placed on truck for card preparation.

Arrange books on truck by program requirements. Number work slips.

2201 Flexowriter
Type proof copy

Work Slip
Proof copy

Instruction Tape
Contents Tape

Proof-read

Make Corrections

Yes

Corrections Required?

No

Book Catalog Data

IBM 047
Convert tape to cards

Book Catalog Data

PART 4

F

Ready-to-file Cards

Figure 1.
Catalog Production System
Part III: Flexowriter Card Production
Figure 1.
Catalog Production System
Part IV: Book Catalog Production
probably will not be consulted by users but will be available if needed. After the first five-year edition is produced, the user might need to consult one additional sequence for each five-year interval.

The printed catalogs and supplements are divided into author, title and subject parts. A new book list in call number order is also produced, but it does not cumulate beyond one month. The annual editions will be printed in a format suitable for photographic reduction and offset printing so that they may be widely distributed throughout the campus and to other libraries that depend heavily on Tech for interlibrary service. Initially the weekly and monthly supplements will be printed in multiple copies, but will not be reproduced for wide distribution. As issues are superseded, they will be available to users who want them, and if there is sufficient demand, monthly cumulations can be reproduced. The monthly new book list will be issued to all faculty and research personnel.

DEVELOPMENT OF THE SYSTEM

Development of the system has been expensive. We were notified of our selection for participation in the project in February 1966, and we are still working on the system. I have spent at least half of my time on development of the system during this period. We have a programmer who has worked approximately nineteen months full time on the project. Another programmer worked about six months at the beginning of the project, but produced no usable coding. Developmental work through April 1968, has cost approximately $31,000. The cost of computer time used in the project through April is approximately $6,000. We cannot accurately distinguish developmental from operational parts of the total computer costs.

During recent months, most of my work has involved planning for conversion and implementation of our new MARC II system. In April our programmer completed all necessary modifications to the programs. We anticipate additional changes as new problems arise, but we hope there will be no major modifications of the programs. We prefer to spend time now designing and programming an improved MARC II/1108 system, rather than continuing the refinement of our present system.

Several problems were encountered in development of the system. First is the not-unusual difficulty of obtaining good programmers. As mentioned above, our first programmer spent six months of unproductive effort before we decided he was not fitted for this task, even though he was a capable programmer. We have been fortunate in our other programmer, who was initially assigned to the project on a part-time basis by the Computer Center. She is now working full time as a member of the Library staff and is doing an excellent job. We have been unable to find an additional qualified programmer and are now training an assistant data processing librarian in programming.

Initially, we lost time because of a lack of knowledge of the details of the MARC format. The initial report on the MARC I format was received in April 1966, and we proceeded with programming on that basis. A test tape and the final report on the record format were not available until October 1966. Therefore, we were unable to begin testing and "debugging" any programs until November.
Perhaps our greatest shortcoming in system development has been inadequate documentation. Anyone who has done system design and programming work is aware of the difficulty and frustration of having to take time to include adequate documentation as a system is developed. At the time one is working with a procedure or program, many decisions seem unforgetable, too obvious to need recording, or not important enough to require documentation. Months later a considerable amount of time may be spent figuring out how or why a decision was made. This is a greater problem, of course, in the development of a large system involving numerous programs and people during a two-year period than it is in a less complex system. The problem of inadequate documentation has been compounded by a high rate of turnover of keypunchers and Flexowriter typists. During the course of the project we have trained five keypunchers and six Flexowriter typists to prepare input to the system. This has been a time-consuming task that could have been easier with better documentation.

Finally, it should be noted that testing and “debugging” the system was a long and difficult process. Several times, as we have tested, we have had to revise previously written programs which we thought were “debugged.” We are now printing more diagnostic data for all runs than we initially planned. Several of our testing problems were caused by B 5500 system defects, especially in the disc sort when used for large files.

RESULTS OF THE SYSTEM

We began selecting records from the MARC tape and printing catalog cards the last week of May 1967. By the first of April 1968, 3,715 records had been selected. We have now printed on the computer and filed into various catalogs about 30,000 cards for those titles. From June through November 1967, we cataloged 4,817 English language monographs. Records for forty percent (1,929) of these were available on MARC tape at the time of cataloging. The average number of titles selected each week has gradually increased. From June through August 1967, the average was sixty-two titles per week; from September through November, it was eighty-seven per week; and from December 1967, through March 1968, it was 105 per week. At present we estimate that records for over half the English language monographs we catalog are in the MARC file at the time of cataloging.

Operation of the Flexowriter subsystem was begun in February 1967, and cards for more than 6,000 titles have now been prepared on the Flexowriters. We have also keypunched data for about 1,000 of the titles which were classified in the LC collection before the Flexowriter subsystem became operational. About 6,000 more titles in the LC collection remain to be keypunched.

We have not yet distributed copies of the book catalog for public use; nor have we begun updating it on a regular schedule. We have printed a series of catalogs, however, with entries for the 11,000 titles now on the master file. We are now making changes and corrections before printing entries for the 11,000 titles in a single sequence. Within the month we hope to have a copy of the catalog ready for public use in the Library, supported by a regular schedule for updating the basic list.
MARC tapes have been received regularly each week without delay. Throughout most of the period of the Pilot Project we found that records came on the tapes about the same time that the LC deposit cards were received. Records for a title rarely appeared on the MARC File after we had cataloged the item. In a sample batch of seventy-five titles satisfying the criteria for inclusion in the MARC File, but done on the Flexowriters because they were not in the MARC File at the time of cataloging, only two were added later to the MARC File.

When work goes according to schedule, the elapsed time from the punching of the select cards until the completed sets are returned to the catalogers is about one week. Three computer runs are required and we usually get overnight service on each. Delays have frequently caused the elapsed time to be more than a week. The causes of delay have been extremely varied, including printing problems, incorrect preparation of input, program defects for untested data conditions, turnover and absenteeism of library personnel, Computer Center errors in running the programs, a delay in receiving a shipment of card stock, and one period of over a week when the computer was out of operation. We hope that nothing new can now go wrong.

One of our most serious problems has been the poor quality of the printed output from the computer. The B 321 Line Printers used on our B 5500 system are drum printers which produce wavy print lines when not in exact adjustment. Two weekly batches of cards have had to be reprinted because of the extreme waviness of the printing, and one batch had to be rerun because the forms were not properly aligned. Recently, we have tried to have the cards printed immediately after the Burroughs engineers have adjusted the printer in their regular daily maintenance.

The cost of computer time for maintaining the MARC file, selecting, converting, and reformatting the records, making the required changes and corrections, and printing catalog cards, averaged about 30 cents per title during the months of October and November. During the period, December through March, the average cost of computer time increased to about 38 cents per title.* We averaged eight cards per title for MARC records, so the cost per card has increased by one cent, to just under five cents. The increase is a function of the increased size of the MARC file. The cost of file maintenance and selection runs is determined primarily by the size of the MARC file.

We have recently purged our MARC file of all juvenile titles and altered the file maintenance program so that it does not add records for these titles. Eventually we will purge our MARC file of older records and maintain an active MARC file of records added during the last twelve to twenty-four months. We have not yet determined the optimal period for keeping a record on the active file.

Costs of catalog card stock, tab cards, and a prorated part of card cutter and keypunch costs are about a cent and a half per card or 12 cents per title.

*Computer time is charged at a rate of $140 per hour for process time and $47 per hour for 10 time.
During the past three months the time required for selecting, proofing, correcting, and handling the MARC records has averaged about ten hours per 100 titles. This work has been done by a nonprofessional technical assistant. At $3 per hour this gives a labor cost of 30 cents per title. The total cost is approximately 80 cents per title or 10 cents per card.

Our Flexowriter subsystem has not operated as efficiently as we had expected. The programs are more complicated and longer than those at the University of Missouri and Washington University. To make the Flexowriter records compatible with MARC records, we insert a number of codes and delimiters not necessary for simple Flexowriter card production. The added program complications cause slower manual typing of the records as well as slower automatic typing of the card sets.

Our greatest disappointment with the Flexowriter system has been the unreliability of the machines. During a five-month period when we kept a record of the hours when the machines were out of service because of mechanical failures, the total came to twenty-four working days for the two machines. There is seldom a week when we do not have at least one breakdown. Our experience in this respect contrasts with that of libraries using the older SPD Flexowriters. Washington University reported that during a three-month period only nine service calls were necessary for three machines. Another problem is the machine's sporadic dropping of characters, a condition that may go unnoticed until numerous defective sets have been run. Our experience, that if the typed data were correct, the final card would be correct and would not need to be proofread, has not turned out to be the case.

We have not been able to reduce our costs on the Flexowriter system to anything near the five cents per card cost at the University of Missouri and Washington University. Our actual cost per card has not been determined because the same subsystem produces the catalog cards, book cards and book pockets, and computer input for the book catalogs. The complete operation costs about $2 per title.

Reaction by the users of our card catalogs to the computer-printed catalog cards has been surprising. Almost 30,000 cards have been filed into the catalogs during a period of eleven months. Reader service librarians report that as far as they can determine, our users do not notice the differences in the cards produced on the computer or the Flexowriters. Not one user comment indicating awareness of the change has been reported.

EVALUATION AND FUTURE PLANS

Forthcoming changes in the MARC format will necessitate rewriting our MARC programs. In order to retain all the information provided in the new MARC II format, not only the select program, but also the format of our master file and all of our programs, must be changed. Our Computer Center has also advised us to convert our system from the B 5500 to the more powerful UNIVAC 1108 which has been acquired since we developed our MARC system. Since these two changes will require considerable rewriting of programs, we are reviewing the system to see what other changes should be made at the same time.
Our new master file format will be more nearly identical to the MARC II format. The use of a consolidated directory similar to the directory which will be a part of the MARC II format was one way in which our master file format differed from the MARC I format. We will continue to maintain, as fixed fields, a few fields which are variable in the MARC II format.

We will probably retain on our master file the coding for upper and lower case printing with all of the special characters provided in the MARC II character set. We do not retain shift codes or codes for diacritics on our master file at present. Our experience so far has convinced us that the absence of lower case and diacritical characters is of little concern to our users. On the other hand, we recognize that use of an expanded character set is desirable if it can be obtained at a reasonable cost. We have regarded the cost of printing with an expanded character set to be excessive. We are now considering the possibility of using a photon which provides more attractive printing with an expanded character set rather than continuing to use an impact printer. The denser page achieved with the photon may mean sufficient savings in printing and binding costs to justify its use.

We also plan to discontinue our present Flexowriter system. Since there has been no objection to the use of the computer-printed cards, we have decided to print all of our cards on the computer. The Flexowriters will be used only as input devices. Programming to produce card sets on the Flexowriters need not be punched into the tapes, thus simplifying and accelerating initial typing of the records. Simplification of this step will also make it possible to train new typists more quickly. With the current system it has taken about a month to train a new typist. We also think this change will greatly reduce our mechanical problems with the machines. Most of the breakdowns occur when the machines are being used for automatic typing. The slower speed of manual typing is much easier on the machines. When we change to the UNIVAC 1108, the tape-to-card conversion of the Flexowriter data will be eliminated because the 1108 system includes a paper tape reader.

The most basic change we are planning is in the storage medium of our master file. This is a change to direct access on-line storage of the master file. Separate print files will probably be discontinued, with author, title, and subject machine indexes taking their place. In order to print the catalog, access to a master file record for each index entry will be necessary, but no sorting will be required. This change will eliminate problems created by handling the large number of tapes required by the present system. It will also become practical to update the master file on a shorter cycle, because it will no longer be necessary to read and write the entire master file in order to update it. The most exciting possibility offered by use of a direct-access file is the use of display terminals for real-time updating and editing of records. We do not plan to use display terminals in the first phase of the new system, but will use them in a later phase. Our decision to use direct-access, on-line storage of the master file at this time is based largely on the desire to avoid basic redesign and reprogramming when we do introduce terminals for real-time updating and querying.
In addition to the functions which our catalog production system now performs, we plan to incorporate a selection function. The weekly MARC tapes will be used to produce selection lists for staff and faculty members interested in book selection. Persons participating will indicate those LC classes to be used as criteria for titles to be included on their weekly lists. Ordering from one of these checked lists will be a simple procedure since all of the information needed for acquisition will be available. We considered using the MARC I tapes in this manner, but decided that the coverage was not complete enough to make it useful.

When our MARC II system for cataloging becomes operational, our next step will be to include other acquisitions functions in it. Titles will then be selected from the lists produced from the MARC tapes; orders and claims will be printed from the MARC file; and catalog entries will be made from the same records. We do not anticipate keeping the MARC file on line, but will place the selected records in an on-line process file at the time of ordering.

We regard the MARC Project as highly successful, both as a prototype national system and as an operating system in our Library. The project has demonstrated that centrally prepared cataloging can be distributed in a machine-readable form to be used by receiving libraries in a variety of ways to meet their individual requirements. In our case, the MARC system has enabled us to keep our card production current without employing additional clerk-typists even though our rate of cataloging has increased by 40 percent over the past year. The production of cards on the computer from MARC records has been significantly cheaper for us than either our former practice of purchasing LC cards or our current Flexowriter system. We expect labor costs for producing MARC cards to decrease as errors on the tape decrease. At the same time, machine costs will increase as size of the MARC file increases, at least until we begin purging the file of those records which we are least likely to need. When MARC service is expanded to include all current English language cataloging, we expect to obtain about 75 percent of our cataloging from the MARC file.

APPENDIX

PROGRAMS FOR GEORGIA TECH CATALOG PRODUCTION SYSTEM

1. The MARC MAINTENANCE program updates the MARC file from the weekly tapes supplied by LC.

2. The SELECTION program selects records from the MARC tape, does conversion of character codes, and sets up a record in a format adapted to our use. Data items may be added to, changed, or deleted from the MARC records selected. Two prooflists are printed; one for records for which cataloging copy has been checked by the cataloger, and a second for records for which cataloging copy has not been checked.

3. The CORRECTION program provides for further editing of the records written by the SELECTION program. A proof listing is printed for those records being changed. This program punches cards which can be converted to paper tape and used to type book cards, book pockets, and spine labels on a Flexowriter.
4. The CARD PRINT program prints catalog cards for the selected records. The cards may be pre-sorted and alphabetized for filing.

5. The FLEXOWRITER Program processes output from our Flexowriter subsystem for records which are not on the MARC tape, as well as key-punched changes, corrections, and deletions for the master file and book catalogs.

6. The UPDATE-GENERATE program merges and sorts to call number order the MARC and non-MARC input for the master file. It updates the master file and generates entries and changes for the print files. It sorts the entries and changes by catalog and by the generated sort fields.

7. The WEEKLY PRINT program prints the weekly supplements for the three printed catalogs and a list of new books in call number order. The weekly supplements cumulate until the next monthly supplement is produced.

8. The MONTHLY PRINT program updates the print files for the catalogs and prints monthly supplements which are cumulated until the next printing of the full catalog. A new book list for the month is also printed.

Reference