

Development and Mechanization of Libraries of the University of California

加州大学図書館の発展と機械化

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要 旨

カリフォルニア州立大学はアメリカ合衆国において最大の規模を有し、1964年秋における学生数は約7万、1970年には約10万に達する。キャンパスは加州全体にわたり9ヶ所に在り、その蔵書数の合計は700万冊に及ぶ。このような大規模の図書館組織における利用および蔵書構成ならびに事務処理を統制する上で、大学図書館評議会の果す役割は極めて大きい。

この評議会は、各キャンパスの図書館長、バークレー及びロスアンジェルス図書館学長、および州全般の学事を管掌する大学研究調査部長から構成され、図書館の開発計画を作成した。その内容の要点は、1) 大学図書館群は、学術コレクションの共同プールと見なされ、2) 共同計画を実行に移すことにより増大する利用者へのサービスを確保すると共に、資料購入費の増加をはかり、3) 資料の不必要な重複を避けることにある。

評議会はこの他にも、各種の共同作業計画を立てたが、その中の重要なものの一つに、二大保存図書館設立の計画がある。北部に散在するキャンパスに対してはリッチモンドに古くからある図書館を改装して利用し、南部に関してはUCLAのキャンパスに新しく建造の予定である。また、キャンパス間における図書館相互貸借システムの発展も意図され、通信運輸手段の改善だけでなく、相互貸借用図書収集および写真複製機器の設備のための予算獲得も試みられた。

キャンパス間の蔵書利用促進のためには、1962年および1963年にUCLA図書館の辞書体目録ならびにバークレー図書館の著者名目録を冊子体に編成して刊行配布したが、1967年刊行予定の補遺第1号は、1962年から1967年までの全大学図書館の全増加図書を含むことになっている。別に、南部三キャンパスのそれぞれに合計7.5万冊に達する学部学生用図書を収集することも、計画の一端として実施に移された。その他建築基準の設置、図書館の地位および給与改善に関する常設委員会も評議会内に設けられ、活躍している。

しかし、評議会の最大の成果であり、影響力が甚大であると考えられるものは、1961年に提案され2年後に成立した図書館研究所の設置であろう。この研究所はその支所をバークレーとロスアンジェルス



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の図書館学校にそれぞれ設置しているが、その活動にはすべての図書館が参画する。諮問機関としては、大学総長に任命された教授よりなる委員会および図書館評議会がある。

研究所の目的は、図書館および情報処理に関する問題の解明、両者に関するシステムの改善ならびに図書館学教育の高度化にある。その長期計画の中には、大学図書館の使命、研究方法および研究者の要求の変遷、記録情報の発展と複雑性、多図書館間組織、情報源および情報システムの進化、などに関する研究が含まれている。この他、図書館資料およびサービスの価値の経済的分析法、ファイルの効率測定、などの基本的問題および機械語に書誌的データを変換する方法などの調査も計画され、中央のセンターと地方のそれで行われるべき索引深度の決定ならびに作成された索引の集中・交換利用に関わる研究も意図されている。

別に、大学図書館に直接的価値を持つ特定の研究も行われるが、その中には、図書館におけるコスト測定法、配本技術——特にキャンパス間に於て電子工学等を利用した印刷資料の内容の送達——、現存の機械化組織の図書館業務に対する応用、冊子体目録の作成と累積などが数えられるが、これらの諸問題の解決に当り、近い将来研究所に実行班が設けられることが希まれている。

図書館業務の機械化の実際は、冊子体目録作成の他、貸出業務、逐次刊行物に関する記録に見られるが、近い将来に於て、国立医学図書館のメドラー・システムとの連携作業が行われることになっている。

貸出業務の機械化はパンチカードを利用して行われ、ソーターを用いて毎日期限超過の貸出カードを採し出すと共に、当日の貸出冊数を計算する。この方法はデーヴィス・キャンパスで行われているが、ロスアンジェルスキャンパスでは、IBM のトランザクション・カード・システムを利用し、さらに詳細なデータが得られるようになっている。

逐次刊行物の記録作成に関しては、パンチカードと磁気テープが併用される。逐次物の受入れに関しては、毎月受入れ予定のファイルがパンチカードから作られ、刊行物を毎日受け入れるごとにチェックし、それから受入れ日報を作成し、後にまとめて月報の形にする。その他このシステムを利用し、所蔵逐刊物リスト、受入れリスト、合本リスト、欠号リスト、クレイム・リストなどが作成される。

メドラー・システムには、ロスアンジェルス生物学・医学図書館が参加し、同システムに蓄積された情報を上記キャンパスの機械で利用しうるように変換送付している。

この他、既に発注業務にも機械が利用されているが、相互に関連しうる機械化システムを開発することにより、全大学の図書館がより緊密に協調することが期待されている。(M. F.)

The University of California is the largest institution of learning in the United States with an enrollment of approximately 70,000 students in the Fall semester of 1964. A total of over 100,000 students is expected before 1970. There are 9 campuses: Berkeley, Los Angeles, Davis, San Francisco, Santa Cruz, Santa Barbara, Riverside, San Diego, and Irvine. The Santa Cruz and Irvine campuses are the newest and will begin accepting students in 1965.

Taken together the University's Libraries form one of the largest systems in the country with almost 7,000,000 volumes. They house many distinguished collections. Modern and

functional library buildings have recently arisen or are at the planning stage on several campuses. However, the state of the libraries is not entirely satisfactory. The total number of volumes is not so impressive when one considers that they are scattered among nine campuses and that much duplication is necessary. Libraries on the emerging campuses are not adequate to support new academic programs and enormously increased enrollments.

The Library Council of the University of California

It is obvious that in such a large university

system, with extraordinary library needs, there must be careful coordination of library resources. Such coordination has been achieved largely through the efforts of the University's Library Council. Members of the Library Council include the head librarians of each campus, the Dean of the School of Librarianship, Berkeley, and the Dean of the School of Library Service at UCLA. A recently added member is the Dean of University Research who represents the Statewide Administration. This group developed a tentative planning document for the libraries in 1960. In 1961 the President of the University released a *Plan for Library Development* which was based on the Council's report but which recommended a slower rate of growth for the smaller campuses than did that report. The fundamental tenets of this plan are:

1. The libraries of the University are to be thought of as a "closely related group of scholarly collections forming a common pool of bibliographic resources."
2. The libraries will effect greater coordination among themselves, provide service to an enlarged clientele and spend more of their operating budgets on purchases of library materials. Costs of processing these purchases are to be reduced. Access of faculty and students to the collections is to be facilitated.
3. Undue duplication, particularly in the specialized collections of Berkeley and Los Angeles, should be avoided. The "common pool" will total about 9,750,000 volumes by 1971. UCLA is to have 3,000,000 volumes in 1971 and thereafter to grow at an annual rate not to exceed 4%. Berkeley is to reach 3,000,000 volumes at a growth rate of 4% per year and then increase at not more than 4% annually. Upon reaching 3,000,000 volumes, Berkeley and Los Angeles are to transfer 120,000 volumes per year to new intercampus storage libraries. Target figures for 1970/71 for the other campuses, outside of Irvine and Santa Cruz, vary from approximately 750,000 for Davis to about 250,000

volumes for San Francisco. The two new campus libraries at Irvine and Santa Cruz will have a minimum of 75,000 volumes at the time instruction begins in 1965.

Good progress is being made in achieving these target figures and a greatly expanded rate of growth is now underway at all of the University of California Libraries. Because of greater enrollments than originally predicted, target figures for some of the campuses will probably have to be revised upward.

The Library Council has also worked on many other cooperative enterprises. One of the most important has been the planning of two large storage libraries—one in the north and one in the south. The storage library in the north, which will house excess publications from the Berkeley, Davis, San Francisco and Santa Cruz Libraries is now established in the remodeled old Ford Assembly Plant in Richmond. The storage facility for the southern campuses will be housed on the UCLA campus. The libraries have been working together for years to improve interlibrary loan facilities and to make their materials more readily accessible to students and faculty at all campuses. This has been achieved through the use of a TWX system connecting the campus libraries, inter-campus bus systems which speed books and readers back and forth, and the provision of extra funds by the Statewide Administration to expedite the collecting of books for inter-campus loan, and the making of photocopies when the original item cannot be lent. Any registered student or faculty member of a University campus may visit any library of the University and use it freely. Another project which has expedited the intercampus use of the libraries has been the publication in book form in 1962 and 1963 of the dictionary catalog of the UCLA Library and the author catalog of the Berkeley Library. The first supplement to these two catalogs will be published after 1967 and will include the holdings of all the University libraries that were added during the five year period 1962 to 1967. One of the most interesting cooperative enterprises has been the coordinated development of undergraduate

libraries totaling 75,000 volumes each for the San Diego, Irvine and Santa Cruz campuses. These collections are now approaching completion and will soon be filed on their respective campuses. The simultaneous development of three such libraries has resulted in very substantial savings in staff time for cataloging and book selection and illustrates what can be achieved through cooperative work of this kind. Members of the Library Council have also worked closely together to prepare building standards and to improve the salaries and status of librarians within the University. The Council has two standing committees—one on personnel and the other on building standards.

The Library Research Institute

The most impressive achievement of the Library Council, and the one that will perhaps have the most far reaching results, has been the development of the Library Research Institute. First recommended by the Council in 1961, the Library Research Institute was approved in 1963 by the University's Administration. It consists of a branch located at the Berkeley School of Librarianship and another branch at the Los Angeles School of Library Service. Additional branches may be located on other campuses that in the future establish new library schools. The libraries of all campuses will participate in the work of the Institute and individual libraries may propose and conduct appropriate projects. An inter-campus, inter-disciplinary faculty advisory committee is appointed by the President of the University. The Library Council also plays a formal advisory role. The Acting Director of the Institute at present is Raynard Swank, a well known leader in the library field, formerly librarian of Stanford University, and Dean of the School of Librarianship at Berkeley. The Associate Director is Professor Robert Hayes of the School of Library Service at UCLA. Professor Hayes, a mathematician formerly with the Western Data Processing Center at Los Angeles, is well known for his great interest in information systems and the problems of libraries.

The purpose of the Institute is to conduct research into library and information problems, and to study methods for the improvement of the University of California and other library and information systems and advanced education for librarianship. In cooperation with the UC Schools of Librarianship, the Institute will provide opportunities for faculty and student research and for advanced or specialized post graduate training for practicing librarians. The nine campuses of the University will be its laboratory. The multi-campus nature of the University of California system, the varieties of libraries within it, and its overall size and strength should make it a model from which national library problems may be extrapolated.

Some of the long term projects which are planned will include a study of the mission of university libraries, the changing methods and needs of scholarship, the growth and complexity of recorded information, the development of multi-library systems, and the evolution of information sources and systems. It is hoped to make an economic analysis of the values of university library resources and services including an attempt to measure as closely as possible the benefits derived by universities and society in general from varying kinds and degrees of library effort. A study which will be fundamental to any objective theoretical evaluation of library services will involve a measurement of file effectiveness. It is hoped to set up cooperative projects with national agencies and information networks which will study the regional and local utilization of bibliographical data produced in machine readable form. One of the initial studies of this type will be a cooperative one with the National Library of Medicine and the medical libraries of the University. A study may eventually be conducted involving cooperation between the National Agricultural Library and the Davis Library which would become a participant in a national library network serving the agricultural and biological sciences. Significant problems to be studied in this connection are the amount of depth indexing that should be

done at such regional centers and fed back into a national system, the printing out and distribution of hard copy indexes at the regional level, and the applications of the bibliographical data on magnetic tape to mechanized local library operations.

Other than theoretical studies of long range interest, the Institute will also participate in specific projects of immediate value to the University's libraries. These projects will include studies of cost accounting methods in libraries, book delivery techniques—particularly rapid transmission of printed material by electronic and other methods between campuses—the applications of existing mechanized systems to library procedures, and methods of producing and accumulating future issues of the University wide book catalog. It is hoped to set up a task force attached to the Institute which will deal with some of these immediate and pressing problems.

Mechanization

As one can readily see much cooperative work for all University of California Libraries has been achieved or is under way; however, the individual libraries, working independently, have also accomplished a great deal in improving and modernizing their procedures and services. As would be expected, the most interesting developments of this kind have been concerned with mechanization. Several of them are described as follows:

Mechanization of Circulation Work

The most recent mechanized circulation system to be installed in a University of California Library is the one at Davis. It is a "borrower-participation" system and involves machine punching and sorting plus manual filing. It supplants a completely manual system which required two charge files: one arranged by call number, the other by date due. Procedures are briefly as follows. The borrower fills out an IBM card with the usual information: his name, address and status, the book's call

number, author and title. The card has numbered columns for punching designated as *status*, *borrower's number* and *date due*. The proper status number, the borrower's number (for faculty only) and the appropriate date due are then punched on the card and other cards received during the day by use of the IBM 024 keypunch. After punching, cards are filed into the charge file manually by call number. When a book is returned it is discharged manually by the usual procedure of pulling the appropriate card from the charge file. The IBM 082 sorter is used daily to sort overdues from the charge file and to count the number of books circulated. The sorter is also used to separate charges for a professor by means of a borrower's number that has been punched into each charge card.

It is estimated that the system requires about three less full time employees than would have been needed for the same workload with the old system. The advantages of this system are evident when information about overdues or an inventory of faculty charges is needed. With only one file as compared with the two previous used, it is possible to identify overdue charges and to produce a list of books charged to an individual faculty member. Rental of the IBM equipment costs about \$115 a month.

A more completely mechanized circulation system was installed in 1962 at the UCLA Library and is described briefly by the Head of that Library's Circulation Department, Mr. James R. Cox.*

"We have selected the basic elements of an IBM-Transaction Card system now in use at the Brooklyn College Library, with certain refinements to fit our particular situation and to improve some aspects of the Brooklyn system. The basic tool of the IBM-Transaction Card system, quite aside from the machinery involved, is the IBM call card, an 80-column $3\frac{1}{4}'' \times 7\frac{3}{8}''$ punched card to replace the present call slip and book check. This card consists of two parts able to be separated from each other by tearing across a scored portion

* A detailed description of this system is available in the following mimeographed report: IBM Circulation Control at the University of California Library, Los Angeles, a preliminary report, Los Angeles, 1963.

of the card. The portion on the right facing the card is the Transaction Stub and is $2\frac{9}{16}'' \times 3\frac{1}{4}''$. It is called a 25-column stub. The remainder of the 80-column card (on the left) is the actual Charge Card, $4\frac{13}{16}'' \times 3\frac{1}{4}''$, and contains all of the information now on the present call slip. It is called a 51-column card.

The equipment involved in the IBM-Transaction Card System consists of the following:

IBM 026 Printing Keypunch: The Keypunch is used to punch various type of information into the IBM Charge Card after charging which will allow for various types of machine filing and sorting. The information to be punched in this manner will include call number and borrower's status. The call number will at the same time be imprinted at the top of the charge card, there to be visibly readable.

IBM 083 Sorter: The Sorter is used for sorting the IBM cards into various desired sequences, such as call number order; and for dropping out overdue charges according to certain due dates, charges made to any particular status of borrower such as Faculty, etc. It will also sort Transaction Cards into numerical order and count cards for all types of circulation statistics.

IBM 087 Collator: The Collator is used to merge mechanically the charge cards each day with the existing current charge file, and to remove the charges for returned books. It will also perform any other file merging and/or matching necessary, and will check the sequence of a file to see whether it is in order.

IBM 514 Reproducer: The Reproducer is used to reproduce or duplicate the original IBM charge cards with the exact information originally punched into them. The file thus produced is used as an aid in the subsequent discharge process. It also gang punches the due date and loan code into each charge card, after the books are charged out. The Reproducer will also be used to prepunch the sequential transaction numbers onto both parts of the IBM call cards before they are used.

IBM 548 Interpreter: The Interpreter is used to interpret punched information on cards and make this information visible on the cards in printed form. Information thus imprinted on the IBM Transaction Cards will include due date, call number, and transaction number.

The Interpreter will also print the sequential transaction number on both portions of the card."

Mechanization of Serial Records

The first experiment in the mechanization of serial records at a large university or research library was started in 1961 by Melvin Voigt, Librarian of the San Diego Campus of the University of California. It is now working satisfactorily and the knowledge gained through this project will be of great value in setting up similar installations in other libraries.

A brief description of the procedures and equipment used is as follows. Records of journals are first placed on specially designed forms called "Intermediate serial records" which provide "copy" for the keypunch operators. Information on the intermediate serial record includes: fixed field information, mnemonic title, call number, complete title, and holdings statement. The fixed field information is composed of symbols and abbreviations designating certain characteristics of each journal. This information is then keypunched on IBM cards and put on magnetic tape for the computer. An "arrival" file is made up each month of computer produced IBM cards. This file consists of cards for journals expected during the month. On receipt of an issue, the checker matches it with the card which has been placed in the daily receipt file to provide the daily print-out and later on to update the complete holdings list at the end of the month. Cards which remain in the "arrival" file at the end of the month constitute a file of potential claims. The program can provide five output statements:

1. Complete holdings of all serials.
2. Lists of current receipts of periodicals by location.
3. Bindery lists of all serials.
4. Want lists for all serials.
5. A claim list for all serials.

The equipment used which is available in the computer center of the San Diego campus is as follows:

1. A Controlled Data Corporation 1604

computer. This is the central "memory unit," the heart of which is magnetic tape capable of a memory size of 32,768 words of eight characters each. The data transfer rate is 30,000 characters per second. Information is fed to this unit from punched cards.

2. A CDC high speed printer which prints at the rate of 2,000 lines per minute.
3. An IBM 088 card reader and 523 card punch.

More complete information about this project is available in the following article: Vdovin, George and Voigt, Melvin J. Computer processing of serial records. *Library Resources and Technical Services*. 7 (1): 71-80. Winter, 1963.

Cost information about the San Diego project as well as the mechanized circulation system at UCLA is available in: Culbertson, Don S., Voigt, Melvin J. and Cox, James R. The costs of data processing in university libraries. *College and Research Libraries*. 24(6): 487-495. November, 1963.

Other Projects Employing Data Processing Equipment

All library projects in the University of California using EDP machinery cannot be described here; however, mention should be made of the fact that the Berkeley Library, one of the first in the U.S. to install a mechanized circulation system, has also used for years an IBM punched card system in connection with its order work. The Biomedical Library

at UCLA is participating in the Medlars project and is now transferring information stored in the Medlars system to a form that can be handled by machinery on the UCLA campus. Other projects are underway or in the planning stage at the various UC libraries. Additional ones will be initiated in connection with the Library Research Institute. Eventually, it is hoped that the UC libraries will be even more closely knit and coordinated through interlocking and compatible mechanized systems.

Summary

A very large state university system with nine rapidly growing campus libraries has found it necessary to coordinate closely library development and to plan for the mechanization and modernization of library procedures. The methods used to achieve these goals may be of interest to those attempting to improve and coordinate library and information systems for national governments and scientific societies as well as large universities. These methods include the preparation of a long range plan for library development, the utilization of a Library Council which promotes cooperative projects and coordinates library policies and plans, the creation of a Library Research Institute for the study of new and better methods of library operation, and the rapid development of several methods of mechanizing routine procedures at certain individual libraries.