

DOCUMENT RESUME

ED 051 827

LI 002 886

TITLE Joint Serials Control System Project for the Libraries of Cornell University, University of Rochester and the State University of New York at Buffalo. Phase I Feasibility Study. Final Report.

INSTITUTION Five Associated Univ. Libraries, Syracuse, N.Y.

PUB DATE Feb 71

NOTE 141p.

EDRS PRICE EDRS Price MF-\$0.65 HC-\$6.58

DESCRIPTORS *Automation, Library Cooperation, *Library Technical Processes, *Serials, *University Libraries

IDENTIFIERS FAUL, *Five Associated University Libraries, Joint Serials Control System

ABSTRACT

The Joint Serials Control System includes a total of 38 libraries on three campuses. Twelve have independent technical service units for processing serials and 26 are dependent libraries. The objective of Phase I of this Project is to identify feasible alternative system configurations and provide a basis for their evaluation so that the contract libraries can select the most workable configuration for intensive design in Phase II. The alternatives must take into consideration three major factors: (1) requirements of the contract libraries, (2) implications of state and national standards and (3) the state-of-the-art of automated library applications in general and serials control systems in particular. Four tasks are defined to fulfill these objectives: (1) a literature review and bibliography on serials control systems and related topics, (2) the analysis of non-contract libraries and other organizations, (3) the study of current serials systems at the contract libraries and (4) the cost estimate of alternative system configurations. This final report is presented in five sections: (1) conclusions and recommendations, (2) literature review summary and conclusions, (3) report on selected non-contract libraries and other organizations, (4) analysis of current systems at the contract libraries and (5) alternative system configuration costs. (Author/NH)

ED051827

U.S. DEPARTMENT OF HEALTH, EDUCATION
& WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED
EXACTLY AS RECEIVED FROM THE PERSON OR
ORGANIZATION ORIGINATING IT. POINTS OF
VIEW OR OPINIONS STATED DO NOT NECES-
SARILY REPRESENT OFFICIAL OFFICE OF EDU-
CATION POSITION OR POLICY

*JOINT SERIALS CONTROL SYSTEM PROJECT
for the Libraries of CORNELL UNIVERSITY,
UNIVERSITY of ROCHESTER and the STATE
UNIVERSITY of NEW YORK at BUFFALO*

*PHASE I FEASIBILITY STUDY
FINAL REPORT*

February 1971

*FIVE ASSOCIATED UNIVERSITY LIBRARIES
SYRACUSE, NEW YORK*

*Office of the Coordinator of
Library Systems*

LI002886

TABLE OF CONTENTS

SECTION	PAGE
	Foreword. vi
	Introduction. viii
I	Conclusions & Recommendations 1
II	Literature Review Summary and Conclusions 9
	Why Automate? 9
	Pros and Cons of Automating Serials Control 9
	Library Automation Problems and Trends. 10
	Serials Control System Problems and Trends. 12
	Implications of User Needs on Library Procedures. 13
III	Report on Selected Non-Contract Libraries and Other Organizations 15
	National and State Developments 15
	On-Line Serials Control Systems 17
	Major Batch Systems 19
	Serials Control Network Systems 21
	Commercial Serial Systems 21
IV	Analysis of Current Systems at the Contract Libraries 22
	Serials Processing Functions. 22
	Current Serials Systems Operational Data. 24
	File Activity Analysis. 27
V	Alternative System Configuration Costs. 37
	Manual System Current and Projected Costs 38
	Estimated Costs of Alternative Machine Systems. 40
	Costs of Computer Configurations. 55
 APPENDICES	
A	FAUL Joint Serials Control Project File 71
B	Current Serials Systems Summary Data. 74
C	Serials File Inventory. 81
	Part I: Cornell. 82
	Part II: Buffalo. 85
	Part III: Rochester. 87
D	Cost Estimating Data. 90
E	Time and Cost Analysis: Cornell University 115

LIST OF TABLES

Table No.		Page
1	Phase II Schedule	8
2	Comparison of Cataloging and Classification Policies for Serials and Periodicals.	23
3	Manpower Requirements and Size of Serial Collections	26
4	Shelving Order, Stack Access and Circulation Policies for Serials at the Contract Libraries.	28
5	File Access to Perform Serials Processing Functions: by Function	33
6	File Access to Perform Serials Processing Functions by Library - Cornell.	34
7	File Access to Perform Serials Processing Functions by Library - Buffalo.	35
8	File Access to Perform Serials Processing Functions by Library - Rochester.	36
9	Total Current Serials Function Costs (1969-1970)	38
10	Alternate Computer Configuration Costs.	56
11	Manpower and Cost Requirements: Recommended System: Check-in	57
12	Manpower and Cost Requirements: Comprehensive System: Check-in	58
13	Manpower and Cost Requirements: Recommended System: Holdings Update.	59
14	Manpower and Cost Requirements: Comprehensive System: Holdings Update.	60
15	Manpower and Cost Requirements: Recommended System: Claiming	61
16	Manpower and Cost Requirements: Comprehensive System: Claiming	62
17	Manpower and Cost Requirements: Recommended System: Binding.	63
18	Manpower and Cost Requirements: Comprehensive System: Binding.	64
19	Manpower and Cost Requirements: Comprehensive System: Acquisition.	65

LIST OF TABLES (continued)

Table No.		Page
20	Manpower and Cost Requirements: Comprehensive System: Selection	66
21	Manpower and Cost Requirements: Comprehensive System: Accounting.	67
22	Manpower and Cost Requirements: Comprehensive System: Cataloging.	68
23	Total Manpower and Cost Requirements for the Recommended System	69
24	Total Manpower and Cost Requirements for the Comprehensive System	70

LIST OF FIGURES

<i>Figure No.</i>		<i>Page</i>
<i>I</i>	<i>Range of Total Costs in 1975.</i>	<i>41</i>
<i>II</i>	<i>Flow Diagram: Check-In</i>	<i>45</i>
<i>III</i>	<i>Flow Diagram: Holdings Update.</i>	<i>47</i>
<i>IV</i>	<i>Flow Diagram: Claiming</i>	<i>49</i>
<i>V</i>	<i>Flow Diagram: Binding.</i>	<i>51</i>
<i>VI</i>	<i>Flow Diagram: Acquisitions/Selection</i>	<i>52</i>
<i>VII</i>	<i>Flow Diagram: Accounting</i>	<i>54</i>

FOREWORD

In the Fall of 1969, a meeting of the library and computing center directors from the member universities of the Five Associated University Libraries (FAUL) met with Mr. Joseph Becker, Acting President of EDUCOM. The purpose of the meeting was to determine the extent to which member universities could coordinate the needs of the library managers and patrons with the computing talent and facilities available on the several campuses. Of prime concern was the role which the FAUL headquarters staff should play in that process.

Two proposals resulting from that meeting recommended that the universities (1) commit themselves to a joint project defined by an analysis of the computer-oriented needs of the member libraries, and (2) that a permanent central system team be built to analyze, plan, recommend, and implement systems to meet those needs.

Early efforts in this direction were less than satisfactory: financial support was obtained in varying amounts from the member libraries and SUNY-Buffalo contributed a portion of the time of several staff members from the Technical Information Dissemination Bureau (TIDB) located on its Ridge Lea campus. Coincident with assignment of those staff members to FAUL was the announced phasing-out of the TIDB operation. The problems attendant to coordinating the work between FAUL Central at Syracuse and the staff at Buffalo were severe. Despite these limitations, the group did complete a gross study of the internal technical services operations at each of the five central libraries.

At this point, some of the library directors determined that circulation control or serials control constituted the most likely areas where cooperative system development could occur. Serials control was selected as the one problem area where a majority of the member libraries could agree to commit resources on a centrally coordinated basis in a major attempt to find solutions. A preliminary plan of attack with cost estimates was constructed by the Coordinator of Library Systems, and the Joint Serials Control Project was born on August 17, 1970. Participant libraries included Cornell, SUNY-Buffalo and the University of Rochester. A letter contract was drawn up with the Biomedical Communication Network located at the SUNY-Upstate Medical Center which supplied the manpower for the project, under the direction of the Coordinator.

There are a great many people who have contributed time, ideas and hard work to the effort. Among them are Ryburn Ross and A. Elizabeth Crosby (Cornell), Judith Nientimp (University

of Rochester), Kent Schriefer and Elizabeth Myers (SUNY-Buffalo). The library directors and university administrators are to be congratulated on their personal and institutional commitments, their confidence and their willingness to join together in a new and not risk-free enterprise. These men are David Kaser, Director of Libraries, Cornell; Myles Slatin, Director of Libraries and Coordinator of Information and Library Resources, SUNY-Buffalo; Ben Bowman, Director of Libraries and Robert France, Vice-President for Planning and Director of Budgets, both of the University of Rochester.

At this point, as Principal Investigator, I wish to thank Rudolph Lienhard, Manager of the Biomedical Communication Network, and special thanks and commendation are offered to Mrs. Elizabeth Pan, Coordinator of Phase I of the project. It was to her that the major responsibility for the implementation of the project was assigned.

Ronald F. Miller
Principal Investigator

INTRODUCTION

The Joint Serials Control System Project has the long-range objective of designing and implementing a serials control system for the libraries of Cornell University, the State University of New York at Buffalo, and the University of Rochester. The Project is divided into four phases: Phase I is a feasibility study; Phase II is the system design; Phase III is a test implementation of the system, and Phase IV is the operating system itself.

The Joint Serials Control System includes a total of 38 libraries on three campuses. Twelve of these libraries have independent technical service units for the processing of serials and 26 are dependent libraries.

The objective of Phase I is to identify feasible alternative system configurations and provide a basis for their evaluation so as to enable the contract libraries to select the most workable configuration for intensive design in Phase II. The alternatives must take into consideration three major factors: (1) requirements of the contract libraries, (2) implications of state and national standards, and (3) the state-of-the-art of automated library applications in general and serials control systems in particular.

To fulfill these objectives four tasks are defined for Phase I. Task I is a literature review and bibliography on serials control systems and related topics. Task II is the analysis of non-contract libraries and other organizations. Task III is the study of current serials systems at the contract libraries and Task IV is the cost estimate of alternative system configurations.

Paralleling the Phase I tasks, the final report is presented in five major sections:

- o Section I presents the conclusions based on the findings of the literature review, the analysis of serials systems in non-contract libraries and other organizations, the data collected on the serials systems at the contract libraries and the cost estimates of alternative machine configurations. The recommendations are made on the basis of the conclusions and cover the organization, manpower, resource requirements, funding sources and schedule of the future phases of the Project, particularly Phase II.

- o Section II summarizes the conclusions derived from the literature on the human, technological and financial problems of library automation and the discernable trends in solving these problems.
- o Section III reports on selected non-contract libraries and other organizations in five categories: national and state developments of significance to serials control and standards, on-line serials control systems, major batch systems, serials control network systems and commercial serials systems.
- o Section IV analyzes the operational data collected on the current serials systems at the contract libraries, including the size of the serial collections, the variations in serials operations, and identification of the major serial files, their sizes and activity.
- o Section V utilizes the data presented in Section IV to arrive at projected costs of the manual system over a number of years. In addition the cost of an ideal and comprehensive total on-line system is estimated based on the hardware configuration at the Biomedical Communication Network. The recommended system for design and implementation is also cost estimated.

SECTION I

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the findings of the literature review, visits to non-contract libraries, analysis of the current serials systems at the contract libraries and cost estimates of the alternative machine systems.

In 1969/70, the total cost of the manual serials systems on three campuses is almost two million dollars for salaries, subscriptions, and binding. It is safe to assume that these costs would increase over the years. The rate of increase is dependent upon the growth of the serial collection and increases in salaries, subscription prices, and binding costs. Even assuming a rate of increase equal to inflation, the only ways to maintain the current level of expenditures are to decrease the number of subscriptions, or to increase staff productivity or tolerate a lower quality of service to the user.

Assuming that degrading service is unacceptable, the key to cost savings lies in two areas: decreasing the number of subscriptions and increasing the productivity of the staff. Automated systems can affect both areas. A centralized data base for the libraries of three campuses can provide information to allow decisions to be made on cooperative acquisitions. This does not mean that knowing the holdings of one library necessarily implies that another library will not duplicate it. An easily accessible centralized data base can only provide the information on which such decisions can be made. Cooperative acquisitions can lower costs without reducing the effectiveness of the collection if it is reinforced by a reliable and fast delivery service and cooperative access and interlibrary loan policies among the libraries involved.

That automated procedures increase staff productivity has been proven by a number of operational systems. At the minimum, the size of the staff in an automated system is held at the same level as in the manual system with normal increases in workload. At best, the automated system can result in staff cutbacks, or at least, staff reallocation. The analysis of the serials procedure at the contract libraries shows that a total of 4.41 FTE's are required to perform duplicated activities, mainly check-in. What is not so obvious are the manpower requirements to maintain the numerous manual files required to perform the serials functions. The effect of automation is the centralization of these files so that file maintenance requirements are lessened considerably.

In addition, automated serials control systems provide products and services which are impossible to provide in manual systems at the same cost. It is difficult to attach a dollar figure to these products since their benefits are often intangible. Some of these major products and services are:

- o Access to current holdings information through on-line displays or holdings lists;
- o Statistical and other information needed by management for planning, budgeting and performance analysis;
- o Better control over claims and binding.

All of the above factors support the basic conclusion of the Phase I study: that an automated serials control system is a feasible alternative to the manual system.

Other conclusions and findings of Phase I are:

1. The technical feasibility of automated serials control is proven by various operational systems. The design of such a system is a matter of finding the most efficient combination of man and machine operations.
2. Developments on the national level of significance to serials systems indicate that local efforts to develop such systems should consider the eventual availability of machine readable serials data. These developments however can not be expected to replace local efforts for a serials control system.
3. Preliminary conclusions of the UCLA Biomedical Library's study on the feasibility of an on-line serials control system indicate that the on-line system offers advantages over the batch system with a minimum of additional operational cost; that on-line systems are more justifiable if the system requires large files and a high access rate to the files; that an on-line system requires a high degree of machine reliability; and that printed holdings lists should supplement on-line files until the cost/benefit of holdings lists versus on-line file access for library patrons can be determined.
4. Serials control systems which operate on a network basis are planned by several library organizations. One such system is operational at the Washington University School of Medicine in St. Louis, Missouri.
5. Interface with commercial serials systems is possible and should be investigated. The University of Guelph in Canada has taken this approach for their acquisitions system.

6. The analysis of the current serials systems at the contract libraries show a commonality of serials functions performed. There are, however, variations in the types of materials considered as serials. The automated system need not include only those types of serials which are held in common by the contract libraries, nor, on the other hand, include all the types of serials identified. Guidelines can be defined to determine the advantages and disadvantages of including certain type of serials in the system, such as newspapers. Other local variations such as call numbers can be accommodated by the system.
7. Without consideration of the overlap of titles held in common among the libraries on three campuses, there is a total of 120,000+ serial titles, 82,000 of which are active. There are 86,000 current subscriptions for 82,000 active titles. The serial collection is estimated to grow at an average annual rate of 7%.
8. The file activity study results indicate that the major file used for serials processing is the check-in file and the functions which require the highest file access are check-in, holdings update, binding and cataloging. It should be pointed out however that the file activity study was defined to include only the use of the files by the library staff. It recorded the use of the files to support the reference function only for those questions which were channeled through a staff member. It is expected that file access to answer reference questions would be one of the highest if the study included the use of the files by the public. The file activity study did show that the most commonly sought kinds of information are ownership, holdings and location of a title.
9. The majority opinion of management personnel from the contract libraries favor the implementation of check-in, holdings update, binding and claiming as the first module of the serials control system. It is not as clear whether acquisitions and accounting functions should be implemented as the second module of the system or whether these functions should be implemented as an independent system. There is unanimous agreement that circulation be an independently developed system. In view of the expectation that machine readable serials data will be available from a national source, the cataloging module will be postponed. The system should be capable of collecting and correlating statistical data useful to management for each module implemented.

10. Cost estimates of alternative machine systems show that it is not economically feasible to have a dedicated facility with a single application, such as a serials control, for the libraries of three campuses. It is, however, feasible if the system is expanded for other applications, such as shared cataloging, circulation, etc. and especially if the system can serve more than three campuses. It is estimated, for example, that to double the number of participating libraries would require an additional 25% of on-line storage capability.

The recommendations which follow are derived from the conclusions above.

RECOMMENDATION I

Based on the conclusion that automated library systems, specifically serials control systems, provide essential products and services unavailable in manual systems, and that there are no problems -- human, technological or financial -- serious enough to warrant the discontinuance of present efforts, the Project Staff recommends:

- A. That funds and resources be committed to Phase II;
- B. That this commitment be made in writing as soon as possible to avoid a loss of momentum and to retain continuity in staff.

RECOMMENDATION II

In line with the majority opinion of management personnel at the contracting libraries and supported by the analysis of file activity, it is recommended that:

- A. The first module implemented in the serials control system should comprise the check-in, claiming, holdings update and binding functions.

It is further recommended, on the basis of the experiences of operational serials control systems, particularly the UCLA Biomedical Library system, that the Joint Serials Control System (JSCP) should exhibit the following characteristics:

- B. The JSCP should be a centralized system which will initially serve 38 libraries on three campuses;
- C. The JSCP will be designed to be expandable to serve at least 50 additional libraries at minimum cost;

- D. The system will operate on-line for file access and record update to perform the check-in operation. Claim slips, candidate claim lists, and binding slips will be batch produced. Section V contains the full description and cost of the recommended system;
- E. On-line file access will be supplemented initially by holdings lists until the cost/benefit of total on-line capability for the library patron can be determined;
- F. The system will be open-ended, i.e., it will allow the addition of other applications such as acquisitions, invoice control, shared cataloging, etc.;
- G. The system will accommodate some local variations with respect to the titles to be included in the system and with respect to local data variations such as classification numbers;
- H. The system will be self-monitoring in that reports will be generated on demand for run times, units processed, error messages, distribution arrays of transaction types correlated with system request channels, query maps, and any other operational data which contribute to system improvement;
- I. Statistics for the use of management in planning, budgeting, and performance analysis will be counted and correlated;
- J. The data base of the system will be designed in such a way that it can serve as the data base of other modules such as acquisition, circulation, etc. without requiring a major record conversion effort.
- K. The system will be able to accept and process MARC serials records when they become available.

RECOMMENDATION III

The central Project Staff shall consist of a Principal Investigator, a highly qualified systems analyst, and support staff. The Principal Investigator will report to the Directors of the contract libraries. He will be advised by the Serials Monitor Committee which is composed of appropriate representatives from the contract libraries with the Committee Chairmanship rotating on a six months basis throughout all the phases of the Project.

Supplementary Project Staff should be located at each campus to carry out studies, gather data and train local staff members. The supplementary staff may be presently employed by the libraries but will report directly to the Principal Investigator or his designate for the portion of the time they spend on Project activities. The local Project Staff will be paid from Project funds.

RECOMMENDATION IV

It is recommended that Phase II be divided into two parts, Part A consisting of Tasks 1 through 7 and Part B consisting of Tasks 8 and 9 (see below).

Task 1 A seminar/workshop to address specific problems in serials control systems design and operation should be held early in Phase II. It is hoped that the seminar will be supported primarily by outside funds.

Task 2 An aggressive staff education program which parallels and anticipates Project developments should be implemented. It is recommended that such a program be continued throughout the subsequent phases of the Project and intensified as the system approaches and attains operational status.

Task 3 Proposals will be submitted to appropriate funding agencies for (1) partial support of the Serials Seminar, (2) partial support of the conversion of records to machine-readable form (Task 8) and (3) for system design (Task 9).

Task 4 A study will be done by a staff researcher to determine the overlap of serial titles among the contract libraries. The results will yield an estimated number of titles to be stored in the central data base. This information is necessary to determine storage requirements and conversion cost.

Task 5 A major activity in Phase II is the building of a User Profile which reflects the data element and transaction requirements of the system. The User Profile consists of two parts:

1) Data element identification, definition, specification - such as mean, maximum and minimum lengths, code type, range of values, etc.

2) Machine transactions required to perform the functions defined for the system including their description, projected volume by a target date, system response requirements, and the data elements processed. The User Profile is the basic document upon which logical and physical machine records and files will be designed.

Task 5 is divided into three sub-tasks:

- Sub-Task 1: Data element specifications
- Sub-Task 2: Design of input worksheet for record conversion
- Sub-Task 3: Transaction specifications

Task 6 A trade-off study to determine the feasibility of using available serials data bases in machine-readable form as an alternative to total local conversion will be conducted. The study will build upon the experiences of other libraries which have taken this approach (e.g. University of Colorado, RECON), note the problems met and make recommendations on the basis of the cost of alternative approaches.

Task 7 Based on the results of the previous activities which specify the required data elements at least 1,000 records will be converted to define accurately resource and procedural requirements for record conversion.

Task 8 Full conversion effort will follow a progress report synthesizing the findings of the title overlap study (Task 4), trade off study on the use of available serials data bases (Task 6) and the conversion of 1,000 records (Task 7).

Task 9 System design will be accomplished by three sub-tasks:

Sub-Task 1: Logical record and file design is based on the User Profile built in Task 5. Physical record and file design is derivable from logical record and file design. The results of this effort, in addition to the physical layout of machine files, become the hardware and software requirements for the system.

Sub-Task 2: A survey of computer hardware, including (but not limited to) available hardware on the three campuses, should be done. The hardware specifications are then compared to the system hardware and software requirements of the system. The machine configuration will be selected on the basis of the results of the comparison.

Sub-Task 3: A system design is simulated in order to assure the adequacy of the recommended hardware configuration to satisfy the system requirements.

PHASE II SCHEDULE

MONTHS (From March 1971 through August 31, 1972)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			

TASKS

- . Serials Control Seminar Held
- . Staff Education Program Implemented
- . Overlap Study Completed
- . Proposals to get funds for Tasks 8&9 submitted to funding sources
- . User Profile
 1. Data Elements Identified
 2. Input Worksheet Designed
 3. Transactions Identified
- . Data Base Study Finished
- . Record conversion 1,000 Records Implemented
- . Full Conversion Implemented
- . System Design Completed
 1. Logical & Physical File Design Completed
 2. Hardware Survey
 3. Simulation

SECTION II

LITERATURE REVIEW SUMMARY AND CONCLUSIONS

The first task defined for Phase I is a review of the literature on serials control systems and related subjects. A working draft of the literature review was distributed in October, 1970 to the Project Staff and appropriate personnel at the contract libraries. The report has been expanded and updated for publication and distribution by the ERIC/Clearinghouse on Library in Information Sciences headquartered at ASIS in Washington. A summary of the conclusions drawn from the literature is included in this final report.

Why Automate?

There is a growing body of opinion which holds that traditional procedures in libraries are increasingly unable to maintain a level of service consistent with the past in the face of increasing user demands and growing collections. As the size of the collection grows and bibliographic control becomes more complex, the productivity of library staffs decreases. Automation, it is hoped, will increase productivity, improve the control of library materials, simplify file maintenance, and improve access to bibliographic information.

Traditionally, innovations in library procedures have been sparked by technological developments. The computer is the latest of these. The basic characteristic of library operation is large file maintenance and access. The repetitive procedures required to maintain and access large files lend themselves well to automation. Furthermore, the technological trend is towards more efficient and lower cost machines. The combination of these factors make automated systems a tenable alternative to the current manual systems.

Pros and Cons of Automating Serials Control

All of the arguments for library automation support the automation of serials control and some are reinforced. Bibliographic control of serials, particularly regarding the access to current holdings information, is even less adequate than bibliographic control for monographs in current systems. Two characteristics of serials control systems which make it an attractive candidate for automation, are large files and high rates of access to the files. Bibliographic records of serials are longer than those for monographs, especially the serial records for active titles which include current and retrospective holdings and control type information for binding and claiming.

In manual systems, serials information is scattered among numerous files that require separate maintenance. File maintenance is simplified in automated systems by consolidating the manual files. In addition to the size and number of serial files, serials processing requires a higher rate of file access per title than monographic processing due mainly to the posting of receipts of issues and holdings update of completed volumes.

On the other hand, the relative instability of serials and the unpredictability of their behavior are the arguments given against the selection of serials control for automation. The common assertion is that the resource requirements to develop such a system cannot be met by a single library, and that activities on the national and state levels ultimately will fulfill local needs.

Library Automation Problems and Trends

Library automation problems can be classified into three categories: human (or people) problems, technical, and financial.

Perhaps the most serious lack in library automation programs is adequate planning needed for the education of the user of the system, whether he be a librarian or a patron or both. Project budgets and schedules often do not provide for a staff education program; meetings of local library staff are commonly a hidden but significant cost of the system development.

Any disruption of familiar routines can be expected to be met with some resistance. To minimize this resistance, the library staff should be informed of project developments prior to their involvement in the data collection and analysis phase of the project.

The technical problems of library automation are those of any system characterized by large files and random access of records in the file. These characteristics require 1) the conversion of manual files into machine-readable form, 2) a file design that is optimal in terms of the number of access to the file required for and storage.

Compared to the total cost of designing and operating an automated system, the conversion cost is a significant but probably not major item. However, conversion presumes that the manual files are in order, and that the data are gathered

together. More often than not, neither is the case. If conversion is to include these two requirements, it then becomes a major resource allocation. The most logical solution is to supplement original input by data that already exist in machine readable form. Besides format compatibility, the biggest question on the feasibility of using available data bases is data acceptability. MARC is an internationally accepted format but few systems accept MARC records without changing them to conform to local standards.

A promising solution to the problem of conversion is computer input microfilm which converts conventional alphanumeric and graphics on microfilm to machine language.

The best solution of course is to by-pass conversion. The basic principle of computer controlled retrieval is to have the computer do what it does best -- that is, locate information and have the information stored outside the computer.

Although the technological trend, as noted earlier, is toward lower cost and higher efficiency, the computer technology has not developed library oriented machines. Computing power is usually beyond what is necessary for library applications while speed in input and output of data is below library system's requirements. With few exceptions (Stanford's BALLOTS and MIT's TIP), libraries cannot afford to experiment with custom made equipment while off-the-shelf hardware do not meet all the requirements.

When asked what is the single most vexing problem in an operating library system, most librarians agree that it is the lack of control over the computer facility. Libraries compete with other applications for time on the campus computer. Equipment and operating system changes add to the instability of an operational system. This prolongs the period required to recoup the original investment for developing the automated system.

On the other hand, library-dedicated machines have not proven to be economically viable, either due to under-utilization of the computer or because the income derived from the services provided by the system is not a true reflection of the value of the service or the cost of providing it. The proposed solution is a library-dedicated facility, maintained and operated by a central office for a network of libraries. The major advantage of such a facility is stability and library control.

Last, but certainly not least among the problems of library automation, is the cost of developing and operating the automated

system. Few libraries can afford to bear the cost of developing an automated system parallel to the current system. Under ideal conditions, grants can cover part of the development costs. Grants, however, are not readily available. Other means of easing the financial burden are being explored: (1) collaborative systems development, as exemplified by the Stanford-Columbia-Chicago group. The objective of this experiment was to test the feasibility of joint systems design. After two years of effort, the conclusion was that collaborative systems design was not feasible within the circumstances wherein the collaborating institutions were at various stages of individual effort and where there was a lack of central mandate and authority; (2) library networks with a central computer facility and systems staff. Such networks (e.g. Ohio College Library Center) are initially funded by a grant with operational costs supported by income derived from the products and services provided by the system to its member libraries; (3) standardization. The ideal solution for eliminating duplication of effort is a single system design and software package for a group of libraries using the same hardware. The Library Systems Development Program for the University of California campuses is currently doing a cost benefit study to determine the feasibility of such an approach.

Serials Control System Problems and Trends

The problems discussed earlier are common to any library automation effort. In addition to these, there are some technical difficulties unique to serials control systems. Basically these stem from the nature of serials themselves rather than from the machine aspect. They do, however, have important implications for automating serials control.

Serials, by definition, are issued periodically but this period may not always be known, or if known, it may not be regular. A study at UCLA done in connection with its on-line serials system design, arrived at the conclusion that 70% of the serial titles in its collection exhibit a predictable publication pattern. Even assuming that receipt pattern can be deduced from publication pattern by the calculation of a lag time, it should be noted that the percentage of predictable titles would differ with each collection. In general, the greater the ratio is between esoteric and core titles, the smaller the percentage of predictable titles.

The percentage of predictable titles in the system has implications for the operating mode of the system performing the check-in operation. Check-in performed in a batch system is based upon the premise that expected arrivals are predictable thus reducing

the file to be searched. An on-line check-in system on the other hand operates in a manner similar to the manual system, that is, the entire file is available for searching and therefore does not require prediction of arrival.

Prediction of receipt may or may not be a requirement for the check-in function, depending upon the operating mode of the system, but it is necessary for the claiming function regardless of the operating mode. There are basically two kinds of claims: claims for skipped issues and claims for late arrivals. The former is easily recognizable by the system but the latter demands human and machine interaction.

Prediction for claiming is based on publication pattern plus a lag time between the stated frequency of publication and its receipt. There are four approaches to calculating lag time: first, by a standard formula such as frequency plus one (e.g., if the serial is a monthly, claim only after two months have elapsed from the last issue received); second, by human experience; third, by machine, based on a history of receipt of each title and fourth, by a combination of the three methods.

Another difficulty in automating the control of serials is that a serial title consists of various physical and bibliographic units. The serials system must identify and control each unit and recognize its relationship to other units within a serial title, and the relationship of the title with other titles in the system.

Implications of User Needs on Library Procedures

With increasing demands and decreasing resources, whether a library plans to automate or not but especially when it does, user studies become important tools to guide management in assigning priorities to traditional library services. The results of two significant studies on the use of bibliographic tools for periodical literature are summarized below.

Periodical literature is controlled by two major types of bibliographic tools: those generated by the library, such as card catalogs, book catalogs, serials lists, and indexes prepared by indexing and abstracting services such as Chemical Abstracts, Index Medicus, etc. The main difference between the two types of bibliographic tools is the bibliographic unit controlled by each. In the former, the unit is the periodical title, in the latter, it is the article, paper, or report contained in a periodical.

The Lipetz study on the use of the card catalog at the Yale University Library indicates that only 5% of users approach the card catalog to do bibliographic searches (defined as using the information on the catalog card without any intention of locating or borrowing the document); 73% are document or known item searches; 16% are subject searches and 6% are author searches.¹

The availability and accuracy of search clues tend to favor the title approach over the author approach. Potentially useful access points not available under present cataloging practices are title-like clues such as sub-titles, short titles, analytic titles, etc.

Another important conclusion in the Lipetz study is that the card catalog can be made more useful by making it more comprehensible to the user and by making its expansion more timely, i.e., providing access to current materials more quickly, rather than providing more access points to the materials.

Peterson reports specifically on the use of periodical literature at the University of Michigan.² His findings indicate that 50% of the users had precise references before coming to the library; of the remaining half, 65% identified precise references through indexes and abstracts before approaching the card catalog.

Furthermore, Peterson reports that the subject access to periodical citations is 86%, followed by corporate name, 18%, period of publication, 8% and country of publication, 4%.

The results of the Lipetz and Peterson studies suggest that the typical route the user of periodical literature starts with is a list of references obtained from indexes and abstracts or from other sources. The card catalog or some other local library tool is consulted to determine if the desired title and holding is part of the collection and its location. The Lipetz study further suggests that full cataloging may not be as valuable a service to the user as providing early access to new acquisitions.

1/ These figures apply to the use of the card catalog regardless of the form of material sought, i.e., monographs, serials, maps. The ratio between use of the card catalog for monographs and periodicals is 8:1.

B. Lipetz, *USER REQUIREMENTS IN IDENTIFYING DESIRED WORKS IN A LARGE LIBRARY*. (New Haven, Conn., Yale University Library, 1970).

2/ S.L. Peterson, "Patterns of Use of Periodical Literature," *COLLEGE AND RESEARCH LIBRARIES* 30:5 (September 1969), 422-430.

SECTION III
REPORT ON SELECTED NON-CONTRACT
LIBRARIES AND OTHER ORGANIZATIONS

The literature review provided the basis for the selection of contacts with non-contract libraries and other organizations. The results of these contacts are summarized below under six categories: national and state developments in serials standards and control systems, on-line and major batch oriented serials systems, serials control network systems and commercial serial systems. More complete descriptions of specific systems are available from the Project File upon request. A list of SECON reports documenting visits and conversations with key personnel of various systems appears in Appendix A.

National and State Developments

One of the specifications of the Phase I study is that the alternative system models will take into consideration developments on the national and state levels which have implications in the planning and design of a serials control system. On the national level, the most significant development is the National Serials Data Program (NSDP). NSDP is charged with "developing a national data bank of machine readable information on all serial publication". The first phase of the project resulted in the publication of the preliminary edition of the MARC format for serials. There are two activities on-going in Phase II: first, a pilot project to determine the technical and economic feasibility of converting existing bibliographic records for serials into machine-readable form using the MARC format. The Association of Research Libraries has been contracted to provide project leadership and staff for this effort. The main activity so far has been the conversion of the Union List of Scientific Serials in Canadian Libraries into the MARC format. The pilot project will end on June 30, 1971, with the delivery of software, a serials data base with the holdings of the three national libraries, and a final report. Phase III activities have not been defined but it is expected that the Library of Congress will assume an active role.

The second major current activity of the NSDP is developing the Standard Serial Number (SSN). The SSN specifications were approved by the American National Standards Institute Board in November, 1971. The Library of Congress has submitted a proposal to the Council of Library Resources for funds to implement the program. The approach specified in the proposal is that the SSN will first be assigned to current titles - basically

those listed in New Serial Titles. The most definitive statement that can be made at this time is that the SSN program will probably be administered by the Library of Congress, that the SSN will be 7 digits long plus an 8th check digit, it will be unique to each serial title, and it will appear on serial issues in a manner similar to the SSN.

As an indirect result of the SSN effort, the Library of Congress is rethinking its policy of recataloging title changes under the most current title. Under the proposed change, a new record will be created for the changed title and the old title entry will be closed. Cross references will link the various titles.

On the state level, the most significant activity in this area is the serials control system at the New York State Library. It is probably one of the most comprehensive serials systems in terms of operations performed by the system. The system operates in the batch mode on a weekly cycle for most updating. It requires 40 hours per week of processing time on a CDC 3300. The data base consists of 10,000 currently received, non-government-issued serials. The average record length is approximately 2,000 characters for complete bibliographic description, acquisition data, retrospective and current holdings, and control information required for claiming and binding.

The cost of developing and operating the system is not available but the developmental cost alone is estimated at \$660,000. Preparation of data for conversion required 8 - 10 FTE's for two-and one-half years. Printing costs have become a major operating cost and there are plans to experiment with computer output microfilm (COM).

The automated system at the New York State Library has made file maintenance simpler due to centralization of records. Access to the file, especially to holdings information, is more readily available. There is better control over claims, binding and invoicing in the automated system. Although the system has not resulted in staff cut-backs, there has been no staff increase.

The second source of potential influence within New York State is the serials activity at the New York Public Library (NYPL). Since 1966, NYPL has been engaged in building a central serial record in preparation for record conversion. In an earlier section, the requirement of building machine records from various manual records prior to actual conversion was discussed. The central serial record at NYPL consists of the bibliographic, acquisitions and holdings records. It has taken NYPL four years to construct the central serial record of 100,000 titles.

On-Line Serials Control Systems

Laval University in Quebec, Canada has an on-line serials system which has been operational since 1968. The system uses an IBM 360/50 and four IBM 2260 cathode ray tube (CRT) terminals. It has the capability of on-line file access and update as well as the batch production of lists. About 48,000 transactions a year are performed by the system on a data base of 16,000 titles.

The check-in operation is done manually on a computer-produced calendar list. The receipt data are transferred to input sheets which are batched and entered on-line. Because the only access to the on-line file is through a local serial control number, check-in at the terminal is too time consuming. An experiment to test the economic feasibility of on-line file query resulted in the conclusion that it is too expensive at this time. Claiming, binding, acquisition, and invoice control are not part of the system. In this sense, the Laval serials system cannot be described as a control system.

Holdings information is accessible mainly through a holdings list. Access to on-line file is limited to information on the latest receipts. There are plans to install two more terminals at branch libraries which can be used by library patrons without first going through staff members. The check-in operation, however, will be maintained centrally.

The major benefit of the Laval system is the greater availability of holdings information. The total cost of the system is not documented but the operational cost of the system for data processing alone is \$80,000 a year. There has been no staff increase since the system achieved operational status.

The UCLA Biomedical Library has received a grant from the National Library of Medicine to study the economic and technical feasibility of an on-line serials control system. The system is nearing operational status as of January 1971.

The system operates on an IBM 360/91 with three IBM 2260 CRT terminals. Each terminal has a functional assignment, i.e. check-in, binding, reference but none is limited in use to its assigned function. The programs, written in COBOL, take 100,000 bytes of core with overlay.

Access to the file is by serial number, title, subject, author, and language. A notable feature is the ability to use a keyword in title access rather than the full title. The form of the title used as an access point need not be the same

as the form of the title in the file. This feature reduces cross reference maintenance requirements but may require a large storage allocation for the indexes.

Prediction for claiming is based on the frequency of the publication plus a lag time which is subjectively assigned and may be changed as the receipt pattern of the title changes.

Prediction for binding is based on the binding control information determined for each title.

Holdings update for completed sets is performed at the terminal. There is concern about the error rate for this activity since it requires the operator to "erase" the issue holdings and change the volume number. Error rate can be lowered either by increasing editing or making the procedure more automatic. Note that the PHILSOM system at Washington University School of Medicine updates holdings automatically.

The major advantage of the on-line versus the batch operating mode is the elimination of the lag time between check-in and the accessibility to current holdings information. The UCLS system is also capable of simple boolean searching for batch production of lists.

The preliminary conclusion of the feasibility study on the feasibility for an on-line serials control system at UCLA is that the on-line mode of operation offers advantages over the batch system at little additional operating cost. Note that this refers only to operational cost. Also note that although there will be a terminal for the reference application, in order to serve multiple users at the same time, holdings lists will still be printed. Therefore, the on-line terminal for reference will be used only for those questions which cannot be answered by the printed lists. Elimination of the printed lists will increase the load on the system.

Other important preliminary conclusions of the study are: (1) that on-line systems must have access to machines with high reliability, (2) the operating costs of an on-line system are more justifiable for large data bases and high volume of traffic.

Northwestern University in Evanston, Illinois is currently engaged in on-line conversion of 15,000 serial titles which will serve as the data base for a comprehensive serials control system operating on-line for retrieval and file update. A search code based on main entry and title will be used to enter the file. It is expected that the check-in function will be implemented first.

The University of Texas Biomedical Library in Galveston takes the total system approach. Serials control is one module in the total system which will operate on-line. There are approximately 4,000 serial titles in the collection, 3,000 of which are currently received. The Medical Library Center of New York data base will be used to build the serials system data base.

More indefinite are the plans for a serials control system at Harvard University, the New York Public Library and the National Library of Medicine.

Major Batch Systems

The University of California at San Diego, with one of the first serials control systems in a university library, is widely copied. The current system, having a data base of 24,000 titles, operates batch mode with card input and tape storage. Outputs include a university-wide holdings list published monthly, which is supplemented by a daily arrivals list which, in turn, is cumulated weekly.

Check-in is performed on an expected arrivals list containing 13,000 entries for active subscriptions. Document serials and newspapers are not included in the system. If the issue checked in carries the volume and issue number that appear on the check-in list, a check mark indicates that the item is received. If the volume and issue number received are not the same as the predicted numbers, the expected arrivals list is corrected and a punched card is prepared manually. The list is used to pull out the prepunched cards for the issues checked in. These cards are then used to update the master file.

The binding module of the system produces a list of titles ready for binding. Acquisition and accounting functions are not incorporated into the system but will be parts of the planned acquisition system.

The San Diego system has undergone extensive modifications due to increased file size and activity as well as equipment changes. Plans include the provision of decentralized check-in by providing tailored check-in lists to branch libraries. This will allow the materials to reach the users sooner and still retain centralized record keeping. The check-in list will use full titles rather than mnemonic titles which, it was discovered, created problems with staff turnovers. The idea of eliminating cards for the check-in operation by utilizing machine-readable score sheets through mark sensing or other methods is being investigated. Another system refinement

under consideration is the prediction of arrival to replace the current practice of prediction of next issue regardless of its arrival. This is expected to reduce the size of the check-in list and therefore cut printing costs and the time required to locate the desired entry on the list. The approach taken is prediction of arrival based on frequency and lag time calculated on the basis of the last date of receipt.

The University of Minnesota Biomedical Library has a system similar to the one at San Diego. Accounting and ordering procedures are incorporated into its acquisition system. There are 8,100 titles in the data base, 2,100 of which are active.

The PHILSOM system at the Washington University School of Medicine Library has the same basic features as the San Diego and Minnesota systems with one major difference: check-in is performed with prepunched arrival cards rather than on arrival lists. The prepunched arrival cards are produced by the system on the basis of expected arrival, not the next expected issue as in the case of the San Diego system. Prediction is based on a standard formula of frequency plus one. Upon the update of the master file, replacement cards are produced and interfiled with the rest of the remaining cards in the file.

System outputs include a union list, prepunched receipt cards, binding slips, claim lists, and a subject list (PHILSOMS).

The most notable achievement of the PHILSOM system is that it is at present serving two other medical libraries at a nominal service fee. As such, it is the only serials control system which is operating as a network.

A characteristic of listing oriented systems, such as the ones mentioned, is the large amount of paper generated. Printing costs become a major expense as the data base increases in size unless the frequency of update is decreased or another storage medium such as computer output microfilm (COM) is used. Batch systems require that arrival of issues be predicted in order to avoid accessing the entire data base for check-in. On the plus side, since prediction is programmed, keyboarding for holdings update is held at a minimum. Another advantage is that listing-oriented systems can accommodate decentralized check-in. This advantage allows the material to take the shortest route from the vendor to the user. With centralized record keeping, lists can be produced in multiple copies, thereby providing direct access to the user for current holdings information.

Serials Control Network Systems

Of particular significance to this project are similar ventures into multi-library systems. The only operational multi-library serials control system is the one at the Washington University School of Medicine. It provides prepunched arrival cards which are used to update the holdings of the contract libraries in addition to claims lists and binding slips. There are a number of planned multi-library serials control systems. The Ohio College Library Center's plans include a serials control system to serve the member libraries. The California State Library Processing Center has published a five-volume report on its centralized serials control system which will operate in the batch mode. The Iowa State University Libraries approach is to standardize the manual systems in three libraries prior to the design of a single automated system.

We can conclude from this that multi-library serials control systems can work and others are taking the same approach.

Commercial Serials Systems

In planning for a serials control system, the interface with jobbers, especially those with machine systems, is an important consideration. The possibilities of linking a jobber's and a library's machine systems exist and require further investigation. In at least one case - the University of Guelph in Canada - the acquisitions system consists of a Viatron cassette recorder which collects data processed by the jobber's machine system. This approach has enabled the library to eliminate a substantial part of the developmental cost and drastically reduce its acquisitions staff.

Faxon Company, Inc. in Boston and Franklin Square Subscription Agency in New Jersey are serials jobbers who have machine systems with the potential capability of interfacing with library systems. Richard Abel Company of Los Angeles has a contract with the Atomic Energy Commission libraries to acquire, catalog and process serials. The subscribing libraries receive, in addition to the processed serials, a status list by title containing the name of the subscribing library, date of account, number of subscriptions, price, frequency of publication, source, billing and payment information and subject descriptions. The Abel system aims to minimize the time required for a serial to travel from the source to the library shelves.

SECTION IV
ANALYSIS OF THE CURRENT
SYSTEMS AT THE CONTRACT LIBRARIES

Serials Processing Functions

The serial processing procedures at each of the contract libraries were analyzed in order to identify the major functions involved, and to compare the variations at the libraries which will have to be accommodated in the design of a single automated system. The analysis resulted in a gross flow chart of the current systems at each library. The level of detail shown on the flow charts was controlled to achieve the consistency in detail necessary for comparative analysis. It should be noted that the gross flow charts were not intended for system design but for the comparison of serial processing procedures. The flow charts for each library are in the Project File and copies are available upon request.

The analysis revealed that the following major functions are performed at each library to process serials:

- o Selection
- o Pre-order verification
- o Acquisition of new titles, back orders, replacement issues and renewals of current subscriptions
- o Authorization of payment of invoices
- o Check-in of issues
- o Claiming of non-receipt of issues
- o Cataloging
- o Holdings update for completed volumes
- o Binding preparation and receipt from bindery

Variations in the procedures of these major functions do occur and the sequence of operation differ from library to library. However, the major functions as identified above are common to all the libraries.

There are some differences in cataloging policies which should be noted, (see Table 2).

Of the twelve libraries, six libraries fully catalog and classify all serials. Lockwood at Buffalo and Industrial and

Labor Relations at Cornell catalog serials, but not periodicals, (see Table 2 for definitions). Miner Medical at Rochester performs brief descriptive cataloging but does not classify serials. Only one library - Health Sciences at Buffalo - does not catalog nor classify serials.

Table 2: Comparison of cataloging and classification policies for serials and periodicals

Library	Serials ¹		Periodicals ²	
	Catalogs	Classifies	Catalogs	Classifies
<u>Cornell</u>				
Olin	y	y	y	y
Mann	y	y	n	n
Law	y	y	y	y
Hotel	y	y	y	y
Veterinary	y	y	y	y
ILR	y	y	y	n
<u>Buffalo</u>				
Lockwood	y	y	n	n
Science & Eng.	y	n	y	n
Health Science	n	n	n	n
Law	y	y	y except for vertical file	y except for vertical file
<u>Rochester</u>				
Rush Rhees	y	y	y ³	y
Miner Medical	y ³	n	y ³	n

- 1/ Issued with a frequency of once a year or less
- 2/ Issued with a frequency of more than once a year
- 3/ Serials and periodicals are given brief descriptive cataloging but are not classified.

Current Serials Systems Operational Data

A questionnaire to gather cost and related data was distributed to the contract libraries early in Phase I. The results of the data gathered by the initial questionnaire revealed that certain hidden costs of serials processing, primarily those arising from activities occurring at the dependent libraries, were not identified. An expanded questionnaire was distributed in an attempt to identify the total cost of processing serials. The cost of the current systems form the basis of comparison with the estimated cost of the feasible alternative machine systems.

In order to capture cost data more accurately, Olin Library at Cornell performed a time and cost study at the central serials department and its dependent libraries. The technique used and the results of the study appear as Appendix E. Appendix B contains the summary of the data gathered from the questionnaire except those related to the costs which are presented in Section V of this report. What follows are some observations and comparisons of the data collected.

Types of Materials Considered as Serials

Periodicals are the only serials commonly held in all the libraries. It does not necessarily imply that the automated system should include only those types of serials held in common by most of the libraries, nor, on the other hand that it should include all of the types of serials identified. Inclusion tends to favor those types of serials which are commonly held by most of the member libraries, especially in a centralized system. However, the system should accommodate those types which are unique to a particular library if it is determined that their inclusion is desirable. Guidelines will be developed for determining the desirability of including certain types of serials such as newspapers and technical reports.

Number of Serial Titles and the Growth of Serial Collections

Based on estimates provided by the libraries and without consideration of overlap of titles or subscriptions held in common by libraries within a campus and among the campuses, there are 126,130 serial titles, 82,023 of which are active and 44,107 of which are inactive. For 82,023 active titles,

there are 85,996 current subscriptions. These figures reflect the totals for the 38 libraries on three campuses.

Estimates provided by the libraries indicate that the rate of new acquisitions will either be held at the 1969 - 1970 level or will decrease slightly due to anticipated budget cuts. The only exception to this trend is evidenced at Lockwood where more than a 200% increase in serial title acquisition by 1973 - 1974 is anticipated. Based on the estimates the total number of serial titles for twelve libraries by 1974 - 1975 will be 143,385.

Percentage of Titles Acquired Through Gift and Exchange, Government Deposit and Paid Subscription

With one exception the major source of acquisition is through paid subscription followed by gift and exchange. At Mann Library, acquisition through gift and exchange is slightly higher than paid subscription, and at the Veterinary Library, both sources are almost equally used.

Serials Processing Functions and the Organizational Unit Responsible

At six of the libraries, the serials or periodical departments are responsible for performing the serials processing functions identified earlier. In addition to the major functions, Lockwood and Rush Rhees have the responsibility for updating their printed union lists. At the other libraries there is no distinct organizational unit for serials processing.

Olin and Mann, Lockwood, Science and Engineering, Health Sciences and Rush Rhees Libraries process serials for a number of dependent libraries. While the bulk of the work is done at the independent libraries, there are some serials activities in the dependent libraries. The total manpower requirements for serials processing include the central serials staff and the percentage of staff time utilized to process serials at the dependent libraries. Table 3 correlates the total manpower requirements at each library with the number of subscriptions processed and the number of serial titles in the collection.

Duplication of Serial Processing Functions at the Dependent Libraries

The functions which are duplicated efforts vary from library to library. Only invoice control and cataloging are

Table 3: Manpower Requirements and Size of Serial Collections

LIBRARY	MANPOWER (FTE)			UNITS PROCESSED	
	Prof.	Clerical	Students & Others	No. of Serial Titles	No. of Current subs.
<u>Cornell</u>					
Olin	5.0	26.295	0.50	52,000	32,000
Mann	2.36	8.907	0	22,668	12,168
Law	1.0	3.0	0	4,349	4,650
Hotel	0.10	0.10	0	285	250
Veterinary	0.30	0.98	0.075	2,055	2,055
ILR	0.75	2.22	0	450	1,600
<u>Buffalo</u>					
Lockwood	7.50	26.80	0	12,271	9,156
Sci.&Eng.	1.0	4.18	0	2,843	2,465
Health Sci.	0	3.30	0.04	3,421	3,421
Law	1.0	3.0	0	7,460	5,860
<u>Rochester</u>					
Rush Rhees	5.0	12.02	1.0	12,371	10,171
Miner Med.	1.0	2.0	0	3,960	2,200

not ever duplicated in any library. Note, however, that this statement does not include the duplicated cataloging effort for titles held in common since this is not known at this time. The function which has the highest duplication rate is check-in. This reinforces the fact that the major weakness of a manual serial system is the lack of availability of current holdings information at various locations in the library system.

To perform duplicated activities a total of 4.41 FTE's is required for all the libraries. This is a potential savings in an automated system which can provide current holdings information either through holdings lists or at on-line terminals.

Shelving Order, Stack Access and Circulation Policies for Serials

It is assumed that a library with the policy of classifying library materials shelves those materials by the call number. The rationale for classifying library materials is that it is wise to keep together materials on the same subject whether they be serials or monographs.

Analysis of the shelving order, stack access and circulation policies of the libraries reveals some interesting discrepancies between theory and practice.

Among the libraries which classify serials, the Undergraduate Library at Cornell shelves periodicals by main entry, the Hotel Library shelves serials by title and Life Science at Rochester shelves by main entry. Almost all the libraries that classify serials and shelve their bound volumes by call number, shelve their current issues by main entry or title, (see Table 2 for cataloging and classification policies and Table 4 for shelving order, stack access and circulation policies). The practice of shelving current issues by main entry or title seems to be tacit recognition that the user prefers these approaches. Furthermore, it is interesting to note that the browsing capability provided by shelving by call number is, in some libraries, of limited usefulness since stack access is restricted.

File Activity Analysis

Hardware requirements determine to some extent the cost of the automated system. In order to estimate the hardware capability required to perform the functions defined for the system, storage requirements and the number of accesses to the machine files must be estimated. Initial estimates are based on the size and use of manual files. These estimates will necessarily be revised when the system is designed since actual storage requirements and file access are a function of file design.

In order to obtain the necessary data, a file activity study was done at each library, including the dependent libraries. The objective of the study was to identify the major files used in serials processing functions. Participants in the study included all the library staff who access files for serials information. Staff meetings were held at each campus in order to clarify the procedure for filling out the file activity log.

The library staffs were asked to fill out a file activity log for each file use. Repetitive operations such as check-in and holdings update were recorded on a single log with the number of access to the file specified. The log called for the name and location of the file being used and asked the file user to check off one of five possible purposes of using the file, to specify the information changed, added or located, and to check off the serial processing function performed.

Table 4: Shelving order, stack access and circulation policies for serials at the contract libraries

LIBRARY	SHELVING BOUND VOL.	ORDER CURRENT ISSUES	STACK ACCESS	BOUND VOL.	CURRENT ISSUES
<u>Cornell</u>					
Olin	call No.	call No. 2,3	restricted	restricted	restricted
Business	call No.	main entry	open	circulates	no
Engin- eering	call No.	broad subj./ main entry	open	circulates	circ. except for latest issues
Fine Arts	call No.	call No. 2	open	no	no
Math	call No.	main entry	open	restricted	no
Music	call No.	call No. 1	restricted	restricted	no
Phys. Sci.	call No.	main entry	open	restricted	no
Undergrad	Periodicals - main entry				
Mann	Serials-call No.				
Law	call No.	call No. 4	restricted	restricted	restricted
Hotel	call No.	call No.	open	circulates within building	circulates within building
Veter- inary	title	title	open	restricted	restricted
ILR	main entry	main entry	open	circulates	circ. except for latest issue
	Periodicals - main entry	main entry	open	circulates except for union periodicals	latest issue
<u>Buffalo</u>					
Lockwood	Periodicals - main entry	main entry	bound-open	restricted	circ. within building
	Serials-call No.		current - closed		
Art	Periodicals - main entry	main entry	open	no	circ. within building
	Serials-call No.				

Table 4 (continued)

LIBRARY	SHELVING BOUND VOL.	ORDER CURRENT ISSUES	STACK ACCESS	BOUND VOL.	CURRENT ISSUES
<u>Buffalo</u> (cont.)					
Bell Sci. Library Studies	title Periodicals - main entry Serials-call No.	title main entry	open open	no no	no circ. within building
Music	Periodicals - main entry Serials-call No.	main entry	open	restricted	circ. within building
Ridge Lea	Periodicals - main entry Serials-call No.	main entry	open	restricted	circ. within building
Sci.&Eng. Health Sci. Law Chemistry	Serials-call No. cutter No. title call No. cutter No.	title title call No. title	open open open open	no no circulates no	no no no no
<u>Rochester</u>					
Rush Rhees	call No.	main entry	open	restricted	circ. except for latest issue
Art	call No.	main entry	open	restricted	circ. except for latest issue
Bus. Adm.	random ⁵	subject	open	circulates	
Chemistry	random ⁵	main entry	open	no	no
Education	call No.	main entry	open	no	circulates
Engineering	call No.	main entry	open	restricted	no
Geology	call No.	main entry	open	restricted	restricted
Life Sci.	main entry	main entry	open	restricted	no
Physics	call No.	main entry	open	restricted	no

Table 4 (continued)

LIBRARY	SHELVING BOUND VOL.	ORDER CURRENT ISSUES	STACK ACCESS	BOUND VOL.	CURRENT ISSUES
Rochester (cont.)					
Math					
Optics					
Astronomy					
East Asia	call No.	main entry	open	circulates	no
South Asia	call No.	main entry	open	circulates	no
Miner Med.	main entry	main entry	open	circulates	

-
- 1/ Restricted to one or more of the following users: faculty, graduate and undergraduate students
 - 2/ Selected titles shelved in special areas by main entry
 - 3/ Special areas are reading areas open to everyone
 - 4/ Selected current issues in Periodical Room are shelved by title
 - 5/ Very few bound serials are housed in this library.

The five purposes of file use are as follows:

1. To add a new record
2. To remove a record permanently
3. To modify information in a record
4. To add information to a record
5. To locate information in a record.

These file uses are coincident with the types of machine transactions in an automated system except for report generation which is not a typical use of manual files but is a machine transaction especially important in batch systems.

Specifying the information modified, added or located determines the data elements which need to be included in the printed products and/or terminal displays of the automated system.

Since it cannot be assumed that the system to be designed will perform all of the serials processing functions, it is important to know the file activity for each function. Functions requiring the highest file activities are the most likely candidates for automation.

At the University of Rochester libraries, the study was done on January 11, 13, and 15. At Buffalo and Cornell, the study period was January 18, 20 and 22. The interpretation of the results of the file activity study should take into consideration the following factors:

- o The acquisition of new titles during the period was low or non-existent due to budget cutbacks. Since normal acquisition activities are not expected to resume until the beginning of the next fiscal year, it was felt that the study could not be postponed but that the situation be noted and allowances made for it;
- o The study periods coincided with inter-session at the campuses. File activity arising from the use of the files by the public are atypical for the periods. However, the study was not designed to measure the use of the files by the public. This study will be done at a later phase;
- o There were a number of staff absences due to illness of vacation. Any study period involving the staff would find the same situation;

- o Filling out the log sheets required time which could be spent in actual work. In this sense the study has the effect of lowering file activity. This is known as the Hawthorn effect.
- o Other unique situations at individual libraries which affect file activity are:
 - At Lockwood, the check-in file for continuations was being built
 - At Miner Medical there was a major recataloging effort to give brief descriptive cataloging to serials
 - The Undergraduate Library at Cornell was closed on one of the days the study was done
 - One of the rotary files at the Mann Library was not in operation on one of the days the study was done.

Extrapolations of the resulting data take the above factors into consideration.

The file activity data are summarized for the libraries of each campus in Tables 5 through 8. The data reduction tables are not included in this report but are available upon request. Appendix C contains the serial file inventory for each campus. Each file with reported activity is described in terms of the number, type and arrangement of records. The number of records in files which contain monographs as well as serials, such as shelflist, are not estimated. Files which differ in name but are essentially the same are correlated; e.g. the check-in Kardex at Olin is called rotary at Mann and general periodical rotary at the Industrial and Labor Relations Library.

Table 5: File access to perform serials processing functions:
by function

FUNCTION	CORNELL	BUFFALO	ROCHESTER	TOTALS
Selection	76	11	63	150
Acquisition	512	341	155	1008
Invoice Control	765	208	328	1301
Check-In	3708	4090	1376	9174
Claiming	191	235	350	776
Cataloging	1382	436	515	2339
Holdings Update	1751	711	481	2942
Binding	1238	2889	776	4903
Reference	680	770	261	1711
Totals for each campus	10,303	9691	4305	
Total for 3 campuses				24,299

The number of accesses to the file is not always the same as the number of records retrieved since not every file access is successful in retrieving the desired record on the first try. In cases where the two numbers vary, they were specified, e.g. 12 accesses to check-in 10 issues. The results indicate that on the average, 1.11 accesses to the file are required to retrieve a single record.

Table 6: File access to perform serials processing functions by library

CORNELL

Library Name (File Loc.)	Sel	Acqui	In-voice	Check-in	Claiming	Cat	Holdings Update	Binding	Ref	Total by Library
Olin		254	435	1577	104	309	827	373	316	4195
Business	45	7		149			99	10	12	322
Engineering		4		160	4		24	52	52	296
Fine Arts		1		166	2		22	5	3	199
Mathematics				24			1		2	27
Music		6		1				1	12	20
Phys. Science		1		107	7		14	71	47	247
Undergrad							1		6	7
Mann	20	116	292	729	59	767	461	510	140	3094
Entomology	1	1		18	1	4	23	2	11	61
Law		91	7	428	11	292	98	31	21	979
Hotel		8		7			10		1	26
Veterinary		12	30	90			79		30	241
ILR	10	11	1	252	3	9	92	183	27	588
Totals for functions	76	512	765	3708	191	1382	1751	1238	680	
Total for campus										10,303

Table 7: File access to perform serials processing functions by library

BUFFALO

Library Name (File Loc.)	Sel	Acqui	In- voice	Check in	Claim- ing	Cat	Hold- ings Update	Bind- ing	Ref	Total by library
Lockwood	1	137	21	2324	114	431	301	1888	91	5308
Art				39		1		42	1	83
Bell Science				47					206	253
Lib. Science				26	6		73	8		113
Music		1		26	3	3				33
Ridge Lea				96				21	29	146
Sciences&Engin.	10	147	133	447	78		33		87	935
Health Science		29	52	573	34	1	158	930	352	2129
Law		27	2	512			146		4	691
Total for functions	11	341	208	4090	235	436	711	2889	770	
Total for campus										9691

Table 8: File access to perform serials processing functions by library

ROCHESTER

Library Name	Sel	Acqui	In-voice	Check-in	Claiming	Cat	Holdings Update	Binding	Ref	Total by library
Rush Rhees	63	146	274	606	37	484	441	607	172	2830
Art				16	1	2		1	6	26
Bus. Admin.		6		157	1			22	14	200
Chemistry				58		3		37	9	107
Education		1		39		1	5		5	51
Engineering				63		6		14	12	95
Geology				29				26	2	57
Life				61		1		6	6	74
Physics				105		4		17	17	143
S. Asia						1				1
Miner Med.		2	54	242	311	13	35	46	18	721
Totals for functions	63	155	328	1376	350	515	481	776	261	
Total for campus										4305

SECTION V

ALTERNATIVE SYSTEM CONFIGURATION COSTS

The cost of the manual system is often used as the basis of comparison with the cost of the automated system proposed to replace it. The dangers in making such a comparison arises from three factors:

- o Accurately identifying the total cost of the manual system
- o Accurately projecting this cost into the future
- o The wide gap in the products and services of the manual and automated system.

If the automated system is to provide products and capabilities unavailable in the manual system, it should be expected to cost more. The question is, how much more and for what additional benefits. What are the alternative combinations of man and machine configurations from which a selection can be made? The basic variables which compose an alternative configuration are:

- o Functions to be performed by the system
- o The degree of automation in the performance of these functions
- o The essential products of the system
- o Response requirements of the frequency of update in case of lists
- o Display medium of the product, e.g., terminal, printed, microfilm.

Varying any one of these factors constitutes a different alternative configuration. In this sense the possible combinations of variables are large. It is futile to cost each one. Therefore the approach is to describe and cost a total comprehensive on-line system. Alternatives to this system are obtainable by changing any one of the variables discussed earlier.

In addition to the comprehensive system, the recommended system, which is the product of the findings summarized in previous sections of this report, is described and estimated.

Section V is presented in four parts: 1) the total cost of the manual system, current and projected; 2) the cost of the recommended system; 3) the cost of the comprehensive system; and 4) the cost of alternative hardware configurations.

Manual System Current and Projected Costs

The participants of this Project completed an extensive questionnaire which was designed to provide an adequate and complete picture of the current financial picture of the serials control function. The reduction of these data, and consolidation into three major cost elements served not only as a summary of the cost of the existing system, but also provided a basis for an extrapolation of the costs for the future. The need for accuracy and comparisons necessitated the removal of some cost elements. Therefore, only the following cost elements were summarized:

Salaries

Subscription Costs

Binding Costs

Supplies and equipment costs for the libraries were included in the questionnaire. However, the accounting and budget rules at some of the participating libraries made it impossible to present a firm figure for these items. Similarly microfilm, though a legitimate cost item, was omitted since it was not used extensively by all the libraries.

The results of the summary of current serials control function costs are presented below:

Table 9: Total Current Serials Function Costs (1969 - 1970)

	Cornell	Buffalo	Rochester	TOTAL
Salaries	295,651	258,694	155,838	710,183
Subscriptions	301,731	311,482	235,000	848,213
Binding	<u>123,456</u>	<u>114,700</u>	<u>56,800</u>	<u>291,256</u>
TOTALS	720,638	684,876	447,638	1,853,352

The information in the preceding table provides the basis for the extrapolation of the cost for the manual system for the next five years. This period will adequately show the effects of varying one or more of the three basic cost elements.

Subscription costs are affected by two variables: the number of subscriptions and the rate of increase of subscription prices. The projected number of current subscriptions is based on the estimated growth of the serial collection at each library. For the rate of increase of subscriptions, it is assumed that the unit cost will increase at a rate equal to the increase in the last decade. Appendix D contains tables which show some possible cost totals for subscriptions at the participating libraries. Current subscription levels, the proposed growth rate of the collection and a more limited growth rate were each costed at various subscription price rates.

The cost of salaries of personnel required to perform the serials functions similarly depend upon the values of two variables: the number of FTE's required to perform the work and the rate of increase of salaries. Even assuming no change in services performed, the growth of the collection will require additional manpower. It is also safe to assume that salaries will increase at least at a rate equal to inflation. Tables 12 - 14 in Appendix D show the increase of salaries by varying each of these elements.

Binding costs again vary according to the number of volumes being bound and the rate of increase of binding costs. Assuming the estimated growth of the serial collection, the number of volumes to be bound in the next five years will increase. The rate of increase of the unit binding cost will increase at least at the rate of inflation. Tables 18 - 20 in Appendix D present the increase in binding cost by varying the number of volumes bound and the rate of increase of the unit binding cost.

A summary of the totals accumulated in this modeling effort is presented in Tables 21 & 22 which also show a range of possible expenses for the year 1975. (Appendix D).

Comparing this to the current totals, the significant increases which will most likely occur during the next few years are shown. In five years total subscription costs may almost triple, salaries increase more than 60% over current figures and binding costs may also more than double.

Using these summary figures, it is possible to draw an almost limitless number of cost curves for the next five years. Table 11 is the result of picking eight possible outcomes

between the minimum and maximum changes modeled. A graphic presentation of this table points out that a fan shaped area of possible outcomes has been created (Figure 1).

Estimated Costs of Alternative Machine Systems

Past experience in computer systems design has shown time and time again that estimates have a tendency to be low. The basic reason seems to be that cost estimates are based on gross facts, management's wishes, and a certain amount of optimism and anticipation which exist at the start of any project. Keeping this in mind, an effort has been made to be generous in all estimates.

For some on-line applications, response times in the range of three to ten seconds are desirable. A computer system which could meet this requirement might well be underutilized, and would need other applications to justify its costs. Response time versus cost thus can be a considerable determinant of the ultimate system configuration. To reduce costs, sharing of a computer system with other applications might be necessary.

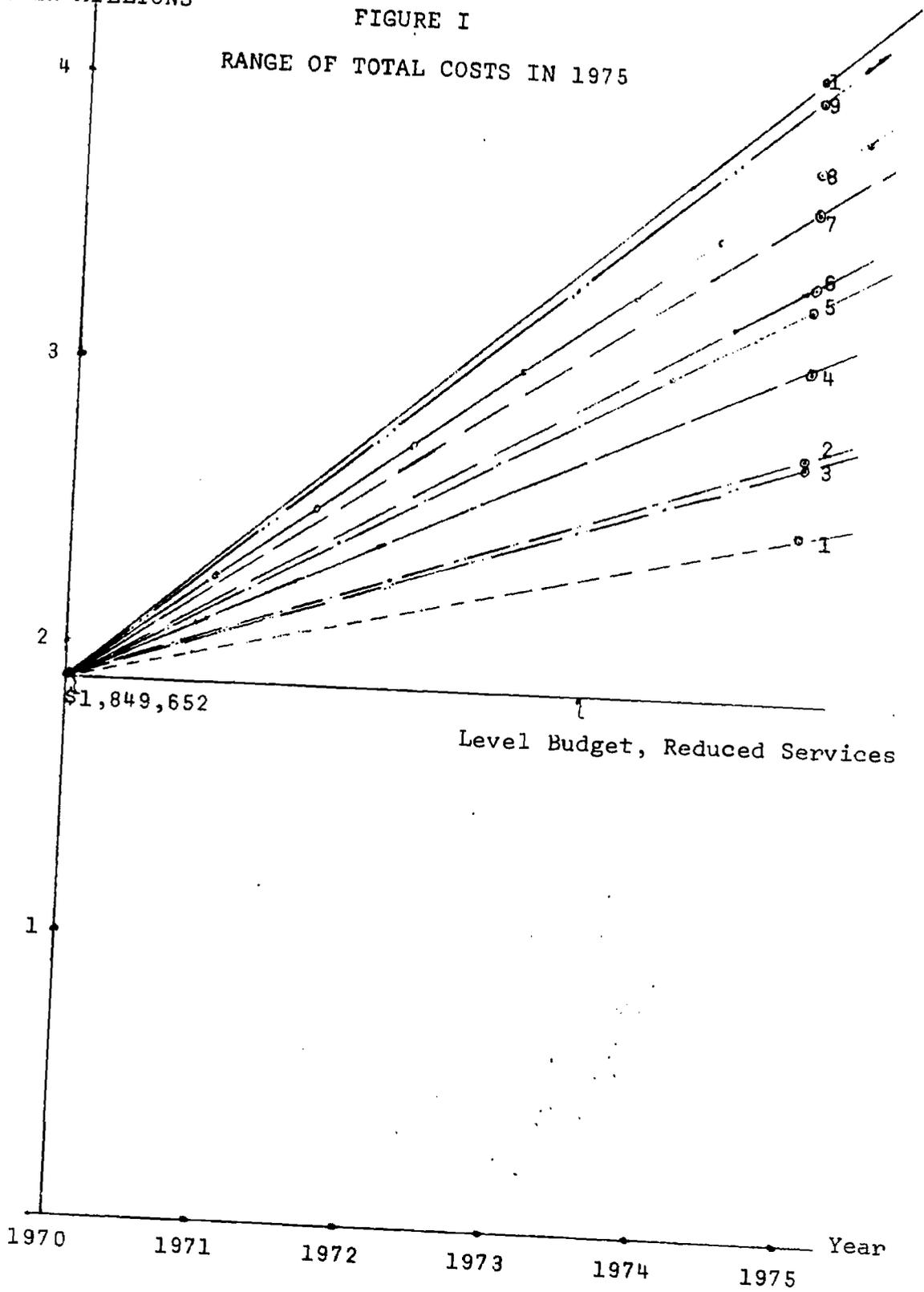
Since cost effectiveness of an on-line serials control system will be most important, the question of optimizing the performance of the system has to be raised. Location of the computer will affect the costs of communications considerably. However, as long as the participating libraries are relatively close to each other, more consideration will have to be given to the incremental costs involved for additional on-line modules for the three universities, or, making the existing modules available to additional participants.

Cost and performance data available from computer manufacturers point to a problem which has been particularly noticeable in the data processing field. The state-of-the-art improves continuously and radically. Therefore, price performance increases, or unit transaction costs decrease. Recently a large computer manufacturer announced new disk drives, compatible with existing models, which are faster and cheaper. Transaction costs therefore for disk input-output bound applications can be reduced by almost 25%. Cost estimates based on the previous configuration similarly would be inaccurate.

A last limitation which will be discussed here has general implications for any project of the size of the proposed serials control system. Estimates for programming and system design can be reduced to a certain number of man months or years, regardless of the number of people involved. For a large effort a minimum staff should be assembled to provide continued leadership for the project. Experience has demonstrated that for a 10-man-year effort, ten people working one year will accomplish

\$ IN MILLIONS

FIGURE I
RANGE OF TOTAL COSTS IN 1975



their goal on time. However, two people working on the same job as effectively since they will not benefit from the synergism generated by a larger group. In this regard, cost estimates have to be kept in perspective. Therefore, to get adequate results within a reasonable time, care will have to be taken to ensure that a minimum staff will be available to see the Project through to completion.

The following assumptions are therefore made:

- o Computer cost is rated at \$100 per hour and a ratio of 1 to 10 has been assigned to computer time used versus programmer time.
- o Salaries for the Project Staff are based on existing salary rates which are lower than those which comparable software houses, or unbundled systems manufacturers charge.
- o Research and design activity estimates for the individual modules will generally appear to be high. It has been assumed that these activities will be extensive, even after logical file and record design and analysis has been performed.
- o Every module has adequate back-up facilities so that recreation or correction of hardware and software errors is possible, and the integrity of the files is assured.
- o Every module has built-in statistical generating capacity to provide management with information for planning, budgeting, and performance analysis and to provide operational data for system refinement.
- o The cost estimates assume modular implementation but accounts for the cost of integrating the modules.
- o No assumptions are made on record or file design but it is assumed that the data elements required to perform each function will be provided for. The systems flow for each module show the names of types of data elements with which each module might interact.
- o Costs of record conversion and computer rental for the operational system are not included in the cost estimates. Machine costs will be entirely dependent on the computer system utilized.

The analysis of the current manual systems resulted in the identification of the major serials control functions as follows: selection, acquisition, accounting, check-in, claiming, cataloging, holdings update, and binding. For purposes of estimating the cost of machine systems, the functions are equated to modules within the automated system. Selection, however, remains essentially a manual operation.

For each module the following cost elements are included:

Development Costs:

Research

Design

Programming - Personnel
- Computer Costs

Training

Management

Implementation Costs:

Testing - Personnel
- Computer Costs

Conversion

Training

Management

Operations, Maintenance and Improvement:

Programming - Personnel
- Computer Costs

Testing - Personnel
- Computer Costs

Operations

Management

Each module is described in terms of capabilities, operating mode, products and transactions required. The description is followed by the cost estimate broken down into the elements defined above. (See Table 11 - 24).

For reasons stated at the beginning of this section, a comprehensive system, as well as a recommended system are described and cost estimated. The comprehensive system encompasses all of the functions of a serials control system. The

recommended system is a subset of the comprehensive system. It is initially limited to check-in, claiming, holdings update, and binding functions. The two systems may also differ in system capability i.e., the degree of automation in performing each function, the system products and the operating modes. To avoid repetition of descriptive data, the recommended system is described fully and only variations to the description are noted for the comprehensive system.

The descriptions of the systems modules are provided not for system design purposes, but for cost estimating. It is expected that costs can be more accurately defined when the system design becomes more definite. Cost estimating is an iterative process, and will be updated as systems design, computer configuration and other economic factors become more defined.

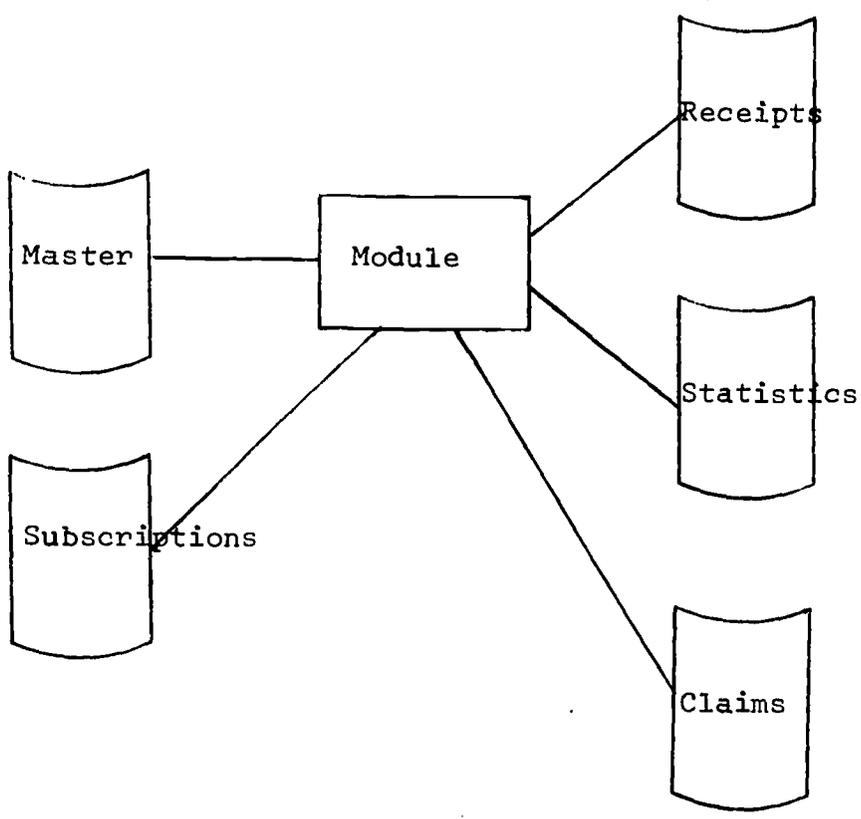
In the modules the following transaction symbols were used:

SYMBOL	FUNCTION	DEFINITION
I	INQUIRY	locate information in a record
U	UPDATE	modify/add information to a record, or delete a record
D	DATA ENTRY	add a new record
R	REPORT	listings

Module: Check-In as Performed in the Recommended System

Check-in is performed at the terminal with the issue in hand. Access to the on-line file is by cover title, search code based on the author and title; and by the FAUL System Number which will exhibit the same characteristics as the Standard Serial Number (SSN). The SSN's will replace the FAUL System Numbers as they become available. The record displayed will contain the essential information for distinguishing a publication from another (library code, author, title, publisher, etc.), disposition of the item and the identification (volume and issue number) of the expected issue. If the issue received fits the description displayed at the terminal, a release button will send the information to permanent storage. If the issue received is not the expected issue, the correct issue identification is keyboarded. The update of the other data elements of the record such as author, title and publisher will be done on-line.

FIGURE II
SYSTEM FLOW: CHECK-IN



Additional Capabilities in the Comprehensive System

Upon successful check-in of an issue, the system will produce a label containing data of receipt, shelve location, name of library, etc., which is attached to the piece.

The comprehensive system will provide some boolean searching capability with additional access points such as language, subject and country of publication.

Basic Transactions Required by the Module

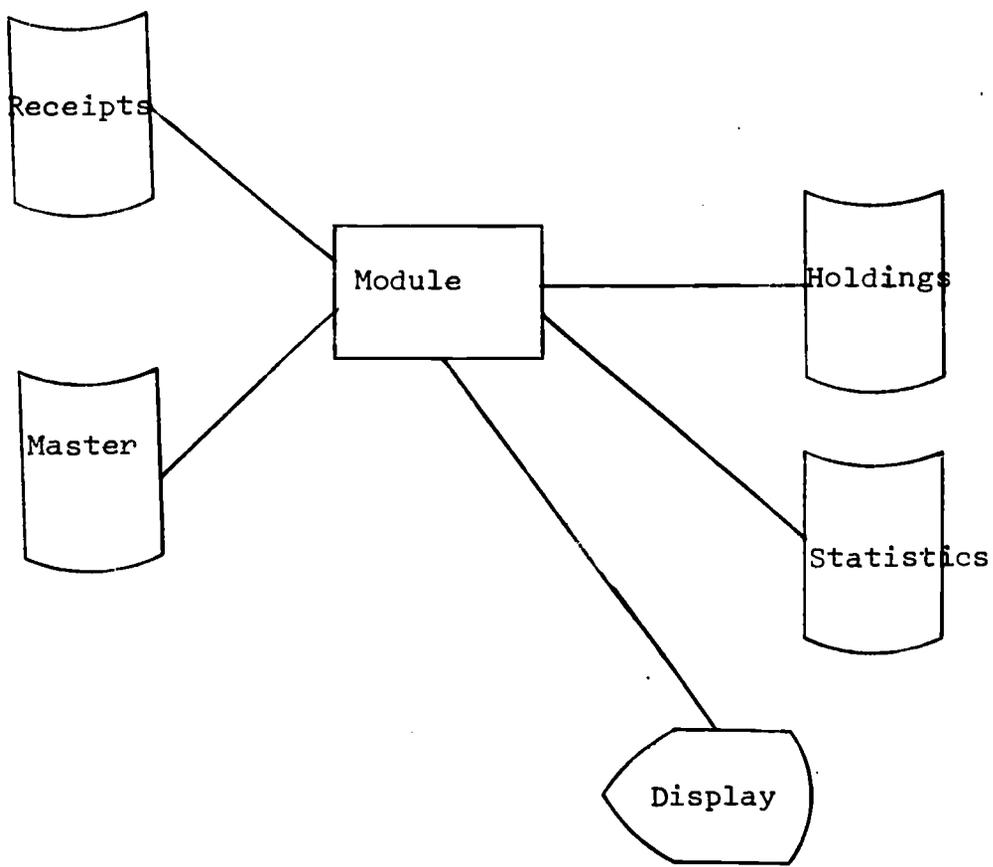
- D - Create holdings records for newly acquired titles
- I - Inquire for ownership, holdings and location for any title
- R - Generate special listings and/or statistical counts by any data element in the record, independently or in combination, e.g., number of titles published in Thailand in the English language.
- U - Post receipts of issues, supplements, parts, indexes, etc.
- U - Update records for titles which have ceased publication or to which the library no longer subscribes
- U - Update records to reflect changes in bibliographic data (e.g., author, title) and local data (e.g. bindery data, subscription cost).

Module: Holdings Update as Performed in the Recommended System

Holdings update refers to the deletion of the issue holdings and the update of the completed volume holdings, regardless of the binding status of the item. Whenever possible, holdings update is performed automatically by the system. The action is triggered by the receipt of the issue, part, etc. which has been identified in the record as the issue, part etc. that completes the volume provided no claim is outstanding. Titles for which a "completing" issue cannot be identified, the holdings will be updated by keyboarding at the terminal. Issue holdings are "erased" and the appropriate volume number added to the completed holdings statement.

Access to holdings information will be primarily through holdings lists produced by the system. On-line access will initially be limited to current (last year's) holdings.

FIGURE III
SYSTEM FLOW: HOLDINGS UPDATE



Comprehensive System:

Access to all holdings information will be on-line.

Basic Transactions Required by the Module:

- I - Inquire for ownership, holdings and location for any title
- R - Generate listing of gaps in holdings (desired data list)
- R - Generate holdings list by library and/or union lists
- R - Generate special listings and/or statistical counts by any data element in the record independently or in combination.
- U - Update holdings statement

Module: Claiming as performed in the Recommended System:

All claims will fall into one of two categories. Claims of the first category may be described as "skipped" issues triggered by the receipt of an issue not consecutive with the previous issue posted. Claims of the secondary category may be described as "non-receipts" or "late arrivals" according to a predetermined lag time. The file will be scanned periodically to identify late arrivals and a list of potential claims containing all the necessary information for claiming shall be produced in the batch mode. An operator makes the decision to claim or not to claim.

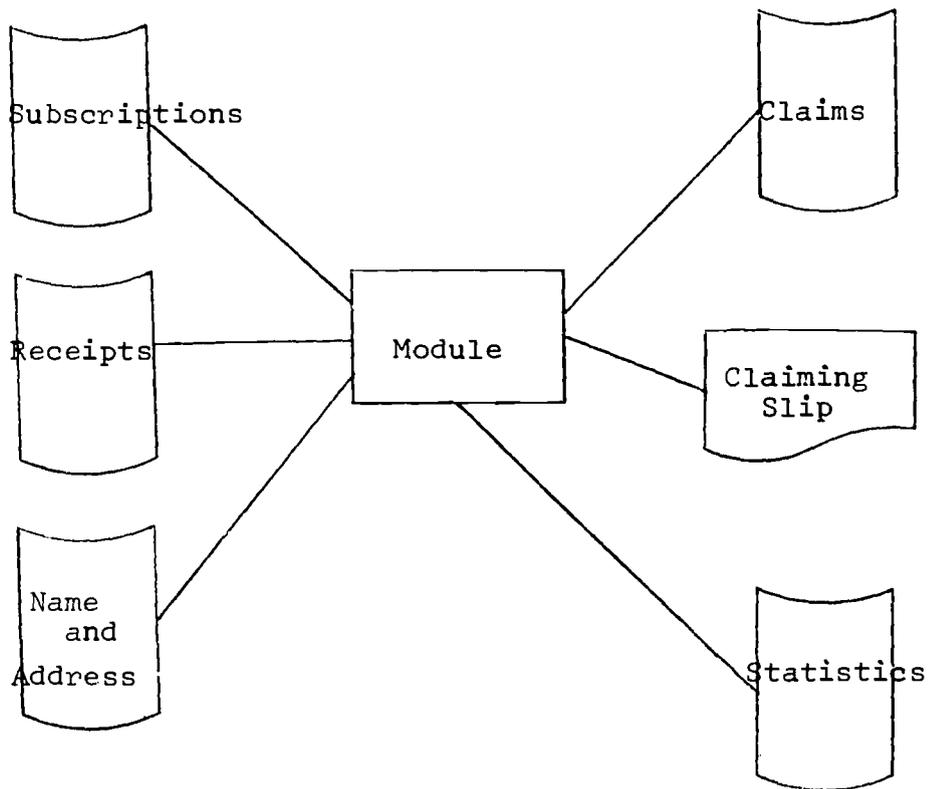
The lag time for each title will be determined by an experienced operator whenever this is possible; otherwise, a standard formula of frequency plus N will be applied. The lag time for any title can be changed based on the history and pattern of receipt. A claim suppress switch can be entered on any record for which no claims are to be initiated.

Upon claiming a title, the claim date will be entered in the record. The claim list will be supplemented by titles which have been claimed but not received. The operator can judge when a second, third, etc., claim is due until the item is received or reordered.

Comprehensive System

Lag time will be recalculated by the system based upon the history of receipt. Claim slips ready for mailing will be produced automatically by the system.

FIGURE IV
SYSTEM FLOW: CLAIMING



Basic Transactions Required by the Module

- R - Generate claim slip
 - Generate list of potential claims
- R - Generate report on vendor performance
- U - Update record to show claiming status
- U - Update record to post receipt of claimed item

Module: Binding as Performed in the Recommended System

The system will automatically issue binding slips after scanning the file periodically to identify bindable units. (The record will indicate what constitutes a bindable unit, e.g., bind two bibliographic volumes in one physical volume.) The binding slips can be used as shelf picking slips as well as binding instructions.

Comprehensive System:

The record will be updated for charging out to, and charging in from the bindery. Access to this information will be on-line.

Basic Transactions Required by the Module:

- R - Generate binding slips
- R - Generate report for bindery performance
- U - Update record to reflect charge out and charge in from bindery
- U - Update record to reflect changes in binding information.

Module: Acquisition/Selection (only in Comprehensive System)

A candidate title for acquisition is matched against the file to determine if the title is already in the system, on order, or has a deferred acquisition status. Order information is entered on-line for those titles selected for acquisitions and purchase orders are produced. The record is updated to show receipt of the ordered item. The file is scanned periodically for non-receipt of orders and claims are produced for them.

FIGURE V
BINDING

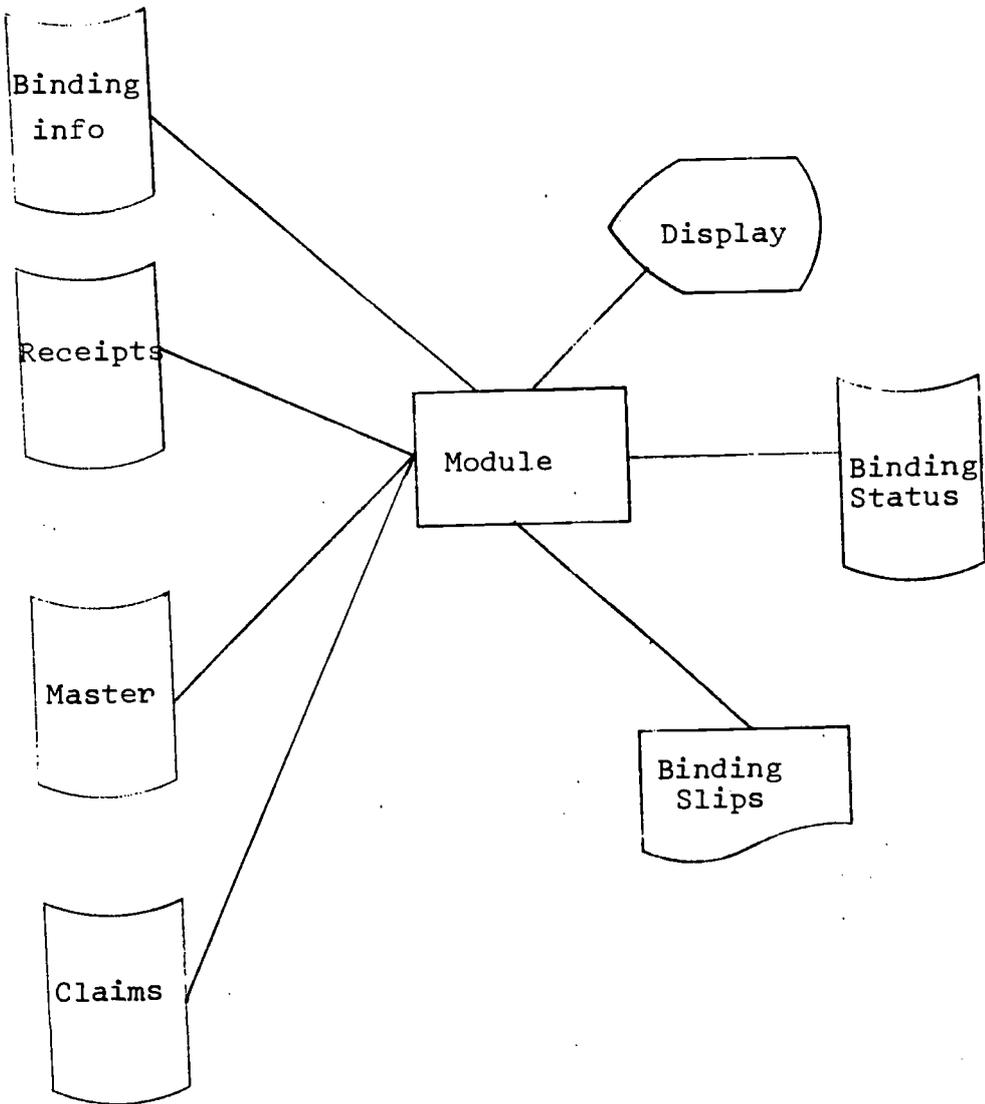
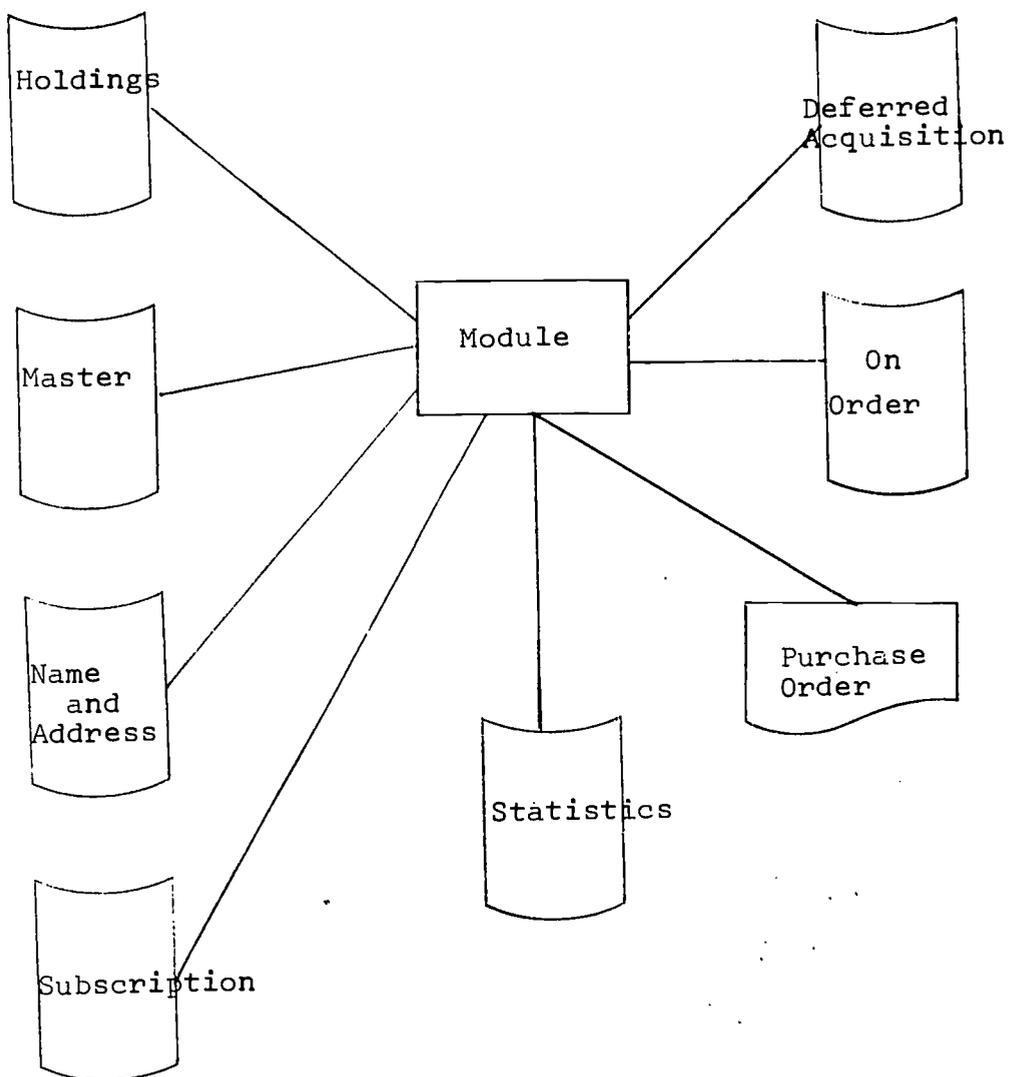


FIGURE VI
SYSTEMS FLOW: ACQUISITION/SELECTION



Subscriptions are renewed prior to their date of expiration. Subscriptions may be cancelled at any time.

Basic Transactions Required by the Module

- D - Create record for title on order
- D - Create record for title on deferred acquisition status
- I - Access on-line file to determine if the selected title is in the system, on order or has a deferred acquisition status.
- R - Generate purchase order
- R - Generate claims for non-receipt of orders
- R - Generate subscription renewal

Module: Accounting-(only in Comprehensive System)

Upon the issuance of a purchase order, the designated fund or allocation is encumbered by the amount stated on the order. Upon receipt and approval of the invoice or voucher, the fund is debited by the stated amount on the invoice and the original encumbrance is deleted. The system will also allow fund credits.

Basic Transactions Required by the Module

- R - Fund status report
- R - Financial and statistical reports
- U - Encumber funds
- U - Debit funds
- U - Credit funds
- U - Update record for subscription price.

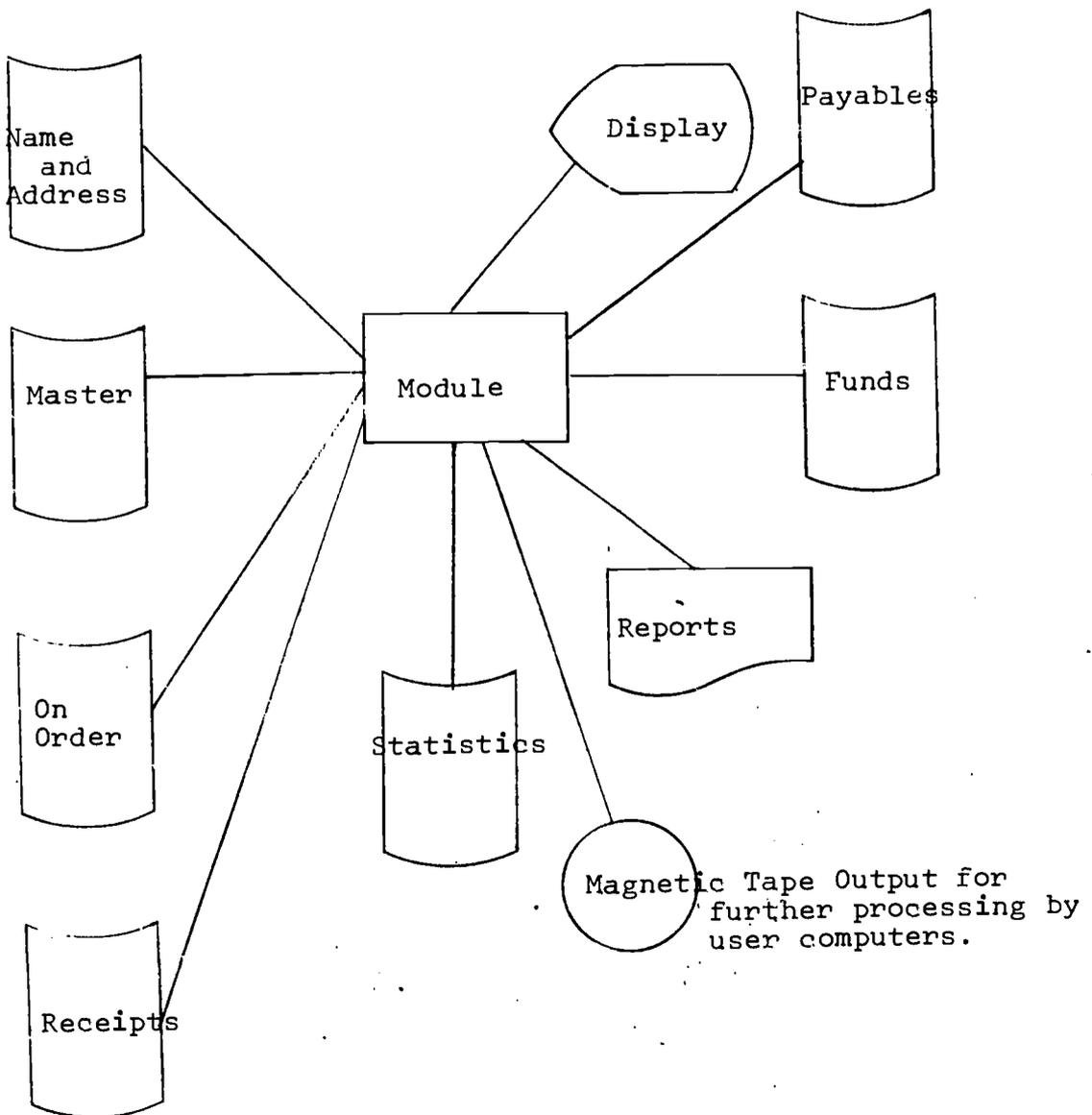
Module: Cataloging-(only in Comprehensive System)

The on-line file can be used as an authority file for pre-cataloging searching. The catalog record is entered at the terminal. Record update is also performed on-line. Local holdings are shown for each title.

Basic Transactions Required by the Module

- D - Create catalog record
- I - File inquiry to perform pre-cataloging verification
- I - File inquiry for ownership, holdings and location

FIGURE VII
SYSTEM FLOW: ACCOUNTING



- U - Update catalog record for bibliographic changes
- U - Update catalog record for the holding library

Cost of Computer Configurations

Actual operating costs of any computer system will depend on the configuration installed, just as ultimately some of the design and programming costs will vary with the actual system implemented. In order to provide the management of the participating libraries with adequate cost estimates, the costs of the various sizes of computer configurations are computed, (Table 10). The prices quoted are gross and possible discounts offered to educational institutions may decrease the total costs somewhat.

Column A shows what is considered to be a minimum configuration for a complete on-line serials control system. Based on the number of file transactions found in the study of file access by function (see Table 5), the number of terminals required to handle the expected volume is estimated at 50. To handle this number of on-line terminals, a reasonably sophisticated system (O/S 360, or equivalent) will be needed. This, plus the buffers required to allow reasonable response times to inquiries (3 - 10 seconds) will necessitate the use of over 100,000 of core for these two functions alone. It is not unreasonable to expect that the remaining application programs will require more than 150,000.

Column B shows the prices for an enlarged central processing unit (at least 512,000) and additional on-line disk storage. This configuration would seem to be powerful enough to allow sharing of the computer resources with other user groups.

Column C shows the net result of evenly sharing the costs for the large system (Column B) between two users. The effective savings of this approach over a dedicated on-line serials control center amount to \$14,200 per month.

Column D illustrates using only one third of the available computer system time for the serials control function. In this case a cost reduction of \$20,566 per month is possible.

TABLE 10

ALTERNATE COMPUTER CONFIGURATION COSTS
(DOLLAR COSTS PER MONTH)

Computer System:	A	B	C	D
Central Processing Unit (minimum 256K core storage, 1.5 μ sec or better cycle time, appropriate channel capacity)	18,000	21,000	10,500	7,000
Central Disk Storage (minimum 600 million char- acters on-line, expandable to at least 1 billion)	7,000	8,400	4,200	2,800
Tape Drives (4)	3,000	3,000	1,500	1,000
Card Input/Output	1,000	1,000	500	333
High Speed Printer	1,800	1,800	900	600
Communications Control De- vices	5,000	5,000	5,000	5,000
Communications Lines	4,000	4,000	4,000	4,000
Appropriate Terminals Video Display Units (50)	8,000	8,000	8,000	8,000
On-Line Printers (12)	4,200	4,200	4,200	4,200
<u>TOTALS</u>	52,000	56,400	38,800	32,933
<u>Facilities:</u>				
Costs for space, Power, Air Conditioning, etc.	2,000	2,000	1,000	666
Administrative Facilities (Desks, Phones, Equipment, etc.)	500	1,000	500	333
<u>TOTALS</u>	2,500	3,000	1,500	1,000

TABLE 11
 MANPOWER AND COST REQUIREMENTS:
 RECOMMENDED SYSTEM: CHECK-IN

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.25	5,000
Design	0.30	6,000
Programming - Personnel	0.25	5,000
- Computer Cost		5,000
Training	0.05	1,000
Management	0.05	1,500
TOTALS	0.90	23,500
 <u>Implementation Phase:</u>		
Testing - Personnel	0.15	3,000
- Computer Cost		3,000
Conversion		
Training	0.05	1,000
Management	--	--
TOTALS	0.20†	7,000†
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	1.50	18,000
TOTALS	1.70	26,000

TABLE 12
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: CHECK-IN

	Man Years	Cost
<u>Development Phase:</u>		
Research	1.00	20,000
Design	0.50	10,000
Programming - Personnel	1.00	20,000
- Computer Cost		20,000
Training	0.25	5,000
Management	0.25	7,500
TOTALS	3.00	82,500
 <u>Implementation Phase:</u>		
Testing - Personnel	0.25	5,000
- Computer Cost		5,000
Conversion	-	--
Training	0.10	2,000
Management	0.15	4,500
TOTALS	0.50	16,500
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	2.00	24,000
TOTALS	2.20	32,000

TABLE 13
 MANPOWER AND COST REQUIREMENTS
 RECOMMENDED SYSTEM: HOLDINGS UPDATE

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.10	2,000
Design	0.20	4,000
Programming - Personnel	0.50	10,000
- Computer Cost	0.10	10,000
Training	0.10	2,000
Management	<u>0.05</u>	<u>1,500</u>
TOTALS	0.95	29,500
 <u>Implementation Phase:</u>		
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Conversion		
Training	0.04	800
Management	<u>--</u>	<u>--</u>
TOTALS	0.14	4,800
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	<u>0.10</u>	<u>1,200</u>
TOTALS	0.30	9,200

TABLE 14
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: HOLDINGS UPDATE

	<u>Man Years</u>	<u>Elapsed Years</u>	<u>Cost</u>
<u>Development Phase:</u>			
Research	.50	.25	10,000
Design	.50	.25	10,000
Programming - Personnel	.75	.25	15,000
- Computer Cost			15,000
Training	.25	.08	5,000
Management	<u>.10</u>	<u>.10</u>	<u>3,000</u>
Totals	2.10	.75	58,000
<u>Implementation Phase:</u>			
Testing - Personnel	.10	.10	2,000
- Computer Cost			2,000
Conversion			
Training	<u>.04</u>	<u>.04</u>	<u>800</u>
Totals	.14	.14	4,800
<u>Operations, Maintenance and Improvement Phase:</u>			
Programming - Personnel	.10	1.0	2,000
- Computer Cost			2,000
Testing - Personnel	.10	1.0	2,000
- Computer Cost			2,000
Operations/Management	<u>.10</u>	<u>1.0</u>	<u>1,200</u>
Totals	.30	1.0	9,200

TABLE 15
 MANPOWER AND COST REQUIREMENTS
 RECOMMENDED SYSTEM: CLAIMING

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.2	4,000
Design	0.25	5,000
Programming - Personnel	0.6	12,000
- Computer Cost		12,000
Training	0.05	1,000
Management	0.05	1,000
TOTALS	1.15	35,000
 <u>Implementation Phase:</u>		
Testing - Personnel	0.25	5,000
- Computer Cost		5,000
Conversion	0.1	2,000
Training	0.1	2,000
Management	--	---
TOTALS	0.45	14,000
 <u>Operations, Maintenance and</u>		
<u> Improvement Phase:</u>		
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Operations/Management	0.25	3,000
TOTALS	0.45	11,000

TABLE 16
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: CLAIMING

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.5	10,000
Design	0.5	10,000
Programming - Personnel	0.75	15,000
- Computer Cost		15,000
Training	0.05	1,000
Management	0.08	2,400
TOTALS	1.90	53,400
<u>Implementation Phase:</u>		
Testing - Personnel	0.5	15,000
- Computer Cost		15,000
Conversion	0.1	2,000
Training	0.1	2,000
Management		
TOTALS	0.7	34,000
<u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Operations/Management	1.0	12,000
TOTALS	1.2	20,000

TABLE 17
 MANPOWER AND COST REQUIREMENTS
 RECOMMENDED SYSTEM: BINDING

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.05	1,000
Design	0.15	2,000
Programming - Personnel	0.4	4,000
- Computer Cost		4,000
Training		
Management	0.05	1,000
TOTALS	0.65	12,000
 <u>Implementation Phase:</u>		
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Conversion	0.10	2,000
Training	--	--
Management	--	--
TOTALS	0.2	6,000
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Operations/Management	0.1	1,200
TOTALS	0.3	9,200

TABLE 18
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: BINDING .

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.1	2,000
Design	0.25	5,000
Programming - Personnel	0.25	5,000
- Computer Cost		5,000
Training		
Management	0.05	1,500
TOTALS	0.65	18,500
<u>Implementation Phase:</u>		
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Conversion	0.1	2,000
Training		
Management		
TOTALS		6,000
<u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Operations/Management	0.1	1,200
TOTALS	0.3	9,200

TABLE 19
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: ACQUISITION

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.25	5,000
Design	0.50	10,000
Programming - Personnel	0.50	10,000
- Computer Cost		10,000
Training	--	--
Management	<u>0.08</u>	<u>2,400</u>
TOTALS	1.33	37,400
 <u>Implementation Phase:</u>		
Testing - Personnel	0.20	4,000
- Computer Cost		4,000
Conversion	0.20	4,000
Training	0.10	2,000
Management	<u>--</u>	<u>--</u>
TOTALS	0.50	14,000
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	<u>0.10</u>	<u>1,200</u>
TOTALS	0.30	9,200

TABLE 20
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: SELECTION

	Man Years	Cost
<u>Development Phase:</u>		
Research	--	--
Design	0.1	2,000
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Training	--	--
Management	--	--
TOTALS	0.2	6,000
 <u>Implementation Phase:</u>		
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Conversion	--	--
Training	0.1	2,000
Management	--	--
TOTALS	0.2	6,000
 <u>Operations, Maintenance and</u>		
<u> Improvement Phase:</u>		
Programming - Personnel	0.1	2,000
- Computer Cost		2,000
Testing - Personnel	0.1	2,000
- Computer Cost		2,000
Operations/Management	0.3	3,600
TOTALS	0.5	11,600

TABLE 21
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: ACCOUNTING

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.25	5,000
Design	0.50	10,000
Programming - Personnel	0.50	10,000
- Computer Cost		10,000
Training		
Management	<u>0.06</u>	<u>1,800</u>
TOTALS	1.31	36,800
 <u>Implementation Phase:</u>		
Testing - Personnel	0.20	4,000
- Computer Cost		4,000
Conversion	0.20	4,000
Training	0.10	2,000
Management	<u>0.06</u>	<u>1,800</u>
TOTALS	0.56	15,800
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	<u>0.20</u>	<u>2,400</u>
TOTALS	0.40	10,400

TABLE 22
 MANPOWER AND COST REQUIREMENTS
 COMPREHENSIVE SYSTEM: CATALOGING

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.10	2,000
Design	0.20	4,000
Programming - Personnel	0.30	6,000
- Computer Cost		6,000
Training	--	--
Management	<u>0.04</u>	<u>1,200</u>
TOTALS	0.64	19,200
 <u>Implementation Phase:</u>		
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Conversion	--	--
Training	0.10	2,000
Management	<u>--</u>	<u>--</u>
TOTALS	0.20	6,000
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.10	2,000
- Computer Cost		2,000
Testing - Personnel	0.10	2,000
- Computer Cost		2,000
Operations/Management	<u>--</u>	<u>--</u>
TOTALS	0.20	8,000

TABLE 23
TOTAL MANPOWER AND COST REQUIREMENTS
FOR THE RECOMMENDED SYSTEM

	Man Years	Cost
<u>Development Phase:</u>		
Research	0.60	12,000
Design	0.90	17,000
Programming - Personnel	1.75	31,000
- Computer Cost		31,000
Training	0.20	4,000
Management	<u>0.20</u>	<u>5,500</u>
TOTALS	3.65	100,000
 <u>Implementation Phase:</u>		
Testing - Personnel	0.60	12,000
Computer Cost		12,000
Conversion	0.20	4,000
Training	<u>0.19</u>	<u>3,800</u>
TOTALS	0.99	31,800
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.40	8,000
- Computer Cost		8,000
Testing - Personnel	0.40	8,000
- Computer Cost		8,000
Operations/Management	<u>1.95</u>	<u>23,400</u>
TOTALS	2.75	55,400

TABLE 24
TOTAL MANPOWER AND COST REQUIREMENTS
FOR THE COMPREHENSIVE SYSTEM

	Man Years	Cost
<u>Development Phase:</u>		
Research	2.7	54,000
Design	3.05	61,000
Programming - Personnel	4.15	83,000
- Computer Cost		83,000
Training	0.55	11,000
Management	<u>0.66</u>	<u>19,800</u>
TOTALS	11.11	311,800
 <u>Implementation Phase:</u>		
Testing - Personnel	1.55	36,000
- Computer Cost		36,000
Conversion	0.60	12,000
Training	0.64	12,800
Management	<u>0.21</u>	<u>6,300</u>
TOTALS	3.00	103,100
 <u>Operations, Maintenance and</u>		
<u>Improvement Phase:</u>		
Programming - Personnel	0.70	14,000
- Computer Cost		14,000
Testing - Personnel	0.70	14,000
- Computer Cost		14,000
Operations Management	<u>3.50</u>	<u>42,000</u>
TOTALS	4.90	98,000

APPENDIX A

FAUL JOINT SERIALS CONTROL PROJECT FILE

- SECON - 1 Cornell study: early observations, problems and
9/21/70 gross flow. Notes from site visit on September
18, 1970.
- SECON - 1.1 Visit to Cornell University Libraries #2.
10/6/70
- SECON - 1.2 Visit to Cornell University Libraries #3.
10/14/70
- SECON - 1.3 Visit to Cornell University Libraries #4.
11/5/70
- SECON - 2 Visit to Buffalo - September 22, 1970.
9/24/70
- SECON - 2.1 Visit to SUNY at Buffalo Libraries #2.
10/29/70
- SECON - 3 Literature Review.
10/70
- SECON - 4 Visit to Faxon, Inc.
9/14/70 15 Southwest Park
 Westwood, Massachusetts 02090
 (617) 329-3350
- SECON - 5 Visit to the National Serials Data Program (NSDP)
10/7/70 Pilot Program and the Library of Congress.
- SECON - 6 Interview guide.
10/12/70
- SECON - 7 Agenda for Serials Staff Meeting October 23, 1970.
10/23/70
- SECON - 8 Visit to University of Rochester Libraries.
10/27/70
- SECON - 9 Visit to New York State Library.
10/22/70
- SECON - 10 Joint Serials Control Project: Progress Report.
11/4/70
- SECON - 11 Notes from contacts made at the ASIS Conference
10/17/70 Philadelphia, October 15, 1970.
- SECON - 12 Contact with Jim Woods at Chemical Abstract on
11/3/70 November 3, 1970.
- SECON - 13 Trip to New York Public Library and conversation
11/16/70 with UC San Diego about operations and plans for
 serials control system, on November 8, 1970.
- SECON - 14 Visit to Franklin Square Subscription Agency
11/10/70 545 Cedar Lane
 Teaneck, New Jersey 07666
 (201) 836-8700

- SECON - 15 Visit to SUNY at Binghamton.
11/6/70
- SECON - 16 Trip to Canadian Libraries: University of Western
11/17/70 Ontario, University of Guelph, Laval University.
- SECON - 17 Notes from telephone calls made to update the
11/22/70 literature review for ERIC.
- SECON - 18 CONFIDENTIAL, Telephone conversation with Fred
12/23/70 Bellomy, Library Systems Development Group,
UC-Santa Barbara.
- SECON - 19 Progress Report for period ending 1/7/71.
1/11/71
- SECON - 20 Progress Review, December 10, 1970.
12/14/70 Questions and Points of Discussion.
- SECON - 21 Letter of Intent to U.S. Office of Education and
1/8/71 the Council on Library Resources.
- SECON - 22 Visits to:
1/25/71 New York State Library Serials System.
UC, Irvine Book Acquisition System
UC, San Diego Serials System
Library Systems Development
UCLA Biomedical Library Serials System
Washington University Medical School Library
Serials System
Ohio State University Circulation
- SECON - 23 Report of presentation about national plans
2/1/71 relating to Serials at ARL meeting on Sunday,
January 17, 1971, at the Biltmore Hotel, L.A.
- SECON - 24 Conversation with Arnie Goldfein regarding SU's
1/31/71 plans for a serials control system.
- SECON - 25 FAUL Joint Serials Control Project schedule for
2/4/71 phase I.
- SECON - 26 Comments about project governance.
2/8/71
- SECON - 27 Report of a breakfast meeting of R. Ross, R.
2/8/71 Miller, G. Olsen, D. Eaves, R. Abel of Richard
Abel Co. at Los Angeles on Thursday, January 21,
1971 (see also NELINET staff report, attached).
- SECON - 28 Notes taken during a serials system requirements
2/8/71 meeting at the Northway Inn, Syracuse, January
28 - 29, 1971.

APPENDIX B

CURRENT SERIALS SYSTEMS SUMMARY DATA

- o Types of materials handled as serials
- o Number of serial titles
- o Number of serial titles added to the collection
- o Functions performed by the serials department
- o Number of FTE's performing serials functions
- o Duplicated functions and the number of FTE's required to perform them

CURRENT SERIALS SYSTEMS SUMMARY DATA

	CORNELL						BUFFALO			ROCHESTER		
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
1. Types of materials handled as serials												
Journals	X	X	X	X	X	X	X	X	X	X	X	X
Yearbooks	X	X	X	X	X	X	X	X	X	X	X	X
Annual Reports	X	X	X	X	X	X	X	X	X	X	X	X
Reports & Transactions of Societies & other non-commercial org.	X	X	X	X	X	X	X	X	X	X	X	X
Almanacs	X	X	X	X	X	X	X	X	X	X	X	X
Foreign & Domestic Gov't Periodicals	X	X	X	X	X	X	X	X	X	X	X ¹	X
General Trade Cat	X	X	X	X	X	X	X	X	X	X	X	X
House Organs	X	X	X	X	X	X	X	X	X	X	X	X
Newspapers		X	X	X	X	X	X	X	X	X	X	X
Proc. of conferences and congresses	X	X	X	X	X	X	X	X	X	X	X	X
Memoirs		X	X	X	X	X	X	X ²	X	X	X	X
No. Monographic Series		X	X	X	X	X	X	X ²	X	X	X	X
Looseleaf Services	X	X	X	X	X	X	X	X	X	X	X	X
Handbooks Issued in Series		X	X	X	X	X	X	X	X	X	X	X

	CORNELL						BUFFALO			ROCHESTER		
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
Bul. of experimental stations	X	X			X						X	
Tech Reports	X	X			X						X	X
Pocket Parts										X		
Multi-Vol Sets Issued over Period of Time												
2.#of Serial Titls	52,000	22,668	4349	285	2055	450	12,271	2843	3421	7460	16,128+	2200
Active (#)	32,000	11,378	4131	235	1159	360	9,156	2427	3386	5860	10,171	1760
Active (%)	62	52	95	82	55	80	25.4	85	99	77	62	80
Inactive (#)	20,000	11,290	218	50	896	90	3,115	416	35	1600	5,957	440
Inactive (%)	38	48	5	18	45	20	74.6	15	1	23	38	20
Current subs.	32,000	12,168	4650	250	2055	1600	9,156	2465	3421	5860	18,328+	2200
TOTALS for each campus												
Serial Titles	81,807						25,995				18,328+	
Active	49,263						20,829				11,931	
Inactive	32,544						5,166				6,397	
Current subs.	52,723						20,902				11,931	

	CORNELL						BUFFALO				ROCHESTER	
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
GRAND TOTAL for 3 campuses												
Serial Titles	126,130											
Active	82,023											
Inactive	44,107											
Current subs.	85,996											
3. # of titls added to collection												
1968 - 1969	2837	666	145	19	42	NA	1091	NA	367	460	612	NA
1969 - 1970	3699	623	195	19	120	10	729	70	234	575	869	NA
Estimated: 70-71	3300	600	210	20	54	8	660	75	150	620	700	NA
Est: 1971 - 1972	3150	600	217	20	NA	8	725	80	100	750	700	NA
Est: 1972 - 1973	3000	600	225	20	NA	8	800	85	100	1200	700	NA
Est: 1973 - 1974	2750	600	240	20	NA	8	1250	90	100	1000	700	NA
Est: 1974 - 1975	2500	600	255	20	NA	8	2100	95	100	600	700	NA
4. % of Titles												
Acquired by Gifts & Exchange	23.8	59	22	10	49	10	18	4	19	17	14	1
Gov't Deposit	4	3	0	2	0.01	3	0	11	0	0.09	0	5

	CORNELL						BUFFALO				ROCHESTER	
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
Paid Subscription	72.2	38	78	78	50	8	82	84	81	74	86	95
Other				10				11				
5a. Does your library have a <u>serials dept.?</u>	YES	NO	NO	NO	NO	NO	YES ³	YES	YES	NO	YES	YES
Functions Selection	X	X	X	X	X	X	subj biblio	X	par-tial	X		X
Pre-Order verif.	X	X	X	X	X	X	X	X	X	X	X	X
Subs. Renewal	X	X	X	X	X	X	X	X	X	X	X	X
Invoice Author.	X	X	X	X	X	X	X	X	X	X	X	X
Check-In	X	X	X	X	X	X	X	X	X	X	X	X
Claiming	X	X	X	X	X	X	X	X	X	X	X	X
Binding prep.	X	X	X	X	X	X	X	X	X	X	X	X
Cataloging	X	X	X	X	X	X	X	4/		X	X	X
Holdings Update	X	X	X	X	X	X	X	X	X	X	X	X
Other							5/				6/	
5b. No. of FTE's performing serials functions at In-dep. lib. prof.	5	2.36	1	.10	.30	.75	7.4	1		1	5	1

	CORNELL						BUFFALO				ROCHESTER	
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
Clerical	19.8	7.35	3	.10	.98	2.22	24.8	3.75	3	3	11	2
Student Assist.	0.25			.075	.075				.40		1	
Other	0.25											
6a. Does your Lib proc serials for a dep. lib?	YES	YES	NO	NO	NO	NO	YES	YES	YES	NO	YES	NO
6b. # of FTE's Per- forming serials functions for dep. lib.												
Clerical	6.495	1.57	NONE	NONE	NONE	NONE	2	.43	.30	NONE	1.02	NONE
Professional												
Student Assist												
Other												
7a. Which serials functions are dup. at dep. lib.												
Selection												
Pre-order verif.	X										X	
Acquisitions											X	
Invoice Control												
Check-In	X	X					X	X			X	

	CORNELL						BUFFALO				ROCHESTER	
	OLIN	MANN	LAW	HOTEL	VET	ILR	LOCK WOOD	S&E	HSL	LAW	RUSH RHEES	MINER
Claiming	X										X	
Binding Prep.	X							X			X	
Cataloging												
Holdings Update	X						X	X			X	
Other												
7b. # of FTE's Performing dup. functions.	2	.44	NONE	NONE	NONE	NONE	1	.43	NONE	NONE	.54	NONE

1/ U.S. UN, Rochester, Monroe County, N.Y. State entered in Documents Section. Other states and a few foreign title entered in Serials and Binding Department.

2/ Defined as "serials" only if indexed in Biological Abstracts, Index Medicus of Chemical Abstracts.

3/ Called Periodicals & Binding Section.

4/ Assignment of cutter numbers to periodicals.

5/ SUNYAB union list update.

6/ Union List of Serials update Rochester Academy of Science Exchange. Supervision of periodical reading room.

APPENDIX C

SERIAL FILE INVENTORY

- Part I: Cornell University
- Part II: SUNY at Buffalo
- Part III: University of Rochester

PART I: CORNELL

FILE NAME	LOCATION	ARRANGEMENT	NO. OF RECORDS	
Binding records, permanent (called serials pattern at Law; Rubbing cards at Mann)	Olin	by library	13,800	
	Mann	call no.	7,300	
	Law	call no.	3,500	
Binding records, temporary (called Bindery at Law, Mann & Entomology)	Olin	call no.	600	
	Mann Ento Law	call no.	150	
Discard	Olin	main entry	7,000	
	Mann	main entry	3,000	
Foreign exchange, active	Mann	by country	800	
Inprocess	Law	main entry		
	ILR	main entry		
Kardex (called rotary at Mann; general rotary periodi- cal Kardex at ILR)	Olin	main entry	58,540	
	Business	main entry		
	Engin	main entry		
	Fine Arts	main entry		
	Math	main entry		
	Music	main entry		
	Phys.Sci.	main entry		
	Undergrad	main entry		
	Mann	main entry		21,900
	Ento	main entry		
	Law	main entry		10,290
	Hotel	main entry		160
	Vet	main entry		3,650
	ILR	main entry		1,100
Kardex, dead (called inactive rotary at Mann)	Olin	main entry	4,500	
	Mann	main entry		
Kardex, preliminary check-in	ILR	main entry	600	

PART I: CORNELL (cont.)

FILE NAME	LOCATION	ARRANGEMENT	NO. OF RECORDS
Kardex, serials check-in	ILR	main entry	7,500
Linedex	Mann ILR	main entry main entry	1,600
Membership	Olin	name of org.	
On order by main entry	Business Mann Law Vet ILR	main entry main entry main entry main entry main entry	1,500 1,000 500 180
On order by vendor	Law	vendor	1,500
On order, dept. & staff	Mann	main entry	2,000
Order, perm. record of	Olin	order no.	60,000
Orders, standing	Law		
Orders, being considered	Vet	main entry	30
Out of print serials	Mann	main entry	800
Outstanding orders			
Periodicals list, BPA	various loc		
Periodicals list, ILR	various loc		
Public catalog	Olin Business Engineer Fine Arts Math Music Phy.Sci. Undergrad Mann Entomology Law Hotel Vet ILR	Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj Auth/tit/subj	
Publisher's Address	Olin	pub. name	500

PART I: CORNELL (cont.)

FILE NAME	LOCATION	ARRANGEMENT	NO. OF RECORDS
Serials catalog	Olin	main entry	Union-77,342 Olin and Dep. - 55,981
	Math	main entry	176,000
	Phy.Sci.	main entry	
	Mann	main entry	
	Entomology	main entry	
	Vet	main entry	
ILR	main entry		
Serials list, CUL	various loc.		
Shelflist	Olin	call no.	309,000
	Business	call no.	
	Engineer	call no.	
	Fine Arts	call no.	
	Math	call no.	
	Music	call no.	
	Phy.Sci.	call no.	
	Undergrad	call no.	
	Mann	call no.	
	Entomology	call no.	
Law		2,000	
Vet	title		
Subscriptions, dept. and staff	Mann	main entry	1,000
Uncataloged serials	Mann	main entry	500

PART II: BUFFALO

FILE NAME	LOCATION	ARRANGEMENT	NO. OF RECORDS
Bindery invoices	Lockwood	Library unit	293
Bindery shipment	Lockwood	date sent	6,190
	Bell Sci. HSL	date of rtrn.	580
Bound periodical	S&E	title	5,010
Claim	HSL	title	1,870
Continuation	Lockwood Music	title	
Kardex	Lockwood Art Bell Sci. Library Sci. Ridge Lea S&E HSL Law	title title title main entry	10,540 3,240 3,640 4,000
Kardex, dead	Lockwood	title	2,640
Newspaper	Lockwood	title	200
Periodical order	HSL S&E	title order no.	1,060 440
Periodicals Rec'd	Lockwood	order no.	10,060
Public catalog	Lockwood	auth/tit/subj	
Publishers' address	Lockwood	Publisher	1,090
Shelflist	Lockwood Reference	call no. call no.	
SUNYAB union list	various loc.	title	

PART II: BUFFALO (cont.)

FILE NAME	LOCATION	ARRANGEMENT	NO. OF RECORDS
Treasurer's Visible also called vertical file at Music	Lockwood Library Sci. Music	order no. main entry main entry	10,060

PART III: ROCHESTER

FILE NAME	LOCATION	ARRANGEMENT	TYPE OF REC.	# OF REC.
Bindery	Rush Rhees	call no.	-	380
	Chemistry	call no.	-	
	Engineer	call no.	-	
	Geology	call no.	-	
	Life Sci.	call no.	-	
	Physics	call no.	-	
Bindery, separates at Binding	Rush Rh-S&B	main entry	-	1,450
Bindery, back	Rush Rh-S&B	main entry	-	2,170
Binding replace.	Rush Rh-S&B			
Card copy	Rush Rh-S&B	main entry	-	27
Claims	Rush Rh-S&B	month-title	-	670
	Miner Med.		-	50
Continuation	Rush Rh-S&B	main entry	-	63,600
Cross ref.	Rush Rh-S&B	main entry	-	890
Dealer	Rush Rh-S&B	dealer	-	368
Depository	Rush Rh-cat dept.			
Invoice	Rush Rh-S&B	yr/pub/date	-	7,500
Kardex	Rush Rh-S&B	main entry	check-in 7 order bindery	11,080
	Art	main entry		5,090
	Bus. Adm.	main entry		
	Chemistry	main entry		
	Education	main entry		
	Engin.	main entry		
Geology	main entry			

PART III: ROCHESTER (cont.)

FILE NAME	LOCATION	ARRANGEMENT	TYPE OF REC.	# OF REC.
	Life Sci. Physics Miner Med.	title	check-in	1,760
Kardex, dead	Rush Rh-S&B	main entry	-	11,000
Membership	Rush Rh-S&B	name of org.	-	124
Official cat	Rush Rh-cat dept.	main entry	-	56,400
Order by order number	Rush Rh-S&B	order no.	-	3,210
Orders outstand.	Rush Rh-S&B Miner Med.	PO number	-	368
Orders can- celled	Rush Rh-S&B	main entry	-	370
Orders open	Acquis.dept.			
Orders rec'd	Rush Rh-S&B	yr-main entry	-	4,380
Public cat	Rush Rhees Chemistry Education Engineer Geology Life Sci. Physics S. Asia Miner Med.	main entry main entry main entry main entry main entry main entry main entry main entry main entry	- - - - - - - - -	
Publishers' add	Rush Rh-S&B	publisher	-	440
Roch.union list punch card file	Rush Rh-S&B	by lib, tit.		14,610
Sample & Discard	Rush Rh-S&B	main entry		1,000
Shelf list	Rush Rh-Ref. Miner Med.	call no.		2,200

PART III: ROCHESTER (cont.)

FILE NAME	LOCATION.	ARRANGEMENT	TYPE OF REC.	# OF REC.
Wheeldex	Rush Rh-Ref	main entry	-	7,750
	Rush Rh- Photocopy	main entry	-	7,750
	Art	main entry	-	
	Physics	main entry	-	
	Miner Med.	main entry	-	1,760

APPENDIX D
COST ESTIMATING DATA

TABLE	TITLE
1	Subscription Costs (1969-1970)
2	Subscription Costs in 1975
3	Library Subscription Costs (Cornell)
4	Library Subscription Costs (Buffalo)
5	Library Subscription Costs (Rochester)
6	Proposed Subscription Increases and Range of Cost (Cornell)
7	Proposed Subscription Increases and Range of Cost (Buffalo)
8	Proposed Subscription Increases and Range of Cost (Rochester)
9	Library Subscription Costs (Cornell)
10	Library Subscription Costs (Buffalo)
11	Library Subscription Costs (Rochester)
12	Total Salaries for Varying Raises and Personnel Levels (Cornell)
13	Total Salaries for Varying Raises and Personnel Levels (Buffalo)
14	Total Salaries for Varying Raises and Personnel Levels (Rochester)
15	Binding Costs for Proposed Subscription Increases (Cornell)
16	Binding Costs for Proposed Subscription Increases (Buffalo)
17	Binding Costs for Proposed Subscription Increases (Rochester)
18	Cornell Binding Costs Level Growth Rate
19	Buffalo Binding Costs Level Growth Rate
20	Rochester Binding Costs Level Growth Rate
21	Total Subscription Cost in 1975
22	Range of Cost Totals in 1975

TABLE I
SUBSCRIPTION COSTS (1969-1970)

	Cornell	Buffalo	Rochester	TOTAL
Number of Pair Subscriptions	13,214	16,899	10,804	40,917
Subscription Cost	301,731.48	311,482.00	235,000.00	848,213.48
Unit Cost Per Subscription	22.83	18.43	20.17	20.48

TABLE 2
SUBSCRIPTION COSTS IN 1975
PLANNED GROWTH RATE

	Rate of Annual Cost Increase			
	8%	10%	11%	12%
Cornell	877,756	944,449	978,926	1,015,382
Buffalo	649,539	699,025	724,934	751,361
Rochester	373,158	405,399	416,418	431,791
TOTALS	1,900,453	2,048,873	2,120,278	2,198,534
	Level			
Cornell	429,984	485,747	508,078	531,731
Buffalo	457,625	501,562	524,883	548,880
Rochester	320,014	354,155	367,120	384,082
TOTALS	1,207,623	1,341,464	1,400,081	1,464,693
	Limited			
Cornell	566,391	639,845	669,251	700,417
Buffalo	489,380	536,231	571,628	597,762
Rochester	340,748	377,101	390,906	408,967
TOTALS	1,405,519	1,553,177	1,631,795	1,707,146

TABLE 3
LIBRARY SUBSCRIPTION COSTS

Cornell Current (1970) Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
1971	13214	24.66	325,857.24	25.11	331,803.54
1972	13214	26.63	351,888.28	27.62	364,970.68
1973	13214	28.76	380,034.64	30.38	401,441.32
1974	13214	31.06	410,426.84	33.42	441,611.88
1975	13214	32.54	429,983.56	36.76	485,746.64

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
1971	13214	25.23	333,389.22	25.34	334,842.76
1972	13214	27.83	368,406.32	28.12	371,577.68
1973	13214	30.81	407,123.34	31.21	412,408.94
1974	13214	34.05	449,936.70	34.64	457,732.96
1975	13214	37.63	497,242.82	38.45	508,078.30

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
1971	13214	25.46	336,428.44	25.57	337,881.98
1972	13214	28.29	373,824.06	28.64	378,448.96
1973	13214	31.54	416,769.56	32.08	423,905.12
1974	13214	35.17	464,736.38	35.93	474,779.02
1975	13214	39.22	518,253.08	40.24	531,731.36

TABLE 4
LIBRARY SUBSCRIPTION COSTS

Buffalo Current (1970) Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	16899	19.90	336,290.10	20.27	342,542.73
1972	16899	21.49	363,159.51	22.30	376,847.70
1973	16899	23.21	392,225.79	24.53	414,532.47
1974	16899	25.07	423,657.93	26.98	454,921.08
1975	16899	27.08	457,624.92	29.68	501,562.32

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	16899	20.37	344,232.63	20.46	345,753.54
1972	16899	22.51	380,396.49	22.71	383,776.29
1973	16899	24.87	420,278.13	25.21	426,023.79
1974	16899	27.48	464,384.52	27.98	472,834.02
1975	16899	30.37	513,144.89	31.06	524,882.94

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	16899	20.55	347,274.45	20.64	348,795.36
1972	16899	22.91	387,156.09	23.12	390,704.88
1973	16899	25.54	431,600.46	25.89	437,515.11
1974	16899	28.48	481,283.52	29.00	490,071.00
1975	16899	31.76	536,712.24	32.48	548,879.52

TABLE 5

LIBRARY SUBSCRIPTION COSTS

Rochester Current (1970) Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,196.68
1971	10804	21.78	235,311.12	22.19	239,740.76
1972	10804	23.52	254,110.08	24.41	263,725.64
1973	10804	25.40	274,529.64	26.85	290,087.40
1974	10804	27.43	295,253.72	29.80	322,067.24
1975	10804	29.62	320,014.48	32.78	354,155.12

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,916.68
1971	10804	22.29	240,821.16	22.39	241,901.56
1972	10804	24.63	266,102.52	24.85	268,479.40
1973	10804	27.22	294,084.88	27.58	297,974.32
1974	10804	30.08	324,984.32	30.61	330,710.44
1975	10804	33.24	359,124.96	33.98	367,119.92

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,916.68
1971	10804	22.49	242,981.96	22.59	224,062.36
1972	10804	25.08	270,964.32	25.30	273,341.20
1973	10804	27.96	302,079.84	28.34	306,185.36
1974	10804	31.18	336,868.72	31.74	342,918.96
1975	10804	34.77	375,655.08	35.55	384,082.20

TABLE 6

PROPOSED SUBSCRIPTION INCREASES AND RANGE OF COST

Cornell

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
70-71	17406	24.66	429,231.96	25.11	473,064.66
72-73	21259	26.33	566,127.17	27.62	587,173.58
73-74	24877	28.76	715,462.52	30.38	755,763.26
74-75	28260	31.06	877,755.60	33.42	944,449.20

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
70-71	17406	25.23	439,153.38	25.34	441,068.04
72-73	21259	27.88	592,700.92	28.12	597,803.08
73-74	24877	30.81	766,460.37	31.21	776,411.17
74-75	28260	34.05	962,253.00	34.64	978,926.40

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	13214	22.83	301,675.62	22.83	301,675.62
70-71	17406	25.46	443,156.76	25.57	445,071.42
72-73	21259	28.29	601,417.11	28.64	608,857.76
73-74	24877	31.54	784,620.58	32.08	798,054.16
74-75	28260	35.17	993,904.20	35.93	1,015,381.80

TABLE 7

PROPOSED SUBSCRIPTION INCREASES AND RANGE OF COST

Buffalo

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	18404	19.90	366,239.60	20.27	373,049.08
72-73	20584	21.49	442,350.16	22.30	459,023.20
73-74	23019	23.21	534,270.99	24.53	564,656.07
74-75	25909	25.07	649,538.63	26.98	699,024.82

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	18404	20.37	374,889.48	20.46	376,545.84
72-73	20584	22.51	463,345.84	22.71	467,462.64
73-74	23019	24.87	572,482.53	25.21	580,308.99
74-75	25909	27.48	711,979.32	27.98	724,933.82

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	16899	18.43	312,448.57	18.43	312,448.57
1971	18404	20.55	378,202.20	20.64	379,858.56
72-73	20584	22.91	471,579.44	23.12	475,902.08
73-74	23019	25.54	587,905.26	25.89	595,961.91
74-75	25909	27.98	724,933.82	29.00	751,361.00

TABLE 8

PROPOSED SUBSCRIPTION INCREASES AND RANGE OF COST

Rochester

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,916.68
70-71	11504	21.78	250,557.12	22.19	255,273.76
72-73	12204	23.52	287,038.08	24.41	297,899.64
73-74	12904	25.40	327,761.60	26.85	346,472.40
74-75	13604	27.43	373,157.72	29.80	405,399.20

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,916.68
70-71	11504	22.29	256,424.16	22.39	257,574.56
72-73	12204	24.63	300,584.52	24.85	303,269.40
73-74	12904	27.22	351,246.88	27.58	355,892.32
74-75	13604	30.08	409,208.32	30.61	416,418.44

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	10804	20.17	217,916.68	20.17	217,916.68
70-71	11504	22.49	258,274.96	22.59	259,875.36
72-73	12204	25.08	306,076.32	25.30	308,761.20
73-74	12904	27.96	360,795.84	28.34	365,699.36
74-75	13604	31.18	424,172.72	31.74	431,790.96

TABLE 9

LIBRARY SUBSCRIPTION COSTS

Cornell Intermediate Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	17406	22.83	397,378.98	22.83	397,378.98
1971	17406	24.66	429,231.96	25.11	437,064.66
1972	17406	26.63	463,521.78	27.62	480,753.72
1973	17406	28.76	500,596.56	30.38	528,794.28
1974	17406	31.06	540,630.36	33.42	581,708.52
1975	17406	32.54	566,391.24	36.76	639,844.56

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	17406	22.83	397,378.98	22.83	397,378.98
1971	17406	25.23	439,153.38	25.34	441,068.04
1972	17406	27.88	485,279.28	28.12	489,456.72
1973	17406	30.81	536,278.86	31.21	543,241.26
1974	17406	34.05	592,674.30	34.64	602,943.84
1975	17406	37.63	654,987.78	38.45	669,260.70

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	17406	22.83	397,378.98	22.83	397,378.98
1971	17406	25.46	443,156.76	25.57	445,071.42
1972	17406	28.29	492,415.74	28.64	498,507.84
1973	17406	31.54	548,985.24	32.08	558,84.48
1974	17406	35.17	612,169.02	35.93	625,397.58
1975	17406	39.22	682,663.32	40.24	700,417.44

TABLE 10
LIBRARY SUBSCRIPTION COSTS

Buffalo Intermediate Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	18404	18.43	339,185.72	18.43	339,185.72
1971	18404	19.90	366,239.60	20.27	373,049.08
1972	18404	21.49	395,501.96	22.30	410,409.20
1973	18404	23.21	427,156.84	24.53	451,450.12
1974	18404	25.07	461,388.28	26.98	496,539.92
1975	18404	27.08	498,380.32	29.68	536,230.72

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	18404	18.43	339,185.72	18.43	339,185.72
1971	18404	20.37	374,889.48	20.46	376,545.84
1972	18404	22.51	414,274.04	22.71	417,954.84
1973	18404	24.87	447,707.48	25.21	463,964.84
1974	18404	27.48	505,741.92	27.98	514,943.92
1975	18404	30.37	558,929.48	31.06	571,628.24

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	18404	18.43	339,185.72	18.43	339,187.72
1971	18404	20.55	378,202.20	20.64	379,858.56
1972	18404	22.91	421,635.64	23.12	425,500.48
1973	18404	25.54	470,038.16	25.89	478,479.56
1974	18404	28.48	524,145.92	29.00	533,715.00
1975	18404	31.76	584,511.04	32.48	597,761.92

TABLE 11

LIBRARY SUBSCRIPTION COSTS

Rochester Intermediate Level Subscriptions

Year	Quantity	<u>Increase at 8%</u>		<u>Increase at 10%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	11504	20.17	232,035.68	20.17	232,035.68
1971	11504	21.78	250,557.12	22.19	258,273.76
1972	11504	23.52	270,574.08	24.41	280,812.64
1973	11504	25.40	292,201.60	26.85	308,882.40
1974	11504	27.43	315,554.72	29.80	342,819.20
1975	11504	29.62	340,748.48	32.78	377,101.12

Year	Quantity	<u>Increase at 10.5%</u>		<u>Increase at 11%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	11504	20.17	232,035.68	20.17	232,035.68
1971	11504	22.29	256,424.16	22.39	257,574.56
1972	11504	24.63	283,343.52	24.85	287,874.40
1973	11504	27.22	313,138.88	27.58	317,280.32
1974	11504	30.88	346,040.32	30.61	352,137.44
1975	11504	33.24	382,392.96	33.98	390,905.92

Year	Quantity	<u>Increase at 11.5%</u>		<u>Increase at 12%</u>	
		Unit Cost	Total Cost	Unit Cost	Total Cost
1970	11504	20.17	232,035.68	20.17	232,035.68
1971	11504	22.49	258,724.96	22.59	259,875.36
1972	11504	25.08	288,520.32	25.30	291,051.20
1973	11504	27.96	321,652.84	28.34	326,023.36
1974	11504	31.18	358,694.72	31.74	365,136.96
1975	11504	34.77	399,994.08	35.55	408,967.20

TABLE 12

TOTAL SALARIES FOR VARYING
RAISES AND PERSONNEL LEVELS

Cornell - 1970 Total Salaries = 295,651.93 Total Personnel = 45

ANNUAL SALARY INCREASE 4%

	45 FTE	46 FTE	47 FTE	48 FTE
1970	\$ 295,651.93	\$ 302,221.97	\$ 308,792.01	\$ 315,362.04
1971	307,478.00	214,210.84	321,143.68	327,976.52
1972	319,777.12	326,883.27	333,989.42	341,095.57
1973	332,568.20	339,958.60	347,349.00	354,739.40
1974	345,870.92	353,556.94	361,242.96	368,928.98
1975	359,705.75	367,699.21	375,692.67	383,686.13

ANNUAL SALARY INCREASE 5%

1970	295,651.93	302,222.00	308,792.00	315,362.00
1971	310,434.53	317,344.00	324,243.00	331,142.00
1972	325,956.26	333,199.00	340,442.00	347,685.00
1973	342,254.07	349,860.00	357,446.00	365,072.00
1974	359,366.77	367,353.00	375,339.00	383,325.00
1975	377,335.11	387,720.00	394,105.00	402,490.00

ANNUAL SALARY INCREASE 6%

1970	295,651.93	302,222.00	308,792.00	315,362.00
1971	313,391.05	320,355.00	437,319.00	334,283.00
1972	332,194.51	339,577.00	346,959.00	354,341.00
1973	352,126.18	359,951.00	367,776.00	375,601.00
1974	373,253.75	381,549.00	389,844.00	398,139.00
1975	395,648.98	404,441.00	413,233.00	422,025.00

ANNUAL SALARY INCREASE 7%

1970	295,651.93	302,222.00	308,792.00	315,362.00
1971	316,347.57	323,378.00	330,408.00	337,438.00
1972	338,491.90	346,014.00	353,536.00	361,058.00
1973	362,186.33	370,235.00	378,284.00	386,333.00
1974	387,539.37	396,151.00	404,763.00	413,375.00
1975	414,189.37	423,404.00	432,619.00	441,834.00

TABLE 12 (continued)

Cornell - 1970 Total Salaries = \$295,651.93 Total Personnel = 45

ANNUAL SALARY INCREASE 8%

	45 FTE	46 FTE	47 FTE	48 FTE
1970	\$ 295,651.93	\$ 302,222.00	\$ 308,792.00	\$ 315,362.00
1971	319,304.08	326,400.00	333,496.00	340,592.00
1972	344,848.41	352,511.00	360,174.00	367,837.00
1973	372,436.28	380,712.00	388,988.00	397,264.00
1974	402,231.18	411,169.00	420,107.00	429,045.00
1975	434,409.67	444,064.00	453,728.00	463,382.00

ANNUAL SALARY INCREASE 9%

1970	295,651.93	302,222.00	308,792.00	315,362.00
1971	322,260.60	329,417.00	336,573.00	343,729.00
1972	351,264.05	359,064.00	366,864.00	374,664.00
1973	382,877.81	391,380.00	399,882.00	408,384.00
1974	417,336.81	427,604.00	436,871.00	446,138.00
1975	454,897.12	464,998.00	475,099.00	485,200.00

ANNUAL SALARY INCREASE 10%

1970	295,651.93	302,222.00	308,792.00	315,362.00
1971	325,217.12	332,438.00	339,659.00	346,880.00
1972	357,738.83	365,682.00	373,625.00	381,568.00
1973	393,512.71	402,250.00	410,987.00	419,724.00
1974	432,863.98	442,475.00	452,086.00	461,697.00
1975	476,150.37	486,722.00	497,294.00	507,866.00

TABLE 13

TOTAL SALARIES FOR VARYING
RAISES AND PERSONNEL LEVELS

Buffalo - 1970 Total Salaries = \$258,694.00 Total Personnel = 44

ANNUAL SALARY INCREASE 4%

	44 FTE	45 FTE	46 FTE	47 FTE
1970	\$ 258,694.00	\$ 264,572.00	\$ 270,450.00	\$ 276,328.00
1971	269,041.76	275,155.07	281,268.38	287,381.69
1972	279,804.99	286,162.83	292,520.67	298,878.51
1973	290,997.19	297,690.34	304,221.49	310,833.64
1974	302,637.08	309,513.72	316,390.36	323,267.00
1975	314,742.56	321,894.27	329,045.98	336,197.69

ANNUAL SALARY INCREASE 5%

1970	258,694.00	264,572.00	270,450.00	276,328.00
1971	271,628.70	277,800.79	283,972.88	290,144.97
1972	285,210.13	291,690.83	298,171.53	304,652.23
1973	299,470.63	306,275.37	313,080.11	319,884.85
1974	314,444.16	321,589.14	328,734.12	335,879.10
1975	350,166.36	357,668.59	365,170.82	372,673.05

ANNUAL SALARY INCREASE 6%

1970	258,694.00	264,572.00	270,450.00	276,328.00
1971	274,215.64	280,446.51	286,677.38	292,908.25
1972	290,667.57	297,278.29	303,883.01	310,487.73
1973	308,108.68	315,109.68	322,110.68	329,111.68
1974	326,595.20	334,016.26	341,437.32	348,858.38
1975	346,190.91	354,057.23	361,923.55	369,789.87

ANNUAL SALARY INCREASE 7%

1970	258,694.00	264,572.00	270,450.00	276,328.00
1971	276,802.58	283,092.23	289,381.88	297,671.53
1972	296,178.76	302,908.69	309,638.62	316,368.55
1973	316,911.27	324,112.30	331,313.33	338,514.31
1974	339,095.05	347,339.51	355,583.97	363,828.43
1975	362,831.07	371,075.53	379,319.99	387,564.45

TABLE 13 (continued)

Buffalo - 1970 Total Salaries = \$258,694.00 Total Personnel = 44

ANNUAL SALARY INCREASE 8%

	44 PTE	45 PTE	46 PTE	47 PTE
1970	\$ 258,694.00	\$ 264,572.00	\$ 270,450.00	\$ 276,328.00
1971	279,389.52	287,737.95	292,086.38	298,434.81
1972	308,740.68	308,596.98	315,453.28	322,309.58
1973	325,879.93	333,284.73	340,689.53	348,094.33
1974	351,950.32	359,947.50	367,944.68	375,941.86
1975	380,106.34	388,743.29	397,380.24	406,017.19

ANNUAL SALARY INCREASE 9%

1970	258,694.00	264,572.00	270,450.00	276,328.00
1971	281,976.46	288,383.68	294,790.90	301,198.12
1972	307,254.34	314,338.21	321,322.08	328,305.95
1973	355,015.23	262,628.65	370,241.07	377,853.49
1974	365,167.69	373,465.23	381,762.77	390,060.31
1975	398,032.78	407,077.10	416,121.42	425,165.74

ANNUAL SALARY INCREASE 10%

1970	258,694.00	264,572.00	270,450.00	276,328.00
1971	284,563.40	291,029.40	297,495.40	303,961.40
1972	313,019.74	320,132.34	327,244.94	334,357.54
1973	344,321.71	352,145.57	359,969.43	367,793.29
1974	378,753.88	387,360.13	395,966.38	404,572.63
1975	416,629.26	435,563.02	445,029.90	454,496.78

TABLE 14

TOTAL SALARIES FOR VARYING
RAISES AND PERSONNEL LEVELS

Rochester - 1970 Total Salaries = \$155,838.28 Total Personnel = 21

ANNUAL SALARY INCREASE 4%

	21 FTE	22 FTE	23 FTE	24 FTE
1970	\$ 155,838.28	163,240.10	170,641.92	178,043.74
1971	162,071.82	169,769.71	177,467.60	185,165.49
1972	158,554.68	176,560.49	184,566.30	192,572.11
1973	175,296.87	183,622.91	191,948.95	200,274.99
1974	182,308.74	190,967.82	199,626.90	208,285.98
1975	189,601.09	198,606.53	207,611.97	216,617.41

ANNUAL SALARY INCREASE 5%

1970	155,838.28	163,240.10	170,641.92	178,043.74
1971	163,630.19	171,402.10	179,174.01	186,945.92
1972	171,811.70	179,972.21	188,132.72	196,293.23
1973	180,402.29	188,970.83	197,539.37	206,107.91
1974	189,422.40	198,419.37	207,416.34	216,413.31
1975	198,893.52	208,340.34	217,787.16	227,233.98

ANNUAL SALARY INCREASE 6%

1970	155,838.28	163,240.10	170,641.92	178,043.74
1971	165,188.58	173,034.51	180,880.44	188,726.37
1972	175,099.89	183,416.48	191,733.27	200,049.96
1973	185,605.88	194,421.57	203,237.26	212,052.95
1974	196,742.23	206,086.86	215,431.49	224,776.12
1975	208,546.76	218,452.07	228,357.38	238,262.69

ANNUAL SALARY INCREASE 7%

1970	155,838.28	163,240.10	170,641.92	178,043.74
1971	166,746.96	174,666.91	182,576.86	190,496.81
1972	178,419.25	186,983.60	195,367.95	203,842.30
1973	190,908.60	199,976.15	209,043.70	218,111.25
1974	204,272.20	213,974.48	223,676.76	233,379.04
1975	218,571.25	228,952.69	229,334.13	249,715.57

TABLE 14 (continued)

Rochester - 1970 Total Salaries= \$155,838.28 Total Personnel=21

ANNUAL SALARY INCREASE 8%

1970	\$ 155,838.28	\$ 163,240.10	\$ 170,641.92	\$ 178,043.74
1971	168,305.34	176,299.39	184,293.28	192,287.25
1972	181,769.77	190,403.26	199,036.75	207,670.24
1973	196,311.35	205,635.52	214,959.69	224,283.86
1974	212,016.26	222,086.36	232,156.46	242,226.56
1975	228,977.56	239,853.57	250,728.98	261,604.69

ANNUAL SALARY INCREASE 9%

1970	155,838.28	163,240.10	170,641.92	178,043.74
1971	169,863.73	177,931.71	185,999.69	194,067.67
1972	185,151.47	193,945.57	202,739.67	211,533.77
1973	201,815.10	211,400.67	220,986.24	230,571.81
1974	219,978.46	230,426.73	240,875.00	251,323.27
1975	239,776.52	251,165.13	262,553.74	273,942.35

ANNUAL SALARY INCREASE 10%

1970	155,838.28	163,240.10	170,641.92	178,043.74
1971	171,422.11	179,564.11	187,706.11	195,848.11
1972	188,564.32	197,520.52	206,476.72	215,432.92
1973	207,420.75	217,272.57	227,124.39	236,976.21
1974	228,162.83	238,999.83	249,836.83	260,673.83
1975	250,979.11	262,899.82	274,820.51	286,741.21

TABLE 15

BINDING COSTS FOR PROPOSED SUBSCRIPTION INCREASES

CORNELL

	ADDITIONS	TOTAL SUBSCR	INCREASE 4%	UNIT BIND- ING COST	TOTAL BIND- ING COST
69-70	--	51827	--	\$ 2.38	--
70-71	4192	56019	.10	2.48	\$ 138,927.12
72-73	3853	63490	.10	2.58	163,804.20
73-74	3618	67108	.10	2.68	179,849.44
74-75	3383	70491	.11	2.79	196,669.89
			<u>INCREASE 5%</u>		
70-71	4192	56019	.12	2.50	140,047.50
72-73	3853	63490	.13	2.63	166,978.70
73-74	3618	67108	.13	2.76	185,218.08
74-75	3383	70491	.14	2.90	204,423.90
			<u>INCREASE 6%</u>		
70-71	4192	56019	.14	2.52	141,167.88
72-73	3853	63490	.15	2.67	169,518.30
73-74	3618	67108	.16	2.83	189,915.64
74-75	3383	70491	.17	3.00	211,473.00
			<u>INCREASE 8%</u>		
70-71	4192	56019	.19	2.57	143,968.83
72-73	3853	63490	.21	2.78	176,498.20
73-74	3618	67108	.22	3.00	201,324.00
74-75	3383	70491	.24	3.24	228,390.84
			<u>INCREASE 10%</u>		
70-71	4192	56019	.24	2.62	146,769.78
72-73	3853	63490	.26	2.88	182,851.20
73-74	3618	67108	.29	3.17	212,732.36
74-75	3383	70491	.32	3.49	246,013.59

TABLE 16

BINDING COSTS FOR PROPOSED SUBSCRIPTION INCREASES

BUFFALO

	ADDITIONS	TOTAL SUBSCR	INCREASE 4%	UNIT BIND- ING COST	TOTAL BIND- ING COST
69-70	-	20892	--	\$ 5.26	---
70-71	-	22397	.21	5.47	\$ 122,511.59
72-73	2180	24577	.22	5.69	139,843.13
73-74	2435	27012	.23	5.92	159,911.04
74-75	2890	29902	.24	6.16	184,196.32
			<u>INCREASE 5%</u>		
70-71	1505	22397	.26	5.52	123,631.44
72-73	2180	24577	.28	5.80	142,446.60
73-74	2435	27012	.29	6.09	165,503.08
74-75	2890	29902	.30	6.39	191,073.78
			<u>INCREASE 6%</u>		
70-71	1505	22397	.32	5.58	124,975.26
72-73	2180	24577	.33	5.91	145,250.07
73-74	2435	27012	.35	6.26	169,095.12
74-75	2890	29902	.38	6.64	198,549.28
			<u>INCREASE 8%</u>		
70-71	1505	22397	.42	5.68	127,214.96
72-73	2180	24577	.45	6.13	150,675.01
73-74	2435	27012	.49	6.62	178,819.44
74-75	2890	29902	.53	7.15	213,799.30
			<u>INCREASE 10%</u>		
70-71	1505	22397	.53	5.79	129,678.63
72-73	2180	24577	.58	6.37	156,555.49
73-74	2435	27012	.64	7.01	189,354.12
74-75	2890	29902	.70	7.71	230,544.42

TABLE 17

BINDING COSTS FOR PROPOSED SUBSCRIPTION INCREASES
ROCHESTER

	ADDITIONS	TOTAL SUBSCR	INCREASE 4%	UNIT BIND- ING COST	TOTAL BIND- ING COST
69-70	--	12371	--	\$ 4.59	--
70-71	700	13071	.18	4.77	\$ 62,348.67
72-73	700	13771	.19	4.96	68,308.16
73-74	700	14471	.20	5.16	74,670.36
74-75	700	15171	.21	5.37	81,468.27
			<u>INCREASE 5%</u>		
70-71	700	13071	.23	4.82	63,002.22
72-73	700	13771	.24	5.06	69,681.26
73-74	700	14471	.25	5.31	76,841.01
74-75	700	15171	.27	5.58	84,654.18
			<u>INCREASE 6%</u>		
70-71	700	13071	.28	4.87	63,655.77
72-73	700	13771	.29	5.16	71,058.36
73-74	700	14471	.31	5.47	79,156.37
74-75	700	15171	.33	5.80	87,991.80
			<u>INCREASE 8%</u>		
70-71	700	13071	.37	4.96	64,832.16
72-73	700	13771	.40	5.36	73,812.56
73-74	700	14471	.43	5.76	83,787.09
74-75	700	15171	.46	6.25	94,818.75
			<u>INCREASE 10%</u>		
70-71	700	13071	.46	5.05	66,008.55
72-73	700	13771	.51	5.56	76,566.76
73-74	700	14471	.56	6.12	88,562.52
74-75	700	15171	.61	6.73	102,100.83

TABLE 18
 CORNELL BINDING COSTS
 LEVEL GROWTH RATE

Year	Total		Total	
	Increase at 4%		Increase at 5%	
1970	4938.24	123,456.00	6172.80	123,456.00
1971	5135.77	128,394.24	6481.44	129,628.80
1972	5341.20	133,530.01	6805.51	138,110.24
1973	5554.85	138,871.21	7145.79	142,195.75
1974	5777.04	144,426.06	7503.08	150,061.54
1975	6008.12	150,203.10	787.23	157,564.62
	<u>Increase at 6%</u>		<u>Increase at 8%</u>	
1970	7407.36	123,456.00	9876.48	123,456.00
1971	1851.80	130,863.36	10,666.60	133,332.48
1972	8322.85	138,714.16	11,519.93	143,999.08
1973	8822.22	147,037.01	12,441.52	155,519.01
1974	9351.55	155,859.23	13,436.84	167,960.53
1975	9912.65	165,210.78	14,511.79	181,397.37
	<u>Increase at 10%</u>			
1970	12,345.60	123,456.00		
1971	13,580.16	135,801.60		
1972	14,938.18	149,381.76		
1973	16,431.99	164,319.94		
1974	18,071.19	180,751.93		
1975	19,882.71	198,827.12		

TABLE 19
BUFFALO BINDING COSTS
LEVEL GROWTH RATE

Year	Total		Total	
	Increase at 4%		Increase at 5%	
1970	4440.00	111,000.00	5550.00	111,000.00
1971	4617.60	115,440.00	5827.00	116,550.00
1972	4802.30	120,057.60	6118.88	122,377.50
1973	4994.40	124,859.90	6424.82	128,496.38
1974	5194.17	129,854.30	6746.06	134,921.20
1975	5401.94	135,048.47	7083.36	141,667.26
	<u>Increase at 6%</u>		<u>Increase at 8%</u>	
1970	6660.00	111,000.00	8880.00	111,000.00
1971	7059.60	117,660.00	9590.40	119,880.00
1972	7483.18	124,719.60	10,357.63	129,470.40
1973	7932.17	132,202.78	11,186.24	139,828.03
1974	8408.10	140,134.95	12,081.14	151,014.27
1975	8912.58	148,543.05	13,047.63	163,095.41
	<u>Increase at 10%</u>			
1970	11,100	111,000.00		
1971	12,210	122,100.00		
1972	13,431	134,310.00		
1973	14,774	147,741.00		
1974	16,251	162,515.00		
1975	17,876	178,766.00		

TABLE 20
 ROCHESTER BINDING COSTS
 LEVEL GROWTH RATE

Year	Total		Total	
	Increase at 4%		Increase at 5%	
1970	2272.00	56,800.00	2840.00	56,800.00
1971	2362.88	59,072.00	2982.00	59,640.00
1972	2457.40	61,434.88	3131.10	62,522.00
1973	2555.69	63,892.28	3287.65	65,753.10
1974	2657.92	66,447.97	3452.04	69,040.75
1975	2764.24	69,105.89	3624.64	72,492.79
	<u>Increase at 6%</u>		<u>Increase at 8%</u>	
1970	3408.00	56,800.00	4544.00	56,800.00
1971	3612.48	60,208.00	4907.52	61,344.00
1972	3829.23	63,820.48	5300.12	66,251.52
1973	4058.98	67,649.71	5724.13	71,551.6
1974	4302.52	71,708.69	6182.06	77,275.7
1975	4550.67	76,011.21	6676.63	83,457.83
	<u>Increase at 10%</u>			
1970	5680.00	56,800.00		
1971	6248.00	62,480.00		
1972	6872.80	68,728.00		
1973	7560.08	75,600.80		
1974	8316.09	83,160.88		
1975	9147.70	91,476.97		

TABLE 21

Total Subscription Cost in 1975

	Annual Rate of Price Increase			
	8% (low)	10%	11%	12% (high)
No Growth	1,207,623	1,341,464	1,400,081	1,464,693
<u>Subscription Growth:</u>				
Limited	1,405,519	1,553,177	1,631,795	1,707,146
Proposed	1,900,453	2,048,873	2,120,278	2,198,534

Total Salary Costs in 1975

	Annual Rate of Salary Increases				
	4%	6%	7%	8%	10%
No Growth	864,049	950,386	995,592	1,043,492	1,143,758
<u>Personnel Growth:</u>					
Add 1 FTE/yr	888,200	976,950	1,023,432	1,072,660	1,185,184
Add 2 FTE/yr	912,351	1,003,514	1,051,272	1,101,836	1,217,143
Add 3 FTE/yr	936,501	1,030,078	1,079,112	1,131,003	1,249,103

Total Binding Costs in 1975

	Annual Rate of Binding Increases				
	4%	5%	6%	8%	10%
<u>Subscription Growth:</u>					
No Growth	354,357	371,725	389,765	427,950	469,070
Proposed Growth	462,334	480,152	498,014	537,008	578,659

TABLE 22
RANGE OF COST TOTALS IN 1975

Base 1970 = \$1,849,652

1.	(1,1;1,1;1,1) minimum modeled	\$ 2,426,029
2.	(2,1;2,1;2,1)	2,756,053
3.	(1,2;2,3;1,2)	2,736,621
4.	(2,2;2,3;2,2)	3,056,761
5.	(3,1;3,1;2,1)	3,275,138
6.	(3,2;3,3;2,3)	3,598,159
7.	(2,4;2,4;2,4)	3,316,814
8.	(3,3;3,3;2,4)	3,708,558
9.	(3,4;3,5;2,4)	3,952,685
10.	(3,4;4,5;2,5) maximum modeled	4,026,296

Items in parentheses refer to the row and column entry of Table 22, in the sequence of the table. For example (1,3;4,5;2,2) refers to the following:

- o Subscriptions - no growth and 11% annual price increase = \$1,400,081;
- o Salary cost - add 3 FTE per year and 10% annual salary increase = \$1,249,103;
- o Binding - add subscriptions at the rate proposed by the member libraries and increase binding costs per volume at 5% per year = \$480,152.

APPENDIX E

CORNELL UNIVERSITY LIBRARIES

A TIME AND COST ANALYSIS OF SERIAL CONTROL ACTIVITIES
IN THE SERIALS DEPARTMENT AND DEPENDENT LIBRARIES
OF THE CORNELL UNIVERSITY LIBRARIES

Prepared by:

Miss A. Elizabeth Crosby
Serials Librarian

Ryburn M. Ross, Assistant Director
Technical Services

Ithaca, New York
February 1971

Introduction and Objectives

A time and cost analysis study of the serial control activities in the Serials Department and the Dependent Libraries in the Cornell University Libraries (CUL) was performed in support of a much broader system analysis study undertaken by the Five Associated University Libraries (FAUL), Serials Control System Project. This latter study's long range objective is "to design and implement an on-line serials control system" for three member libraries of FAUL; namely, Cornell University, the University of Rochester and the State University of New York at Buffalo. One objective of the initial effort is collecting information on the costs of currently operated manual systems in these three libraries. In order to satisfy this requirement, each library was requested to estimate the FTE staff time and costs involved in various serials control activities i.e., selection, pre-order verification, acquisition, invoice control, check-in, claiming, binding preparation, cataloging, updating holdings and any other tasks associated with serials control. The complexity of the CUL manual system due mainly to the involvement of many staff members in various tasks each day seemed to make the estimating technique almost meaningless for this library. Thus it was decided to do a time audit for one week with all personnel in both the Serials Department and the Department and College libraries participating. The study was conducted during the week of January 11, 1971 with the objectives of the study to determine in so far as possible the following:

- o The amount and percentage of staff time involved in various serial control activities
- o The total annual direct labor cost and the percentage of the total cost for each activity.

Methodology of Study

This analysis was performed utilizing the "time-ladder" technique. The process required each staff member involved in serial control activities to maintain a daily time-ladder on his own activities (see Exhibit A). Time spent on each activity is recorded in increments of five minutes and each employee was asked to record the activity, as well as the number of work units processed when applicable, within each time span recorded on the time-ladder form. The forms were collected daily and at the end of the week an analysis of the time spent on each activity in minutes was multiplied by each employee's hourly rate to determine the cost for the week of that activity. Assuming that this was a reasonably typical week in serial control activity the weekly cost data were then used to determine the total annual cost.

CUL's Manual Serials Control System

The manual serials control system that is analyzed in this study is a very large and complex operation. It consists of a wide variety of activities performed in the central Serials Department for the main research library (Olin) and for several dependent libraries and departmental collections.

The Serials Department is responsible for searching, ordering and cataloging all serial publications, as well as searching and ordering U.S. (Federal and Local) and U.N. document monographs for all libraries on the Ithaca campus except Hotel, Law, Mann and Veterinary. It receives and processes all document depository items. It verifies bibliographic information on requests, checks requests against holdings and establishes proper entries. It maintains a Kardex record of over 33,500 entries and accessions all bound materials processed by the department. The department catalogs, classifies, recatalogs and reclassifies serial material for no less than twelve college and departmental collections. It maintains a Serials Catalog containing approximately 200,000 cards and updates holdings information in both this catalog and in the serial volumes for binding and checks them in from the bindery. It binds pamphlet material and prepares protective boards for unbound materials for shelving.

It is estimated that in this year approximately 240,000 separate serial issues will be recorded into the Kardex file and routed to the dependent library and departmental collections, that 3600 new orders will be placed, 4800 claims made for missing issues and over 3000 new serial titles cataloged for the various collections. The material received by this department is received from numerous countries of the world and is printed in both the Western and non-Western languages. Separate Kardex files are maintained for titles published in the Cyrillic alphabet, Chinese, Japanese and the various languages of South East Asia.

Results and Conclusions

The analysis of serial control tasks in the central Serials Department indicated that they can be grouped into 20 discrete categories as shown in Tables I and II and are performed by 24.8 full time equivalent staff members (Exhibit C). Definitions of these activities are outlined in Exhibit B.

Whereas all tasks are performed in the Serials Department Table II indicates that at least ten are also carried on in the Dependent Libraries. The cost of these activities as

shown in Tables I and II is \$175,973.54 in the Serials Department and \$19,598.76 in the Dependent Libraries for a total cost of \$195,572.30 for this operation. The results of this portion of the study would indicate that one week was not a long enough period of time to collect data on certain activities, i.e., Binding Preparation, in the Dependent Libraries and should be extended for at least one more week. Obviously, the costs of serial control activities would be somewhat higher if this was done.

Name: Jane Doe Date: 12-30-70
 Library: Olin
 Working Title: Kardex Assistant
 Grade: A-12

1. Fill in the above information.
2. Draw a line across after you finish each activity.
3. Record the number of units processed within a time period.
4. Complete one form each day.

Time	Activity
7:00	
7:05	Sorting
7:10	Mail
7:15	
7:20	
7:25	
7:30	
7:35	400
7:40	
7:45	
7:50	
7:55	
8:00	
8:05	
8:10	
8:15	
8:20	Kardex
8:25	Inventory
8:30	
8:35	
8:40	
8:45	
8:50	
8:55	
9:00	
9:05	
9:10	
9:15	
9:20	
9:25	
9:30	
9:35	
9:40	
9:45	
9:50	
9:55	
10:00	
10:05	
10:10	
10:15	
10:20	LUNCH
10:25	
10:30	
10:35	
10:40	
10:45	
10:50	
10:55	
11:00	
11:05	
11:10	
11:15	
11:20	
11:25	
11:30	
11:35	
11:40	
11:45	
11:50	
11:55	
12:00	
12:05	
12:10	
12:15	
12:20	
12:25	
12:30	
12:35	
12:40	
12:45	
12:50	
12:55	
1:00	
1:05	Break
1:10	
1:15	
1:20	
1:25	
1:30	
1:35	
1:40	
1:45	
1:50	
1:55	
2:00	
2:05	Checking Problems
2:10	
2:15	
2:20	
2:25	
2:30	
2:35	
2:40	
2:45	
2:50	
2:55	
3:00	

Name: Jane Doe Date: 12-30-70
 Library: Olin
 Working Title: Searcher
 Grade: A-13

1. Fill in the above information.
2. Draw a line across after you finish each activity.
3. Record the number of units processed within a time period.
4. Complete one form each day.

Time	Activity
7:00	
7:05	
7:10	
7:15	
7:20	
7:25	
7:30	
7:35	
7:40	
7:45	
7:50	
7:55	
8:00	
8:05	
8:10	
8:15	
8:20	
8:25	
8:30	
8:35	
8:40	
8:45	
8:50	
8:55	
9:00	
9:05	
9:10	
9:15	
9:20	
9:25	
9:30	
9:35	
9:40	
9:45	
9:50	
9:55	
10:00	
10:05	
10:10	
10:15	
10:20	
10:25	
10:30	
10:35	
10:40	
10:45	
10:50	
10:55	
11:00	
11:05	
11:10	
11:15	
11:20	
11:25	
11:30	
11:35	
11:40	
11:45	
11:50	
11:55	
12:00	
12:05	
12:10	
12:15	
12:20	
12:25	
12:30	
12:35	
12:40	
12:45	
12:50	
12:55	
1:00	
1:05	
1:10	
1:15	
1:20	
1:25	
1:30	
1:35	
1:40	
1:45	
1:50	
1:55	
2:00	
2:05	
2:10	
2:15	
2:20	
2:25	
2:30	
2:35	
2:40	
2:45	
2:50	
2:55	
3:00	

Name: Jane Doe Date: 12-30-70
 Library: Olin
 Working Title: Cataloger
 Grade: As Lib

1. Fill in the above information.
2. Draw a line across after you finish each activity.
3. Record the number of units processed within a time period.
4. Complete one form each day.

Time	Activity
7:00	
7:05	
7:10	
7:15	
7:20	
7:25	
7:30	
7:35	
7:40	
7:45	
7:50	
7:55	
8:00	
8:05	
8:10	
8:15	
8:20	
8:25	
8:30	
8:35	
8:40	
8:45	
8:50	
8:55	
9:00	
9:05	
9:10	
9:15	
9:20	
9:25	
9:30	
9:35	
9:40	
9:45	
9:50	
9:55	
10:00	
10:05	
10:10	
10:15	
10:20	
10:25	
10:30	
10:35	
10:40	
10:45	
10:50	
10:55	
11:00	
11:05	
11:10	
11:15	
11:20	
11:25	
11:30	
11:35	
11:40	
11:45	
11:50	
11:55	
12:00	
12:05	
12:10	
12:15	
12:20	
12:25	
12:30	
12:35	
12:40	
12:45	
12:50	
12:55	
1:00	
1:05	
1:10	
1:15	
1:20	
1:25	
1:30	
1:35	
1:40	
1:45	
1:50	
1:55	
2:00	
2:05	
2:10	
2:15	
2:20	
2:25	
2:30	
2:35	
2:40	
2:45	
2:50	
2:55	
3:00	

EXHIBIT B

Activity	Definition
Selection	Review of titles and decision made to acquire for the library.
Pre-order verification	Establishing beginning date, place of publication, publisher and if title is already in the library.
Acquisitions	Fund and dealer assignment, and placing orders.
Invoice control	Renewal and invoice approval and recording invoice information on payment record.
Opening and sorting mail	Open mail upon receipt, alphabetizing for check-in and sorting for distribution after check-in.
Check-in	Entering on Kardex record, volume, number and date of issue and date received.
Kardex card preparation	Making cards for new titles, making new cards for titles already received and filing cards into Kardex.
Kardex inventory	Examination of records for missing issues and lapsed subscriptions.
Claims	Ordering missing issues.
Duplicates	Sorting and arranging in a storage area.
Withdrawals	Includes removal of records from the Kardex, Dictionary Catalog, Serials Catalog and Shelf List.
Pre-catalog searching	Establishing proper catalog entry, searching for cataloging copy and preparing work sheet for Kardex Maintenance section.
Cataloging	Includes classification, descriptive cataloging, subject analysis, and setting up holdings cards for Serials Catalog and Shelf List.
Holdings update	Update holdings records in Serials Catalog and Shelf List as bound volumes are received.

EXHIBIT B (continued)

Activity	Definition
Binding preparation	Includes collating volume, preparing binding instructions, updating permanent binding record cards, checking in volumes returned from bindery.
Bookmarking	Includes embossing, book plating and putting call number on volume when necessary.
Secretarial	Perform those secretarial activities required by the department.
Administrative/supervision	Directing and supervising section activities, training new personnel.
Document monographs	Includes checking in and searching U.S. and U.S. depository items as well as searching and ordering U.S., U.N., State and municipal publications.
Miscellaneous	Includes coffee breaks, course work, meetings, sick leave, vacation and related activities.

EXHIBIT C

FULL TIME EQUIVALENTS (FTE) PERFORMING
SERIAL CONTROL ACTIVITIES

Serials Department	24.8
Dependent Libraries	
Business Library	0.81
Engineering Library	0.39
Fine Arts Library	0.74
Mathematics Library	0.105
Music Library	0.03
Physical Sciences Library	0.55
Undergraduate	0.13
Reference Department, Olin Library	
Reference and Bibliography Collection	0.03
Periodic Reading Room	0.15
Special Collections, Olin Library	
Wason Periodical Reading Room	<u>0.06</u>
Total Dependent Libraries	3.00
	TOTAL 27.8

TABLE I

TIME AND COST ANALYSIS OF SERIAL CONTROL ACTIVITIES
FOR THE SERIALS DEPARTMENT
OF THE CORNELL UNIVERSITY LIBRARIES

Activity	Hours/per Week	% of Time	Cost per year	% of Cost
Selection	6.58	0.6	\$ 2,200.49	1.3
Pre-order verification	22.00	2.1	3,673.00	2.1
Acquisitions	40.50	3.9	8,536.84	4.9
Invoice control	28.25	2.7	4,373.20	2.5
Opening and sorting mail	58.25	5.7	8,755.76	5.0
Check in (actual)	112.91	11.0	17,916.60	10.2
Kardex card preparation	53.66	5.2	7,286.76	4.1
Kardex inventory	9.75	1.0	1,386.84	0.8
Claims	36.75	3.6	5,314.40	3.0
Duplicates ¹	4.75	0.5	592.80	0.3
Withdrawals ²	4.41	0.4	768.48	0.4
Pre-catalog searching	79.33	7.6	14,273.92	8.1
Cataloging	104.08	10.1	22,148.36	12.6
Holdings update	73.08	7.1	10,926.76	6.2
Binding preparation	81.33	7.9	12,674.38	7.2
Bookmarking	9.50	0.9	1,057.16	0.6
Secretarial	36.16	3.5	5,007.24	2.8
Administrative/Supervision	53.08	5.1	17,706.66	10.1
Document monographs ³	25.08	2.4	5,847.40	3.3
Miscellaneous ⁴	193.50	18.7	25,526.49	14.5
TOTAL	1,033.00	100.0	175,973.54	100.0

1 Includes sorting and arranging in storage area

2 Includes removal of records from Kardex, Dictionary Catalog, Serials Catalog and Shelf List

3 U.S., State, Municipal and U.N. only

4 Coffee break (3 hours per week per FTE); course work, meetings, sick leave, vacation, related activities.

TABLE II
 COST ANALYSIS FOR SERIAL CONTROL ACTIVITIES
 FOR THE SERIALS DEPARTMENT AND DEPENDENT LIBRARIES
 OF THE CORNELL UNIVERSITY LIBRARIES

Activity	Serials Dept	Dependent Libraries	Total Cost	% of Cost
Selection ¹	\$ 2,200.49	\$ 5,889.25	\$ 8,089.74	4.1
Pre-order verification	3,673.00	244.66	3,917.66	2.0
Acquisitions	8,536.84		8,536.84	4.4
Invoice control	4,373.20		4,373.20	2.2
Opening and sorting mail	8,755.76	621.96	9,377.72	4.8
Check-in (actual)	17,916.60	5,126.16	23,042.76	11.8
Kardex card preparation	7,286.76	44.72	7,331.48	3.7
Kardex inventory	1,386.84	475.28	1,862.12	1.0
Claims	5,314.00	1,244.84	6,558.84	3.4
Duplicates	592.80		592.80	0.3
Withdrawals	768.48	234.00	1,002.48	0.5
Pre-catalog searching	14,273.92		14,273.92	7.3
Cataloging	22,148.36		22,148.36	11.3
Holdings update	10,926.76	2,735.63	13,662.39	7.0
Binding preparation ²	12,674.38	2,982.663	15,657.16	8.0
Bookmarking	1,057.16		1,057.16	0.5
Secretarial	5,007.24		5,007.24	2.6
Administrative/Supervision	17,706.66		17,706.66	9.0
Document monographs	5,847.40		5,847.40	3.0
Miscellaneous	25,526.49		25,526.49	13.1
TOTAL	\$ 175,973.54	\$ 19,598.76	\$ 195,572.30	100.0

1 Includes only personnel of the Serials Dept. Does not include time and cost for the following members of the Serials Selection Committee: Assistant Director for the Development of Collections, Assistant Director for Technical Services, Reference Dept. (2), Acquisitions Dept. (1), and Catalog Maintenance Dept. (1).

2 Does not include cost of collecting material from Olin stacks.

3 This is not a duplicate cost.

TABLE III

TIME AND COST ANALYSIS OF SERIAL CONTROL ACTIVITIES
 BY LIBRARY AND ACTIVITY FOR THE SERIALS DEPARTMENT
 AND DEPENDENT LIBRARIES OF THE CORNELL UNIVERSITY LIBRARIES

	SELECTION		PRE-ORDER VERIFICATION		ACQUISITIONS	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	6.58	\$2,200.49 ¹	22.00	\$3,673.00	40.50	\$8,536.84
Engineering	1.00	359.84				
Physical Sciences	1.00	340.64	0.25	38.74		
Mathematics			0.50	86.84		
Business	15.00	5,112.00	0.50	119.08		
Music	0.53	76.77				
Fine Arts						
Undergraduate						
Reference Dept.						
Reference/Periodical						
Reading Room						
Wason/Periodical						
Reading Room						
TOTAL	23.91	\$8,089.74	23.25	\$3,917.66	40.50	\$8,536.84

¹ Includes only personnel of the Serials Department. Does not include time and cost for the following members of the Serials Selection Committee: Assistant Director for the Development of Collections, Assistant Director for Technical Services, Reference Dept. (2), Acquisitions Dept. (1), and Catalog Maintenance Dept. (1).

TABLE III (continued)

	INVOICE CONTROL		OPENING & SORTING MAIL		CHECK-IN (actual)	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	28.25	\$4,373.20	58.25	\$8,755.76	112.91	\$17,916.60
Engineering			2.41	356.20	7.25	1,131.00
Physical Sciences			0.41	68.16	5.75	774.28
Mathematics					2.33	404.56
Business			1.08	135.20	6.66	832.00
Music					1.08	135.20
Fine Arts			0.41	62.40	10.25	1,547.52
Undergraduate					2.41	301.60
Reference Dept.						
Reference/Periodical						
Reading Room						
Wason/Periodical						
Reading Room						
TOTAL	28.25	\$4,373.20	62.75	\$9,377.72	148.66	\$23,042.76

TABLE III (continued)

	KARDEX CARD PREPARATION		KARDEX INVENTORY		CLAIMS	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	53.66	\$7,286.76	9.75	\$1,386.84	36.75	\$5,314.00
Engineering					0.50	85.60
Physical Sciences	0.33	44.72	0.75	100.88	2.66	271.08
Mathematics					0.33	58.24
Business			3.00	374.40	0.91	114.20
Music						
Fine Arts					3.00	453.40
Undergraduate						
Reference Dept.						
Reference/Periodical					1.16	156.04
Reading Room						
Wason/Periodical					0.66	106.08
Reading Room						
TOTAL	54.00	\$7,331.48	13.50	\$1,862.12	46.00	\$6,558.84

TABLE III (continued)

	DUPLICATES		WITHDRAWALS		PRE-CATALOG SEARCHING	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	4.75	\$ 592.80	4.41	\$ 768.48	79.33	\$14,273.92
Engineering			1.00	171.60		
Physical Sciences						
Mathematics						
Business						
Music						
Fine Arts						
Undergraduate			0.50	62.40		
Reference Dept.						
Reference/Periodical						
Reading Room						
Wason/Periodical						
Reading Room						
TOTAL	4.75	\$ 592.80	5.91	\$1,002.48	79.33	\$14,273.92

TABLE III (continued)

	CATALOGING		HOLDINGS UPDATE		BINDING PREPARATION	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	104.08	\$22,148.36	73.08	\$10,926.76	81.33	\$12,674.38
Engineering			0.30	85.60	2.50	429.00
Physical Sciences			5.33	736.32	4.91	687.16
Mathematics			0.50	86.84		
Business			3.00	374.00	2.00	249.60
Music			0.50	62.40		
Fine Arts			7.08	1,077.95	7.50	1,129.44
Undergraduate			1.00	124.80	1.50	187.20
Reference Dept.			1.00	187.72	0.50	93.86
Reference/Periodical					5.50	850.72
Reading Room					2.25	355.68
Wason/Periodical						
Reading Room						
TOTAL	104.08	\$22,148.36	92.00	\$13,662.39	107.75	\$15,657.04

TABLE III (continued)

	BOOKMARKING		SECRETARIAL		ADMIN/SUPERVISION	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	9.50	\$1,057.16	36.16	\$5,007.24	53.08	\$17,706.66
Engineering						
Physical Sciences						
Mathematics						
Business						
Music						
Fine Arts						
Undergraduate						
Reference Dept.						
Reference/Periodical						
Reading Room						
Wason/Periodical						
Reading Room						
TOTAL	9.50	\$1,057.16	36.16	\$5,007.24	53.08	\$17,706.66

TABLE III (continued)

	DOCUMENT MONOGRAPHS		MISCELLANEOUS	
	Hours Per Wk	Cost Per Year	Hours Per Wk	Cost Per Year
Olin	25.08	\$5,847.40	193.50	\$25,526.49
Engineering				
Physical Sciences				
Mathematics				
Business				
Music				
Fine Arts				
Undergraduate				
Reference Dept.				
Reference/Periodical				
Reading Room				
Wason/Periodical				
Reading Room				
TOTAL	25.08	\$5,847.40	193.50	\$25,526.49