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ABSTRACT

A cost/benefit analysis of the Public Library Automation Network (PLAN) project was undertaken to evaluate those areas in library technical processing impacted by BALLOTS: searching the data base for catalog copy; cataloging with MARC or original catalog copy input by participating libraries; data entry of original records and modification of existing records for the production of catalog cards or tape output to interface with other systems; and processing instituted in the libraries for catalog card handling or proofreading and edit procedures. Significant findings indicated that libraries were able to shift a significant portion of costs (for functions studied) from personnel expenses to contracted computer-based services; the system was at least as effective as previous systems employed by the libraries; the system supported an increase in production workrate and a decrease in processing calendar time requirements; no significant staff problems or obstacles were discovered in the use of the BALLOTS terminal; and in general, modification of a library's internal operating system to utilize BALLOTS did not present significant planning or management problems. System benefits and problems are identified and discussed. All data collected on computer use represents BALLOTS in LINE MODE operating at 30 characters per second. Data on past system monthly operating costs, BALLOTS system monthly operating costs, cost differences, and projected cost over seven years are presented in tabular form. (JPF)

PUBLIC LIBRARY AUTOMATION NETWORK

A Cost/Benefit Analysis of the PLAN PROJECT

by

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and

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FOREWARD

The PLAN Project marked a major step forward in the creation of an automated network for public libraries in California. The project undertaken jointly by the California State Library and the BALLOTS Center at Stanford University is both timely and significant.

If automation is to play a major role in library processing and services, its impact must be carefully assessed to provide guidelines for the future. Toward that end the PLAN Cost/Benefit Analysis is a reference document.

It is hoped that the information gathered and presented in this report on the experiences, benefits, and impact costs of the PLAN libraries will now serve the information needs of others who are currently planning the future course of their own library.

The major portion of the work on the PLAN cost/benefit analysis which included; systems documentation, data collection design and reduction, cost model construction, and writing the final report was performed by Tom Shoemaker. Liz Gibson worked closely with Tom during all phases of the study, adding insight into the data analysis, and editing the report as well as writing the section on System Benefits and Problems.

Brett Butler acted as consultant to the study reviewing the study's methodology, outlining the study's objectives, advising Tom where needed, as well as writing the Executive Summary of the report.

Ron Jamtgaard acted as the principal contact at BALLOTS during the term of the study. This included attending cost study meetings, making BALLOTS system data available to the study, acting as liaison for computing facilities needed by the study, and reviewing the final report.

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SECTION I

EXECUTIVE SUMMARY

PUBLIC LIBRARY AUTOMATION NETWORK:

A COST/BENEFIT ANALYSIS OF THE PLAN PROJECT

A. Introduction:

Responding to the need in public libraries for better information about the economics of computer based networking in 1974, the California State Library funded the PLAN[1] consortium to use the BALLOTS[2] bibliographic network. After the initial year of BALLOTS usage, the seven PLAN libraries requested the continued experimental use of BALLOTS. As a condition of the continuation the State Library required that the libraries participate in a formal evaluation of the impact of the use of BALLOTS services for cataloging within each library.

Development of detailed cost data was beyond the resources of most PLAN libraries, but was a necessary support for their future planning. The cost analysis described in depth in sections II and III of the report has provided this detailed cost information for the individual libraries.

It is hoped that the publication of this report will provide analogous support to other libraries in their planning for the use of network and automated services.

B. General Conclusions

1. Based on the detailed cost data gathered and reported herein, and on extensive workflow analyses and field site visits, BALLOTS was found to be at least as effective a system as previous systems, when cost was used as the measure. And it was evaluated by PLAN libraries as more effective in several other service aspects. For approximately the same overall cost a better service was provided.

   The costs measured did not include indirect, overhead, or administrative costs for past or BALLOTS systems. Since use of BALLOTS decreased the proportion of system costs dedicated to personnel long term savings not shown by the cost models in the areas of supervision and administrative overhead are to be expected with BALLOTS use.

2. Benefits not directly associated with the costs measured were reported by all libraries, with different libraries stressing different benefits of the BALLOTS implementation.

1) Public Library Automation Network

2) Bibliographic Automation of Large Library Operations using a Time-sharing System

B. General Conclusions

3. The BALLOTS system generally supported an increase in production workrate and a decrease in actual processing calendar time requirements.

4. The project demonstrated the ability to transmit data from the library to BALLOTS and in machine readable form through BALLOTS to library agency or contractor data processing facilities more efficiently than methods previously used in the libraries.

C. Summary of Study Results

1. Costs

A. When the libraries' reported cost data were taken as a group (see Tables A & B), the differences in costs between the varied past systems and the BALLOTS systems were so close that no significant cost difference could be said to exist. That is, BALLOTS and the past systems cost essentially the same for the tasks measured.

B. BALLOTS significantly decreased the proportion of labor costs as a part of the total costs measured. As illustrated in Table C, personnel costs dropped from 77% to 47% of total costs of the functions studied.

C. The measured BALLOTS system costs (being BALLOTS line mode at 30 cps*) did not represent a fully optimized use of the system by PLAN libraries. With implementation of BALLOTS Full Face mode at 120-cps, together with further staff experience to develop the most optimal configuration of BALLOTS services, additional reductions in observed BALLOTS costs can be expected in these libraries.

2. Cataloging Operations

A. Although the cost study effort was not begun until after one year of initial BALLOTS usage, significant system use experience was observed during the cost study field visits. No significant staff problems or obstacles to the use of the BALLOTS terminal and system was discovered.

B. In general, modification of libraries' internal operating systems to utilize the resources of BALLOTS did not present significant planning or management problems. Considerable administrative time was spent in each library planning policy and procedure changes, and time was also spent supporting the tasks of the study effort itself.

*CPS=characters per second transmission rate

TABLE A

PAST SYSTEM MONTHLY OPERATING COSTS

Cost Categories	Library Number 3	4	5	6	Rounded Sum
A. PERSONNEL					
1. Copy Search	$ 426.35	$ 618.80	$ 423.16	$	$1468.00
2. Catalog/copy	187.80	1171.25	401.66	327.40	2088.00
3. Catalog/Orig.	200.45	434.30	517.05	(In Line 2)	1152.00
4. Title control	1052.15	---	---	---	1052.00
5. Proofreading	120.87	---	118.05	---	239.00
6. Data Entry	---	---	1456.70	---	1457.00
7. Cat. Cards	---	3611.68	---	---	3612.00
				Subtotal A	$11068.00
B. Cataloging Services	$ 610.60	$ 793.90	$ 1180.35	$ 40.95	$ 2626.00
C. Equipment Supplies	125.10	582.50	55.15	(In Line B)	763.00
Monthly total	2723.32	7212.43	4152.12	368.35	14500.00
Annual total	$32,679.80	$86,549.16	$49,835.44	$4,420.20	$174,000.00

TABLE B

BALLOTS LINE-BY-LINE MODE MONTHLY OPERATING COSTS

Cost Categories	Library Number 3	4	5	6	Rounded Sum
A. PERSONNEL					
1. Copy Search	$ 156.31	$ 422.65	$ 284.44	$ 40.35	$ 904.00
2. Catalog/copy	230.85	1,279.45	628.70	100.63	2,240.00
3. Catalog/orig.	156.45	322.30	442.15	(In Line 2)	921.00
4. Title Control	---	---	---	---	---
5. Proofreading	120.87	---	118.05	---	239.00
6. Data entry	196.65	349.15	870.50	---	1,416.00
7. Cat. Cards	---	1,629.77	---	---	1,630.00
				Subtotal A	$ 7,350.00
B. Cataloging Services	$ 1,995.80	$ 3,229.95	$ 2,209.95	$ 133.44	$ 7,569.00
C. Equipment Supplies	150.60	295.00	154.80	---	600.00
Monthly total	3,007.53	7,528.27	4,708.59	274.42	15,500.00
Annual Total	$36,090.36	$90,339.24	$56,503.08	$3,293.04	$186,000.00

TABLE C

MONTHLY OPERATING COST DIFFERENCES 1976 - 1977

		PAST SYSTEM	%	BALLOTS SYSTEM	&	PERCENT CHANGE*
A.	FERSONNEL	$ 11,068.00	77%	$ 7,350.00	47%	-34.2%
B.	CATALOGING SERVICES	2,626.00	18%	7,569.00	49%	+188.2%
C.	EQUIPMENT SUPPLIES	760.00	5%	600.00	4%	-21%
			100%		100%	
	Monthly total	$ 14,500.00		$ 15,500.00		6.90%
	Annual total	$174,000.00		$186,000.00		6.90%

*Percent change = ((BALLOTS - PAST) * 100/PAST)

C. Summary of Study Results (cont.)

2. Cataloging Operations

C. Where it was necessary to integrate BALLOTS and internal library operations with external services from a third agency - an agency data processing bureau, for instance - the desired or necessary changes were implemented, but at times with more difficulty than originally planned. Difficulties were basically related to technically complex efforts needed to allow data to flow between BALLOTS and another computer system.

D. Wide variations in the cataloging policy and practice with regard to use of BALLOTS products (MARC, Shared cataloging records) were observed. Definition of the scope, cost impact, or recommendations regarding cost/benefit changes of these cataloging practices was beyond the scope of the study project.

3. Methodology

A. The detailed system flow charts while unique to the individual libraries studied, provide a guide to other libraries analyzing their own local procedures.

B. The list of BALLOTS-related tasks, arranged by function including detailed task definitions, provide a useful checklist for public libraries planning a BALLOTS installation. They will be illustrative but not exhaustive for use by academic libraries considering BALLOTS, or for libraries utilizing OCLC or another network.

C. The "standard times" obtained for the BALLOTS-related tasks particularly searching and other terminal-related tasks, should be usable by almost any type of library. Times related to associated but non-BALLOTS-related tasks are illustrative. However, the detailed description of the tasks must be consulted before times can be taken as a standard for another library's operations.

D. Considerations in Reviewing the Cost Data

1. The individual libraries which contributed data to these cost analyses are keenly aware of the limits of the information gained, even at the cost of many hours of effort by project and library staff.

2. The following points are particularly important to other libraries attempting to analyze their local situation from the data presented in Section II and III:

C. Summary of Study Results (Cont.)

3. Methodology

D. Considerations in Reviewing the Cost Data (cont.)

A. As noted above, only direct costs have been included in the reported data. Overheads of various types apply to any library operation but these overheads are not uniform among all libraries. Consequently, they have not been included in this analysis. Inclusion would certainly affect relative costs, and generally tend to improve the cost effectiveness of BALLOTS.

B. The shift of costs from personnel to contract service expenses will have different effects on various library operating budgets, but should be considered in addition to the direct costs analyzed.

C. Obviously, personnel pay scales which affect the adjusted hourly rate personnel cost used in the study, and the classification of staff assigned to tasks, will vary the reported personnel costs.

D. Past system costs, while accurate for those portions of the system that could be observed include estimates by the library for parts of past systems that were no longer performed at the time of the study. Areas of the cost data which are derived from estimates are: 1) LC Proof file operation, 2) Title control in batch searching, 3) Multilith production of catalog cards. These areas are particularly subject to a margin of error.

E. The PLAN libraries used a limited form of access to the system (line-by-line mode), which in the continuing application within PLAN libraries has been replaced by the full operating system (full-face mode) similar to that originally implemented at Stanford University Libraries. It is estimated* that (for the libraries studied and using BALLOTS charging rates in effect at the time of the study) operating costs for the BALLOTS related functions studied would be reduced approximately 15% or about 1% of the overall library operating system cost (Table D) by shifting to full-face BALLOTS

*using BALLOTS staff production-rate estimates

TABLE D

MONTHLY COST IMPACT ON DATA ENTRY OF FULL FACE OPERATION

FUNCTION DATA ENTRY	OBSERVED EXPENSES LINE MODE	PRODUCTION RATE* LINE	PRODUCTION RATE* FULL	FULL FACE COST
Create new Record	$498.35	100%	85%	$423.60
Modify existing record	246.60	100%	90%	221.94
Total Affected BALLOTS Functions	744.95 month			645.54 month
Cost Comparison	100%			86.7%
Affected Functions % of Total** Costs	5.1%			4.2%

*BALLOTS staff estimate based on limited available data

**Monthly total BALLOTS system Table C

C. Summary of Study Results (Cont.)

3. Methodology

D. Considerations in Reviewing the Cost Data (cont.)

F. Shared Cataloging was available to BALLOTS users including the PLAN libraries as of November, 1976; however, loading of the retrospective PLAN records from magnetic tape was not accomplished until April and May, 1977. For this reason, the Shared Cataloging files during the study showed little impact as an additional source of catalog copy. As this file increases in the future allowing for greater interchange or original cataloging among libraries to a potential maximum of 90% available catalog copy in MARC and shared files, an additional 6.5% savings of personnel costs, or 3% of overall system costs (Table E) could/might be estimated for these libraries.

G. Some observed costs could have been reduced by internal library system changes not directly related to the BALLOTS system functions studied. A reasonable expectation for overall system cost decreases which might occur with another year's experience would be in the range of 10-15%.

H. Some intangible system benefits may also be expected to accrue from the use of the full-face BALLOTS production system. The "Full-face mode" is easier to use for new personnel and provides better tutorial features. Both BALLOTS and library staffs have gained valuable experience in training, problem solving and trouble shooting which did not exist when PLAN became the first "network" user group of BALLOTS.

TABLE E

PROJECTED SAVING THROUGH SHARED CATALOGING

PERSONNEL COST DIFFERENCES IN CATALOGING AND DATE ENTRY

LIBRARY #	OBSERVED COSTS (72.8% HIT RATE)	PROJECTED COSTS (90% HIT RATE*)	PERCENT CHANGE
3	$ 583.95	$ 534.30	- 8.5%
4	1,950.90	1,992.90	+ 2.15%
5	1,941.35	1,657.35	-14.6%
	$4,476.20	$4,184.55	- 6.5%

*90% is maximum expected hit rate estimated from OCLC user experience

LOOKING TOWARD THE FUTURE

The most significant result of this study has been the finding that PLAN member libraries were able to shift a significant portion of costs (for the functions studied) from personnel or staff expenses to contracted computer-based services. This shift in resource management was accomplished without negative staff morale effects.

The reason this finding is so important is that - to summarize the impact of a wide variety of technical and social trends - staff-related costs will grow more rapidly than computer-related expenses over the next decade.

Some illustrations of the economic impact of these trends provides an appropriate summary and projection covering the import of this study for library administrators and planners.

As noted above, BALLOTS reduced staff costs from 77% of the total expenses studied to 47% of overall expenses for the PLAN library group. This was accomplished by procurement of BALLOTS and related services which raised outside services from 18% to 49% of the overall expenses for these functions.

The immediate impact of these shifts in types of costs was a negligible change in overall expenses for the functions studied, for the group as a whole. It should be noted again that neither inflation nor administrative overhead costs were included in this study.

The long-range impact of this shift in types of costs may be expected to favor the installation of BALLOTS or any similar computer-based system if one assumes the costs of the computer hardware will increase at a much lower rate than the manual activity it is replacing.

Technology-based computer equipment has been decreasing in cost over the past twenty years, and may be expected to decrease significantly over the next seven to ten years on the basis of already-proven technological developments (bubble memories, etc.). Comples network systems such as BALLOTS, however, have and will continue to have a substantial element of staff (programming and training) expense as part of the overall system and these staff costs will probably increase over the next decade along with personnel costs in libraries and all other segments of the U.S. economy.

A conservative projection, then, might be to assume that a library might decide to use a network system such as BALLOTS if the increase in overall costs were no greater than would be experienced with the existing manual systems. Table F illustrates a seven-year cost projection for PLAN libraries studied assuming increases of 12% in personnel costs, 8%

TABLE F

PROJECTION OF COST OVER SEVEN YEARS

PAST SYSTEM	1977	Percent	1984	Change
Personnel	$11,100	+12%	$24,600	221%
Cataloging Services	2,600	+ 8%	4,400	171%
Equipment	800	+ 8%	1,400	171%
TOTAL	$14,500		$30,400	210%

BALLOTS SYSTEM: Breakeven Cost Assumption				
Personnel	$ 7,300	+12%	$16,100	221%
Cataloging Services	7,600	+ 9%	14,200	187%
Equipment	600	+ 8%	1,000	171%
TOTAL	$15,500		$31,300	202%

BALLOTS SYSTEM: Projection without Dollar Cost Increase				
Personnel	$ 7,300	12%	$16,100	221%
Cataloging Services	7,600	0%	7,600	0%
Equipment	600	8%	1,000	166%
TOTAL	$15,500		$24,700	159%

in cataloging serves, and 8% in equipment costs. Another set of numbers could be chose, but the one example illustrates the likely trends.

With this mix of cost increases, PLAN libraries continuing in the use of their old systems would (as a group) experience an increase in operating costs of 210% over the period 1977 to 1984.

With this expected result in mind, the rate of increase in BALLOTS costs can now be calculated which would leave the library in no worse cost position than otherwise expected. As the second portion of Table F shows, the closes approximation is a 9% annual price increase in BALLOTS and related services. This increase results in an overall cost increase of 202% from 1977 to 1984.

Conversely, we can project more optimistic assumptions regarding the development of computer-based information services. The final portion of Table F changes only the BALLOTS-related costs, by assuming no growth in dollars over the seven-year future projection period. (This could combine a potential reduction in computer processing costs with the effects and increased staff costs at the BALLOTS Center.)

With such an assumption - whichis by no means wildly unrealistic when compared to the history of other automated library services including OCLC - we find that BALLOTS costs increase 159% over the same period 'past system' costs would increase 210%.

On balance, then, a library analyzing the benefits of BALLOTS use - given the constraints of the data obtained in this study - would find the selection of BALLOTS beneficial if the price rate increase for BALLOTS services were between zero and nine percent annually over this period. Given the various non-cost benefits of network cataloging, library support of such a risk management decision may be expected.

SECTION.II

PLAN PROJECT BACKGROUND

Of the many library computer projects undertaken during recent years, one of the most significant in California was the PLAN Project (Public Library Automation Network). Begun in 1974 PLAN put 7 California public libraries in online communication with the BALLOTS Project at Stanford University. The California State Library in cooperation with BALLOTS developed this LSCA-funded pilot program that would test the potential of remote time-sharing of BALLOTS in public libraries.

The PLAN members, Los Angeles County Public Library, Los Angeles Public Library, Marin County Library, Orange County Public Library, San Francisco Public Library, Santa Clara County Free Library, and Sutter County Free Library, ranged from a small library serving a rural community, to a large metropolitan library system with 90 branches. Each consulted with BALLOTS staff on the design of experimental tests that would reveal how BALLOTS could meet the widely varied individual needs.

Issues faced by BALLOTS and the libraries were: Magnetic tape output to interface with vendors of microform catalogs, catalog card production, and BALLOTS interface with in-house systems. All PLAN members eagerly anticipated the search and retrieval access to records in the BALLOTS data base for cataloging, reference, bibliography production, or some phase of interlibrary loan processing.

The PLAN members were given free rein to experiment with any application of BALLOTS that would serve an identified need, and this became the spirit of PLAN: developing new ideas, writing new procedures, testing and sharing results. The final element of the project was designed to access the impact of the BALLOTS online system on the operations of these diverse libraries. To that end a formal cost benefit study was undertaken. This report represents the results of that study.

At the start of the second year of the project, when the evaluation was begun, the majority of PLAN members had settled into new system configurations which could be compared with their previous systems in terms of costs and benefits. One library had completed its testing and would not be involved in the study, and two libraries were still in a testing phase and were not yet ready for evaluation. The libraries available for the study did represent a variety of systems, i.e. interface with microform catalog vendor, use of catalog cards, interface with in-house system, and search only. The study was therefore able to evaluate a variety of BALLOTS applications. The objectives of the study are outlined below:

PLAN/BALLOTS ANALYSIS OBJECTIVES

General

1. Determine the effectiveness of the BALLOTS online system in supporting bibliographic networking for public libraries.

2. Identify the cost impact of BALLOTS and PLAN libraries' present and projected operations.

Specific

3. Provide detailed cost analyses of current library tasks presently affected by BALLOTS in at least one PLAN library.

4. Provide general workflow analyses of major libraries' departments with BALLOTS - affected functions.

5. Develop a cost analysis methodology with potential for subsequent application to other California public and academic libraries.

6. Recommend specific changes in PLAN library procedures, and general guidelines for other California libraries, necessary to optimize use of BALLOTS or other network resources.

7. Relate present library BALLOTS-related costs to past system costs.

8. Identify functional changes in BALLOTS which will more fully or effectively support public library network developments in California.

Scope of the Study

The PLAN cost study attempted to cost and evaluate in detail those areas in library technical processing impacted by BALLOTS. Those areas included searching BALLOTS data base for catalog copy; cataloging with MARC or original catalog copy input into BALLOTS by libraries participating in shared cataloging; data entry of original catalog records and modification of existing records for the production of catalog cards or tape output to interface with other systems, plus the addition of those records to an online file of titles cataloged by the library; and processes instituted in the libraries for catalog card handling or proofreading and edit procedures.

Additional areas impacted by BALLOTS, such as bibliography production; interlibrary loan verification, etc., were investigated where possible, but as procedures were not yet formalized, these areas were not costed.

A large quantity of data was analyzed to reach the results of this study. Recorded data on 541 computer terminal sessions in the libraries, which represented the search and data entry of 16,666 titles, was processed using SPSS (Statistical Package for the Social Sciences) which is a package computer program designed for a wide variety of data analysis applications.

Cataloging times for 2118 books are the basis for the reported tables and costs for cataloging. In addition an uncounted number of data records on past statistics, catalog card production, proofreading, LC Proof and NUC searching, and a variety of smaller data samples collected to illuminate some aspects of the study, were processed by computer or hand calculation to complete the picture of past and present system operation as needed by this analysis.

LIMITATIONS OF THE STUDY

All data collected on computer use represents BALLOTS in LINE MODE operating at 30 characters per second. LINE MODE was the form of BALLOTS used by PLAN members during the study. However five of the PLAN members will be shifting to BALLOTS FULL FACE MODE after completion of the study. Tests at Stanford indicate that the FULL FACE MODE of BALLOTS which operates at 120 characters per second will perform computer tasks 50% faster. For the library this increase in speed will show a reduction in time required for computer tasks. For example, printing a record in BALLOTS long format which takes an average of 15 sec in line mode, can be done in full face mode in 7.5 seconds.

Due to time and manpower constraints, the study was unable to collect significant data on system down time. In an online system configuration down time can occur in any of three areas. Thus, the BALLOTS system could become unavailable to the PLAN libraries because (1) a failure in the BALLOTS computer, (2) a failure in the communications line between the library and the BALLOTS computer, or (3) an equipment failure in the library itself. The determination of the number, type, and duration of failure could not be adequately tracked during the study. In addition the PLAN terminals experienced an unusual amount of terminal problems during the study, caused not by BALLOTS but by extremely poor service from the maintenance vendor (one whom BALLOTS does not recommend to current customers). The results, then of any analysis of down time in general would be incomplete as well as skewed by an atypical maintenance situation. Consequently, the study lacks information on this important facit of online system use.

Accurate timings for staff training requirements were impossible to collect during the study. At the time of the analysis staff members of the PLAN libraries had already been using the BALLOTS system for as much as one year. Consequently, this information is also lacking.

Finally, the study was unable to provide accurate and reliable data on startup time devoted to planning and implementation of BALLOTS in the libraries, for the same reasons that staff training time could not be measured. Time devoted to trouble shooting and general problem solving is also missing, as these times vary widely with the level of application of BALLOTS and because many problems observed during the study were related to initial development of new system features which did not represent normal operation expectations.

In reviewing the findings of this study, then, care should be taken to remember that these results will certainly not represent factors exactly as a library might expect to find them in its own implementation. They are a general guide, but allowance must be made for the limitations of data outlined here.

METHODOLOGY

The methodology of this analysis can be outlined as including six distinctive steps:

1. Literature survey
2. Delination of library operations impacted by BALLOTS
   - System documentation
   - Functions impacted
3. Workflow analysis
   - Tasks and times
   - Data collection
4. Determination of past and present production levels
5. Construction of cost models
6. Distillation of data and documentation

1. Literature survey.

An extensive review of available cost analyses and literature on cost analysis began this study. Some of the literature found most useful to this study is listed in the bibliography, page II-37. Specific references to this bibliography are found throughout the report. The purposes of this survey were to: determine what technical services and online bibliographic system analyses have been undertaken already; find out what data from these might be useful to this study; and review what methodologies were used and determine their applicability to this study. The methodology developed for this study does indeed use many ideas from the previous, documented studies. Of particular assistance at this stage was the library and conversation with Lawrence Leonard, Library Services Regional Program Officer, US Office of Education; Conference with ULAP (University of California Library Automation Program) and UCLA (University of California Los Angeles) library systems group who were undertaking similar studies for academic libraries; discussion with Ms. Eleanor Montague and Ms. Mary Ann Kevin Brown who were involved in a library technical processing cost study for WICHE (Western Interstate Commission for Higher Education); and Los Angeles County Public Library Systems group who were involved in an internal systems analysis using GPC (Group Production Control) methodology.

2. Delineation of library operations impacted by BALLOTS.

System documentation

The first 3 man-months of the study were devoted to

documenting the manner in which BALLOTS was being used by the PLAN libraries. Several on-site visits were made to each library and all levels of staff were interviewed. A set of flow-process charts were prepared for each of the observed systems (see appendix IV), which show in detail the flow of work within each of the libraries using standard flowchart symbols for documents, processes, decisions, etc., along with a narrative overview of basic system features. Areas within the previous system which had been replaced, altered, or in some way impacted by BALLOTS were identified.

Functions impacted.

To be able to effect a comparison among all libraries, and provide a focus on the areas to be evaluated by the study, eleven BALLOTS impacted functions in the libraries' technical processing systems were identified (see Figure 1). Each of the functions was being performed by at least one of the PLAN members, and several of the functions were performed by all PLAN members.

3. Workflow analysis.

Tasks and times.

Each of the functional areas was broken down to the detailed task level. Tasks where possible were given standard definitions used in the task list of previous studies (see references 1, 5, 7, 10, 11, page II-37).

Tasks performed by the PLAN libraries were compiled by function in the union task list for this study (see appendix II).

Average times for each task were collected in the libraries, however, times for those tasks which were portions of previous systems no longer being performed, were located in standard time data from previous studies, or if the time data was not available, the task time was estimated by the library. The source of the time data for each task is included in the union task list.

Tasks identified by this study will be incorporated into the Los Angeles County Public Library GPC (Group Production Control) data base of standard times for library tasks. This project was coordinated with Ms. Florence Sisco, Library Systems Analyst, Los Angeles County Public Library. Each of the task group functions of the union task list was assigned a GPC standard number for inclusion into the GPC data base.

Data Collection.

Time data was collected in the libraries by two methods; field data collection, and stop watch timing.

FIGURE 1

FUNCTIONAL AREAS STUDIED IN THE PLAN COST ANALYSIS

1. ACQUISITIONS AND BOOK RECEIPT

   Use of BALLOTS in pre-order verification.

2. RECEIPT PREPARATION

   Sorting books for catalog copy search.

3. SEARCHING FOR CATALOG COPY

   Use of BALLOTS and other sources for location of catalog copy.

4. STANDING SEARCH

   Use of the BALLOTS standing search feature.

5. CATALOGING

   Offline cataloging of new titles with copy or original.

6. DATA ENTRY

   Conversion of catalog copy into machine readable form.

7. PROOFREADING AND EDIT

   Library processing in quality control of records.

8. CATALOG CARD PRODUCTION AND HANDLING

   BALLOTS and multilith.

9. CATALOG REPRODUCTION

   BALLOTS interface with production of book or fiche catalogs.

10. BOOK PROCESSING

    BALLOTS services in end processing.

11. REFERENCE ACCESS

    BALLOTS applications in bibliography production, reference searching, and inter library loan processing.

Field data collection was implemented in the libraries and run for four months to establish averages on the long term. In the field data collection, tasks were grouped into logical operational units for measurement. For example the 14 identified task elements for searching BALLOTS were treated as 1 operation. Library staff reported the start and stop time of a computer terminal searching session, and tallied the number of titles searched during the session. The elapsed time of the session divided by the number of titles searched produced the average time per title statistics reported in Table 1, page II-13. In the searching data collection other tallys were also collected to determine hit rate, number of searches per title and type of search used. The general format of the field data collection was to tally a production unit amount and an associated elapsed time to process that amount. Forms were created to correspond to each of the functional areas studied. Data collection forms used in the study are in appendix V.

To tabulate the data collected in the field a packaged computer program called SPSS (Statistical Package for the Social Sciences) was used. The data collection forms were coded with keypunch notation to convert the collected data into machine readable form for SPSS processing. The use of SPSS in the study was a straightforward application. Upon the arrival of the first month's keypunched data, the data processing files were built and a set of programs to compute results were written, run, and saved. Each month the new data from the libraries was added to the files and the programs run again. The version of SPSS installed in the Stanford Center for Information Processing was used by the study.

BALLOTS system monitor data was used as a cross check for collected computer terminal statistics.

As the field data collection gathered long term average times for groups of tasks, the individual task elements were stop watch timed at each library. The average time for each stop watch sample is included in the union task list.

4. Production levels.

Breakdown of titles cataloged monthly.

Past production statistics of each library were analyzed to determine an average number of titles cataloged by each system. For comparison purposes this average was used in both the past and present system cost models for each library to simulate an average monthly operating cost.

The average monthly number of titles cataloged was broken down using ratios derived from collected tallys and library statistics to determine the distribution of the titles among all tasks in both past and present

systems. For example, if a library cataloged an average of 900 new titles per month and the collected tallies showed that an average of 58% of the observed sample were adult non-fiction, then 522 of the 900 titles in the cost model were treated as being adult non-fiction. If collected tallies further showed that the hit rate for the observed sample of adult non-fiction in searching for catalog copy was 73%, then 381 of the 522 adult non-fiction titles in the cost model were costed as having catalog copy available. By this method, production levels were derived for each task. See appendix III for monthly production breakdown tables.

5. Cost model construction.

Calculating operating costs.

Operating costs for a system were grouped into three categories: 1) Personnel, cost of labor for each task in the system, 2) Cataloging services, costs of computer and other subscription services used by a system, and 3) Equipment/Supplies, costs of equipment and relevant supplies used by a system.

Personnel costs.

Personnel wage rates were computed using a formula to calculate the adjusted hourly rate (Figure 2). This formula includes sick leave, vacation, breaks and fringe benefits in the hourly personnel rate, but does not include administrative overhead. The adjusted hourly rate was computed for each job class for each library, and the same rate was used in both the past and present system cost models. This figure provides a convenient representation of total costs to a library for completing a specific number of units. Readers are cautioned, however, not to equate this manufactured hourly cost figure with any hourly salary figure.

Administrative overhead (i.e. the cost for the personnel office, payroll office, supply office, etc. needed to support staff performing costed tasks) was omitted from these calculations because it is calculated on such diverse bases by different agencies that valid figures were impossible to obtain. It should be noted, however, that since requirement for administrative services varies directly with the amount of staff which must be supported and that the automated system generally required significantly less staff than the past system this reduction could mean a sizeable long term savings in administrative support requirements and should be included for long range cost projections. In the short term, the saving to the PLAN libraries would be non existent and was not pursued further.

Also omitted from personnel costs was labor for direct supervision, as ratios between supervision and production could not be determined for past and BALLOTS systems. This also shows costs in favor of the past system because the greatly reduced labor force required by the BALLOTS operation, also implies a significant reduction in the more costly supervisorial salaries over the long term. Again, no short term savings pertain.

After the adjusted hourly rate was computed, each task used by a system was pulled from the union task list and placed on a cost detail sheet (see appendix I). The time to perform the task was listed as units per hour. The number of production units (titles, forms, etc.) for the task was pulled from the monthly production breakdown tables. The monthly production units divided by the units per hour equal the number of hours consumed by that task per month which when multiplied by the adjusted hourly rate for the task provide the monthly labor cost for the task.

Cataloging services costs.

Fees for communications, computer use, LC Proof subscriptions, National union catalogs, etc. were identified in early system documentation. Each cost was treated as a monthly line item in the cost detail sheet for a system. (See appendix I)

Equipment/Supplies.

Costs for these items, where possible, were treated as monthly line item costs in the cost detail. However, items which could not be given a monthly charge were listed separately as one-time start up costs as is the convention used in similar cost studies. (See appendix I)

6. Distillation of data and documentation.

Finally, hundreds of pieces of data collected during the eight months of this study have been analyzed to provide cost comparisons, service evaluations, and benefit analyses which are documented in this report.

FIGURE 2

FORMULA USED FOR CALCULATING THE ADJUSTED HOURLY RATE FOR LABOR COST

Personnel Costs:

Direct labor for technical processing tasks were identified as belonging to 5 major classes: Librarian, Library Technical Assistant, Library Assistant, Clerk Typist, and Page. An average rate for each level of personnel at each PLAN library was calculated using library salary schedules. This figure was further processed using a formula from a previous study (6[a]) to calculate the Adjusted Hourly Rate (AHR). The final figure of the AHR was used in the final cost tabulations for both the past and present system cost models. The Adjusted Hourly Rate which is derived by dividing the yearly labor cost by the number of productive hours was calculated by the following formula.

Number of Productive Work Hours:

52 weeks X 5 work days = 260 days =	2080 hours	2080 hours
LESS		
- Holidays (avg 10/yr)	80 hours	
- Vacation (avg. 2.5 weeks)	100 hours	
- Sick Leave (avg 10 days)	80 hours	
- Breaks (avg 40 min/day)		
(40 min X 221.5 days at work)	148 hours	- 408 hours
TOTAL	408 hours	- 408 hours
PRODUCTIVE WORKING HOURS		1672 hours

Yearly Labor Cost:

Annual Salary + (Annual Salary X benefit percent[b])

ADJUSTED HOURLY RATE:

Divide yearly labor cost by 1672 hours

[a] See References, page II-37

[b] Actual benefit rates quoted by each library were used.

FINDINGS IN FUNCTIONS STUDIED

ACQUISITIONS AND BOOK RECEIPT:

The full acquisitions service in the BALLOTS system is currently available only for Stanford University, however searching capabilities allowed one PLAN member to implement BALLOTS use for pre-order verification. This application was seen to be a successful solution to a problem involving duplicate orders due to variations in the form of entry. By searching BALLOTS, the entry was established for the library's on-order file, as well as locating catalog copy which was used upon receipt of the item. As LC Card numbers were not as readily available for a pre-order search, the BALLOTS author/title word indexes proved very useful in the success of this activity.

RECEIPT PREPARATION:

Sorting new titles by imprint date was a common practice by several PLAN members at the beginning of the evaluation. If a title was 1972 or newer, or seemed likely to have been cataloged by Stanford, it was sent to the BALLOTS searching section. Older imprints were routed to NUC or other searching sources in the library.

At that time, the BALLOTS data base contained only MARC from 1972 and original cataloging by Stanford libraries, however the new shared cataloging files in BALLOTS now also store online original cataloging by remote users of the system. The practice of sorting by date is gradually being abandoned, as it is becoming less possible to predict what citations may or may not be available in the data base.

SEARCHING FOR CATALOG COPY:

PLAN members, during the data collection for the study, were using BALLOTS in LINE MODE at 30 cps line speed. Table 1 shows PLAN libraries searching and printing found records at rates of 34.3 to 48 titles per hour. These average titles per hour rates will increase when PLAN libraries shift to BALLOTS FULL FACE MODE. (See LIMITATIONS of the study)

Procedures for searching BALLOTS were generally similar among all PLAN libraries. New titles were taken to the terminal, the terminal was logged on to BALLOTS, searches were keyed using BALLOTS command language, and found records were printed on the character printer coupled to the terminal. At the end of the session, the printout was cut into individual records and matched with titles for distribution to the next processing location.

Interactive searching on the terminal was observed to fall into three basic search scenarios: The LC Card number (LCCN) search with a single hit (Figure 3), The author/title word search with several records retrieved (Figure 4), and the LCCN or author/title word search which did not locate a record (Figure 5).

TABLE 1

SEARCHING BALLOTS
Line mode at 30 characters per second

AVERAGE TIME

Searching and printing found records

TITLES PER HOUR

	LOW	RANGE	HIGH	MEAN
LIBRARY 1	33	13	46	40.8
LIBRARY 2	30	36	66	48.0
LIBRARY 3	18	76.3	94.3	44.8
LIBRARY 4	8.4	77.5	85.9	34.5
LIBRARY 5	10.5	61.5	72	34.7
LIBRARY 6	16	64	80	34.3

As each of the three search scenarios has different times, and as each of the scenarios may have several variations which will also have different times (i.e. variations in the number of records found per search; use of AND, OR, NOT Boolean operators to modify searches; a non-productive first search by LCCN followed by a productive second search by author/title words; etc.) it was apparent that the time for a single observed search may be unique, but that a terminal searching session would be composed of some combination of all search variations.

Terminal search sessions which see a high hit rate will average a longer time per search as more records will be printed, whereas sessions with low hit rates will take less time per title as the session will include less printing time, such as in Figure 5 scenarios.

In data collection, the search time per title was defined as the elapsed time of the search session divided by the number of titles searched during that session. In this way all the variations of searching would be equalized in the collection of a large sample, and the result would more accurately describe expected throughput for searching on the BALLOTS computer terminal. (Table 1)

BALLOTS subject heading and call number indexes are typically not used by a library cataloging department. As searching was being performed usually with book in hand, the major type of search used was by LCCN or author/title words. A sample of the ratio of LCCN to author/title word searches showed an average of 85% LCCN to 15% author/title searches performed by the libraries. Usually if an LCCN search was non-productive the libraries keyed a second search by author/title for the same item. Author/title searches were also modified using AND, OR, NOT boolean operators. Second searches and modified searches were tallied which indicated an average search to title ratio of 1.15 searches/titles, showing that 15% of the titles in the sample were searched more than once.

One PLAN member developed a time saving scheme by having the LCCN located in the book and written on the top edge of the order card as part of a pre-terminal procedure. When the search truck was brought to the terminal all located LC Card Numbers were visible protruding from the tops of the books. The terminal operator therefore actually handled only those books which did not have LCCN or were LCCN search non-hits where a second search using author/title words was undertaken.

Choosing author/title words for a search is an art that improves with experience. Not all title words are indexed, as certain high frequency, low information content words have been excluded from the indexes. The BALLOTS list of index exclusion words was kept near the terminal for ready reference by operators. Despite the exclusion words, many terms included in the indexes are still of high frequency. For example, for the search Find Author Smith, the BALLOTS computer will locate every record with the name Smith. As the number of Smith's in

FIGURE 3

SEARCHING BY LIBRARY OF CONGRESS CARD NUMBER

Step number	Time in seconds*	Description of task
1.	:02	Pull book from truck
2.	:08	Locate LCCN in book
3.	:07	Key LCCN on terminal
4.	:10	System finds record and displays in short format
5.	:04	Verify citation with book
6.	:01	Push printer button on
7.	:02	Key print command (Long, Full)
8.	:15 Long format :25 Full format	System prints record
9.	:01	Push printer button off

Total time for long format 50 seconds

Total time for full format 60 seconds

Note: The above times represent BALLOTS at 30cps line speed. Using BALLOTS at 120 cps line speed reduces system time by one half (steps 4 and 8)

at 120 characters per second:

Total time for long format 37.5 seconds

Total time for full format ~43 seconds **

* times established via stop watch timing

** BALLOTS Line Mode at 120cps. The FULL FACE Mode mnemonic print format was not available to be stop watch timed during the study.

FIGURE 4

SEARCHING BY AUTHOR/TITLE WORDS

Step number	Time in seconds*	Description of task
1.	:02	Pull book from truck
2.	:10	Key author title word search
3.	:05	System responds multiple hit RESULT 2 in CDF
4.	:02	Display command (DIS)
5.	:10	System displays first record
6.	:04	Verify citation with book
7.	:01	Hit carriage return for next record
8.	:10	System displays second record
9.	:04	Verify citation with book
10.	:01	Push printer button on
11.	:02	Key print command (long,full)
12.	:15 Long format :25 Full format	System prints second record
13.	:01	Push printer button off

At 30cps line speed:

Total time for Long format	67 seconds
Total time for Full format	77 seconds

At 120cps line speed:

Total time for Long format	47 seconds
Total time for Full format	53.5 seconds**

* times established via stop watch timing

** BALLOTS Line Mode at 120cps. The FULL FACE Mode mnemonic print format was not available to be stop watch timed during the study.

FIGURE 5

NON-PRODUCTIVE SEARCH

Step number	Time in seconds*	Description of task
1.	:02	Pull book from truck
2.	:08	Locate LCCN in book
3.	:07	Key LCCN search on terminal
4.	:05	System message none found
5.	:10	Key Author/Title word search
6.	:05	System message none found

At 30cps line speed:

Total time for non-productive search 37 seconds

At 120cps line speed:

Total time for non-productive search 32 seconds

* times established via stop watch timing

the file is large, the resources used in the computer and time required to complete the search rise to a threshold where the system interrupts the search and asks the user if he wishes to continue the search, thus allowing even an inexperienced searcher to use the system efficiently.

BALLOTS contains 4 logical files: MARC, CDF, IPF, and REF. The MARC file contains machine readable cataloging from the Library of Congress and is updated weekly as new MARC tapes arrive at BALLOTS. The CDF (Catalog Data File) contains original catalog records and variations of MARC records for those titles cataloged by libraries participating in Shared Cataloging. The IPF (In-Process File) contains abbreviated records for those titles on order or in-process in the Stanford University libraries, and the REF (Reference) file contains cross references used by Stanford.

BALLOTS searches the files in sequences depending on the function used. System command language allow the user to specify the order in which files will be searched.

Using this feature a library could search the CDF first, if ILL holdings data rather than cataloging date is desired. In addition the order in which CDF records are displayed can be specified, thus allowing for display of holdings of nearby libraries before those of more distant libraries for ILL applications. One new feature in BALLOTS for selecting CDF files for searching allows the user to set groups of files, for example set GROUP NOR CAL will search only the northern California libraries' CDF's. Code names for CDF groups are available at BALLOTS Center.

The average hit rate in searching for catalog copy for all PLAN libraries combined was 72.8%. (Table 2). The largest portion of this was found in MARC (68.5% avg.). The low, 3.28% average hit in the CDF is related to the fact that the shared cataloging files for public libraries were begun during the course of the study and that the retrospective records cataloged by PLAN members during the first year of the project were not added to the CDF until very near the completion of the study. In the future when the number of shared original catalog records in the BALLOTS data base increases, the hit rate experienced by libraries searching the CDF file is expected to increase beyond the level observed in this study.

Hits in the IPF (Stanford in-process file) averaged a little over 1%, and hits in the REF file were not tallied, as PLAN members only occasionally searched the cross reference file for authority verification. The highest hit rate for a single search session recorded by PLAN members was 92.3%.

STANDING SEARCH:

Of all the functions studied, Standing Search was the only one found to be of very little use by PLAN members. Standing search allows a search to be held in the computer and passed against new MARC tapes as they arrive from the Library of

TABLE 2

HIT RATE PERCENTAGES IN BALLOTS

	MARC	CDF*	IPF	NOT FOUND	STANDING SEARCHES (included in MARC and NOT FOUND totals)	
					FOUND	NOT FOUND
LIBRARY 1	75.6%	2.5%	.3%	21.6%	N.A.	N.A.
LIBRARY 2	67.5%	1.8%	.5%	30.2%	N.A.	N.A.
LIBRARY 3	65.3%	8.5%	1.6%	24.6%	2.2%	6.6%
LIBRARY 4	66.9%	1.7%	1.2%	30.2%	N.A.	N.A.
LIBRARY 5	72.5%	4.3%	1.8%	21.4%	1.08%	3.22%
LIBRARY 6	63.0%	.9%	.8%	35.3%	N.A.	N.A.

* Shared cataloging files for public libraries were made available during the study and retrospective cataloging by PLAN libraries done during the first year of the project were not added to the CDF until near the completion of the study. CDF hit rates are expected to increase.

Congress. Although this capacity appears to be an advantage for academic libraries which process a larger number of titles per year and may be willing to wait longer to obtain a catalog record, the result was different for public libraries.

PLAN members who used standing search experienced an average 25% hit on those titles placed on standing search. Those titles which were standing search no-hits were reported to be occasionally found in one of the shared cataloging files on a second search performed by the library.

Instead of placing a title on standing search for 2 or 3 months, PLAN members will be holding the not found titles to recycle them to the terminal for second searches by their staffs. Using this procedure they feel they will receive a higher hit rate and expedite those titles more economically. However, the accuracy of this assumption (i.e. that staff time and computer costs for performing the re-searches will be less than the standing search costs) were not tested during this study.

CATALOGING VERIFICATION:

All data collected in this function represents offline activity in the library performed by library staff. The times reported in the cataloging tables 3, 4, 5, & 6, represent the process performed at a staff member's desk, from picking up the item to be cataloged as the start of the task, to the completion of cataloging for the item as the end of the task. A list of the types of tasks involved in this activity is found in the union list of tasks (see appendix II).

Cataloging data was collected to determine if there was a difference between the process of cataloging with computer produced catalog copy vs. copy from other sources, such as CIP, NUC, or LC Proof slips.

Cataloging with MARC records was seen to be generally faster than cataloging with CIP, NUC, or LC Proof slips in the sample collected, as part of the time in cataloging with CIP or NUC was used in recopying the citation. Cataloging with CDF or IPF records took longer than with MARC. In the case of CDF records one library may need to perform more checking and modification to another library's original cataloging record than to a MARC record. IPF records were typically only the descriptive data for the item. The need to determine call numbers and subject headings for IPF records placed IPF cataloging times very close to those for originial cataloging. One PLAN library chose not to print or use records found in the IPF, placing those titles directly into original cataloging.

The types of modifications done to MARC and CDF records were: revision of main entry to conform with the library catalog, alteration of subject headings and added entries to used forms in the catalog, or special forms needed by the library. An example of a special form of subject heading involved the repositioning of the dates in historical subjects to insure that computer sorting routines in the production of book or fiche catalogs would arrange the citations in the order desired.

TABLE 3

LIBRARY 3 CATALOGING TIMES

	MARC	CDF	IPF	ORIGINAL
CANF	2.73	3.50	---	5.75
CJNF	2.78	2.90	---	4.00
CAF	1.17	2.00	---	2.00
CJF	1.75	2.00	---	2.00

C = CATALOGING A = ADULT NF = NON-FICTION

J = JUVENILE F = FICTION

--- = CATALOG COPY NOT USED IN CATALOGING

TABLE 4

LIBRARY 4 CATALOGING TIMES

	MARC	CDF	IPF	LC PROOF	CIP	NUC	ORIGINAL
CANF	5.88	9.04	16.25	6.39	6.57	7.46	17.56
CJNF	9.30	*10.00	*10.00	9.63	10.10	12.60	22.30
CAF	---	---	---	---	---	---	3.40
CJF	---	---	---	---	---	---	3.40

C = CATALOGING

A = ADULT
J = JUVENILE

NF = NON-FICTION
F = FICTION

--- = CATEGORY NOT USED

* = ESTIMATED TIME: Category not available during data collection time estimate by cataloger

TABLE 5

LIBRARY 5 CATALOGING TIMES

	MARC	CDF	IPF	LC PROOF	CIP	NUC	ORIGINAL
CANF	4.41	5.90	16.3	4.41	5.31	5.98	18.2
RANF	1.65	3.45	2.0	1.65	1.50	2.59	3.69
CJNF	10.5	4.0	---	10.5	11.85	6.0	10.33
RJNF	1.78	1.5	---	1.78	1.43	1.65	1.5
CAF	---	---	---	---	9.33	---	8.58
RAF	---	---	---	---	1.19	---	1.41
CJF	---	---	---	---	11.55	---	11.98
RJF	---	---	---	---	1.03	---	1.33

C = CATALOGING A = ADULT NF = NON-FICTION

R = REVISE CATALOGING J = JUVENILE F = FICTION

-- = CATEGORY NOT USED

TABLE 6

LIBRARY 6 CATALOGING TIMES

	MARC	CDF	IPF	CIP	ORIGINAL
CANF	1.5	*3.00	*12.45	2.48	12.45
CJNF	---	---	---	---	---
CAF	1.5	*2.00	* 4.05	1.59	4.05
CJF	---	---	---	---	---

C = CATALOGING A = ADULT NF = NON-FICTION

J = JUVENILE F = FICTION

* = ESTIMATED TIME: Category not available during data collection time estimated by cataloger

--- = CATEGORY NOT USED

Cataloging times reflect local library needs and practices. No attempt was made by the study to quantify the differences in cataloging procedures as they varied from library to library.

DATA ENTRY:

When a record was entered into BALLOTS by a PLAN library, it was added to the online CDF file for that library and also used to produce as many card sets as were ordered, or to write a copy onto magnetic tape for the library's book or fiche catalog production system.

To enter records into BALLOTS, library staff brought them to the terminal. Then if a record already existed in the BALLOTS data base, a copy of the record could be modified per the catalog copy used by the library, or if no record existed in the data base the catalog copy could be keyed in as a new record.

Two approaches to data entry were observed. In one approach data entry clerks worked from standard catalog copy format (BALLOTS LONG FORMAT Figure 6). In the second approach data entry clerks worked from catalog copy in BALLOTS FULL FORMAT (Figure 7), which is a listing of BALLOTS data element mnemonics and the parts of the citation arranged in the same order as encountered on the record entry screen of the terminal. While the use of the full format for data entry appeared to be more straightforward for terminal personnel, i.e. the paper copy was identical to the appearance of the terminal screen, clerks using standard catalog copy format revealed no problems in matching portions of citations with the mnemonics on the screen.

The advantage of using the long format was that catalog copy printed by the computer was virtually identical to an LC Proof slip or NUC photocopy and thus could be processed without any change to the existing procedures in the library system.

Use of the full format, while requiring retraining and rewriting of procedures, gave the library knowledge of the exact contents of each mnemonic field in the citation. This was especially important for one library, which needed to carefully control the contents of certain fields used for special applications in a book catalog production system.

BALLOTS was used for data entry by three of the libraries in the study. The two PLAN members who were still in a testing phase and were not evaluated by the study will also be using BALLOTS data entry. The remaining PLAN library in the study used BALLOTS as search only and produced its catalog cards in house from the computer printed catalog copy by typing masters and running them off on a compact multilith machine.

The time to modify existing records in BALLOTS (Table 7) ranged from 1:27 to 1:51 minutes per title. One library at

TABLE 7

AVERAGE DATA ENTRY TIMES
BALLOTS LINE MODE - 30 characters per second

	MODIFICATION OF RECORD IN BALLOTS DATA BASE		KEY IN NEW RECORD CREATE	
	MINUTES PER TITLE	TITLES PER HOUR	MINUTES PER TITLE	TITLES PER HOUR
LIBRARY 1	N.A.	N.A.	N.A.	N.A.
LIBRARY 2	N.A.	N.A.	N.A.	N.A.
LIBRARY 3	1:51	32.3	2:16	26.4
LIBRARY 4	1:27	41.1	3:31	17.1
LIBRARY 5	N.A.	N.A.	2:39	22.6
LIBRARY 6	N.A.	N.A.	N.A.	N.A.

N.A. = NOT APPLICABLE

FIGURE 6

BALLOTS RECORD PRINTING FORMATS

LONG FORMAT

```
   dis long / dis
Record   1 of   5
Dickens, Charles, 1812-1870.
  A tale of two cities. With a critical and biographical profile of Charle
Dickens by Arthur A. Adrian.  New York, F. Watts [1969]
  xxii, 582 p.  24 cm.   5.95

  "A Watts ultratype edition."

  1.France - History - Revolution, 1789-1799 - Fiction.  I.TITLE.
CARD:782806
PZ3.D55.Tal20   PR4571   823/.8
CP:nyu  L:eng   REC:am     MS:C
+B?
```

FIGURE 7

FULL FORMAT

```
    full
Record   1 of   5
   1.     MEPN      Dickens, Charles, 1812-1870.
   2.     TST   10  A tale of two cities.
   3.     TSRT      With a critical and biographical profile of Charles
   4.               Dickens by Arthur A. Adrian.
   5.     PP        New York, F. Watts
   6.     D         [1969]
   7.     PG        xxii, 582 p.
   8.     SZ        24 cm.
   9.     REC       am
  10.     CARD      782806
  11.     DC        823/.8
  12.     LC        PZ3.D55.Tal20
  13.     LCA       PR4571
  14.     SST       3S
  15.     NG        "A Watts ultratype edition."
  16.     SASU      France - History - Revolution, 1789-1799 - Fiction.
  17.     L         eng
  18.     CP        nyu
  19.     MS        C
  20.     LPR       5.95
+B?
```

the time of the study was not able to take advantage of the modification of records in BALLOTS as its records required special codes to interface with an in-house system. In their case it was faster for data entry clerks to key the record with all needed codes and changes rather than insert the codes and changes into an existing record. That library is, however, contemplating changes to its in-house system to take fuller advantage of online catalog copy. The time to key a new catalog record into BALLOTS ranged from 2:15 to 3:31 minutes per title (Table 7).

Using BALLOTS for data entry provided the library with more control over the process of converting records into machine readable form by eliminating previously used keypunch processes. The additional advantage of having access to records already in machine readable form reduced the staff time required to key new citations.

Libraries using BALLOTS full format created special forms for original cataloging (Figures 8 & 9) which resembled blank full formats that were filled out during original cataloging.

PROOFREADING:

The two PLAN libraries who used BALLOTS tape output to interface with catalog production systems had a proofreading and edit cycle to detect and correct errors in their catalog records. This was done by having the agency who received the BALLOTS tape make a printout of all citations on the tape. This printout was then proofread in the library against the citation copy used for data entry into BALLOTS.

Each library handled the proofreading cycle differently. In one library the BALLOTS tape was received at two week intervals, and one librarian proofread the printout averaging 33 seconds per record. (See union task list, appendix II). The other library received the BALLOTS tape at two month cycles which would average close to 2,000 records per tape. In this library proofreading was done by the entire staff on the day the printout of the records arrived in the library (Table 8).

Errors found in the records were corrected through the agency handling the tape. Use of BALLOTS for data entry eliminated all errors due to keypunching of records. Libraries reported that such keypunch errors in past systems were occasionally catastrophic, as a keypunch instruction might b misunderstood and result in a large number of records being punched in a wrong format. The cost of error correction was identified for one of the libraries, but in the second library as the method of detecting and correcting errors in the previous system rendered past error counts non-comperable to error rates observed with BALLOTS, the second library's error correction process was not costed for either past or present system. Types of errors observed were generally typographic which occur during data entry as library staff key in or modify catalog records.

FIGURE 8

EXAMPLE OF ORIGINAL CATALOGING FORM USING BALLOTS FULL FORMAT (LINE MODE BALLOTS)

BALLOTS WORKSHEET

TOP
MEPN
ME

TST 1

TSSB

TSRT

PP

D

PG

INT J BLANK

CARD

MUC

MID
NG

NC

BOT
SASU

SASU

SA

SA

OAPN

OA

OA

HOL
CAL LSI

BRN AR,BK,CA,CE,CL,CU,GI,LA,MH,MI,MV,QU,SA,SH,EV,HQ,RE,TR,WO

LDA

FIGURE 9 EXAMPLE OF ORIGINAL CATALOGING FORM USING BALLOTS FULL FORMAT (LINE MODE BALLOTS)

cre
ME
TST
TSSB
TSRT
ED
PP
D
PG P.
CARD
ISBN

bot
SA
SASU
SA
SA
OA

hol
CALL
LSI

MARIN COUNTY BALLOTS INPUT FORM 4 7/76

TABLE 8

LIBRARY 5 TASK 7B PROOFREADING TIME

JOB CLASS	PERCENT OF MONTHLY NEW CATALOG RECORDS TO PROOFREAD	RECORDS READ PER HOUR
LIBRARIAN	30%	93
LIBRARY TECHNICAL ASSISTANT	30%	71
CLERK TYPIST	40%	64

TASK 7A, 7C DISTRIBUTE, COLLECT, REVIEW PRINTOUT & ERROR FORMS

CLERK TYPIST Task time avg. 16 sec. per record in printout

CATALOG CARD PRODUCTION:

One PLAN library received catalog cards from BALLOTS. In this analysis, the production of catalog cards by BALLOTS was compared to that library's in-house multilith printing system. During system documentation it was observed that the multilith system had several variations such as, making photoplates of LC cards with later typing of headings on card sets, or photographing typed unit cards with acetate overlays of headings. As many of the variations were used at various times in the past, or are being currently used for a small percentage of special category titles not impacted by BALLOTS, the constructed costs in the cost model represent the main stream of the multilith system.

In the costed configuration, main entry cards, added entry cards and subject heading cards are typed on 6-card size multilith masters. The masters are run off in the print shop to produce printed cards. In this system it was necessary to sort entries by number of cards needed, and attempt to group entries needing the same number of cards on the same multilith master. Slight variations in this grouping resulted in the printing of more cards than were needed for one or more citations. Printed cards were returned to the library in banded groups which were sorted into card sets, matched with the books, and sent to the branches where the cards were alphabetized and filed.

Comparing this system to BALLOTS production, the benefit most enjoyed by the library was the elimination of all sorting, typing, and alphabetizing of catalog cards. Computer produced cards are delivered to the library presorted into filing groups such as: dictionary catalog for each branch, shelf list, and official main entry.

Catalog card sets are ordered on the terminal as part of the data entry process, and the problem of producing an additional card set for a later added copy for another branch is simplified by merely locating the record in BALLOTS (which is stored in the form used by the library) and requesting another set of cards.

As a large percentage of the catalog copy used is already in machine readable form in the BALLOTS data base, the need to key catalog copy is reduced, and a one time interaction with the catalog copy is all that is required to produce complete sets of catalog cards, arranged in desired sequences.

CATALOG REPRODUCTION:

As a result of the PLAN project, BALLOTS programmed output formats which allow magnetic tapes of catalog records to interface with several vendors of microform catalogs. Any library desiring to have a microform catalog produced by one of those vendors may locate records in BALLOTS and request that the records be written onto tape in the format used by that vendor. This streamlined method of record transfer from the BALLOTS data base to microform catalog has already attracted

one new library to join BALLOTS.

BOOK PROCESSING:

Call numbers in BALLOTS records are used in the production of spine lables for Stanford libraries. This feature, while not yet available to remote users of BALLOTS, is on the list of future network services.

REFERENCE ACCESS:

Outside the mainstream of technical processing, PLAN members tested other system capabilities. As no standard procedures or job descriptions were instituted for these activities, they were not included in the cost models. However a discussion of the results of various experiments shows the potential for wider use of BALLOTS.

Call number and subject heading indexes in BALLOTS provide a ready means for compiling bibliographies. Found citations can be printed quickly using BALLOTS SHORT FORMAT which is a brief bibliographic description of the item. In the case of large result stacks in which perhaps 100 or more citations are located by a search, the BALLOTS command DIS CON (Display continuously) will cause the computer to print each citation stopping only when the list is complete, thereby freeing the staff member until the job is finished.

The bibliography service was used for patrons at Sutter County Library with great success. Because the library's collection is small enough that it can't cover in depth all subjects needed by county offices and others, the bibliographies were exceptionally useful. By searching the various BALLOTS files by subject, call number, and significant title words, a topical bibliography could be developed at the patron's request. This list could then be used to obtain books in Sutter County's collection and also provided fully verified data for requesting via interlibrary loan those titles not in Sutter's collection.

Use of BALLOTS for interlibrary loan verification was tested by several of the PLAN libraries. One well documented experiment performed by Marin County searched a sample of 373 ILL requests through both CBI and BALLOTS. CBI had a hit rate of 87.9% at 11.5 titles per hour search time, while BALLOTS had a 52,8% hit at 85.7 titles per hour searching.

As the BALLOTS shared cataloging files grow, which represent the actual holdings of participating libraries, ILL requests in the future may be verified in BALLOTS and holding locations found in the same process.

In addition to the reported results which represent the findings of the functions studied during the analysis, the PLAN members responded to a questionnaire which collected the libraries' opinions on various aspects of BALLOTS use in the library which were not necessarily related to costs. The content of the answers to this questionnaire together with observations made during the study, are presented in this section grouped under appropriate headings.

SYSTEM BENEFITS

DIRECT BENEFITS TO PATRONS

-Faster Service: For the same costs as previously incurred, the libraries generally found that they could get their materials out on the shelves faster, with the result that patrons receive more up-to-date items. One library commented that it now gets its materials out within one week, routinely.

-More complete data: Instead of deleting L.C. data from proof slips and other sources in order to reduce typist workload, the libraries generally left this data in. Since the computer could regenerate all of the data so quickly and required no exceptional typist labor, more complete entries were provided for catalog users, thus increasing their chances of finding the specific information they wished.

-Entry verification: The numerous indexes and the ability to search on individual main entry, title, etc. words meant that patrons were not required to know exactly the form which had been established for an item in which they were interested. Just one or two words from the title and/or main entry were enough to key in a search for the item and determine what form had been established for the entry in question. A search in the library's collection or via ILL could then be initiated using the acceptable, library form of entry, without requiring the patron to become familiar with intricacies of library cataloging practice. This is an invaluable service as a side benefit of having the BALLOTS system to support cataloging. It would not be cost justifiable as a solo use at today's terminal and communications rates, but was found to be an extremely desirable added benefit of the existing system.

AS A CATALOGING TOOL FOR STAFF

-Source of bibliographic data: The searching proved much more rapid than via conventional manual methods. Whether searching on L.C. card number or by one of the many full word indexes, searching was fast and extremely simple. Search strategy was learned quickly.

Libraries were able to eliminate their proof slip files and the attendant sorting and interfiling that these required. In addition, the flexibility of search strategies provided the searchers with a great variety of potential entries to the cataloging data. The proof slip file, on the other hand, provided only one (i.e. the order in which the whole file was arranged - author, or title, etc., but not both).

The libraries found that the ability to obtain hard copy of the bibliographic data retrieved was critical to their operation. The mixture of display terminal and printer configuration provided them the ability to print out - in any one of BALLOTS 4 online print formats - exactly the data that was best adapted to their own local processing system.

-Data manipulation and entry: Libraries were generally satisfied with the flexibility provided by the data manipulation and entry functions of the line mode system and seem to be eagerly awaiting their opportunity to work with the more flexible and efficient functions in the full face system. They commented on the ease of correcting errors when compared to past systems.

Two of the libraries were able to eliminate or reduce the keypunching of the data required to support their book catalog system. This provided at least two very significant benefits. First, the data had to be keyed only once, instead of once onto keypunch instruction sheets and once by the keypunch staff. Secondly, and even more significantly, the data input could now be done by library staff, knowledgeable of what the data should be like. Lack of understanding of the data had caused several large-scale problems in the past. No costs can be correlated with these problems; however, they're elimination - or at least reduction - has provided a much easier operation for these libraries.

-Backlogs: At least one library was able to not only maintain their current workload with 1 terminal of the project but to also work off at least half of their better than 10,000 volume backlog.

OTHER LIBRARY USES

As detailed in the Reference Access section, page II 33, the libraries found that having the installation available in the library allowed them to provide a number of added reference services.

Besides the reference services, one library found that they could increase the effectiveness of the total Technical Services operation by search at point of acquisitions in order to establish an authority for entry into their manual on order file. By this method they were able to eliminate a large number of unwanted duplicate orders which showed up in cataloging.

ADDITIONAL SIDE BENEFITS

-Library cooperation: One library used its installation in a cooperative mode to provide backup searches for bibliographic data for all System members. Again, the service proved very useful as an added use of the installed system.

-Procedural analyses: The implementation had the added benefit in most of the libraries of being a stimulus to exam various areas of the cataloging operation with an eye to making procedural changes to further effect an efficient operation.

-Introduction to automation: One side benefit of the PLAN project was the fact that many of the library staff members were introduced to computer activities for the first time. Many of the fears and mysteries of such applications could be faced in the comfort of familiar surroundings and without initial budget hassles. The libraries found the experience very helpful in understanding some of the good - and bad - of computer assistance, and seem to have come away with positive reactions.

SYSTEM PROBLEMS

-System messages: Messages which appear on the terminal screen during a session such as "WYLBUR HAS JUST DIED", are not always easily interpreted by the library. The lack of meaning of these messages, as well as the lack of knowledge of whether the condition was caused by the terminal operator or by the System itself and lack of knowledge about the action required by the library, are all part of one aspect of BALLOTS seen as a problem by new users of the System.

-Additional Juvenile Titles: The data base included MARC juvenile titles only since 1975. The libraries would like to see this file expanded. This would be a cost advantage as well as a general benefit. (Note: plans are already underway to add all MARC juvenile records from 1972 to 1975.)

-Communication with BALLOTS staff: As with any growing system BALLOTS staff members were observed to be extremely busy during the time of study. At this time the libraries commented that they would like to have more formal or informal communication with BALLOTS staff. Toward this end BALLOTS has expanded the library services staff, holds user meetings on a regular schedule, and maintains a "hot line" during normal working hours.

A library needs this type of communication, not only for the initial planning for BALLOTS implementation, analysis of its own procedures, and staff training; but also for immediate help with system or equipment problems that occur at unpredictable intervals.

-System Book: Library comments are not so much picking on the actual system documentation, but are responding to the general complexity of BALLOTS. A new user will undoubtably feel bewildered on the first contact with BALLOTS; however, library technical processing is complicated and thus BALLOTS is equally complicated, or more so, as it has many options built in to handle variations which occur among libraries. If there is a way to simplify the documented explanations of BALLOTS functions, and to create an easier way by which a library may locate just the information it needs at the moment, this would be a desirable added benefit.

-Flexibility in BALLOTS receipt & delivery of data: Libraries would like to see the BALLOTS system interfaced even more with other bibliographic systems. Specifically, they would like to see BALLOTS able to accept batch input in MARC format from book catalog systems, see records cataloged in BALLOTS be transferable to in-house computerized circulation systems, and would like to have the BALLOTS system provide an easy and inexpensive interface to the statewide public library union catalog system.

In sum, BALLOTS is seen to be a very effective resource in searching, cataloging, data entry, card production, and some interface with other systems. Comments by the PLAN members show a sample of the effects BALLOTS has had on their systems. Increased speed of through-put, elimination of older, time-consuming procedures, streamlining of technical processing, are all among the benefits derived through the use of BALLOTS. The PLAN members with cataloging volumes ranging from 413 to 992 titles per month, were all able to process their quotas using one BALLOTS computer terminal, and some also were able to use remaining time to perform searches for other libraries, or undertake special projects such as file conversion of retrospective catalog records.

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SYSTEM COSTS

As outlined in the PLAN Cost Analysis Methodology, above, a comparison of short-term budgeted costs of the BALLOTS line mode system and the libraries' estimated past system costs was performed using cost models of typical monthly activity. It should be noted that these costs reflect short-term costs of standard processing activities. They do not reflect the long-term savings in reduced requirements for administrative support and supervisorial staff resulting from the reduced staff requirements of the online system. Neither do they try to put a dollar cost on the sporadic, catastrophic keypunch errors that resulted in past systems because of data entry being performed by persons unfamiliar with cataloging data. They do not reflect any of the additional benefits provided by the BALLOTS system as detailed in systems benefit section.

Table 9 provides a summary of the costs per library. In all but one library the BALLOTS line mode system costs slightly more than the past system in the short-term (ranging from an increase of 32¢ to 64¢ per title). Indeed, in the one library which showed a short-term decrease in costs using BALLOTS in line mode, the difference was less than $94 per month. The result, then, is that there was no significant short-term difference between the costs of cataloging in past and present systems. The PLAN libraries made their decision to continue use of the BALLOTS system for reasons other than short-term savings. Potential long-term savings, the benefits detailed in systems benefits section, the increased potential of BALLOTS in full face, and the expected BALLOTS rate decrease are all apparently reasons for the decision to continue BALLOTS on local funding.

TABLE 9

MONTHLY OPERATING COSTS SUMMARY

	BALLOTS SYSTEM LINE MODE 30 CPS	NUMBER TITLES CATALOGED	PAST SYSTEM	NUMBER TITLES CATALOGED
LIBRARY 3	$ 3007.53	822	$ 2723.32	822
LIBRARY 4	$ 7528.27	992	$ 7212.43	992
LIBRARY 5	$ 4708.59	855	$ 4152.12	855
LIBRARY 6	$ 274.42	413	$ 368.35	413

INDIVIDUAL LIBRARY COST SUMMARIES

Tables 10 through 13 summarize the costs by category for the PLAN libraries analyzed. Both operating and one-time startup costs are summarized. In general a significant decrease in personnel costs in the BALLOTS line mode system is pretty much offset by the increase in cataloging services costs with that system. Detail for these summaries is contained in the Appendices.

LIBRARY 3

TABLE 10
COST SUMMARY

BALLOTS SYSTEM (LINE MODE)		PAST SYSTEM	
PERSONNEL Search for Cat. Copy	$ 156.31	PERSONNEL Search for Cat. Copy	$ 426.35
Catalog with Copy	$ 230.85	Catalog with Copy	$ 187.80
Original Cataloging	$ 156.45	Original Cataloging	$ 200.45
Data Entry	$ 196.65	Title Control in Batch Searching	$ 1052.15
Proofreading	$ 120.87	Proofreading	$ 120.87
CATALOGING SERVICES	$ 1995.80	CATALOGING SERVICES	$ 610.60
EQUIPMENT / SUPPLIES	$ 150.60	EQUIPMENT / SUPPLIES	$ 125.10
ONE TIME START UP COST $6374.50 (plus variable costs)		ONE TIME START UP COST $500.00	
TOTAL PER MONTH	$ 3007.53	TOTAL PER MONTH	$ 2723.32
Number of titles cataloged : 822 per month		Number of titles cataloged : 822 per month	

LIBRARY 4

TABLE 11
COST SUMMARY

BALLOTS SYSTEM (LINE MODE)		PAST SYSTEM	
PERSONNEL Search for Cat. Copy	$ 422.65	PERSONNEL Search for Cat. Copy	$ 618.80
Catalog with Copy	$ 1279.45	Catalog with Copy	$ 1171.25
Original Cataloging	$ 322.30	Original Cataloging	$ 434.30
Data Entry	$ 349.15	Data Entry	$ ---.--
Catalog Card Production	$ 1629.77	Catalog Card Production .	$ 3611.68
CATALOGING SERVICES	$ 3229.95	CATALOGING SERVICES	$ 793.90
EQUIPMENT / SUPPLIES	$ 295.00	EQUIPMENT / SUPPLIES	$ 582 .50
ONE TIME START UP COST	$ 6604.50 (plus variable costs)	ONE TIME START UP COST	$ 3380.00
TOTAL PER MONTH	$ 7528.27	TOTAL PER MONTH	$ 7212.43
Number of titles cataloged : 992 per month		Number of titles cataloged : 992 per nth	

LIBRARY 5

TABLE 12
COST SUMMARY

BALLOTS SYSTEM (LINE MODE)		PAST SYSTEM	
PERSONNEL Search for Cat. Copy	$ 284.44	PERSONNEL Search for Cat. Copy	$ 423.16
Cataloging with copy	$ 628.70	Cataloging with copy	$ 401.66
Original cataloging	$ 442.15	Original cataloging	$ 517.05
Data Entry	$ 870.50	Data Entry	$ 1456.70
Proofreading	$ 118.05	Proofreading	$ 118.05
CATALOGING SERVICES	$ 2209.95	CATALOGING SERVICES	$ 1180.35
EQUIPMENT/SUPPLIES	$ 154.80	EQUIPMENT/SUPPLIES	$ 55.15
ONE TIME START UP COST	$ 6374.50 (plus variable costs)	ONE TIME START UP COST	$ 3,700
TOTAL OPERATING EXPENSE PER MONTH	$ 4708.59	TOTAL OPERATING EXPENSE PER MONTH	$ 4152.12
Number of titles cataloged: 855 permonth		Number of titles cataloged: 855 per month	

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LIBRARY 6

TABLE 13
COST SUMMARY

BALLOTS SYSTEM (LINE MODE)		PAST SYSTEM	
PERSONNEL Searching for Cat. Copy	$ 40.35	PERSONNEL Searching for Cat. Copy	$ --.--
Cataloging	$ 100.63	Cataloging	$ 327.40
CATALOGING SERVICES EQUIPMENT / SUPPLIES	$ 133.44	CATALOGING SERVICES EQUIPMENT / SUPPLIES	$ 40.95
One time start costs $ 2504.70			
TOTAL PER MONTH	$ 274.42	TOTAL PER MONTH	$ 368.35
Number of titles cataloged : 413 per month		Number of titles cataloged : 413 per month	

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APPENDICES

FOR

PUBLIC LIBRARY AUTOMATION NETWORK

November, 1977

APPENDIX I

Cost detail supporting tables 9 - 13

LIBRARY 3 — PERSONNEL — SEARCHING FOR CATALOG COPY

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
3.1,3.3,3.5 Logon Routine	Logon Terminal to BALLOTS	20	75 / .27	LIB.TECH. $ 7.20	$ 1.95
3A Search BALLOTS	New Title	822	44.8 /18.35	LIB.TECH. $ 7.20	$ 132.10
3.20 Logoff	Logoff Terminal from BALLOTS	20	200 / .1	LIB.TECH. $ 7.20	$ .75
3.21 Remove printout from Printer	Computer printed Catalog Records	20	177 / .11	LIB.TECH. $ 7.20	$ .80
3.22,3.24 Handle Computer Catalog Record	Computer printed Catalog Record	620	353 /1.76	LIB.TECH. $ 7.20	$ 12.65
4B Process Standing Search Report	Standing Search Report (eac' title)	72	88 / .82	LIB.TECH. $ 7.20	$ 5.90
4.10 Retrieve found SSR's on Terminal	Found Standing Searches	18	60 / .3	LIB.TECH. $ 7.20	$ 2.16
				SUBTOTAL	$ 156.31

LIBRARY 3 PERSONNEL CATALOGING

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction MARC	New Title	372	22 /16.9	CATALOGER $ 9.50	$160.55
5A Catalog Adult Non-Fiction CDF	New Title	10	17 / .6	CATALOGER $ 9.50	$ 5.70
5A Catalog Juv. Non-Fiction MARC	New Title	53	22 / 2.4	CATALOGER $ 9.50	$ 22.80
5A Catalog Juv. Non-Fiction CDF	New Title	5	21 / .2	CATALOGER $ 9.50	$ 1.90
5A Catalog Adult Fiction MARC	New Title	88	51.3 / 1.7	CATALOGER $ 9.50	$ 16.15
5A Catalog Adult Fiction CDF	New Title	39	30 / 1.3	CATALOGER $ 9.50	$ 12.35
5A Catalog Juv. Fiction MARC	New Title	24	34.3 / .7	CATALOGER $ 9.50	$ 6.65
5A Catalog Juv. Fiction CDF	New Title	16	30 / .5	CATALOGER $ 9.50	$ 4.75
				SUBTOTAL	$230.85

LIBRARY 3 PERSONNEL ORIGINAL CATALOGING

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction ORIGINAL	New Title	133	10.4 / 12.8	CATALOGER $ 9.50	$121.60
5A Catalog Juv. Non-Fiction ORIGINAL	New Title	28	15 / 1.87	CATALOGER $ 9.50	$ 17.75
5A Catalog Adult Fiction ORIGINAL	New Title	34	30 / 1.13	CATALOGER $ 9.50	$ 10.75
5A Catalog Juv. Fiction ORIGINAL	New Title	20	30 / .67	CATALOGER $ 9.50	$ 6.35
				SUBTOTAL	$ 156.45

LIBRARY 3 PERSONNEL DATA ENTRY

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
6.1,6.2,6.3 Logon Routine	Logon Terminal To BALLOTS	20	56 / .36	LIB.TECH. $ 7.20	$ 2.60
6.6 Modify existing record	New Catalog Record	620	32.3 / 19.2	LIB.TECH. $ 7.20	$ 138.20
6.7 Key Catalog Copy (Create)	New Catalog Record	202	26.4 / 7.65	LIB.TECH $ 7.20	$ 55.10
6.14 Logoff	Logoff Terminal from BALLOTS	20	200 / .1	LIB.TECH. $ 7.20	$ .75
7B Proof read	New Catalog Record (from BALLOTS tape)	822	107 / 7.68	CATALOGER $ 9.50	$ 73.00
7.9 Code error form	Error Fields in Record	337	107 / 3.15	CATALOGER $ 9.50	$ 29.95
7.16 Typescribe error form	Error Fields in Record	337	125 / 2.8	CLK.TYP. $ 6.40	$ 17.92
			DATA ENTRY PROOFREAD	SUBTOTAL SUBTOTAL	$ 196.65 $ 120.87

LIBRARY 3

CATALOGING SERVICES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Shared Cataloging (Library 3 on-line file)	822 Titles @ 45.35 Connect Hrs. = 18 Titles per Hour Fee : $ 2.00 per Title X 822 Titles = $ 1644.00	$1644.00
Tape Output	2 Tapes per month @ $ 34.00 ea.	$ 68.00
Communications Charge	Leased Line @ $ 228.50/mo.	$ 228.50
Standing Searches	72 Standing Searches @ .30¢ ea.	$ 21.60
Vendor Fee	Modify error fields in catalog records .10¢ per field X 337 fields	$ 33.70
	SUBTOTAL	$1595.80

LIBRARY 3

EQUIPMENT / SUPPLIES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Modem for Leased Line	Lease from Telephone Co. @ $40.00/mo.	$ 40.00
Printout Paper	.005¢ sheet .005¢ X 620 Catalog Records = $ 3.10	$ 3.10
Service Contract	Maintenance of terminal @ $40.00/mo. Maintenance of printer (range $55 to $80/...o.)	$ 40.00 $ 67.50
ONE TIME COSTS		
BALLOTS CRT TERMINAL with printer interface	$ 3760.50(plus tax & shipping)	
PRINTER : Dec Printer I	$ 2350.00 (plus tax, shipping & installation) (other printer options plus/minus $200)	
INSTALL LEASED LINE	$ 164.00	
INSTALL TERMINAL	$ 100.00	
Total one time costs	$ 6374.50	
	SUBTOTAL	$ 150.60

LIBRARY 3 PERSONNEL SEARCHING FOR CATALOG COPY

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
3.26 Check Call # on Card set	New Title Call #	411	86 / 4.8	CATALOGER $ 9.50	$ 45.60
3.25 Determine Call #	New Title Call #	411	27 /15.2	CATALOGER $ 9.50	$ 144.40
3.27 Write Call #, Auth/Title Key & LCCN on Cat. Slip	New Title (Vendor search info.)	822	75 /11	CATALOGER $ 9.50	$ 104.50
3.28 Type Vendor Search Form	Vendor Search Form (for keypunch)	822	120 / 6.9	CLK.TYP. $ 6.40	$ 44.15
6.21 Enter Record in Circulation Data Base	New Title	822	60 /13.7	CLK.TYP. $ 6.40	$ 87.70
				SUBTOTAL	$ 426.35

LIBRARY 3 PERSONNEL CATALOG WITH VENDOR COPY

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction MARC	New Title	335	22 /15.2	CATALOGER $ 9.50	$ 144.40
5A Catalog Juv. Non-Fiction MARC	New Title	51	22 / 2.3	CATALOGER $ 9.50	$ 21.85
5A Catalog Adult Fiction MARC	New Title	84	51.3 / 1.6	CATALOGER $ 9.50	$ 15.20
5A Catalog Juvenile Fiction MARC	New Title	23	34.3 / .67	CATALOGER $ 9.50	$ 6.35
				SUBTOTAL	$ 187.80

LIBRARY 3 PERSONNEL ORIGINAL CATALOGING & TITLE CONTROL

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
ORIGINAL CATALOGING					
5A Catalog Adult Non-Fiction ORIGINAL	New Title	144	10.4 /13.8	CATALOGER $ 9.50	$ 131.10
5A Catalog Juvenile Non-Fiction ORIGINAL	New Title	34	15 / 2.27	CATALOGER $ 9.50	$ 21.55
5A Catalog Adult Fiction ORIGINAL	New Title	103	30 / 3.43	CATALOGER $ 9.50	$ 32.60
5A Catalog Juvenile Fiction ORIGINAL	New Title	48	30 / 1.6	CATALOGER $ 9.50	$ 15.20
TITLE CONTROL					
7D Title control in Vendor Batch Searching	New Title	822	6 /137	CLK.TYP. $ 6.40	$ 876.80
517 Recall book from branch	New Title	329	12 /27.4	CLK.TYP. $ 6.40	$ 175.35
				Original Cat. SUBTOTAL	$ 200.45
				Title Control SUBTOTAL	$1052.15

LIBRARY 3

PAST SYSTEM

PERSONNEL PROOFREADING

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
7B Proofread	New Catalog Record	822	107 /7.68	CATALOGER $ 9.50	$ 73.00
7.9 Code Errors	Record Fields	337	107 / 3.15	CATALOGER $ 9.50	$ 29.95
7.16Typescribe Correction	Record Fields	337	120 / 2.8	CLK.TYP. $ 6.40	$ 17.92
				SUBTOTAL	$ 120.87

LIBRARY 3

CATALOGING SERVICES

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
County Data Processing	Keypunch Vendor search data/ convert to tape Programs / Testing	$ 100.00
Vendor Fee	.30¢ per found title (includes printout) .30¢ X 493 Titles	$ 147.90
Vendor Fee	Modify error fields in catalog records .10¢ per field X 337 fields	$ 33.70
Vendor Fee	Keypunch Original Record & Add to data base $ 1.00 per record X 329 records	$ 329.00
	SUBTOTAL	$ 610.60

LIBRARY 3

EQUIPMENT/SUPPLIES
ONE TIME START UP COSTS

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
Catalog card sets from jobber	411 sets @ $ .30 ea	$ 123.30
Keypunch forms	60 forms @ $ .03 ea.	$ 1.80
ONE TIME START UP COSTS		
Electric typewriter (1)	$ 500.00	
	SUBTOTAL	$125.10

LIBRARY 4 PERSONNEL SEARCHING FOR CATALOG COPY

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
2A Sort books for search	New Title (Non-Fiction)	893	240 / 3.7	PAGE $ 5.10	$ 18.90
3.1,3.3,3.5, Logon Routine	Logon Terminal to BALLOTS	20	75 / .27	LIB.TECH. $ 7.80	$ 2.10
3.6-3.19 Search BALLOTS	New Title	715	34.5 /20.72	LIB.TECH. $ 7.80	$161.60
3.20 Logoff Routine	Logoff Terminal from BALLOTS	20	200 / .1	LIB.TECH. $ 7.80	$ .80
3.21 Remove printout from printer	Computer printed Catalog Records	20	177 / .11	LIB.TECH. $ 7.80	$ .85
3.22,3.24, Handle printout	Computer printed Catalog Records	500	353 / 1.4	LIB.TECH. $ 7.80	$ 10.95
3E Search NUC	New Titles	324	10 /32.4	LIB.ASST. $ 6.30	$204.15
3.33 Polaroid photo NUC copy	Found Titles	227	240 / .95	LIB.ASST. $ 6.30	$ 6.00
3.34 Reload camera	Film (8 shots)	29	12 / 2.4	LIB.ASST. $ 6.30	$ 15.15
3.36 Match copy with book	NUC Polaroid copy	227	667 / .34	LIB.ASST. $ 6.30	$ 2.15
				SUBTOTAL	$422.65

LIBRARY 4 — PERSONNEL — CATALOGING

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5.16 Cutter/Verify Subjects	BALLOTS & NUC copy	727	11.4 / 63.8	LIB.ASST. $ 6.30	$ 401.95
5A Catalog Adult Non-Fiction MARC	New Title	453	10.2 /44.4	CATALOGER $10.00	$ 444.00
5A Catalog Adult Non-Fiction CDF	New Title	12	6.7 / 1.8	CATALOGER $10.00	$ 18.00
5A Catalog Adult Non-Fiction IPF	New Title	8	3.7 / 2.2	CATALOGER $10.00	$ 22.00
5A Catalog Adult Non-Fiction CIP	New Title	67	9.2 / 7.3	CATALOGER $10.00	$ 73.00
5A Catalog Adult Non-Fiction NUC	New Title	214	8.1 /26.4	CATALOGER $10.00	$ 264.00
5A Catalog Juv. Non-Fiction MARC	New Title	25	6.5 / 3.9	LIB.TECH. $ 7.80	$ 30.45
5A Catalog Juv. Non-Fiction CDF & IPF	New Title	2	6 / .3	LIB.TECH. $ 7.80	$ 2.35
5A Catalog Juv. Non-Fiction CIP	New Title	2	5.9 / .34	LIB.TECH. $ 7.80	$ 2.65
5A Catalog Juv. Non-Fiction NUC	New Title	13	4.8 / 2.7	LIB.TECH. $ 7.80	$ 21.05
				SUBTOTAL	$1379.45

LIBRARY 4 PERSONNEL ORIGINAL CATALOGING

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction ORIGINAL	New Title	92	3.5 /26.3	CATALOGER $10.00	$ 263.00
5A Catalog Juv. Non-Fiction ORIGINAL	New Title	5	2.7 / 1.9	LIB.TECH $ 7.80	$ 14.85
5A Catalog Adult Fiction ORIGINAL	New Title	79	17.6 / 4.5	LIB.TECH. $ 7.80	$ 35.10
5A Catalog Juvenile Fiction ORIGINAL	New Title	20	17.6 / 1.2	LIB.TECH. $ 7.80	$ 9.35
				SUBTOTAL	$ 322.30

LIBRARY 4 PERSONNEL DATA ENTRY

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
6.1,6.2,6.3 Logon Routine	Logon Terminal to BALLOTS	20	56 / .36	LIB.TECH. $ 7.80	$ 2.80
6.6 Modify existing record	New Catalog Record	571	41.1 /13.9	LIB.TECH. $ 7.80	$ 108.40
6.7 Key Catalog Copy (Create)	New Catalog Record	421	17.1 /24.6	LIB.TECH. $ 7.80	$ 191.90
6.14 Logoff	Logoff Terminal from BALLOTS	20	200 / .1	LIB.TECH. $ 7.80	$ .80
6.15 File Copy & Slips	Order Slip Catalog Copy	992	171 / 5.8	LIB.TECH. $ 7.80	$ 45.25
				SUBTOTAL	$ 349.15

LIBRARY 4 PERSONNEL CATALOG CARD PRODUCTION & FILING

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
8.1 Receive Card Order	Catalog Cards from BALLOTS (boxed order)	4	3 / 1.3	LIB.TECH. $ 7.80	$ 10.14
8.2 Match order slip with Shelf list & Pocket card	Order slips, Shelf list Pocket card	992	36 / 27.6	LIB.TECH. $ 7.80	$ 215.28
8.11 File cards in Public Catalog	Catalog Cards	20832	171 /121.8	LIB.ASST. $ 6.30	$ 767.35
8.12 Revise filing in Public Catalog	Catalog Cards	20832	400 / 52.1	CATALOGER $10.00	$ 521.00
8.13,8.14 File Shelf list & Official Main Entry	Shelf List & Official Main Entry	1984	171 / 11.6	CATALOGER $10.00	$ 116.00
				SUBTOTAL	$1629.77

LIBRARY 4

CATALOGING SERVICES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Shared Cataloging (Library 4 on-line file)	992 Titles ÷ 59.22 Connect Hrs. = 16.8 Titles per Hour Fee : $ 2.00 per Title X 992 = $ 1984.00	$1984.00
Catalog Card Production (Computer Printed)	24800 Cards @ .04¢ ea. = $ 992.00	$ 992.00
Communications Charge	Leased Line @ $ 179.75/mo.	$ 179.75
NUC (National Union Catalog)	Yearly Set $ 890.00 ÷ 12 = $ 74.20/mo.	$ 74.20
	SUBTOTAL	$3229.95

LIBRARY 4

EQUIPMENT / SUPPLIES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Modem for Leased Line	Lease from Telephone Co. @ $40.00/mo.	$ 40.00
Printout Paper	.005¢ per sheet .005¢ X 500 Catalog Records = $ 2.50	$ 2.50
Polaroid Film (29 rolls)	$5.00 per roll X 29 rolls = $ 145.00	$ 145.00
Service Contract	Maintenance of printer(range $55 to $80/mo) Maintenance of terminal @ $40.00/mo.	$ 67.50 $ 40.00
ONE TIME CHARGE : Polaroid Camera	$180.00	
Leased Line Installation	$164.00	
Catalog Card Profile	$ 50.00	
BALLOTS CRT Terminal with printer interface	$ 3750.50 (plus tax and shipping)	
Printer : Dec Printer I	$ 2350.00 (plus tax, shipping,& installation) (other printer options plus or minus $200.00)	
Install terminal	$ 100.00	
Total one time costs	$ 6604.50 SUBTOTAL	$295.00

LIBRARY 4 PERSONNEL SEARCHING FOR CATALOG COPY

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
3.29 Sort/discard Proof slip	LC Proof Slips	5775	900 / 6.4	PAGE $ 5.10	$ 32.65
3.30 Alphabetize Proof slip	LC Proof Slips	4321	900 / 4.8	PAGE $ 5.10	$ 24.50
3.31 File Proof slip	LC Proof Slips	4321	171 /25.27	LIB.ASST. $ 6.30	$159.20
2A Sort books for searching	New Titles	846	240 / 3.53	PAGE $ 5.10	$ 18.00
332 Search Proof slip file	New Titles	625	60* /10.42	LIB.ASST. $ 6.30	$ 65.65
3E Search NUC	New Titles	455	10 /45.5	LIB.ASST. $ 6.30	$286.65
333 Polaroid photo NUC copy	Found Titles	318	240 / 1.3	LIB.ASST. $ 6.30	$ 8.20
3.34 Reload camera	Film (8 shots)	40	12 / 3.3	LIB.ASST. $ 6.30	$ 20.80
3.36 Match copy with book	NUC Polaroid copy	318	667 / .5	LIB.ASST. $ 6.30	$ 3.15
				SUBTOTAL	$ 618.80

* Production rate provided as an estimate from library staff. Because of atypical searching situation at time of data collection, results of the collection were deemed invalid.

LIBRARY 4 PERSONNEL CATALOGING

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction LC Proof	New Title	207	9.4 /22	CATALOGER $ 10.00	$ 220.00
5A Catalog Adult Non-Fiction CIP	New Title	207	9.2 /22.5	CATALOGER $ 10.00	$ 225.00
5A Catalog Adult Non-Fiction NUC	New Title	302	8.1 /37.3	CATALOGER $ 10.00	$ 373.00
5A Catalog Juv. Non-Fiction LC Proof	New Title	12	6.2 /1.94	LIB.TECH. $ 7.80	$ 14.85
5A Catalog Juv. Non-Fiction CIP	New Title	12	5.9 / 2	LIB.TECH. $ 7.80	$ 15.60
5A Catalog Juv. Non-Fiction NUC	New Title	16	4.8 / 3.3	LIB.TECH. $ 7.80	$ 25.75
5.16 Cutter/ Verify Subjects	LC Proof Slips & NUC Photo	537	11.4 /47.1	LIB.ASST. $ 6.30	$ 296.75
				SUBTOTAL	$1171.25

LIBRARY 4 PERSONNEL ORIGINAL CATALOGING

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Cataloging Adult Non-Fiction ORIGINAL	New Title	130	3.5 / 37	CATALOGER $ 10.00	$ 370.00
5A Cataloging Juv. Non-Fiction ORIGINAL	New Title	7	2.7 / 2.6	LIB.TECH. $ 7.80	$ 20.30
5A Cataloging Adult Fiction ORIGINAL	New Title	79	17.6 / 4.5	LIB.TECH. $ 7.80	$ 35.10
5A Cataloging Juv. Fiction ORIGINAL	New Title	20	17.6 /1.14	LIB.TECH. $ 7.80	$ 8.90
				SUBTOTAL	$ 434.30

LIBRARY 4 PERSONNEL CATALOG CARD PRODUCTION & FILING

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
8.4 Sort new titles by # vol. & # cards in set	New Titles	992	60 /16.5	CLK.TYP. $ 5.90	$ 97.35
8.5 Type Multilith Master (6 card size)	Multilith Master	829	4.8 /172.7	LIB.ASST. $ 6.30	$ 1088.00
89 Sort card sets	Printed catalog card sets	3472	60 / 57.9	LIB.ASST. $ 6.30	$ 364.75
8.2 Match order slip with Shelf list & Pocket card	Order slips, Shelf list Book Pocket cards	992	36 / 27.6	LIB.TECH. $ 7.80	$ 215.28
810 Alphabetize Catalog Cards	Catalog Cards	24800	450 / 55	PAGE $ 5.10	$ 280.50
8.11 File cards in Public Catalog	Catalog Cards	20832	171 /121.8	LIB.ASST. $ 6.30	$ 767.35
8.12 Revise filing in Public Catalog	Catalog Cards	20832	400 / 52.1	LIBRARIAN $ 10.00	$ 521.00
8.13,B.14 File Shelf list & Official Main Entry	Shelf List & Official Main Entry	1984	171 / 11.6	LIBRARIAN $ 10.00	$ 116.00
8.5A Revise Multilith master	Multilith master	829	40 / 20.7	LIB.ASST. $ 7.80	$ 161.45
				SUBTOTAL	$3611.68

LIBRARY 4

CATALOGING SERVICES

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
LC Proof Slips	Subscription (English only) $303.53/yr. ÷ 12 =$25.30/mo.	$ 25.30
NUC (National Union Catalog)	Yearly Set $ 890.00 ÷ 12 = $ 74.20/mo.	$ 74.20
Catalog Card Production	In-house Print Shop charge : $ .028 per card .028 ¢ X 24800 cards = $ 694.40	$ 694.40
	SUBTOTAL	$ 793.90

LIBRARY 4

EQUIPMENT/SUPPLIES
ONE TIME START UP COST

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
Multilith Masters (850)	$.45 ea. X 850 Masters = $ 382.50/mo.	$ 382.50
Polaroid film (40 rolls)	$5.00 per roll X 40 rolls = $ 200.00/mo.	$ 200.00
ONE TIME COSTS		
Electric typewriters (4) $500.00 ea.	$ 2000.00	
3 X 5 card file cabinet LCProof slip file	$ 1200.00	
Polaroid camera	$ 180.00	
Total one time costs	$ 3380.00	
	SUBTOTAL	$ 582.50

LIBRARY 5 — PERSONNEL — SEARCHING FOR CATALOG COPY

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
2A Sort books for search	New Title (Non-Fiction)	626	240 / 2.6	CLK.TYP. $ 6.65	$ 17.29
3.1,3.3,3.5, Logon Routine	Logon Terminal to BALLOTS	20	67 / .3	CLK.TYP. $ 6.65	$ 2.00
3A Search BALLOTS	New Titles (Non-Fiction)	643	34.7 / 18.5	CLK.TYP. $ 6.65	$ 123.00
3.20 Logoff Routine	Logoff Terminal from BALLOTS	20	200 / .1	CLK.TYP. $ 6.65	$ .70
3.21 Remove printout from printer	Catalog copy printout	20	177 / .11	CLK.TYP. $ 6.65	$ .75
3.22,3.23,3.24 Handle computer printed catalog record	Catalog record computer printed	497	316 / 1.6	CLK.TYP. $ 6.65	$ 10.65

SUBTOTAL $ 154.39

(next page) + 130.05

SUBTOTAL $ 284.44

LIBRARY 5 PERSONNEL SEARCHING FOR CATALOG COPY

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
4A Review new Standing Searches	New Standing Searches on BALLOTS	~~37~~	60 / .6	LIBRARIAN $ 10.50	$ 6.30
4B Process Standing Search Report	Standing Search Report (each title)	37	88 / .4	CLK.TYP. $ 6.65	$ 2.65
4C Retrieve found SSR's on Terminal	Found Standing Searches	9	60 / .15	CLK.TYP. $ 6.65	$ 1.00
3E Search NUC	New Title (Non-Fiction)	172	10 /17.2	CLK.TYP. $ 6.65	$114.40
3.35 Xerox NUC copy	Found Titles	120	176 / .68	CLK.TYP. $ 6.65	$ 4.50
3.36 Match copy with book	NUC Xerox Copy	120	567 / .18	CLK.. TYP. $ 6.65	$ 1.20
				SUBTOTAL	$130.05

LIBRARY 5 PERSONNEL CATALOGING WITH COPY
CATALOGING ADULT NON-FICTION

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction MARC	New Title	431	13.6 /31.7	LIB.TECH. $ 7.55	$ 239.35
5A Catalog Adult Non-Fiction CDF	New Title	26	10.2 / 2.6	CATALOGER $10.50	$ 27.30
5A Catalog Adult Non-Fiction IPF	New Title	11	3.7 / 2.97	CATALOGER $10.50	$ 31.20
5A Catalog Adult Non-Fiction CIP	New Title	6	11.3 / .5	LIB.TECH $ 7.55	$ 3.80
5A Catalog Adult Non-Fiction NUC	New Title	106	10 /10.6	LIB.TECH $ 7.55	$ 80.00
5A Revise Cat. Adu. Non-Fic. MARC	New Title	431	36.4 /11.8	CATALOGER $10.50	$ 123.90
5A Revise Cat. Adu. Non-Fic. CDF	New Title	26	17.4 / 1.5	CATALOGER $10.50	$ 15.75
5A Revise Cat. Adu. Non-Fic. IPF	New Title	11	30 / .37	CATALOGER $10.50	$ 3.90
5A Revise Cat. Adu. Non-Fic. CIP	New Title	6	40 / .15	CATALOGER $10.50	$ 1.60
5A Revise Cat. Adu. Non-Fic. NUC	New Title	106	23.2 /4.57	CATALOGER $10.50	$ 48.00
				SUBTOTAL	$ 574.80
				(next page) +	53.90
				SUBTOTAL	$ 628.70

LIBRARY 5 PERSONNEL CATALOGING WITH COPY CATALOGING JUVENILE NON-FICTION

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Juv. Non-Fiction MARC	New Title	14	5.7 / 2.5	LIB.TECH $ 7.55	$ 18.90
5A Catalog Juv. Non-Fiction CDF	New Title	15	15 / 1	CATALOGER $10.50	$ 10.50
5A Catalog Juv. Non-Fiction CIP	New Title	1	5.1 / .2	LIB.TECH. $ 7.55	$ 1.50
5A Catalog Juv. Non-Fiction NUC	New Title	14	10 / 1.4	LIB.TECH. $ 7.55	$ 10.60
5A Revise Cat. Juv. Non-Fic. MARC	New Title	14	33.7 / .4	CATALOGER $10.50	$ 4.20
5A Revise Cat. Juv. Non-Fic. CDF	New Title	15	40 / .38	CATALOGER $10.50	$ 4.00
5A Revise Cat. Juv. Non-Fic. CIP	New Title	1	41.9 / .02	CATALOGER $10.50	$ .20
5A Revise Cat. Juv. Non-Fic. NUC	New Title	14	36.4 / .38	CATALOGER $10.50	$ 4.00
				SUBTOTAL	$ 53.90

LIBRARY 5 PERSONNEL ORIGINAL CATALOGING

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction ORIGINAL	New Title	46	3.3 /13.9	CATALOGER $10.50	$ 145.95
5A Revise Cat. Adu. Non-Fic. ORIGINAL	New Title	46	16.3 / 2.8	CATALOGER $10.50	$ 29.40
5A Catalog Juv. Non-Fiction ORIGINAL	New Title	6	5.8 /1.03	LIB.TECH. $ 7.55	$ 7.80
5A Revise Cat. Juv. Non-Fic. ORIGINAL	New Title	6	40 / .15	CATALOGER $10.50	$ 1.60

SUBTOTAL $ 184.75

plus FICTION CATALOGING (next page) + $257.40

SUBTOTAL $ 442.15

LIBRARY 5 PERSONNEL CATALOGING FICTION

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR /HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5ACatalog Adult Fiction CIP	New Title	84	6.5 /12.9	LIB. TECH $ 7.55	$ 97.40
5A Catalog Adult Fiction ORIGINAL	New Title	48	7 / 6.9	LIB. TECH $ 7.55	$ 52.10
5A Catalog Juv. Fiction CIP	New Title	35	5.2 / 6.7	LIB. TECH $ 7.55	$ 50.60
5A Catalog Juv. Fiction ORIGINAL	New Title	12	5 / 2.4	LIB. TECH $ 7.55	$ 18.10
5A Revise Cataloging Adult Fiction CIP	New Title	84	50.4 / 1.7	CATALOGER $10.50	$ 17.85
5A Revise Cataloging Adult Fiction ORIGINAL	New Title	48	42.6 / 1.13	CATALOGER $10.50	$ 11.90
5A Revise Cataloging Juv. Fiction CIP	New Title	35	58.3 / .6	CATALOGER $10.50	$ 6.30
5A Revise Cataloging Juv. Fiction ORIGINAL	New Title	12	45.1 / .3	CATALOGER $10.50	$ 3.15
				SUBTOTAL	$257.40

LIBRARY 5 PERSONNEL DATA ENTRY & PROOFREADING

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
6.1,6.2,6.3 Logon Routine	Logon Terminal to BALLOTS	20	56 / .35	CLK.TYP. $ 6.65	$ 2.35
6.7 Key Catalog Copy in BALLOTS (Create)	New Catalog Record	855	22.6 / 37.8	CLK.TYP $ 6.65	$ 251.35
6.14 Logoff Routine	Logoff Terminal from BALLOTS	20	200 / .1	CLK.TYP. $ 6.65	$ .65
7B Proofread	New Catalog Record (from BALLOTS tape)	257	93 / 2.76	LIBRARIAN $10.50	$ 29.00
7B Proofread	New Catalog Record (from BALLOTS tape)	257	71 / 3.6	LIB.TECH $ 7.55	$ 27.20
7B Proofread	New Catalog Record (from BALLOTS tape)	341	64 / 5.3	CLK.TYP. $ 6.65	$ 35.25
7A,7C, Distribute,Collect & Review Printout	New Catalog Record Printout	855	214 / 4	CLK.TYP. $ 6.65	$ 26.60
8.6 Type catalog data (data entry)	Multilith Master	855	12 /71.25	CLK.TYP. $ 6.65	$ 473.85
6.18 Review master Correct errors (data entry)	Multilith Master	855	40 /21.4	CLK. TYP. $ 6.65	$ 142.30
			DATA ENTRY	SUBTOTAL	$ 870.50
			PROOFREAD	SUBTOTAL	$ 118.05

LIBRARY 5

CATALOGING SERVICES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Shared Cataloging (Library 5 on-line file)	855 Titles ÷ 56.45 Connect Hours = 15 Titles per Hour Fee : ~~$2.00 Title X 855 Titles~~ = $ 1710.00	$1710.10
Tape Output	1 Tape every 2 months (.5 X $34.00 = $ 17.00) 1210 Records @ .04¢ ea. = $ 48.40	$ 65.40
Standing Searches	37 Standing Searches X .30¢ ea. = $11.10	$ 11.10
Communications Charge	Leased Line @ $140.00/mo.	$ 140.00
County Data Processing	Add BALLOTS Tape to Master File & Printout New Records	$ 200.00
NUC (National Union Catalog)	Yearly Set $1000.00 ÷ 12 = $ 83.35	$ 83.35
	SUBTOTAL	$2209.95

LIBRARY 5

EQUIPMENT / SUPPLIES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Modem for Leased Line	Lease from Telephone Co. @ $40.00/mo.	$ 40.00
Printout Paper	.005¢ per sheet .005¢ X 497 Catalog Records = $ 2.50	$ 2.50
Xerox NUC copy	120 Catalog Records @ .04¢ per Xerox = $ 4.80	$ 4.80
Service Contract	Maintenance of terminal @ $40.00/mo. Maintenance of printer (range $55 to $80/mo)	$ 40.00 $67.50
ONE TIME COSTS		
BALLOTS CRT TERMINAL with printer interface	$ 3760.50 (plus tax and shipping)	
Printer : Dec Printer I	$ 2350.00 (plus tax, shipping,& installation) (other printer options plus or minus $200.00)	
Leased Line Installation	$ 164.00	
Terminal installation	$ 100.00	
Total one time costs	$ 6374.50	
	SUBTOTAL	$ 154.80

LIBRARY 5 PERSONNEL SEARCHING FOR CATALOG COPY

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
3.29 Sort discard Proof Slip	LC Proof Slips	10,000	900 /11.1	PAGE $3.59	$ 39.85
3.29 Sort discard Proof Slip	LC Proof Slips	3,300	900 / 3.7	CATALOGER $10.50	$ 38.85
3.30 ALPHABETIZE Proof Slip	LC Proof Slips	3,000	900 /3.3	PAGE $3.59	$ 11.84
3.31 File Proof Slip	LC Proof Slips	3,000	171 /17.5	PAGE $3.59	$ 62.80
2A Sort books for searching	New Titles	626	240 / 2.6	CLK.TYP. $6.65	$ 17.29
3.32 Search Proof Slip file	New Titles	472	60 /7.9	PAGE $3.59	$ 28.36
3E Search NUC	New Titles	321	10 /32.1	CLK.TYP. $6.65	$213.47
3.35 Xerox NUC	Found Titles	224	176 /1.27	CLK.TYP. $6.65	$ 8.45
336 Match NUC copy with book	NUC Xerox copy	224	667 / .34	CLK.TYP $6.65	$ 2.25
				SUBTOTAL	$ 423.16

LIBRARY 5 PERSONNEL ORIGINAL CATALOGING AND CATALOGING FICTION

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5ACatalog Adult Fiction CIP	New Title	84	6.5/12.9	LIB. TECH $ 7.55	$ 97.00
5A Catalog Adult Fiction ORIGINAL	New Title	48	7 / 6.9	LIB. TECH $ 7.55	$ 52.10
5A Catalog Juv. Fiction CIP	New Title	35	5.2 / 6.7	LIB. TECH $ 7.55	$ 50.60
5A Catalog Juv. Fiction ORIGINAL	New Title	12	5 / 2.4	LIB. TECH $ 7.55	$ 18.10
5A Catalog Adult non-fiction ORIGINAL	New Title	90	3.3/27.3	CATALOGER $10.50	$286.65
5A Catalog Juv. non-fiction ORIGINAL	New Title	7	5.8/1.2	CATALOGER $10.50	$ 12.60
				SUBTOTAL	$ 517.05

LIBRARY 5 PERSONNEL CATALOGING WITH COPY
CATALOGING ADULT NON-FICTION AND JUV. NON-FICTION

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Cataloging Adult Non-Fiction LC PROOF SLIP	New Title	219	13.6 /16.1	LIB. TECH $ 7.55	$121.55
5A Cataloging Adult Non-Fiction CIP	New Title	109	11.3 / 9.7	LIB.TECH $ 7.55	$ 73.24
5A Cataloging Adult Non-Fiction NUC	New Title	208	10 /20.8	LIB.TECH $ 7.55	$157.04
5A Cataloging JUV. Non-Fiction LC Proof	New Title	18	5.7 / 3.2	LIB.TECH. $ 7.55	$ 24.16
5A Cataloging JUV. Non-Fiction CIP	New Title	9	5.1 / 1.8	LIB.TECH. $ 7.55	$ 13.59
5A Cataloging JUV. Non-Fiction NUC	New Title	16	10 / 1.6	LIB.TECH. $ 7.55	$ 12.08
				SUBTOTAL	$ 410.66

LIBRARY 5 PERSONNEL DATA ENTRY - PROOFREADING

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
6.17 Type catalog data	Greensheet (Keypunch code form)	855	20 /42.75	CLK. TYP. $ 6.65	$284.30
8.6 Type catalog data	Multilith Master	855	12 /71.25	CLK. TYP. $ 6.65	$473.85
6.18 Review Greensheet & Master Correct errors	Greensheet Multilith Master	855	20 /42.75	CLK. TYP. $ 6.65	$284.30
6.19 Assign record I.D.# Review	Greensheet	855	30 /28.5	CLK.TYP. $ 6.65	$189.55
6.20 Final review for errors	Greensheet	855	40 /21.4	CATALOGER $10.50	$224.70
7B Proofread printout	New Catalog Record	257	93 / 2.76	CATALOGER $10.50	$ 29.00
7B Proof read printout	New Catalog Record	257	71 / 3.6	LIB. TECH $ 7.55	$ 27.20
7B Proofread printout	New Catalog Record	341	64 / 5.3	CLK. TYP. $ 6.65	$ 35.25
7A,7C Distribute, Collect & review printout, errors	New Catalog Records	855	214 / 4	CLK. TYP $ 6.65	$ 26.60
				DATA ENTRY SUBTOTAL	$1456.70
				PROOFREAD SUBTOTAL	$ 118.05

LIBRARY 5

CATALOGING SERVICES

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
LC Proof Slips	Subscription $ 500.00/yr. ÷ 12 = $ 42.00/mo.	$ 42.00
NUC (National Union Catalog)	Yearly Set $1000.00 ÷ 12 = $ 83.35/mo.	$ 83.35
County Data Processing	Keypunch Catalog Records 855 Catalog Records @ $ 1.00 ea.	$ 855.00
County Data Processing	Add Records to Master File & Printout New Catalog Records	$ 200.00
	SUBTOTAL	$1180.35

LIBRARY 5

EQUIPMENT/SUPPLIES
ONE TIME START UP COSTS

PAST SYSTEM

ITEM	COST DESCRIPTION	MONTHLY COST
Keypunch forms (Greensheets)	$ 554.00/year ÷ 12 months = $46.20/mo.	$ 46.20
Xerox NUC copy	$ .04 per NUC copy X 224 NUC copies = $ 8.95	$ 8.95
START UP COSTS		
Electric tyrpwriters (5)	$500.00 ea. X 5 = $2500.00	
3 X 5 card file cabinet (LC Proof Slip file)	$1200.00	
	Total start up cost $3700.00	
	SUBTOTAL	

LIBRARY 6 PERSONNEL SEARCHING FOR CATALOG COPY

BALLOTS SYSTEM
(LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
3.1,3.3,3.4, Logon Routine	Logon Terminal to BALLOTS	10	39 / .26	CLK.TYP. $ 5.30	$ 1.40
3A Search BALLOTS	New Titles	230	34.3 /6.7	CLK.TYP. $ 5.30	$ 35.50
3.20 Logoff	Logoff Terminal from BALLOTS	10	200 / .05	CLK.TYP. $ 5.30	$ .25
3.21 Remove printout from Printer	Computer printed Catalog Records	10	177 / .05	CLK.TYP. $ 5.30	$ .25
3.22,3.24, Handle printout of Catalog Records	Computer printed Catalog Records	194	353 / .56	CLK.TYP. $ 5.30	$ 2.95
				SUBTOTAL	$ 40.35

LIBRARY 6 PERSONNEL CATALOGING

BALLOTS SYSTEM (LINE MODE)

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction MARC	New Title	145	40 / 3.6	CATALOGER $ 7.20	$ 25.95
5A Catalog Adult Non-Fiction CDF	New Title	21	20 / 1.05	CATALOGER $ 7.20	$ 7.55
5A Catalog Adult Non-Fiction IPF	New Title	18	4.8 / 3.8	CATALOGER $ 7.20	$ 27.35
5A Catalog Adult Non-Fiction CIP	New Title	1	24.2 / .04	CATALOGER $ 7.20	$ .30
5A Catalog Adult Non-Fiction ORIGINAL	New Title	10	4.8 / 2.08	CATALOGER $ 7.20	$ 14.95
5A Catalog Adult Fiction MARC	New Title	36	40 / .9	CATALOGER $ 7.20	$ 6.50
5A Catalog Adult Fiction CDF	New TItle	7	30 / .23	CATALOGER $ 7.20	$ 1.65
5A Catalog Adult Fiction IPF	New Title	6	14.8 / .4	CATALOGER $ 7.20	$ 2.88
5A Catalog Adult Fiction CIP	New Title	2	37.7 / .05	CATALOGER $ 7.20	$ .35
5A Catalog Adult Fiction ORIGINAL	New Title	27	14.8 / 1.83	CATALOGER $ 7.20	$ 13.15
				SUBTOTAL	$ 100.63

LIBRARY 6

CATALOGING SERVICES / EQUIPMENT / SUPPLIES

BALLOTS SYSTEM
(LINE MODE)

ITEM	COST DESCRIPTION	MONTHLY COST
Service Contract	Maintenance on terminal and modem at $32.19/mo.	$32.19
Communications	Tymnet @ $9.00 per hour X 6.7 Hrs. = $60.30	$ 60.30
Catalog Card Sets from Vendor	105 Card Sets (Juvenile) X .39¢ ea.	$ 40.95
One time costs:		
Trenwriter 300 terminal	$2042.45 plus tax	
Acoustic coupler	$ 412.25	
Freight and installation	$ 50.00	
Total one time costs	$2504.70	
	SUBTOTAL	$ 133.44

LIBRARY 6 PERSONNEL CATALOGING

PAST SYSTEM

TASK ELEMENT	ITEM PROCESSED	MONTHLY PRODUCTION UNITS	UNITS PER HOUR/HOURS	ADJUSTED HOURLY RATE	MONTHLY COST
5A Catalog Adult Non-Fiction CIP	New Title	81	24.2 / 3.4	CATALOGER $ 7.20	$ 24.50
5A Catalog Adult Non-Fiction ORIGINAL	New Title	149	4.8 /31	CATALOGER $ 7.20	$ 223.20
5A Catalog Adult Fiction CIP	New Title	27	37.7 / .72	CATALOGER $ 7.20	$ 5.20
5A Catalog Adult Fiction ORIGINAL	New Title	51	14.8 /3.5	CATALOGER $ 7.20	$ 25.20
5.2 Authority Verification	New Title	185	20 / 9.3	CLK.TYP $ 5.30	$ 49.30
				SUBTOTAL	$ 327.40

LIBRARY 6

PAST SYSTEM

CATALOGING SERVICES / EQUIPMENT / SUPPLIES

ITEM	COST DESCRIPTION	MONTHLY COST
Catalog Card Sets from Vendor	105 Card Sets (Juvenile) X .39¢ ea	$ 40.95
	SUBTOTAL	$ 40.95

APPENDIX II

PLAN COST STUDY

UNION TASK LIST

Data Source Codes
DC Data Collection
SW Stop Watch time
SD Standard Data
LE Library Estimate

	LIBRARY CODE		TASK TIME
1. ACQUISITIONS AND BOOK RECEIPT GPC STANDARD # 851			
1A. Use of BALLOTS in Order Process			
1.1 Pre-order verification (same as terminal searching # 3A)	---4--	DC	Table 1
2. RECEIPT PREPARATION GPC STANDARD # 852			
2A. Sorting books for catalog data search	---45-	DC	:15 sec.
2.1 Match order card with book	----5-		--
2.2 Check date	---45-		--
2.3 Aside Non-Fic 1972+ to BALLOTS	----5-		--
2.4 Aside Non-Fic 1971- to NUC	----5-		--
2.5 Aside Fic by Adult or Juv.	---45-		--
2.6 Aside Foreign Lang.	---4--		--
2.7 Aside 2 years or newer imprint to LC Proof File	---45-		--
2.8 Aside older than 2 year imprint to NUC	---45-		--
3. SEARCHING FOR CATALOG COPY GPC STANDARD # 853			
3A. Searching BALLOTS	123456	DC	Table 1
3.1 Get statistic tally sheet	123456	SW	:06 sec.
3.2 Get color pens & Highlighter	----5-	SW	:06 sec.
3.3 Activate terminal & printer	123456	SW	:06 sec.
3.4 Logon to BALLOTS (Tymnet)	123456	SW	1:20 min.
3.5 Logon to BALLOTS (Leased Line)	--345-	SW	:36 sec.
3.6 Pull slips from book	--3456	SW	:02 sec.
3.7 Take one order card	1----6	SW	:03 sec.
3.8 Locate LCCN on order card	123-56	SW	:03 sec.
3.9 Locate LCCN in book	-23456	SW	:10 sec.
3.10 Key LCCN search	123456	SW	:06 sec.
3.11 System display hit/miss	123456	SW	:10 sec
3.12 Key Author/Title word search	123456	SW	:14 sec.
3.13 Print record Long format	12-4-6	SW	:15 sec.
3.14 Print record Full format	--3-5-	SW	:25 sec.
3.15 Key Standing Search Keep	--345-	SW	:02 sec
3.16 Highlight search terms on card	----5-	SW	:03 sec.
3.17 Write BSSR # on order card	--3-5-	SW	:07 sec.
3.18 Aside book or order card	123456	SW	:02 sec.
3.19 Replace slips in book	-23456	SW	:03 sec.
3.20 Logoff	123456	SW	:18 sec.

UNION TASK LIST (cont.)

	LIBRARY CODE	DATA SOURCE	TASK TIME
3. SEARCHING FOR CATALOG COPY (cont.)			
3B. HANDLE PRINTOUT OF CATALOG RECORD			
3.21 Remove/fold printout from printer	123456	SW	:20 sec.
3.22 Separate individual record	123456	SW	:05 sec.
3.23 Stamp branch codes on record	----5-	SW	:01 sec.
3.24 Match record with book/order card	123456	SW	:05 sec.
3C. BATCH SEARCH VENDOR DATA BASE			
3.25 Determine Call Number	--3---	LE	2:12 min.
3.26 Check card set Call# with catalog	--3---	LE	:42 sec.
3.27 Write Call#, Auth/Title Key & LCCN on slip	--3---	LE	:48 sec.
3.28 Type vendor search code form	--3---	LE	:30 sec.
3D. L.C. PROOF FILE			
3.29 Sort/discard Proof slip	---45-	SD	:04 sec.
3.30 Alphabetize Proof slip	---45-	SD	:04 sec.
3.31 File Proof slip	---45-	SD	:21 sec.
3.32 Search Proof file	---45-	LE	1:00 min.
3E. SEARCH NUC	---45-	SD	6:00 min.
3.33 Polaroid photo NUC copy	---4--	LE	:20 sec.
3.34 Relcad camera (8 shots)	---4--	LE	5:00 min.
3.35 Xerox NUC copy	----5-	LE	:20 sec.
3.36 Match copy with book	---45-	LE	:05 sec.
4. STANDING SEARCH ROUTINE GPC STANDARD # 854			
4A. REVIEW NEW STANDING SEARCH	----5-	LE	1:00 min.
4.1 Check highlighted search terms	----5-		--
4.2 Determine alternate search terms	----5-		--
4.3 Write delete SSR instruction	----5-		--
4.4 Aside second searches to cart	----5-		--
4.5 Aside SSR deletes to cart	----5-		--
4.6 Aside SSR KEEP to SSR shelf	----5-		--
4B. PROCESS STANDING SEARCH REPORT	--3-5-	DC	:40 sec./title
4.7 Get BALLOTS SSR report	--3-5-		--
4.8 Match SSR Founds with book	--3-5-		--
4.9 Match SSR Purges with book	--3-5-		--
4.10 Retrieve Founds on terminal	--3-5-	DC	1:00 min./title
4.11 Review SSR Purges	--3-5-		--
4.12 Aside " search agains" to cart	--3-5-		--
4.13 Aside remainder to other search or original cataloging	--3-5-		--

	LIBRARY CODE	DATA SOURCE	TASK TIME
5. CATALOGING VERIFICATION GPC STANDARD # 855			
5A. Cataloging new titles	123456	DC	Tables 3,4,5,6
5B. Cataloging with computer copy			
5.1 Verify descriptive data with book	123456		--
5.2 Verify entries with catalog	123456		--
5.3 Delete data with pencil line	123456		--
5.4 Type additions on computer copy	123456		--
5.5 Write class # on copy/slips	-23456		--
5.6 Write Auth/Title Key on copy	--3---		--
5.7 Highlight used terms with marker	----5-		--
5.8 Write special codes on copy	----5-		--
5.9 Write card set order on work card	---4--		--
5.10 Write branch codes on copy	--3-5-		--
5.11 Replace slips in book	--3-56		--
5.12 Band slips aside to terminal	1--4--		--
5.13 Aside book to release shelf	---4--		--
5.14 File shelf list marker	---4--		--
5.15 Aside new subject headings to review	---4--		--
5.16 Cutter/ Verify subject headings	---4--	DC	5:16 min.
5C. Catalog with MARC vendor copy	--3---	LE	2:45 min.
5D. Original Cataloging on vendor code form	--3---	LE	5:45 min.
5.17 Recall book from branch	--3---	LE	5:00 min.
6. CATALOG DATA ENTRY GPC STANDARD # 856			
6A. Enter records on BALLOTS terminal	--345-	DC	Table 7
6.1 Get record entry file	--345-	SW	:25 sec.
6.2 Get statistic tally sheet	--345-	SW	:06 sec.
6.3 Logon to BALLOTS (leased line)	--345-	SW	:36 sec.
6.4 Separate banded slips	---4--	SW	:03 sec.
6.5 Retrieve record in BALLOTS data base	--34--	SW	:10 sec.
6.6 Modify record in BALLOTS	--34--	DC	Table 7
6.7 Key catalog copy (Create)	1-345-	DC	Table 7
6.8 Key book cat. rec. I.D. # in LSI field	----5-	SW	:02 sec.
6.9 Key Auth/Title key in LSI field	--3---	SW	:02 sec.
6.10 Enter record for card production	---4--	SW	:05 sec.
6.11 Key card production order	---4--	SW	:02 sec.
6.12 Enter record for tape output	--3-5-	SW	:05 sec.
6.13 Aside entered catalog copy	--345-	SW	:03 sec.
6.14 Logoff	--345-	SW	:18 sec.
6.15 File catalog copy and slips	---4--	SW	:21 sec.

UNION TASK LIST (cont.)

	LIBRARY CODE	DATA SOURCE	TASK TIME
6. CATALOG DATA ENTRY (cont.)			
6B. Batch data entry			
6.16 Typescribe catalog modifications	--3---	LE	2:00 min.
6.17 Type greensheet keypunch form	----5-	LE	3:00 min.
6.18 Review greensheet and correct	----5-	LE	1:30 min.
6.18A Review master and correct		LE	1:30 min.
6.19 Assign record I.D.# review copy	----5-	SW	2:00 min.
6.20 Final review of greensheet	----5-	LE	1:30 min.
6.21 Enter record in Circ. data base	--3---	LE	1:00 min.
7. PROOFREADING AND EDIT GPC STANDARD # 857			
7A. Distribution and review of new catalog record printout	----5-	DC	Table 8
7.1 Check edit error listing	----5-		--
7.2 Separate printout into 150-200 record units	----5-		--
7.3 Match catalog copy with sections	----5-		--
7.4 Distribute to staff	----5-		--
7B. Proofreading record	--3---	DC	:33 sec.
	----5-	DC	Table 8
7.6 Match cat.copy with printout record	--3-5-		--
7.7 Mark found errors on printout	--3-5-		--
7.8 Flag error printout page with paperclip	---5-		--
7.9 Type coded error correction form	--3-5-	DC	:33 sec.
7.10 Batch printout,error form, cat copy	----5-		--
7C. Collection and review of new catalog record printout	----5-	DC	Table 8
7.11 Collect printout,error form,cat copy	----5-		-
7.12 Review error forms	----5-		--
7.13 Assemble printout	----5-		--
7.14 Discard catalog copy	----5-		--
7.15 Aside error forms to keypunch	----5-		--
7.16 Typescribe error forms	--3---	LE	:30 sec.
7.17 File printout	----5-		--
7.18 Distribute cat. copy input errors to staff	----5-		--
7D. Title control in vendor batch searching	--3---	LE	10:00 min./title
7.19 Prepare title entry	--3---		--
7.20 Maintain vendor search titles in-process file	--3---		--
7.21 Match entries with vendor hits	--3---		--
7.22 Purge not found entries for recall for original cataloging	--3---		--

UNION TASK LIST (cont.)

	LIBRARY CODE	DATA SOURCE	TASK TIME
8. CATALOG CARD DISTRIBUTION GPC STANDARD # 858			
8A. Processing computer printed catalog cards			
8.1 Receive weekly card order, separate into card groups; Shelf list Official main entry Book pocket cards CSL union catalog D.C. card set	---4--	SW	20:00 min.
8.2 Match order slip with S.L. & pocket Check cat. copy, card/slip Count pockets per # volumes Type Call # & Price when missing Erase " card #1" on first card discard #2 card for pocket & Shelf list	---4--	SW	1:39 min.
8.3 File in release file for end process	---4--	LE	:15 sec.
8B. Catalog cards multilith process			
8.4 Sort new titles by number of volumes and number in card set	---4--	LE	1:00 min.
8.5 Type 6 card multilith master	---4--	SW	12:30 min.
8.6 Type 1 card multilith master	----5-	LE	5:00 min.
8.7 Type headings on card set	---4--	SW	8:00 min.
8.8 Paste unit card to 6 up guide	---4--	LE	:15 sec.
8.9 Sort printed cards into sets	---4--	LE	1:00 min.
8.10 Alphabetize card	---4--	SD	:08 sec.
8.5A Review 6 card master and correct	---4--	LE	1:30 min.
8C. Filing catalog cards			
8.11 File card in public catalog	---4--	SD	:21 sec.
8.12 Revise filing in public catalog	---4--	SD	:09 sec.
8.13 File in Official main entry file	---4--	SD	:21 sec.
8.14 File in Shelf list	---4--	SD	:21 sec.
9. CATALOG PUBLICATION GPC STANDARD # 859			
9A. BALLOTS interface with book or fiche catalog.			
10. BOOK PROCESSING GPC STANDARD # 860			
10A. BALLOTS services in end processing.			
11. REFERENCE ACCESS			
11A. BALLOTS use in inter-library loan and bibliography production.			

APPENDIX III A

LIBRARY 3 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

SEARCHING FOR CATALOG COPY

	BALLOTS	PAST SYSTEM
ADULT FICTION		
SEARCH	187 TITLES	187 TITLES
FIND	155 (83 %)	84 (45%)
NOT FOUND	32	103
JUV. FICTION		
SEARCH	71 TITLES	71 TITLES
FIND	52 (73.5%)	23 (33%)
NOT FOUND	19	48
ADULT NON-FICTION		
SEARCH	479 TITLES	479 TITLES
FIND	354 (73.9%)	335 (70%)
NOT FOUND	125	144
JUV. NON-FICTION		
SEARCH	85 TITLES	85 TITLES
FIND	59 (68.8 %)	51 (60%)
NOT FOUND	26	34
TOTAL PRODUCTION UNITS	822 TITLES	822 TITLES

LIBRARY 3 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOGING UNITS

	BALLOTS	PAST SYSTEM
ADULT FICTION		
MARC	84	84
CDF	71	--
ORIGINAL	32	103
JUV. FICTION		
MARC	23	23
CDF	29	--
ORIGINAL	19	48
ADULT NON-FICTION		
MARC	335	335
CDF	19	--
ORIGINAL	125	144
JUV. NON-FICTION		
MARC	51	51
CDF	8	--
ORIGINAL	26	34
TOTAL PRODUCTION UNITS	822 TITLES	822 TITLES

LIBRARY 3 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

DATA ENTRY IN BALLOTS

	MODIFY EXISTING RECORD	CREATE NEW RECORD	TOTAL
ADULT FICTION	155	32	187
JUV. FICTION	52	19	71
ADULT NON-FICTION	354	125	479
JUV. NON-FICTION	59	26	85
TOTAL	620	202	822

APPENDIX III B

LIBRARY 4 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOG COPY SOURCE

	BALLOTS	PAST SYSTEM
ADULT FICTION		
ORIGINAL CATALOGING	79 TITLES	79 TITLES
JUV. FICTION		
ORIGINAL CATALOGING	20 TITLES	20 TITLES
ADULT NON-FICTION	846 TITLES	846 TITLES
SEARCH BALLOTS	677	---
FIND BALLOTS	473	---
USE CIP	67	---
TO NUC	137	---
SEARCH LC PROOF	---	592
FIND LC PROOF	---	207
USE CIP	---	207
TO NUC	---	178
SEARCH NUC	169	254
	(169+137= 306)	(254+178= 432)
	306 Total NUC search	432 Total NUC search
FIND NUC	214	302
NOT FOUND	92	130
JUV. NON-FICTION	47 TITLES	47 TITLES
SEARCH BALLOTS	38	---
FIND BALLOTS	27	---
USE CIP	2	---
TO NUC	9	---
SEARCH LC PROOF	---	33
FIND LC PROOF	---	12
USE CIP	---	12
TO NUC	---	9
SEARCH NUC	9	14
	(9+9=18)	(14+9=23)
	18 Total NUC search	23 Total NUC search
FIND NUC	13	16
NOT FOUND	5	7
TOTAL TITLES	992 TITLES	992 TITLES

LIBRARY 4 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOGING UNITS

	BALLOTS	PAST SYSTEM
ADULT FICTION		
ORIGINAL CAT.	79	79
JUV. FICTION		
ORIGINAL CAT.	20	20
ADULT NON-FICTION		
MARC	453	---
CDF	12	---
IPF	8	---
LC PROOF	---	207
CIP	67	207
NUC	214	302
ORIGINAL	92	130
JUV. NON-FICTION		
MARC	25	---
CDF	1	---
IPF	1	---
LC PROOF	---	12
CIP	2	12
NUC	13	16
ORIGINAL	5	7
TOTAL	992	992

--- = CATAGORY NOT USED

LIBRARY 4

MONTHLY PRODUCTION BREAKDOWN ESTIMATE

DATA ENTRY IN BALLOTS

	MODIFY EXISTING RECORD	CREATE NEW RECORD	TOTAL
ADULT FICTION	60	19	79
JUV. FICTION	11	9	20
ADULT NON-FICTION	473	373	846
JUV. NON-FICTION	27	20	47
TOTAL	571	421	992

MULTILITH CARD PRODUCTION SYSTEM

LIBRARY 4

BREAKDOWN ESTIMATE

1. MONTHLY PRODUCTION LEVEL

   24,800 catalog cards
   992 titles
   3,472 volumes

2. CATALOG CARD BREAKDOWN

   4 cards per each title (Shelf list, Official main entry, California State Library Union Catalog, NUC)
   6 cards per each volume (Main entry, Title, Subject headings, Added entries, book pocket)

3. TITLE TO VOLUME RATIO

   992 Title X 4 Cards = 3968 cards
   3472 Vol. X 6 Cards = 20832 cards
   Total monthly cards 24800 cards

   992 Titles / 1 Title = 3472 Volumes / 3.5 Volumes

4. CATALOG CARDS PER TITLE

   24800 Catalog cards ÷ 992 Titles = 25 Catalog cards per Title

5. BREAKDOWN OF PRODUCTION

CARD QUANTITY	CARD TYPE	PRODUCTION LEVEL	NUMBER OF MULTILITH MASTERS NEEDED (6 cards per master)
6	Main Entry	992	992 ÷ 6 = 166 masters
1	Title	992	992 ÷ 6 = 166 masters
2	Subject	1984	1984 ÷ 6 = 331 masters
1	Add Entry	992	992 ÷ 6 = 166 masters
			Total = 829 masters
			+ 21 error replacement
			850 MULTILITH MASTERS PER MONTH

APPENDIX III C

LIBRARY 5 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOG COPY SOURCE

	BALLOTS	PAST SYSTEM
ADULT FICTION	132 TITLES	132 TITLES
USE CIP	84	84
ORIGINAL	48	48
JUV. FICTION	47 TITLES	47 TITLES
USE CIP	35	35
ORIGINAL	12	12
ADULT NON-FICTION	626 TITLES	626 TITLES
SEARCH BALLOTS	595	---
FIND BALLOTS	468 (78.6%)	---
USE CIP	6	---
TO NUC	121	---
SEARCH LC PROOF	---	437
FIND LC PROOF	---	219 (50%)
USE CIP	---	109 (25%)
TO NUC	---	109
SEARCH NUC	31+121	189+109
	152 total NUC search	298 total NUC search
FIND NUC	106 (70%)	208 (70%)
NOT FOUND	46	90
JUV. NON-FICTION	50 TITLES	50 TITLES
SEARCH BALLOTS	48	--
FIND BALLOTS	29 (60%)	--
USE CIP	1	--
TO NUC	18	--
SEARCH LC PROOF	--	35
FIND LC PROOF	--	18 (50%)
USE CIP	--	9
TO NUC	--	8
SEARCH NUC	2+18	15+8
	20 total NUC search	23 total NUC search
FIND NUC	14 (70%)	16 (70%)
NOT FOUND	6	7
	855 TITLES	855 TITLES

DASH = CATAGORY NOT USED

LIBRARY 5 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOGING UNITS

	BALLOTS	ALTERNATIVE
ADULT FICTION		
CIP	84	84
ORIGINAL	48	48
JUV FICTION		
CIP	35	35
ORIGINAL	12	12
ADULT NON-FICTION		
MARC	431	---
CDF	26	--
IPF	11	--
LC PROOF	---	219
CIP	6	109
NUC	106	208
ORIGINAL	46	90
JUV. NON-FICTION		
MARC	14	--
CDF	15	--
IPF	0	--
LC PROOF	--	18
CIP	1	9
NUC	14	16
ORIGINAL	6	7
TOTAL	855	855

DASH = CATAGORY NOT USED

LIBRARY 5 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

DATA ENTRY IN BALLOTS

	MODIFY EXISTING RECORD	CREATE NEW RECORD	TOTAL
ADULT FICTION	N.A.	132	132
ADULT NON-FICTION	N.A.	626	626
JUV. FICTION	N.A.	47	47
JUV. NON-FICTION	N.A.	50	50
		TOTAL TITLES	855

N.A. = NOT APPLICABLE

APPENDIX III D

LIBRARY 6 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

SEARCHING FOR CATALOG COPY

	BALLOTS	ALTERNATE SYSTEM
ADULT FICTION		
SEARCH	78 TITLES	78 TITLES
FIND BALLOTS	49	---
USE CIP	2	27
ORIGINAL CAT.	8	51
JUV. FICTION	47 TITLES	47 TITLES
COMMERCIAL		
CATALOG		
CARDS		
ADULT NON-FICTION	230 TITLES	230 TITLES
SEARCH BALLOTS	230	---
FIND BALLOTS	145	---
USE CIP	2	81
ORIGINAL CAT.	44	149
JUV. NON-FICTION	58 TITLES	58 TITLES
COMMERCIAL		
CATALOG		
CARDS		
TOTAL TITLES	413 TITLES	413 TITLES

--- = CATALOG CATAGORY NOT USED

LIBRARY 6 MONTHLY PRODUCTION BREAKDOWN ESTIMATE

CATALOGING UNITS

	BALLOTS	ALTERNATE SYSTEM
ADULT FICTION		
MARC	36	---
CDF	7	---
IPF	6	---
CIP	2	27
ORIGINAL	27	51
JUV. FICTION		
COMMERCIAL CATALOG CARDS	47	47
ADULT NON-FICTION		---
MARC	145	---
CDF	21	---
IPF	18	---
CIP	2	81
ORIGINAL	44	149
JUV. NON-FICTION		
COMMERCIAL CATALOG CARDS	58	58
TOTAL TITLES	413 TITLES	413 TITLES

--- = CATALOG CATAGORY NOT USED

APPENDIX IV.A

MARIN COUNTY PUBLIC LIBRARY

TECHNICAL PROCESSING

Marin County processes books and materials for its 3 Branch Libraries and 7 stations, and is able to provide additional technical processing support for three local libraries. The present rate of processing averages 822 titles/mo. - 2200/volumes mo.

The technical processing dept. uses CLSI acquisition system hardware and software for all order, receipt, claiming and canceling. This in-house mini computer system is operated by library staff . Using the computer terminals is now part of the normal technical processing work flow and provides computer printing of all purchase orders, claim/cancel notices, payment accounting, production of spine and book labels, and a variety of statistical reports.

The computer terminals interact with the random access disc memory. Records are searched and retrieved from the disc memory which represents the on-order file, and in-process file. A record is entered at time of order, updated at time of receipt and passed on to a history disc of all materials ordered at time of sending the item to the branches. The system is able to identify added copies by recognizing that a new record is similar to an old record in the file.

Marin also uses CLSI circulation system hardware and software. The circulation data base is maintained by staff at the technical processing center, but records in the data base are updated from terminals located in each of the branches to note if a book is on loan, returned, lost, reserved or available at another branch. The central system prints patron notices for; overdue, reserve available, recall, hold cancels, and bills.

The catalog used by Marin is produced on microfiche and contains citations for materials held at all branches. Citations for new material held at two other local public libraries are also beginning to be included. Several sets of the microfiche catalog are available at each branch for patron and librarian use.

The microfiche catalog is updated in two ways. Every month a supplement of new items is prepared on microfiche and sent to all branches. Every 3-4 months the entire fiche catalog is updated with new items interfiled and the new catalog is sent to all branches.

The catalog is produced by a vendor using COM equipment (computer output microform). The machine readable catalog records are sent to the vendor on a tape from BALLOTS. Marin uses BALLOTS as part of its cataloging process.

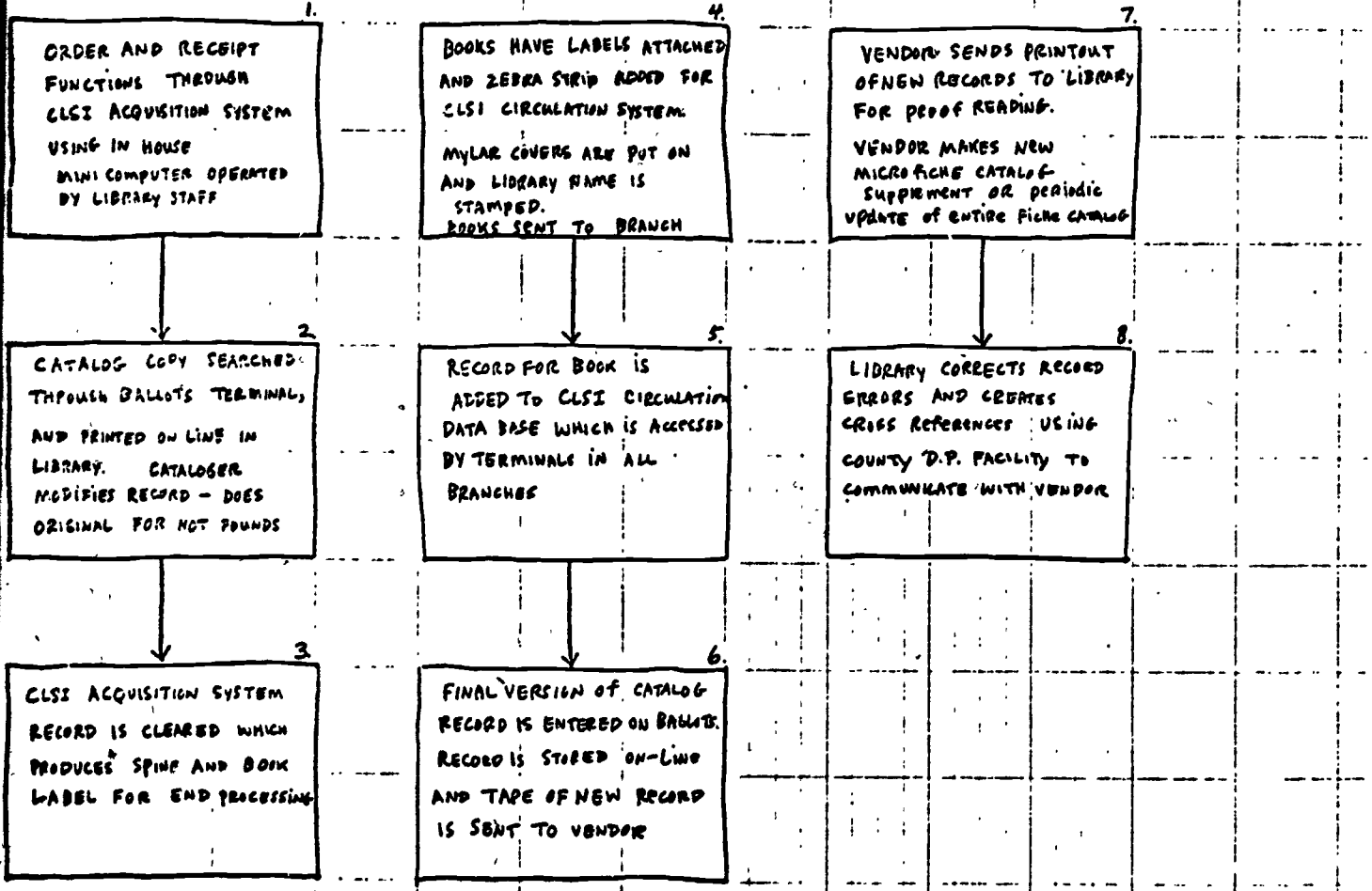
New items are searched by library staff on the BALLOTS terminal. If a record is found in the data base it is printed on-line in the library. The cataloger modifies the record as needed, and creates new records for items requiring original cataloging. The modified and new records are then entered on the BALLOTS terminal. BALLOTS stores these records in an on-line catalog data file and produces the tape of the new items for the microfiche catalog vendor.

Errors in the catalog records are discovered by the library staff who proofread a printout from the vendor and may be corrected at any time. Library staff prepare a coded correction card which is transferred to machine readable form using county data processing equipment. The correction tape is sent to the vendor who updates Marin's master file.

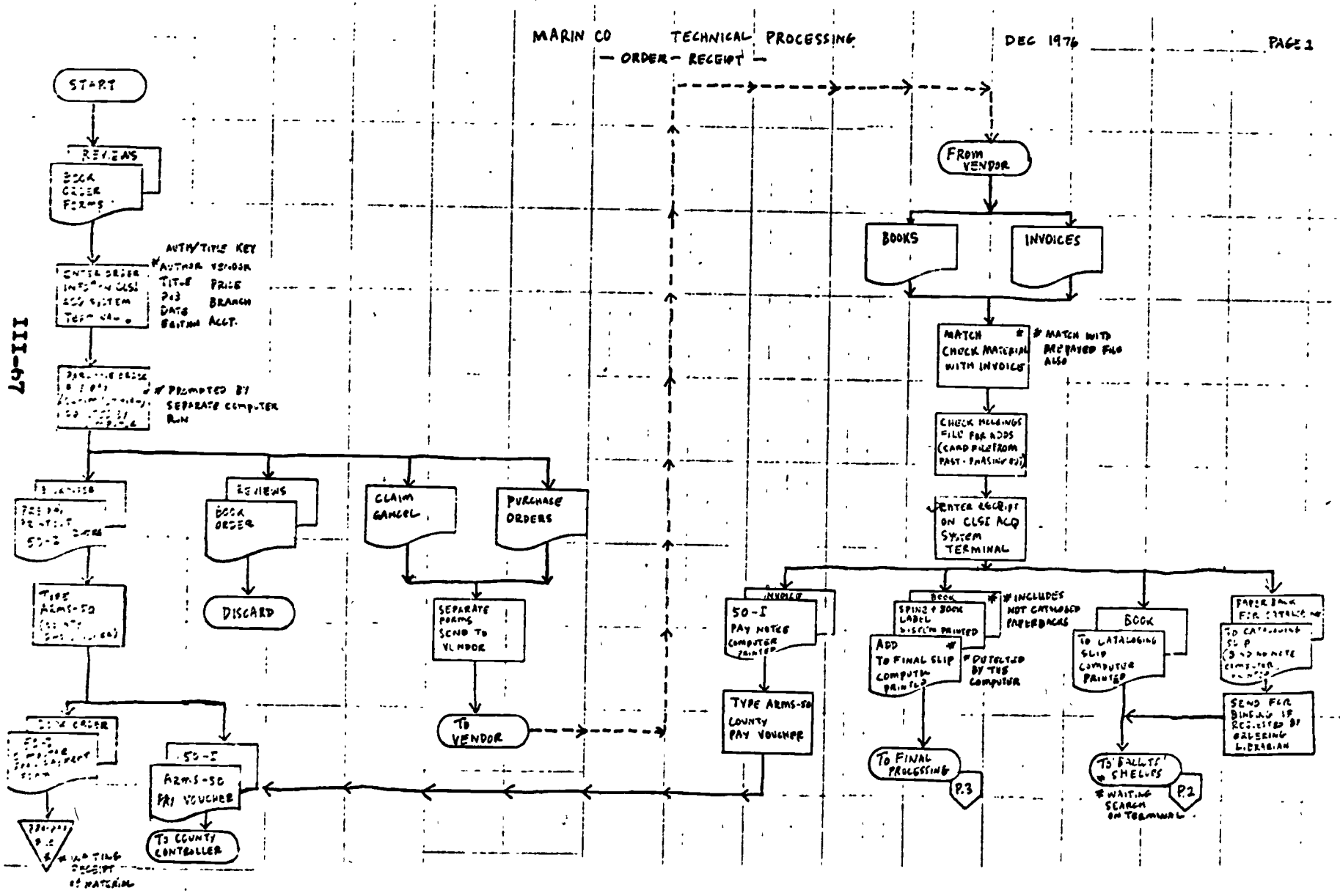
The first microfiche catalog was produced by a special contract to convert the majority of Marin's card catalog to computer format.

MARIN CO. TECHNICAL PROCESSING SYSTEM OVERVIEW

DEC 1976

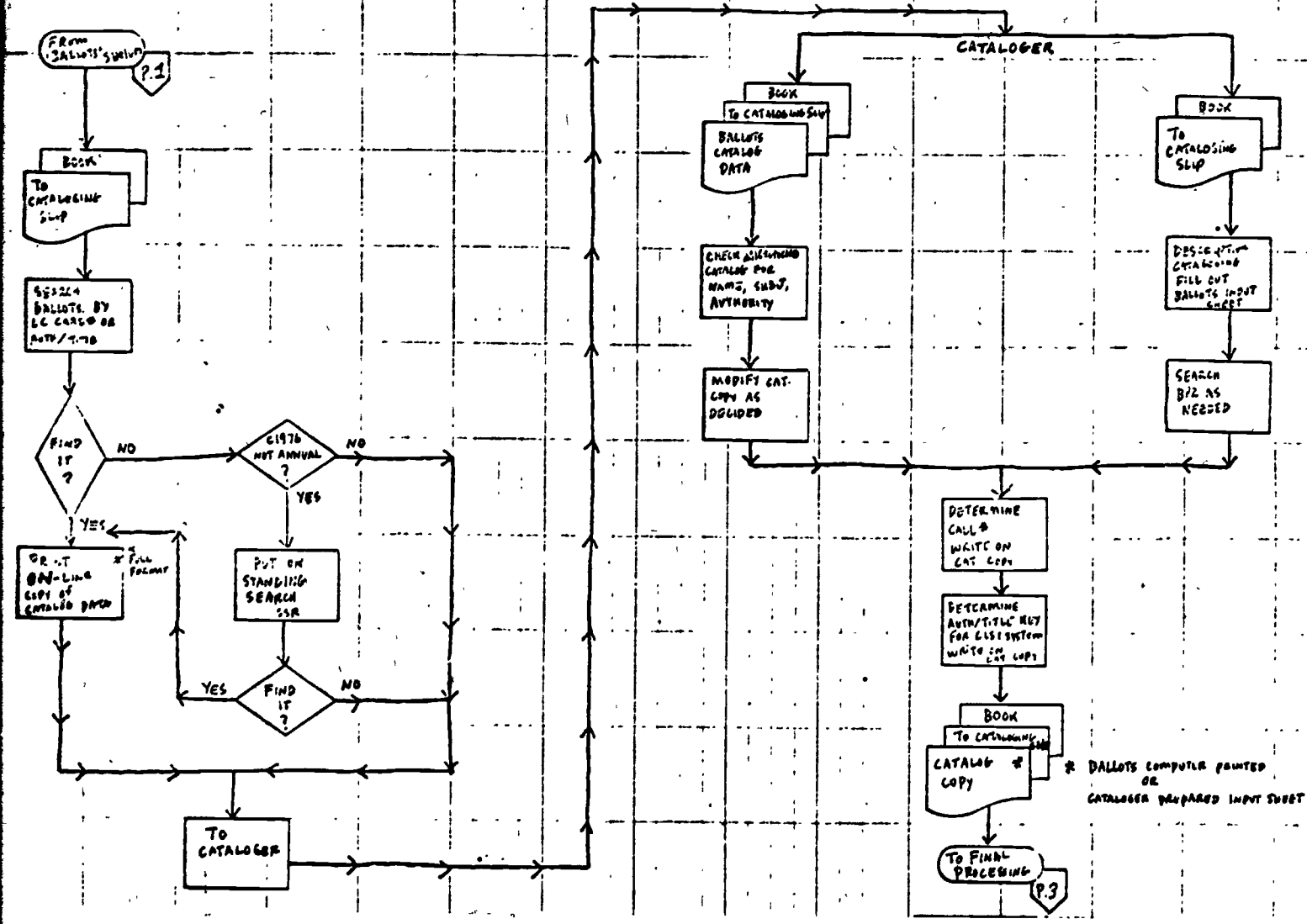


FC-1


MARIN CO TECHNICAL PROCESSING
DEC 1976
PAGE 2
— ORDER — RECEIPT —
START
REVIEWS
BOOK ORDER FORMS
AUTH/TITLE KEY
AUTHOR VENDOR
TITLE PRICE
PUB BRANCH
DATE EDITION ACCT.
ENTER ORDER INFO ON CLSI ACQ SYSTEM TERMINAL
* PROMPTED BY SEPARATE COMPUTER RUN
TYPE ARMS-50
DISCARD
REVIEWS
BOOK ORDER
CLAIM CANCEL
PURCHASE ORDERS
SEPARATE FORMS SEND TO VENDOR
TO VENDOR
50-I
ARMS-50 PAY VOUCHER
TO COUNTY CONTROLLER
* MATCHING RECEIPT OF MATERIAL
FROM VENDOR
BOOKS
INVOICES
MATCH * CHECK MATERIAL WITH INVOICE
* MATCH WITH PREPAID FILE ALSO
CHECK HOLDINGS FILE FOR ADDS (CAMP FILE FROM PAST PHASING)
ENTER RECEIPT ON CLSI ACQ SYSTEM TERMINAL
50-I PAY NOTES COMPUTER PRINTED
TYPE ARMS-50 COUNTY PAY VOUCHER
BOOK
SPINE + BOOK LABEL DISPLAY PRINTED
* INCLUDES NOT CATALOGED PAPERBACKS
ADD * TO FINAL SLIP COMPUTER PRINTED
* DETECTED BY THE COMPUTER
TO FINAL PROCESSING
P3
BOOK
TO CATALOGING SLIP COMPUTER PRINTED
TO BALLET SHELVES
P2
* WAITING SEARCH ON TERMINAL
PAPER BACK FOR LIBRARY
TO CATALOGING SLIP (SEND NO NOTE COMPUTER PRINTED)
SEND FOR BINDING IF REQUESTED BY ORDERING LIBRARIAN

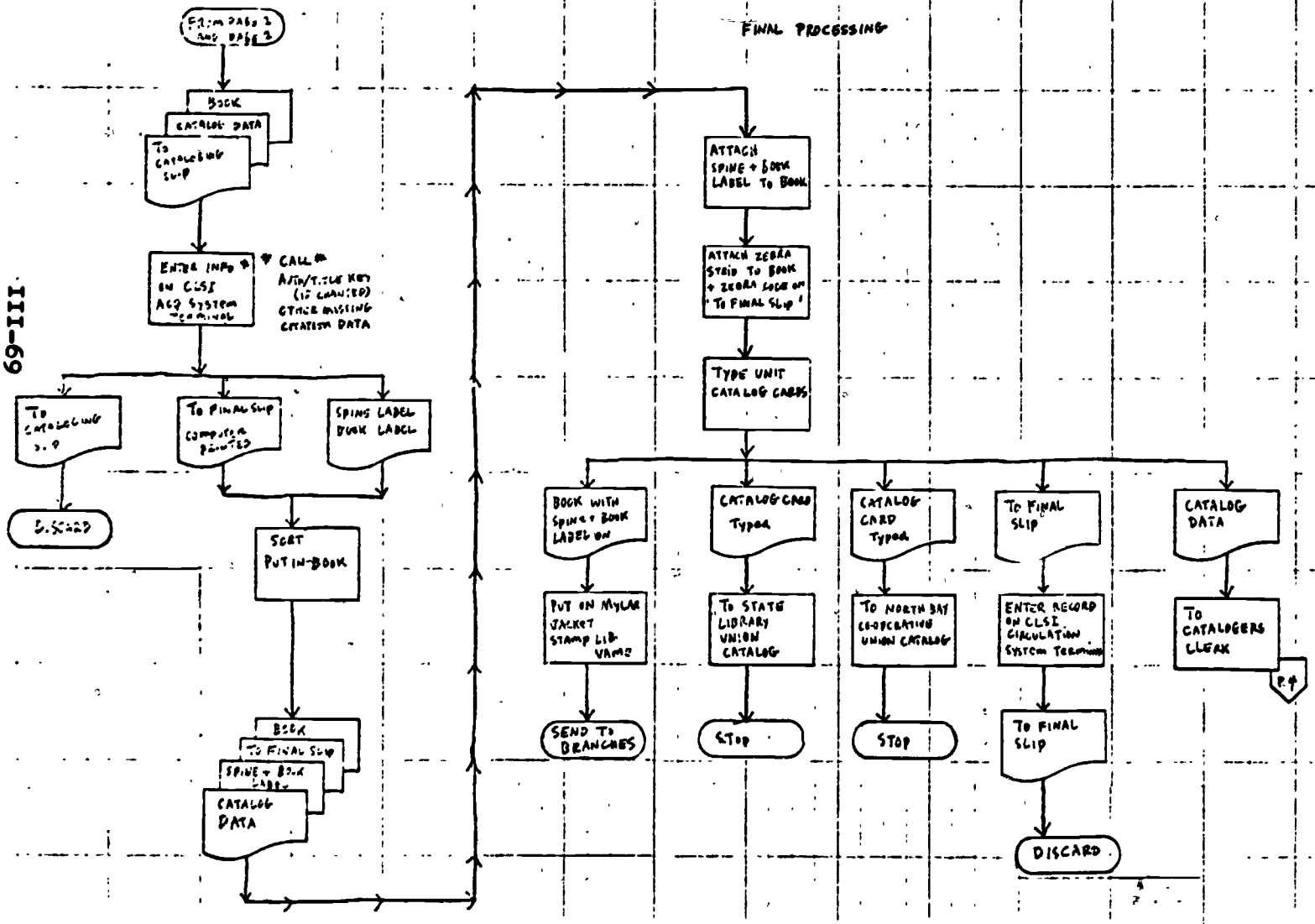
MARIN CO. TECH. PROC. DEC 76

SEARCH — CATALOG



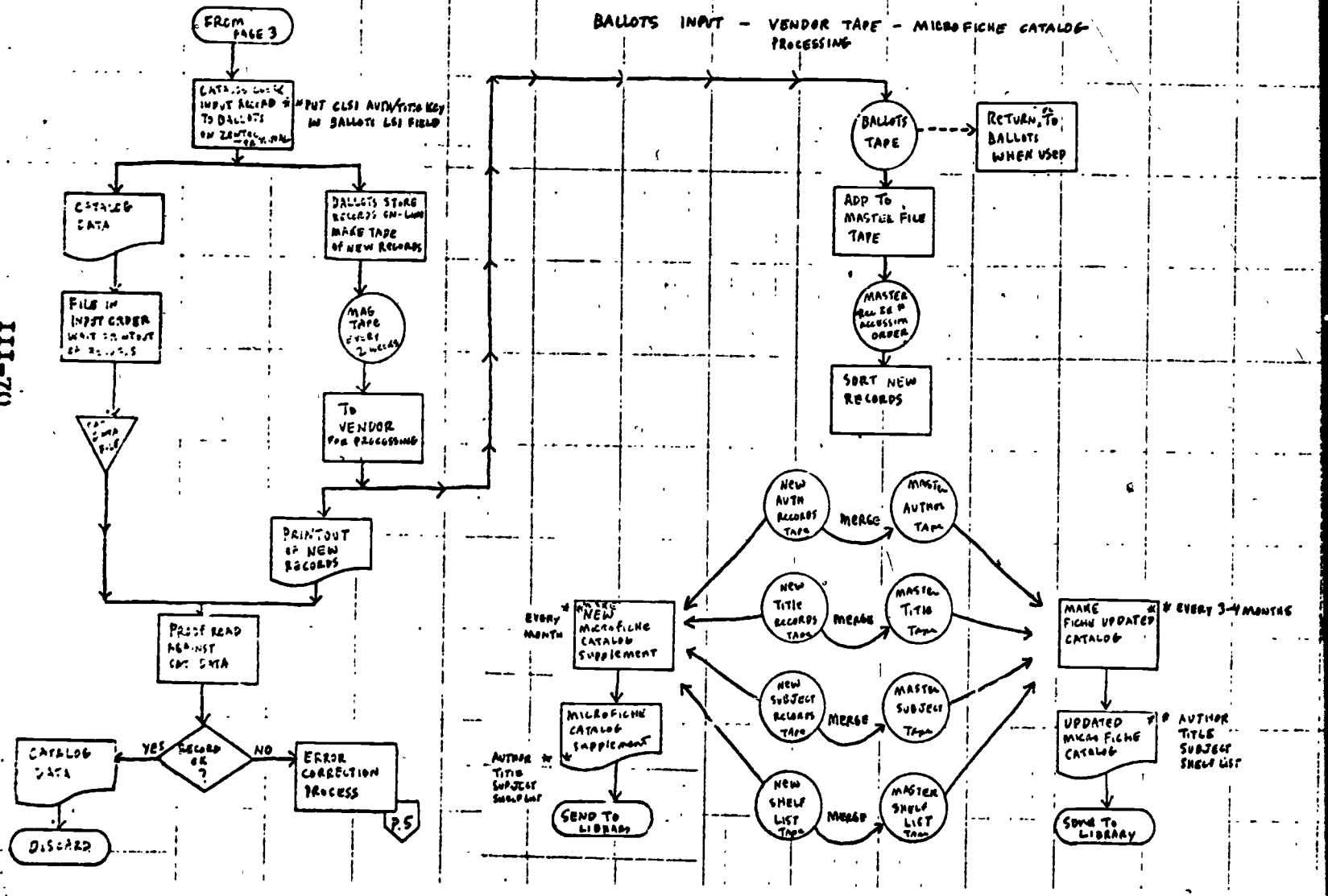
MARIN CO TECH PROC DEC 76

FINAL PROCESSING



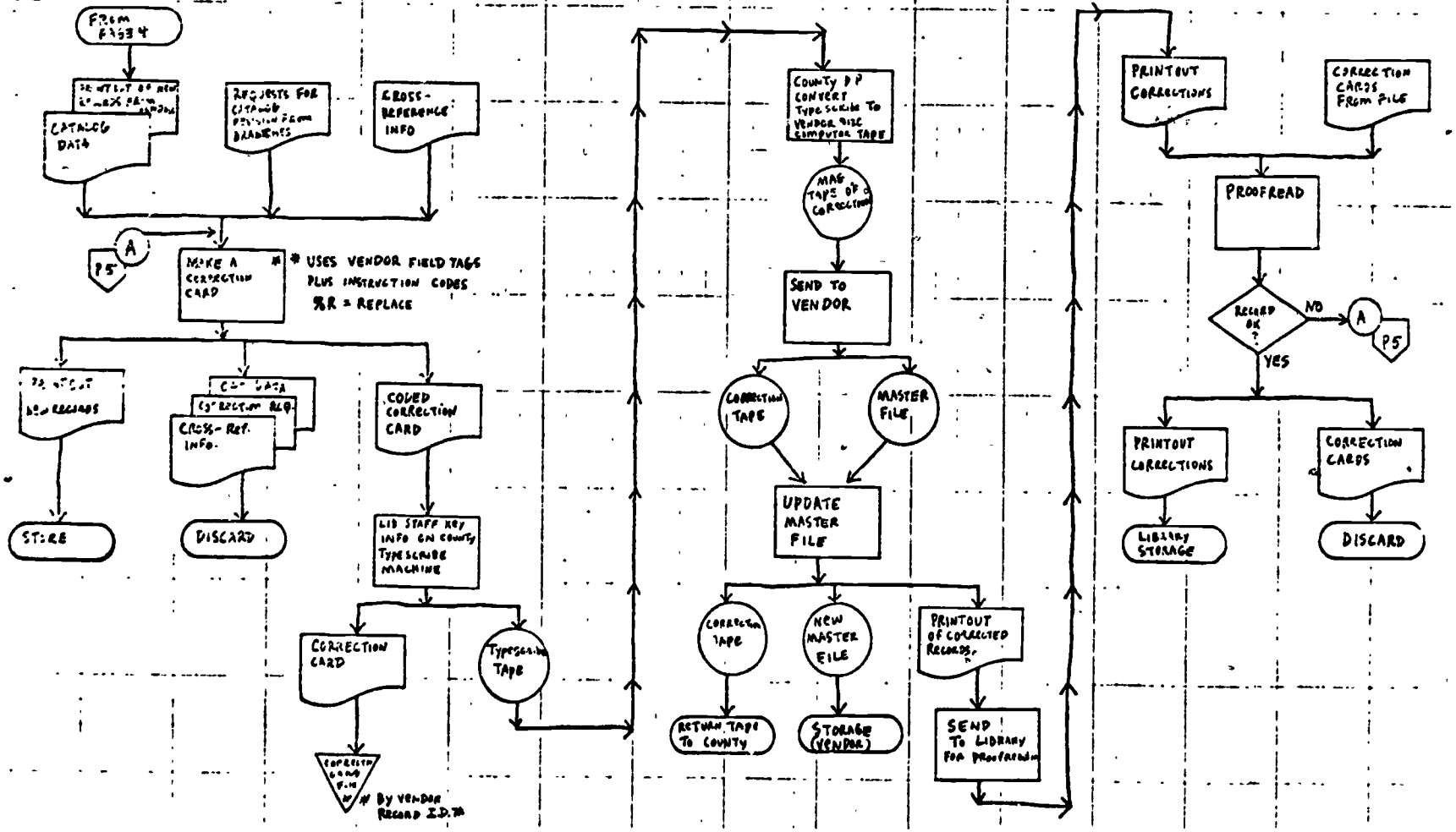
MARIN CO. TECH PROC DEC 76

BALLOTS INPUT - VENDOR TAPE - MICROFICHE CATALOG PROCESSING



MARIN CO. TECH. PROC. DEC 76 PAGE 5

CATALOG ERROR CORRECTION — CROSS REFERENCE PREPARATION



APPENDIX IV B

SAN FRANCISCO PUBLIC LIBRARY

TECHNICAL PROCESSING

SFPL processes books for its 26 Branch Libraries and 1 station. The present rate of processing averages 992 titles/mo. - 7130 volumes/mo.

Prior to the implementation of BALLOTS the Cataloging Division processed books under a manual system which remains intact for certain catagories of books. BALLOTS is seen as a future replacement of the LC Proof Slip File and all associated order, sorting, alphabetizing, filing, searching and purging of proof slips. BALLOTS is currently used to search for catalog records and to produce catalog cards.

The previous method of producing cards, which is still done for certain catagories, is the typing of a large multilith master (6 card size) which is used for card printing at an in house shop.

BALLOTS card production process is preferred as it has increased the speed of the cataloging process and reduced a backlog using existing staff. The difference being; original cataloging or modifications to an existing record are keyed only once on the BALLOTS CRT terminal. Entering the record on BALLOTS includes the ordering of card sets, thus the separate administration of card order is replaced. BALLOTS cards come to the library presorted with the Shelf List, Official Main Entries, and public catalog cards in separate groups. The dictionary catalog cards are also in separate groups for each branch already alphabetically interfiled ready to be added to the public catalog.

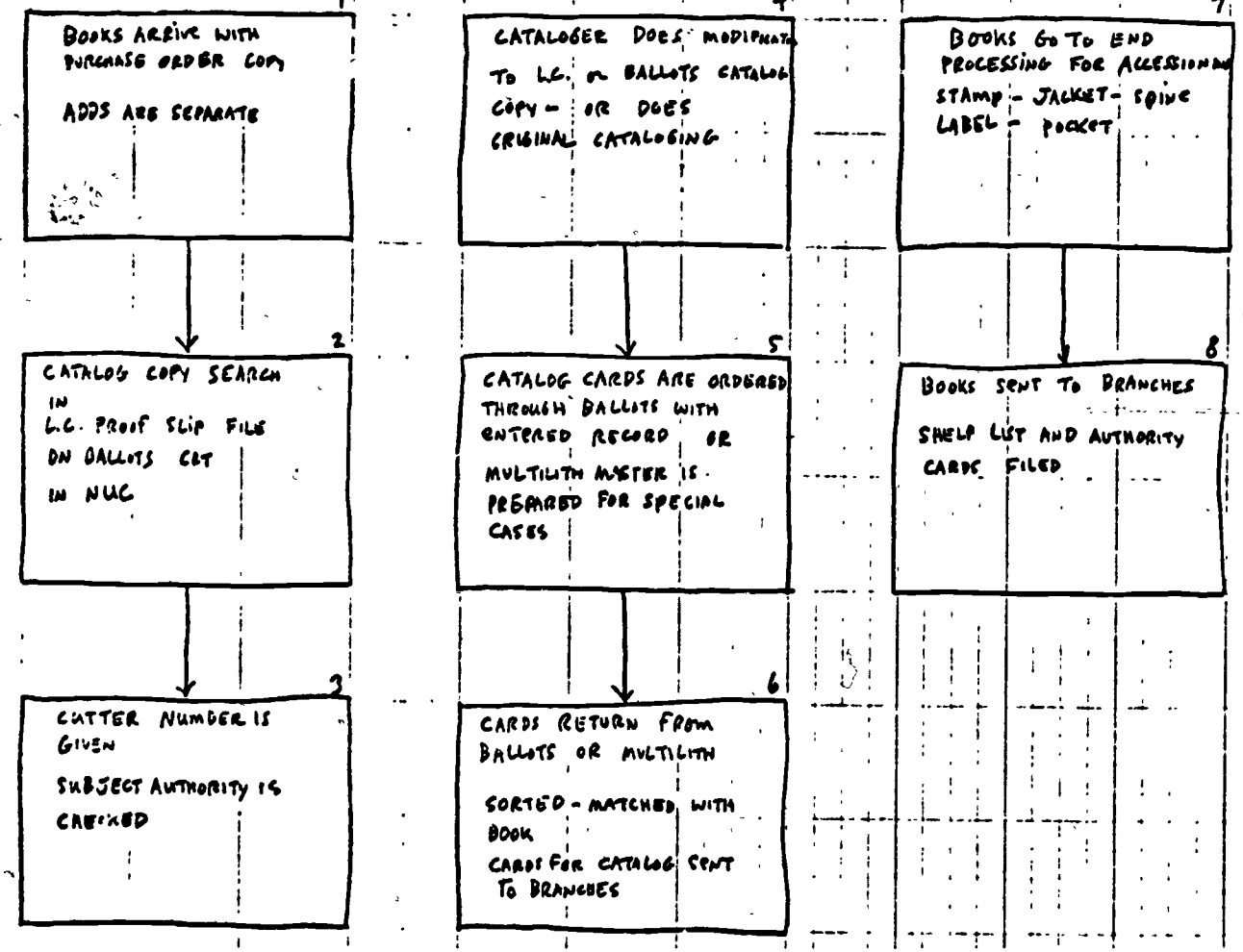
In the multilith system card sets are sent with the books. This created various problems of keeping track of card sets and books during end processing, and in linking a card set with a rush book which was sent to the branch before the cards were printed.

The additional problem of duplicating a card set for a book which is already at one branch but now being ordered by another branch is also made easier using BALLOTS.

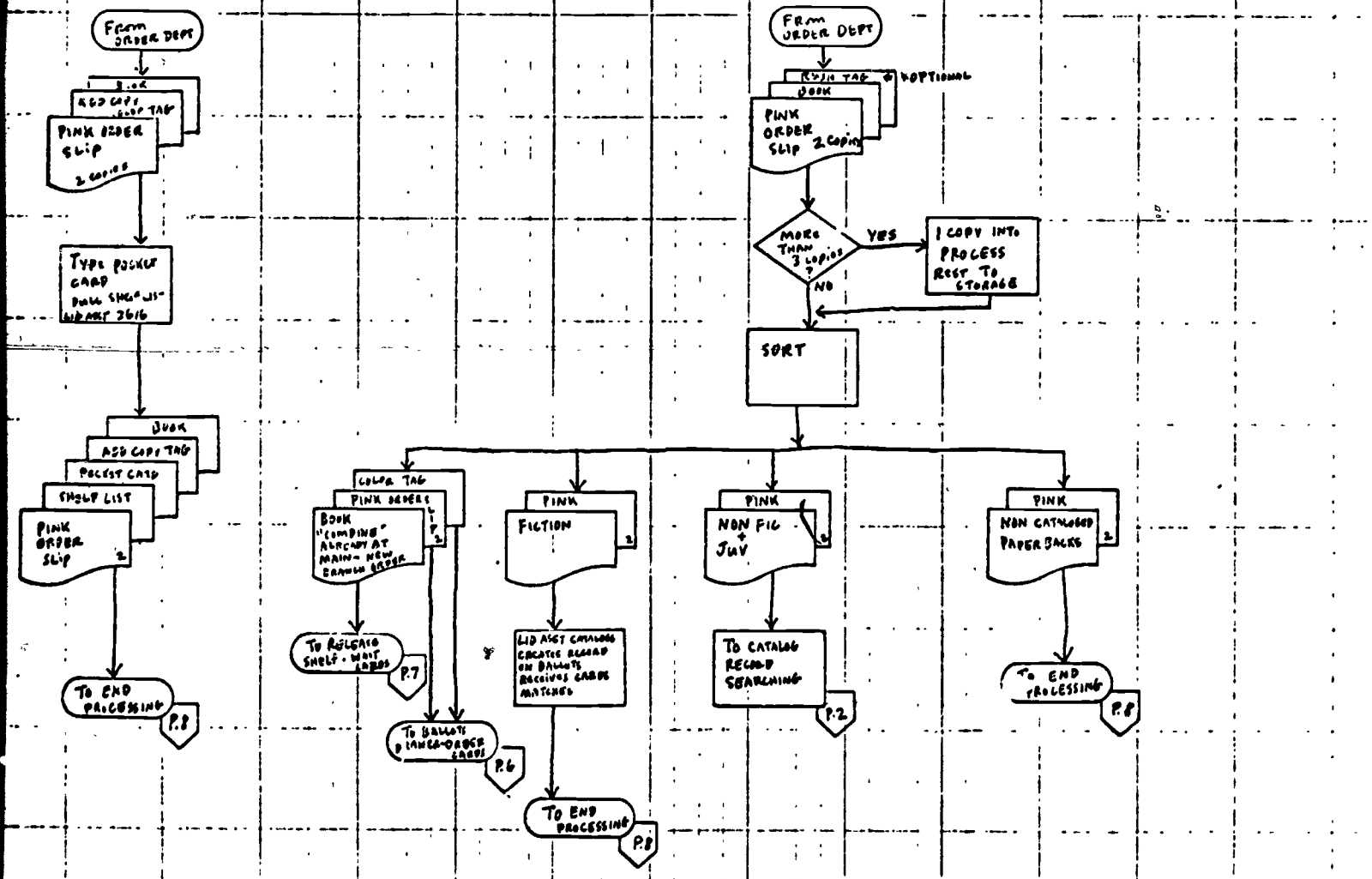
The BALLOTS system saves many staff hours in the typing, sorting, alphabetizing, and keeping track of catalog cards which SFPL adds beyond the hundred thousand mark yearly.

SFPL technical processing is now in a state of change. The staff is responding to the impact of BALLOTS by carefully reexamining its procedures and planning a course toward more effective processing in accord with the new national standards. The staff is very enthusiastic about its use of the BALLOTS computer system and the outlook seems favorable.

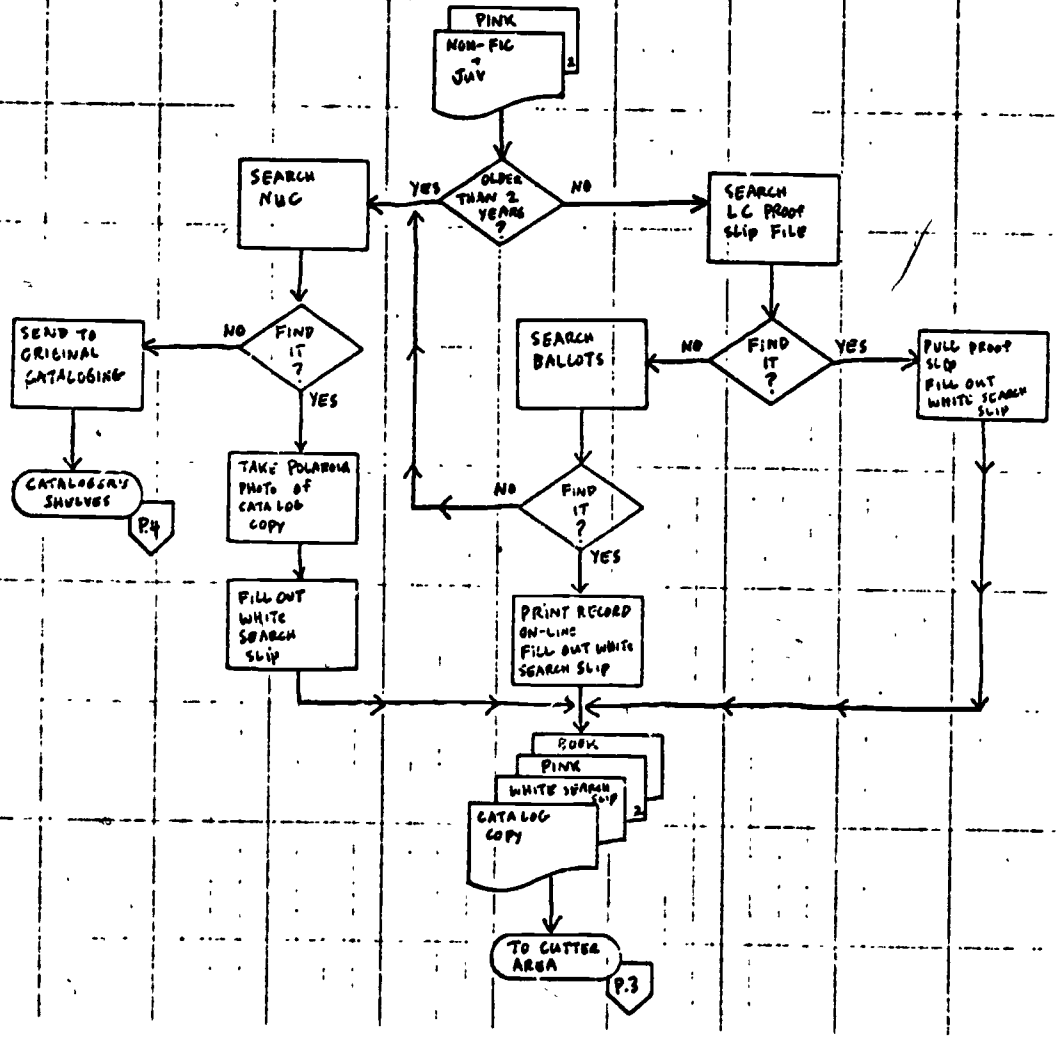
SAN FRANCISCO PUBLIC LIBRARY TECHNICAL PROCESSING DEC '76
SYSTEM OVERVIEW



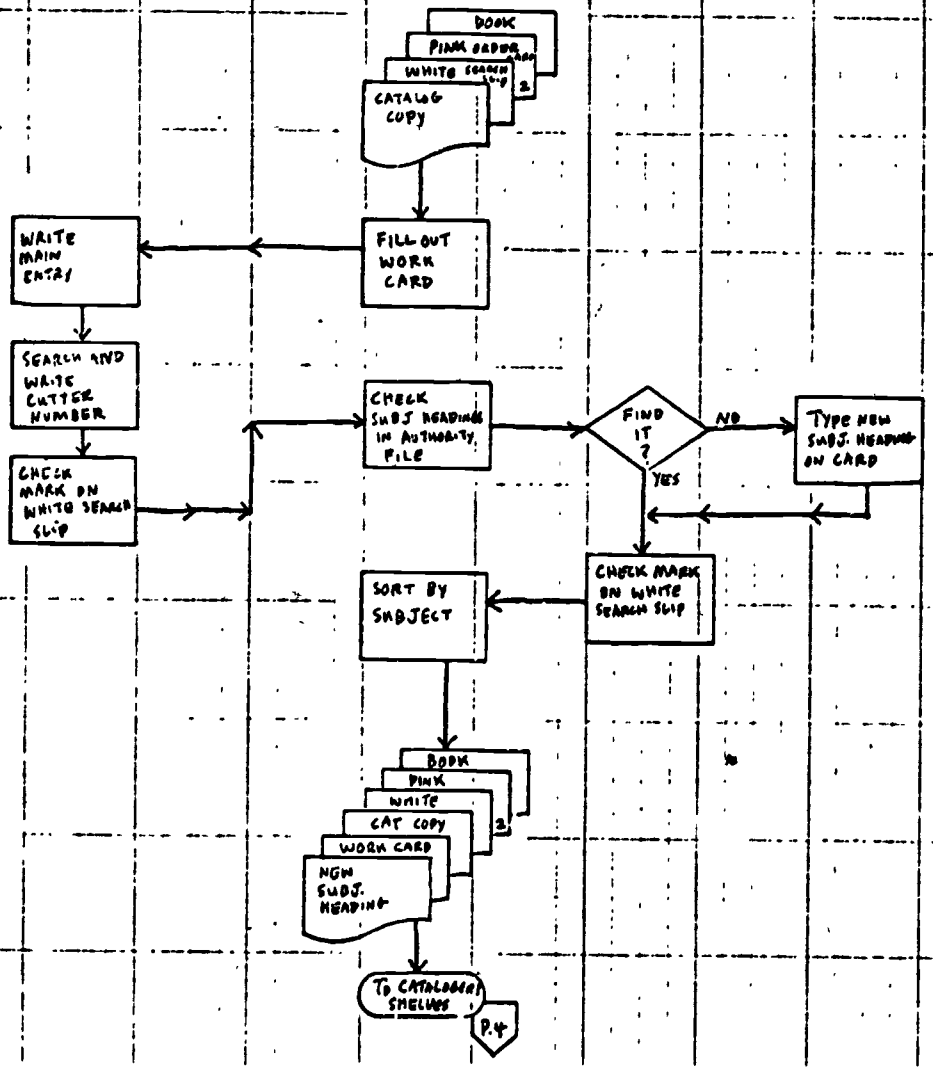
III-74


From ORDER DEPT
PINK ORDER SLIP
2 COPIES
TYPE POCKET CARD
BOOK
ADD COPY TAG
POCKET CARD
SHELF LIST
PINK ORDER SLIP
TO END PROCESSING
P.8
From ORDER DEPT
BOOK
PINK ORDER SLIP 2 COPIES
OPTIONAL
MORE THAN 3 COPIES ?
YES
1 COPY INTO PROCESS REST TO STORAGE
NO
SORT
COLOR TAG
PINK ORDERS
BOOK "COMPING" ALREADY AT MAIN - NEW BRANCH ORDER
TO RELEASE SHELF - WAIT CARDS
P.7
TO BALLOTS PLANNED-ORDER CARDS
P.6
PINK
FICTION
LIB ASST CATALOGS CREATES RECORD ON BALLOTS RECEIVES CARDS MATCHES
TO END PROCESSING
P.8
PINK
NON FIC + JUV
TO CATALOG RECORD SEARCHING
P.2
PINK
NON CATALOGED PAPER BACKS
TO END PROCESSING
P.8

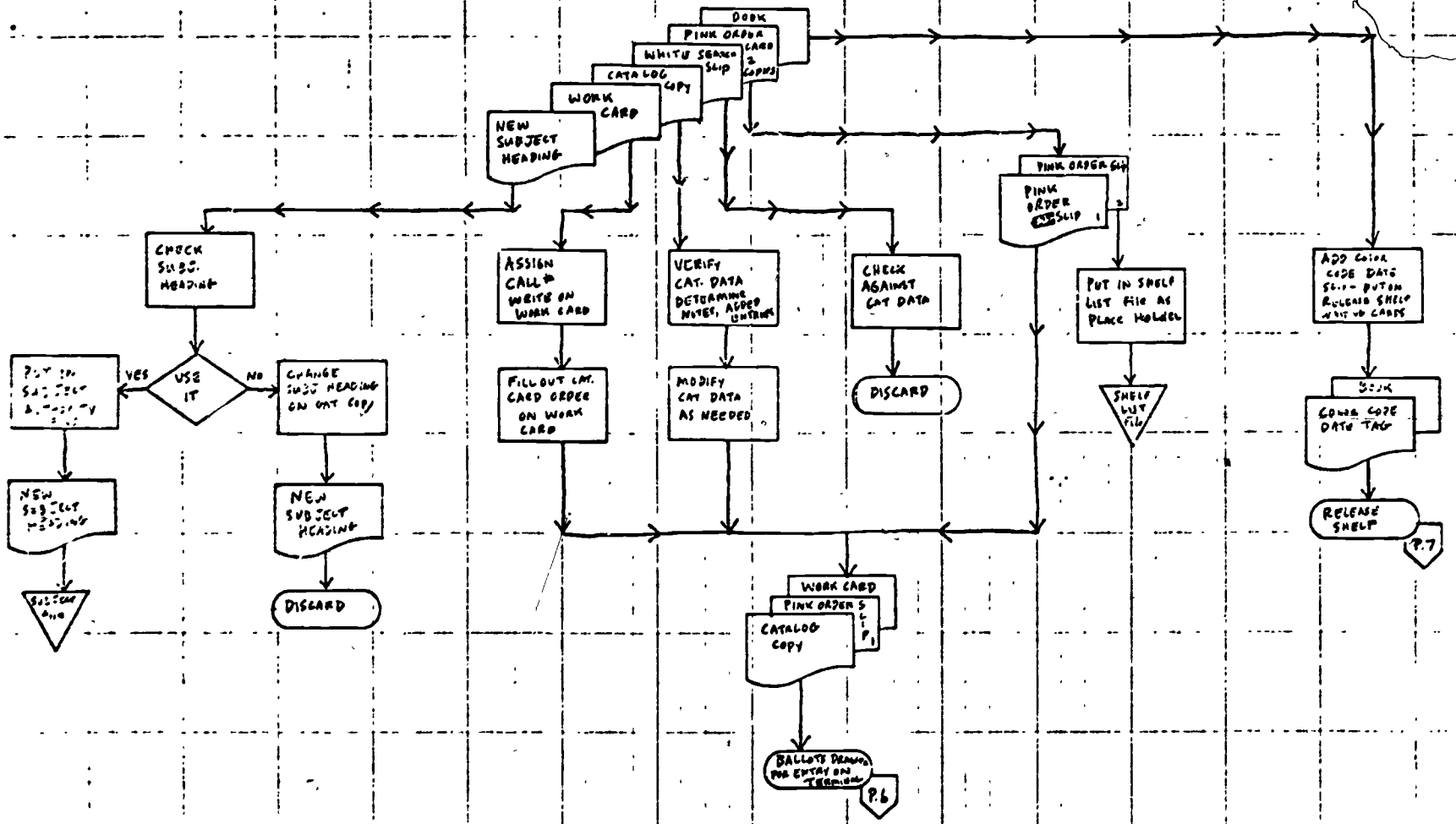
CATALOG COPY SEARCHING



CUTTER AREA

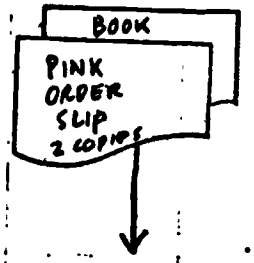

BOOK
PINK SLIP
WHITE SEARCH SLIP
2
CATALOG COPY
FILL OUT WORK CARD
WRITE MAIN ENTRY
SEARCH AND WRITE CUTTER NUMBER
CHECK MARK ON WHITE SEARCH SLIP
CHECK SUBJ HEADING IN AUTHORITY FILE
FIND IT ?
NO
YES
TYPE NEW SUBJ. HEADING ON CARD
CHECK MARK ON WHITE SEARCH SLIP
SORT BY SUBJECT
BOOK
PINK
WHITE
CAT COPY
2
WORK CARD
NEW SUBJ. HEADING
TO CATALOGING SHELVES
P.4

CATALOGING WITH L.C. COPY



III-76

ORIGINAL CATALOGING



Type a unit card.
- establish the main entry: verify the entry in NUC.
  verify the entry in the Official Catalog.
  Make the necessary see references.

- compose the 'body of the entry', using the title page as source of information for the title, author statement and edition statement.

- record the information of imprint.

- describe the physical work in collation.

- include the necessary notes.

- trace all secondary entries:

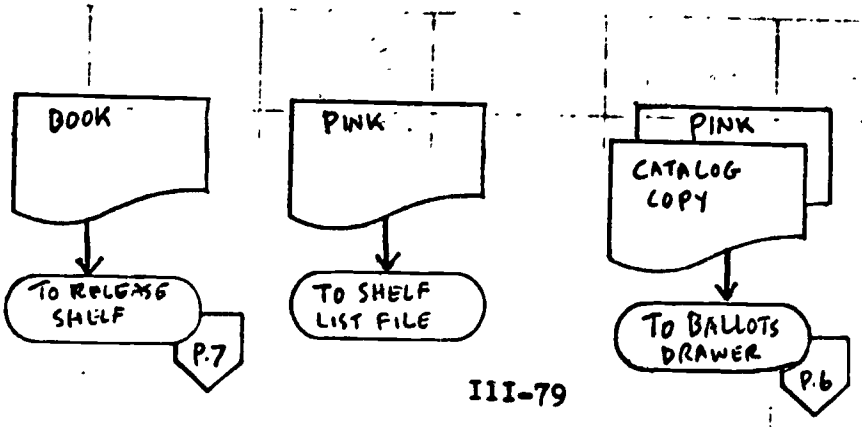
  subject headings - verify in the Subject Authority File (based on LC subject headings; make the necessary see references.

  added entries for joint authors, etc. -
  verify the names in NUC and in the Official Catalog; make the necessary see references.

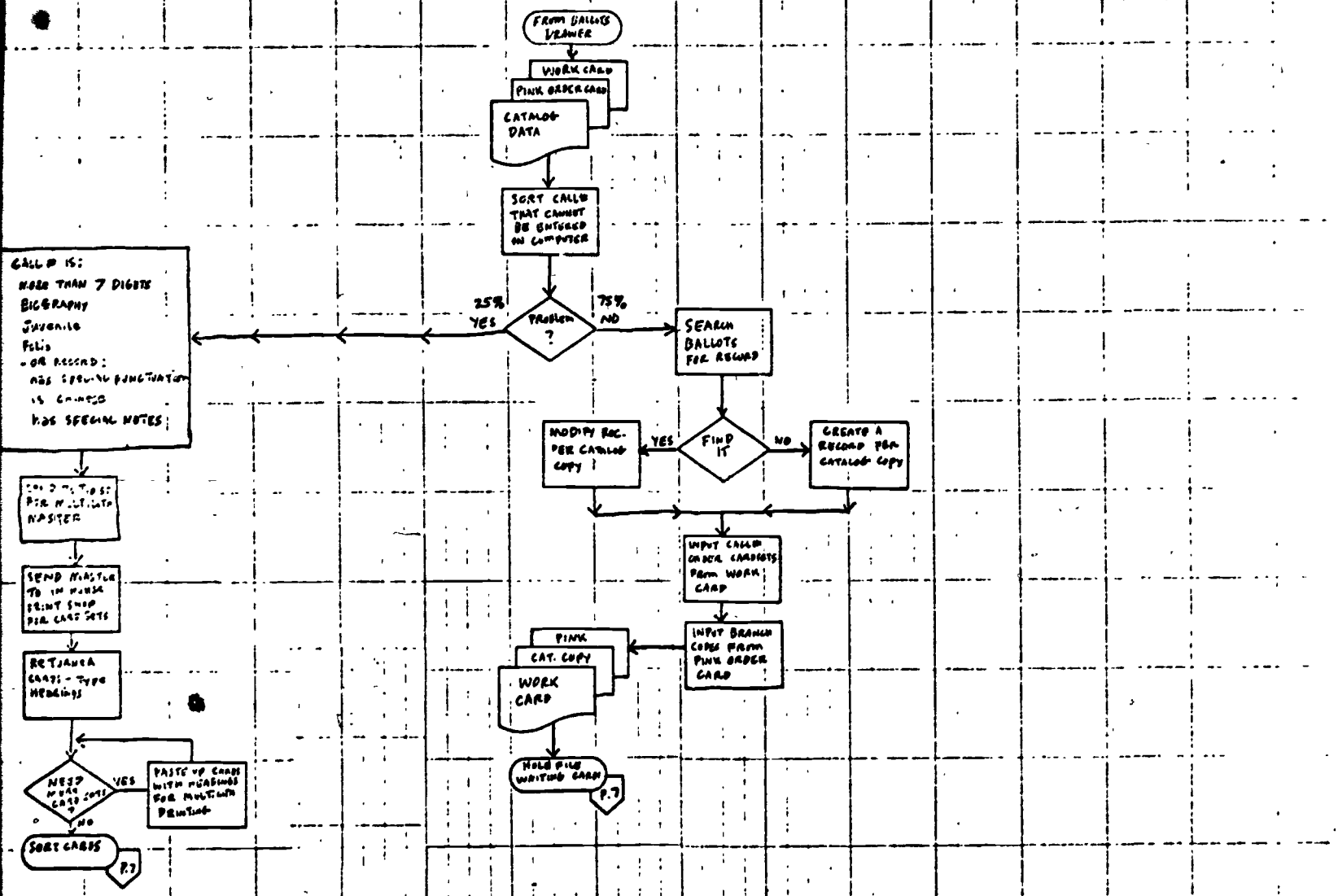
  trace the series added entry when necessary.

Assign classification number, using mostly the 18th edition of Dewey and consulting our own shelflist.

'Shelflist' the call number to avoid dulpication.

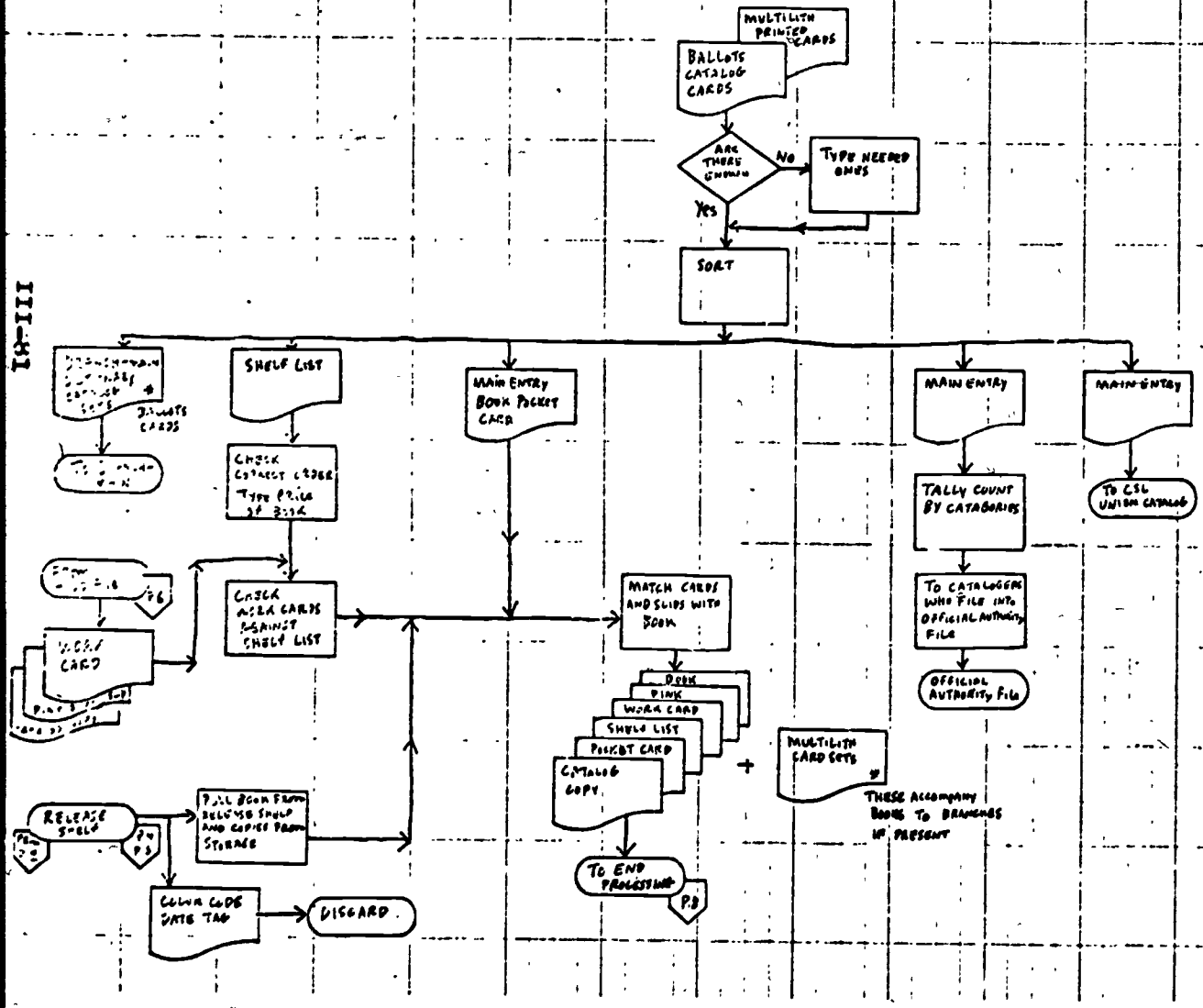


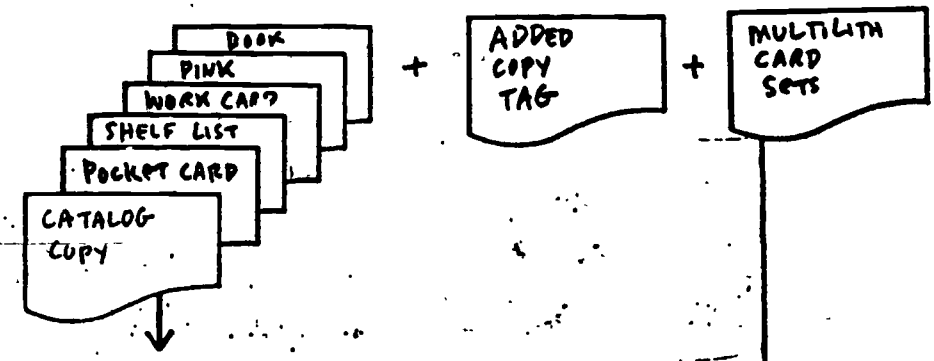
BALLOTS ENTRY — ORDER CARD SETS



SFPL TECH. PROC. DEC 76

RECEIVE CARD SETS FROM BALLOTS — MULTILITH





ON PROCESSING LINE:

CALL NUMBER ENTERED ON VERSO OF TITLE-PAGE. ~~of reference books only~~

POCKET OR REFERENCE PLATE PASTED.

TOP EDGES STAMPED "S. F. PUBLIC LIBRARY".

SPINE NUMBERED
- -BY HAND, IF SINGLE COPIES
- -BY ELECTRIC LETTERING MACHINE, IF SETS.
- -SPINE LABEL PRINTING MACHINE

PLASTIKLEER JACKET APPLIED.

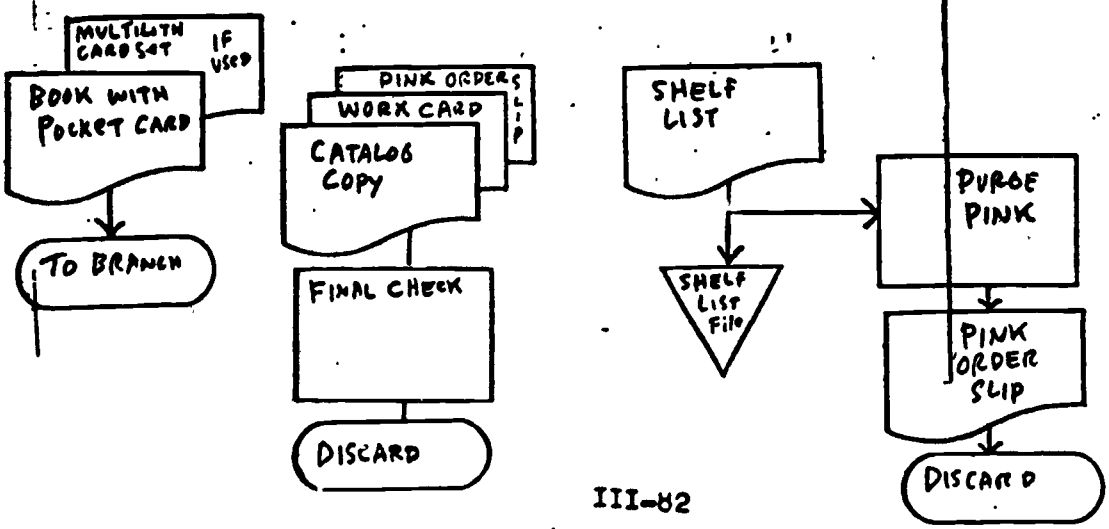
SHELF-LIST ENTRIES MADE
- -FOR MAIN BOOKS, COPY ID NO. TYPED
- -FOR BRANCH " , HOLDINGS STAMPED ON VERSO.

BRANCH NAME STAMPED ON POCKET, AND CARD SET INSERTED.

MAIN BOOKS STAMPED WITH SFPL OWNERSHIP AND DEPARTMENT STAMP.

BOOKS COUNTED AND SORTED FOR DELIVERY TO MAIN DEPARTMENTS AND BRANCHES.

SHELF-LISTS RETURNED FOR FILING.



SFPL TECH. PROC.
END PROCESSING
DEC 76

APPENDIX IV C

Santa Clara County Technical Processing

S.C.Co. processes books and materials for 14 branches and for Mountain View. The present rate for all materials processed averages 855 titles/month - 5500 volumes/mo.

There is existing computer support for the library by the county data processing facility. The computer services interface with the library acquisitions function and with the production of the library book catalog and supplements.

For acquisitions, the county D.P. maintains an on-line file for library use. This file can be accessed via computer terminals within the library. The file is used as an on-line IPF. Orders for new books, etc. are entered on the terminal by library staff. The new orders are added to the file and in addition the county D.P. produces three items. 1. a magnetic tape of new orders for Baker Taylor co. . The tape is sent to B & T by the county D.P. 2. printed order slips for all other vendors. The order slips are given to library staff for manual handling. 3. Printed order cards for all items ordered. The order cards are sent to library receiving to be matched with the items as they arrive.

The IPF is updated via two methods. 1. Baker Taylor sends a magnetic tape reply of orders that it will fill. This tape is used to update the records on the IPF. 2. Replies from other vendors are entered on the terminal by library staff which also updates the IPF.

Microfiche hard copy of the contents of the IPF is provided weekly.

As part of the technical processing work flow the acquisitions computer support produces spine labels and book pocket labels.

The acquisition and book catalog computer services are separate. IPF records are generated to support order and receipt. Catalog records for the book catalog are generated through an alternate process.

Catalog records are searched through BALLOTS and NUC. Catalog copy for all found or original cataloging except five catagories are entered on the BALLOTS terminal. BALLOTS stores those records on-line as a catalog data file for Santa Clara, and produces a tape of the new records which is sent to the county D.P.

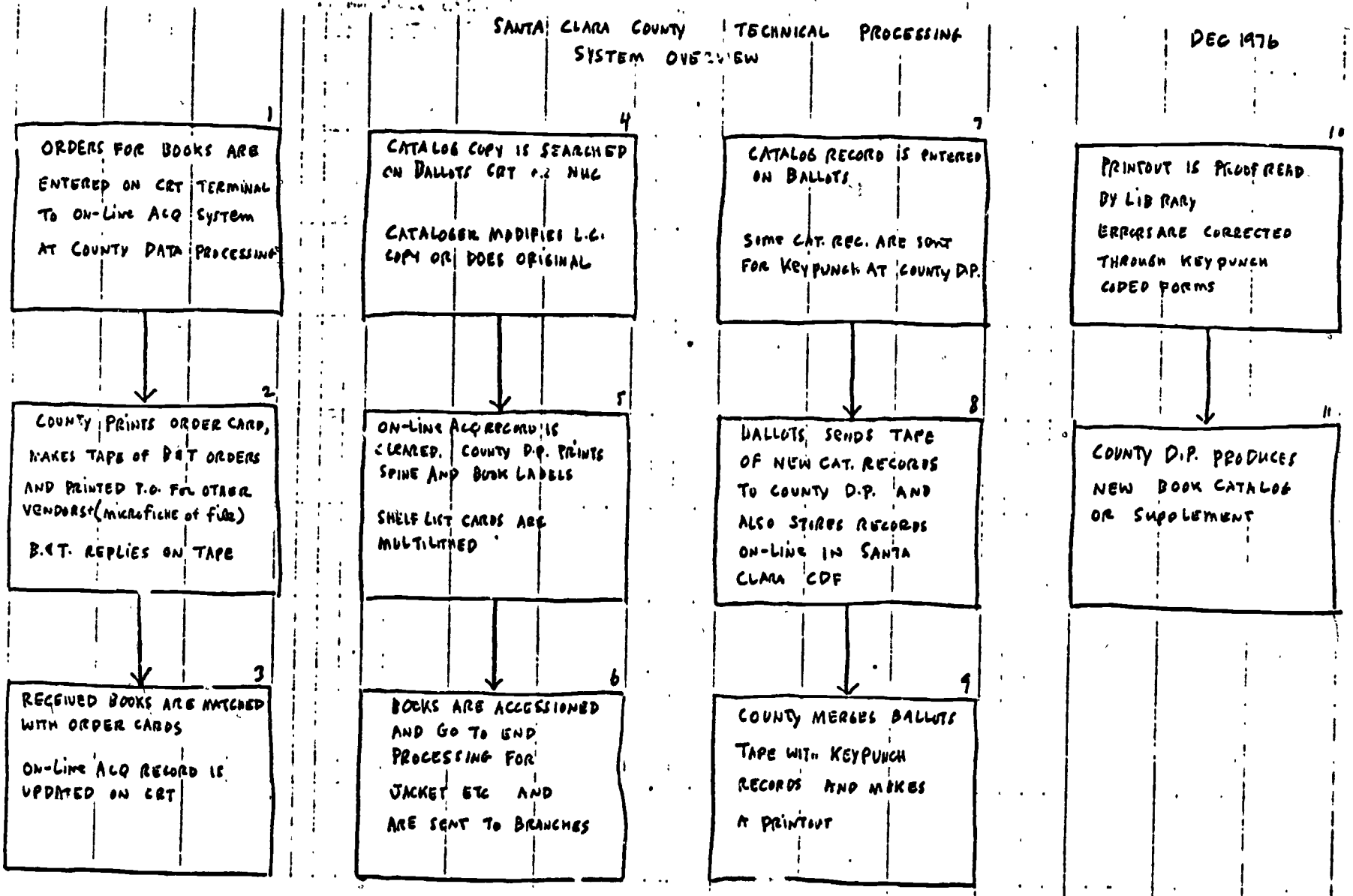
The five catagories of records not entered on BALLOTS are : 1. Phonodiscs, 2. Cross references, 3. retrospective cataloging (a record found in the card catalog but now being added to the book catalog.) , 4. Corrections to records in the book catalog, 5. Any updating of book catalog records (withdraws, etc.)

These records are keypunched by the county D.P. from forms prepared by library staff.

The county D.P. combines the BALLOTS tape and the keypunched data for production of the book catalog supplement (every 2 months) and the cumulated new book catalog (yearly).

SANTA CLARA COUNTY TECHNICAL PROCESSING SYSTEM OVERVIEW

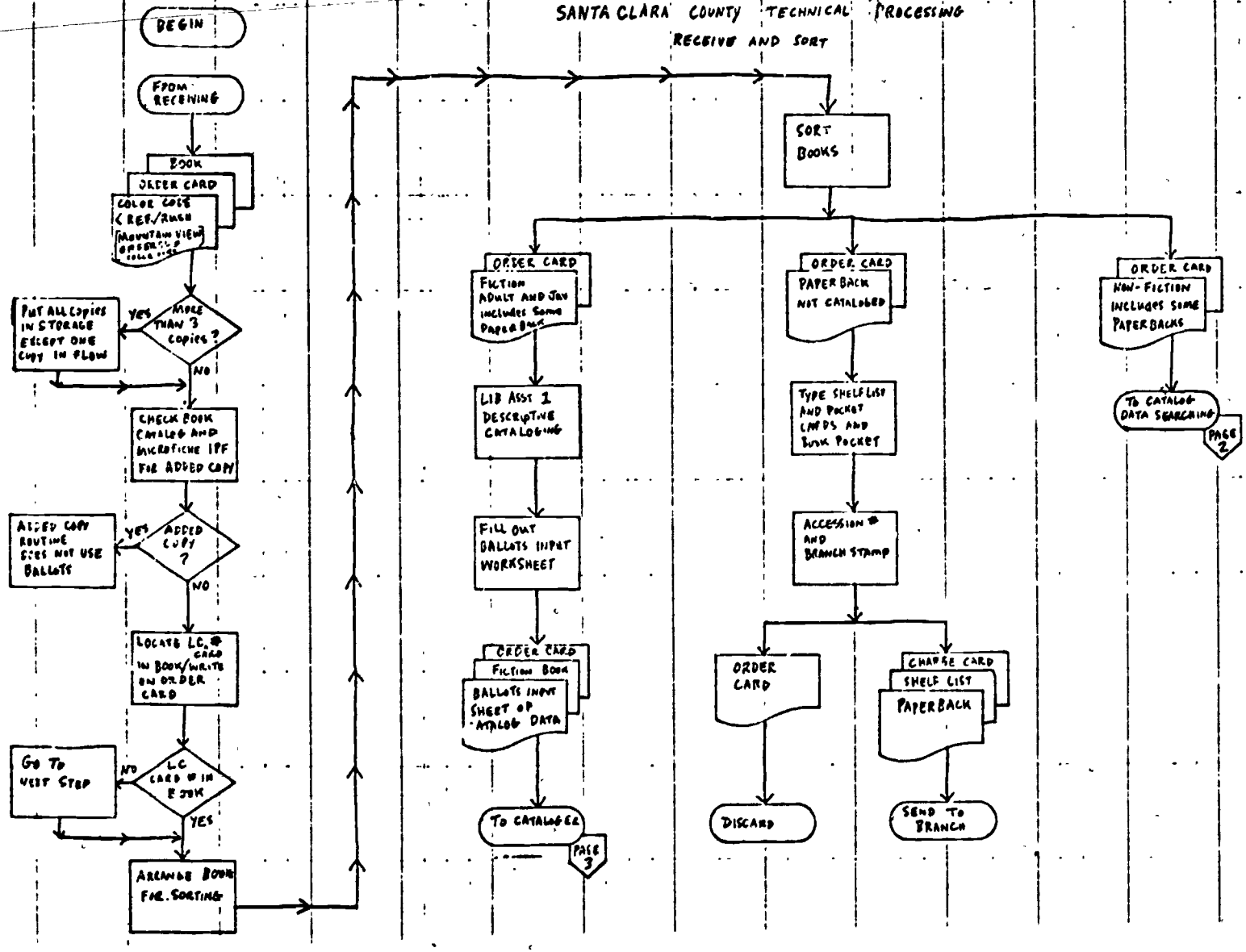
DEC 1976



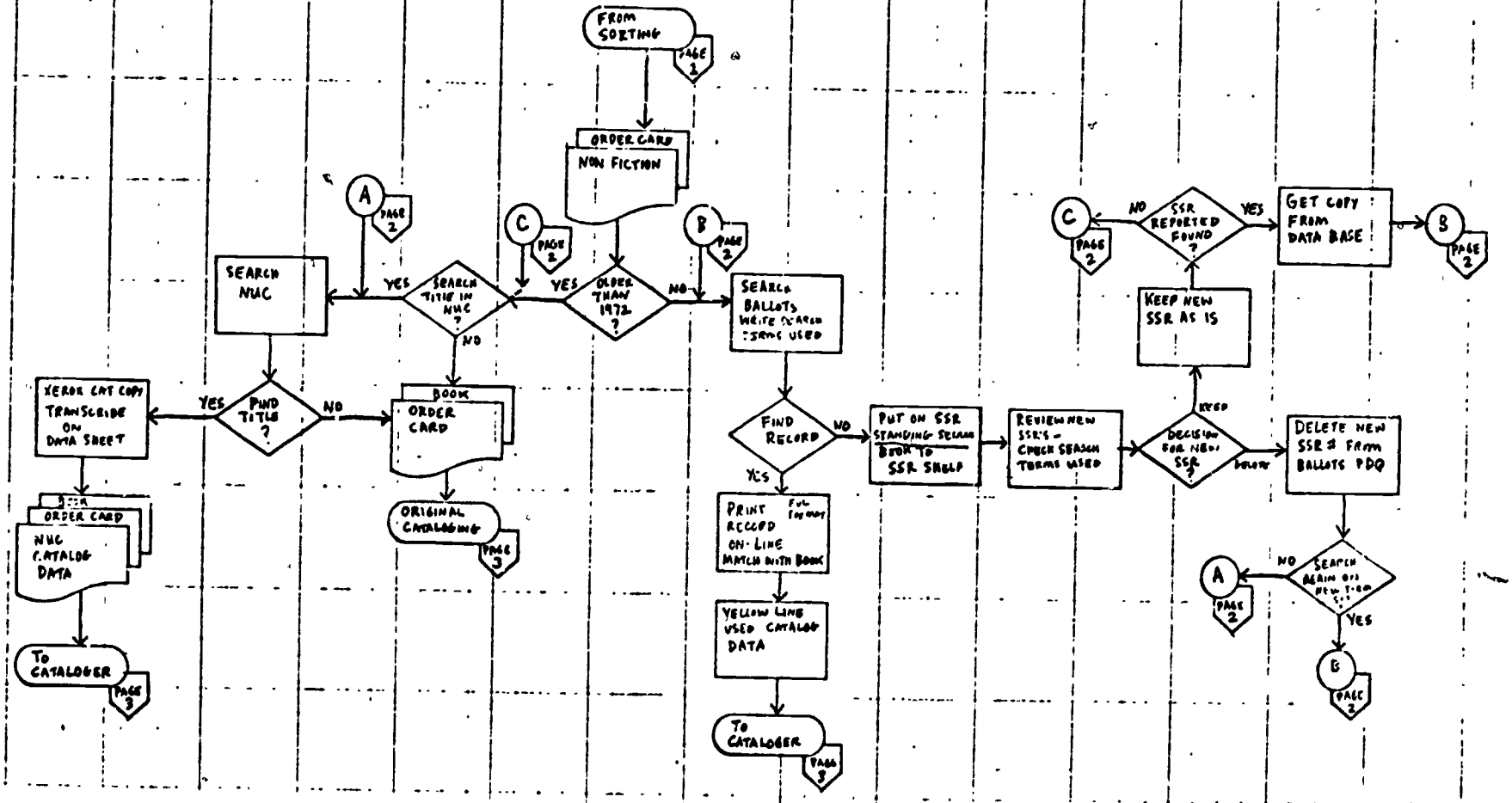
FC-4A

SANTA CLARA COUNTY TECHNICAL PROCESSING

RECEIVE AND SORT

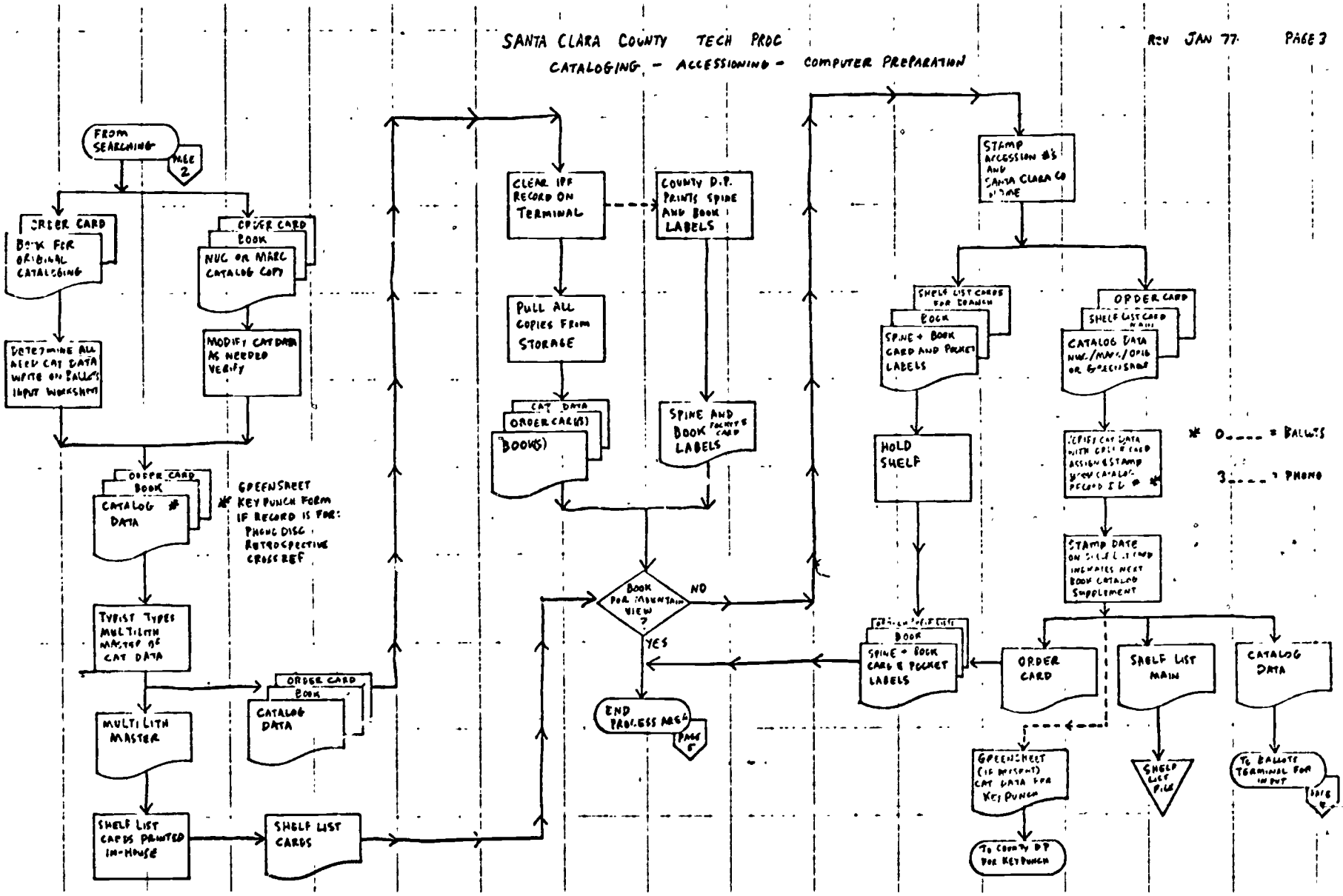


SANTA CLARA CO. TECH. PROC.
CATALOG DATA SEARCHING

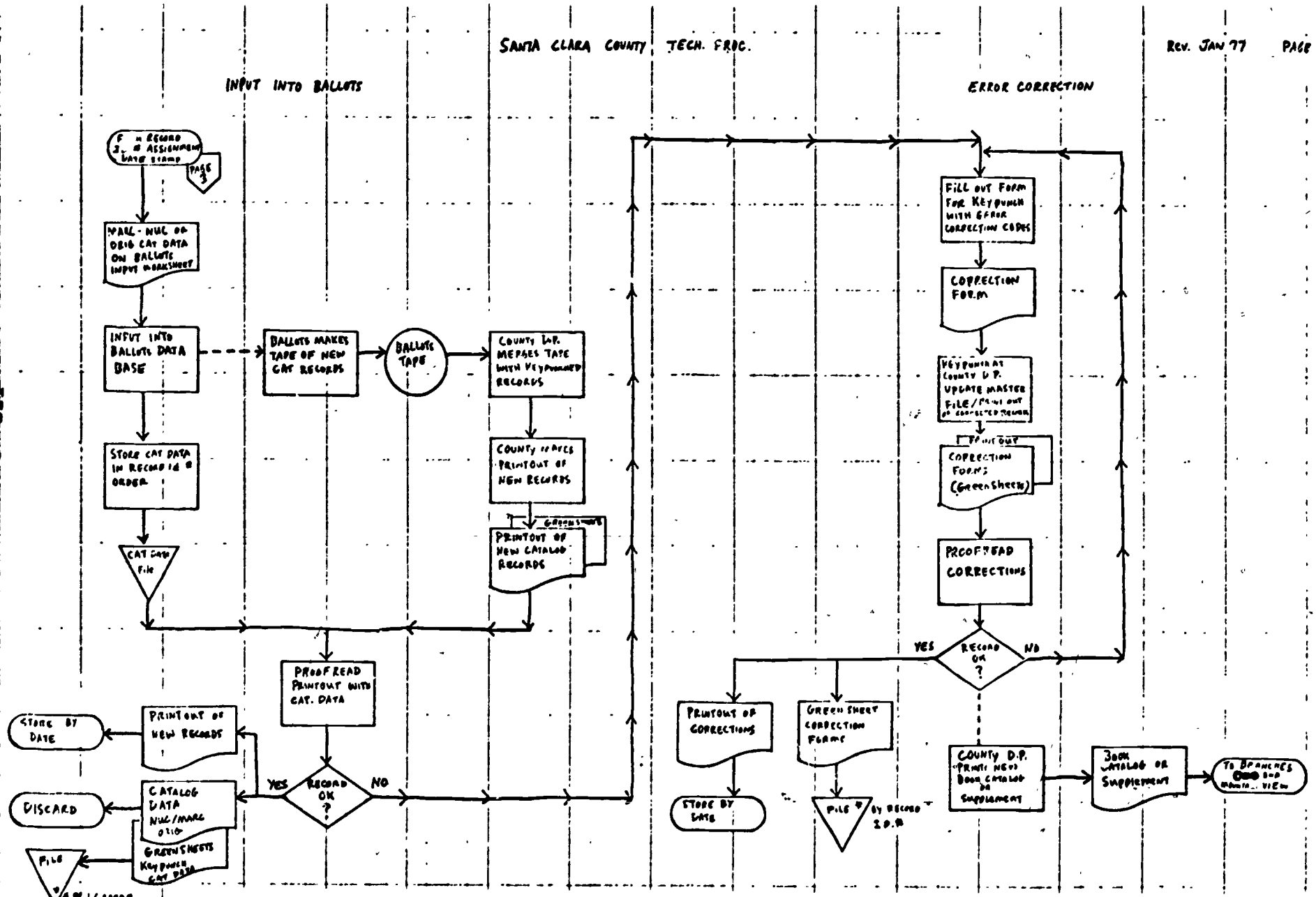


168

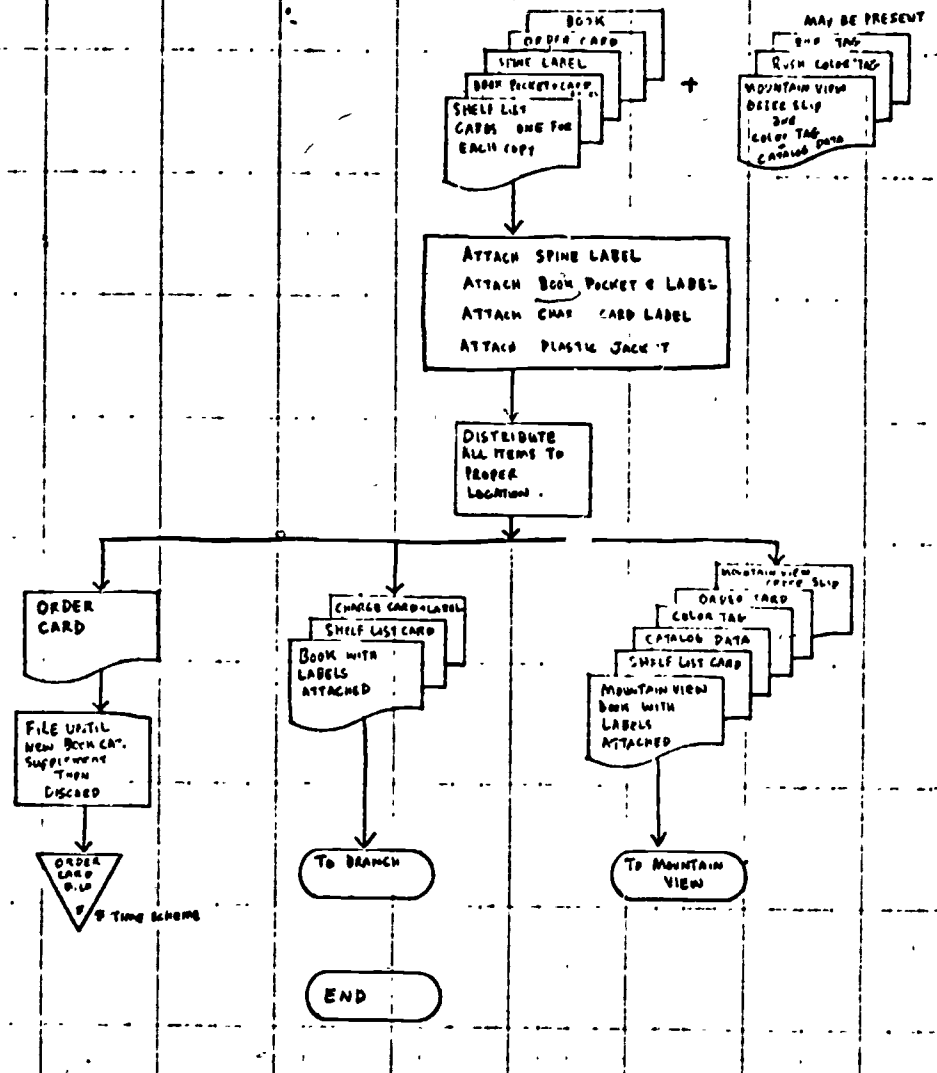
CATALOGING - ACCESSIONING - COMPUTER PREPARATION



III-88


INPUT INTO BALLOTS
ERROR CORRECTION
MARC - NUC OR OBIB CAT DATA ON BALLOTS INPUT WORKSHEET
INPUT INTO BALLOTS DATA BASE
STORE CAT DATA IN RECORD ID # ORDER
CAT DATA FILE
BALLOTS MAKES TAPE OF NEW CAT RECORDS
BALLOTS TAPE
COUNTY LIB. MERGES TAPE WITH KEYPUNCHED RECORDS
COUNTY REVIEWS PRINTOUT OF NEW RECORDS
PRINTOUT OF NEW CATALOG RECORDS
PROOFREAD PRINTOUT WITH CAT. DATA
RECORD OK ?
YES
NO
PRINTOUT OF NEW RECORDS
STORE BY DATE
CATALOG DATA NUC/MARC OCLC
DISCARD
GREENSHEETS Keypunch CAT DATA
FILE
FILL OUT FORM FOR KEYPUNCH WITH ERROR CORRECTION CODES
CORRECTION FORM
KEYPUNCH AT COUNTY D.P. UPDATE MASTER FILE / PRINT OUT OF CORRECTED RECORDS
PRINTOUT CORRECTION FORMS (Green Sheets)
PROOFREAD CORRECTIONS
RECORD OK ?
YES
NO
PRINTOUT OF CORRECTIONS
GREEN SHEET CORRECTION FORMS
STORE BY DATE
FILE BY RECORD I.D.#
COUNTY D.P. PRINTS NEW BOOK CATALOG OR SUPPLEMENT
BOOK CATALOG OR SUPPLEMENT
TO BRANCHES AND MAIN... VIEW

SANTA CLARA COUNTY TECH. PROC
END PROCESSING



APPENDIX IV D

SUTTER COUNTY FREE LIBRARY

TECHNICAL PROCESSING

Sutter Co. processes books for its 6 stations at an average rate of 413 titles/mo. - 495 volumes/mo.

Sutter Co. has placed its BALLOTS terminal in the central public area of the library next to the reference desk. The terminal has been used on many occasions to prepare a special bibliography from the BALLOTS data base as an added patron reference service.

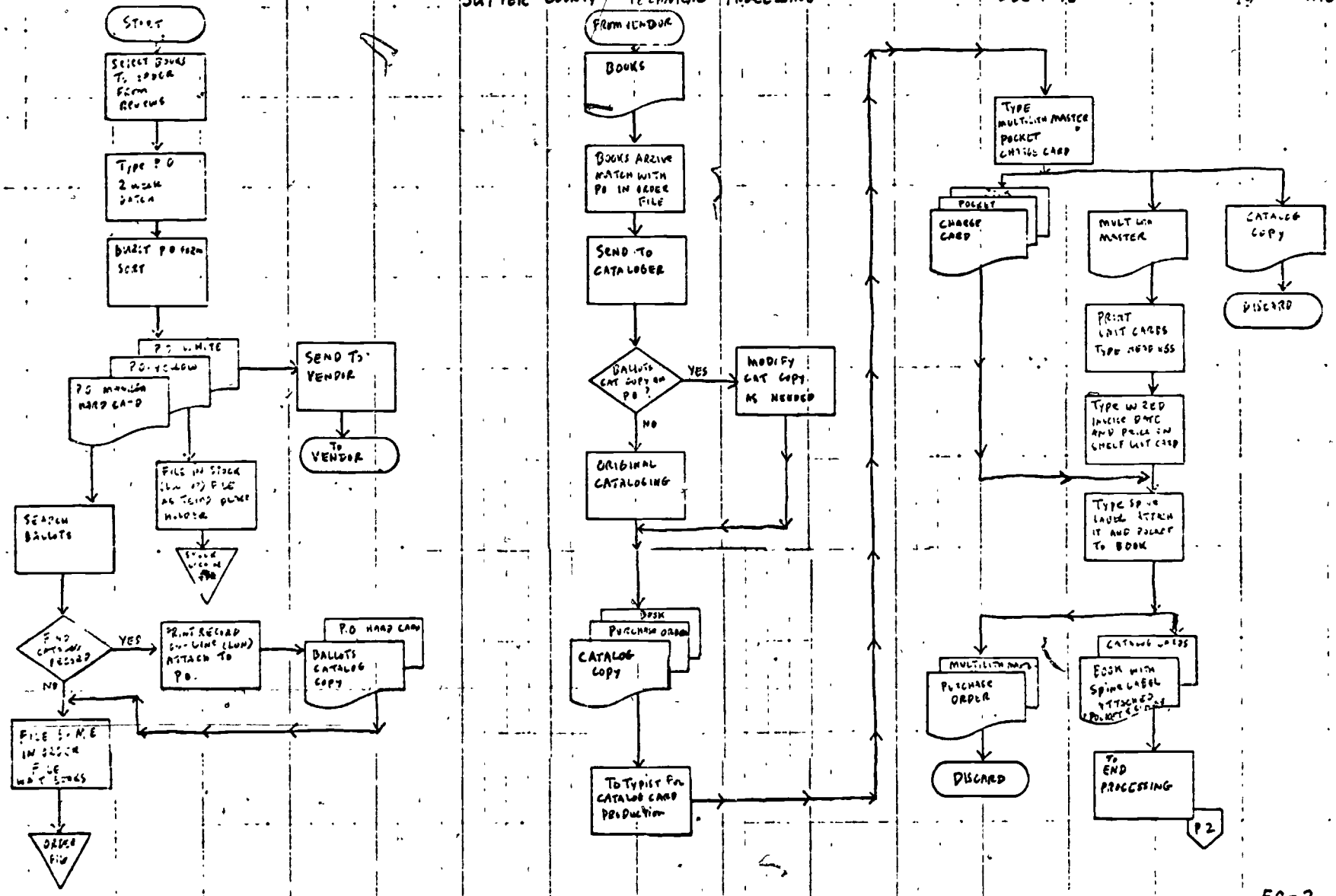
The BALLOTS system has also been used to interface with the cataloging needs of Sutter co. New titles are searched and found records are printed on-line for cataloger review.

Sutter's technical processing is done by manual methods using a compact multilith printer for card set reproduction in house.

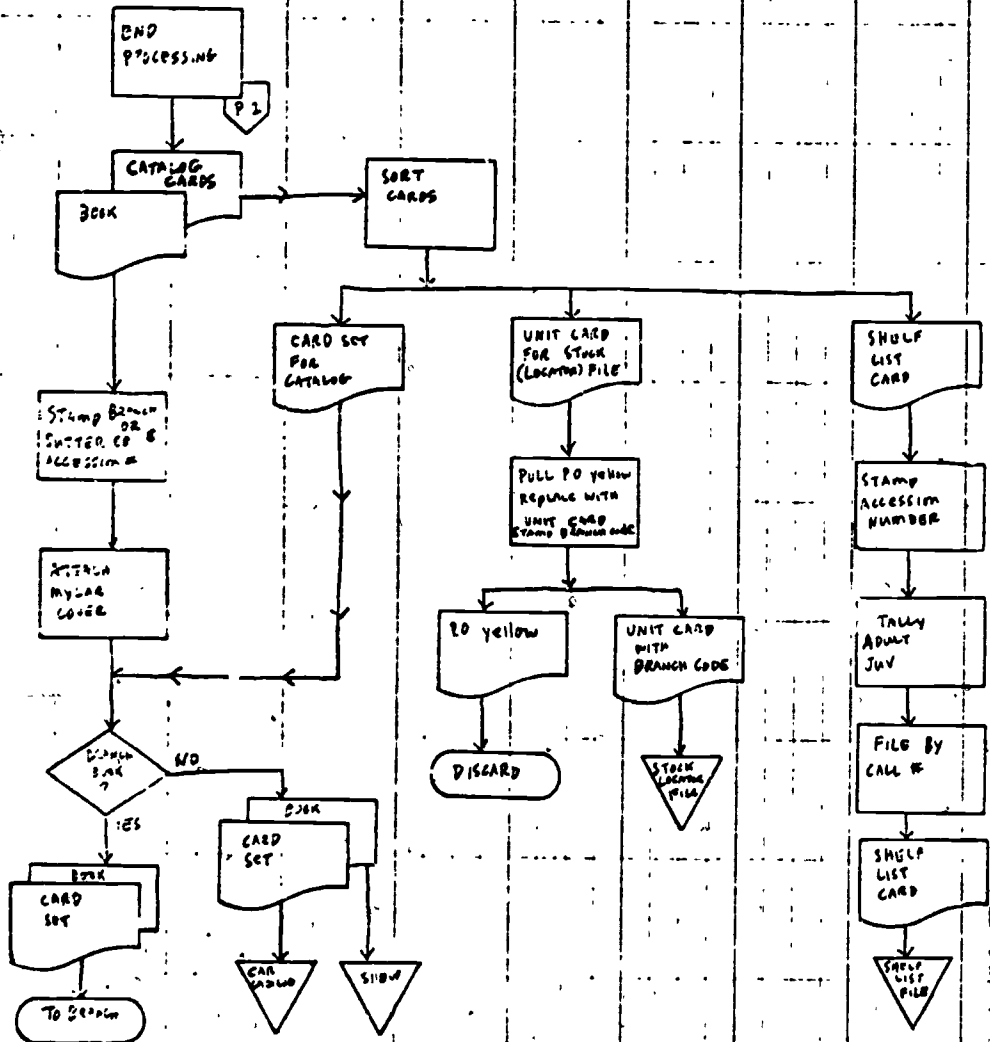
Staff responce to BALLOTS is enthusiastic, and management is planning to incorporate many of the new library computer services in the future for greater patron service.

SUTTER COUNTY / TECHNICAL PROCESSING

DEC 1976



FC-3


END PROCESSING
P 1
CATALOG CARDS
BOOK
SORT CARDS
CARD SET FOR CATALOG
UNIT CARD FOR STOCK (LOCATION) FILE
SHELF LIST CARD
STAMP BRANCH OR SUTTER CO & ACCESSION #
ATTACH MYLAR COVER
PULL PO yellow REPLACE WITH UNIT CARD STAMP BRANCH CODE
STAMP ACCESSION NUMBER
PO yellow
UNIT CARD WITH BRANCH CODE
TALLY ADULT JUV
DISCARD
STOCK LOCATION FILE
FILE BY CALL #
BRANCH BOOK ?
NO
YES
BOOK
CARD SET
BOOK
CARD SET
SHELF LIST CARD
CARD CATALOG
SHELF LIST FILE
TO BRANCH

III-93

APPENDIX V

DATA COLLECTION FORMS USED BY THE STUDY

1. Sorting books for search for catalog copy
2. Searching on computer terminal
3. Standing search
4. Cataloging
5. Data entry on computer terminal
6. Proofreading
7. System related data
8. Other catalog copy search; Cuttering

1 **1** SORTING

2 LIB. I.D. A 3-4 B 5-6 C 7-9 D 10-12 E 13-15

DATE 16-19 M M D D	PREP TIME 20-21 MIN	BALLOTS 22-24	NUC 25-27	L.C. PROOF 28-30	FICT. 31-33	JUV. 34-36	ORIG. 37-39	F 40-42	G 43-45	H 46-48	SORT TIME 49-51 HR MIN	J 52-53

III-95

SORTING

LIB I.D.

A

B

C

D

E

DATE EXAMPLE FEB 9 2 0 9
M M D D

PREP TIME : TIME IT TOOK TO GET READY FOR THE TASK

TALLY COUNTS; THE NUMBER OF BOOKS SORTED TO EACH CATEGORY

BALLOTS

NUC

LC PROOF

FICT

JUV

ORIG

F

G

H

SORT TIME: TIME IT TOOK TO SORT THE BOOKS

J

1
2 TERMINAL SEARCHING

2
LIB. I.D. _____

A 3-4 B 5- C 7-9 D 10-12 E 13-15

DATE	START CLOCK TIME	# OF LONG SEARCH	TITLES SEARCHD	LCCN NUMBER SEARCHS	FOUND MARC	S/M CDF	OTH. CDF	IPF	SSR	NOT FOUND	STOP CLOCK	SYSTEM CRASH	PANICS	F	G
16-19	20-23	24-25	26-28	29-31	32-33	34-35	36-37	38-39	40-41	42-43	44-47	48	49	51-52	53-54
M M D D	HR MIN										HR MIN	C	P		

L6-III

AUTHOR TITLE 55-57

F2A.R4

TERMINAL SEARCHING

Library I.D.#

A

B

C

D

E. Form accession number

Date: Todays date May 15 | 0 5 | 1 5 | (M M D D)

Start clock time; time of day session starts

# of long searches; number of times computer responds long search

Titles searched; number of titles searched during session

LCCN searches; number of LC Card Number searches

Author Title; number of Author/Title word searches

Found Marc; number of records found in MARC

S / M CDF; number of records found in Stanford CDF file

OTH. CDF: number of records found in other CDF files

IPF; number of records found in the IPF file

SSR; number of titles placed on Standing Search

Not Found; number of titles not found in any file

Stop Clock; Time of day at end of session

C; Tally 1 if system crashes during session

P; Tally 1 for each panic interrupt during session

F

G

1

3 STANDING SEARCH

2 LIB. I.D.

A	B	C	D	E
3-4	5-6	7-9	10-12	13-15

DATE	PREP TIME	TIME MATCH SSR REPT.	PURGED	FOUND	CLOCK TIME	TIME RETRIEVE ELAPSED	C
16-19	20-21	22-24	25-27	28-30	31-34	35-37	38
M M D D	MIN.	HR MIN.			HR. MIN.	HR. MIN.	

66-III

STANDING SEARCH

LIB I.D.

A

B

C

D

E

PREP TIME: TIME IT TOOK TO GET READY TO MATCH BALLOTS SSR REPORT WITH SSR BOOKS (GET SLIPS ET

MATCH SSR REPT : TIME IT TOOK TO MATCH BALLOTS SSR REPORT WITH SSR BOOKS

RETRIEVE ELAPSED TIME : TERMINAL TIME TO FIND AND PRINT FOUND SSR RECORDS

TALLY COUNTS:

PURGED: NUMBER OF SSR'S PURGED FROM YOUR SSR FILE

FOUND : NUMBER OF SSR'S FOUND

C: TALLY 1 IF SYSTEM CRASHES WHILE RETRIEVAL

4 CATALOGING

2 LIB. I.D.

A 3-4 | B 5-6 | C 7-9 | D 10-12 | E 13-15

1.CAT 1.ADU 1.N.F. ELAPSED TIME
2.REV 2.JUV 2.FICT HR MIN

16 | 17 | 18 | 19-22 | MARC 23-24 | S/M CDF 25-26 | OTH. CDF 27-28 | IPF 29-30 | LC PROOF 31-32 | NUC 33-34 | CIP 35-36 | ORIG 37-38 | G 39-40 | H 41-42 | 43-46 | 47-48 | J 49

III-101

F-4A
Rev 2

CATALOGING

IIB I.D.

A

B

C

D

E

1. CAT : Put a 1 in the box if cataloging

2. REV : Put a 2 in the box if revising cataloging

1. ADU : Put a 1 in the box if the book(s) is/are Adult

2. JUV : Put a 2 in the box if the book(s) is/are Juvenile

1. N.F. : Put a 1 in the box if the item is non-fiction

2. FICT : Put a 2 in the box if the item is fiction

NOTE: This is a test of cataloging time with computer produced copy vrs other sources of catalog copy.

Please have only one type of catalog copy with a time notation, on one line.

For this study 30 samples of each category are needed. Please do not exceed 5 samples during one time period.

ELAPSED TIME: TIME IT TOOK TO DO THE NUMBER TALLIED

TYPE OF CATALOG COPY; Use only one type of copy per line, this is a test of the time difference cataloging with different types of copy

MARC : a record from MARC

S/U CDF : Any Stanford CDF record

OTH CDF : Any record from a SHARED CATALOGING CDF belonging to an outside of Stanford library.

IPF : INF file record

IC PROOF; IC Proof slip

NUC/CIP : Records from these sources

Orig: Original cataloging

G:

H:

5 TERMINAL INPUT

LIB. I.D.

A	B	C	D	E
3-4	5-6	7-9	10-12	13-15

DATE	START CLOCK TIME	MOD REC	STOP CLOCK	C	P	START CLOCK	CREATES	STOP CLOCK	C	P	J
16-19	20-23	53-54	55-58	59	60	63-66	69-70	71-74	75	76	77
M M D D	HR MIN		HR MIN			HR MIN		HR MIN			

TALLY MODIFIED RECORDS

TALLY CREATES

III-103

FSA R.3

TERMINAL INPUT

Library I.D. #

A

B

C

D

E accession number of form

Date; todays date

Start clock time; time of day at start of session

Mod. Rec.; number of modified records input

Stop Clock; Time of day at end of session

C; tally 1 if system crashes during session

P; tally number of panic interrupts during session

Start clock; time of day at start of session

Creates; number of created new records during session

Stop Clock; time of day at endof session

C; tally 1 if system crashes during session

P; tally number of panic interrupts during session

J;

6 PROOFREADING

LIB. I.D.

A	B	C	D	E
3-4	5-6	7-9	10-12	13-15

DATE	PREP TIME	NUMBER RECORDS	NUMBER ERRORS	READNG TIME	F	G	H	J	COLLECT REVIEW TIME	K	L	M	N
16-19	20-22	23-25	26-28	29-31	32-33	34-35	36-37	38	39-41	42-43	44-46	47-49	50
M M D D	HR MIN			HR MIN					HR MIN				

III-105

F6A

PROOFREADING

Library I.D. #

A

B

C

D

E. accession number of forms

Date; todays date

Prep Time; amount of time to prepare for proofreading

Number Records; number of records proofread

Number Errors; number of errors found during proofreading

Reading time; elapsed time of proofreading session

F

G

H

J; Job classification

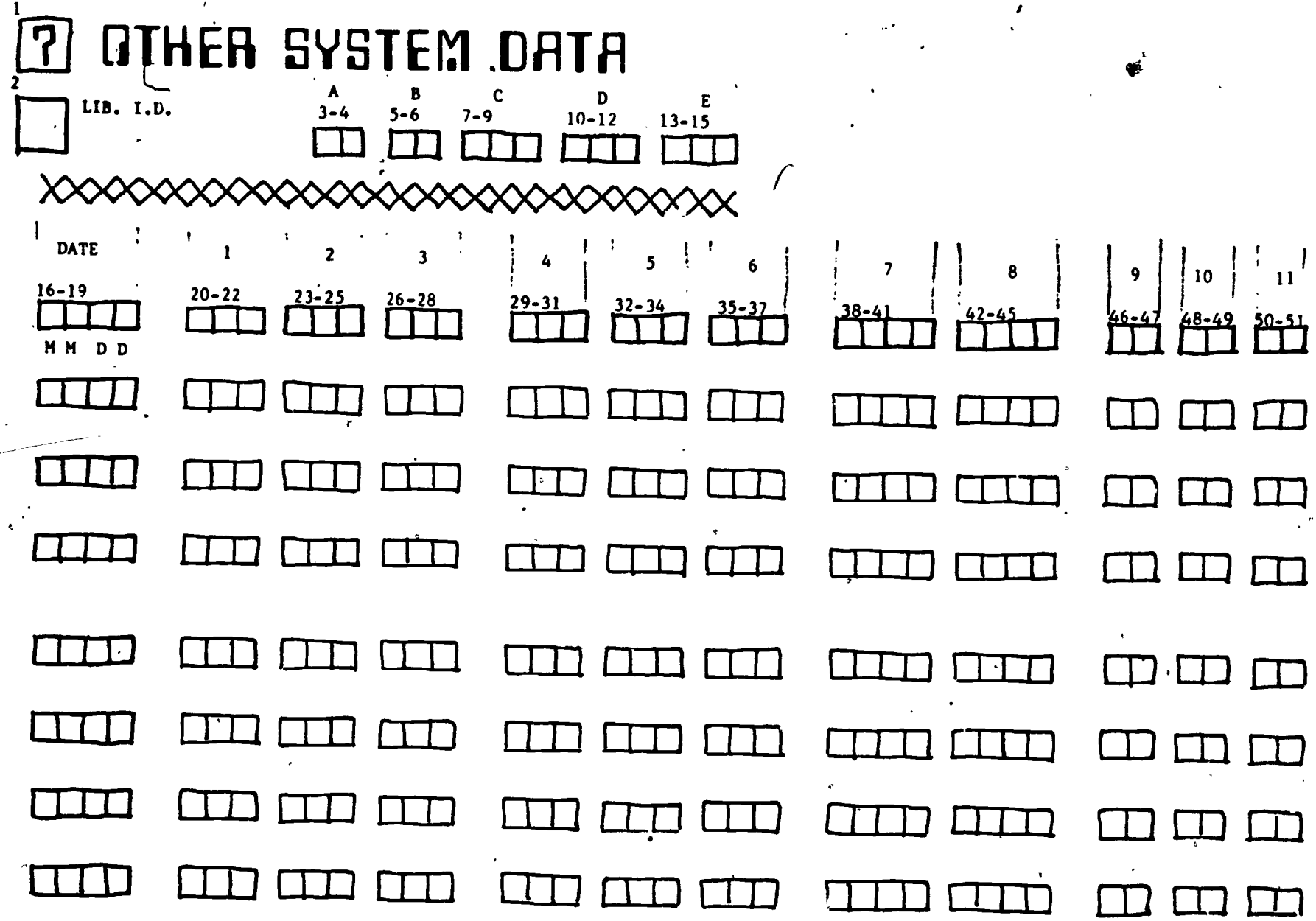
Collect Review Time; elapsed time to collect and review printout from staff

K

L

M

N


1
? OTHER SYSTEM DATA
2
LIB. I.D.
A 3-4
B 5-6
C 7-9
D 10-12
E 13-15
DATE
M M D D
1 16-19
2 20-22
3 23-25
4 26-28
5 29-31
6 32-34
7 35-37
8 38-41
9 42-45
10 46-47
11 48-49
50-51

III-107

OTHER SYSTEM DATA

LIB I.D.

A: JOB CLASS CODE

B

C

D

E

DATE EXAMPLE MAY 1 [5][0][1]
M M D D

1. TIME PROBLEM SOLVING IN LIBRARY
2. CONTACT BALLOTS TIME
3. STAFF MEETING TIME

   TRAINING TIME
4. DIRECT INSTRUCTION
5. OBSERVATION
6. ON CALL
7.
8.
9.
10.
11.

1 **8 SEARCHING : CUTTER**

2 LIB. I.D.

A	B	C	D	E
3-4	5-6	7-9	10-12	13-15

DATE	L.C. PROOF FOUND	NOT FOUND	SEARCH TIME	NUC FOUND	NOT FOUND	SEARCH TIME	CUTTER TALLY DONE	CUTTER TIME	F	G	H
16-19	20-22	23-25	26-28	29-31	32-34	35-37	38-40	41-43	44-46	47-49	50
M M D D			HR MIN			HR MIN		HR MIN			

III-109

201

F.9A

SEARCHING : CUTTER

Library I.D. #

A

B

C

D

E; form accession number

Date; todays date

LC Proof found; number of LC proof copy found

Not Found; number of titles searched in the LC Proof file which did not have catalog copy found

Search time; elapsed time searching all found and not found catalog copy in LC Proof file

NUC Found; Number of titles searched in NUC which located catalog copy

NOT Found; number of tit les searched in NUC which did not have catalog copy found

search time; elapsed time searching above titles in NUC

Cutter Tally done; tally total of the number of titles processed by the cutter section

Cutter time; elapsed time to process above titles

F

G

H

BALLOTS CENTER

APPENDIX VI

SERVICES, RATES, AND USER DOCUMENTATION

Fall 1976

USING BALLOTS

BALLOTS ("Bibliographic Automation of Large Library Operations using a Time-sharing System") is a library services system that was originally developed to support technical processing--both acquisitions and cataloging--in the Stanford University Libraries. It has been in production use at Stanford since fall 1972. In 1975 the system was expanded to permit searching and cataloging by other libraries; the first BALLOTS "network" libraries using these services were seven California public libraries, known as PLAN (the "Public Library Automation Network"). During 1975-76, other institutions in California and across the country have also begun using BALLOTS. At the BALLOTS Center, located on the Stanford University campus, development and implementation continue in order to expand services further and to make BALLOTS more useful and more widely available.

The BALLOTS data base consists of Library of Congress MARC (Machine-readable Cataloging) records, Stanford University Libraries' cataloging, reference, and acquisitions (in process) records, and cataloging records of institutions participating in the BALLOTS shared cataloging service (see below). (Initially these will include the records of the University of California at Berkeley Main Library, the Los Angeles Public Library, the Marin County Free Library, the Santa Clara County Library, and one or two others.) In mid-September 1976 this data base contained nearly 700,000 records.

A BALLOTS user can retrieve any record in this data base on-line at a video or typewriter computer terminal by searching for it through a variety of indexes; these are: personal name, corporate/conference name, title word, L. C. card number, subject heading, call number, and unique BALLOTS record identification number. Using a simple but flexible search language that includes the terms "and", "or", and "not", the user can combine indexes in a search, perhaps requesting a record by author's full

name and some words from the title, one of the most common index combinations.

The information in records found can be viewed in a variety of formats, like the "Short Data Display", "Long Data Display" (which looks like a catalog card), or "Cataloged Holdings Display" format--there are eight possible display formats, depending on what a user wants from a record.

If a user searches the file of MARC records and finds no record to match the search inquiry, the user can request the system to store this search inquiry in a special file of "standing searches", from which it will be tried again against the BALLOTS MARC file once a month until a record to match it is found or a specified number of months has passed. At present, an average of three thousand new MARC records are added to the BALLOTS MARC file every week; thus, each time a standing search request is tried against the file, some twelve thousand additional records are there to be searched. The user is notified monthly of records found in the BALLOTS MARC file from the user's standing searches as well as of standing searches purged because the time specified for them has elapsed.

Once a user has found a desired record in the BALLOTS data base, the user can make alterations to an on-line copy of it at the terminal, using one or more input formats, like the "Bibliographic Input" or the "Holdings Input" format. If a record sought is not in the data base, the user can create a new record, again through the input formats. Such activity, like searching and record modification, is performed by means of standardized commands to the system plus the user's particular information entered on the appropriate formats.

The user can request that any bibliographic record found in the data base be printed by the computer on a form called a "catalog worksheet", in a format resembling the on-line input formats. Such worksheets are printed at the BALLOTS Center and delivered to the user on an appropriate schedule. The user can then verify and edit the cataloging data on the worksheet and use it as an aid in entering catalog records at the terminal.

The user has several options as to what becomes of the records modified and created, depending on arrangements made with the BALLOTS Center. These records can be added to the on-line data base, for possible future maintenance by the user and for searching by all users of BALLOTS. This use of the system is called "shared cataloging"; this is an important new service of BALLOTS, through which the records of an increasing number of participating libraries will become accessible to all BALLOTS users.

At the same time, the user can receive copies of these records in MARC II communications format on magnetic tape, for use in an in-house processing system or by a vendor of computer-produced book catalogs, microfiche, etc. The user can also arrange to receive computer-produced, pre-sorted catalog

cards from the records, printed at the BALLOTS Center using the American Library Association approved print train. The user fills out a "catalog card profile" questionnaire to provide the BALLOTS system with the information necessary to format these catalog cards as the user desires.

The user can thus add records to the data base and receive tapes, or cards, or both. Finally, the user can elect not to add records to the BALLOTS data base, but only to produce tapes and/or cards. This use of the system is called "output cataloging".

The BALLOTS system can be used in two modes. (1) "Full-face transmission" requires a specially programmed CRT (cathode ray tube) terminal with a television-like screen and a typewriter-like keyboard; the system transmits data to this terminal and receives information keyed in at 120 characters per second (cps) or more, 24 lines at a time. In addition to permitting faster transmission of data, the BALLOTS CRT terminal used in full-face mode has a keyboard and internal program tailored to the system's use. This terminal is normally used over leased communication lines to the Stanford IBM 370 model 168 computer on which BALLOTS runs. (2) "Line-by-line transmission" is possible with most typewriter, CRT, and CRT-printer terminals; data is transmitted usually at 30 cps, one line at a time. Any of the terminals used in line-by-line mode can be connected with the computer by direct telephone dial-up or through the TYMNET (TYMSHARE Corporation) communications network, which has connecting points in 71 cities in the United states plus four cities in Canada.

The services described above are offered through a number of "functions"; the user specifies the function or functions to be used at the time an account is opened with the BALLOTS Center. Briefly, the division is as follows: INQUIRY function--search and display access to the BALLOTS data base; SEARCH function--search and display plus the standing search capability; NETWORK--search, display, standing search, and output cataloging; CATALOG--search, display, standing search, and shared cataloging; MAINTENANCE--maintenance (modification) of records stored in the BALLOTS data base through shared cataloging.

For more information on any of the aspects of BALLOTS described here, please telephone Ms. Lennie Stovel, Manager, Library Services, 415/497-3741 at the BALLOTS Center. Or you may write to the BALLOTS Center, Library Services, SCIP - Willow, Stanford University, Stanford, CA 94305.

BALLOTS SERVICE RATES

The rates shown below are effective from July 1, 1976 to December 31, 1976. Prices for additional new services will be announced as they become available. Price reductions will also be announced as they become available. Brokers for networks should consult with Ms. Stovel regarding rates.

SERVICES	RATES

NOTE: In calculating total costs of service, the cost of on-line services must be added to those of delivered services, communication, catalog card profile definition, training, and terminal rental.

A. On-Line Services

1. Shared Cataloging

Per Title Cataloged* (minimum of 12 titles per connect hour averaged over billing month)	$ 2.00
OR	
For usage under minimum average of 12 titles/hour, user will be charged a combination of:	
Per Title Cataloged,	$ 1.00
Plus Per Connect Hour	$12.00

2. Output Cataloging

Per Title Processed for magnetic tape or catalog card production (but not entered as a new record in the BALLOTS data base),	$ 0.50
Plus Per Connect Hour	$12.00

3. Searching Only

Per Connect Hour (no cataloging activity)	$12.00

* "Titles Cataloged" are defined as titles entered in the BALLOTS data base by a network library, either through original cataloging or through modification to existing records copied from BALLOTS files.

B. Delivered Services

1. Catalog Card Printing Services (per card)	$ 0.04
2. Standing Search (per search per month)	$ 0.30
3. Catalog Worksheet Printing Services (per sheet)	$ 0.25

4. Cataloging Records on Magnetic Tape

Standard Service: weekly or monthly delivery of records in MARC II communications format on 9-track, 1600 bits-per-inch ASCII tape at the following charge

Per Tape Reel	$20.00
Less Refund on Return of Reel	$ 6.00
Net Charge Per Reel	$14.00
Plus Per Record Charge of $0.04 (500 record minimum)	$20.00
Minimum Net Charge Per Tape	$34.00
Per Each Record Beyond First 500 on Tape, additional charge of	$ 0.04

Non-standard Service: charges for variations from the standard service are negotiable.

C. Communication Lines

1. TYMNET Service (30 cps) Per Connect Hour	$ 9.00
2. Dial-up Service (Billed by Telephone Company)	Variable
3. Leased Line (120 cps)**	Variable

**Leased Line: Full-face service users are urged to use leased lines in order to obtain transmission speeds of 120 characters per second.

D. Miscellaneous

1. Catalog Card Profile Definition

Standard Service: cards produced in standard formats

Per Profile for 10 or fewer branch libraries	$50.00
Plus Per Hour of Center staff time* to complete profile definition for each branch above 10	$30.00

Non-standard Service: cards produced in non-standard formats chosen from profile options

Per Hour of Center staff time* to complete necessary profile definition	$30.00

2. Training

For 1 BALLOTS Center staff member per 4 to 6 library staff members to be trained:

Per Day	$200.00
Plus travel expenses	Variable

Two days' training are recommended for shared cataloging activity, one day's training for searching activity.

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*This activity includes machine time required to complete definition.

E. Terminals

Full-Face Service - requires a BALLOTS CRT video terminal.

Line-by-Line Service - available using many common CRT or typewriter terminals. (Typical terminal rental costs run from $90 to $140 per month for a typewriter terminal and from $200 to $300 per month for a CRT terminal with a printer attachment.) 30 character-per-second, ASCII, asynchronous terminals recommended.

Call or write the BALLOTS Center for more information regarding the BALLOTS CRT terminal, prices, and line-by-line terminal selection.

DOCUMENTATION AVAILABLE

The following documents are available from the Documentation Office, BALLOTS Center, at the prices shown.

A GUIDE TO BALLOTS NETWORK SERVICES, April, 1976. This 194-page Guide presents information on the use of BALLOTS in the INQUIRY, SEARCH, and NETWORK functions in line-by-line mode. It contains information on BALLOTS files and indexes, how to search, how to input, display and input formats, data elements, and commands. One copy is supplied free to each holder of a BALLOTS account for line-by-line use of the system. Price: $9.00.

SUPPLEMENT TO THE GUIDE: SHARED CATALOGING, CATALOG CARDS, in press, September 1976. This supplement to the GUIDE will be a description of services implemented after the GUIDE TO BALLOTS NETWORK SERVICES was published. Will be sold with the GUIDE once it is published, with no change in the $9.00 price of that document. Price if sold separately from GUIDE: $1.50.

BALLOTS REFERENCE DIGEST FOR THE INQUIRY, SEARCH, AND NETWORK FUNCTIONS IN LINE-BY-LINE MODE, August 1976. This 18-page pamphlet is a summary of information drawn from the GUIDE TO BALLOTS NETWORK SERVICES for the user's convenient reference when working at the computer terminal. One copy is supplied free to each holder of a BALLOTS account for line-by-line use of the system. Price: $0.50.

BALLOTS REFERENCE MANUAL: USING THE SYSTEM IN FULL-FACE MODE, in press, September 1976. This ca. 250-page Manual is a user's reference guide to searching and cataloging under BALLOTS using the BALLOTS-programmed CRT terminal (making possible full-face transmission). Includes information on entering shared cataloging records into the BALLOTS data base and producing magnetic tapes and/or catalog cards from on-line cataloging. One copy is supplied free to each holder of a BALLOTS account for full-face use of the system. Price: $12.00.

BALLOTS NETWORK REFERENCE DIGEST FOR FULL-FACE MODE, in press, September 1976. This pamphlet will be a summary of information drawn from the BALLOTS REFERENCE MANUAL for the user's convenient reference when working at the BALLOTS CRT terminal. One copy is supplied free to each holder of a BALLOTS account for full-face use of the system. Price: $0.50.

BALLOTS DATA ELEMENTS NOTEBOOK, April 1976. This 522-page document describes in full each of the data elements used in both full-face and line-by-line BALLOTS. The descriptions includes the mnemonic tag, examples, input conventions, display conventions, the formats and outputs on which the data element occurs, and the valid indicators and delimiters for the data element. To be updated before end of 1976. Price: $20.00.

AN ANNOTATED LIST OF BALLOTS PUBLICATIONS, September 1976. A descriptive bibliography of items currently available or in press. Free on request.

APPENDIX VII

PLAN COST STUDY DATA SAMPLE

Data collected during the PLAN study was tabulated by using SPSS (Statistical Package for the Social Sciences) a packaged computer program, and by hand calculation. SPSS was used for the large quantity of data collected at the study sites 3,4, & 5. Data from sites 1 and 2 were hand calculated to gain a comparative sample of searching hit rate percentages, and data from site 6 was also hand calculated using a sample collected during the study in addition to past statistics tallied during the first year of the study.

The data records and SPSS programs used have been deposited with BALLOTS in punched card form. The computer printout of the results of the SPSS program runs is of considerable volume as the collected data was run monthly for each library for searching, data entry and the cataloging sample. Presented in this section are the total title counts of the sample, and the searching statistics produced by SPSS for the sample from sites 3,4, & 5, plus statistics on data entry times for the combined samples on data entry collected at these libraries. Time constraints prohibited the presentation of the complete set of statistics generated by this study, and limited this presentation to only those relevant statistics. Researchers may contant BALLOTS to examine the complete set of statistics of the study in its computer printout form.

PLAN COST STUDY SAMPLE SIZE : BALLOTS LINE MODE 30 characters per second

	Titles Searched	FOUND MARC	CDF*	IPF	PUT SSR	Not Found	Minutes per title Searching & Printing Found records
LIB 1	2695	2036	68	8	0	583	1.47
LIB 2	665	449	12	3	0	201	1.25
LIB 3	1104**	696	94	18	97	199	1.34
LIB 4	2740	1880	81	40	0	739	1.74
LIB 5	2199	1563	95	39	101	401	1.73
LIB 6	825	520	8	6	0	291	1.75

* Shared cataloging files for public libraries were made available during the study and cataloging records for the first year of the project were not added to the files until near the completion of the study. Amounts of titles found in the CDF are expected to increase.

** an additional sample of 2368 titles were collected at this site, as it was a special project to convert older records into the microform catalog the expected lower hit rate of 47% was not included in the sample for this library to establish an average hit rate for new titles. Records were searched in this project at an average rate of 50.4 titles per hour.

BALLOTS LINE MODE 30 characters per second
Searching Statistics

LIBRARY 3 21 search sessions

	Mean	Mode	Median	Minimum	Maximum	Standard Deviation
Titles Searched	52.81	34.0	53.0	3.0	110.0	27.191
Found						
MARC	33.143	12.0	36.75	0.0	90.0	20.696
Stanford CDF	1.857	0.0	1.0	0.0	11.0	3.217
Shared CDF	2.619	0.0	1.375	0.0	9.0	2.575
IPF	.857	0.0	.667	0.0	4.0	1.062
Put SSR	4.619	0.0	3.250	0.0	18.0	4.695
Not Found	9.476	2.0	6.25	1.0	36.0	9.564

BALLOTS LINE MODE 30 characters per second
Searching Statistics

LIBRARY 4 62 search sessions

	Mean	Mode	Median	Minimum	Maximum	Standard Deviation
Titles Searched	44.306	18.0	41.50	7.0	107.0	24.057
Found						
- MARC	30.323	20.0	26.50	2.0	80.0	19.39
Stanford CDF	.742	0.0	.361	0.0	3.0	1.007
Shared CDF	.565	0.0	.256	0.0	6.0	1.175
IPF	.645	0.0	.238	0.0	6.0	1.065
Put SSR	0.0	0.0	0.0	0.0	0.0	0.0 (did not use SSR function)
Not Found	11.919	7.0	10.50	1.0	28.0	6.974

BALLOTS LINE MODE 30 characters per second
Searching Statistics

LIBRARY 5 82 search sessions

	Mean	Mode	Median	Minimum	Maximum	Standard Deviation
Titles searched	28.886	13.0	27.50	1.0	55.0	14.634
Found						
MARC	20.817	10.0	19.50	0.0	49.0	12.189
Stanford CDF	.585	0.0	.337	0.0	3.0	.845
Shared CBF	.646	0.0	.391	0.0	3.0	.880
IPF	.488	0.0	.304	0.0	3.0	.724
PUT SSR	1.366	0.0	.833	0.0	6.0	1.629
Not Found	5.195	2.0	4.143	0.0	21.0	4.495

BALLOTS LINE MODE 30 characters per second

Data Entry Time Statistics

Minutes per Title Modification of existing records in BALLOTS data base

Mean	1.873	Median	1.627	Minimum	0.737	Number of data entry sessions 44
Mode	2.500	Std. Dev.	1.202	Maximum	8.000	

Minutes per Title Creating new records in BALLOTS data base

Mean	3.003	Median	2.693	Minimum	0.667	Number of data entry sessions 278
Mode	2.500	Std. Dev.	1.567	Maximum	10.000	