

COMPUTERIZED BOOK CATALOGS AND THEIR EFFECTS ON
INTEGRATED LIBRARY DATA PROCESSING: RESEARCH
AND PROGRESS AT THE LOS ANGELES COUNTY
PUBLIC LIBRARY

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Fashions in library catalogs change with current academic-administrative climate, technological advances, and the socio-economic well-being of a society. Book catalogs were supreme in the rarefied quill pen era. The typewriter, coupled with emerging professionalism, brought card catalogs to full flower. Equipment breakthroughs, the ever-increasing "information explosion," and expanding mass interest in libraries have brought about a revival in catalog experimentation. As systems become more complex, the need for long-range planning grows dramatically. If automatic data processing (ADP) is to be used successfully and selectively, library administrators must increasingly approach individual applications within a framework of integrated data processing.

For the past three years, the Los Angeles County Public Library has been conducting a systemwide study dealing with potential areas of library mechanization. A task group representing various specialties within the library has been operative during this time. William S. Geller, County Librarian, and members of his Executive Division have utilized group findings in formulating their approach to integrated data processing.

Since 1952, the County Library has been producing book catalogs, first via unit record (or punched card) equipment and currently through sequential camera processing. During this time, catalog content and format have undergone developmental modifications to improve overall quality. The library is now preparing for conversion to a computerized catalog system, since the sequential camera method, while providing excellent copy, is fraught with production difficulties.

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Research at the County Library has centered about advances in data collection, sophisticated computer output devices, library bibliographical techniques, and to a lesser extent computer processing where an advanced state-of-the-art exists. In July, 1966, the Council on Library Resources, Inc., granted the County \$38,000 to conduct a research-demonstration project. One of the major project goals involves demonstrating optical character recognition in bibliographical control, patron registration, and circulation applications. At present, this CLR-sponsored study is still in progress.

Book Catalog Production Methods

There are essentially five book catalog production methods:

(1) Manual, in which previously prepared catalog cards are arranged to form pages. An image of the arranged cards is converted into a repro-plate, stencil, etc. Catalog pages are then reduced and bound. With the manual method, it is also possible to type or typeset complete catalog pages, rather than shingle or arrange cards.

(2) Unit record, in which catalog data is keypunched into tab cards. Decks of cards are manually or machine sequenced (coding is required for machine sequencing), and listings are printed out on a tabulator. Listings may be printed out on multilith mats or ordinary paper with or without carbons. Listing pages are then bound or reproduced and bound.

(3) Sequential camera, in which data is typed or typeset in single or multiple lines, on tab or other cards. Decks of cards are then manually or machine sequenced (coding is required for machine sequencing). Cards are then processed by sequential camera, that is, they are individually photographed on a continuous roll of film. After film is developed, cut into column lengths and pasted up to form pages, reproduction and binding processes commence.

(4) Computer, in which catalog data is converted to machine processable form. Data is sequenced by manual or machine methods and then listed on a line printer or converted to a form which may be listed off-line on a line printer, typesetter, or other device.

(5) Combinations of the above. An example of such a combination is provided by the Alanar book catalogs of Bro-Dart, Inc. In these catalogs, random catalog cards are arranged to form pages, then referenced by page number and location, and processed to produce "registers." This procedure is equivalent to the manual method previously described. Indexes to the registers are produced by key-punching short catalog information and register page and entry location into tab cards. Index information is then processed, reproduced and bound as in the unit record or computer method.

There are advantages and disadvantages associated with all book catalog methods, when one considers the requirements of a particular library. Within the framework of integrated data processing, a library might select any one of the methods presented or their variants, selecting a combination on the basis of catalog quality desired, technical restrictions, and cost factors.¹

Computerized Catalogs—Hardware

Hardware ranging from small-scale card computers to large-scale processors with many peripherals may be used advantageously in book catalog production. Minimal control processing unit (CPU) and equipment configuration technical capabilities are dictated primarily by data file size, individual record length, the extent of data manipulation required, the complexity of or necessity for machine sorting, and the input medium used in preparing data. New general and special purpose computers with catalog production capability are continually being developed by an increasing number of manufacturers. A descriptive list of selected newer machines is presented in Figure 1.

Five basic types of equipment are currently available for generation or input of catalog data: keypunches, paper-tape punches, magnetic tape writers, on-line terminals, and optical character readers. Magnetic ink character readers, pattern recognition equipment (mark sense, bar code, etc.), incremental measurement devices, and sound recording techniques are presently unsuitable for such use.

Keypunching, paper-tape punching, and magnetic-tape writing all employ keystroking to encode machine-processable information. After the keystroking process, data is verified by performing either a second keystroking operation, manual scanning of interpreted data, or proofreading of a machine printout. When errors are encountered, data are corrected.

On-line terminals are used for keying information directly into a computer or peripheral processing system. Data usually is simultaneously typed out or displayed on a cathode ray tube (CRT) with on-line verification and correction procedures. More detailed information concerning data conversion via terminals is available in studies completed by IBM for the Library of Congress.²

Optical character-page readers are capable of reading characters typewritten on stylized forms with great accuracy, when quality is controlled. This is the only method in which man and the machine are able to "read" the same symbols. With character recognition, it is possible to type a catalog entry on a page, manually proof the page, make corrections, additions, and deletions to the page—and then

optically read fully proofed data. In 1966, the first book to deal exclusively with optical character-page reader (OCR) equipment, techniques, and selected applications was published.³

Figure 2 lists selected equipment of the five basic types previously described.

To date, direct-access storage has not been a popular medium for retaining large files of catalog data. This is probably due to the relatively high cost of direct-access storage devices such as disc packs, when compared to magnetic tape and other sequential storage media. Newer mass memory devices such as magnetic strip files have not yet countered this trend.

While there are a number of on-line and off-line computer output devices, except for several notable examples, book catalogs have been listed on standard computer printers. When a lower case alphabet and extensive special symbols are added to a line printer character set, speed of the printer and system throughout are substantially reduced. Input-output (I/O) typewriters are too slow for serious consideration in listing book catalogs. The availability of newer hardware, such as a computer interfaced Calcomp 835 plotter, has not countered the preference for off-line alternatives to the computer printer.

Devices used for off-line preparation of catalog pages are primarily magnetic tape or punched paper tape activated. Such machines and systems range from relatively simple automatic typewriters and print stations to complex photo-composers and high speed microfilm recorders of cathode ray tube (CRT) displayed symbols. When off-line processing requires a conversion from magnetic tape to punched paper tape, it is possible that conversion time may exceed processing time, since paper tape cannot be punched as fast as it may be read. Libraries and Automation,⁴ though lacking details on the latest equipment, contains excellent information about automated graphics. A selected list of currently available hardware is included in Figure 3.

Computerized Catalogs—Systems and Software

Mechanized book catalog procedures all employ some manual procedures. The balance between manual and machine operations fluctuates widely with different systems. A computer may be used in a limited capacity much like a 407 tabulator, that is, as a printer for listing decks of punched cards which are manually sequenced. In a highly computerized book catalog system, a complete bibliographical record might be prepared once, in a machine-processable form. Subsequent computer processing might include extracting data from master records for catalog entries; formatting entry data; machine

sequencing or alphabetizing of entries in a dictionary catalog or individual sections of a divided catalog; deletion of repetitious heading information; maintenance of master and other files; and creation of multi-columned catalog pages which include fixed-spaced or proportionally-spaced characters and justified or unjustified right hand margins in columns.

The minimal hardware capabilities and software requirements for computerized book catalog production increase with the number and/or type of operations to be performed on the computer. It is a most difficult matter to estimate (accurately) system design and programming costs for a catalog system of this complexity. Figure 4 charts the range of operations and equipment which may be potentially incorporated into computerized book catalog systems.

To machine-catalog data in accordance with ALA or similar filing rules presents formidable problems. Computers sort fixed length fields of data strictly character by character. A typical collating sequence or ascending character order for computer filing is space, A-Z, and 0-9. A period (.) might file after the space and before the character A. Non-standard treatment of characters or data to be sorted must be programmed into the computer. For example, if "U.S." is to be filed as United States, a special subroutine must be written to handle such cases. To develop a workable machine-filing system requires compromise. Data will require rearrangement in the input-preparation stage. Special symbols with programmed filing uses will have to be added to records. Filing rules will need to be modified on occasion for the benefit of the computer and quite possibly the catalog user. The mysteries of machine filing are explored in some depth in a recent work issued by the Bro-Dart Foundation.⁵

A single source record concept is difficult to develop for bibliographical data. Within catalog records there are units of data such as author, title, notes, etc., which may be designated as fields. Fields may be referenced by tags. For example, the class number field might be identified by the tag 1, the author field by the tag 2, etc. Unfortunately, fields may contain extremely variable length data. Any given catalog record may contain data for only a selected number of fields. There is even lack of agreement in the library world as to how fine a division of data should be made when separating bibliographical data into fields. The Library of Congress in its Project MARC has completed a considerable amount of work dealing with the organization of input data.⁶

Other factors which affect computer catalog systems are frequency of issuing master and supplement catalogs; dictionary arrangement or divided nature of a catalog; readability and format requirements for printed copy; and entry density on the printed page. These and other factors are discussed in studies conducted for the

State of New York,⁷ the New York Public Library,⁸ and the California State Library.⁹

Book Catalogs and Integrated Library Data Processing

Proponents of integrated data processing usually reason that data for catalog and book record production may be captured during acquisition input preparation. Acquisition data actually decreases in value as a source of catalog information as depth and quality of cataloging increase. If one is planning a highly mechanized book catalog which will contain entries comparable to Library of Congress cataloging in detail, together with a fair number of added entries, and which will have good typographical quality, it is highly improbable that acquisitions data can be successfully adapted for catalog input use.

Catalog production is the one public library application in which there is a strong interest in extended character sets and high speed graphic quality output. Applications such as ordering, registration, circulation and serials may effectively use upper case alphabetic information, numerals and a limited array of punctuation and special symbols, as available on standard unit record and line-printing equipment.

Los Angeles County Computerized Catalog Planning

The evolution of the Los Angeles County Public Library unit record book catalogs¹⁰ and sequential camera catalogs¹¹ has greatly influenced the design of this library's future computer-compiled catalogs. Major aims, goals, and solutions presently incorporated into the over-all system currently under development include:

(1) Retaining the informational content and sectional division of present catalogs. Samples of entry content are presented in Figure 5. Separate catalogs are produced for Adult and Juvenile collections. Adult catalogs are divided into Author, Title, Subject, Fiction and Foreign sections. Juvenile catalogs contain Author, Title and Subject sections.

(2) Retaining the present concept of master catalogs with periodical cumulative supplements. The planned production schedule includes six printings of catalogs each year, a master catalog with five bi-monthly cumulative supplements. These catalogs will be printed and bound in a quantity of three hundred copies.

(3) The conversion of the entire present catalog data base to a machine-processable form in an extended character set, by library personnel in a relatively short time. A single master record approach will be used. Library authority files are presently undergoing modification to conform to the new Operations Manual which has been issued. Actual input data will be typed on IBM Selectric typewriters equipped with carbon ribbons and pin-feed platens. This data will be "machine-read" through optical character recognition techniques. See Figures 6 and 7 for input description and samples.

(4) Initially contracting with a vendor or vendors for complete programming, computer processing, printing and binding of book catalogs. At this writing a request for proposal (RFP) to vendors is being finalized. This RFP includes specifications for at least upper and lower case alphameric catalog printouts with a minimum of eighteen special symbols. Double-columned pages, suppression of duplicate author and subject headings, and computer filing of data are specified. Figure 8 documents the system under development.

Implementation and Future Plans

The computerized catalog system should become operative in the latter part of 1967. Initially the system will be used to produce cumulative bi-monthly supplements and to convert master catalog data to magnetic tape. A complete set of master catalogs is scheduled for production in late 1969. It is estimated that these master catalogs will contain approximately 2,000,000 lines of computer printout or more than 20,000 pages which will then be printed and bound in quantity.

It is difficult to determine what future systems improvements will be incorporated into Los Angeles County Public Library book catalogs. There is much interest in using newer high speed type composing equipment such as the RCA Videocomp. Magnetic tapes to be produced may be modified at a later date for use with type composing equipment.

Another technique which may be explored is the graphic reproduction of OCR input forms typed at the Library. These printed input forms could be supplied to other libraries for use in similar catalog production systems. A user library could add and/or delete information as needed directly on input forms prior to machine processing.

There is a tendency, in developing a computer-based book catalog system, to overstate the importance of data processing operations. While great care and ingenuity must go into engineering such a mechanized system, it must always be realized that the system is

dependent on non-mechanized functions, such as cataloging, proof-reading and maintenance of information files. The success or failure of a computer-based catalog will depend heavily on these manual procedures long after technical problems have been overcome.

COMPANY & MODEL	BITS PER WORD	CORE SIZE (K)	CARDS		PAPER TAPE		MAG. TAPE (Kepe)	PRINTER LPM	DISC	DRUM
			IN	OUT	IN	OUT				
Burroughs B300	6	4.8-	200-	300	1000	100	18-72	475-	x	-
B5500	48	19.2 4-32	1400 200- 1400	300	1000	100	24-66	1040 475- 1040	x	x
Control Data 3300	24	8-262	1200	250	100	120	120	150- 1000	x	x
6400	60	32-131	1200	250	100	120	30-240	150- 1000	x	x
General Electric 115	8	2-8	600	300	400	100	21-42	600	x	-
435	24	32	900	300	500	150	160	900	x	x
Honeywell 200/120	Varies	2-32	800	100- 400	600	120	13-90	450- 1260	x	x
200/4200	Varies	32-524	800	100- 400	600	120	13-90	650-950	x	x
IBM 360/20	8	4-16	1000	300	-	-	15	200-1100	-	-
360/65	8	131- 524	1000	300	-	-	30-340	200-1100	x	x
NCR 590	48	.2-4	100	100	650	120	-	125	x	x
315RMC	12	20-80	2000	250	1000	120	24-120	1000	x	-
RCA spectra 70/15	8	4-8	550- 1435	100- 300	200	100	30-120	600-1250	-	-
70/55	8	65-524	550- 1435	100- 300	200	100	30-120	600-1250	x	x
Univac 9200	8	1-4	1000	75- 200	-	-	-	250	-	-
1108	36	52-131	900	300	400	110	25-120	700-922	x	x

Figure 1.
Selected Newer Computer Systems

INPUT EQUIPMENT.

KEYPUNCHES & VERIFIERS			TAPE PUNCHING		MAGNETIC TAPE WRITING	
COMPANY	MODEL	INTERPRET	COMPANY	MODEL	COMPANY	MODEL
IBM	024 026 029 056	no yes yea -	Dura Business Machines	Mach 10	Mohawk Data Sciences	1101 keyed Data Recorder
Univac	80 column no keypunch 80 column - verifier		Friden Invac SCM Fairchild	Flexowriter Justowriter TMP-200 Typetronic Line per- forator (non-typing)		

OPTICAL PAGE READERS

COMPANY	MODEL	CHARACTER SET	FONT (S)	PAGE SIZE (INCHES)	CPS*	FEED & TRANSPORT	SCANNER & LOGIC
Burroughs	Typed Page Reader	Alphameric Punctuation	Upper, Case Elite	L:11 W:8.5	75	Vacuum, Drum	Flying spot, Matrix match
Rabinow (CDC)	915/Page Reader	Alphameric Punctuation Symbols	A.S.A. & other Upper Case	L:2.5-14 W:4-12	370	Vacuum, Conveyor belt	Parallel photocell, Matrix match
Farrington	IP Page Reader	Alphameric Punctuation Symbols	Selfchek, A.S.A. & IBM 1428	L:5.5-13.5	280	Vacuum, Drive roller	Mechanical disc, Stroke analysis
	Selected Data Page Scanner	Alphameric Punctuation Symbols	Selfchek	L:5.5-13.5 W:4.5-8.5	200	Vacuum, Drive roller	Mechanical disc, Stroke analysis
Philco	General Purpose Print Reader	Alphameric Punctuation Symbols	Multiple fonts	L:3-11 W:5-8.5	2000	Vacuum, Conveyor belt	Flying spot, Matrix match
Recognition Equipment	Electronic Retina Rapid Index Page Reader	Alphameric Punctuation Symbols	Multiple fonts	L:3.25-14 W:4.88-14	2400	Vacuum, Drum & conveyor belt	Parallel photocell, Matrix match

*Reading speed in terms of CPS (characters per second) should not be used for comparison purposes. Selective reading requirements, document handling speed, page layout, machine reject rates, etc., all affect actual production speed of OCR (optical character-page reader) devices.

Figure 2
Selected Data Collection Equipment.

DISPLAY SYSTEMS*

MANUFACTURER	CONSOLE (ALPHAMERIC)	# CHARACTERS DISPLAYED	PRINTER MODEL
Control Data	211	1000	Model 218 Hard copy printer
General Electric	760	736	Model 33 or 35 Teletype
Honeywell	303	768	
IBM	2260	960	1053 Terminal
Raytheon	DIDS-400	1040	Model 33 Teletype
Sanders	720	1024	Model 33 Teletype
Stromberg Carlsen	SC1100	500	Model 33 Teletype
Teleregister	203	768	Model 33 Teletype

*Display systems require controllers or other devices to interface with a central processing unit. The number of display stations which may be placed on-line varies with different systems. Additional information about display systems is available in System Development Corporation report TM-2571, Study of Small Scale Tabular Display Systems, 1965.

TERMINAL SYSTEMS*

MANUFACTURER	SYSTEM	KEYING DEVICE
IBM	1440/1460 Administrative Terminal System	1052/2 Printer-Keyboard Terminals or Modified Selectric I/O Typewriter terminals

*A description of ATS (administrative terminal system) is contained in IBM Application Program report number H20-0129-0.

Figure 2 (cont.)
Selected Data Collection Equipment.

TYPE OF DEVICE	SPEED RANGE	PROPORTIONAL SPACING	LOWER CASE	BOLD FACE	PRINT QUALITY	EXAMPLES
Typewriter on-line	5-15 cps	Yes	Yes	No	Good	
Automatic typewriter	5-15 cps	Yes	Yes	No	Good	Flexowriter
Computer line-printer	150-1200 lpm	No	Yes*	Yes*	Fair	IBM 1403
Off-line printers	150-1200 lpm	No	Yes*	Yes*	Fair	Data Products 4000 series Potter Instruments Chain Printer
Hot Metal Typesetters	3-8 cps	Yes	Yes	Yes	Excellent	Mergenthaler Linotype
Photocomposers Paper tape activated	5-30 lpm	Yes	Yes	Yes	Excellent	Mergenthaler Linofilm Photon 713 Photon Zip
Magnetic tape activated	25-150 lpm	Yes	Yes	Yes	Excellent	
Videocomposers	100-180 lpm	Yes	Yes	Yes	Excellent	RCA Videocomp
High speed plotters & microfilm recorders	50,000-100,000 lpm	No	Yes	No	Fair-Good	Stromberg Carlson 4000 series equip. Calcomp 835

*Speed is substantially reduced with the addition of characters.

Figure 3
Printout Devices

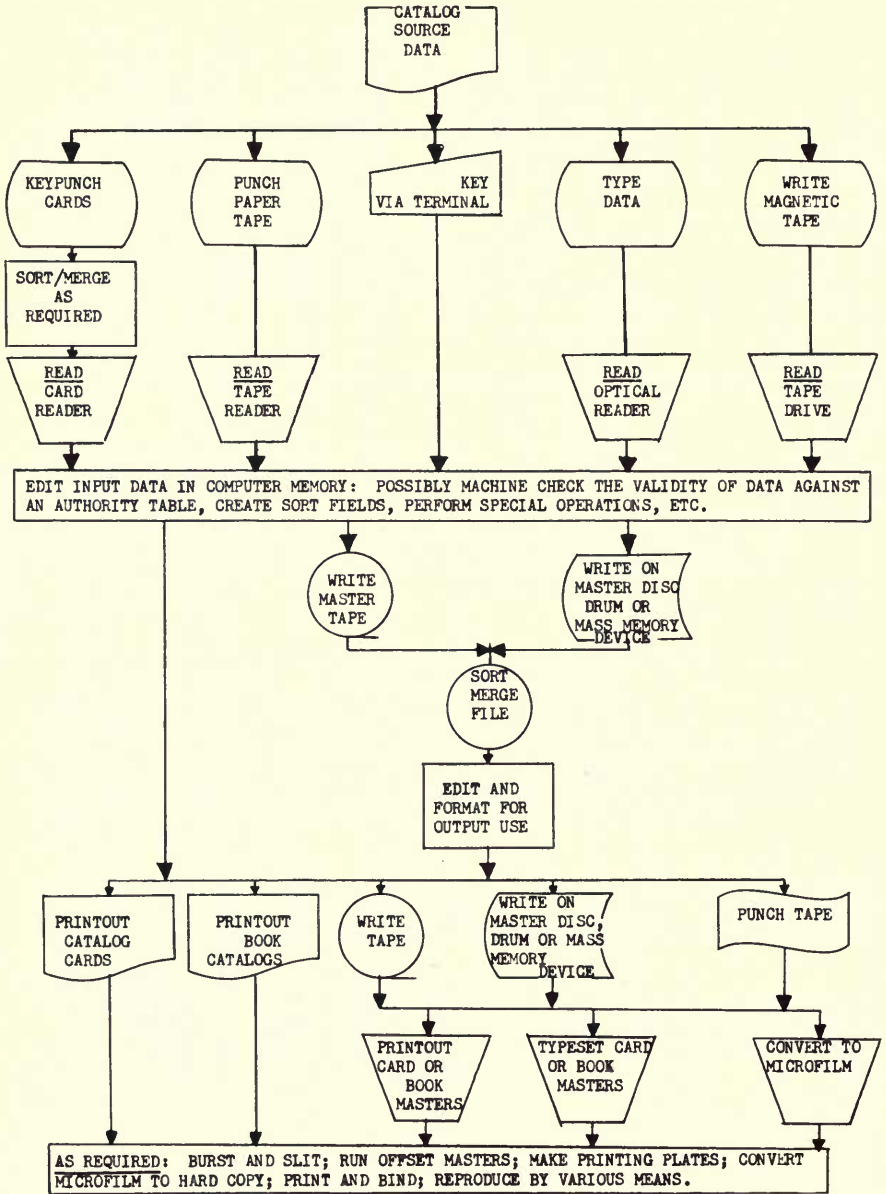


Figure 4
Operations and Equipment for Computerized Book Catalog Systems.

KENNEDY, JOHN FITZGERALD, PRES. U. S.
#816 Adler, Bill. John F. Kennedy and the young people of America. McKay, 1965. 146 p. Illus.

Collection of letters sent by children and young people to John F. Kennedy and his wife.

975.5 Andrews, Peter. In honored glory; the story of Arlington. Putnam, 1966. 191 p. Illus., ports.
Arlington National Cemetery from the Civil War to the Kennedy Memorial, and the lives of twenty-five notable persons buried there.

92 K354 Berquist, Laura. Very special President. Photos. by S. Tretrick. Designed by L. Jossel. McGraw, 1965. 203 p. Illus., ports.

A portrait based upon interviews with John F. Kennedy by Look newswoman.

SUBJECT

R317.3 U. S. census of population: 1960. Detailed characteristics. California, by U. S. Bureau of the Census.
U3998 U. S. Government serials & periodicals. SEE
015 Andriot, John L. Guide to U. S. Government serials & periodicals.
947.08 U. S. S. R. and the future, by L. B. Schapiro.
92 N962 U Nu of Burma, by R. A. Batwell.
641.56 Ulcer diet cook book, by H. Rubin.

TITLES

WRIGHT, LOUIS BOOKER
822.852 Shakespeare for everyman. Washington Square Pr., 1965. 221 p. Illus., ports., facsimis. Bibliography: p. 183-209.
972.99 Voyage to Virginia in 1609; two narratives: Strachey's "True reportory" and Jourard's Discovery of the Bermudas. Published for the Association for the Preservation of Virginia Antiquities, by Univ. Pr. of Va., 1964. 116 p.

CHURCH WORK
Curtsinger, Josephine. Seldom without love; a mock mock epic. Macmillan, 1965.

Newly acquired hearing aid sparks a Texas wife's determination to raise money for her church.

CIRCUSES AND CIRCUS LIFE

Finney, Charles Grandison. 1905. Circus of Dr. Lao; with drawings by B. Artzybasheff. Viking, 1964, 1962.

Impact of a traveling circus upon the citizenry of small American town.

Stewart, Mary. Ails above the ground. Mill, 1965.

What promised to be no more than a personal mission for a married woman and her young charge in Vienna, eventually involves security forces of three countries and the white stallions of Vienna.

CIVIL RIGHTS

Kennedy, Jay Richard. Favor the runner. World Pub. Co., 1965.

New York attorney, champion of many past causes, and a Negro entertainer enter into partnership to aid the Civil Rights movement

FICTION

BERLITZ SCHOOLS OF LANGUAGES OF AMERICA, INC.

Berlitz German for children: Cinderella and Sleeping Beauty. Ed. by the staff of the Berlitz Schools of

Languages under the direction of R. Strumpfen-Darrie and C. F. Berlitz. Illus. by D. Wilson.

Grosset, 1962.

English and German in text.

BERNA, PAUL

J Flood warning. Tr. from the French by

J. Buchanan-Brown. Illus. by C. Keeping.

Patheon, 1962.

Translation of "La grande alerte".

Figure 5
Samples of Entry Content of present Los Angeles County Public Library
Book Catalog.

WRIGHT, LOUISE LEONARD

SEE

327 Wright, Quincy. Study of war. Abridged ed. 1964.

WRIGHT, QUINCY

327 Study of war. Abridged ed. Abridged by L. L. Wright. Univ. of Chicago Pr., 1964. 451 p.

AUTHOR

-A-

- J A promise is a promise, by M. Cone.
 J633 About grasses, grains, and canes, by M. J. Uhl.
 J386 About canals, by S. P. Newman.
 J634 About nuts, by S. P. Russell.
 J Across five Aprils, by I. Hunt.
 J150 Adventure book of the human mind, by J. G. Miller.

JUVENILE TITLEJUVENILE AUTHOR**WESTWARD MOVEMENT - STORIES**

J Bond, Gladys Baker. Head on her shoulders. Illus. by R. Kennedy. Abelard, 1963.

An accident forces thirteen-year-old Brita to assume the responsibility of moving three younger children and family possessions in a boxcar traveling west with a pioneer train. Grades 5-6.

J Yates, Elizabeth. Carolina's courage. Illus. by N. S. Unwin. Dutton, 1964.

A young girl has a difficult sacrifice to make during the long journey westward with her family in pioneer days. Grades 3-4.

JUVENILE SUBJECT

Figure 5 (cont.)
 Samples of Entry Content of present Los Angeles County Public Library
 Book Catalog.

903

LOS ANGELES COUNTY PUBLIC LIBRARY
BIBLIOGRAPHICAL DATA

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Figure 6
Sample Bibliographic Input Form

TAG	FIELD	DESCRIPTION
0	Class number	Dewey number or special symbol(s)
1	Author	The entire main author under which a work is listed in the Author Catalog
2	Title (main title)	The entire title of a work or portion thereof which is listed in the Title Catalog
3	Sub Title and/or additional information	Any information which follows the main title of a work and precedes the imprint
4	Imprint	The publisher and publication date
5	Collation	Information concerning pagination, illustrations, bibliographical coverage, etc., which follows the imprint and precedes the notes
6	Notes (Liners and Contents)	Any notes to which the library has added the liner indication
7	Annotation	A descriptive statement developed by the library for inclusion in one of the various types of subject catalogs
8	Subject(s)	The subject heading which will appear in the non-fiction Subject Catalog (also foreign language)
9	Fiction subject(s)	The subject heading which will appear in the Fiction Subject Catalog
A		Author reference to an author
B		Author reference to a work
C		Author-title reference to a work
D		Title reference to a work
E		Title-author reference to a work
F		Non-fiction subject reference
G		Fiction subject reference
H-Z		Reserved for future uses and information for ordering or book records production usage if required

Figure 7
Sample Input Data Tags and Fields

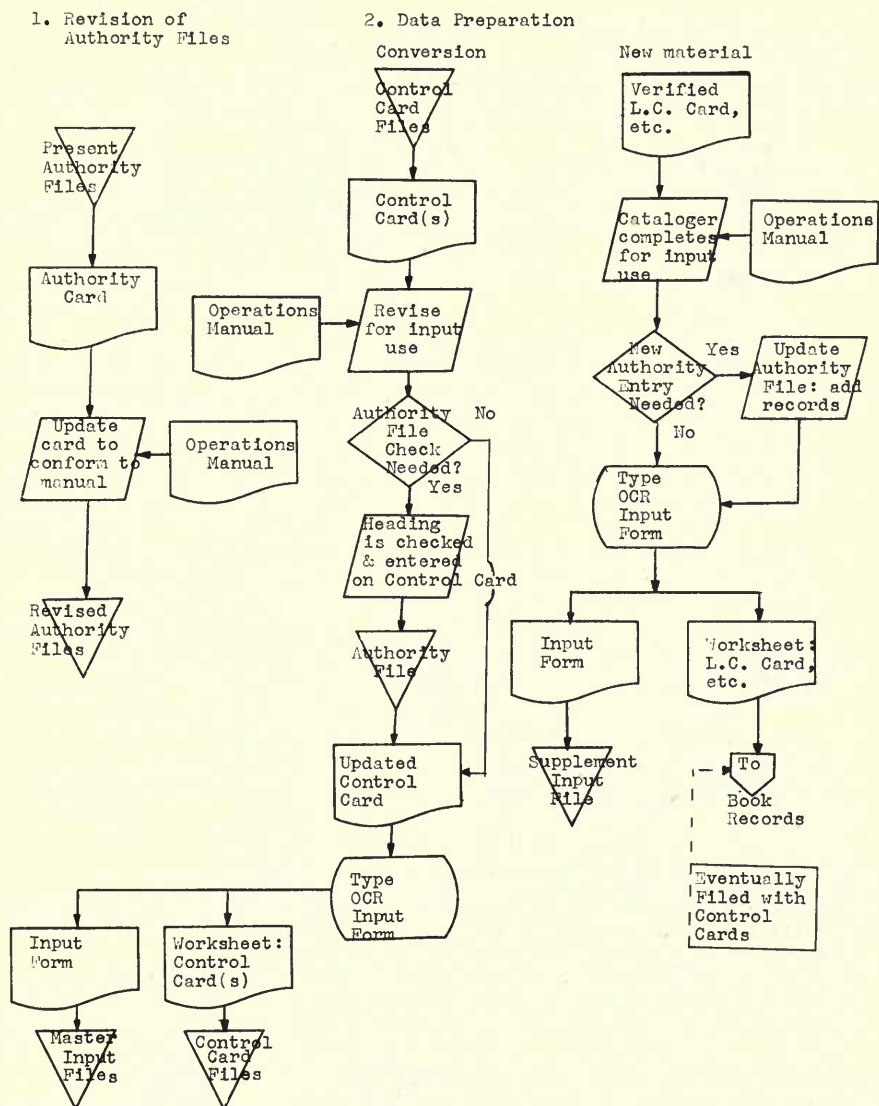


Figure 8

Computerized System now under Development at the Los Angeles County Public Library

3. Catalog Processing

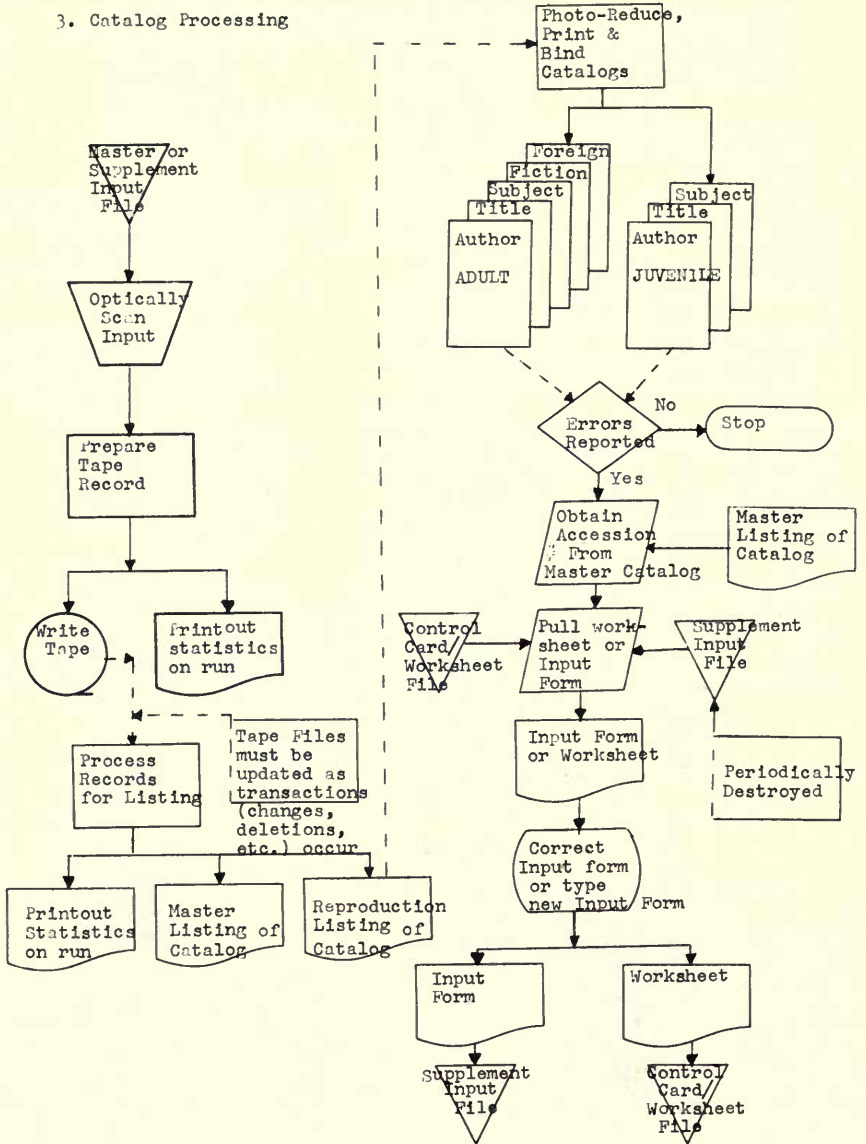


Figure 8 (cont.)
 Computerized System now under Development at the Los Angeles County
 Public Library

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11. Macquarrie, Catherine. "The Metamorphosis of the Book Catalogs," Library Resources & Technical Service, 8:370-378, Fall 1964.