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**REVISED COMPUTER PROGRAMS FOR ORDERING,
LISTING, AND CIRCULATING LIBRARY BOOKS**

**MYRA S. FELDMAN
H. FRANCES WREN
NORMA A. BUHL**

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Savannah River Laboratory
Aiken, S. C. 29801**

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Printed in the United States of America

Available from
National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

Price: Printed Copy \$5.45; Microfiche \$2.25

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REVISED COMPUTER PROGRAMS FOR ORDERING, LISTING, AND CIRCULATING LIBRARY BOOKS

by
Myra S. Feldman
H. Frances Wren
and
Norma A. Buhl

Approved by
J. R. Hilley, Research Manager
Computer Applications Division
and
S. W. O'Rear, Supervisor
Technical Information Service

Publication Date: August 1975

**E. I. du Pont de Nemours & Co.
Savannah River Laboratory
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ABSTRACT

The Technical Library of the Savannah River Laboratory uses COBOL programs to assist in purchasing and circulating books and to provide book lists and printed catalogs. The programs are written for the IBM System/360-195 with 2kk byte storage capacity and may be used by a library of any size. Bibliographic and cataloging data for the library holdings are stored on magnetic tape from which data can be recalled in twenty-nine printout options to retrieve information concerning borrowers, authors, subject matter, inventory, etc. Book ordering is simplified, requiring only key-punched data cards as input and obtaining multiple purchase order forms as printout.

The programs are improved over those reported earlier as follows: The data are more compact. Subject, series, and cross-reference files are maintained in the computer memory bank. Manual handling and sorting operations have been eliminated; thus key-punching of data input cards is the only manual operation remaining.

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REVISED COMPUTER PROGRAMS FOR ORDERING, LISTING, AND CIRCULATING LIBRARY BOOKS

INTRODUCTION

The Technical Library of the Savannah River Laboratory uses an IBM System/360-195 with 2kk storage to process book orders and to control the circulation of over 22,000 books and monographs. Many time-consuming and repetitive library operations have been automated to provide better and additional service to library users.

The library serves the Savannah River Laboratory (SRL), the Savannah River Plant (SRP), and the Savannah River Operations Office (SR). The facilities for these organizations are located near Aiken, South Carolina. E. I. du Pont de Nemours and Company operates the laboratory and the plant for the U. S. Energy Research and Development Administration (ERDA). The library, staffed with three librarians and four assistants, is concerned primarily with atomic energy and its related science disciplines.

Two COBOL programs have been developed: the Book Order Program and the Book Control Program. The Book Order Program prepares purchase orders for books. The Book Control Program stores bibliographic and cataloging data on a master tape that is updated periodically. Twenty-nine different options can be used to recall the data. These options provide catalog listings of all books in the library as well as lists of books on loan and those charged permanently to individuals and departments. There is no limit to the number of books that can be processed by these programs.

The present programs are a revision of earlier COBOL programs.* The programs were changed to compact the data, thus reducing the number of input cards and the amount of computer storage required. Card formats were altered to facilitate processing and handling of cards and to control tape assignments. Subject, series, and cross-reference files are maintained by the computer rather than manually maintained by library personnel. Error messages were expanded and revised.

*N. A. Buhl and M. S. Feldman. *Computer Programs for Ordering, Listing, and Circulating Library Books*. USAEC Report DP-1113, E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, S. C. (1967).

GENERAL DESCRIPTION OF PROGRAMS

The library procedures for ordering, processing, circulating, recalling, and listing books are shown in Figure 1.

As each book is ordered, a unique accession number is assigned to it. This accession number is added to each of the punched cards necessary for a "book record." The order clerk keypunches three book cards when ordering a book. The Book Order Program prints purchase orders from these cards. Before the use of computer programs, the order clerk typed multiple (6) copies of book orders on 3-in. x 5-in. preprinted purchase order forms. Three of these slips were filed, one was sent to the book vendor and the remaining two were used for the Library of Congress card order. Only four computer-printed slips are needed and are distributed as shown on Figure 1. Three separate files (requestor, author, and item number) maintained by the order clerk are replaced by printouts from the Book Control Program.

When a book is received, the book and the three cards punched by the order clerk are given to the technical processing personnel. The book is cataloged, and additional cards are keypunched. The additional data include all bibliographic and cataloging information. As few as four or as many as thirteen punched cards may be needed. The Book Control Program stores the bibliographic and cataloging data on a master tape. The master tape is updated as new books are received or as the status of a book changes. Partial or complete printouts may be obtained on demand. These printouts replace eight manual files previously maintained by library personnel. Printouts from the Book Control Program provide:

- Shelf lists
- Author, title, series, and subject catalogs
- Subject bibliographies
- Purchase and accounting records
- Inventory control
- Accurate control over desk or departmental materials, surplus books, and lost books
- Circulation records
- Recall notices

At the circulation desk, only one charge-out card file of punched cards is kept; before the computerized system, two charge-out card files were necessary. The Book Control Program produces two printouts of all books on loan: one alphabetically by authors and the other alphabetically by borrowers. Recall notices are also obtained as computer printouts, eliminating handwritten pre-printed forms.

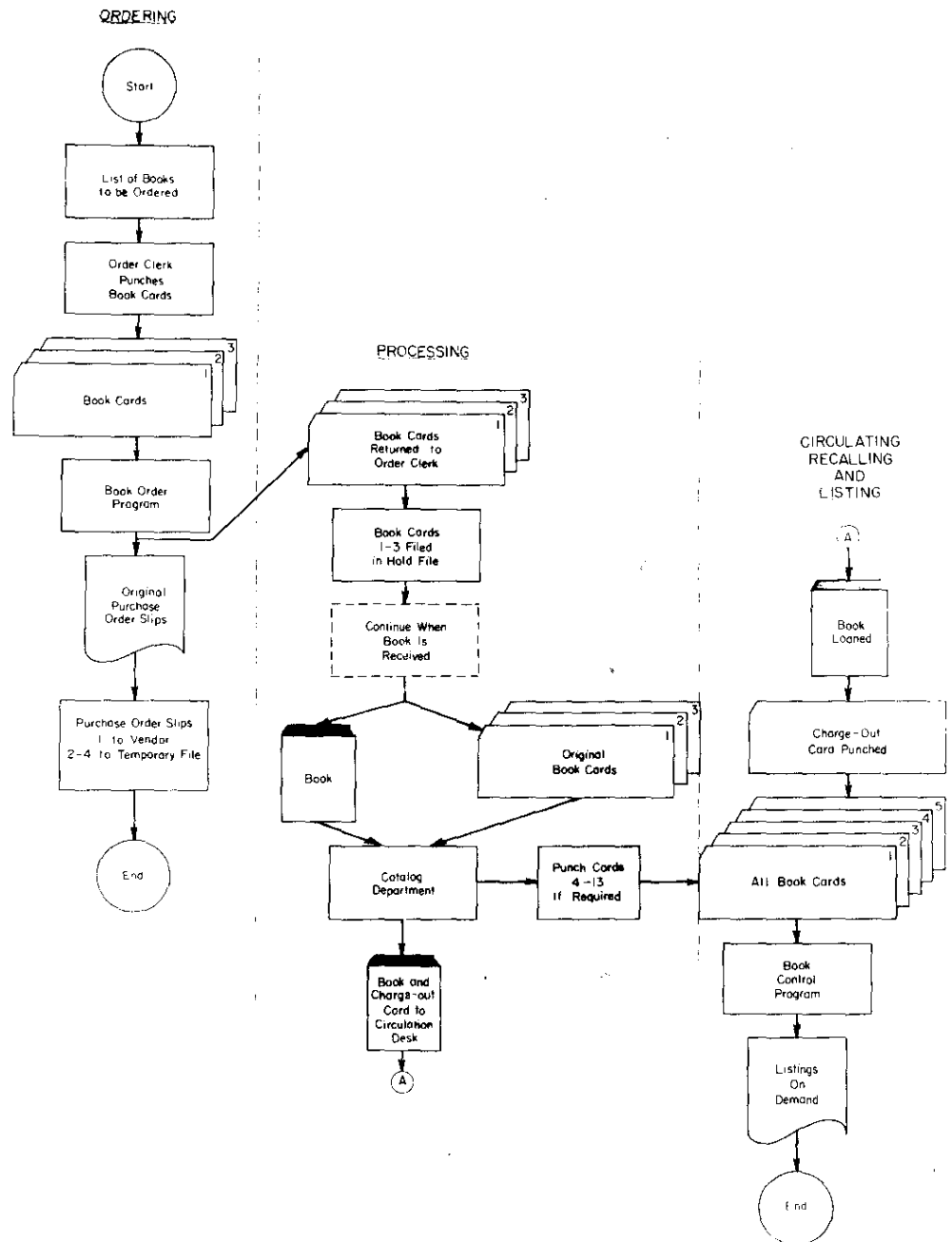


FIG. 1 LIBRARY PROCEDURE FLOWCHART

BOOK ORDER PROGRAM

The flowchart for ordering books is shown schematically in Figure 2. To initiate a book order, the library order clerk key-punches three data cards per book from original order requests (see Appendix A). These data cards are combined with a small COBOL source deck for each computer run. There is no upper limit on the number of books ordered at any one time.

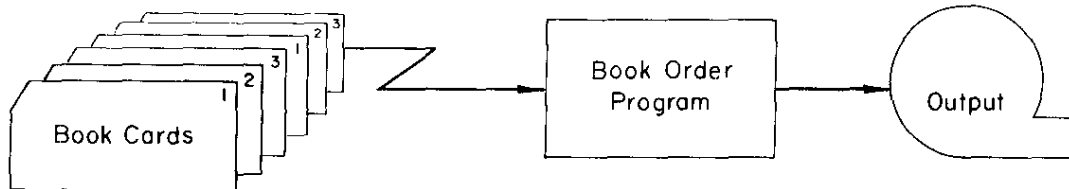


FIG. 2 BOOK ORDER FLOWCHART

Output from the Book Order Program is written on magnetic tape. The information on this tape is then printed, eight lines per inch, on unlined 10 in. x 14 in. paper. Four original purchase order forms are printed for each book (Figure 3). The printout sheets are cut to provide standard 3 in. x 5 in. order forms. Since headings are underlined, preprinted forms are not necessary.

The four copies of the order form are distributed as follows: 1) vendor, 2) on-order file, 3) claim file, and 4) accession number file.

<p>25642 ITEM NO LC CARD NO 64-23889</p> <p>AUTHOR WEERTMAN,J</p> <p>TITLE ELEMENTARY DISLOCATION THEORY (PAPER)</p> <p>PUBLISHER MACMILLAN YEAR 1964 ED 01</p> <p>VOL COPY NO 01 ORD 06/12/67 LETTER REL 412</p> <p>ESI CDSI \$ 4.40 CDSI CODE 8071 QUANTITY 01</p> <p>REQUESTER LIB (KRAPP)</p> <p>1</p>	<p>25642 ITEM NO LC CARD NO 64-23889</p> <p>AUTHOR WEERTMAN,J</p> <p>TITLE ELEMENTARY DISLOCATION THEORY (PAPER)</p> <p>PUBLISHER MACMILLAN YEAR 1964 ED 01</p> <p>VOL COPY NO 01 ORD 06/12/67 LETTER REL 412</p> <p>ESI CDSI \$ 4.40 CDSI CODE 8071 QUANTITY 01</p> <p>REQUESTER LIB (KRAPP)</p> <p>2</p>
<p>25642 ITEM NO LC CARD NO 64-23889</p> <p>AUTHOR WEERTMAN,J</p> <p>TITLE ELEMENTARY DISLOCATION THEORY (PAPER)</p> <p>PUBLISHER MACMILLAN YEAR 1964 ED 01</p> <p>VOL COPY NO 01 ORD 06/12/67 LETTER REL 412</p> <p>ESI CDSI \$ 4.40 CDSI CODE 8071 QUANTITY 01</p> <p>REQUESTER LIB (KRAPP)</p> <p>3</p>	<p>25642 ITEM NO LC CARD NO 64-23889</p> <p>AUTHOR WEERTMAN,J</p> <p>TITLE ELEMENTARY DISLOCATION THEORY (PAPER)</p> <p>PUBLISHER MACMILLAN YEAR 1964 ED 01</p> <p>VOL COPY NO 01 ORD 06/12/67 LETTER REL 412</p> <p>ESI CDSI \$ 4.40 CDSI CODE 8071 QUANTITY 01</p> <p>REQUESTER LIB (KRAPP)</p> <p>4</p>

FIG. 3 BOOK ORDER PRINTOUT

BOOK CONTROL PROGRAM

The Book Control Program consists of five program steps (Figure 4 and Appendices B and C). Each program step, however, may be executed as a separate program. All update data for the Master File are submitted in a single card deck to the *Initial Scrub Program*. The work file produced by this program is used as input to the *Card Image Sort Program*. The sorted work file, the old Master File, and a Report Request File are input to the *Update and Report Program*, which produces a new Master File and also a Report Work File containing information pertinent to the reports requested. The old Master File is retained as a backup file. After the Report Work File is sorted by the *Report Sort Program*, the *Printout Program* uses the sorted work file to generate the report listings that have been requested.

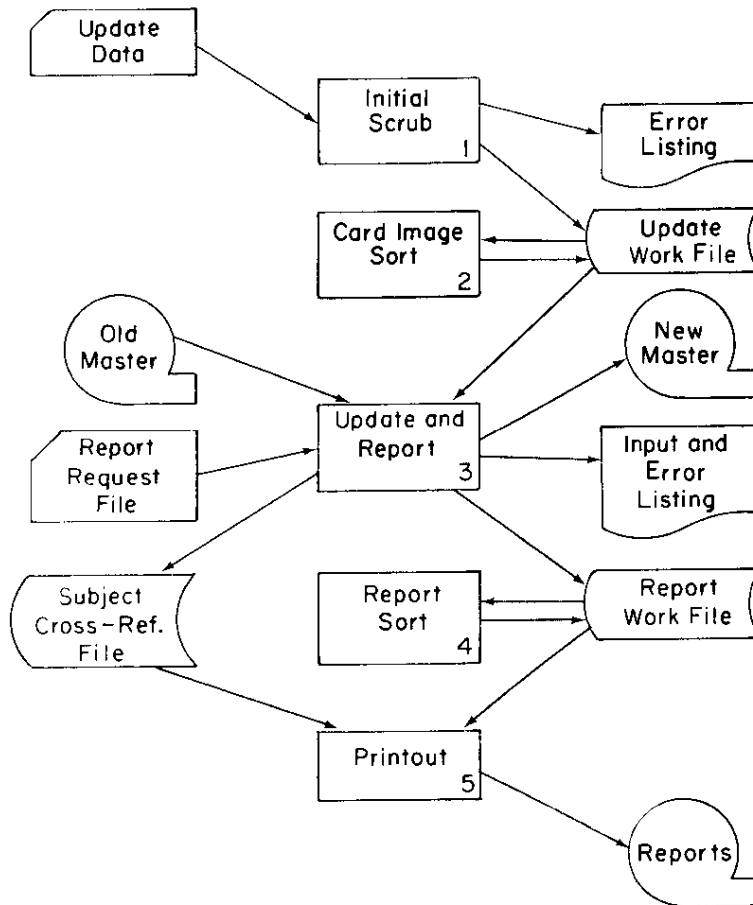


FIG. 4 BOOK CONTROL PROGRAM

Twenty-nine different request options can be reported. These output reports are parallel to and replace all cataloged, bibliographic, and accounting files that must be maintained by library personnel. Table I and Figure 5 list the report codes and report listings available. The master item is a major sort, and the cumulative item is a secondary sort.

					Report Code
(2)	* Author (36)	Title (95)	Item No 6		1, 2, 3, 4
(2)	Call No. (23)	Item No. (6)	Author (36)		5, 6
(2)	Cost Code (5)	Date Received (6)			7
(2)	Item No. (6)				8, 9
(2)	Series (72)	Series Identify (15)	Author (36)	Title (58 Positions)	10, 11, 12, 13
(2)	Subject (First Portion) (50)	Author (36)	Title (95)		14, 15
(2)	Title (95)	Author (36)	Call No. (23)		16, 17, 20, 21
(2)	Author (36)	Title (95)	Item No. (6)		18
(2)	Borrower (18)	Author (36)	Title (95)		19, 25
(2)	Requester (18)	Author (36)	Title (95)	Item No (6)	22, 23
(2)	Requester or Borrower (18)	Author (36)	Item No (6)	Title (95)	24, 26
(2)	Cross-Ref. Code (6)	Subject, Series, or Subject Cross-Reference Heading (72)	Subj. or Ser. No. (6)		28, 29

* Report Code Identification Number

(Not To Scale)

FIG. 5 SUMMARY OF REPORT SORT FIELDS

TABLE I

Request Options and Applications

Report Code	Request Option	
01	(master)	All books by author, title, and accession number.
02	(cumulative)	Books added since last master printout by author, title, and accession number.
Report codes 01 and 02 give complete listings of all books (library, departmental, surplus, lost) to replace master author file.		
03	(master)	All books with call number by author and then title.
04	(cumulative)	Books added since last master printout with call number by author and then title.
Report codes 03 and 04 give complete listings of all cataloged library material. Copies of this printout replace the author file in reading room and are sent to plant areas remote from the library.		
05	(master)	All books with call number by call number.
06	(cumulative)	Books with call number added since last master printout by call number.
Report codes 05 and 06 give complete listings of cataloged library material to replace shelf-list file, to provide subject bibliographies according to Library of Congress classification, and to facilitate shelf inventory.		
07	(master)	All books by departmental cost code and date received.
Report code 07 gives a complete listing of all books purchased by individual departments but not kept on Library shelves (desk copies).		
08	(master)	All books by accession number.

- 09 (cumulative) Books added since last master printout by accession number.

Report codes 08 and 09 give complete listings of all books to replace master accession number file and to provide accurate accounting for all library items.

- 10 (master) All books with series by series.

- 11 (cumulative) Books with series added since last master printout by series.

Report codes 10 and 11 give complete listings of all books to provide a master series listing.

- 12 (master) All books with call number and series by series.

- 13 (cumulative) Books with call number and series added since last master printout.

Report codes 12 and 13 give complete listings of all cataloged material to replace this portion of the card catalog.

- 14 (master) All books with call number by subject and then author.

- 15 (cumulative) Books with call number added since last master printout by subject and then author.

Report codes 14 and 15 give complete listings of all cataloged material to replace this portion of the card catalog. A book may be listed under as many as 11 different subjects.

- 16 (master) All books by title and then author.

- 17 (cumulative) Books added since last master printout by title and then author.

Report codes 16 and 17 give complete listings of all books and their present status, whether library or desk copies, surplus, or lost books.

- 18 (master) All books on loan by author and then title.

- 19 (master) All books on loan by borrower, then author and title.

Report codes 18 and 19 give two printouts to control the circulation of library material.

- 20 (master) All books with call number by title and then author.

- 21 (cumulative) Books with call number added since last master printout by title and then author.

Report codes 20 and 21 give complete listings of all cataloged material to replace this portion of the card catalog and to provide listing of new acquisitions. Several of the above listings could also be used for new acquisition lists for current awareness programs depending upon styles desired.

- 22 (master) All books without call number by requester, then author and title.

- 23 (cumulative) Books without call number added since last master printout by requester, author, and title.

Report codes 22 and 23 give complete listings of all departmental and desk copies, surplus, and lost books to eliminate a departmental book file.

- 24 (master) All books loaned to a particular individual.

Report code 24 is used for accounting purposes for an individual being transferred or terminated; also eliminates typing a list of an individual's books and gives in one print format the library copies and desk copies charged to that individual. (Upper limit of 200 requests per run.)

- 25 (master) All books with call number loaned to a particular individual. Printout lists borrower, author, and title.

Report code 25 is used for recall notices only. (Upper limit of 200 recall requests per run).

- 26 (master) All books without call number. Printout lists the author and the accession number.

Report code 26 is used for inventory of departmental or desk copies.

27 (master) All books cataloged under a particular subject.

Report code 27 is used for subject bibliographies. (Upper limit of 200 requests per run.)

28 (master) All series and subject codes with their corresponding alphabetic headings. (Used by Library personnel in assigning codes).

29 (master) All subject cross-references. (Used by Library personnel in assigning codes.)

- 19 (master) All books on loan by borrower, then author and title.

Report codes 18 and 19 give two printouts to control the circulation of library material.

- 20 (master) All books with call number by title and then author.

- 21 (cumulative) Books with call number added since last master printout by title and then author.

Report codes 20 and 21 give complete listings of all cataloged material to replace this portion of the card catalog and to provide listing of new acquisitions. Several of the above listings could also be used for new acquisition lists for current awareness programs depending upon styles desired.

- 22 (master) All books without call number by requester, then author and title.

- 23 (cumulative) Books without call number added since last master printout by requester, author, and title.

Report codes 22 and 23 give complete listings of all departmental and desk copies, surplus, and lost books to eliminate a departmental book file.

- 24 (master) All books loaned to a particular individual.

Report code 24 is used for accounting purposes for an individual being transferred or terminated; also eliminates typing a list of an individual's books and gives in one print format the library copies and desk copies charged to that individual. (Upper limit of 200 requests per run.)

- 25 (master) All books with call number loaned to a particular individual. Printout lists borrower, author, and title.

Report code 25 is used for recall notices only. (Upper limit of 200 recall requests per run).

- 26 (master) All books without call number. Printout lists the author and the accession number.

Report code 26 is used for inventory of departmental or desk copies.

APPENDIX A Data Input for Book Order Program

Three data cards (Figures 6 through 8) constitute the input to the Book Order Program. Data in all fields are left-justified unless otherwise noted. Periods are not used after initials or abbreviations.

[illegible]

<u>Column</u>	<u>Content</u>
1-36	Main author
37-68	Title (if longer than 32 characters, continued on card 2)
69-72	Blank
73	Type of record (used in Book Control Program only)
74	Card number (in this case, 1)
75-80	Accession number (unique identity of book)

FIG. 6 BOOK CARD 1

91	AWS	72071473013930071	LIBRARY	3.00	34194						
Ed	Vol	Publisher	Yr	Date Ordered	Cy	LR	Cost Code	Requester	E LC Cd No.	Est Cost	Access. No.
0000	0000000000000000	0000000000000000	000000	000000	000000000000	000000000000	000000000000	000000000000	000000000000	000000000000	000000000000
1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

STANDARD FORM 5001

Column	Content
1 - 2	Edition
3 - 4	Volume
5 - 20	Publisher
21 - 22	Year of publication
23 - 28	Date book ordered (leading zeros)
29 - 30	Copy number (indicates number of copies in library's collection; leading zeros)
31 - 33	Transmittal Letter number
34 - 38	Cost code to which book charged
39 - 56	Requester (an individual's name if book is desk copy; "library" if book is cataloged for the library's collection; can be used later to indicate "lost" or "surplus" items)
57	Expendable (term used for accounting purposes) normally blank.
58 - 64	Blank
65 - 70	Estimated cost of book (data not stored permanently; right justified)
71 - 72	Blank
73	Type of record (used in Book Control Program only)
74	Card number (in this case, 3)
75 - 80	Accession number

FIG. 8 BOOK CARD 3

SERIES DATA INPUT

Series data consist of a five-digit numeric code and a corresponding alphabetic prefix heading. These data are stored in card image form (Figure 10).

US NATL BUREAU OF STANDARDS SPECIAL TECHNICAL PUBLICATION		AS00576
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
28	29	30
31	32	33
34	35	36
37	38	39
40	41	42
43	44	45
46	47	48
49	50	51
52	53	54
55	56	57
58	59	60
61	62	63
64	65	66
67	68	69
70	71	72
73	74	75
76	77	78
79	80	81
82	83	84
85	86	87
88	89	90
91	92	93
94	95	96
97	98	99
100	101	102
103	104	105
106	107	108
109	110	111
112	113	114
115	116	117
118	119	120
121	122	123
124	125	126
127	128	129
130	131	132
133	134	135
136	137	138
139	140	141
142	143	144
145	146	147
148	149	150
151	152	153
154	155	156
157	158	159
160	161	162
163	164	165
166	167	168
169	170	171
172	173	174
175	176	177
178	179	180
181	182	183
184	185	186
187	188	189
190	191	192
193	194	195
196	197	198
199	200	201
202	203	204
205	206	207
208	209	210
211	212	213
214	215	216
217	218	219
220	221	222
223	224	225
226	227	228
229	230	231
232	233	234
235	236	237
238	239	240
241	242	243
244	245	246
247	248	249
250	251	252
253	254	255
256	257	258
259	260	261
262	263	264
265	266	267
268	269	270
271	272	273
274	275	276
277	278	279
280	281	282
283	284	285
286	287	288
289	290	291
292	293	294
295	296	297
298	299	300

Column	Content
1	Blank (to differentiate Subject from Series)
2 - 72	Series heading
73	Type of record (A, C, or D - see Fig. 9)
74	S (to indicate series file)
75 - 80	Series code number

FIG. 10 SERIES INPUT CARD

These data input "see" and "see also" references to the program. A subject cross-reference record consists of a five-digit numeric code and a corresponding alphabetic prefix heading. This record is stored in card image form (Figure 11).

```

SEE CHEMISTRY, ANALYTIC
ANALYTICAL CHEMISTRY
A #13322
A #13321

```

<u>Column</u>	<u>Content</u>
1 - 72	Cross-reference heading
73	Type of record (A, C, or D - see Fig. 9)
74	Blank
75	9,1 multiple punch
76 - 79	Cross-reference code number
80	1 (to indicate "see from" reference) or 2 (to indicate "see" reference)

FIG. 11 SUBJECT CROSS-REFERENCE CARD

The Master File also contains *book information*. As many as nine different card formats may be used. Cards 1 through 4 contain the primary information and are always necessary (Figures 6-8 and 12). Cards 5 through 8 contain secondary information such as subject codes and alternate title or author (Figures 13-16). Card 9, the charge-out card, contains information pertaining to the loan of the book (Figure 17). Cards 5 through 9 are optional. It is not necessary that the card input be in order. Charge-out cards, deletion cards, change cards, and new-book cards can be submitted simultaneously and in any order.

[illegible]

<u>Column</u>	<u>Content</u>
1 - 6	Date book received (leading zeros)
7 - 12	Price of book before discount (right justified)
13 - 16	Percent discount on price of book (leading zero)
17 - 20	Pagination (right justified)
21 - 43	Call number (expanded beyond normal form) ^a

FIG. 12 BOOK CARD 4 (Primary Information)

21 - 22	Alphabetic field (left justified)
23 - 26	Numeric field (right justified, leading zeros)
27	Decimal
28 - 29	Numeric field (left justified, zeros to right)
30	Alphabetic field (blank if no subdivision)
31 - 32	Numeric field (left justified, zeros to right)
33	Alphabetic field (author letter; will always appear)
34 - 36	Numeric field (Cutter number, left justified, zeros to right)
37 - 40	Alphabetic field (indicates form of material such as directory, bibliography, etc; left justified; remainder of field blank)
41 - 43	Alphabetic field (indicates reference material; will always be "ref" or blank)
44 - 49	Numeric series code indicating series ^b of which book is a part (leading zeros or blank if the book is not part of a series)
50 - 64	Series identity (such as Handbook 4 or Bulletin 304)
65 - 72	Blank
73	Type of record (A, C, or D - see Fig. 9)
74	Card number (in this case, 4)
75 - 80	Accession number

-
- a.* As indicated, the call number of a book is entered in expanded form to facilitate sorting. On a final printout, however, the call number will appear in its normal form.
- b.* A series of publications issued with some regularity usually by the same publisher and with related subject matter, formats, etc.

FIG. 12 BOOK CARD 4 (Continued)

[illegible]

<u>Column</u>	<u>Content</u>
1 - 66	6 column subject codes for 11 subjects. Subject codes are 5-digit numbers (right-justified with leading zeros) and an alphabetic character or blank in the sixth column.
67 - 72	Blank
73	Type of record (A, C, or D - see Fig. 9)
74	Card number (in this case,
75 - 80	Accession number

FIG. 13 BOOK CARD 5 (Numeric Codes for Subject Headings)

SMITH, JA		773A	111773	C924194	
Read	Borrower	Bldg	Date	Record	Access.
				No.	

Charge-Out Card

TIS LIBRARY

Savannah River Laboratory

NAME & INITIALS
PLEASE PRINT → Smith, J. A

BUILDING → 773-A

DATE → 11-17-73

Column	Content
1	Blank if book presently loaned; "R" if book returned
2 - 6	Blank
7 - 24	Borrower's name
25 - 30	Borrower's address
31 - 36	Date borrowed
37 - 72	Blank
73	Type of record (always C; prepunched)
74	Card number (in this case, 9)
75 - 80	Accession number

FIG. 17 BOOK CARD 9 (Charge-Out)

To add a new-book record to the Master File only Cards 1 through 4 are necessary. Card 2 can be deleted from the book order deck if the title is complete on Card 1.

To update an existing book record, a change card is necessary. The type of record code is always C. The card number is the same as for input for a new book record. Only the card containing the field to be changed is submitted. For example, to correct the main author entry, the following card (Figure 18) must be submitted.

[illegible]

FIG. 18 CHANGE CARD FORMAT (Update or Correction)

To delete a complete book record, a punched card containing only the accession number and the type of record code is submitted (Figure 19).

[illegible]

<u>Column</u>	<u>Content</u>
1 - 72	Blank
73	Type of record (a 7,9 multiple punch indicates deletion of whole book record)
74	Card number (cards 1 through 9 could be used; however, for convenience, card 1 is almost always shown here)
75 - 80	Accession number

FIG. 19 BOOK DELETION FORMAT

To delete one card image of a book record, a punched card containing the accession number, card number, and type of record code is submitted. For example, the card below (Figure 20) will delete the card image for a Card 6.

<u>Column</u>	<u>Content</u>
1 - 71	Blank
72	1, 2, or 3 to indicate which Card 6 out of a possible 3 is to be deleted.
73	D (to indicate deletion card)
74	Card number (in this case, 6)
75 - 80	Accession number

- 35 -

To receive any of the report options the card shown in Figure 21 must appear first in the request deck.

[illegible]

<u>Column</u>	<u>Content</u>
1 - 29	Asterisks are punched in each column whose number corresponds to the code number of the reports requested. (Refer to Table I and Figure 5.)
30 - 74	Blank
75 - 80	REPTNO

FIG. 21 REPORT REQUEST CARD

[illegible]

FIG. 22 REQUEST CARD FOR REPORT CODE 24
(All Books Charged to an Individual)

To secure Report Code 25 (Recall notices) the loan cards (Figure 23) are sorted and the deck fed to the computer. No new cards need to be punched.

SMITH, JA		773A	111773	C924194	
Reel	Borrower	Bldg	Date	Access.	No.
<div style="display: flex; justify-content: space-between;"> <div> <p>Charge-Out Card</p> <p>TIS LIBRARY</p> <p>Savannah River Laboratory</p> </div> <div> <p>NAME & INITIALS PLEASE PRINT → Smith, J. A</p> <p>BUILDING → 773-A</p> <p>DATE → 11-17-73</p> </div> </div>					

FIG. 23 LOAN CARD SUBMITTED FOR REPORT CODE 25 (Recall Notices)

[illegible]

FIG. 24 REQUEST CARD FOR REPORT CODE 27
(All Books Cataloged under a Single Subject)

[illegible]

- 40 -

APPENDIX C Functional Operation of the Book Control Program

INITIAL SCRUB (Step 1)

The Initial Scrub Program (Figure 26) transfers all update data (new data, changes, and deletions) from punched cards to a Data Set Work File. At the same time the program "scrubs" the input data for errors, such as an incorrect card or record number.

Input to the Initial Scrub Program are punched cards containing all update data for the Master File. This includes additions, corrections, and deletions for subject and series, subject cross-references, and book data. There is no limit on the number of cards that can be entered. They are submitted as a card deck and in any order.

Output from the Initial Scrub Program is a Data Set Work File containing the card images of the input data cards, excluding any which were deleted by the scrub. A printout listing additions, changes, and errors (Appendix D) found by the scrub routine is also generated by Step 1.

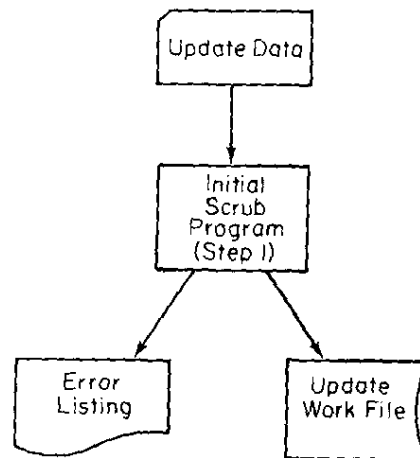


FIG. 26 FLOWCHART FOR INITIAL SCRUB PROGRAM

CARD IMAGE SORT PROGRAM (Step 2)

The Card Image Sort Program performs a major sort by accession number, and secondary sorts by record type, card number, and then an added entry number. Control information for this sort is supplied to the Operating System/360 Sort/Merge Program.

Input is the Data Set Work File from Step 1.

Output is the sorted data on a Data Set Work File. This file is one source of input for Step 3 (Figure 27).



FIG. 27 FLOWCHART FOR CARD IMAGE SORT PROGRAM

UPDATE AND REPORT PROGRAM (STEP 3)

The Update and Report Program (Figure 28) performs five main functions:

1. Adds a new record to the Master File
2. Changes an existing record in the Master File.
3. Deletes an existing record on the Master File.
4. Identifies book records relevant to the report requests received.
5. Stores pertinent data in formats designed to facilitate sorting.

Update Functions

The update function to be performed is determined by the record code punched in each card (see card formats).

The first part of the Master File to be updated is the series and subject data. Library personnel have the option of adding, changing, or deleting any subject or series data.

The Master File entries are updated sequentially on the basis of subject or series code numbers. Because the subject and series file is too large to warrant storing all of it in the memory core, a direct access method is used to perform the operation of retrieving the proper heading for a numeric code.

As the Master File is being updated, each subject or series entry is written on a temporary file. When all entries have been processed, the temporary file is written on a direct access device utilizing relative organization. This new Direct Access File is now used throughout Step 3 (Update and Report Program) as a relatively organized Random Access File to replace subject and series codes with their corresponding headings.

The next portion of the Master File, the subject cross-reference data, is also updated sequentially according to code number. If Report Code 14 is requested (Table I), the cross-reference data are written on a temporary file to be passed as input to Step 5 (Printout Program). This temporary file is generated as the Cross-Reference Master File is updated.

The final portion of the Master File to be updated is the book information. Here again data may be added, changed, or deleted. The Update and Report Program (Step 3) stores the data (as few as 3 or as many as 13 punched cards per book record) into a data bank as card images. The program ascertains for each new book record that the correct number of cards has been submitted in Step 1 and that the accession number has not been assigned previously to another book. If one or more of the three cards containing primary information is omitted (Cards 1, 3, and 4), an error message is generated, and the book is not added to the Master File.

Once a book has been added to the Master File, any additional data must be submitted as a "change" record. To change data in an existing book record, only those cards containing the fields which are to undergo change are submitted. The Update and Report Program matches the accession number of the change card with the accession number of an existing card image. Each field of the change card is checked to see if it is blank. The contents of a non-blank field replace the contents of a corresponding field in the existing record.

To blank out a call number, series, subject, or the term "expendable," an asterisk is punched in the first column of that data field. The program checks for an asterisk and sets the corresponding field to blanks.

The accession number of a book can never be changed. If attempted, however, an error message is generated, and the complete book record must be deleted and re-added with the corrected accession number.

To delete an existing card image in a book record, the Update and Report Program matches the accession number and the card number of the change card with an existing card image. The matching record remains on the old Master File and is not transferred to the new Master File. Similarly, a complete book record may be deleted from the Master File with only the accession number of the update card being matched with the accession number of an existing book record. All card images having this accession number are deleted from the Master File.

Report Functions

Reports, or listings, are requested by use of a Report Code (Table I). Each complete book record is examined to see if it is relevant to the requested reports; if so, it is written in a work data set in a format that will facilitate sorting in the Report Sort Program (Step 4).

In a cumulative printout, the program first examines a record to see if it is pertinent to the report requested and then determines if the book is already on a corresponding master report. In a master printout, the program determines only if the book record is pertinent to the report requested.

As a book is added to a master report, the book record is flagged to indicate it should not appear on any subsequent corresponding cumulative printouts. Library personnel request cumulative reports as supplements to a master printout. When the supplements become too large and cumbersome, a new master printout is requested.

Input for Update and Report Program is:

- 1) old Master File
- 2) Request Option (Report Code) punched card
- 3) sorted update work file generated in Step 2

Output for this program is

- 1) new Master File
- 2) report work file
- 3) cross-reference file
- 4) input and error listing

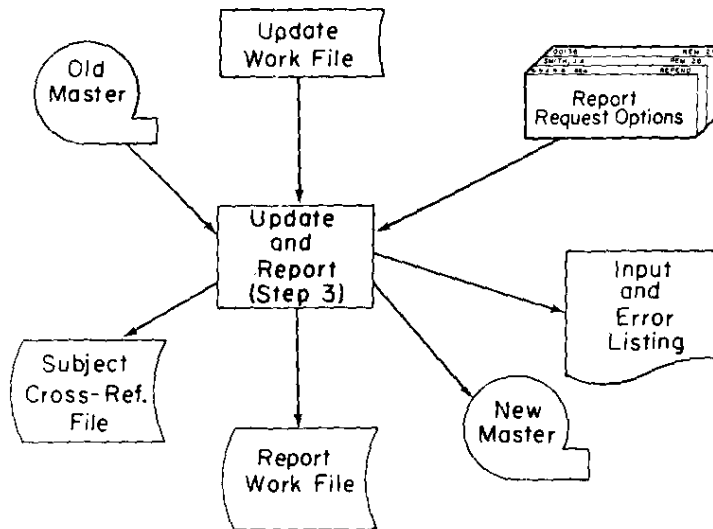


FIG. 28 REPORT FLOW CHART

REPORT SORT PROGRAM (STEP 4)

The Report Sort Program uses the Operating/360 Sort/Merge Program.

Input is the work file containing report information produced in Step 3.

Output is the sorted work file to be used as input to Step 5.

This program sorts the information into the selected Report Codes (1 to 29 - see Table I and Figure 5).

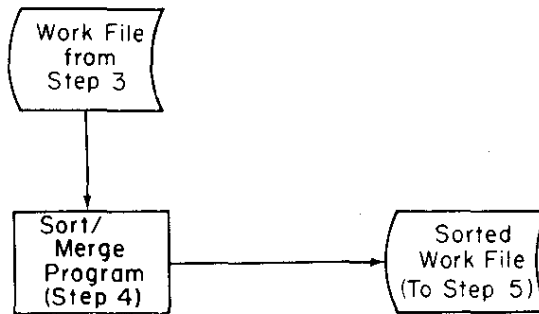


FIG. 29 FLOWCHART FOR REPORT SORT PROGRAM

PRINTOUT PROGRAM (STEP 5)

The Printout Program arranges and lists the information from the sorted report work file into proper formats for the requested report codes (Figure 30).

Input is the sorted work file generated in Step 4 and the temporary cross-reference file generated in Step 3.

Output is the report listings as requested by designated report codes.

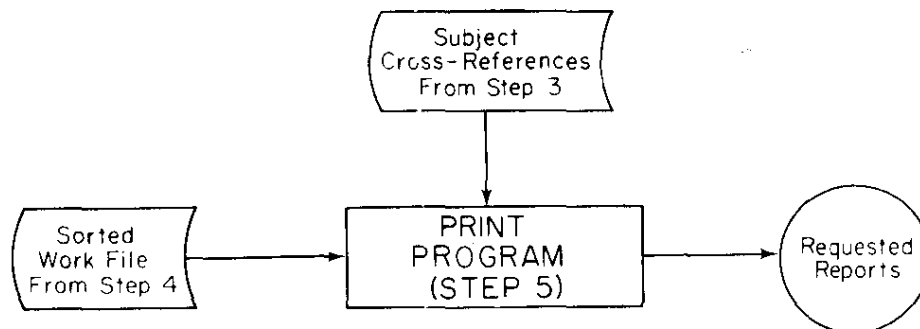


FIG. 30 FLOWCHART FOR PRINT PROGRAM

Examples of each type of listing obtainable from the Printout Program appear in Figures 31 through 49.

```

AMER NUCLEAR SOCIETY
NUCLEAR SAFETY CRITERIA FOR THE DESIGN OF STATIONARY GAS COOLED REACTOR PLANTS (DRAFT)
TK9203.G4A5 REF 01 ED VOL ANS 1974
32917 NO. 23 AMER NUCLEAR SOCIETY STANDARD

AMER NUCLEAR SOCIETY SEE- WHEELWRIGHT,EJ
PROMETHIUM TECHNOLOGY

AMER PUBLIC HEALTH ASSN
STANDARD METHODS FOR THE EXAMINATION OF WATER & WASTEWATER
HURLEY,J 13 ED VOL APHA 1971
31755

```

FIG. 31 ALL BOOKS BY AUTHOR, TITLE, AND ACCESSION NUMBER
(Report Codes 1 and 2)

```

AMER SOC FOR METALS
SOLIDIFICATION; PAPERS PRESENTED AT A SEMINAR, 1974
QC145.H35 01 ED VOL STANFORD U PR 1974
32904

AMER SOC FOR TESTING & MATLS
ANNUAL BOOK OF ASTM STANDARDS 1974
TA401.A653 REF 01 ED VOL 01 ASTM 1974
32774

AMER SOC FOR TESTING & MATLS
ANNUAL BOOK OF ASTM STANDARDS 1974
TA401.A653 REF 01 ED VOL 02 ASTM 1974
32775

```

FIG. 32 ALL BOOKS WITH CALL NUMBER BY AUTHOR AND TITLE
(Report Codes 3 and 4)

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QA76.53652B1BL
BLANC,RP GPO 1973
ANNUJED BIBLIOGRAPHY OF THE LITERATURE ON RESOURCE SHARING COMPUTER NETWORKS 01 ED VOL 90P
NO. 384 US NATL BUKEAU OF STANDARDS SPECIAL PUBLICATION
33010 01. ELECTRONIC DATA PROCESSING
02. COMPUTER NETWORKS

QA374.Y25
YANENKO,NN SPRINGER-VERLAG 1971
METHOD OF FRACTIONAL STEPS; THE SOL OF PROBLEMS OF MATHEMATICAL PHYSICAL IN SEVERAL VARIABLES 01 ED VOL 160P
32568 01. DIFFERENTIAL EQUATIONS, PARTIAL--NUMERICAL SOLUTIJS
02. HOUNDARY VALUE PROBLEMS
03. MATHEMATICAL PHYSICS

```

FIG. 33 ALL BOOKS WITH CALL NUMBER BY CALL NUMBER
(Report Codes 5 and 6)

8210 GUIDE TO FORTRAN IV PROGRAMMING
MC CRACKEN,DD WILEY 1965
RECD 11/04/71 COST \$ 4.95 DISCOUNT 15.0 VOL 30279
GORKRELL,TC

8211 ALGEBRAIC EIGENVALUE PROBLEM
WILKINSON,JM OXFORD U PRESS 1965
RECD 03/14/67 COST \$ 17.80 DISCOUNT 10.0 VOL 25196
CHURCH,JP

8211 ITERATIVE SOLUTION OF ELLIPTIC SYSTEMS & APPLICATIONS
WACHSPRESS,EL PRENTICE-HALL 1966
RECD 03/20/67 COST \$ 13.50 DISCOUNT 10.0 VOL 25157
CHURCH,JP

FIG. 34 ALL BOOKS BY DEPARTMENTAL COST CODE AND DATE RECEIVED
(Report Code 7)

14003
AMER NATL STANDARDS INSTITUTE ANSI 1972 OKD 07/23/73 RECD 08/21/73 LETTER REL 8P
STATISTICAL TERMINOLOGY & NOTATION FOR NUCLEAR MATERIALS MANAGEMENT
N 15. 5-1972 AMER NATIONAL STANDARDS INSTITUTE
HD9698.A22A51 REF 8071 COST \$ 2.50 DISCOUNT COPY 01

14309
AMER NATL STANDARDS INSTITUTE ANSI 1972 OKD 07/23/73 RECD 08/21/73 LETTER REL 15P
CRITERIA FOR FILM BADGE PERFORMANCE
N 13. 7-1972 AMER NATIONAL STANDARDS INSTITUTE
QC787. C6A55 REF 8071 COST \$ 3.50 DISCOUNT COPY 01

FIG. 35 ALL BOOKS BY ACCESSION NUMBER (Report Codes 8 and 9)

NU. 24 CHEMICAL SOCIETY, LONDON SPECIAL PUBLICATION
CHEMICAL SOCIETY, LONDON
ESSAYS ON FREE-RADICAL CHEMISTRY
3063C
QD471.C516

NU. 25 CHEMICAL SOCIETY, LONDON SPECIAL PUBLICATION
CHEMICAL SOCIETY, LONDON
STABILITY CONSTANTS OF METAL-ION COMPLEXES SUPPL
30201
BAUMANN,EW

FIG. 36 ALL BOOKS WITH SERIES BY SERIES (Report Codes 10 and 11)

NU. 8 CHEMICAL ENGINEERING PROGRESS SYMP SERIES
AMER INST OF CHEMICAL ENGINEERS
COMMUNICATIONS
1224E
MF5353.A53

NU. 10 CHEMICAL ENGINEERING PROGRESS SYMP SERIES
AMER INST OF CHEMICAL ENGINEERS
COLLECTED RESEARCH PAPERS FOR SPRING 1954
1164L
QD455.A56

FIG. 37 ALL BOOKS WITH CALL NUMBER AND SERIES BY SERIES
(Report Codes 12 and 13)

AGRICULTURAL RESEARCH--RUSSIA
 MICKF,A
 ISOTOPES & RADIATION IN AGRICULTURAL RESEARCH IN THE SOVIET UNION; REPORT OF STUDY TOURS
 5889.5M52
 32832
 01 ED VOL 108P 1973 UNIPUB

AIR COMPRESSORS
 COMPRESSED AIR & GAS INSTITUTE
 COMPRESSED AIR & GAS HANDBOOK REF BOOK ALL PHASES INDUSTRIAL AIR & GAS COMPRESSORS
 1J985.C6
 33251
 01 ED VOL P 1973 CAGI

AIR QUALITY
 LINCH,AI
 EVALUATION OF AMBIENT AIR QUALITY BY PERSONNEL MONITORING
 TD890.L56
 30886
 01 ED VOL 226P 1974 CRC PRESS

FIG. 38 ALL BOOKS WITH CALL NUMBER BY SUBJECT AND AUTHOR
(Report Codes 14 and 15)

FUEL & FUEL ELEMENTS FOR FAST REACTORS; PROCEEDINGS OF A SYMPOSIUM, 1973
 INTERNATL ATOMIC ENERGY AGENCY
 TK9203.F4147
 33121
 01 ED VOL 01 P 1974 UNIPUB

FUNDAMENTALS GOVERNING THE DESIGN & OPERATION OF LOCAL EXHAUST SYSTEMS
 AMER NATL STANDARDS INSTITUTE
 CROLEY,JJ
 33245
 01 ED VOL 2 9-2-1971 P 1971 ANSI AMER NATIONAL STANDARDS INSTITUTE

GLOBAL TECTONICS & EARTHQUAKE RISK
 LOMNITZ,C
 QE501.L64
 32755
 01 ED VOL 5 320P 1974 AM ELSEVIER DEVELOPMENTS IN GEOTECTONICS

FIG. 39 ALL BOOKS BY TITLE AND AUTHOR (Report Codes 16 and 17)

ALLEN,AM PHOTOMICROGRAPHY WARKEN,TJ	BLOG 773A	15682	QH251.A42	02 ED	VOL	10/27/70
ALLEN,MP PRACTICAL REFRACTOMETRY BY MEANS OF THE MICROSCOPE EDGAR,WF	BLOG 772D	11442	QC337.A4	01 ED	VOL	11/05/72
ALLEN,T PARTICLE SIZE MEASUREMENT SHEFFAN,JF	BLOG 773A	30660	TA418.8A43	01 ED	VOL	05/14/73

FIG. 40 ALL BOOKS ON LOAN BY AUTHOR AND TITLE (Report Code 18)

BETHMANN,HK GLASSTONE,S ELEMENTS OF PHYSICAL CHEMISTRY	BLOG 221H	17239	QD453.G56	02 ED	VOL	08/25/70
BETHMANN,HK PRANDTL,L ESSENTIALS OF FLUID DYNAMICS	BLOG 221F	4645	QA911.P714	01 ED	VOL	07/11/66
BETHMANN,HK SHERWOOD,TK ABSORPTION & EXTRACTION	BLOG 221F	1738	TP156.A355	03 ED	VOL	04/25/66

FIG. 41 ALL BOOKS ON LOAN BY BORROWER, AUTHOR, AND TITLE
(Report Code 19)

FREQUENCY RESPONSE TESTING IN NUCLEAR REACTORS			
KERLIN,TW	ACADEMIC	1974	
TK9202,K4			
32610	01 ED VOL	175P	
FUEL & FUEL ELEMENTS FOR FAST REACTORS; PROCEEDINGS OF A SYMPOSIUM 1973			
INTERNATL ATOMIC ENERGY AGENCY	UNIPUB	1974	
TK9203,F4147			
33190	01 ED VOL 02	P	

FIG. 42 ALL BOOKS WITH CALL NUMBER BY TITLE AND AUTHOR
(Report Codes 20 and 21)

*HATLEY,V						
HARKS,L	MCGRAW-HILL	07 ED VOL	P	1967		
STANCAKE HANDBOOK FOR MECHANICAL ENGINEERS						COST-CODE 8310
32171	CRD 12/05/73 RECD 08/06/74					
*HATLEY,V						
SQUIDERS,M	WILEY	01 ED VOL	P	1966		
ENGINEERS COMPANION						COST-CODE 8310
3291C	ORD 05/24/74 RECD 06/22/74					
*WINDO,HE						
COLLIER,JG	MCGRAW-HILL	01 ED VOL	P	1972		
CONVECTIVE BOILING & CONDENSATION						COST-CODE 8310
33058	CRD 07/17/74 RECD 08/19/74					

FIG. 43 ALL BOOKS WITHOUT CALL NUMBER BY REQUESTER, AUTHOR,
AND TITLE (Report Codes 22 and 23)

GORRELL,TC

THE FOLLOWING BOOKS ARE CHARGED TO YOU FROM TIS LIBRARY.
THOSE WITH CALL NUMBERS ARE FROM THE CIRCULATION DESK,
THOSE WITHOUT CALL NUMBERS ARE DESK COPIES.

TK2896.A2	AMER INST OF AERONAUTICS & ASTRONCS	14694
	INTER-SOCIETY ENERGY CONVERSION ENGINEERING CONF PHILADELPHIA 1973	
TK2896.A2	AMER INST OF AERONAUTICS & ASTRONCS	14694A
	INTER-SOCIETY ENERGY CONVERSION ENGINEERING CONF PHILADELPHIA 1973 ADDENDUM	
	ETHERINGTON,H	19857
	NUCLEAR ENGINEERING HANDBOOK	
	MC CRACKEN,DD	30279
	GUIDE TO FORTRAN IV PROGRAMMING	

FIG. 44 ALL BOOKS LOANED TO A BORROWER BY EITHER
REQUESTER OR BORROWER (Report Code 24)

TO GOULD,TH
BLDG. 773A

THE FOLLOWING BOOK(S) HAVE BEEN ON LOAN TO YOU FOR MORE THAN TWO WEEKS AND HAVE BEEN REQUESTED BY OTHER PERSONNEL. PLEASE RETURN TO

TIS LIBRARY BLDG 773A

COTTRELL,AH DISLOCATIONS & PLASTIC FLOW IN CRYSTALS	QD945.C6	21090	11/27/73
MC CRACKEN,DD NUMERICAL METHODS + FORTRAN PROGRAMMING, WITH APPLICATIONS IN ENGINEERING + SCIENCE	QA76.5M187	22728	12/13/74
MC LEAN,WC SCHAUMS OUTLINE OF THEORY & PROBLEMS OF ENGINEERING MECHANICS	TA350.M1	15144	11/04/74

FIG. 45 ALL BOOKS WITH CALL NUMBER LOANED TO A BORROWER BY BORROWER, AUTHOR, AND TITLE (Report Code 25)

TO BOWERS,BL

THE FOLLOWING BOOKS ARE CHARGED TO YOU AS DESK COPIES. IF ANY OF THESE ARE LOST, DESTROYED, OR TRANSFERRED TO OTHER PERSONNEL, PLEASE INDICATE ON THIS SLIP AND RETURN TO TIS LIBRARY.

US DEPT OF DEFENSE	PRODUCTION EQUIPMENT DIRECTORY,
13 ITEM NO RE ED VOL	

FIG. 46 ALL BOOKS WITHOUT CALL NUMBER BY REQUESTER, AUTHOR, AND ACCESSION NUMBER (Report Code 26)

OZONE			
INTERNATL OZONE CONFERENCE	ACS	1959	
OZONE CHEMISTRY + TECHNOLOGY, PROCEEDINGS, CONFERENCE, CHICAGO, 1956			
QD181.O115	01 ED VOL	465P	
22351 NO. 21	AMER CHEMICAL SOCIETY	ADVANCES IN CHEMISTRY SERIES	
JOHNSTON,MS	GPO	1968	
GAS PHASE REACTION KINETICS OF NEUTRAL OXYGEN SPECIES			
QD181.O1J5	01 ED VOL	49P	
2946 NO. 20	US NATL BUREAU OF STANDARDS	US NATL STANDARD REFERENCE DATA SERIES	
SMITH,MM	PRINCETON U	1958	
SELECTED BIBLIOGRAPHY ON LIQUID OZONE-OXYGEN MIXTURES AS ROCKET OXIDIZERS			
QD181.O1S65B1BL	01 ED VOL	38P	
870 NO. 14	PRINCETON UNIV	LITERATURE SEARCH	

FIG. 47 ALL BOOKS CATALOGED UNDER A PARTICULAR SUBJECT (Report Code 27)

10975	INTERSTELLAR MATTER
10980	INTERVIEWING
10982	INVARIANT IMBEDDING
10982F	INVARIANTS
10990	INVENTIONS

FIG. 48 ALL SERIES AND SUBJECT CODES WITH THEIR CORRESPONDING ALPHABETIC HEADINGS (Report Code 28)

01201 ALIPHATIC CYCLIC COMPOUNDS
01202 SEE - ALICYCLIC COMPOUNDS
01251 ALTERNATING CURRENT
01252 SEE - ELECTRIC CURRENTS, ALTERNATING
01301 ALUMINUM ALLOY FORGINGS
01302 SEE - ALUMINIUM FORGINGS

FIG. 49 ALL SUBJECT CROSS REFERENCES
(Report Code 29)

APPENDIX D Input and Error List for Update Program

ADD S-S	The information on the following card was added to the Master File as a subject or series entry.
CH S-S	The subject or series heading on the following card replaced the subject or series heading with the corresponding code number in the Master File.
DE S-S	The following subject or series entry was deleted from the Master File.
ADD XREF	The information on the following card was added to the Master File as a subject cross-reference entry.
CH XREF	The cross-reference heading on the following card replaced the cross-reference heading with the corresponding code number on the Master File.
DE XREF	The following subject cross-reference entry was deleted from the Master File.
ADD	The information on the following card was added to the Master File as a part of a book entry.
CH	The items shown on the following card have replaced corresponding fields in an existing book record.
DE 1	The following card image was deleted from an existing book record on the Master File.
DE	The following complete book record was deleted from the master tape.
ERROR-1	The following new book record card has the same accession number as an existing book record. This card has been discarded.
ERROR-4	More than one Card 1 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-5	More than one Card 2 with the same accession number has been submitted for a new book record. This card has been discarded.

ERROR-6 More than one Card 3 with the same accession number has been submitted for a new book record. This card has been discarded.

ERROR-7 More than one Card 4 with the same accession number has been submitted. This card has been discarded.

ERROR-8 More than three Card 6's with the same accession number have been submitted for a new book record. This card has been discarded.

ERROR-9 More than three Card 7's with the same accession number have been submitted for a new book record. This card has been discarded.

ERROR-10 More than one Card 5 with the same accession number has been submitted for a new book record. This card has been discarded.

ERROR-11 More than one Card 8 with the same accession number has been submitted for a new book record. This card has been discarded.

ERROR-12 More than one Card 9 with the same accession number has been submitted for a new book record. This card has been discarded.

ERROR-14 No existing book record has the same accession number as this change or deletion card. This card has been discarded.

ERROR-30 An incomplete set of new book record cards has been submitted. These cards have been discarded. The cards necessary for a complete set are Cards 1, 3, and 4.

ERROR-40 The subject (or series) code indicated in the message was not found in the subject (or series) file. Cards 4, 5, and 8 are printed on the error report to facilitate locating the bad code.

ERROR-65 The following new subject or series record has the same code number as an existing subject or series record. This card has been discarded.

ERROR-70 No existing subject or series record has the same code number as this correction or deletion card. This card has been discarded.

ERROR-75 This new subject or series code number was submitted more than once. This card has been discarded.

- ERROR-80 The following new subject cross-reference record has the same code number as an existing subject cross-reference record. This card has been discarded.
- ERROR-85 No existing subject cross-reference record has the same code number as this change or deletion card. This card has been discarded.
- ERROR-90 This new subject cross-reference code number was submitted more than once. This card has been discarded.