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EDP PROCEDURES IN TECHNICAL LIBRARY OPERATIONS

Hillis L. Griffin

**PHILLIPS
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ATOMIC ENERGY DIVISION

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PHILLIPS
PETROLEUM
COMPANY

Atomic Energy Division

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U. S. ATOMIC ENERGY COMMISSION

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Hillis L. Griffin*

ABSTRACT

Library procedures employing electronic data processing (EDP) equipment are described. Systems for circulation control, book ordering, journal renewal, printing a book catalog, preparing monthly acquisitions lists, and other activities are explained. Complete operating instructions are given for all systems, and IBM 1401 programs are included for many of the systems. Control panel wiring diagrams are also given for those systems which may be accomplished on the IBM 407 accounting machine.

The systems were developed in the Technical Library at the National Reactor Testing Station in Idaho, operated for the U. S. Atomic Energy Commission by the Atomic Energy Division of Phillips Petroleum Company.

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CONTENTS

INTRODUCTION	1
PRINTED LIST OF JOURNAL HOLDINGS	2
General Description of the Procedure	2
Preparation of the List	2
Card Format	3
System Operation	4
BOOK LISTS AND PRINTED CATALOG	7
General Description of the Procedure	7
System Operation	7
Card Format	8
Operating Procedures	10
BOOK PURCHASING WITH EDP EQUIPMENT	17
System Operation	18
Procedure for Material Received	22
Preparation of Finance Summaries	22
JOURNAL RENEWAL	26
Card Format	26
System Operation	27
CIRCULATION PROCEDURES	31
Check-in Procedures	34
Inventory and Overdues	35
TEXT BOOK ORDERING FOR THE NRTS EDUCATION PROGRAM	38
APPLICATION OF PUNCHED CARDS TO THE HANDLING OF TECHNICAL REPORTS	39
EQUIPMENT AND TRAINING	40
APPENDIX A POST LIST OF 1401 <u>UNION</u> LIST PROGRAM	43
APPENDIX B-1 <u>MOBK 1</u> POST LIST	44
APPENDIX B-2a 407 WIRING CHART	47
APPENDIX B-2b 407 WIRING CHART	49
APPENDIX C PREPARATION OF MULTIPLE COPY BOOK ORDER FORMS ON THE IBM 407 ACCOUNTING MACHINE	51

APPENDIX D	<u>BOOK 1</u> POST LIST	57
APPENDIX E-1	<u>VSUM 1</u> POST LIST	61
APPENDIX E-2	<u>VSUM 2</u> POST LIST	63
APPENDIX F-1	<u>ANPER</u> POST LIST	66
APPENDIX F-2	<u>RECVR</u> POST LIST	70
APPENDIX F-3	<u>PORDR</u> MOD. I POST LIST	73
APPENDIX G	<u>CIRCN</u> POST LIST	78
APPENDIX H	<u>BUGLR</u> POST LIST	82
APPENDIX I	<u>JBACK</u> POST LIST	84

FIGURES

Fig. 1	Card layout form for journal holdings listing	4
Fig. 2	Sample of printed journal listing	5
Fig. 3	Flow sheet for journal listing	6
Fig. 4	Work card for book catalog	8
Fig. 5	Card layout form for book catalog	9
Fig. 6	Cards for one title, and print out	11
Fig. 7	Flow sheet for book list	12
Fig. 8	Subject authority file	15
Fig. 9	Book order slips	18
Fig. 10	Search card	19
Fig. 11	Card layout form for book orders	19
Fig. 12	Flow sheet for book purchasing	21
Fig. 13	No figure 13	
Fig. 14	Sample of VSUM1 print out	23
Fig. 15	Sample of VSUM2 print out	23
Fig. 16	Flow sheet for receiving	24
Fig. 17	Form for expediting	25
Fig. 18	Card layout form for journal renewal	27
Fig. 19	Flow sheet for journal renewal	28
Fig. 20	Journal renewal letter	28
Fig. 21	Journal renewal purchase order	30
Fig. 22	Journal renewal receiver request	30
Fig. 23	Book recall card	32
Fig. 24	Flow sheet for circulation	33
Fig. 25	Card layout form for circulation	33
Fig. 26	Flow sheet for circulation - returns	34
Fig. 27	Inventory form	36
Fig. 28	Inventory followup letter	36
Fig. 29	Journal recall listing	37
Fig. 30	Card layout form for text book ordering	38
Fig. 31	Classbook invoice card	39
Fig. 32	Classbook summary to finance	39
Fig. 33	Sample of reports received list	40
Fig. C-1	Cards for IBM 407 book order system	55
Fig. C-2	Flow chart for IBM 407 book order system	56

EDP PROCEDURES IN TECHNICAL LIBRARY OPERATIONS

INTRODUCTION

The application of electronic computers and other data processing equipment in the field of information retrieval and in associated areas such as selective dissemination of information and automatic translation is exciting to contemplate. The flood of literature in all fields of knowledge has become a well recognized problem and considerable work is being done to find ways to handle information quickly in order to get it to those who need it while it is of greatest value.

In routine, day-to-day operations also, EDP quipment can bring substantial benefits to many libraries. Acquisitions, accounting, cataloging, and circulation activities can benefit from the use of punched card procedures. This paper will describe applications which have been used successfully at the National Reactor Testing Station Technical Library near Idaho Falls, Idaho. This library, located at the Station, fifty miles west of Idaho Falls, is operated for the United States Atomic Energy Commission by Phillips Petroleum Company's Atomic Energy Division to serve the literature needs of several hundred scientists, engineers, and other technical personnel employed by the Atomic Energy Commission and its contractors at the NRTS. Now twelve years old, the library is staffed by three professional librarians, three group leaders, and fourteen other staff members. Its collections include approximately 15,000 volumes, 100,000 technical reports, and 800 journal titles.

The NRTS is a large area of sagebrush covered arid land, comparable in size to the state of Rhode Island. Various operational areas located about the site are served by the central library and branch libraries, as is the headquarters of the Idaho Operations Office of the Atomic Energy Commission, located in Idaho Falls. Many of the library users have their major contact with the library by telephone as they request that books, journals, and reports be sent to them. Automatic answering telephones in the library provide round-the-clock auxilliary telephone service for many of these requests.

Study of the possibilities of using EDP equipment to absorb clerical and typing loads and provide better service began late in 1958, under the spur of rapidly increasing holdings and growing numbers of users. The systems developed to date in the NRTS Technical Library include those for producing IBM-printed lists of journal holdings, books received, and reports received; for handling the purchase of books and renewal of journal subscriptions, and for controlling the circulation of library materials.

PRINTED LIST OF JOURNAL HOLDINGS

A printed list of the Library's journal holdings, used by research and engineering people at their scattered locations as well as by the library staff, was the first item to be produced with EDP equipment instead of typewriter. Frequent additions of new titles and back runs made periodic revisions essential, but time could not be afforded to retype a complete revised list for each new printing. A system was needed that required only the new and revised material to be prepared, enabling obsolete items to be deleted, and leaving unchanged listings intact. Key punching the list on IBM cards serves these needs.

General Description of the Procedure

Each line of the listing is punched on a separate IBM card. The cards, properly sorted and fed into an IBM printer, produce copy at the rate of up to 600 lines per minute with the 1401 or 120 lines per minute with the 407. Either printer is arranged to double space between entries (groups of cards). The machines print directly on Multilith masters for offset printing (or on blank paper for later photo-production of Multilith plates) or make up to five usable copies on regular machine paper with NCR or interleaved carbon.

Preparation of the List

Preparation of the list involved surveying the entire library collection and typing, on working cards ruled to coincide with the spacing of information on the punched cards, each title held and the date of the first volume of each title. Authority for form of entry is, in most cases, the usage of the "Union List of Serials" or "New Serial Titles."

Each entry consists of the title, volume numbers held, and the year of issue of the first volume in the run. Cross references are provided for title changes, referring to the latest title. Inclusive volumes under former titles are shown as a note after the latest title. Cross references are also provided for foreign journals published in translation under variant titles, and volume numbers are shown for both publications if volume numbering of the translated journal differs from that of the original. The location of each set is shown on the list, together with the extent of the holdings at each location. For runs which are not complete, the complete volumes are shown, as well as those which are only partially complete.

In order to secure the greatest ease in machine handling of the punched cards a five-digit numeric code number is assigned to each title. All cards making up a given entry have the same code (title identity) number. Because each number is assigned on an alphabetic basis by title, the use of this number enables us to place the file in alphabetic order quickly by machine, and is essential to machine filing operations as well.

By using a five-digit title identity number, it is possible to "space" our approximately 1000 journal titles 100 units apart, thereby allowing

sufficient room for later additions and changes without renumbering existing titles.

Card Format

Two types of cards make up the list--title cards and holdings cards. Each has as many trailer cards as needed. Stock IBM 5081 cards are used, since the small number required does not justify the expense of printing special cards. The keypunching format is so simple, however, that this presents no problem in performing the punching activities. Keypunching is done on an IBM model 026 printing keypunch.

Title card

*cc 1 - 65 Title or comment
cc 66 - 70 Title identity number
cc 71 Sequence number of card
 within this entry (first
 card is 0)
cc 72 - 80 Blank

Holdings card

cc 1 - 2 Blank
cc 3 - 49 Holdings (e.g., v. 1+ means
 holdings complete from vol. 1 to date; v. 1-4, v. 5*,
 v. 6+ means vol. 5 is incomplete, but the set is other-
 wise complete to date; v. 1-8. means that our run
 closes with vol. 8)
cc 50 - 53 Year of first volume held
 (e.g., 1948)
cc 54 Status: + if still being received,
 - if no longer being received, R if reference
cc 55 - 56 Blank
cc 57 - 59 Location holding this run (e.g.,
 MTR library, CPP library, or contractor library)
cc 60 - 65 Blank
cc 66 - 70 Title identity number (duplicated
 from header or preceding card)
cc 71 Sequence number within the title
cc 72 - 78 Blank
cc 79 - 80 Branch code (MTR = 00, CPP = 01,
 NRF = 05, ANL-Idaho= 07)

A card layout sheet for these cards is shown in Fig. 1. Before beginning the keypunching operations, it is advisable to check the type complement on the machines available for printing of the cards. We have found that certain special characters can be used to advantage in the listing.

* cc is used as an abbreviation for card column.

TITLE	TITLE OR COMMENT																																																																	TITLE IDENTITY NUMBER										SEQUENCE NO.					BLANK				
TITLE TRAILER	TITLE OR COMMENT (CONTINUED)																																																																	DUPLICATE																			
HOLDINGS	HOLDINGS																																													YEAR OF FIRST VOL.					STATUS					HOLDING LOCATION					BLANK					BLANK					BRANCH CODE														

Fig. 1 Card layout form for journal holdings listing.

System Operation

After the cards have been punched and verified, they are printed directly as punched, card for card, and this "as punched" (80-80) print-out is checked for accuracy. This done, the printed listing for publication may be prepared. The control panel for the IBM 407 is wired to print card columns 1 - 65 into print wheels 1 - 65, double space on a Q punch in card column 71 (from 1st read), and to begin no entry lower than 8 lines above the bottom of a page. Zero print is wired "on". Proper page spacing is secured by appropriate punches in the carriage tape which controls the paper advance in the printer. Card columns 66 - 80 are not printed. The diagram for wiring the control panel for the 407 is not shown, but the panel is very simple to wire. We did not maintain a wired control panel for this printout while we were using the 407, but wired a spare panel whenever a new listing was published. We presently use the IBM 1401 to print the listing, and a copy of the program is shown in appendix A. This system will operate satisfactorily on a basic IBM 407 or on the smallest IBM 1401. A sample of the finished listing is shown in Fig. 2 and a flow sheet for the system is shown in Fig. 3.

Additions and changes are relatively easy to make. To add a new title, assign an unused title identity number to the new entry. Punch the cards and either file them by hand or wait until a number of cards have accumulated, at which time they may be merged on the collator, using the title identity and sequence number as the controlling fields. If information on existing cards is to be changed, the information is punched into new cards and they are filed in a similar manner. A collator panel may be wired to merge with selection to add new cards to the file and to remove old cards which are being replaced by new cards with like title identity and sequence numbers.

Once the system has been set up, the file is easy to maintain and use. The time involved in the initial conversion is no more than would be involved in typing a similar list for publication. Once the conversion to punched cards has been accomplished, later listings can be prepared quickly by machine.

ATOMIC ENERGY CONFERENCES, MEETINGS, TRAINING COURSES.
 SEE--INTERNATIONAL ATOMIC ENERGY AGENCY. A CHRON-
 OLOGICAL LIST OF ATOMIC ENERGY CONFERENCES, MEETINGS,
 TRAINING COURSES.

ATOMIC ENERGY LAW JOURNAL.
 LAB CHARGE

ATOMIC ENERGY NEWSLETTER.
 V.12*, V.13-24, V.25*. 1955 CTL

ATOMIC ENERGY REVIEW. SEE--INTERNATIONAL ATOMIC ENERGY
 AGENCY. ATOMIC ENERGY REVIEW.

ATOMIC ENERGY SOCIETY OF JAPAN. JOURNAL.
 (NIHON-GENSHIRYOKU-GAKKAI SHI.)
 V.1*, V.2+ 1959 CTL

ATOMIC INDUSTRIAL DEVELOPMENTS. FLORIDA.
 DEVELOPMENT COMMISSION. NUCLEAR DEVELOPMENT DEPT.
 V.1-2. 1959 CTL

ATOMIC INDUSTRIAL FORUM. ANNUAL REPORT. (TITLE VARIES -
 ATOMIC INDUSTRIAL FORUM. REPORT.)
 1955, 1957-58, 1961+ CTL

ATOMIC POWER REVIEW.
 V.1*. 1956 CTL

ATOMIC SCIENTIST NEWS.
 V.4*. NS 1-2*. 1950 CTL

ATOMIC SCIENTISTS JOURNAL. LONDON. (CEASED WITH V.5 NO.6.
 SUPERSEDED BY NEW SCIENTIST.)
 V.2*, V.3-5. 1952 CTL

ATOMIC WORLD. LONDON. (V.1-4 AS ATOMICS, V.4-6 AS
 ATOMICS AND ATOMIC TECHNOLOGY, V.7 AS ATOMICS
 ENGINEERING AND TECHNOLOGY, V.8-9 AS ATOMICS AND
 NUCLEAR ENERGY. CEASED PUBLICATION WITH V.10 NO.6.
 ABSORBED BY CHEMICAL AND PROCESS ENGINEERING.)
 V.1-2, V.4-5, V.7-10. 1949 CTL

ATOMICS. (BARRINGTON.) FORMERLY A SECTION IN POWER
 ENGINEERING. (BEGINS WITH V.14.)
 V.15+ 1962 NRF
 CURRENT YEAR ONLY. ANL
 V.14+ 1961 CTL

ATOMICS. (LONDON.)
 SEE--ATOMIC WORLD.

ATOMICS AND ATOMIC TECHNOLOGY. LONDON.
 SEE--ATOMIC WORLD.

ATOMICS AND NUCLEAR ENERGY. LONDON.
 SEE--ATOMIC WORLD.

Fig. 2 Sample of printed journal listing.

This system has worked well at the NRTS Technical Library and the resulting list of journal holdings is very useful. Trips to the stack area by circulation personnel to see whether we hold a title or a particular volume are eliminated. The reference section of the library has found it helpful in determining which citations can be supplied directly from our shelves. Branch librarians have better access to the entire library collection of journals. Scientific and technical personnel, each of whom has available a copy of the list, are aided in their research by being able to find out quickly if a given reference is held by the library.

Fig. 3 Flow sheet for journal listing.

BOOK LISTS AND PRINTED CATALOG

Punched cards were next used in the preparation of monthly lists of new books and periodic cumulations of these lists. This application was designed to be the initial phase of an integrated system for book ordering and ultimately for the preparation of a printed book catalog.

Since the monthly lists and the printed book catalog are regarded as finding media (what is in the library, and where), only the following information is keypunched: author, title, date of publication, and call number. Incidental information (e.g., series numbers, edition) is included as a parenthetical note after the title. Information such as publisher, pagination, or contents note is found in the shelf list, which is maintained in conventional form.

As many cards as are necessary are used to provide full author information and full title.

General Description of the Procedure

One set of cards is punched for each title. This single set of cards, containing author, title, call number and subject codes, together with the title and sequence numbers, is analogous to the main entry in a conventional card catalog. The subject codes are alpha-numeric codes representing conventional subject headings. The assignment of code numbers to subject headings permits handling subject headings more easily by machine. The printed catalog nominally requires that three decks of cards be maintained--one deck filed by author (author deck), another arranged by title (title deck) and the third and largest deck arranged by author within subjects (subject deck). From the single set of cards produced at the keypunch come duplicate sets of cards for the title and subject decks. This process is accomplished automatically on the IBM 514 or 519 reproducing punch or on the IBM 1401. Packets of subject cards are duplicated in sufficient quantity to provide one set of cards for each heading used. A maximum of five subject headings per title is planned in the present system.

At timely intervals the appropriate lists are prepared through the use of sorting procedures for the desired list. Cards flow logically from monthly lists to use for printing cumulations. Duplicate sets are filed automatically in the card files for the printed catalog, and copies of the author, title, or subject catalogs may be printed as desired.

System Operation

As the books are cataloged the cataloger types a 3" x 5" working card (Fig. 4) for each title, showing author, title, notes, call number, and branch location. A six-digit alpha-numeric title number for use with the printed catalog is also assigned. The card is so ruled that the type spacing for author and title is identical with the number of columns assigned for this information on the IBM card. The space allotted for the author on the working card, for example, will accommodate 27 typed characters, just as the field allotted for author on the IBM card

contains 27 columns. Space is allocated for title information on a similar basis. Branch locations are assigned a one digit numeric code, which allows us to gain more room in the card for alphabetic information for author and title. These numeric location codes are translated automatically on the print-out to full alphabetic representation of the branch location.

At the end of each month a one-digit subject code number is assigned to each title. This subject code represents one of the nine broad subject headings which are used in arranging titles for publication in the monthly book list. The working cards are then alphabetized by author and the information from them is keypunched into IBM cards which have been specially printed for this application.

sub 5	Chang, Sheldon S	L
cc 66	Synthesis of optimum control systems.	
Br:	61 TJ216.C45	
✓ 0-MTR		
1-CPP		
8-Both	A9360	E4720
cc 78		

Fig. 4 Work card for book catalog.

Card Format

The card format for all cards (author, title, and subject) in the system is shown in Fig. 5. The format for the basic cards in the system, and the only ones which are punched manually--the author cards--is described below:

Header card

cc 1-27		Author
cc 28-65		Title
cc 66		Subject code for monthly list
cc 67-70		Blank
cc 71-76		Title number
cc 77		Sequence number (begin with 0)

cc 78 Branch location code
cc 79 Print code (if cc 1-27 to print
place 1 punch in this column; if cc 1-27 not to print
leave this column blank)

Trailer card

cc 1-5, 6-10, 11-15, 16-20, 21-25 . . . Subject codes
cc 26-27 Blank
cc 28-29 Year of publication
(last two digits, e.g., 1963)
cc 30-65 Call number (e.g.,
QCD184.B3M295.1960)
cc 66 Subject code (duplicate
from preceding card)
cc 67-70 Blank
cc 71-76 Title number (duplicate
from preceding card)
cc 77 Sequence number
cc 78 Branch code (duplicate
from preceding card)
cc 79 Print code (punch 2)
cc 80 Blank

MONTHLY LIST HEADER	AUTHOR																										TITLE																																		MONTHLY SUBJ.	BLANK	I.D. NUMBER	SEQUENCE	BRANCH CODE	PRINT CODE													
	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
MONTHLY LIST TRAILER	SUBJECT CODES																										BLANK	YEAR	CALL NUMBER																																		DUPLICATE				SEQUENCE	BRANCH CODE	PRINT CODE										
	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
BOOK CATALOG AUTHOR HEADER	AUTHOR																										TITLE																																		BLANK	I.D. NUMBER	SEQUENCE	BRANCH CODE	PRINT CODE														
	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
BOOK CATALOG AUTHOR TRAILER	SUBJECT CODES																										BLANK	YEAR	CALL NUMBER																																		BLANK				I.D. NUMBER	SEQUENCE	BRANCH CODE	PRINT CODE									
	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
BOOK CATALOG SUBJECT HEADER	AUTHOR																										TITLE																																		SUBJECT CODE	I.D. NUMBER	SEQUENCE	BRANCH CODE	PRINT CODE														
	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
BOOK CATALOG SUBJECT TRAILER	SUBJECT CODES																										BLANK	YEAR	CALL NUMBER																																		DUPLICATE				SEQUENCE	BRANCH CODE	PRINT CODE										
	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

Fig. 5 Card layout form for book catalog.

A sample set of cards for one title is shown in Fig. 6. The 407 printing format is as follows:

Header card and detail cards

cc 1-27 to print positions 1-27
cc 28-65 to print positions 33-70
cc 66-80 (not printed)

Trailer card

cc 1-27 (not printed)
cc 28-29 to print positions 39-40 (emit 19 in pp 37-38)
cc 30-48 to print positions 42-60 (although this is not
 the full call number field, this is generally
 sufficient)
cc 48-80 (not printed)
Branch location emitted in pp 62-68 from code punch in cc 78.

The system was initially designed for a system in which the printed output was obtained from an IBM 407 printer. We are presently writing a program to do the printing on the IBM 1401 in a slightly different format. It presently appears that the only change will be made in printing the last line of each entry. This change will take advantage of the powerful editing ability of the 1401 to enable us to print the entire call number area if necessary, but in any event to place the branch location information in its present position (if the call number is not long) or four spaces from the end of the call number (if it is long).

Operating Procedures

After the IBM cards have been punched they are prepared for the particular job as shown on the system flow sheet (Fig. 7) and as described below.

A. Monthly list.

1. Prepare an "as punched" (80-80) proof listing of the cards. Check for errors and make corrections.
2. If title numbers have been assigned sort cc 77-71 to place deck in author/title order and proceed to step 4.
3. If title numbers have not been assigned, sequence number the cards in cc 72-76. Numbers should be continuous through the year.

(When this system is used with the IBM 407 it is necessary to have some way to get appropriate spacing between subject categories on the printed listing and if mats are being used, to print subject headings. We maintain a special deck of cards which are sorted into the monthly list for this purpose. There

are five cards for each subject category, each having the appropriate subject code punched in cc 66 with a + overpunched in this column to allow removal of these cards from the deck

Fig. 7 Flow sheet for book list.

after printing is completed. The first two such cards for each category are blank except for the subject code which is punched in cc 66. The third card has the title of the category centered in cc 28-65, and the last two cards are blank except for the subject code. We have preferred to strip in pre-printed category titles on the final listing, which is produced two columns per page through photoreduction to Multilith mats. The category titles are produced in a bolder and somewhat larger type face to provide contrast in the printed copies. It is not necessary to use this blank deck when using the IBM 1401.)

4. Place blank deck of subject headers in hopper of IBM 082 sorter ahead of cards for monthly list and sort cc 66 numeric. This will place the subject headers and blanks

at the head of each category. Perform this step without blanks for the 1401 system. After this step the deck will be in subject sequence with authors in alphabetic order within each subject.

5. Print listing on appropriate paper or mats, using proper control panel or program for final listing.
6. Sort cc 66 for + punch only, using sort suppress or alpha sorting procedure, to pull subject header blanks from deck.
7. Return cards to file, placing behind cards for last list. Send output to printing department after stripping in subject headings and checking for errors.

B. Cumulations.

1. If title numbers have been assigned proceed as for monthly list.
2. If title numbers have not been assigned, duplicate master deck on cc 1-66, 71-80 on reproducing punch and interpret. Return master deck to file.
3. Sort new deck on cc 77 for 1 punch only. This will keep remainder of deck in sequence while removing the first card of each title for further processing.
4. Sort cc 30-28 alpha to place titles in rough order.
5. Sort cc 27-1 alpha to place authors in order.
6. Sequence number cc 67-70 on reproducing punch. If reproducing punch is to be used for step 9 emit control punch in cc 80. This step places new sequence numbers in cards for the cumulation sequence.
7. Sort on cc 76-71. This places cards in original sequence for merging with cards remaining from step 3.
8. Merge on collator with cards remaining from step 3, controlling on cc 71-77. If no collator is available sort on cc 77-71.
9. Reproduce sequence number from cc 67-70 from header card into trailer cards for each title on reproducing punch.
10. Sort into new order on cc 77, cc 70-67. Deck is now in cumulated order.
11. Make proof listing 80-80 on 407 or 1401. Check for proper sequence and errors. Make necessary corrections. It will not be necessary to re-number cards for titles and authors

out of sequence. They may be placed manually in proper position in the deck.

12. Proceed through steps for monthly listing beginning with step 4.

If the reproducing punch does not have a sequential numbering device it is not difficult to duplicate them from a master deck. If a reproducing punch is not available, the sequence numbering may be accomplished with a sequential master deck, a collator, and the keypunch with the interspersed master card gang punch device.

The program used on the IBM 1401 for printing the monthly book list and cumulations is shown in appendix B, together with the control panel wiring diagram for the IBM 407 accounting machine. The same program or control panel is used to print the author catalog.

Some explanation should be made at this point about the printed book catalog projected for the NRTS library. We have mentioned two areas in the cards which are reserved for subject coding. The coding in column 66 is that for the monthly list, in which the books are divided into nine broad subject categories. A more finite subject breakdown would doubtless defeat the purpose of the monthly list and would probably prove unwieldy for cumulations during the year. These subject codes are suitable only for broad subject groupings.

The subject codes in cc 1-25 of the trailer cards are those reserved for subject headings used in the printed catalogs. Each subject heading and cross reference in the catalog will receive a five-digit alpha-numeric code number and these code numbers will be the ones placed in the subject code area of the trailer card.

At the time we embarked on this program we were faced with two problems. Our original problem of publishing the monthly list quickly and easily was solved very nicely by the introduction of punched cards. As we looked at our catalog, however, it was quite apparent that this catalog would not lend itself to conversion as it stood. Subject headings had proliferated, there were no cross references, and no subject authority file. It appeared that before we would be able to assign subject codes for subject headings we should work to reduce the number of subject headings in the catalog by consolidation. Cross references would have to be supplied. This job is still in progress. When it is completed we will gain, as a by-product of the coding operation, a printed subject authority file. (Fig. 8)

The printed subject authority file will offer the primary benefit of utility. It will be readily available on the catalogers desk, and can be quickly reprinted as often as necessary. Inasmuch as the cataloger must use it as the basis for assigning subject codes to each book cataloged, it will also serve as an automatic check on each heading used and will verify that it is a current heading in the catalog.

We have attempted to tailor many of our subject headings to our users. "Atomic energy" is a frequently used conventional subject heading

N8740	NUCLEAR COUNTERS	
	SA GEIGER-MULLER COUNTERS	G2740
	IONIZATION CHAMBERS	I6410
	SCINTILLATION COUNTERS	S3020
	X RADIATION COUNTERS	R1869
	XX IONIZATION CHAMBERS	I6410
	NUCLEAR PHYSICS	N8820
	RADIOACTIVITY--INSTRUMENTS	R2870
N8760	NUCLEAR ENGINEERING	
	SA NUCLEAR POWER	N8870
	NUCLEAR REACTORS	N8910
	RADIOISOTOPES	R3460
	SHIELDING (RADIATION)	S5040
	X ATOMIC POWER ENGINEERING	A8949
	XX ATOMIC ENERGY	A8410
	ENGINEERING	E6840
	NUCLEAR PHYSICS	N8820
N8770	NUCLEAR FISSION	
	X FISSION (NUCLEAR)	F4409
	XX ATOMIC ENERGY	A8410
	NUCLEAR PHYSICS	N8820
N8779	NUCLEAR GEOLOGY	
	SEE- NUCLEAR GEOPHYSICS	N8790
N8790	NUCLEAR GEOPHYSICS	
	SA RADIOACTIVE SUBSTANCES	R2350
	RADIOCARBON DATING	R3180
	X NUCLEAR GEOLOGY	N8779
	XX GEOLOGY	G3010
	GEOPHYSICS	G3400
	NUCLEAR PHYSICS	N8820
	RADIOACTIVITY	R2854
N8799	NUCLEAR MASSES	
	SEE- ATOMIC MASS	A8730
N8810	NUCLEAR MOMENTS	
	XX NUCLEAR PHYSICS	N8820

Fig. 8 Subject authority file.

from LC which would in itself cover a major part of our collection. Many books have been written about nuclear reactors, for example, and it is important that these titles receive more definitive subject treatment when this is appropriate. Analytics, too, have their place in this scheme. Specific chapters or sections of certain books may contain information

on a given reactor type. We feel that this information should be easily and readily available to our readers, and it is for this reason that we have decided to proceed to get our subject headings in order before proceeding to assign subject codes to our subject headings.

Any conversion job is always a monumental undertaking. We are well aware that conversion of our catalog to punched cards will be a difficult job. We propose to proceed with it as rapidly as possible, however. Our present plans are to produce first an author catalog and a title catalog. In this manner we can punch cards for each title with all information except subject codes. As the subject headings are brought into order, and each heading and cross reference has a code number assigned to it, we can then proceed to code the subject headings assigned to each title. From the master author deck we will duplicate the trailer card for each title. These cards will then be sorted into call number order (cc 65-30). They will be in shelf list order at this point. Working from our shelf list, we can then proceed to punch the appropriate codes for subjects into the card for each title. These cards will then be merged into the author file to replace the corresponding uncoded trailer cards. The author file will then be duplicated to obtain the subject file.

In duplicating for the subject file, we must duplicate one set of cards for each subject heading assigned to the title. Thus, if two subject headings are assigned a given title, two sets of cards will be produced for the subject deck. The subject codes are punched in cc 66-70 of the subject deck from the individual subject code fields in the trailer cards. When completed, sorting cc 77-66 will place this deck in order with authors in order within subject groups.

We feel that the division of the present catalog into a divided catalog will bring many advantages. It will be easier to use than a conventional dictionary catalog, for we can look for authors in the author catalog without the distraction of title and subject entries. We think that the author catalog will have great usefulness to our staff members for verification of entries, searching book orders, and location of books for borrower requests. The librarian is generally concerned with the author entry, and probably the title entry secondarily. But the scientist may very often be looking to see what we have on a particular subject. To him the subject catalog will probably be the most important. It will be readily available to him whenever he needs it, either at his own desk or a short distance away within his division, together with the author and title catalogs. We look to this extension and improvement of the library catalog to increase the usefulness of our collections.

BOOK PURCHASING WITH EDP EQUIPMENT

For many years the books for the library were purchased by sending lists of books required to the dealer with a covering purchase order for each list. Cards were then typed for the various library files to indicate that the books were on order.

Incoming material was (and is) received in a central warehouse where it is checked against the purchase order and then forwarded to the library. The EDP system was devised to work within the framework of established purchasing, receiving, and finance procedures and at the same time enable the Library to process orders and check in materials quickly and accurately.

Punched cards are used to print order slips on the 1401 using pre-printed forms (Fig. 9). The basic slip is three by four and one-half inches in size. These slips are arranged three across the form and five copies deep with interleaved carbon. The back sheet, of heavier stock in a distinctive color, supplies the slips for the public catalog, the warehouse receiving section, and one of the invoices returned by the dealer. One printing operation produces fifteen copies of slips for each copy of each title ordered. Fortunately, not all of these copies stay in the library! Distribution is as follows:

Company: 8 slips

1. Library public catalog
2. Library purchase order file
3. Library file by invoice number
4. Library file by author
5. Purchasing department
6. Warehouse (receiving section)
7. Finance department
8. Extra copy

Dealer: 7 slips

1. Purchase order to publisher
2. Report to library
3. Dealer file copy
- 4-7. Invoice copies, returned to us with the book and marked with selling price.

All slips for each item bear the same identifying number, and these numbers also appear in the IBM cards, which are filed pending receipt of the material ordered. This number, actually the invoice number for each item, facilitates several operations. Warehouse personnel match this number on the invoice sent with the book with the one on the copy of the form which they received when the book was ordered. Library personnel use it in pulling slips from the files when the item is received. The invoice number makes it much easier to resolve any problems with the dealer because it ties down the item in question very nicely. It aids too, in pulling IBM cards from the "on order" file for processing invoice slips for payment.

<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 94413 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 135.00 SELLING PRICE: \$ 135.00</p> <p>A.E.D. 48596</p> <p>FILE COPY</p>	<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 81300-C83 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 335.00 SELLING PRICE: \$ 335.00</p> <p>A.E.D. 48596</p> <p>PURCHASE ORDER</p>	<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 94413 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 335.00 SELLING PRICE: \$ 335.00</p> <p>A.E.D. 48596</p> <p>ORDERS OUTSTANDING FILE</p>
<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 94413 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 335.00 SELLING PRICE: \$ 335.00</p> <p>A.E.D. 48596</p> <p>ORIGINAL INVOICE</p>	<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 81300-C83 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 335.00 SELLING PRICE: \$ 335.00</p> <p>A.E.D. 48596</p> <p>REPORT COPY</p>	<p>RICHARD ABEL AND COMPANY, INC. SCHOLARLY BOOKS IN THE ARTS AND SCIENCES P. O. BOX 5357 - PORTLAND 6, OREGON</p> <p>NATIONAL REACTION TESTING STATION DATE: AUG 20, 1963 IF- 6122</p> <p>QUANTITY: 1 AUTHOR: CLARK, G. L.</p> <p>TITLE: ENCYCLOPEDIA OF X-RAYS AND GAMMA RAYS</p> <p>PUBLISHER: REINHOLD 1963</p> <p>REQUESTOR: J.P.CUSIMANO UNIT: 94413 ORGANIZATION: AEC</p> <p>PURCHASE ORDER: 48596 LIST PRICE: \$ 335.00 SELLING PRICE: \$ 335.00</p> <p>A.E.D. 48596</p> <p>L. C. CARD FILE</p>
<p>DUPLICATE INVOICE</p>	<p>PURCHASING COPY</p>	<p>REQUISITION COPY</p>
<p>DUPLICATE INVOICE</p>	<p>FINANCE COPY</p>	<p>NUMBER FILE COPY</p>
<p>LIBRARY INVOICE COPY</p>	<p>RECEIVING COPY</p>	<p>CARD CATALOG FILE</p>

Fig. 9. Book order slips (1/2 actual size), with the punched edges for feeding into the IBM 1401 removed. Each slip is 3 x 4½ inches. The 1401 automatically prints the same information simultaneously in three columns. There are four carbon copies, so that 15 slips are produced in one printing. The illustration shows the full areas of the original and first carbon, but only the lower edges of the remaining three carbon copies.

System Operation

A 3" x 5" search card (Fig. 10) is prepared for each book to be ordered. These cards are printed in continuous strips for easier handling in the typewriter. Like the card used in preparation of punched cards for the book catalog, the search cards are arranged in fields like those on the punched cards. They are spaced so that the number of typed characters which will fit into the spaces on the card is equal to the number of characters which may be punched in the same fields of the punched card. After the card has been cleared for ordering, the information from the card is punched into the appropriate fields on the IBM card.

It is at this point in the system that the flexibility of the IBM 1401 system becomes evident in the preparation of basic cards for the system. While the 1401 system certainly operates much more easily and offers greater flexibility, the 407-based system served us well for over a year. Since the 1401 system is probably more straightforward for purposes of description, this is the system which will be described below. Complete details on the 407 system are contained in appendix C.

INVOICE		AUTHOR	
IF _____		Clark, G. L.	
REQN. _____		TITLE	
DEALER		Encyclopedia of X-rays and gamma	
(R) B G D		rays.	
PUBLISHER		RECOMMENDED	
Reinhold		Library	
PRICE	PUB. DATE	CHARGE ACCT.	
\$ 35.00	1963	81300-C83 1 ea.	
☐ PW ☐ BIP ☐ CB1 ☐ BKS LR. ☐ PS			
NRTS TECHNICAL LIBRARY			

Fig. 10 Search card.

CARD ONE	AUTHOR																											TITLE																											BLANK		INVOICE NUMBER		SEQUENCE		BLANK		DEALER		CODE		
	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80																																
CARDS 2 & 3	BLANK																											TITLE																											BLANK		INVOICE NUMBER		SEQUENCE		BLANK		DEALER		CODE		
	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80	1-27	28-65	66-76	77	78-80																																
TRAILER CARD	PUBLISHER															MONTH OF PUBLICATION		YEAR OF PUBLICATION		LIST PRICE		ACCOUNT NUMBER		ORGANIZATION		NAME OF REQUESTOR		SELLING PRICE		PURCHASE ORDER NUMBER		INVOICE DATE		BLANK		INVOICE NUMBER		SEQUENCE		BLANK		DEALER		CODE																							
	1-15	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	1-15	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

Fig. 11 Card layout form for book orders.

The card format for the 1401-oriented system is shown below, and a card layout sheet is shown in Fig. 11. Appendix D is the post list.

Card 1 (Author-title card)

cc 1-27 Author
 cc 28-65 Title (first line)
 cc 66-76 Blank
 cc 77 Sequence number (begin with 1)
 cc 78-80 Blank

(cc 72-76 will later receive the invoice number, and cc 79-80 will show the code letters indicating the dealer to whom the order was sent.)

Card 2 (Title continuation card)

cc 1-27 Blank
 cc 28-65 Title (continued)

Card 3 (Title continuation)

Card 4 (Trailer card)

As the slips are printed on the 1401 a new deck of cards is punched simultaneously. This deck is identical to the input deck, with the exception that the invoice numbers and dealer code are added to all cards, and the purchase order number is added to the trailer card.

Each purchase order is written for a certain maximum amount. Costs for materials ordered are debited automatically against this amount. When the limit is reached the program stops, the total amount against the order is printed, and a new load card is produced. The program may be started again by supplying a new load card with a new purchase order number and reloading the program.

20

any title is ordered against an invoice number, however. We had initially thought that this might be a disadvantage, but it has proven to be an unexpected benefit. In this way the dealer can ship as many copies as he is able to supply from stock, and he can send additional copies as he receives them from the publisher. Therefore we have no problems in re-writing or altering invoices to reflect the number of copies received, or in renumbering for copies received later. An invoice is either open or closed, because material can be received against it only once. There is no waiting for additional material to appear against any invoice number. If material does slip through, it is caught immediately when we try to pull the cards for it from the "orders outstanding" file and find that the particular invoice number has already been paid.

After the printing has been completed the slips are separated manually for distribution and filing. The cards which were used as input to the 1401 (the cards which were keypunched originally) are destroyed. The deck which was punched while slips were being written is interpreted and filed at the back of the "orders outstanding" file, which places them in proper invoice number order. A complete flow chart of the system is shown in Fig. 12.

Fig. 12 Flow sheet for book purchasing.

Procedure for Material Received

When material is received, the invoices are removed from the books and placed in a file for later preparation of monthly clearings. Once each month these slips are sorted manually into invoice number order. A finder card is prepared with the selling price punched in cc 50-54, the invoice date in cc 60-64, and the complete invoice number in cc 66-71. Finder cards are used in the collator to pull cards with matching invoice numbers from the "orders outstanding" file. The finder card has a different color top stripe and opposite top corner cut from the cards used in the "orders outstanding" file. This prevents it from becoming lost in the deck, and serves to enable us to use it in a later operation to transfer data from this finder card to the trailer card from the set used to order the book. This trailer card is then used for our list of clearings and the finance summary which will be described. This purging operation is performed monthly.

After the finder cards have been prepared they are used to pull cards from the "orders outstanding" file as follows:

1. Sort finder cards on cc 71-68. They are now in invoice number order.
2. Wire collator to compare cc 68-71 from finder cards to cc 72-76 in the "orders outstanding" cards and pull equals from the order file.
3. Sort selected order cards on cc 77 for a 5 punch and separate these cards from the remainder of the deck. Discard the remainder of this deck.
4. Merge finder cards ahead of order trailers having identical invoice numbers using collator.
5. Duplicate price and invoice date from finder cards into order trailer cards using reproducing punch or interspersed master card gang punch feature on 026 keypunch.
6. Sort cc 67 to separate finder cards and order trailer cards. Discard finder cards.
7. Cards are now in invoice number order.

Preparation of Finance Summaries

The finance summaries are prepared in two formats. One, printed in invoice number order, accompanies our check to the dealer and gives him a detailed listing of the invoices being paid by the check. The second listing, arranged by purchase order and account number, is used by the finance section to debit the various accounts for materials received against them. These listings may be made on either the 407 or the 1401. Programs for these operations are shown in appendix E.

The first listing is prepared from the trailer cards from step 7 of the receiving procedure. The cards are printed using the VSUM1 program on the 1401. The total number of items presented for payment, and the total amount of the payment is shown at the end of the listing (Fig. 14).

SUMMARY INVOICE LISTING		BLACKWELLS	OXFORD, ENGLAND	04/01/63	PAGE 1
INVOICE NO.		A.E.D.	AMOUNT		
BW-	62	36726	\$20.72		
BW-	90	36726	\$3.92		
BW-	107	36726	\$127.12		
BW-	109	36726	\$9.24		
BW-	110	36726	\$16.80		
BW-	114	36726	\$17.64		
BW-	117	36726	\$5.88		
BW-	148	36726	\$19.60		
BW-	162	36726	\$6.79		
BW-	167	36726	\$1.03		
BW-	180	36726	\$7.35		
BW-	193	36726	\$13.44		
TOTAL ITEMS-		12	\$249.53 TOTAL THIS LIST		

Fig. 14 Sample of VSUM1 print out.

The second listing requires that the cards be sorted into account number order on cc 34-25 and then into purchase order number order on cc 59-55. This brings all account numbers together within each purchase order number. The printed listing (Fig. 15) totals for each account and totals and breaks on each purchase order. The finance section can thus debit totals to each account for each purchase order. Postage is printed as a fixed amount for each item. A grand total is also shown as a control check against the total produced from the VSUM1 program. The VSUM2 program is used to print the second listing. Both finance programs described above may be easily duplicated on the 407.

SUMMARY INVOICE LISTING		RICHARD ABEL AND COMPANY, INC.		PURCHASE ORDER AED 18426		04/17/63	PAGE 1
INVOICE NO.	A.E.D.	AMOUNT	ACCOUNT	CONTR.	REQUESTOR		
IF-- 492	18426	\$16.65	3810	PPC	LIBRARY		
***TOTAL	\$16.65			GRAND TOTAL--	\$16.65		
IF-- 3243	27846	\$12.40	3810	PPC	LIBRARY		
***TOTAL	\$12.40			GRAND TOTAL--	\$12.40		
IF-- 3365	30356	\$7.20	3810	PPC	LIBRARY		
IF-- 3371	30356	\$20.25	3810	PPC	LIBRARY		
IF-- 3372	30356	\$20.25	3810	PPC	LIBRARY		
IF-- 3373	30356	\$20.25	3810	PPC	LIBRARY		
***TOTAL	\$67.95			GRAND TOTAL--	\$67.95		
AED TOTAL COST--		\$97.00					
				6 ITEMS POSTAGE BILLED-- \$0.00			

Fig. 15 Sample of VSUM2 print out.

After the lists have been printed the date of the list is gang punched into cc 66-69 of the trailer cards. This allows us to determine at any time when a particular item has been paid should any question arise. The cards are then sorted back to invoice number order and merged with cards already in the "paid" file. Each year these cards are listed for record purposes and the cards destroyed. At any time during the year we can sort the file by account number to determine the total debits for any account to date. We have had occasional requests for this information and the job formerly took one person several days to accomplish. It can now be done quickly (in an hour or less) with the sorter and the 407 or 1401. When it appears necessary, a program may be written for the 1401 which will accept the file, unsorted, and print and total only items for any given account number.

A complete flow sheet of the procedures for the receiving and finance summary operations is shown in Fig. 16.

Fig. 16 Flow sheet for receiving.

We have been well satisfied with the performance of this system in our library. It has saved a great deal of clerical time, and has enabled us to secure improvements in the promptness of the whole book ordering operation. Records are readily available on any phase of the transaction. In addition, the "orders outstanding" file may be used for expediting orders which have not been received within a given period of time. All cards in the "orders outstanding" file for material ordered prior to a specified cut-off date may be passed through the 1401 to write slips requesting information on the status of the order. These slips (Fig. 17) show all information in the cards, including the invoice number. This operation can be accomplished very rapidly at the high printing speeds (up to 600 lines per minute) available on the 1401, or on the 407. This procedure makes expediting easy and quick, and frees the staff for other activities.

BOOK ORDER EXPEDITE LISTING			DATE OF LISTING---APR 15, 1963	
AED	INVOICE NO.	AUTHOR	TITLE	PUBLISHER
42597	04491	PROV. INTNATL COMPUTER CEN.	SYMP ON NUMERICAL TREATMENT OF ORDINARY DIFF. EQUATIONS, INTEGRAL AND INTEGRO-DIFF. EQUATIONS. ROME, 1960	BIRKHAUSER-VER.
42597	04492	HARTMAN, S., ET AL.	THE THEORY OF LEBESQUE MEASURE AND INTEGRATION - TRANSLATED FROM POLISH BY LEO F. BORON	PERGAMON
42597	04493	ALTHOUSE, A. D., ET AL.	MODERN REFRIGERATION AND AIR CONDITIONING	GOODHEART
42597	04494	A.I.E.E.	ELECTRICAL POWER DISTRIBUTION FOR INDUSTRIAL PLANTS	A.I.E.E.
42597	04495	A.I.E.E.	ELECTRICAL POWER DISTRIBUTION FOR INDUSTRIAL PLANTS	A.I.E.E.
42597	04496	A.I.E.E.	ELECTRICAL POWER DISTRIBUTION FOR INDUSTRIAL PLANTS	A.I.E.E.
42597	04497	HUSKEY, H. D., ET AL.	COMPUTER HANDBOOK	MCGRAW-HILL
42597	04498		ROGETS THESAURUS IN DICTIONARY FORM	POCKET BOOKS
42597	04499		ROGETS THESAURUS IN DICTIONARY FORM	POCKET BOOKS
42597	04500		ROGETS THESAURUS IN DICTIONARY FORM	POCKET BOOKS
42597	04501	HUSKEY, H. D., ET AL.	COMPUTER HANDBOOK	MCGRAW-HILL
42597	04502	TOMER, R. B.	INDUSTRIAL TRANSISTOR AND SEMICONDUCTOR HANDBOOK	SAMS

Fig. 17 Form for expediting.

JOURNAL RENEWAL

Using an IBM 1401 data processing system, the Library now handles most of the problems of journal renewal quickly and efficiently. One basic deck of cards is used to print several forms: 1. Renewal notices to send to those for whom we order journals, requesting that they authorize renewal; 2. Renewal orders; using a different 1401 program; 3. A letter to each recipient asking that he certify receipt of the first issue.

The system utilizes a header card for each title. This card contains the constant information for each title, i.e., library code number for the title, title, price per year or volume, and a code for the agent to whom the order is sent. Behind this header card are the cards for the individual subscriptions to this title. On these subscription cards is the unique number for this subscription, subscriber name, location, organization and account number, the period or volumes covered by the present subscription, the purchase order number under which it was entered, and the agent.

Card Format

Format for the cards (Fig. 18) is as follows:

Title header card

cc 1-4		Library code number for this subscription
cc 5-7		Sorting code to sort title card ahead of subscription cards
cc 8-56		Title
cc 57-61		Blank (reserved for future use)
cc 62-67		Unit price (per volume or per year)
cc 68-73		Agent's code number for this publication (if assigned)
cc 74-78		Blank (reserved for future use)
cc 79-80		Code for agent to whom this subscription to be sent

Subscription card

cc 1-4		Library code number for this subscription
cc 5-6		Code to identify this subscription (first letter of subscriber's first and last name except for library which is always AB)
cc 7		Blank
cc 8-29		Subscriber name
cc 30		Address code
cc 31-37		Subscriber work location

cc 38-42 Contractor
cc 43-58 Subscriber account number
against which subscription to
be charged
cc 59-61 Number of subscriptions to be
entered
cc 62-66 Purchase order number under
which subscription entered
cc 67-72 Period of subscription
(beginning and expiration date,
e.g., 012122 = 01/62 - 12/62)
cc 73-78 Inclusive volumes (if appli-
cable, e.g., v. 112 - 116)
cc 79-80 Dealer to whom sent

TITLE HEADER		LIBRARY TITLE CODE		TITLE																																																				BLANK		UNIT PRICE		AGENTS TITLE CODE		BLANK		AGENT	
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																																																													
SUBSCRIPTION CARD		LIBRARY TITLE CODE		SUBSCRIBER		BLANK		SUBSCRIBER		ADDRESS CODE		LOCATION		ORGANIZATION		ACCOUNT NUMBER		NUMBER OF SUBS.		PURCHASE ORDER NUMBER		PERIOD OF SUBSCRIPTION		INCLUSIVE VOLUMES		AGENT																																							
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																																																					

Fig. 18 Card layout form for journal renewal.

System Operation

A flow sheet for the system is shown in Fig. 19. The first phase of the system is used to direct a renewal notice to the subscriber, and request that he authorize renewal of the subscription for the coming year. He is also asked to supply the proper account number against which the renewal is to be charged. The right hand portion of the notification is removed and used as a tickler file in the library. The deck is processed each month to detect subscriptions due for renewal three months hence or earlier. The expiration date in each subscription card is tested to see whether it is earlier or later than the comparing date (three months hence) which is loaded to a comparing location in the computer program. Renewal notices are written for subscriptions which are equal to or earlier than this date. Dates which are later than the comparing date are passed by without renewal notification at this time. As the 1401 writes each letter (Fig. 20) it pulls the subscription card from the file. The only way that the subscription can be renewed is for the subscriber to return his authorization. When this is received, any necessary corrections in the card are made and it is returned to the file. It is impossible to renew a subscription without proper authorization. A copy of the 1401 program for this operation is shown in appendix F.

Renewal subscription orders are entered each month for subscriptions due to expire two months hence. Cards for which renewal authorization has been received are sorted and collated back into the subscription file,

Fig. 19 Flow sheet for journal renewal.

FROM- NRTS TECHNICAL LIBRARY MTR625	07/03/62	07/03/62	SUB. NO.- A010AB
TO- TECH LIB MTR625 PPCO	TO- TECH LIB MTR625 PPCO		

THE PERIODICAL SHOWN BELOW IS PRESENTLY BEING SENT TO YOU AND THE COST CHARGED AGAINST THE ACCOUNT INDICATED- RENEWAL NOTICE

TITLE- AICHE JOURNAL - AMERICAN INSTITUTE OF CHEM ENGRS	2 COPIES	AICHE JOURNAL - AMERICAN INSTITUTE OF CHEM ENGRS
ACCOUNT NO.- 3810	ESTIMATED RENEWAL PRICE- \$ 50.00	2 COPIES

YOUR SUBSCRIPTION EXPIRES 12-62. TO RENEW, INSERT YOUR CURRENT ACCOUNT NUMBER AGAINST WHICH THIS SUBSCRIPTION SHOULD BE CHARGED, SIGN THIS FORM AND RETURN IT TO THE LIBRARY WITHOUT DELAY. IF NOT TO BE RENEWED CHECK BELOW, SIGN AND RETURN.

RENEW..... DO NOT RENEW..... CHARGE TO ACCOUNT.....

SIGNATURE.....

INSURE CONTINUOUS SERVICE WITHOUT INTERRUPTION - RETURN FORM PROMPTLY..
RENEWAL SUBSCRIPTION WILL NOT BE ENTERED WITHOUT THIS AUTHORIZATION.

LIBRARY USE ONLY-

VENDOR-	SUBSCRIPTION NO.- A010AB
AED-	VENDOR FN
PUBLISHER	

Fig. 20 Journal renewal letter.

controlling on cc 1-6. This file is then processed through the 1401 and lists of subscriptions for renewal are written for the appropriate agents or publishers. The subscriptions are tested for renewal against a comparing date which is loaded at the start of the program.

Also loaded is the purchase order number against which the renewals are being written. It is also possible in this program to limit the amount of the purchase order to a given sum if this is necessary. This simply means that renewals will be written to this amount and the program will stop. Another purchase order number can then be entered and renewals will continue, or remaining cards may be processed at a later date. Renewals are written only to one dealer on any list, and this test is internal to the program. The proper dealer code is punched into the load card which loads the date, purchase order number, renewal comparing date, and dealer name, together with his code designation. This load card immediately follows the program and precedes the data. It loads the comparing units with the variable information which is required for each run.

As the subscription renewals are being written on sheets of paper by the printer, the 1401 punch unit is punching updated subscription cards for each item renewed. Cards for which renewals are written may be selected from the deck by suitable program modification. The new cards are merged into the deck by the collator upon completion of the renewal run and old cards matched by new subscription cards are selected out and discarded. A copy of the 1401 program (PORDR) for this system is shown in appendix F, and a sample of the renewal sheets is shown in Fig. 21.

One month after the initial issue of the renewal subscription should have been received, the third phase of the system comes into operation. Letters (Fig. 22) are sent to each subscriber asking for verification that the subscription is being received. The beginning date of the subscription is the testing medium. As these acknowledgements are returned to the library by the subscribers we can clear our records and assure ourselves that the subscriptions are entered properly and that they are arriving in good order. A copy of the program (RECVR) is shown in appendix F.

ITEM NO.	JOURNAL TITLE	QUANTITY	PERIOD	VOLUMES	EST. COST	TITLE NO.	ACCOUNT
24.	COMPUTER ABSTRACTS ON CARDS						
	PHILLIPS PETROLEUM CO. A.E.D. TECHNICAL LIBRARY P.O. BOX 2067 IDAHO FALLS, IDAHO AED-A7051 C553AB	1 SUB	01-63 TO 12-63	4- 4	\$250.00	352008	3810
	TOTAL SUBS THIS TITLE-	1					
25.	COMPUTERS AND AUTOMATION						
	PHILLIPS PETROLEUM CO. A.E.D. TECHNICAL LIBRARY P.O. BOX 2067 IDAHO FALLS, IDAHO AED-A7051 C576AB	1 SUB	01-63 TO 12-63		\$15.00	352038	3810
	TOTAL SUBS THIS TITLE-	1					
26.	CONTROL ENGINEERING						
	PHILLIPS PETROLEUM CO. A.E.D. TECHNICAL LIBRARY P.O. BOX 2067 IDAHO FALLS, IDAHO AED-A7051 C691AB	2 SUBS	01-63 TO 12-63		\$6.00	267112	3810
	TOTAL SUBS THIS TITLE-	2					
27.	CORROSION ABSTRACTS						
	PHILLIPS PETROLEUM CO. A.E.D. ATTN- T L HOFFMAN P.O. BOX 2067 IDAHO FALLS, IDAHO AED-A7051 C760TH	1 SUB	01-63 TO 12-63	2- 2	\$50.00	303137	2653
	TOTAL SUBS THIS TITLE-	1					
	TOTAL SUBS THIS ORDER-	43			EST. PRICE \$944.50		
	ALL INVOICES MUST SHOW PURCHASE ORDER NUMBER AED A7051 BILL AGAINST ONLY ONE PURCHASE ORDER PER INVOICE						

Fig. 21 Journal renewal purchase order.

04/01/63

FROM- NRTS TECHNICAL LIBRARY
MTR 625

TO- TECH LIB
MTR625 PPCO

TO- TECH LIB
MTR625 PPCO

RECEIVER REQUEST

04/01/63

THE PERIODICAL SHOWN BELOW HAS BEEN RENEWED FOR THE PERIOD INDICATED-

TITLE-	ADHESIVES AGE	ONE COPY	ADHESIVES AGE
RENEWED FOR PERIOD-	02-63 TO 01-64	VOL. -	PERIOD- 02-63 TO 01-64
			ONE COPY

YOU SHOULD ALREADY HAVE RECEIVED THE FIRST ISSUE OF THIS SUBSCRIPTION. PLEASE PLACE A CHECK IN THE APPROPRIATE SPACE BELOW TO INDICATE THE CURRENT STATUS OF THIS SUBSCRIPTION. SIGN THIS FORM AND RETURN IT TO US PROMPTLY IN ORDER THAT WE MAY CLEAR OUR RECORDS.

BEING RECEIVED NOT BEING RECEIVED

.....
SIGNATURE

SUB CODE- A118AB

SUB CODE- A118AB

VENDOR- CN AED- 35766

VENDOR- CN AED- 35766

Fig. 22 Journal renewal receiver request.

CIRCULATION PROCEDURES

Circulation control is an important aspect of any library operation and must function as smoothly as possible while maintaining a high degree of accuracy. Conventional circulation systems consume a great deal of clerical time in charging out books, filing cards, locating specific titles, discharging returned books, and recalling overdue materials. The NRTS Library, like many research and university libraries, maintains two circulation files, one by call number and the other by borrower. A periodic inventory of books is made, and notifications are sent to those having journals out longer than three days. With the EDP system described below, the files, containing about 8,000 items, can be searched and overdue notices for journals printed in less than 15 minutes on the IBM 1401. It took the IBM 407 about 1-1/2 hours to print the first inventory, and the 1401 cut this time to less than 45 minutes.

In the system as designed* a borrower card and a call number card are filed for each transaction. The two cards are identical, except that they have opposite top corner cuts to insure against wrong filing. The card contains the following information: call number, copy number, year of publication, author, title, and the date loaned. Space is provided in the card for a four digit number which identifies each borrower. A card punched with this basic information (book card), similar to a conventional circulation card, is placed in the pocket of each book when it is cataloged. (The conventional book pocket is suitable for the IBM punched card.) When the book is circulated, the book card is removed from the pocket and duplicated on the IBM 026 printing keypunch. On the duplicate is punched the date and borrower's identity number, and this amended duplicate is duplicated. The original and the "master" duplicate (the "transaction" card) go back in the book pocket. The duplicate duplicate is for circulation files and later processing.

When a book is returned, the desk attendant removes the transaction card and stamps it with the current date. The book is now ready to be shelved. The card which has been removed is placed in a file of returned transaction cards for further processing.

The two circulation files are always available at the loan desk, except for the period during which they are being processed and updated. It is thus possible at most times to have access to the file for recalling books or other materials in circulation in response to requests from other borrowers. Requests for return of materials may be made by telephone, or by duplicating the circulation card into a special "recall card" (Fig. 23) which is then mailed to the person who has signed out the book from the library.

The transaction card is used for clearing each of the two circulation files of its duplicate cards when the book is returned. Thus it is important, although not absolutely essential, that this card be returned with the book.

At weekly intervals the accumulated borrower cards are sorted into order by call number, year and copy number. They are then duplicated

* Not all features of this system are in operation yet.

Fig. 24 Flow sheet for circulation.

BOOK CARD	CLASSIFICATION NUMBER										CUTTER NUMBER										YEAR	COPY	BOOK AUTHOR OR JOURNAL TITLE																																						BOOK TITLE OR JOURNAL VOLUME, ISSUE & YEAR																																						BLANK									
	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																											
CIRCULATION CARD	CLASSIFICATION NUMBER										CUTTER NUMBER										YEAR	COPY	BOOK AUTHOR OR JOURNAL TITLE																																						BOOK TITLE OR JOURNAL VOLUME, ISSUE & YEAR																																						DATE LOANED			BORROWER NUMBER						
	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																											

Fig. 25 Card layout form for circulation.

are a distinctive color so that they are easily recognizable in the file. For uncataloged material cc 1 and 2 are punched ZA, followed again by a sequential code number. Lab charge materials, purchased against laboratory accounts, are not cataloged. For these items ZL is punched in cc 1 and 2, followed by a sequential number. These codes are designed to place uncataloged items in sequence after books, followed by journals and lab charge items.

In punching cards for journals, the title is punched in cc 21-38, and the volume, issue and year are punched in cc 39-70. The information in cc 1-16 (ZJ plus sequential code number) constitutes the medium for matching and selecting cards from the circulation files when the material is returned. The same is true for uncataloged and lab charge material.

The classification system used in the library determines the requirements of the collator for handling the system. A mixed alpha-numeric classification number (such as the LC notation, which the NRTS Library uses) requires alphabetic collating capabilities. (A straight numeric classification notation (such as Dewey) could be operated very nicely on almost any collator. Cutter numbers, with their mixed alpha-numeric notation, might present some problem in using straight numeric collating equipment, but the problem would certainly not be serious and the file would still be very workable.) Having the alpha collating capability gives also the ability to extend the limits of straight numeric coding by adding alpha prefixes to numeric codes, extending the maximum number of codes which may be assigned by a factor of twenty five. This significant saving leaves more of the card for text, and at the same time allows sufficient room for coding which will be flexible and which will permit interspersed additions to the file over a long period of time.

Check-in Procedures

A flow sheet for the handling of returned circulation is shown in Fig. 26. One problem encountered in the system is the inability of the collator to properly test every position which should be tested. An IBM model 085 collator with alphabetic collating attachment, which gives the optional ability to alpha collate on sixteen positions in place of the normal thirty-two numeric collating positions, is used. Any combination of alpha and numeric also can be tested. The reason for the reduced number of alpha collating positions is that it requires two comparing units to handle each alpha column. One unit handles the zone bit and the other handles the numeric portion of the column. For this

Fig. 26 Flow sheet for circulation - returns.

reason we have been forced to use a random collating scheme, in which we do not test all columns of the card for matching. Merging and selection on the call number file is on the following columns:

cc 1-3	alpha
cc 4-10	numeric
cc 11	alpha
cc 12-20	numeric
cc 71-74	numeric
cc 77-80	numeric

Merging and selection for the borrower file is on the following columns:

cc 77-80	numeric
cc 1-3	alpha
cc 4-10	numeric
cc 11	alpha
cc 12-20	numeric
cc 71-74	numeric

Because the test is not complete for the whole card it is possible that a few false drops may result. These may be detected by matching the cards selected from the file with the finder cards in the collator, matching on date or borrower number columns not tested in the first pass, plus appropriate call number columns. Our experience with false drops in the handling of circulation for technical reports, patterned after this system, indicates an error rate of less than 1% in matching.

Inventory and Overdues

Another use of the borrower circulation file is in connection with inventory and notification of overdue materials. A header card is placed in the borrower file for each borrower. It is punched as follows:

cc 1-38	Blank
cc 39-60	Name (last name first)
cc 61-66	Company
cc 66-71	Location
cc 72-76	Blank
cc 77-80	Borrower number (12 punch overpunched in cc 80)

A master dictionary file of these cards also is maintained and printed to give a convenient desk reference for borrower names and numbers. Numbers were assigned to each borrower in order to stay within the four digits allowed. Assignment of numbers is in alphabetic sequence since the file was created with sufficient number gaps between each name to allow for insertion of new names in proper sequence.

For inventory purposes the borrower circulation file is used to print a list of all items charged to each borrower on pre-printed forms (Fig. 27) using a 1401 program (CIRCN) shown in appendix G. This system was originally designed for the 407, and operated very well on that machine. In

LOANED TO ABBOT JOHN

PPC CPP

BOOK & JOURNAL
INVENTORY LIST

04/08/63

ISSUING
LIBRARY

1

CALL NUMBER	COPY	AUTHOR OR JOURNAL TITLE	TITLE OR JOURNAL VOLUME NUMBER	DATE OF LOAN	EXCHANGE NUMBER	✓
AC 465 A5	1	ASTM	SYM ON SPECTROSCOPIC LIGHT SOURC	03/25/63	MTR	
Q 162 G23 1961	1	GAMOW, G.	ONE, TWO, THREE, ... INFINITY	03/25/63	MTR	
QA 275 B4	3	BEERS, Y.	INTRO TO THEORY OF ERROR	03/25/63	MTR	
QCD1320 U62 1960	2		THE REACTOR HANDBK V.1 MATERIALS	03/25/63	MTR	
QD 65 029	2	BAUER, E. L.	STATISTICAL MANL FOR CHEMISTS	03/25/63	MTR	
TJ 151 M37 1958	2	MARKS, L. S.	MECHANICAL ENGRS HANDBOOK	03/25/63	MTR	
UNCATALOGED		SCHURR, S. H.	ENERGY IN AMERICAN ECONOMY...	03/25/63	MTR	
JOURNAL		SOVIET PHYS JETP	VOL 14 NO 6 JUN, 1962	03/25/63	MTR	
LAB CHARGE		ASTM PT.4	1959 SUPPL TO BK OF STDS + TESTS	03/25/63	MTR	
BOOKS- 6 JOURNALS-	1	UNCATALOGED-	LAB CHARGE- 1			

Fig. 27 Inventory form.

the case of operation on the 407, the machine is wired to recognize a card with a $\pm$ punch in cc 80 as a name header card. This name is loaded to counters and is placed at the top of each page of the individual inventory. Overpunching is used in cc 19 and 20 to cause the machine to print JOURNAL in the call number area of the sheet for journals, and to print LAB CHARGE for books purchased against laboratory accounts. UNCATALOGED is printed for uncataloged material in the same manner.

Followup for inventories which are not returned within a given time is accomplished automatically. As each inventory is returned a finder card is punched showing the borrower number in cc 77-80. These finder cards are used to select matching cards from the master name header deck. Cards remaining in the name header deck after this run are for those people who have not returned their inventories. These cards are used in the 1401 with the BLGR program (appendix H) to write letters (Fig. 28) asking that the inventories be returned. This program makes followup very easy, eliminating need of writing letters or telephoning. Unfortunately, this routine does not work easily on the 407 because it does not

FROM- NRTS TECHNICAL LIBRARY
MTR-625

AUG 29, 1962

TO- ANDERSON SHERMAN D
CF674 PPC

0160

THE INVENTORY LISTING OF LIBRARY AND LAB CHARGE ITEMS SENT TO YOU ON AUG 3, 1962 HAS NOT YET BEEN RETURNED TO THE TECHNICAL LIBRARY WITH YOUR VERIFICATION. PLEASE VERIFY YOUR POSSESSION OF THE MATERIAL SHOWN ON THE LISTING AND RETURN THE LIST, SIGNED, WITHOUT DELAY.

YOUR PROMPT ATTENTION TO THIS MATTER WILL BE GREATLY APPRECIATED.

Fig. 28 Inventory followup letter.

have sufficient storage capacity to accept the contents of the letter in storage. The only way that this operation can be accomplished on the 407 is (1) through the use of pre-printed forms or (2) by placing the name header cards of those to be notified ahead of card packets containing the text of the letter.

For the recall of journals the entire file is loaded into the 1401 for processing using the JBACK program (appendix I). It scans the circulation, card by card. When a journal card is recognized the borrower's name is printed on the inventory sheet, a message is printed telling him that journals are loaned for three days, and the journals which he has checked out are listed (Fig. 29).

This procedure could be used on the 407 with additional card handling involving collating and sorting. Journal cards would have to be pulled from the circulation deck and merged behind name header cards. The list would then be printed, the cards split out from the name headers and merged back into the circulation deck.

This circulation system makes possible a number of jobs which should be done if a library is to operate smoothly, but which require excessive time and manpower by non-EDP methods. It gives a great deal of flexibility as well, because once the information is punched, the cards can be manipulated to produce other reports. New programs can be written for the 1401 to simplify the accomplishment of special, one-time jobs, such as the following example:

One of the site contractors was effecting a sizeable reduction in staff assigned to the NRTS. We modified our inventory program to print inventories for only those borrowers employed by this contractor. One pass of the circulation deck through the 1401 produced printed inventory sheets for them. The whole job, including program modification and processing, took less than one hour. It saved untold hours of manual checking and typing which might have been required if our circulation had not been on punched cards.

CALL NUMBER		COPY	AUTHOR OR JOURNAL TITLE	TITLE OR JOURNAL VOLUME NUMBER	DATE OF LOAN	EXCHANGE NUMBER	✓
JOURNALS ARE LOANED FOR 3 DAYS - REF A18 1.60, SEC. 6.118-. PLEASE RETURN THEM PROMPTLY TO AVOID LOSS AND TO MAKE THEM AVAILABLE TO OTHERS WITHOUT DELAY.							
JOURNAL -MTR-			NUCL SCI, ENGRG	VOL 2 FEB-NOV 1957	05/28/62	4760	
JOURNAL -MTR-			NUCL SCI, ENGRG	VOL 3 1958	12/19/61	4760	
JOURNAL -MTR-			NUCLEONICS	VOL 9 1951	12/19/61	4760	
JOURNAL -MTR-			NUCLEONICS	VOL 10 1952	12/19/61	4760	
JOURNAL -MTR-			NUCLEONICS	VOL 11 1953	12/19/61	4760	
JOURNAL -MTR-			NUCLEONICS	VOL 12 1954	12/19/61	4760	
JOURNAL -MTR-			NUCLEONICS	VOL 13 1955	12/19/61	4760	

Fig. 29 Journal recall listing.

TEXT BOOK ORDERING FOR THE NRTS EDUCATION PROGRAM

Text books for University extension courses offered for NRTS workers in conjunction with the University of Idaho are ordered and distributed by the NRTS Technical Library. The required texts, announced four weeks prior to the meeting of the first class, are ordered from the library by individuals who plan to enter classes. The orders go to the dealer within a week after the texts have been announced.

IBM master cards are punched for each copy ordered, showing the name of the student, his location, the course name number, and the name of the text ordered. The card format (Fig. 30) is:

cc 1-14	Student's name
cc 15-19	Location
cc 20	Blank
cc 21-29	Course number
cc 30	Blank
cc 31-44	Name of text (generally the author)
cc 45	Blank
cc 46-51	Price (e.g., \$22.50)
cc 55-60	Sequence number (students in alpha order)
cc 61-65	Sequence number (students in alpha order by class)
cc 66-76	Blank
cc 77-80	Date paid

Stock 5081 cards are used for this operation. When the texts arrive the prices are entered in cc 46-51, and an invoice card is produced for each copy (Fig. 31).

Payment is returned with the invoice card. This invoice card is used in conjunction with the collator to select the master card from the master deck and is then stamped "paid", dated, and returned to the student as his receipt. The master cards are used with a program on the 1401 to prepare a summary listing (Fig. 32) of those who have paid to accompany the money to Finance.

From the punched cards lists can be printed out in many ways, i.e., by class, text, location, student, etc. A great convenience to all is the use of the cards as a means of preparing and balancing the lists of payments for transmittal to Finance. After master cards have been used to prepare such a list, they are gangpunched with the date of payment and filed, in case of question regarding payment later on.

STUDENT														LOCATION	CLASS	TEXT	PRICE	STUDENT ALPHA SEQUENCE	CLASS ALPHA SEQUENCE	BLANK	PAID DATE																																																									
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

Fig. 30 Card layout form for text book ordering.

ANDERSON, S.		CF674	E.E. 103	JOHNSON	\$ 07.50
TEXTBOOK		INVOICE

<p>THIS IS THE INVOICE FOR A TEXTBOOK WHICH YOU HAVE RECEIVED FOR THE CLASS INDICATED ON THIS CARD.</p> <p>1. YOUR CHECK, MADE OUT TO PHILLIPS PETROLEUM COMPANY, IN THE AMOUNT SHOWN ABOVE, SHOULD BE SENT PROMPTLY TO GEORGE W. STULTZ TECHNICAL LIBRARY MTR 88</p> <p>2. THIS CARD MUST BE INCLOSED WITH YOUR PAYMENT TO INSURE THAT YOUR REMITTANCE IS PROPERLY CREDITED.</p>					
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					

Fig. 31 Classbook invoice card.

NRTS EDUCATION PROGRAM				PAID CLASSBOOKS.		DATE- 03/21/63	PAGE 1
ITEM NO.	STUDENT	LOCATION	CLASS	TEXT	CGST	PAID LIST DATE	
1.	ANDERSON, S.	CF674	E.E.103	JOHNSON	\$7.50	03/21/63	
2.	GATSLBY, M.	FLUOR	E.E.103	JOHNSON	\$7.50	03/21/63	
3.	KATZMA, K.	MTR	E.E.103	JOHNSON	\$7.50	03/21/63	
4.	KINDRED, K.	CF674	E.E.103	JOHNSON	\$7.50	03/21/63	
5.	PENCE, O.	CPP	E.E.103	JOHNSON	\$7.50	03/21/63	
6.	STULINSKY, J.	CF674	E.E.103	JOHNSON	\$7.50	03/21/63	
TOTAL THIS TITLE-				\$45.00	6 ITEMS		

Fig. 32 Classbook summary to finance.

APPLICATION OF PUNCHED CARDS TO THE HANDLING OF TECHNICAL REPORTS

The Report Section of the library handles a large collection of atomic energy research and development reports originating both in this country and abroad, which grows at the rate of over 1,000 titles monthly. The EDP system for handling them covers receiving, circulation, recall, inventory, and the printing of a periodic listing of new reports received. Basically, a set of IBM cards is punched for each report, the operator taking the information directly from the report. Cards are machine duplicated as needed.

The report number is used as the call number, or filing medium, for all reports. A shelf list, or "master file", is maintained for all reports in the collection. Circulation cards for reports in circulation are filed in a two file system like that described earlier for library circulation. One card, filed by number, enables prompt recall of reports.

The other, filed by the borrower, is used to make complete machine-printed listings of reports charged to individuals. The Reports Received List (Fig. 33), a list of new reports received during the preceding two weeks, is prepared through the use of punched cards and IBM sorting and listing equipment. The cards for the list are sorted, alphabetized, placed in subject order, and printed on Multilith mats in an average time of two hours.

APRIL 15, 1963

1. GENERAL, MISCELLANEOUS AND PROGRESS REPORTS

HW 76323	RADIOISOTOPIC HEAT SOURCES. C. A. ROHRMANN. FEBRUARY 1, 1963.
*NP 12421	APR 61-MAR 62 DANISH ATOMIC ENERGY COMMISSION ACTIVITIES. DENMARK. OCTOBER 1962.
*NYO 8103	RESEARCH PROGRESS REPORT. JOHNS HOPKINS UNIV., BALTIMORE. JANUARY 7, 1963.
ORO 598	JAN-JUNE 1962 SEMI-ANNUAL PROGRESS REPORT. UNIVERSITY OF TENNESSEE-AEC AGRICULTURAL RESEARCH LABORATORY. MARCH 1963.
PR 10 52	OCT-DEC 1962 OPERATIONS PROGRESS REPORT. ATOMIC ENERGY OF CANADA LIMITED.
PR W 7	OCT-DEC 1962 WHITESHELL DIVISION PROGRESS REPORT. ATOMIC ENERGY OF CANADA LIMITED.

2. REACTOR TECHNOLOGY

*ACNP 62028	PATHFINDER ATOMIC POWER PLANT SINGLE ROD BURNOUT HEAT FLUX TESTS. SUMMARY REPORT. K. F. NEUSEN AND G. J. KANGAS. DECEMBER 21, 1962.
AECL 1634	NUCLEAR POWER DEMONSTRATION REACTOR. ATOMIC ENERGY OF CANADA LIMITED. OCTOBER 1962.

Fig. 33 Sample of reports received list.

EQUIPMENT AND TRAINING

Experience with the initial IBM application convinced the staff that punched cards could expedite operations. It showed also that an important advantage is lost when library personnel have to copy information onto sheets or cards for keypunching at another location by key-punch operators unfamiliar with the library system and its requirements. It appeared that important benefits would result if personnel were to punch cards directly from the document to the greatest possible extent.

To this end, an IBM model 026 printing keypunch was leased. With this machine the operator can see printed what she has punched and thus develop confidence.

All members of the staff learned to operate the keypunch. Individuals who handled the various routines in the library did the keypunching involved in their areas of work. A training program was instituted, with the assistance of our local IBM Data Processing Division representative, for the entire staff. This had many benefits. No one felt "left out", and staff members not directly associated with certain operations could assist with keypunching duties whenever temporary work overloads or illness made it impossible for the assigned staff member to handle the job.

While staff members can be trained successfully, they may not all become outstanding keypunch operators from the viewpoint of production work. A slow typist will probably not be a fast and efficient keypunch operator, for manual dexterity is an important aspect in keypunching, as in typing. But the staff member who is trained as a keypunch operator knows the rest of the routine, and probably knows and appreciates better than most why certain information must be entered in a specific manner. Knowing this, she will be less prone to let errors slip by.

If the work load justifies, it is probably better to secure a full time keypunch operator to handle all keypunch work for the entire section. This demands a skilled and flexible operator. Jobs which require continual but intermittent use of one keypunch would probably not be given to the full time keypunch operator. Circulation is an "on demand" type of job which cannot be worked into a fixed schedule. The circulation attendant does the punching for circulation cards. But many jobs can be scheduled for the full time keypunch operator in the section. In the NRTS library, for example, preparation of cards in the report section is a full time job for one member. Book orders, cards for the monthly book lists and printed catalog, journal renewal changes and additions, and many of the other jobs in the section can all be channeled to the full time operator. This allows the staff members who are presently doing keypunching in addition to their regular duties to devote more time to the duties for which they are more skilled and better trained.

As other systems were installed, it became apparent that one keypunch could not handle the load of work entering the systems, especially with the report section located some distance from the library. We obtained two more 026 keypunches, both with the alternate program device and one with the interspersed master card gang punch feature. This IMGP feature permits simple gang punching on the spot, without carrying cards to the data processing section and waiting for time to become available on the IBM 514 reproducing punch. Our aim was to be as self sufficient as possible, and to do as much of our work as possible on our own machines. At this time we also secured a model 085 collator with the alphabetic collating feature, and an IBM model 082 sorter, capable of sorting 650 cards per minute. This sorter is equipped with a card counting device and the sort suppress feature.

We chose the IBM 085 collator in preference to their 087 collator although the 087 will sort a few more columns of alphabetic information and allows greater flexibility in the columns which may be used for alpha collating. The alpha collating feature on the 085 can be used only in

certain positions, and this forced us to design our cards to place any information to be alpha collated in a position in the card which would be compatible with the collator columns so equipped. We had the device set up for columns 1-16. Cards with alpha data in other columns can be handled by reproducing the data into columns 1-16 and then reproducing the deck back into the original format. Our systems are so designed, however, that this is not necessary for any of the work which we do. In addition, the 085 is a much more flexible machine than the 087, allowing a greater variety of jobs to be handled.

When we were making our initial applications the only printer available to us was the IBM 407 accounting machine. This was a basic 407 with no additional selectors or special features. It did a fine job within its limitations and enabled us to get systems into operation which were of real benefit.

It was only one year ago that the IBM 1401 data processing system became available to us, for it was at that time that it was installed in the headquarters building in Idaho Falls, fifty-five miles distant from our location at the NRTS. We felt that the advantages which we could obtain from the machine far outweighed the inconvenience of transporting trays of cards from the NRTS to the headquarters building for processing. This machine was a basic 1401 with a 4K core, but with only a limited number of special features. Although this machine had its limitations it vastly extended our capabilities over the 407 and made possible jobs which would not have been physically or economically possible on the 407. A new 1401 system using magnetic tape has recently replaced the machine which we have been using, and we have a number of applications which have been awaiting the installation of this equipment.

Probably the greatest problem for the librarian desiring to utilize punched card procedures is that most of his staff do not understand or appreciate the full capabilities of this equipment. The IBM Data Processing Division representatives are extremely helpful, but there is need for the librarian to become well versed in the principles of electronic data processing. Only in this way can the librarian relate the capabilities of the various types of equipment to the operations which he desires to accomplish.

It is, of course, highly desirable to have all necessary equipment available in the library to handle all of the jobs which are to be done. The convenience which this offers to the smooth functioning of the system cannot be denied. Nevertheless, it is possible to accomplish a great deal with only a keypunch in the library if machine service can be obtained locally. Many universities and colleges now have computing centers or are introducing electronic data processing equipment in their accounting operations. Many city and county governments are using this equipment, and many industrial firms and businesses have such equipment available. It is possible, in many communities, to secure these services from a local service bureau or tabulating center. The major problem which will be encountered will probably be a lack of alpha collating ability, since most data processing jobs are set up for numeric collating.

APPENDIX A. POST LIST OF 1401 UNION LIST PROGRAM

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/I99,027A074028)027B0010270B026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	UNION
1	010			CTL	33						
1	020				*NRTS UNION LIST OF SERIALS.						
1	030				* NRTS TECHNICAL LIBRARY, PHILLIPS PETROLEUM CO.						
1	040				* PROGRAMMED BY HILLIS L. GRIFFIN FEB 1963						
1	050				*						
1	060				*THIS PROGRAM WRITES THE LISTING FOR THE NRTS						
1	070				* UNION LIST OF SERIALS.						
1	080				*						
1	090				*SWITCHES- I/O ON, SW A- ON, PUNCH OFF. SW B- ON						
1	100				* TO PRINT CODE NUMBERS CC 66-80.						
1	109				*						
1	110				*CARRIAGE TAPE - CH 1 LINE 3, CH 2 LINE 6						
1	120				* CH 12 LINE 56. FIT TAPE TO PAPER SIZE.						
1	130				*						
1	140				*LOAD BLANK STOCK TAB PAPER OR DUPLIMATS. USE						
1	150				* PROPER TAPE FOR MATS OR PAPER.						
1	160				*						
1	200				*						
2	010	7	ST	SW	0001	CTRA		0333	,	001 523	
2	020	7		A	ONE	PGCTR		0340	A	501 500	
2	030	4		B	NUPG			0347	B	405	
2	035	4	ST3	CW	CTRA			0351	I	523	
2	036	4		CS	0299			0355	/	299	
2	040	5	START	B	END		A	0359	B	453 A	
2	050	1		R				0364	I		
2	060	8		B	TITLE	0071	0	0365	B	394 071 0	
2	070	7	ST2	MCW	0065	0280		0373	M	065 280	
2	071				*CHANGE 0280 TO DESIRED LOCATION FOR LOW ORDER						
2	072				* PRINT POSITION IF THIS DOES NOT FIT YOUR FORMS						
2	073	5		B	REST		B	0380	B	478 B	
2	080	1	ST4	W				0385	2		
2	090	4		CS	0299			0386	/	299	
2	100	4		B	START			0390	B	359	
2	110	2	TITLE	CC			K	0394	F	K	
2	120	5		B	NUPG		'	0396	B	405 '	
2	130	4		B	ST2			0401	B	373	
2	140	2	NUPG	CC			1	0405	F	1	
2	150	7		LCA	PAGE	0251		0407	L	507 251	
2	160	7		MCE	PGCTR	0251		0414	E	500 251	
2	162			,	*PAGE NO. CENTERED AT TOP OF PAGE.						
2	170	7		SW	PGCTR - 2	PAGE - 5		0421	,	498 502	
2	180	2		CC			B	0428	F	B	
2	190	1		W				0430	2		
2	200	7		A	ONE	PGCTR		0431	A	501 500	
2	210	8		BWZ	ST3	CTRA	1	0438	V	351 523 1	
3	010	7		CS	ST2	0299		0446	/	373 299	
3	020	4	END	S	PGCTR			0453	S	500	
3	030	2		CC			1	0457	F	1	
3	040	7		MCW	MESS1	0290		0459	M	522 290	
3	050	2		CC			A	0466	F	A	
3	060	1		W				0468	2		
3	070	4		CS	0290			0469	/	290	
3	080	1		H				0473	.		
3	090	4		H	ST			0474	.	333	
3	100	4	REST	SW	0066			0478	,	066	
3	110	7		MCW	0080	0299		0482	M	080 299	
3	120	4		CW	0066			0489	)	066	
3	130	4		B	ST4			0493	B	385	
3	140	1		H				0497	.		
81	010				*FOLLOWING ARE CONSTANTS-						
81	020	3	PGCTR	DCW	*		000	0500			
81	030	1	ONE	DCW	*		1	0501			
81	040	6	PAGE	DCW	*		-0	0507			
81	050	15	MESS1	DCW	*			0522			
81	060	1	CTRA	DCW	*			0523			
81	200			END	ST					/ 333 080	

66 CARDS

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2 L072116,110106,105117B101/199,027A074028)027B00102708026/0991,001/00111710
BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	MOBK1
1	010			CTL	33						
1	020				*MONTHLY BOOK LIST. (INTERIM PROGRAM)						
1	030				* NRTS TECHNICAL LIBRARY. MARCH 1963						
1	040				*PROGRAMMED BY HILLIS L. GRIFFIN.						
1	050				*						
1	060				*COMPILE ON 4K 1401 WITH INDEX REGISTERS AND						
1	070				* HI-LO-EQUAL COMPARE						
1	080				*						
1	090				*ACCEPTS CARDS IN ORDER BY AUTHOR AND SUBJECT.						
1	100				* SW B OFF IF NO BREAK ON SUBJECT.						
1	110				* SW G OFF FOR PAGE HEADER FOR AUTH-TITLE-ITEM.						
1	120				*SWITCHES- I/O ON, SW A ON, SW B - SEE ABOVE.						
1	130				*						
1	140				*CARRIAGE TAPE- CH 1- TOP LINE, CH 2- TOP TEXT						
1	150				* LINE, CH 9 IS 3 LINES ABOVE CH 12 - WHICH IS						
1	160				* 10 LINES FROM LAST ALLOWABLE PRINT LINE.						
1	170				*						
2	010	4	ST	SW	0001			0333	, 001		
2	020	5		B	END		A	0337	B 751 A	LAST CARD TEST	
2	030	1		R				0342	1		
2	040	8		B	TRLRCD	0079	2	0343	B 476 079 2	CALL NO CARD	
2	050				*FOLLOWING FOR AUTHOR-TITLE CARDS.						
2	060	7		SW	0028	0066		0351	, 028 066	TITLE, SUBJECT	
2	065	5		B	AUTH		B	0358	B 375 B	NO SUBS BREAK	
2	070	7		C	0066	SUBJCT		0363	C 066 815	TEST NEW SUBJECT	
2	080	5		B	NEWSUB		/	0370	B 706 /	IF NEW SUBJECT	
2	090	7	AUTH	MCW	0065	0289		0375	M 065 289	TITLE IN.	
2	100	8		BWZ	AUTH2	0079	B	0382	V 394 079 B	IF AUTH TO PRINT	
2	110	4		B	AUTH3			0390	B 401		
2	120	7	AUTH2	MCW	0027	0247		0394	M 027 247	AUTHOR IN	
2	130	8	AUTH3	B	AUTH4	0077	0	0401	B 413 077 0	IF FIRST CARD	
2	140	4		B	AUTH5A			0409	B 453		
2	150	7	AUTH4	A	ONE	TITLES		0413	A 808 820		
2	155	8		B	AUTH5	0080	R	0420	B 465 080 R	IF REFERENCE BK	
2	160				*NO ITEM NUMBER PRINTED IF REFERENCE BOOK.						
2	170	7		A	ONE	ITEM		0428	A 808 813	INCR ITEM NUMBER	
2	180	7		MCW	PERIOD	0217		0435	M 814 217	AND LOAD TO	
2	190	7		MCS	ITEM	0216		0442	Z 813 216	WRITE.	
2	200	4		SW	ITEM - 4			0449	, 809		
3	010	1	AUTH5A	W				0453	2		
3	020	4		CS	0299			0454	/ 299		
3	030	7		CS	ST	0080		0458	/ 333 080		
3	032	7	AUTH5	MCW	MESS3	0217		0465	M 851 217	REF. MESSAGE	
3	034	4		B	AUTH5A			0472	B 453		
3	040				*AUTHOR-TITLE PRINTED. CALL NO. CARD NEXT.						
3	050				*						
3	060	7	TRLRCD	SW	0028	0030		0476	, 028 030	YR, CALL NO	
3	065	4		SW	0078			0483	, 078		
3	070	7		MCW	ZERO	IR2		0487	M 807 094	RESET IR-2	
3	080	7		MCW	ZERO	IR3		0494	M 807 099	RESET IR-3	
3	090	8		B	TLR2	0028		0501	B 523 028	IF NO DATE	
3	100	7		MCW	0029	0256		0509	M 029 256	YEAR	
3	110	7		MCW	K19	0254		0516	M 847 254	NINETEEN	
3	120	7	TLR2	MCW	0065	0294		0523	M 065 294	CALL NUMBER.	
3	130	7		A	ONE	IR2		0530	A 808 094		
3	140	8	TLR3	B	TLR4	0029	2	0537	B 556 0K9	TEST BLANK	
3	150	7		A	ONE	IR2		0545	A 808 094		
3	160	4		B	TLR3			0552	B 537		
3	170	7	TLR4	A	ONE	IR2		0556	A 808 094	TEST FOR TWO	
3	180	8		B	TLR5	0029	2	0563	B 575 0K9	BLANKS- RETURN	
3	190	4		B	TLR3			0571	B 537	IF NOT END	
4	010	7	TLR5	A	K14	IR2		0575	A 845 094	SET END FOR	
4	020				* BRANCH LOCATION IN IR2. NEXT TEST FOR LOCATION						
4	030	7	TLR6	C	0078	BR1 - 13 3		0582	C 078 8G1		
4	040	5		B	TLR7		S	0589	B 613 S		
4	041	8		B	LOCERR	BR1 - 13 3	*	0594	B 652 8G1	* END OF TABLE CHK	
4	050	7		A	K14	IR3		0602	A 845 099		
4	060	4		B	TLR6			0609	B 582		
4	070	4	TLR7	SW	BR1 - 12 3			0613	, 8G2		
4	080	7		MCW	BR1 3	0261	2	0617	M 8H4 201		
4	090	4		CW	BR1 - 12 3			0624	J 8G2		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	MOBK1
4	100	2	TLR8	CC			T	0628	F T	SPACE 3	
4	110	1		W				0630	2		
4	120	4		CS	0299			0631	/ 299		
4	130	4		CS	0080			0635	/ 080		
4	140	4		SW	0001			0639	, 001		
4	150	5		B	NUPG		-	0643	B 663 -	END PAGE TEST	
4	160	4		B	ST			0648	B 333		
4	170	7	LOCERR	MCW	STAR	0298		0652	M #95 298	NO MATCH ON LUCN	
4	180	4		B	TLR8			0659	B 628	SET ERROR SIGN	
4	190	2	NUPG	CC			1	0663	F 1		
4	191	5		B	ST		G	0665	B 333 G	NO HDR PRNTD	
4	200	7		MCW	MESS11	0265		0670	M 856 265	TITLE MESS	
4	210	7		MCW	MESS12	0236		0677	M 862 236	AUTHOR MESSAGE	
4	220	7		MCW	MESS13	0220		0684	M 870 220	ITEM NO MESSAGE	
4	230	2		CC			T	0691	F T	SPACE	
4	240	1		W				0693	2		
5	010	7		CS	ST	0299		0694	/ 333 299		
5	010	5	NUPG	CC	ST		1	0701	F 333 1		
5	020	5	NEWSUB	B	NEXTPG		9	0706	B 720 9	IF LOW ON PAGE	
5	030	5		B	NEXTPG		-	0711	B 720 -		
5	040	4		B	NEW1			0716	B 725		
5	050	5	NEXTPG	CC	NEW2		1	0720	F 727 1		
5	060	2	NEW1	CC			K	0725	F K	DOUBLE SPACE	
5	070	7	NEW2	MCW	0066	0250		0727	M 066 250		
5	080	7		MCW	0066	SUBJCT		0734	M 066 815	INCR SUBJ COMP	
5	090	2		CC			T	0741	F T		
5	100	1	NEW3	W				0743	2		
5	110	7		CS	AUTH	0299		0744	/ 375 299		
5	120	2	END	CC			1	0751	F 1		
5	130	7		MCW	MESS1	0276		0753	M 826 276		
5	150	7		MCS	TITLES	0269		0760	Z 820 269		
5	160	7		MCW	MESS2	0250		0767	M 841 250		
5	170	2		CC			A	0774	F A		
5	180	1		W				0776	2		
5	181	1		H				0777	.		
5	190	4		CS	0299			0778	/ 299		
5	200	4		CS	0080			0782	/ 080		
5	210	7		SW	TITLES-	4 0001		0786	, 816 001		
6	010	4		S	TITLES			0793	S 820	RESET	
6	020	4		S	ITEM			0797	S 813		
6	030	4		B	ST			0801	B 333		
6	040				*PROGRAM RESET. RELOAD IF DESIRED AND PRESS						
6	050				* START.						
81	010				*FOLLOWING ARE CONSTANTS AND WORK AREAS.						
81	020	3	IR1	DCW	0089			0089			
81	030	3	IR2	DCW	0094			0094			
81	040	3	IR3	DCW	0099			0099			
81	050	3	ZERO	DCW	*		000	0807			
81	060	1	ONE	DCW	*		1	0808			
81	070	5	ITEM	DCW	*		00000	0813			
81	080	1	PERIOD	DCW	*		.	0814			
81	090	1	SUBJCT	DCW	*			0815			
81	100				*SUBJECT TEST COUNTER						
81	110	5	TITLES	DCW	*		00000	0820			
81	120	6	MESS1	DCW	*			0826			
81	130	15	MESS2	DCW	*			0841			
81	150	2	K35	DCW	*			0843			
81	160	2	K14	DCW	*			0845			
81	170	2	K19	DCW	*			0847			
81	180	4	MESS3	DCW	*			0851			
82	010	5	MESS11	DCW	*			0856			
82	020	6	MESS12	DCW	*			0862			
82	030	8	MESS13	DCW	*			0870			
96	010				*FOLLOWING IS TABLE FOR BRANCH LOCATIONS						
96	020	14	BR1	DCW	*			0884			
96	030	14		DCW	*			0898			
96	031	14		DCW	*			0912			
96	040	14		DCW	*			0926			
96	050	14		DCW	*			0940			
96	060	14		DCW	*			0954			
96	070	14		DCW	*			0968			
96	080	14		DCW	*			0982			
96	090	14		DCW	*			0996			
96	100	14		DCW	*			1010			
96	110	14		DCW	*			1024			
96	120	14		DCW	*			1038			
96	130	14		DCW	*			1052			
96	140	14		DCW	*			1066			
96	141	14		DCW	*			1080			
96	150	14		DCW	*			1094			
96	160	1	STAR	DCW	*			1095			
96	170				*END OF LOCATION TABLE						
97	990			END	ST						

/ 333 080

154 CARDS

Form 22-2875-4
Printed in U.S.A.

ACCOUNTING MACHINE, TYPE 407, CONTROL PANEL DIAGRAM
INTERNATIONAL BUSINESS MACHINES CORPORATION

IBM

DATE _____
DIAGRAM NO. _____
SW1 - N NO LOCATIONS SHOWN
SW1 - T LOCATIONS SHOWN
REPORT SUBJECTS & AUTHOR'S

APPENDIX C. PREPARATION OF MULTIPLE COPY BOOK ORDER FORMS ON THE IBM 407 ACCOUNTING MACHINE

Procedures for card preparation for this system differ in several important respects from those used for preparation of cards for use with the IBM 1401 system. The system described here is designed for a basic IBM 407 without additional selectors or special features.

Slips are printed in much the same format as those produced with the IBM 1401 system. One important difference is that slips in this system must be pre-numbered because there is not enough selector capacity in the basic 407 to handle the printing of numbers. This system also requires pre-numbering because there is no way to punch cards as they are passed through the system, as in the 1401. Slips are limited in width by the 120 printing positions available on the 407.

Close attention to system operation will produce order slips which are completely satisfactory. Multiple sets of cards must be supplied for multiple copies, and a date card must be supplied for each title being ordered if the date is to be printed on the form. Dating could be done by hand, as well.

This system uses five punched cards, in varying keypunch formats, for the preparation of the order slip for each book title. The first, or "date card", prints the order date on the slip. The second, or "author-title" card, is used to print the name of the author and the first line of the title. The third and fourth cards are "title continuation" cards, which are used to continue the title information from the second card. The fifth and final card is the "information" card, containing the publisher, imprint, price, account number, organization and name of the requester, together with the purchase order number under which the book is being ordered. Only one copy of any title is ordered on a slip so there is no necessity for entering the number of copies ordered; it will always be one.

After the cards have been punched and verified they are placed in the IBM 407 accounting machine. Through the use of appropriate control panel wiring and a special carriage control tape the information from the cards is printed in the appropriate spaces on pre-printed multiple copy order forms prepared especially for this purpose.

Distribution of the forms is the same as that in the 1401 system previously described. The main difference between the two systems is the necessity of using the date card, and the necessity that the sequence numbers be punched in the cards prior to the printing operation.

Our only difficulties with this system were essentially with the machine itself. It must be in top mechanical condition, for this program makes considerable demands upon it. Any bad contacts in the relays of the machine will become quite apparent during the operation of this

system. A ruined form means that at least one card must be renumbered, but this can be accomplished after the run has been completed since the invoice numbers are not printed on the slips. This was our only source of trouble with the system, and it happened only infrequently.

Card Punching Information (See Figure C-1 for examples of cards.)

Date Card

cc 1-65 Blank
cc 66-76 Date (e.g., FEB 14 1961)
cc 77 + punch
cc 78-79 Invoice number (last two digits)
cc 80 Blank

Author-Title Card

cc 1-27 Author
cc 28-65 Title (Omit words such as "The",
"A", "An", which precede the first major word of
the title unless they contribute to the sense of
the title.)
cc 66-72 Blank
cc 73-76 Invoice number (three high-order
digits)
cc 77 Sequence number (punch 1)
cc 78-79 Invoice number (two low-order
digits)
cc 80 Multiple line print (machine
control punch; punch B)

Title Continuation Cards

These cards are used to continue the title if it is too long to fit the preceding card. Two cards are allowed for this continuation and must be included, whether they are used or not. This is necessary to get the machine to space down to the lower lines on the form. If they are not used for title information, punch only the invoice number, sequence number, and machine control punches in the card.

cc 1-27 Blank
cc 28-65 Title continuation (indent 2
spaces)
cc 66-72 Blank
cc 73-76 Duplicate invoice number from
preceding card.
cc 77 Sequence number (2 or 3)
cc 78-79 Duplicate invoice number from
preceding card.
cc 80 B punch (machine control)

Information Card

cc 1-15 Publisher
cc 16-17 Month of publication, abbreviated
in two letters (e.g., JA, FB, etc.) Punched only
if being ordered pre-pub.
cc 18-19 Year of publication (Punch only
last two digits, e.g., 1962; the 19 is supplied
by the printer.)
cc 20-24 List price (Space is provided
for prices up to \$999.99. Do not punch the decimal
point but visualize it between cc 22 and 23. Do
not punch the \$ sign.)
cc 25-34 Account number (use only numbers--
special characters or letters will not print
correctly)
cc 35-37 Contractor
cc 38-50 Requester
cc 51-54 Blank
cc 55-59 Purchase order number
cc 60-72 Blank
cc 73-76 Invoice number (duplicate from
preceding card)
cc 77 Sequence number (punch 5)
cc 78-79 Invoice number (duplicate from
preceding card)
cc 80 Blank

This completes the preliminary punching of the order cards. Cards may be punched in this manner at any time and a supply of cards built up prior to ordering. A fixed ordering routine will enable the keypunch operator to punch the date cards as a part of the operation of punching cards for material being ordered. This will save considerable machine time later if these date cards do not have to be punched separately and merged with the order cards. Always begin numbering with the first open invoice number and continue without a break.

While it is best to punch the invoice numbers as the cards are being prepared, they can be numbered prior to processing. Instructions for this operation follow:

1. From a pre-numbered master deck place (manually or with the collator) one of the pre-numbered blanks ahead of the first card for each title.
2. Using 026 keypunch with IMGP feature (or 514 or 519 reproducing punch) duplicate cc 73-76, cc 78-79 invoice numbers from pre-numbered blank.
3. Sort cc 77 (using sort suppress device on sorter) to remove pre-numbered blanks. If no sorter is available they can be pulled by hand.

4. Make date header cards as follows:
 - a. Punch date card cc 66-77 and duplicate as many as are required on the keypunch or reproducing punch. These cards should have same corner cut as data deck.
 - b. Place (manually or with collator) one of the pre-numbered blanks ahead of each data card.
 - c. Duplicate cc 78-79 from pre-numbered blank into date card, using IMGPF feature or reproducing punch.
 - d. Sort cc 77 for + punch to separate pre-numbered blanks from completed date cards.
5. Merge date header cards in front of order cards having same number in cc 78-79 (manually or with collator). The deck is now ready to print.

A pre-numbered deck may be made on the IBM 514 reproducing punch which is equipped with the sequential numbering device special feature. Such a deck may also be obtained from the IBM Data Processing Division representative. Once used, the cards should be discarded or placed in a separate file so that they will not find their way back to the deck which is supplying current invoice numbers. If this practice is followed the working number deck will always correspond with the numbers to be used in producing cards with invoice numbers corresponding to the numbers appearing on the preprinted slips used for ordering.

Samples of the completed cards for one title are shown in Figure C-1, and a flow chart for the system in Figure C-2. After printing, the cards are handled for all operations in the same manner as those produced from the 1401 system.

Fig. C-2. Flow chart for IBM 407 book order system.

APPENDIX D. BOOK 1 POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,105117B101/199,027A074028)027B00102708026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BOOK1
1	010			CTL	33						
1	020				*BOOK ORDER WRITER. NRTS TECHNICAL LIBRARY.						
1	030				* PROGRAMMED BY HILLIS L. GRIFFIN APRIL 1963						
1	040				*						
1	050				*THIS PROGRAM WRITES PREPRINTED BOOK ORDER SHEET						
1	060				*LOAD CARD AS FOLLOWS MUST PRECEED DATA-						
1	070				* CC 1-12 - DATE, CC 13-14 - VENDOR CODE						
1	080				* CC 15-19 - LAST INVOICE NUMBER USED.						
1	090				* CC 20-25 - TOTAL AMOUNT THIS ORDER TO DATE.						
1	100				* CC 26-30 - AED P.O. NUMBER						
1	110				* CC 31-35 - DATE ABBREV E.G. 12043= 12/4/63						
1	120				*NEW DECK OF CARDS PUNCHED AS ORDERS WRITTEN.						
1	130				* DISCARD INPUT DECK. ERRORS TO STACKER 1.						
1	140				*LOAD CARDS TO PUNCH, INVOICE FORMS TO PRINTER.						
1	150				*CARRIAGE TAPE - CH 1 - DATE INV NO LINE						
1	160				* CH 2 - PUBLISHER LINE						
1	170				*						
1	180				*THIS PROGRAM HANDLES ORDER FOR MULTIPLE COPIES						
1	190				* FROM A SINGLE 5 CARD FOLLOWING BASIC CARDS FOR						
1	200				* TITLE.						
1	210				*						
2	010	7	ST	SW	0001	0013		0333	, 001 013	DATE, VENDOR COD	
2	020	7		SW	0015	0020		0340	, 015 020	INV NO,\$ TO DATE	
2	030	7		SW	0026	0031		0347	, 026 031	AED NO, SHORT DT	
2	040	1		R				0354	1		
2	050	7		MCW	0012	DATE		0355	M 012 U42	LOAD DATE	
2	060	7		MCW	0014	VENDOR- 1		0362	M 014 U44	VENDOR CODE	
2	065	7		MCW	0030	AED		0369	M 030 U62	AND AED NO.	
2	070	7		MCW	0019	INVNO		0376	M 019 U50	INVOICE NUMBER	
2	080	7		MCW	0025	TOTAL\$		0383	M 025 U57	TOTAL \$ TO DATE	
2	100	7		MCW	0035	ORDRDT		0390	M 035 X04	ORDER DT FOR CD.	
2	101				*CONSTANTS LOADED FROM LOADER CARD.						
2	110	4	START	CS	0080			0397	/ 080		
2	120	7	ST2	SW	0001	0077		0401	, 001 077		
2	130	5		B	END		A	0408	B T39 A	LAST CARD TEST	
2	140	1		R				0413	1		
2	150	8	ST4	B	CD1	0077	1	0414	B 515 077 1	FIRST CARD	
2	151	8		B	ERROR	0077		0422	B 447 077	BLANK CARD TEST	
2	160	7		C	0077	SEQ		0430	C 077 U64		
2	170	5		B	ST3		S	0437	B 479 S	CONTINUE IF OK	
2	180	5		B	ST3		T	0442	B 479 T		
2	190	2	ERROR	SS			1	0447	K 1		
2	200	1		R				0449	1		
2	210	5		B	END		A	0450	B T39 A		
2	220	8		B	DONE	0077	1	0455	B 467 077 1		
2	230	4		B	ERROR			0463	B 447		
2	240	7	DONE	LCA	BLANK1	CARD3		0467	L W92 W42		
2	250	1		LCA				0474	L		
2	270	4		B	CD1			0475	B 515		
3	010	4	ST3	CW	0077			0479	1 077		
3	020	8		B	CD1	0077	1	0483	B 515 077 1	IF UST CARD	
3	030	8		B	CD2	0077	2	0491	B 537 077 2	2D CARD	
3	040	8		B	CD3	0077	3	0499	B 559 077 3	3D CARD	
3	050	8		B	CD5	0077	5	0507	B 581 077 5	LAST CD THIS BK	
3	060	4	CD1	CW	0077			0515	1 077		
3	061	7		MCW	0077	CARD1		0519	M 077 V42		
3	070	7		MN	0077	SEQ		0526	D 077 U64	INCR SEQ TEST	
3	080	4		B	START			0533	B 397	GET NEXT CARD	
3	090	4	CD2	SW	0028			0537	, 028	TITLE AND SEQ	
3	100	7		MCW	0077	CARD2		0541	M 077 V92	ONLY THIS CARD	
3	110	7		MN	0077	SEQ		0548	D 077 U64	INCR CTR AND	
3	120	4		B	START			0555	B 397	GET NEXT CARD	
3	130	4	CD3	SW	0028			0559	, 028	TITLE AND SEQ	
3	140	7		MCW	0077	CARD3		0563	M 077 W42	ONLY THIS CARD	
3	150	7		MN	FIVE	SEQ		0570	D W99 U64	SET CTR FOR LAST	
3	160	4		B	START			0577	B 397	CARD AND GET IT	
3	180	4	CD5	SW	0020			0581	, 020	PRICE	
3	200	7		A	0024	TOTAL\$		0585	A 024 U57	ADD PRICE CTR	
3	210	4		CW	0020			0592	1 020		
3	220	7		MN	ONE	SEQ		0596	D U51 U64		
4	010	7		C	TOTAL\$	LIMIT		0603	C U57 W98		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BOOK1
4	020	5		B	SPENT		T	0610	B S24 T	IF LIMIT REACHED	
4	030				*THIS ITEM OK TO PRINT. CONTINUE						
4	040	7		A	ONE	INVNO		0615	A U51 U50	RAISE INVOICE NO	
4	050	7	LINE1	MCS	INVNO	0331		0622	Z U50 331	INVOICE NO IN 3D	
4	060	7		MCW	VENDOR	0326		0629	M U45 326	BLOCK AND VENDOR	
4	070	7		SW	INVNO - 4	0324		0636	, U46 324		
4	080	7		MCW	0331	0286		0643	M 331 286		
4	090	7		MCW	0331	0243		0650	M 331 243		
4	100	4		CW	0324			0657	) 324		
4	110	7		MCW	DATE	0319		0661	M U42 319	LOAD DATE TO	
4	120	7		MCW	DATE	0274		0668	M U42 274	THREE BLOCKS	
4	130	7		MCW	DATE	0232		0675	M U42 232		
4	140	2		CC			S	0682	F S	DBL SPACE AFTER	
4	150	1		W				0684	2	WRITE TOP LINE	
4	160	4		CS	0332			0685	/ 332		
4	170	1		CS				0689	/		
4	180	7	LINE2	MN	ONE	0296		0690	D U51 296	QUANTITY THIS	
4	190	7		MN	ONE	0249		0697	D U51 249	INVOICE	
4	200	7		MN	ONE	0205		0704	D U51 205		
5	010	7		MCW	CARD1 - 50	0330		0711	M U92 330	AUTHOR	
5	020	7		MCW	CARD1 - 50	0285		0718	M U92 285	LOADED	
5	030	7		MCW	CARD1 - 50	0242		0725	M U92 242	TO PRINT	
5	040	7		MCW	CARD1	0177		0732	M V42 177	SET UP CD W TEXT	
5	050	7		MCW	INVNO	0176		0739	M U50 176	INV NO VENDOR	
5	060	7		MCW	VENDOR- 1	0180		0746	M U44 180	CODE AND DATE	
5	070	7		MCW	ORDRDT	0171		0753	M X04 171	ORDERED	
5	078	2		CC			S	0760	F S	DOUBLE SPACE	
5	080	1		WP				0762	6		
5	090	4		CS	0332			0763	/ 332	FIRST CARD PCHD	
5	100	1		CS				0767	/		
5	110	1		CS				0768	/	PUNCH AREA CLEAR	
5	120	4	LINE3	SW	CARD1 - 49			0769	, U93	DEFINE TITLE	
5	121	7		MCW	CARD1 - 12	0331		0773	M V30 331		
5	130	7		MCW	CARD1 - 12	0286		0780	M V30 286		
5	140	7		MCW	CARD1 - 12	0241		0787	M V30 241		
5	150	1		W				0794	2		
5	160	4		CS	0332			0795	/ 332		
5	170	1		CS				0799	/		
5	171	4		CW	CARD1 - 49			0800	) U93		
5	180	7		C	CARD2 - 46	BLANK1- 46		0804	C V46 W46	TEST FOR BLANK	
5	181	5		B	LINE6A		S	0811	B 946 S	IF TITLE DONE	
5	190	7	LINE4	MCW	CARD2 - 12	0331		0816	M V80 331	SECOND TITLE	
5	200	7		MCW	CARD2 - 12	0286		0823	M V80 286	LINE	
5	210	7		MCW	CARD2 - 12	0241		0830	M V80 241		
6	010	7		MCW	CARD2	0177		0837	M V92 177		
6	020	7		MCW	INVNO	0176		0844	M U50 176		
6	030	7		MCW	VENDOR- 1	0180		0851	M U44 180		
6	040	7		MCW	ORDRDT	0171		0858	M X04 171		
6	050	1		WP				0865	6	SECOND TITLE	
6	060	4		CS	0332			0866	/ 332	LINE AND 2D	
6	070	1		CS				0870	/	CARD DONE.	
6	080	1		CS				0871	/	PUNCH AREA CLEAR	
6	090	7		C	CARD3 - 46	BLANK1- 46		0872	C V96 W46	TEST FOR BLANK	
6	091	5		B	LINE6A		S	0879	B 946 S	IF TITLE DONE.	
6	100	7	LINE5	MCW	CARD3 - 12	0331		0884	M W30 331		
6	110	7		MCW	CARD3 - 12	0286		0891	M W30 286		
6	120	7		MCW	CARD3 - 12	0241		0898	M W30 241		
6	130	7		MCW	CARD3	0177		0905	M W42 177		
6	140	7		MCW	INVNO	0176		0912	M U50 176		
6	150	7		MCW	VENDOR- 1	0180		0919	M U44 180		
6	160	7		MCW	ORDRDT	0171		0926	M X04 171		
6	170	2		CC			S	0933	F S		
6	180	1		WP				0935	6	THIRD TITLE LINE	
6	190	4		CS	0332			0936	/ 332	AND 3D CARD DUN	
6	200	1		CS				0940	/		
6	210	1		CS				0941	/	PUNCH AREA CLEAR	
6	230	4		B	LINE6			0942	B 948		
7	010	2	LINE6A	CC			2	0946	F 2	SKIP TO LINE 6	
7	020	7	LINE6	MCW	0080	0180		0948	M 080 180	CD5 TO PUNCH	
7	030	7		MCW	INVNO	0176		0955	M U50 176		
7	040	7		MCW	VENDOR- 1	0180		0962	M U44 180		
7	050	7		MCW	ORDRDT	0171		0969	M X04 171		
7	060	7		SW	0035	0038		0976	, 035 038	ORGN, REQUESTOR	
7	070	7		SW	0020	0025		0983	, 020 025	PRICE, ACCOUNT NO	
7	080	7		SW	0016	0018		0990	, 016 018	MONTH, YEAR	
7	090	8		B	LINE6B	0018		0997	B #19 018	IF NO DATE	
7	100	7		MCW	0019	0321		1005	M 019 321	YEAR IN	
7	110	7		MCW	K19	0319		1012	M Y12 319	NINETEEN IN	
7	120	8	LINE6B	B	LINE6C	0016		1019	B #34 016	IF NO MONTH	
7	130	7		MCW	0017	0316		1027	M 017 316	MONTH IN	
7	140	7	LINE6C	MCW	0015	0308		1034	M 015 308	PUBLISHER IN.	
7	150	4		SW	0294			1041	, 294		
7	160	7		MCW	0321	0276		1045	M 321 276		
7	170	7		MCW	0321	0231		1052	M 321 231		
7	180	4		CW	0294			1059	) 294	SET TO PRINT	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BOOK1
7	190	2		CC			S	1063	F 5	PUBLISHER AND	
7	200	1		W				1065	2	DATE WRITTEN	
7	210	4		CS	0332			1066	/ 332		
7	220	1		CS				1070	/		
8	010	7	LINE7	MCW	0037	0325		1071	M 037 325	ORGN	
8	020	7		MCW	0034	0317		1078	M 034 317	ACCOUNT	
8	030	7		MCW	0049	0305		1085	M 049 305	REQUESTOR	
8	040	4		SW	0294			1092	, 294		
8	050	7		MCW	0325	0280		1096	M 325 280		
8	060	7		MCW	0325	0237		1103	M 325 237		
8	061	7		MCW	ACCT	0272		1110	M Y22 272	SET 3810 ACCT NO	
8	070	4		CW	0294			1117	) 294		
8	080	2		CC			S	1121	F 5		
8	090	1		W				1123	2		
8	100	4		CS	0332			1124	/ 332		
8	110	1		CS				1128	/		
8	120	7	LINE8	LCA	EDIT1	0318		1129	L X15 318		
8	130	7		MCE	0024	0318		1136	E 024 318	PRICE IN	
8	140	7		MCS	AED	0303		1143	Z U62 303	AED NO	
8	150	7		SW	0299	AED - 4		1150	, 299 U58		
8	160	7		MCW	0318	0273		1157	M 318 273		
8	170	7		MCW	0318	0231		1164	M 318 231		
8	180	4		CW	0299			1171	) 299		
8	190	2		CC			A	1175	F A		
8	192	4		CS	0080			1177	/ 080		
8	193	4		SW	0001			1181	, 001		
8	200	1		WRP				1185	7		
9	010	4		CS	0332			1186	/ 332		
9	020	1		CS				1190	/		
9	030	1		CS				1191	/		
9	040	8		B	CD5	0077	5	1192	B 581 077 5	IF MULTIPL COPY	
9	050	7		LCA	BLANK1	CARD3		1200	L W92 W42		
9	060	1		LCA				1207	L	CARD 2 SET BLNK	
9	080	5		B	END		A	1208	B T39 A	LAST CARD TEST	
9	090	7		SW	0001	0077		1213	, 001 077		
9	100	4		B	ST4			1220	B 414		
9	120	2	SPENT	CC			K	1224	F K		
9	130	2		CC			K	1226	F K		
9	140	4		SW	0020			1228	, 020		
9	150	7		S	0024	TOTAL\$		1232	S 024 U57		
9	160	4		CW	0020			1239	) 020		
9	170	7		MCW	MESS1	0240		1243	M X44 240		
9	180	1		W				1250	2		
9	190	4		CS	0240			1251	/ 240		
9	200	7		MCW	MESS2	0243		1255	M X67 243		
10	010	7		LCA	EDIT1	0218		1262	L X15 218		
10	020	7		MCE	TOTAL\$	0218		1269	E U57 218		
10	030	4		SW	TOTAL\$- 5			1276	, U52		
10	040	1		W				1280	2		
10	050	4		CS	0299			1281	/ 299		
10	060	7		MCW	MESS3	0241		1285	M X96 241		
10	070	7		MCW	0080	0180		1292	M 080 180		
10	080	1		W				1299	2		
10	090	4		CS	0240			1300	/ 240		
10	100	1		H				1304	.		
10	110	1		R				1305	1	LOAD AED NO ONLY	
10	120	4		SW	0026			1306	, 026		
10	130	7		MCW	0030	AED		1310	M 030 U62		
10	140	4		CW	0026			1317	) 026		
10	150	4		S	TOTAL\$			1321	S U57	ZERO TOTAL	
10	160	7		MCW	0180	0080		1325	M 180 080	SET CD READ BACK	
10	170	7		CS	CD5	0180		1332	/ 581 180	TO READ AREA	
10	220	4	END	CS	0180			1339	/ 180		
11	010	7		MCW	AED	0130		1343	M U62 130		
11	020	7		MCW	TOTAL\$	0125		1350	M U57 125		
11	030	7		MCW	INVNO	0119		1357	M U50 119		
11	040	7		MCW	VENDOR- 1	0114		1364	M U44 114		
11	050	2		CC			K	1371	F K		
11	060	2		CC			K	1373	F K		
11	080	7		MCW	MESS2	0243		1375	M X67 243		
11	090	7		LCA	EDIT1	0218		1382	L X15 218		
11	100	7		MCE	TOTAL\$	0218		1389	E U57 218		
11	110	1		WP				1396	6		
11	120	4		CS	0299			1397	/ 299		
11	130	1		CS				1401	/		
11	140	2		SS			4	1402	K 4		
11	150	7		MCW	MESS4	0234		1404	M Y10 234		
11	160	7		MCW	DATE	0218		1411	M U42 218		
11	170	1		WP				1418	6		
11	180	4		CS	0299			1419	/ 299		
11	190	1		CS				1423	/		
11	200	1		P				1424	4		
11	210	2		SS			8	1425	K 8		
11	220	4		H	ST			1427	. 333		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BOOK1
81	010				*FOLLOWING ARE CONSTANTS AND WORK AREAS--						
81	020	12	DATE	DCW	*			1442			
81	030	3	VENDOR	DCW	*		IF-	1445			
81	040	5	INVNO	DCW	*		*****	1450			
81	050	1	ONE	DCW	*			1	1451		
81	060	6	TOTAL\$	DCW	*				1457		
81	070				*TOTAL SPENT THIS AED TO DATE.						
81	080	5	AED	DCW	*		*****	1462			
81	090				*PURCHASE ORDER NUMBER)						
81	100	1	SIX	DCW	*			6	1463		
81	110	1	SEQ	DCW	*				1464		
81	120				*SEQUENCE TEST CTR FOR INCOMING CARDS.						
81	130	1	TWO	DCW	*			2	1465		
81	140	32		DCW	*				1497		
81	150	32		DC	*				1529		
81	160	13	CARD1	DC	*				1542		
81	170	32		DCW	*				1574		
81	180	18	CARD2	DC	*				1592		
81	190	32		DCW	*				1624		
81	200	18	CARD3	DC	*				1642		
82	010	32		DCW	*				1674		
82	020	18	BLANK1	DC	*				1692		
82	030				*BLANK TO CLEAR CARD AREA)						
82	040	6	LIMIT	DCW	*		250000	1698			
82	050				*LIMIT AMOUNT FOR AED						
82	060	1	FIVE	DCW	*			5	1699		
82	070	5	ORDRDT	DCW	*		00000	1704			
82	080				*DATE ORDERED						
82	090	11	EDIT1	DCW	*		, \$0.	1715			
82	100	29	MESS1	DCW	*	FINISHED THIS PURCHASE ORDER.				1744	
82	110	23	MESS2	DCW	*	TOTAL AGAINST THIS AED.				1767	
82	120	29	MESS3	DCW	*	LOAD LOAD CD AND PRESS START.				1796	
82	130	14	MESS4	DCW	*	RUN COMPLETED.				1810	
82	140	2	K19	DCW	*			19	1812		
82	160	10	ACCT	DCW	*		3810	1822			
99	200			END	ST						

/ 333 080

276 CARDS

APPENDIX E-1. VSUM 1 POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2 L072116,110106,105117B101/I99,027A074028)027B00102708026/0991,001/00111710
BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	VSUM1
1	010			CTL	33						
1	011				* NRTS TECHNICAL LIBRARY					NOVEMBER 1962	
1	012				* PROGRAMMED BY HILLIS L. GRIFFIN						
1	020				*SUMMARY LIST OF INVOICES FOR PAYMENT PART 1						
1	030				* LIST IN INVOICE NUMBER ORDER. NO BREAKS FOR						
1	040				* ACCOUNT OR P.3. NUMBER CHANGE						
1	050				*DATE LOAD CARD PRECEEDS DATA. DATE IN CC 1-8						
1	060				* AS FOLLOWS- 02/24/62 VENDOR CODE IN CC 9-10						
1	110				*DECK FOR OTHER VENDOR MAY BE LOADED ON HALT AT						
1	120				*END OF FIRST RUN WITHOUT RELOADING PROGRAM. BE						
1	130				*CERTAIN THAT IT IS PRECEDED BY NEW LOAD CARD.						
1	140				* PAID DATE IN CC 66-70 APPEARS IF SW B ON.						
1	200				*						
2	010	7	ST	SW	0001	0009		0333	, 001 009		
2	011	4		SW	CTRA			0340	, 889	HEADING GATE	
2	020	1		R				0344	1		
2	030	7		MCW	0008	LINE1 - 11		0345	M 008 796		
2	040	7		LCA	0010	INVNO - 6		0352	L 010 809	VENDOR CODE	
2	050	7		C	INVNO - 6	DLR1		0359	C 809 817		
2	052	5		B	ST3		/	0366	B 375 /		
2	060	4		B	ABEL			0371	B 395		
2	070	7	ST3	C	INVNO - 6	DLR2		0375	C 809 819		
2	072	5		B	ST4		/	0382	B 391 /		
2	080	4		B	BLWL			0387	B 406		
2	090	4	ST4	B	ERROR1			0391	B 594		
2	100	7	ABEL	MCW	DLR1A	LINE1 - 22		0395	M 851 785		
2	110	4		B	START			0402	B 413		
2	120	7	BLWL	MCW	DLR2A	LINE1 - 22		0406	M 883 785		
2	130	5	START	B	FINISH		A	0413	B 628 A		
2	136	1		R				0418	1		
2	140	7		SW	0079	0072		0419	, 079 072	VENDOR INV NO	
2	150	7		SW	0055	0050		0426	, 055 050	AED, PRICE	
2	160	7		C	0080	INVNO - 6		0433	C 080 809	VENDOR TEST	
2	170	5		B	ERROR2		/	0440	B 623 /		
2	180	7		MCW	BLANK1	INVNO		0445	M 888 815		
2	190	4		SW	INVNO - 4			0452	, 811		
2	200	7		MCS	0076	INVNO		0456	Z 076 815		
3	010	4		SW	0072			0463	, 072		
3	020	4		CW	INVNO - 4			0467	, 811		
3	030	8		BWZ	HEADER	CTRA	1	0471	V 539 889 1		
3	040	5		B	HEADER			0479	B 539		
3	045	7	ST2	A	0054	COST		0484	A 054 951		
3	046	7		A	ONE	ITEMS		0491	A 955 959		
3	050	7		LCA	EDIT	0275		0498	L 945 275		
3	060	7		MCE	0054	0275		0505	E 054 275	COST IN	
3	070	7		MCS	0059	0255		0512	Z 059 255	AED IN	
3	080	7		MCW	INVNO	0238		0519	M 815 238	INVOICE NO. IN	
3	081	5		B	DATE		B	0526	B 702 B		
3	090	1	ST5	W				0531	2		
3	100	7		CS	START	0299		0532	/ 413 299		
3	110	4	HEADER	CW	CTRA			0539	J 889		
3	120	2		CC			1	0543	F 1		
3	130	7		A	ONE	PGCTR		0545	A 955 953		
3	140	7		MCS	PGCTR	0298		0552	Z 953 298		
3	150	4		SW	PGCTR - 1			0559	, 952		
3	160	7		MCW	LINE1	0295		0563	M 807 295		
3	168	2		CC			S	0570	F 5		
3	170	1		W				0572	2		
3	180	4		CS	0299			0573	/ 299		
3	190	7		MCW	LINE2	0275		0577	M 935 275		
3	200	2		CC			T	0584	F T		
4	010	1		W				0586	2		
4	020	7		CS	ST2	0299		0587	/ 484 299		
4	030	2	ERROR1	CC			1	0594	F 1	INVALID LOAD CAR	
4	040	7		MCW	MESS3	0270		0596	M *35 270		
4	050	1		W				0603	2		
4	060	4		CS	0299			0604	/ 299		
4	070	4		MCW	MESS4			0608	M *99		
4	080	2		CC			A	0612	F A		
4	090	1		W				0614	2		
4	100	4		CS	0299			0615	/ 299		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	VSUM1
4	110	4		H	ST			0619	. 333		
4	120	5	ERROR2	SS	START		1	0623	K 413 1	INVALID VENDOR	
4	130	2	FINISH	CC			L	0628	F L		
4	140	7		MCW	MESS5	0292		0630	M /14 292		
4	150	7		LCA	EDIT	0275		0637	L 945 275	COST TOTAL	
4	160	7		MCE	COST	0275		0644	E 951 275		
4	170	7		MCS	ITEMS	0232		0651	Z 959 232		
4	180	7		MCW	MESS1	0226		0658	M 971 226		
4	190	2		CC			A	0665	F A		
4	200	1		W				0667	Z		
5	010	4		CS	0299			0668	/ 299		
5	020	7		MCW	MESS2	0298		0672	M /86 298		
5	030	2		CC			A	0679	F A		
5	040	1		W				0681	Z		
5	050	4		CS	0299			0682	/ 299		
5	060	4		S	PGCTR			0686	S 953	ZERO PAGE CTR	
5	070	4		S	ITEMS			0690	S 959	ZERO ITEM CTR	
5	080	4		S	COST			0694	S 951	ZERO COST CTR	
5	090	4		H	ST			0698	. 333		
5	100	4	DATE	SW	0066			0702	, 066	WRITE PD DATE IF	
5	110	7		LCA	DATEED	0295		0706	L S02 295	SW B ON	
5	120	7		MCE	0070	0295		0713	E 070 295		
5	130	4		B	ST5			0720	B 531		
81	010	32		DCW	*	SUMMARY INVOICE LISTING		0755			
81	020	32		DC	*			0787			
81	030	20	LINE1	DC	*			0807	PAGE		
81	040	8	INVND	DCW	*		IF-	0815			
81	050	2	DLR1	DCW	*			0817	IF		
81	060	2	DLR2	DCW	*		BW	0819			
81	070	32	DLR1A	DCW	*	RICHARD ABEL AND COMPANY, INC.		0851			
81	080	32	DLR2A	DCW	*	BLACKWELLS OXFORD, ENGLAND		0883			
81	090	5	BLANK1	DCW	*			0888			
81	100	1	CTRA	DC	*			0889			
81	110	32		DCW	*	INVOICE NO.	A.E.D.	0921			
81	120	14	LINE2	DC	*		AMOUNT	0935			
81	130	10	EDIT	DCW	*		, \$0.	0945			
81	140	6	CCST	DCW	*			0951			
81	150	2	PGCTR	DCW	*		00	0953			
81	160	2	ONE	DCW	*		01	0955			
81	170	4	ITEMS	DCW	*			0959			
81	180	12	MESS1	DCW	*		TOTAL ITEMS-	0971			
81	200	32		DCW	*	INVALID VENDOR CODE IN LOAD CARD		1003			
81	210	32	MESS3	DC	*	CC 8-10. MAKE CORRECTION, PUT		1035			
81	220	32		DCW	*	IN HOPPER IN FRONT OF DATA AND		1067			
81	230	32	MESS4	DC	*	PRESS START KEY.		1099			
81	240	15	MESS5	DCW	*		TOTAL THIS LIST	1114			
82	010	32		DCW	*	RUN COMPLETED. LOAD DECK FOR NEX		1146			
82	020	32		DC	*	T VENDOR WITH LOAD CARD AND PRES		1178			
82	030	8	MESS2	DC	*		S START.	1186			
82	040	16	DATEED	DCW	*		/ /6 ++PAID	1202			
82	200			END	ST				/ 333 080		

122 CARDS

APPENDIX E-2. VSUM 2 POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A074028)027B00102708026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	VSUM2
1	005			CTL	33						
1	010				*FINANCE SUMMARY MONTHLY LISTING PT 2						
1	011				* BREAKS AND TOTALS ON NEW ACCOUNT OR AED NO.						
1	012				* NRTS TECHNICAL LIBRARY.						
1	020				*PROGRAMMED BY HILLIS L. GRIFFIN NOV 1962						
1	030				*						
1	040				*THIS PROGRAM WRITES A SUMMARY LISTING OF						
1	050				* INVOICES DUE FOR PAYMENT. DATA MUST BE SORTED						
1	060				* FOR AED (CC 55-59) AS MAJOR FIELD AND ACCOUNT						
1	070				* (CC 25-34) AS MINOR FIELD. LOAD CARD PRECEEDS						
1	080				* DATA AND IS PUNCHED AS FOLLOWS-						
1	090				* CC 1-8 DATE E.G. 08/22/62						
1	100				* CC 9-10 VENDOR CODE E.G. IF, BW						
1	110				*SWITCHES-						
1	120				* A- ON						
1	130				* B- ON IF PAID DATE TO PRINT						
1	140				*						
1	200				*						
2	010	7	ST	SW	0001	0009		0333	, 001 009		
2	012	4		SW	CTRA			0340	, T54	HDR TEST PG 1	
2	020	1		R				0344	1		
2	030	7		MCW	0008	LINE1 - 7		0345	M 008 S82	DATE IN	
2	040	7		LCA	0010	INVNO - 6		0352	L 010 /83	LOAD INV WK AREA	
2	050	7		C	INVNO - 6	DLR1		0359	C /83 S91	FOR DLR NAME SET	
2	060	5		B	ST2		/	0366	B 375 /	IN LINE 1	
2	070	4		B	ABEL			0371	B 391		
2	080	7	ST2	C	INVNO - 6	DLR2		0375	C /83 S93		
2	090	5		B	ERROR1		/	0382	B 707 /		
2	100	4		B	BWL			0387	B 402		
2	120	7	ABEL	MCW	DLR1A	LINE1 - 45		0391	M T23 S44		
2	130	4		B	START			0398	B 409		
2	140	7	BWL	MCW	DLR2A	LINE1 - 45		0402	M T53 S44		
2	150	5	START	B	FINISH		A	0409	B #83 A		
2	160	1		R				0414	1		
2	170	7		SW	0079	0077		0415	, 079 077	VENDOR CODE, SEQ	
2	180	7		SW	0072	0066		0422	, 072 066	INV NO, DATE PD	
2	190	7		SW	0060	0055		0429	, 060 055	DATE RCD, AED	
2	200	7		SW	0050	0038		0436	, 050 038	COST, REQUESTOR	
2	210	7		SW	0035	0025		0443	, 035 025	ORGN, ACCT	
3	010	8		B	ST4	0077	5	0450	B 463 077 5	TEST FOR BAD CD	
3	020	5	ST5	SS	START		1	0458	K 409 1	BAD INVOICE CARD	
3	030	7	ST4	C	0080	INVNO - 6		0463	C 080 /83	VENDOR TEST	
3	040	5		B	ST5		/	0470	B 458 /	IF BAD CARD	
3	050	7		LCA	BLANK1	INVNO		0475	L Y58 /89		
3	070	7		MCS	0076	INVNO		0482	Z 076 /89		
3	080	4		SW	0072			0489	, 072		
3	090	4		CW	INVNO - 4			0493	, /85		
3	100	7		LCA	ACCT1	ACCT2		0497	L T64 T74	TO TEST CTR	
3	110	7		LCA	0034	ACCT1		0504	L 034 T64	NEW ACCT	
3	120	8		BWZ	ST6	CTRA	1	0511	V 523 T54 1		
3	130	4		B	ST7			0519	B 530		
3	140	7	ST6	LCA	0034	ACCT2		0523	L 034 T74	SET UP FIRST TST	
3	150	7	ST7	C	ACCT1	ACCT2		0530	C T64 T74		
3	160	5		B	NUACCT		/	0537	B 739 /		
3	170	7	ST8	LCA	AED1	AED2		0542	L W31 W36	TO AED TEST SET	
3	180	7		LCA	0059	AED1		0549	L 059 W31		
3	190	7		C	AED1	AED2		0556	C W31 W36		
3	200	5		B	NUAED		/	0563	B 883 /		
3	210				*COMPARE TESTS NOW COMPLETED. NEXT TO WRITE						
3	220				* THIS ENTRY.						
3	230	8		BWZ	HEADER	CTRA	1	0568	V 994 T54 1		
3	240	5		B	HEADER		'	0576	B 994 '		
4	010	7	WRITE	A	ONE	ITEMS		0581	A T75 T79		
4	020	7		A	0054	COST1		0588	A 054 T87		
4	030	7		A	0054	COST2		0595	A 054 T94		
4	033	7		A	POSTK	POST1		0602	A T96 U01		
4	040	5		B	WR2		8	0609	B 618 B	FOR PD DATE ENTR	
4	050	4		B	WR3			0614	B 632		
4	060	7	WR2	LCA	DTEDIT	0291		0618	L V79 291		
4	070	7		MCE	0070	0291		0625	E 070 291	PD DATE IN EDITD	
4	080	7	WR3	MCW	0049	0278		0632	M 049 278 R	REQUESTOR	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	VSUM2
4	090	7		MCW	0037	0258		0639	M 037 258	CONTRACTOR	
4	092	7		LCA	0037	CTRB		0646	L 037 V37		
4	100	7		MCW	0034	0249		0653	M 034 249	ACCOUNT	
4	110	7		LCA	EDCOST	0235		0660	L V89 235		
4	120	7		MCE	0054	0235		0667	E 054 235	COST EDITED	
4	130	7		MCS	0059	0223		0674	Z 059 223	AED NUMBER	
4	140	4		CW	INVNO - 4			0681	J /85		
4	150	7		MCS	INVNO	0212		0685	Z /89 212		
4	160	7		SW	INVNO - 4	CTRD		0692	, /85 Y59		
4	170				*LINE SETUP COMPLETED.						
4	180	1		W				0699	2		
4	190	7		CS	START	0299		0700	/ 409 299		
4	200				*FOLLOWING ARE SUBROUTINES						
5	010	2	ERROR1	CC			1	0707	F 1	FOR INVALID LOAD	
5	020	7		MCW	MESS1	0270		0709	M U70 270	CARD. CORRECT	
5	030	1		W				0716	2	AND PROCEED W/	
5	040	4		CS	0299			0717	/ 299	OUT RELOADING	
5	050	7		MCW	MESS2	0270		0721	M V34 270	PROGRAM.	
5	060	2		CC			A	0728	F A		
5	070	1		W				0730	2		
5	080	4		CS	0299			0731	/ 299		
5	090	4		H	ST			0735	. 333		
5	100	2	NUACCT	CC			S	0739	F S	FOR NEW ACCOUNT.	
5	110	7		C	CTRB	PPCO		0741	C V37 V40	PRINT OUT TOTAL	
5	120	5		B	NU1		/	0748	B 761 /	NO POSTAGE WILL	
5	140	4		S	POST1			0753	S U01	ORDERS	
5	150	4		B	NU2			0757	B 793		
5	160	7	NU1	A	POST1	POST2		0761	A U01 U06		
5	170	7		LCA	EDCOST	0248		0768	L V89 248		
5	180	7		MCE	POST1	0248		0775	E U01 248	POSTAGE IN	
5	190	4		SW	POST1 - 4			0782	, T97		
5	200	7		MCW	MESS4	0239		0786	M V60 239		
6	020	7	NU2	LCA	EDCOST	0225		0793	L V89 225	COST IN	
6	021	7		MCE	COST1	0225		0800	E T87 225		
6	025	7		MCW	MESS5	0214		0807	M V69 214		
6	031	4		SW	COST1 - 6			0814	, T81		
6	040	7		A	POST1	COST1		0818	A U01 T87	POSTAGE ADDED	
6	050	4		S	POST1			0825	S U01	RESET	
6	060	7		LCA	EDCOST	0277		0829	L V89 277		
6	070	7		MCE	COST1	0277		0836	E T87 277	TOTAL DEBIT	
6	080	4		SW	COST1 - 6			0843	, T81		
6	082	4		CW	CTRD			0847	J Y59		
6	090	2		CC			K	0851	F K		
6	100	7		MCW	MESS3	0266		0853	M V52 266		
6	110	4		S	COST1			0860	S T87		
6	120	2		CC			S	0864	F S		
6	130	1		W				0866	2		
6	140				*ACCOUNT TOTAL FINISHED. NOW BACK TO TEST NEW						
6	150				* AED.						
6	160	4		CS	0299			0867	/ 299		
6	161	8		BWZ	NUAED	CTRC	1	0871	V 883 Y60 1		
6	162	4		B	ST8			0879	B 542		
6	170	8	NUAED	BWZ	HEADER	CTRA	1	0883	V 994 T54 1	FIRST PAGE ONLY	
6	171	8		BWZ	NUACCT	CTRD	1	0891	V 739 Y59 1		
6	180	7		MCW	MESS6	0310		0899	M V94 310		
6	190	7		MCS	ITEMS	0304		0906	Z T79 304	TOTAL ITEMS	
6	200	4		SW	ITEMS - 3			0913	, T76		
7	010	4		S	ITEMS			0917	S T79	RESET	
7	020	7		LCA	EDCOST	0332		0921	L V89 332	POSTAGE TOTAL	
7	030	7		MCE	POST2	0332		0928	E U06 332		
7	040	7		MCW	MESS8	0326		0935	M W24 326		
7	060	7		LCA	EDCOST	0229		0942	L V89 229	COST THIS AED	
7	070	7		MCE	COST2	0229		0949	E T94 229		
7	080	7		SW	POST2 - 4	COST2 - 6		0956	, U02 T88		
7	090	7		MCW	MESS7	0219		0963	M W09 219		
7	130	4		SW	COST2 - 6			0970	, T88		
7	140	4		S	COST2			0974	S T94		
7	150	4		S	POST2			0978	S U06		
7	172	4		S	PAGENO			0982	S W26		
7	180	2		CC			L	0986	F L		
7	190	1		W				0988	2		
7	200	4		CS	0332			0989	/ 332		
8	010	1		CS				0993	/		
8	020	2	HEADER	CC			1	0994	F 1	PRINTS TOP LINE	
8	030	7		A	ONE	PAGENO		0996	A T75 W26		
8	040	7		MCW	AED1	LINE1 - 19		1003	M W31 S70	SET NEW AED	
8	050	4		CW	CTRA			1010	J T54		
8	060	7		MCS	PAGENO	0303		1014	Z W26 303		
8	070	4		SW	PAGENO			1021	, W26		
8	080	7		MCW	LINE1	0300		1025	M S89 300		
8	090	2		CC			S	1032	F S		
8	100	1		W				1034	2		
8	110	4		CS	0330			1035	/ 330		
8	120	1		CS				1039	/		
8	130	5		B	HDR2		B	1040	B #56 B	IF PD DT TO PRNT	
8	140	7		MCS	LINE2 - 10	0282		1045	Z X15 282	IF NO PAID DATE	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	VSUM2
8	150	4		B	HDKJ			1052	B #63		
8	160	7	HDR2	MCW	LINE2	0292		1056	M X25 292		
8	170	2	HDR3	CC			T	1063	F T		
8	180	1		W				1065	2		
8	190	4		CS	0330			1066	/ 330		
8	200	1		CS				1070	/		
8	210	8		BWZ	FIN2	CTRC	1	1071	V #95 Y60 1		
8	220	4		B	WRITE			1079	B 581		
8	230	4	FINISH	SW	CTRC			1083	, Y60		
8	240	8		BWZ	NUACCT	CTRD	1	1087	V 739 Y59 1		
9	010	7	FIN2	MCW	BLANK1- 2	CTRB		1095	M Y56 V37		
9	011	4		CW	CTRC			1102	J Y60		
9	020	4		S	PAGENO			1106	S W26		
9	030	4		S	AED1			1110	S W31		
9	040	4		S	AED2			1114	S W36		
9	050	4		S	POST2			1118	S U06		
9	060	4		S	POST1			1122	S U01		
9	070	4		S	COST2			1126	S T94		
9	080	4		S	COST1			1130	S T87		
9	090	4		S	ITEMS			1134	S T79		
9	100	4		S	ACCT2			1138	S T74		
9	110	4		S	ACCT1			1142	S T64		
9	120	4		CW	CTRA			1146	J T54		
9	130	2		CC			1	1150	F 1		
9	140	7		MCW	MESS9	0270		1152	M X89 270		
9	150	1		W				1159	2		
9	160	4		CS	0299			1160	/ 299		
9	170	7		MCW	MESS10	0270		1164	M Y53 270		
9	180	2		CC			A	1171	F A		
9	190	1		W				1173	2		
9	200	4		CS	0299			1174	/ 299		
9	210	4		H	ST			1178	. 333		
81	010	8	INVNO	DCW	*		XX-	1189			
81	020	32		DCW	*	SUMMARY INVOICE LISTING		1221			
81	030	32		DC	*		PURCHAS	1253			
81	040	32		DC	*	E ORDER AED		1285			
81	050	4	LINE1	DC	*		PAGE	1289			
81	060	2	DLR1	DCW	*		IF	1291			
81	070	2	DLR2	DCW	*		BW	1293			
81	080	30	DLR1A	DCW	*	RICHARD ABEL AND COMPANY, INC.		1323			
81	090	30	DLR2A	DCW	*	BLACKWELLS OXFORD, ENGLAND		1353			
81	100	1	CTRA	DC	*			1354			
81	110	10	ACCT1	DCW	*			1364			
81	120	10	ACCT2	DCW	*			1374			
81	130	1	ONE	DCW	*		1	1375			
81	140	4	ITEMS	DCW	*			1379			
81	150	1	PERIOD	DC	*		.	1380			
81	160	7	COST1	DCW	*			1387			
81	170	7	COST2	DCW	*			1394			
81	180	2	POSTK	DCW	*		15	1396			
81	190	5	POST1	DCW	*		00000	1401			
81	200	5	POST2	DCW	*		00000	1406			
82	010	32		DCW	*	INVALID VENDOR CODE IN LOAD CARD		1438			
82	020	32	MESS1	DC	*	CC 8-10. MAKE CORRECTION, PUT		1470			
82	030	32		DCW	*	IN HOPPER IN FRONT OF DATA AND		1502			
82	040	32	MESS2	DC	*	PRESS START		1534			
82	050	3	CTRB	DCW	*			1537			
82	060	3	PPCO	DCW	*		PPC	1540			
82	070	12	MESS3	DCW	*	GRAND TOTAL-		1552			
82	080	8	MESS4	DCW	*	POSTAGE-		1560			
82	090	9	MESS5	DCW	*	***TOTAL		1569			
82	100	10	DTEDIT	DCW	*	/ /		1579			
82	110	10	ECCOST	DCW	*	, \$0.		1589			
82	120	5	MESS6	DCW	*	ITEMS		1594			
82	130	15	MESS7	DCW	*	AED TOTAL COST-		1609			
82	140	15	MESS8	DCW	*	POSTAGE BILLED-		1624			
82	150	2	PAGENO	DCW	*		00	1626			
82	160	5	AED1	DCW	*		00000	1631			
82	170	5	AED2	DCW	*		00000	1636			
82	180	32		DCW	*	INVOICE NO. A.E.D. AMOUNT		1668			
82	190	32		DC	*	ACCOUNT CONTR. RE		1700			
82	200	25	LINE2	DC	*	QUESTOR PAID DATE		1725			
83	010	32		DCW	*	RUN COMPLETED. LOAD NEXT DATA DE		1757			
83	020	32	MESS9	DC	*	CK AND NEW LOAD CARD WITHOUT		1789			
83	030	32		DCW	*	RELOADING PROGRAM. PRESS START.		1821			
83	040	32	MESS10	DC	*			1853			
83	050	5	BLANK1	DCW	*			1858			
83	070	1	CTRD	DC	*			1859			
83	060	1	CTRC	DC	*			1860			
83	200			END	ST				/ 333 080		

237 CARDS

APPENDIX F-1. ANPER POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2 L072116,110106,1051178101/199,027A074028)027B0010270B026/0991,001/00111710
BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	ANPER
	001			CTL	33						
	010				*AUTOMATIC NOTIFICATION FOR PERIODICAL RENEWAL						
	020				* NRTS TECHNICAL LIBRARY, JUNE, 1962.						
	030				* PROGRAMMED BY HILLIS L. GRIFFIN						
	040				*						
	050				* THIS IS PHASE I OF AN AUTOMATIC SYSTEM FOR						
	060				*RENEWAL OF PERIODICAL SUBSCRIPTIONS UTILISING						
	070				*THE IBM 1401 DATA PROCESSING SYSTEM.						
	080				*						
	090				* THIS PROGRAM, ANPER, SEARCHES A FILE OF SUB-						
	100				*SCRIPTION CARDS AND PRINTS RENEWAL NOTIFICATION						
	110				*FOR ALL SUBSCRIPTIONS IN THE FILE, WITHOUT						
	120				*EXCEPTION. IF SENSE SWITCH B IS ON, NOTICES						
	130				*ARE PRINTED ONLY FOR SUBSCRIPTIONS EXPIRING						
1	140				*BEFORE A GIVEN DATE ARE LISTED. IF SWITCH C IS						
1	145				*ON ONLY THOSE SUBSCRIPTIONS EXPIRING ON A GIVEN						
1	150				*DATE ARE LISTED.						
1	155				*LOAD CARD- CC 1-8 - LIST DATE E.G. 01/02/63						
1	156				* CC 9-11 -TEST DATE. LAST DIGIT OF YEAR						
1	157				* PRECEEDS TEST MONTH. TEST FOR EXPIRATION ON OR						
1	160				* BEFORE 12/62 IS PUNCHED 212)						
1	170				* LOAD CARD MUST PRECEED DATA.						
2	010	7	ST	SW	0001	0009		0333	,	001 009	
2	020	1		R				0340	1		
2	030	7		MCW	0008	LINE2 - 37		0341	M 008	S34	DATE1
2	040	7		MCW	0008	LINE2		0348	M 008	S71	
2	060	7		MCW	0011	COMP1		0355	M 011	M76	
2	170	5	START	B	HALT		A	0362	B /75	A	
2	172	4		CS	0080			0367	/	080	
2	174	4		SW	0001			0371	,	001	
2	180	1		R				0375	1		
2	190	8		BWZ	HDR	0007	B	0376	V 388	007 B	
2	200	4		B	SUBCD			0384	B 462		
3	010	7	HCR	SW	0008	0062		0388	,	008 062	
3	020	7		SW	0074	0079		0395	,	074 079	
3	040	7		MCW	0056	LINE14- 68		0402	M 056	V37	TITLE1
3	050	7		MCW	0056	LINE14		0409	M 056	W05	TITLE2
3	060	7		CW	LINE14- 48	LINE14-116		0416	) V57	U89	
3	090	7		MCW	0067	CTRA		0423	M 067	L65	SET IN PRICE
3	100	7		MCW	0076	LINE41		0430	M 076	L54	PUBLISHER
3	110	7		MCW	0080	LINE39		0437	M 080	L39	VENDOR
3	120	7		CW	LINE41- 2	LINE39- 1		0444	) L52	L38	
3	130	7		MCW	0004	COMP2		0451	M 004	L59	SUBNO CK FM HDR
3	140	4		B	START			0458	B 362		
3	150				*HEADER SETUP COMPLETED.						
3	160	7	SUBCD	SW	0031	0038		0462	,	031 038	
3	162	7		SW	0059	0070		0469	,	059 070	
3	164	7		SW	0079	0008		0476	,	079 008	
3	170	4		SW	0043			0483	,	043	
3	171	7		MCW	BLANKS- 20	LINE14- 54		0487	M M06	V51	CLEAR COPY 1
3	172	7		MCW	BLANKS- 20	LINE16		0494	M M06	W98	CLEAR COPY 2
3	180	7		C	0004	COMP2		0501	C 004	L59	
3	190	5		B	ERROR		/	0508	B #81	/	
4	010	5		B	TEST		B	0513	B #86	B	
4	015	5		B	TEST2		C	0518	B /27	C	
4	020	2	BAKER	SS			2	0523	K 2		PULL CDS TO RENU
4	040	7		MCW	0006	LINE38		0525	M 006	S94	
4	050	7		MCW	0006	LINE37		0532	M 006	K96	SUBNO2
4	060	7		CW	LINE37- 5	LINE38- 5		0539	) K91	S89	LINE38 OK PRINT
4	070				*LINE38 AND LINE 37 OK PRINT.						
4	080	7		MCW	0029	LINE6		0546	M 029	T23	NAME
4	090	7		MCW	0037	LINE7 - 11		0553	M 037	T30	LOCATION
4	100	4		CW	LINE6 - 21			0560	) T02		
4	110	7		MCW	0042	LINE7		0564	M 042	T41	CONTRACTOR
4	120	7		MCS	0058	LINE16- 58		0571	Z 058	W40	ACCOUNT NUMBER
4	130	7		CW	LINE7 - 4	LINE16- 73		0578	) T37	W25	LINE7 OK PRINT
4	140	7		C	0061	ONE		0585	C 061	L68	
4	150	5		B	COPS		/	0592	B 622	/	BR IF UNEQUAL
4	160				*BRANCH IF MORE THAN ONE SUBSCRIPTION.						
4	170	7		MCW	ONECOP	LINE14- 54		0597	M L78	V51	COPY1
4	180	7		MCW	ONECOP	LINE16		0604	M L78	W98	COPY2

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
4	190	7		CW	LINE14- 63	LINE16- 9		0611	J V42 W89	
4	200	4		B	ABLE			0618	B 650	
4	210	7	COPS	LCA	COPIES	LINE14- 54		0622	L L88 V51	COPY 1
4	220	7		MCS	0061	LINE14- 61		0629	Z 061 V44	
4	230	7		LCA	COPIES	LINE16		0636	L L88 W98	COPY 2
4	240	7		MCS	0061	LINE16- 7		0643	Z 061 W91	
4	250	7	ABLE	CW	LINE14- 63	LINE16- 9		0650	J V42 W89	
5	010	7		LCA	EDIT3	LINE18- 60		0657	L L96 X33	EXPN DATE 1
5	020	7		MCE	0072	LINE18- 60		0664	E 072 X33	
5	030	7		LCA	EDIT3	LINE18		0671	L L96 X93	EXPN DATE2
5	040	7		MCE	0072	LINE18		0678	E 072 X93	LINE18 OK PRINT
5	050	7		LCA	BLANKS	AREA		0685	L M26 M56	MULT P. 143
5	060	7		LCA	0061	AREA -020		0692	L 061 M36	LOAD SUBS
5	070	8	ZROTST	B	TESTWM	AREA -020	0	0699	B 733 M36 0	
5	080	8		B	TESTWM	AREA -020	+	0707	B 733 M36 +	
5	090	7		A	CTRA	AREA -008		0715	A L65 M48	LOAD PRICE
5	100	7		S	EIN	AREA -020		0722	S M77 M36	
5	110	4		B	ZROTST			0729	B 699	
5	120	8	TESTWM	BWZ	LAST	AREA -020	1	0733	V 752 M36 1	
5	130	7		LCA	AREA -001	AREA		0741	L M55 M56	
5	140	4		B	ZROTST			0748	B 699	
5	150	4	LAST	SW	AREA - 11			0752	, M45	
5	159	7		MZ	AREA - 6	0095		0756	Y M50 095	
5	160	7		LCA	EDIT4	LINE16- 20		0763	L M64 W78	PRICE
5	170	7		MCE	AREA - 6	LINE16- 20		0770	E M50 W78	LINE16 OK PRINT
5	180	7		CW	AREA - 11	LINE14- 9		0777	J M45 V96	
6	010	2	PRINT	CC			/	0784	F /	
6	020	7		MCW	LINE2	0296		0786	M S71 296	
6	030	1		W				0793	2	
6	040	4		CS	0296			0794	/ 296	
6	050	7		MCW	LINE3A	0213		0798	M S77 213	
6	060	7		MCW	LINE3B	0331		0805	M S94 331	
6	070	2		CC			S	0812	F S	
6	080	1		W				0814	2	
6	090	4		CS	0331			0815	/ 331	
6	100	1		CS				0819	/	
6	110	7		MCW	LINE6	0229		0820	M T23 229	
6	120	7		MCW	LINE6	0318		0827	M T23 318	
6	130	1		W				0834	2	
6	140	4		CS	0318			0835	/ 318	
6	150	1		CS				0839	/	
6	160	7		MCW	LINE7	0225		0840	M T41 225	
6	170	7		MCW	LINE7	0314		0847	M T41 314	
6	180	2		CC			T	0854	F T	
6	190	1		W				0856	2	
6	200	4		CS	0314			0857	/ 314	
6	210	1		CS				0861	/	
7	010	7		MCW	LINE11	0296		0862	M U37 296	
7	020	1		W				0869	2	
7	030	4		CS	0296			0870	/ 296	
7	040	7		MCW	LINE12	0238		0874	M U75 238	
7	050	2		CC			S	0881	F S	
7	060	1		W				0883	2	
7	070	4		CS	0238			0884	/ 238	
7	080	7		MCW	LINE14	0330		0888	M W05 330	
7	090	2		CC			/	0895	F /	
7	100	1		W				0897	2	
7	110	4		CS	0330			0898	/ 330	
7	120	1		CS				0902	/	
7	130	7		MCW	LINE16	0293		0903	M W98 293	
7	140	2		CC			S	0910	F S	
7	150	1		W				0912	2	
7	160	4		CS	0293			0913	/ 293	
7	170	7		MCW	LINE18	0295		0917	M X93 295	
7	180	1		W				0924	2	
7	190	4		CS	0295			0925	/ 295	
7	200	7		MCW	LINE19	0272		0929	M Y65 272	
7	210	1		W				0936	2	
7	220	4		CS	0272			0937	/ 272	
8	010	7		MCW	LINE20	0271		0941	M Z36 271	
8	020	1		W				0948	2	
8	040	4		CS	0271			0949	/ 271	
8	050	7		MCW	LINE21	0223		0953	M Z59 223	
8	060	2		CC			T	0960	F T	
8	070	1		W				0962	2	
8	080	4		CS	0223			0963	/ 223	
8	090	7		MCW	LINE24	0264		0967	M -23 264	
8	100	2		CC			T	0974	F T	
8	110	1		W				0976	2	
8	120	4		CS	0264			0977	/ 264	
8	130	7		MCW	LINE28	0260		0981	M -83 260	
8	140	2		CC			S	0988	F S	
8	150	1		W				0990	2	
8	160	4		CS	0260			0991	/ 260	
8	170	7		MCW	LINE30	0271		0995	M J54 271	
8	180	1		W				1002	2	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	ANPER
82	080	32		DC	*	HOUT DELAY. IF NOT TO BE RENEWE		1929			
82	090	7	LINE20	DC	*		D CHECK	1936			
82	100	23	LINE21	DCW	*	BELOW, SIGN AND RETURN.		1959			
82	110	32		DC	*	RENEW..... DO NOT RENEW.....		1991			
82	120	32	LINE24	DC	*	CHARGE TO ACCOUNT.....		2023			
82	130	32		DCW	*		SIGNATURE	2055			
82	140	28	LINE28	DC	*			2083			
82	150	32		DCW	*	INSURE CONTINUOUS SERVICE WITHOU		2115			
82	160	32		DC	*	T INTERRUPTION - RETURN FORM PRO		2147			
82	170	7	LINE30	DC	*		MPLY..	2154			
82	180	32		DCW	*	RENEWAL SUBSCRIPTION WILL NOT B		2186			
82	190	32		DC	*	E ENTERED WITHOUT THIS AUTHORIZA		2218			
82	200	5	LINE31	DC	*		TION.	2223			
82	210	17	LINE35	DCW	*		LIBRARY USE ONLY-	2240			
83	010	32		DCW	*	VENDOR-		2272			
83	020	24	LINE37	DC	*	SUBSCRIPTION NO.-		2296			
83	030	32		DCW	*	AED-		2328			
83	040	11	LINE39	DC	*		VENDOR	2339			
83	050	15	LINE41	DCW	*		PUBLISHER	2354			
84	190	1	PLUS	DCW	*			2355			
8	190	4		CS	0271			1003	/	271	
9	010	7		MCW	LINE31	0269		1007	M	K23 269	
9	020	2		CC			T	1014	F	T	
9	030	1		W				1016	2		
9	040	4		CS	0269			1017	/	269	
9	050	7		MCW	LINE35	0217		1021	M	K40 217	
9	060	2		CC			S	1028	F	S	
9	070	1		W				1030	2		
9	080	4		CS	0217			1031	/	217	
9	090	7		MCW	LINE37	0260		1035	M	K96 260	
9	100	2		CC			S	1042	F	S	
9	110	1		W				1044	2		
9	120	4		CS	0260			1045	/	260	
9	130	7		MCW	LINE39	0247		1049	M	L39 247	
9	140	2		CC			S	1056	F	S	
9	150	1		W				1058	2		
9	160	4		CS	0248			1059	/	248	
9	170	7		MCW	LINE41	0219		1063	M	L54 219	
9	175	2		CC			A	1070	F	A	
9	180	1		W				1072	2		
9	190	4		CS	0219			1073	/	219	
9	200	4		B	START			1077	B	362	
10	010	5	ERROR	SS	START		1	1081	K	362 1	
10	030	7	TEST	ZS	COMPI	CTRST		1086	-	M76 M80	
10	040	7		MN	0071	CTRC		1093	D	071 M67	
10	050	1		MN				1100	D		
10	060	7		MN	0072	CTRC - 2		1101	D	072 M65	
10	062	7		A	CTRC	CTRST		1108	A	M67 M80	
10	064	8		BWZ	BAKER	CTRST	K	1115	V	523 M80 K	
10	066	4		B	START			1123	B	362	
10	070	7	TEST2	ZS	COMPI	CTRST		1127	-	M76 M80	
10	072	7		MN	0071	CTRC		1134	D	071 M67	
10	074	1		MN				1141	D		
10	076	7		MN	0072	CTRC - 2		1142	D	072 M65	
10	078	7		S	CTRC	CTRST		1149	S	M67 M80	
10	080	7		C	CTRST	ZERO		1156	C	M80 M83	
10	082	8		B	START	CTRST	/	1163	B	362 M80 /	
10	084	4		B	BAKER			1171	B	523	
10	090	1	HALT	H				1175	.		
81	010	32		DCW	*	FROM- NRTS TECHNICAL LIBRARY		1207			
81	020	32		DC	*			1239			
81	030	32	LINE2	DC	*	.		1271			
81	050	6	LINE3A	DCW	*		MTR625	1277			
81	060	17	LINE3B	DCW	*	SUB. NO.-		1294			
81	070	29	LINE6	DCW	*	TO-		1323			
81	080	18	LINE7	DCW	*			1341			
81	090	32		DCW	*	THE PERIODICAL SHOWN BELOW I		1373			
81	100	32		DC	*	S PRESENTLY BEING SENT TO YOU AN		1405			
81	110	32	LINE11	DC	*	D THE COST RENEWAL NOTICE		1437			
81	120	32		DCW	*	CHARGED AGAINST THE ACCOUNT INDI		1469			
81	130	6	LINE12	DC	*		CATED-	1475			
81	140	32		DCW	*	TITLE-		1507			
81	150	32		DC	*			1539			
81	160	32		DC	*			1571			
81	170	32		DC	*			1603			
81	180	2	LINE14	DC	*			1605			
81	190	32		DCW	*	ACCOUNT NO.-		1637			
81	200	32		DC	*	ESTIMATED RENEWAL PRICE-		1669			
81	210	29	LINE16	DC	*			1698			
82	010	32		DCW	*	YOUR SUBSCRIPTION EXPIRES		1730			
82	020	32		DC	*	. TO RENEW, INSERT YOUR CURR		1762			
82	030	31	LINE18	DC	*	ENT ACCOUNT EXPIRES		1793			
82	040	32		DCW	*	NUMBER AGAINST WHICH THIS SUBSCR		1825			
82	050	32		DC	*	IPTION SHOULD BE CHARGED, SIGN T		1857			
82	060	8	LINE19	DC	*		HIS FORM	1865			
82	070	32		DCW	*	AND RETURN IT TO THE LIBRARY WIT		1897			

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	ANPER
84	200	4	CCMP2	DCW	*			2359			
84	220	6	CTRA	DCW	*			2365			
85	010	3	ONE	DCW	*		001	2368			
85	020	10	ONECOP	DCW	*	1 COPY		2378			
85	030	10	COPIES	DCW	*	COPIES		2388			
85	040	3	MULTA	DCW	*			2391			
85	050	5	EDIT3	DCW	*		-6	2396			
85	060	30	BLANKS	DCW	*			2426			
85	070	30	AREA	DCW	*			2456			
85	090	8	EDIT4	DCW	*		\$000 .	2464			
85	110	3	CTRC	DCW	*			2467			
86	010	2	CTRB	DCW	*			2469			
86	020	3	TWELVE	DCW	*		012	2472			
86	030	1	MONTHK	DCW	*		4	2473			
86	040	3	COMP1	DCW	*			2476			
86	050	1	EIN	DCW	*		1	2477			
86	052	3	CTRTST	DCW	*			2480			
86	053	3	ZERO	DCW	*		00-	2483			
86	054	1		H				2484			
86	060		END	ST					.	/ 333 080	

263 CARDS

APPENDIX F-2. RECVR POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2 L072116,110106,1051178101/199,027A074028)027B0010270B026/0991,001/00111710
BOOTSTRAP CARC ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	RECVR
1	01C			CTL	33						
1	020				*PERIODICAL RENEWAL PROGRAM- PHASE 3						
1	030				* CALL FOR RECEIVING REPORT						
1	040				*NRTS TECHNICAL LIBRARY NOVEMBER 1962						
1	050				* PROGRAMMED BY HILLIS L. GRIFFIN						
1	060				*USING JOURNAL RENEWAL DECK THIS PROGRAM CALLS						
1	070				* FOR ACKNOWLEDGEMENT OF RECEIPT OF JOURNAL SUB-						
1	080				* SRIPTIONS WHICH SHOULD HAVE STARTED LAST						
1	090				* MONTH						
1	100				*LOAD CARD- CC 1-8 - DATE 02/02/62						
1	110				* CC 9-11 COMPARE DATE ,E.G. FOR						
1	120				* ABOVE DATE 013 (MONTH + LAST DIGIT OF YEAR)						
1	130				*SWITCHES-						
1	140				* A- ON						
1	200				*						
2	010	7	ST	SW	0001	0009		0333	, 001 009		
2	020	1		R				0340	1	LOAD CARD	
2	030	7		MCW	0008	DATE		0341	M 008 Y71		
2	040	7		LCA	0011	COMP1		0348	L 011 Y74	TO DATE COMPARE	
2	050	5	START	B	FINISH		A	0355	B 997 A		
2	060	4		CS	0080			0360	/ 080		
2	070	4		SW	0001			0364	, 001		
2	080	1		R				0368	1		
2	090	8		BWZ	HDR	0007	B	0369	V 381 007 B		
2	100	4		B	SUBCD			0377	B 427		
2	110	7	HCR	SW	0079	0074		0381	, 079 074		
2	120	7		SW	0062	0008		0388	, 062 008		
2	130	7		MCW	0056	LINE6		0395	M 056 U15		
2	140	7		MCW	0056	LINE6 - 68		0402	M 056 T47	TITLE SET	
2	150	7		MCW	0080	LINE17		0409	M 080 Y53		
2	160	7		LCA	0004	COMP2		0416	L 004 Y78		
2	170	4		B	START			0423	B 355		
2	180				*HEADER SETUP COMPLETE						
2	190	7	SLBCD	SW	0079	0067		0427	, 079 067		
2	200	7		SW	0062	0059		0434	, 062 059		
2	210	7		SW	0031	0008		0441	, 031 008		
2	220	7		SW	0038	0073		0448	, 038 073		
3	010	7		C	0069	COMP1		0455	C 069 Y74	DATE TEST	
3	020	5		B	START		/	0462	B 355 /		
3	030	7		C	0004	COMP2		0467	C 004 Y78	SUBN TEST	
3	040	5		B	ERROR1		/	0474	B 992 /		
3	050	7		MCW	0006	LINE16		0479	M 006 Y43	TITLE CODE	
3	060	7		MCW	0029	LINE3		0486	M 029 /45	SUBSCRIBER	
3	065	7		MCW	BLANKS	LINE8		0493	M 255 V37		
3	066	7		MCW	BLANKS	LINE6 - 55		0500	M 255 T60		
3	070	7		C	0061	ONE		0507	C 061 Y81		
3	080	5		B	SUBS		/	0514	B 537 /		
3	090	7		MCW	ONECOP	LINE8		0519	M Y91 V37		
3	100	7		MCW	ONECOP	LINE6 - 55		0526	M Y91 T60	HOW MANY SUBS	
3	110	4		B	WRITE			0533	B 565		
3	120	7	SUBS	MCS	0061	COPIES- 7		0537	Z 061 Y94		
3	130	7		SW	0059	COPIES- 9		0544	, 059 Y92		
3	140	7		MCW	COPIES	LINE8		0551	M 201 V37		
3	150	7		MCW	COPIES	LINE6 - 55		0558	M 201 T60	COPIES SET	
3	160				*READY TO WRITE						
3	170	7	WRITE	MCW	DATE	0318		0565	M Y71 318	DATE LINE	
3	180	7		MCW	DATE	0253		0572	M Y71 253		
3	190	1		W				0579	2		
3	200	4		CS	0332			0580	/ 332		
3	210	1		CS				0584	/		
3	220	7		MCW	LINE1	0298		0585	M /09 298		
3	230	1		W				0592	2		
3	240	4		CS	0299			0593	/ 299		
3	250	2		CC			T	0597	F T		
4	010	7		MCW	LINE2	0216		0599	M /16 216		
4	020	1		W				0606	2		
4	030	4		CS	0220			0607	/ 220		
4	040	7		MCW	LINE3	0310		0611	M /45 310		
4	050	7		MCW	LINE3	0231		0618	M /45 231	NAME LINE	
4	060	1		W				0625	2		
4	070	4		CS	0332			0626	/ 332		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	RECV
4	080	1		CS				0630	/		
4	090	7		MCW	0037	0295		0631	M 037 295	LOCATION	
4	100	7		MCW	0037	0216		0638	M 037 216		
4	110	7		MCW	0042	0305		0645	M 042 305	CONTRACTOR	
4	120	7		MCW	0042	0226		0652	M 042 226		
4	130	2		CC			T	0659	F T		
4	140	1		W				0661	2		
4	150	4		CS	0332			0662	/ 332		
4	160	1		CS				0666	/		
4	170	7		MCW	LINE4	0265		0667	M S03 265		
4	180	1		W				0674	2		
4	190	4		CS	0266			0675	/ 266		
4	200	7		MCW	LINE5	0289		0679	M S90 289		
5	010	2		CC			S	0686	F S		
5	020	1		W				0688	2		
5	030	4		CS	0299			0689	/ 299		
5	040	7		MCW	LINE6	0329		0693	M U15 329	TITLE AND COPIES	
5	050	2		CC			S	0700	F S		
5	060	1		W				0702	2		
5	070	4		CS	0332			0703	/ 332		
5	080	1		CS				0707	/		
5	090	8		B	WR2	0078		0708	B 734 078		
5	100	7		LCA	VOLS	0321		0716	L Z31 321		
5	110	7		MCE	0078	0321		0723	E 078 321	VOLS RIGHT	
5	120	4		SW	0073			0730	, 073		
5	130	7	WR2	LCA	DATES	0306		0734	L Z17 306		
5	140	7		MCE	0072	0306		0741	E 072 306	DATES RIGHT	
5	150	4		SW	0067			0748	, 067		
5	160	7		MCW	LINE7B	0290		0752	M U41 290		
5	170	8		B	WR3	0079		0759	B 781 079		
5	180	7		LCA	VOLS	0254		0767	L Z31 254		
5	190	7		MCE	0078	0254		0774	E 078 254	VOLS LEFT	
5	200	7	WR3	LCA	DATES	0239		0781	L Z17 239		
5	210	7		MCE	0072	0239		0788	E 072 239	DATES LEFT	
6	010	7		MCW	LINE7	0223		0795	M U34 223		
6	020	2		CC			S	0802	F S		
6	030	1		W				0804	2		
6	040	4		CS	0332			0805	/ 332		
6	050	1		CS				0809	/		
6	060	7		MCW	LINE8	0303		0810	M V37 303		
6	070	1		W				0817	2		
6	080	4		CS	0304			0818	/ 304		
6	090	1		CS				0822	/		
6	100	7		MCW	LINE9	0262		0823	M V97 262		
6	110	1		W				0830	2		
6	120	4		CS	0263			0831	/ 263		
6	130	7		MCW	LINE10	0266		0835	M W61 266		
6	140	1		W				0842	2		
6	150	4		CS	0267			0843	/ 267		
6	160	7		MCW	LINE11	0261		0847	M X20 261		
6	170	1		W				0854	2		
6	180	4		CS	0262			0855	/ 262		
6	190	7		MCW	LINE12	0220		0859	M X38 220		
6	200	2		CC			T	0866	F T		
7	010	1		W				0868	2		
7	020	4		CS	0221			0869	/ 221		
7	030	7		MCW	LINE13	0261		0873	M X94 261		
7	040	2		CC			T	0880	F T		
7	050	1		W				0882	2		
7	060	2		CC			/	0883	F /		
7	070	4		CS	0262			0885	/ 262		
7	080	7		MCW	LINE14	0260		0889	M Y18 260		
7	090	1		W				0896	2		
7	100	4		CS	0261			0897	/ 261		
7	110	7		MCW	LINE15	0249		0901	M Y27 249		
7	120	2		CC			T	0908	F T		
7	130	1		W				0910	2		
7	140	2		CC			/	0911	F /		
7	150	4		CS	0250			0913	/ 250		
7	160	7		MCW	LINE16	0299		0917	M Y43 299		
7	170	7		MCW	LINE16	0218		0924	M Y43 218		
7	180	2		CC			S	0931	F S		
7	190	1		W				0933	2		
7	200	4		CS	0299			0934	/ 299		
8	010	7		MCW	0080	LINE17		0938	M 080 Y53		
8	020	7		MCW	LINE17	0293		0945	M Y53 293		
8	030	7		MCW	LINE17	0212		0952	M Y53 212	VENDOR	
8	040	7		MCW	0066	LINE17A		0959	M 066 Y63		
8	050	7		MCW	LINE17A	0314		0966	M Y63 314		
8	060	7		MCW	LINE17A	0236		0973	M Y63 236		
8	065	2		CC			A	0980	F A		
8	070	1		W				0982	2		
8	080	4		CS	0332			0983	/ 332		
8	090	1		CS				0987	/		
8	100	4		B	START			0988	B 355		
8	110	5	ERROR1	SS	START		1	0992	K 355 1		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	RECVR
8	120	2	FINISH	CC			1	0997	F 1		
8	130	7		MCW	MESS1	0250		0999	M Z45 250		
8	140	2		CC			A	1006	F A		
8	150	1		W				1008	2		
8	160	4		CS	0250			1009	/ 250		
8	170	1		H				1013	.		
81	010	32		DCW	*	FROM- NRTS TECHNICAL LIBRARY		1045			
81	020	32		DC	*			1077			
81	030	32	LINE1	DC	*	RECEIVER REQUEST		1109			
81	040	7	LINE2	DCW	*	MTR 625		1116			
81	050	29	LINE3	DCW	*	TO-		1145			
81	060	32		DCW	*	THE PERIODICAL SHOWN BELOW HAS B		1177			
81	070	26	LINE4	DC	*	EEN RENEWED FOR THE PERIOD		1203			
81	080	32		DCW	*	INDICATED-		1235			
81	090	32		DC	*			1267			
81	100	23	LINE5	DC	*	TITLE-		1290			
81	110	32		DCW	*			1322			
81	120	32		DC	*			1354			
81	130	32		DC	*			1386			
81	140	29	LINE6	DC	*			1415			
81	150	19	LINE7	DCW	*	RENEWED FOR PERIOD-		1434			
81	160	7	LINE7B	DCW	*	PERIOD-		1441			
81	170	32		DCW	*	YOU SHOULD ALREADY HAVE RECEIVED		1473			
81	180	32		DC	*	THE FIRST ISSUE OF THIS		1505			
81	181	32	LINE8	DC	*			1537			
81	190	32		DCW	*	SUBSCRIPTION. PLEASE PLACE A CH		1569			
81	200	28	LINE9	DC	*	ECK IN THE APPROPRIATE SPACE		1597			
82	010	32		DCW	*	BELOW TO INDICATE THE CURRENT ST		1629			
82	020	32	LINE10	DC	*	ATUS OF THIS SUBSCRIPTION, SIGN		1661			
82	030	32		DCW	*	THIS FORM AND RETURN IT TO US PR		1693			
82	040	27	LINE11	DC	*	OMPTLY IN ORDER THAT WE MAY		1720			
82	050	18	LINE12	DCW	*	CLEAR OUR RECORDS.		1738			
82	060	32		DCW	*	BEING RECEIVED N		1770			
82	070	24	LINE13	DC	*	OT BEING RECEIVED N		1794			
82	080	24	LINE14	DCW	*			1818			
82	090	9	LINE15	DCW	*	SIGNATURE		1827			
82	100	16	LINE16	DCW	*	SUB CODE- XXXXXX		1843			
82	110	10	LINE17	DCW	*	VENDOR- XX		1853			
82	120	10	LINE17A	DCW	*	AED- XXXXX		1863			
82	130	8	DATE	DCW	*			1871			
82	140	3	CCMP1	DCW	*			1874			
82	150	4	CCMP2	DCW	*			1878			
82	160	3	ONE	DCW	*	001		1881			
82	170	10	ONECOP	DCW	*	ONE COPY		1891			
82	180	10	COPIES	DCW	*	COPIES		1901			
82	160	16	DATES	DCW	*	-6 +TO+ -6		1917			
82	200	14	VGLS	DCW	*	VOL.+ -		1931			
82	210	14	MESS1	DCW	*	RUN COMPLETED.		1945			
82	215	10	BLANKS	DCW	*			1955			
82	300			END	ST						

/ 333 080

207 CARDS

APPENDIX F-3. PORDR MOD. I POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,105117B101/199,027A074028102780010270B026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	PORDR
1	010			CTL	33					THIS IS MOD 1	
1	020				*PROGRAM FOR WRITING SHEETS FOR PERIODICAL						
1	030				* RENEWAL. NRTS TECHNICAL LIBRARY, JULY, 1962.						
1	040				* PROGRAMMED BY HILLIS L. GRIFFIN						
1	050				*						
1	060				* THIS PROGRAM USED IN CONJUNCTION WITH THE						
1	070				*IBM 1401 DATA PROCESSING SYSTEM, LISTS SUBSCRI-						
1	080				*PTIONS TO BE RENEWED. CARDS HAVE BEEN PULLED						
1	090				*FROM THE FILE BY THE ANPER PROGRAM, WHICH IS						
1	100				*THE INITIAL PHASE OF THIS SYSTEM. CARDS SO						
1	110				*PULLED MUST BE MERGED BACK INTO THE DECK BEFORE						
1	120				*THE RENEWAL ORDER WILL BE WRITTEN.						
1	130				*						
1	140				* IF SW B IS OFF A LIMIT COMPARE TESTS ORDER						
1	150				*TOTAL. THE NEXT ITEM IS PRINTED AND THE ORDER						
1	160				*IS COMPLETED. IF SW B IS ON THE OUTPUT WILL						
1	170				*SHOW ONLY A GRAND TOTAL AT THE END OF THE RUN.						
1	180				* IF SW C IS ON ALL SUBSCRIPTIONS WILL BE LISTED						
1	190				*REGARDLESS OF EXPIRATION DATE. A DATE COMPARE						
1	200				*COUNTER WILL OTHERWISE REJECT ITEMS NOT DUE FOR						
2	010				*RENEWAL. NO UPDATED CARDS WILL BE PUNCHED IF						
2	020				*SW C IS ON.						
2	030				* IF SW D IS ON THE VENDOR COMPARISON IS NOT						
2	040				*MADE AND SUBSCRIPTIONS WILL BE LISTED						
2	050				*REGARDLESS OF VENDOR.						
2	060				* IF SW F IS ON DATES AND VOLUMES WILL NOT BE						
2	070				*UPDATED IN THE PRINTOUT.						
2	080				*						
2	090				*LOAD CARD-- CC 1-5 IS P.O. NUMBER THIS LIST.						
2	100				* CC 6-8 - TEST EXPIRATION DATE(DEC 1963= 312)						
2	110				* CC 9-10 - VENDOR CODE FOR THIS ORDER						
2	120				* CC 11-29 - VENDOR NAME						
2	130				*LOAD CARD MAY BE BLANK IF ONLY STRAIGHT LIST						
2	140				* BEING MADE.						
2	150				*						
2	160				*COMPILE ON 4K 1401 WITH HI-LO-EQUAL COMPARE.						
2	170				*NO OTHER SPECIAL FEATURES REQUIRED.						
2	180				*						
10	010	7	ST	SW	0001	0006		0333	, 001 006		
10	020	7		SW	0009	0011		0340	, 009 011		
10	030	1		R				0347	1		
10	040	7		MCW	0005	AED		0348	M 005 Y24	LOAD P.O. NUMBER	
10	050	7		MCW	0008	COMPDT		0355	M 008 Y27	TEST DATE	
10	060	7		MCW	0010	VENDOR		0362	M 010 Y29	VENDOR CODE	
10	070	7		MCW	0029	LINE1		0369	M 029 -34	VENDOR NAME	
10	080	7		SW	CTRZ	ITEMNO		0376	, 097 J53		
10	090	4		B	NUPG			0383	B U50		
10	100	4	ST2	CW	CTRZ			0387	J 097		
10	110	5	START	B	HALT		A	0391	B W30 A		
10	120	4		CS	0080			0396	/ 080		
10	130	4		SW	0001			0400	, 001		
10	140	1		R				0404	1		
10	150	8		BWZ	HDR	0007	B	0405	V 417 007 B	IF HEADER CARD	
10	160	4		B	SUBCD			0413	B 488	IF SUBSCRIPTION	
10	170	7	HDR	SW	0008	0062		0417	, 008 062	SUB CODE, TITLE	
10	180	7		SW	0068	0079		0424	, 068 079	VENDR TL CD,VNDR	
10	190	4		SW	CTRA			0431	, 203		
10	200	4		CW	CTRB			0435	J Y99		
11	010	5		B	ABLE		D	0439	B 456 D	IF NO VENDR TEST	
11	020	7		C	0080	VENDOR		0444	C 080 Y29		
11	030	5		B	START		/	0451	B 391 /		
11	040	7	ABLE	MCW	0004	TLCOMP		0456	M 004 Y37	TL NUMBER	
11	050	7		MCW	0056	TITLE		0463	M 056 Y86		
11	060	7		MCW	0067	PRICE		0470	M 067 Y92		
11	070	7		MCW	0073	VENTL		0477	M 073 Y98	VNDR TITLE CODE	
11	080	4		B	START			0484	B 391		
11	090				*SUBSCRIPTION HEADER TO MEMORY. NOW TO TEST FOR						
11	100				* A SUBSCRIPTION EXPIRATION.						
11	110	4	SUBCD	SW	0079			0488	, 079		
11	120	5		B	SUB1		D	0492	B 509 D	NO VENDOR TEST	
11	130	7		C	0080	VENDOR		0497	C 080 Y29	VENDOR TEST	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	PORDR
11	140	5		B	START		/	0504	B 391 /		
11	150	7	SUB1	SW	0073	0076		0509	, 073 076		
11	160	7		SW	0067	0070		0516	, 067 070		
11	170	7		SW	0043	0059		0523	, 043 059		
11	180	4		SW	0008			0530	, 008		
11	190	7		C	0004	TLCOMP		0534	C 004 Y37		
11	200	5		B	ERROR		/	0541	B T87 /		
12	010	5		B	TEST		C	0546	B 587 C	NO EXPN DT TEST	
12	020	7		MN	0071	CTRC		0551	D 071 Z02		
12	030	1		MN				0558	D		
12	040	7		MN	0072	CTRC - 2		0559	D 072 Z00		
12	050	7		C	CTRC	COMPTD		0566	C 202 Y27		
12	060	5		B	TEST		S	0573	B 587 S	IF EQUAL	
12	070	5		B	TEST		U	0578	B 587 U	IF SUB EARLIER	
12	080	4		B	START			0583	B 391		
12	090	8	TEST	BWZ	PRINT2	CTRA	1	0587	V 612 Z03 1	IF HDR TO PRINT	
12	100	4		SW	CTRX			0595	, 095	IF NOT HEADER	
12	110	5		B	NUPG		'	0599	B U50 '	IF NEED NEW PG	
12	120	4	TEST2	CW	CTRX			0604	J 095	NO PAGE NEEDED	
12	130	4		B	PR2B			0608	B 629		
12	140	8	PRINT2	BWZ	SUBLIN	CTRA	1	0612	V U10 Z03 1		
12	150	4	PR2A	SW	CTRY			0620	, 096		
12	160	5		B	NUPG		'	0624	B U50 '	IF NEED NEW PAGE	
12	170	7	PR2B	CW	CTRY	CTRD		0629	J 096 M13		
12	180	8		BWZ	PRINT3	CTRB	1	0636	V 691 Y99 1		
12	190	7		MCW	ITEMNO	0205		0644	M J53 205		
12	200	7		MCS	ITEMNO- 1	0204		0651	Z J52 204		
13	010	4		SW	ITEMNO- 4			0658	, J49		
13	020	7		MCW	TITLE	0255		0662	M Y86 255		
13	030	2		CC			S	0669	F S		
13	040	1		W				0671	Z		
13	050	4		CS	0299			0672	/ 299		
13	060	4		SW	CTRB			0676	, Y99		
13	070	4		CW	CTRA			0680	J Z03		
13	080	7		A	ONE	ITEMNO- 1		0684	A L69 J52		
13	090				*BEGIN ADDRESS COMPARE						
13	100	8	PRINT3	B	LIB	0030		0691	B 727 030		
13	110	8		B	PPCO	0030	1	0699	B 745 030 1		
13	120	8		B	AEC	0030	2	0707	B 763 030 2		
13	130	8		B	AJG	0030	3	0715	B 781 030 3		
13	140	4		B	ERROR			0723	B T87		
13	150	7	LIB	MCW	LIB1	ADDR1		0727	M J83 L99		
13	160	7		MCW	LIB3	ADDR3		0734	M K25 M12		
13	170	4		B	PRINTR			0741	B 795		
13	180	7	PPCO	MCW	LIB1	ADDR1		0745	M J83 L99		
13	190	7		MCW	LIB3	ADDR3		0752	M K25 M12		
13	200	4		B	PRINTR			0759	B 795		
14	010	7	AEC	MCW	AEC1	ADDR1		0763	M L22 L99		
14	020	7		MCW	AEC3	ADDR3		0770	M L35 M12		
14	030	4		B	PRINTR			0777	B 795		
14	040	7	AJG	MCW	AJG1	ADDR1		0781	M L65 L99		
14	050	7		MCW	AEC3	ADDR3		0788	M L35 M12		
14	060	7	PRINTR	A	0061	TLSUBS		0795	A 061 M99		
14	070	7		A	0061	SUBTL		0802	A 061 078		
14	080	4		CS	0332			0809	/ 332		
14	090	1		CS				0813	/		
14	100	7		MCS	0061	0246		0814	Z 061 246		
14	110	4		SW	0059			0821	, 059		
14	120	8		B	SUBS2	0061	1	0825	B 844 061 1		
14	130	7		MCW	SUBSA	0252		0833	M Y33 252		
14	140	4		B	DTUP			0840	B 851		
14	150	7	SUBS2	MCW	SUBS	0251		0844	M L68 251		
14	160	5	DTUP	B	CC		F	0851	B 884 F	IF NO DATE RAISE	
14	170	7		SW	0069	0072		0856	, 069 072		
14	180	7		A	ONE	0069		0863	A L69 069		
14	190	7		A	ONE	0072		0870	A L69 072		
14	200	7		CW	0069	0072		0877	J 069 072		
15	010	4	CC	SW	0067			0884	, 067		
15	020	4		CW	0070			0888	J 070		
15	030	7		LCA	EDIT2	0269		0892	L 094 269		
15	040	7		MCE	0072	0269		0899	E 072 269		
15	050	5		B	DD		F	0906	B V93 F	NO VOLUME INCR	
15	060	8		B	NOVOL	0075		0911	B #24 075		
15	070	7		MCW	0078	CTRE		0919	M 078 M16		
15	080	7		S	0075	CTRE		0926	S 075 M16		
15	090	7		C	CTRE	ZERO		0933	C M16 M19		
15	100	5		B	UPVOL		/	0940	B 970 /		
15	110	7		A	ONE	0075		0945	A L69 075	IF ONLY ONE VOL/	
15	120	7		A	ONE	0078		0952	A L69 078	YR ADD ONE TO	
15	130	7		CW	0075	0078		0959	J 075 078	TO RAISE	
15	140	4		B	UPVOL1			0966	B #03		
15	150				*IF MORE THAN ONE VOL/YR ADJUST FOR VOL INCREASE						
15	160	8	UPVOL	BWZ	ERROR2	CTRE	K	0970	V T92 M16 K		
15	170	7		A	ONE	CTRE		0978	A L69 M16		
15	180	4		CW	CTRE			0985	J M16		
15	190	7		A	CTRE	0075		0989	A M16 075		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	PORDR
15	200	7		A	CTRE	0078		0996	A M16 078		
16	010	7	UPVOL1	MCS	0075	0274		1003	Z 075 274		
16	020	7		MCW	DASH	0275		1010	M P16 275		
16	030	7		MCS	0078	0278		1017	Z 078 278		
16	040	7	NOVOL	LCA	BLANKS	AREA		1024	L M49 M79	VOLS TO PRINT	
16	050	7		LCA	0061	AREA - 20		1031	L 061 M59	MULT SUBROUTINE	
16	060	8	ZROTST	B	TESTWM	AREA - 20	0	1038	B #72 M59 0		
16	070	8		B	TESTWM	AREA - 20	+	1046	B #72 M59 +		
16	080	7		A	PRICE	AREA - 8		1054	A Y92 M71		
16	090	7		S	ONE	AREA - 20		1061	S L69 M59		
16	100	4		B	ZROTST			1068	B #38		
16	110	8	TESTWM	BWZ	LAST	AREA - 20	1	1072	V #91 M59 1		
16	120	7		LCA	AREA - 1	AREA		1080	L M78 M79		
16	130	4		B	ZROTST			1087	B #38		
16	140	4	LAST	SW	AREA - 11			1091	, M68		
16	150	7		MZ	AREA - 6	0095		1095	Y M73 095		
16	160	7		LCA	EDIT1	0289		1102	L M89 289		
16	170	7		MCE	AREA - 6	0289		1109	E M73 289		
16	180	4		SW	AREA - 11			1116	, M68		
16	190	7		A	AREA - 6	TOTAL\$		1120	A M73 M95		
16	200	5		B	BB		B	1127	B /54 B	IF NO LIMIT TEST	
17	010	7		ZA	LIMIT	CTRF		1132	+ N05 N11		
17	020	7		S	TOTAL\$	CTRF		1139	S M95 N11		
17	030	8		BWZ	HALT	CTRF	K	1146	V W30 N11	K IF LIMIT REACHED	
17	040	7	8B	MCS	VENTL	0298		1154	Z Y98 298		
17	050	4		SW	VENTL - 5			1161	, Y93		
17	060	7		MCS	0058	0331		1165	Z 058 331	ACCT NO TO PRINT	
17	070	7		MCW	ADDR1	0237		1172	M L99 237		
17	080				*PRINT SETUP COMPLETED. NEXT TO SET UP TO PUNCH						
17	090				*AN UPDATED CARD.						
17	100				*NO CARD PUNCHED IF SW C ON						
17	110	5		B	NOCD		C	1179	B S51 C		
17	120	7		CW	0008	0031		1184	J 008 031		
17	130	7		CW	0038	0043		1191	J 038 043		
17	140	7		CW	0059	0079		1198	J 059 079		
17	150	7		CW	0067	0070		1205	J 067 070		
17	160	7		CW	0073	0076		1212	J 073 076		
17	170	7		MCW	0080	0180		1219	M 080 180		
17	180	7		MN	0260	0169		1226	D 260 169		
17	190	7		MN	0269	0172		1233	D 269 172		
17	200	7		MCW	AED	0166		1240	M Y24 166		
18	010				*CARD READY. SHOOT.						
18	020	4		WP	NOCD1			1247	6 S52		
18	030	1	NOCD	W				1251	2		
18	040	4	NOCD1	CS	0332			1252	/ 332		
18	050	1		CS				1256	/		
18	060	4		CS	0180			1257	/ 180		
18	070	8		B	NONAME	0030		1261	B S91 030		
18	080	7		MCW	ATTN	0236		1269	M K92 236		
18	090	4		SW	0008			1276	, 008		
18	100	7		MCW	0029	0236		1280	M 029 236	NAME IN	
18	110	4		B	NAMEIN			1287	B S98		
18	120	7	NONAME	MCW	LIB2	0236		1291	M K12 236		
18	130	5	NAMEIN	B	SETDLR		C	1298	B V24 C	PRINT DLR NAME	
18	140	5		B	SETDLR		D	1303	B V24 D		
18	150	1	NAMEOK	W				1308	2		
18	160	4		CS	0332			1309	/ 332		
18	170	1		CS				1313	/		
18	180	5		B	START		C	1314	B 391 C		
18	190	5		B	START		D	1319	B 391 D		
18	200	7		MCW	ADDR3	0220		1324	M M12 220		
19	010	8		B	AA	0007	1	1331	B X95 007	1 IF NEW SUBSCRIPN	
19	020	1	NEWSET	W				1339	2		
19	030	4		CS	0299			1340	/ 299		
19	040	7		MCW	CITY	0225		1344	M K43 225		
19	050	1		W				1351	2		
19	060	4		CS	0299			1352	/ 299		
19	070	7		MCW	TRAILR	0227		1356	M K63 227		
19	080	7		MCW	0006	0227		1363	M 006 227		
19	090	7		MCW	AED	0216		1370	M Y24 216		
19	100	2		CC			S	1377	F S		
19	110	1		W				1379	2		
19	120	7		CS	START	0299		1380	/ 391 299		
19	130	5	ERROR	SS	START		1	1387	K 391 1		
19	140	7	ERROR2	MCW	0006	0106		1392	M 006 106		
19	150	7		MCW	MESS1	0129		1399	M N23 129		
19	160	4		P	START			1406	4 391		
19	170	8	SUBLIN	BWZ	PR2B	CTRD	1	1410	V 629 M13 1		
19	180	7		MCW	MESS3	0235		1418	M N67 235		
19	190	7		MCS	SUBTL	0239		1425	Z 078 239		
19	200	4		SW	SUBTL - 3			1432	, 075		
20	010	4		S	SUBTL			1436	S 078		
20	020	2		CC			T	1440	F T		
20	030	1		W				1442	2		
20	040	7		CS	PR2A	0299		1443	/ 620 299		
20	050	2	NUPG	CC			1	1450	F 1		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	PORDR
20	060	2		CC			T	1452	F T		
20	070	7		A	ONE	PAGE		1454	A L69	Z06	
20	080	7		MCW	LINE1	0330		1461	M -34	330	
20	090	7		MCS	PAGE	0210		1468	Z Z06	210	
20	100	4		SW	PAGE - 2			1475	, Z04		
20	110	1		W				1479	2		
20	120	4		CS	0332			1480	/ 332		
20	130	1		CS				1484	/		
20	140	2		CC			T	1485	F T		
20	150	7		MCW	LINE2	0316		1487	M J48	316	
20	160	1		W				1494	2		
20	170	4		CS	0332			1495	/ 332		
20	180	1		CS				1499	/		
20	190				*HEADER PRINTED						
20	200	8		BWZ	ST2	CTRZ	1	1500	V 387	097 1	
21	010	8		BWZ	PR2B	CTRY	1	1508	V 629	096 1	
21	020	8		BWZ	TEST2	CTRX	1	1516	V 604	095 1	
21	030	7	SETDLR	MCW	MESS8	0306		1524	M P04	306	
21	040	4		SW	0079			1531	, 079		
21	050	7		MCW	0080	0309		1535	M 080	309	
21	060	4		CW	0079			1542	) 079		
21	070	5		B	SETPO		F	1546	B V56	F	
21	080	5		CC	NAMEOK		T	1551	F T08	T	
21	090	7	SETPO	MCW	TRAILR- 16	0263		1556	M K47	263	
21	100	4		SW	0062			1563	, 062		
21	110	7		MCW	0066	0268		1567	M 066	268	
21	120	7		MCW	0006	0290		1574	M 006	290	
21	130	7		MCW	MESS9	0283		1581	M P15	283	
21	140	5		CC	NAMEOK		T	1588	F T08	T	
21	150	4	DC	SW	0073			1593	, 073		
21	160	7		LCA	EDIT1	0289		1597	L M89	289	
21	170	7		MCE	0078	0289		1604	E 078	289	
21	180	8		B	NOVOL	0075		1611	B #24	075	
21	190	7		SW	0073	0076		1619	, 073	076	
21	200	4		B	UPVOL1			1626	B #03		
22	010	4	HALT	CS	0332			1630	/ 332		
22	020	1		CS				1634	/		
22	030	7		MCW	MESS3	0233		1635	M N67	233	
22	040	7		MCS	SUBTL	0237		1642	Z 078	237	
22	050	4		S	SUBTL			1649	S 078		
22	060	2		CC			T	1653	F T		
22	070	1		W				1655	2		
22	080	4		CS	0299			1656	/ 299		
22	090	1		CS				1660	/		
22	100	2		CC			K	1661	F K		
22	110	7		MCW	MESS2	0247		1663	M N45	247	
22	120	2		CC			S	1670	F S		
22	130	7		MCS	TLSUBS	0252		1672	Z M99	252	
22	140	4		SW	TLSUBS- 3			1679	, M96		
22	150	7		MCW	MESS4	0269		1683	M N78	269	
22	160	7		LCA	EDIT1	0278		1690	L M89	278	
22	170	7		MCE	TOTAL\$	0278		1697	E M95	278	
22	180	1		WP				1704	6		
22	190	4		CS	0299			1705	/ 299		
22	200	5		B	HALT2		F	1709	B X46	F	
23	010	7		MCW	MESS5	0253		1714	M 026	253	
23	020	7		MCW	AED	0259		1721	M Y24	259	
23	030	1		W				1728	2		
23	040	4		CS	0260			1729	/ 260		
23	050	1		CS				1733	/		
23	060	7		MCW	MESS6	0253		1734	M 074	253	
23	070	1		W				1741	2		
23	080	4		CS	0299			1742	/ 299		
23	090	2	HALT2	CC			1	1746	F 1		
23	100	1		H				1748	.		
23	110	1		H				1749	.		
23	120	4		S	SUBTL			1750	S 078		
23	130	4		S	TLSUBS			1754	S M99		
23	140	4		S	TOTAL\$			1758	S M95		
23	150	7		SW	PAGE - 1	CTRD		1762	, Z05	M13	
23	160	7		CW	CTRA	CTRB		1769	J Z03	Y99	
23	170	4		S	ITEMNO- 1			1776	S J52		
23	180	4		S	PAGE			1780	S Z06		
23	190	7		A	ONE	ITEMNO- 1		1784	A L69	J52	
23	200	4		B	ST			1791	B 333		
24	010	7	AA	MZ	0190	0007		1795	Y 190	007	FOR NEW SUB
24	020	7		MCW	MESS7	0249		1802	M Y19	249	
24	030	4		B	NEWSET			1809	B T39		
81	010				*FOLLOWING ARE WORK AREAS AND CONSTANTS.						
81	020	7	MESS7	DCW	*			1819	NEW SUB		
81	030	5	AED	DCW	*			1824			
81	040	3	COMPDT	DCW	*			1827			
81	050	2	VENDOR	DCW	*			1829			
81	060	4	SUBSA	DCW	*		SUBS	1833			
81	070	4	TLCOMP	DCW	*			1837			

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	PORDR
81	080	32		DCW	*			1869			
81	090	17	TITLE	DC	*			1886			
81	100	6	PRICE	DCW	*			1892			
81	110	6	VENTL	DCW	*			1898			
81	120	1	CTRB	DC	*			1899			
81	130				* SET WM WHEN SUBSCRIPTN CARD STORED						
81	140	3	CTRC	DCW	*			00+	1902		
81	150	1	CTRA	DC	*				1903		
81	160				*SET WM WHEN TITLE CARD STORED						
81	170	3	PAGE	DCW	*			000	1906		
81	180	32		DCW	*	PAGE	ADDRESS SUBSCRIPTI		1938		
81	190	32		DC	*	ONS AS INDICATED IN QUANTITIES S			1970		
81	200	32		DC	*	HOWN UNDER EACH TITLE.			2002		
82	010	32	LINE1	DC	*	. VENDOR-			2034		
82	020	32		DCW	*	ITEM NO.	JOURNAL TITLE		2066		
82	030	32		DC	*		QUANTITY PERIOD		2098		
82	040	32		DC	*		VOLUMES EST. COST TITLE		2130		
82	050	18	LINE2	DC	*		NO. ACCOUNT		2148		
82	060	5	ITEMNO	DCW	*		0001.		2153		
82	070	30	LIB1	DCW	*	PHILLIPS PETROLEUM CO. A.E.D.			2183		
82	080	29	LIB2	DCW	*	TECHNICAL LIBRARY			2212		
82	090	13	LIB3	DCW	*		P.O. BOX 2067		2225		
82	100	18	CITY	DCW	*		IDAHO FALLS, IDAHO		2243		
82	110	20	TRAILR	DCW	*		AED-		2263		
82	120	29	ATTN	DCW	*	ATTN-			2292		
82	130	30	AEC1	DCW	*	U S ATOMIC ENERGY COMM. I.D.O.			2322		
82	140	13	AEC3	DCW	*		P.O. BOX 2108		2335		
82	150	30	AJG1	DCW	*	AEROJET-GENERAL NUCLEONICS			2365		
82	160	3	SUBS	DCW	*			SUB	2368		
82	170	1	ONE	DCW	*			1	2369		
82	180	30	ACDR1	DCW	*				2399		
82	190	13	ADDR3	DCW	*				2412		
82	200	1	CTRD	DCW	*				2413		
83	010				*IF WD MK SUBLINE W/NOT PRINT - FOR RUN-IN						
83	020	3	CTRE	DCW	*				2416		
83	030	3	ZERO	DCW	*			000	2419		
83	040	30	BLANKS	DCW	*				2449		
83	050	30	AREA	DCW	*				2479		
83	060	10	EDIT1	DCW	*		\$0.		2489		
83	070	6	TOTAL\$	DCW	*				2495		
83	080	4	TLSUBS	DCW	*				2499		
83	090	6	LIMIT	DCW	*			150000	2505		
83	100	6	CTRF	DCW	*				2511		
83	110	12	MESS1	DCW	*		VOLUME ERROR		2523		
83	120	22	MESS2	DCW	*		TOTAL SUBS THIS ORDER-		2545		
83	130	22	MESS3	DCW	*		TOTAL SUBS THIS TITLE-		2567		
83	140	11	MESS4	DCW	*		EST. PRICE-		2578		
83	150	32		DCW	*	ALL INVOICES MUST SHOW PURCHASE			2610		
83	160	16	MESS5	DC	*		ORDER NUMBER AED		2626		
83	170	32		DCW	*	BILL AGAINST ONLY ONE PURCHASE O			2658		
83	180	16	MESS6	DC	*		RDER PER INVOICE		2674		
83	190	4	SUBTL	DCW	*				2678		
83	200	16	EDIT2	DCW	*		-6 +TO+ -6		2694		
84	010	1	CTRX	DC	*				2695		
84	020				*WM IF BRANCH TO NUPG FROM TEST						
84	030	1	CTRY	DC	*				2696		
84	040				*WM IF BRANCH TO NUPG FROM PR2A						
84	050	1	CTRZ	DC	*				2697		
84	060				*TO SET FIRST PAGE AND SET WM AFTER PRINTED						
84	070	7	MESS8	DCW	*		VENDOR-		2704		
84	080	11	MESS9	DCW	*		TITLE CODE-		2715		
84	090	1	DASH	DCW	*				2716		
84	100			END	ST						

/ 333 080

391 CARDS

APPENDIX G. CIRCN POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A0740281027800102708026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
1	120				* IF SWITCH B IS ON HEADER MESSAGES WILL NOT BE					
1	130				*PRINTED.					
1	140				* IF SWITCH D IS ON ONLY LAB CHARGE ITEMS WILL					
1	150				*BE LISTED.					
1	160				* IF SWITCH E IS ON LAB CHARGE BOOKS WILL NOT BE					
1	170				*LISTED.					
1	180				*					
1	010			CTL	33					
1	020				*INVENTORY AND CIRCULATION LISTING. NRTS					
1	030				* TECHNICAL LIBRARY. AUGUST, 1962.					
1	040				* PROGRAMMED BY HILLIS L. GRIFFIN.					
1	050				*					
1	060				* THIS PROGRAM PRINTS A LIST OF ALL ITEMS IN THE					
1	070				*CIRCULATION FILE. IF SWITCH C IS ON CPP CARDS					
1	080				*WILL BE SELECTED TO STACKER 1. FILING ERRORS					
1	090				*ARE SELECTED TO STACKER 2. LOAD CARD MUST PRE-					
1	100				*CEED DATA. DATE IS PUNCHED IN COLUMNS 1-8 AS					
1	110				*FOLLOWS - 01/12/63					
2	010	4	ST	SW	0001			0333	, 001	READ DATE
2	020	1		R				0337	1	
2	030	7		MCW	0008	DATE1		0338	M 008 T43	LOAD DATE
2	040	5	START	B	HALT		A	0345	B /53 A	
2	050	1		R				0350	1	
2	060	5		B	CPPIN		C	0351	B 364 C	
2	070	8		BWZ	0077	CPPOUT	B	0356	V 077 /48 B	STACK CPP CARDS
2	080	8	CPPIN	BWZ	TLRCD	0080	2	0364	V 411 080 2	
2	090				*HEADER CARD SETUP FOLLOWS.					
2	100	7		SW	0039	0077		0372	, 039 077	
2	110	7		MCW	0070	NAME		0379	M 070 T75	LOAD NAME
2	120	4		SW	CTRA			0386	, T76	HEADING CONTROL
2	130	7		MCW	ONE	PAGE		0390	M T78 V42	
2	140	7		MN	0080	COMP1		0397	D 080 T82	LOAD NAME COMP
2	150	1		MN				0404	D	
2	160	1		MN				0405	D	
2	170	1		MN				0406	D	
2	180	4		B	START			0407	B 345	
2	185	5	TLRCD	B	LABOOK		D	0411	B /16 D	
2	186	5		B	NOLAB		E	0416	B /32 E	
2	190	7	TLRCD1	SW	0011	0017		0421	, 011 017	
2	200	7		SW	0019	0021		0428	, 019 021	
2	210	4		SW	0071			0435	, 071	
2	220	7		MN	0080	COMP2		0439	D 080 T86	
2	230	1		MN				0446	D	
2	240	1		MN				0447	D	
2	250	1		MN				0448	D	
2	260	7		C	COMP1	COMP2		0449	C T82 T86	
2	270	5		B	ERROR		/	0456	B /11 /	
3	010	7		MZ	0020	0099		0461	Y 020 099	
3	020	1		MZ				0468	Y	
3	030	1		MZ				0469	Y	
3	040	1		MZ				0470	Y	
3	042	7		MCW	BLANKS	CALLNO		0471	M V40 V36	
3	045	5		B	AUTH		D	0478	B 546 D	
3	050	8		B	YR1	0020		0483	B 517 020	
3	060	7		MN	0020	CTRB		0491	D 020 V53	
3	061	1		MN				0498	D	
3	062	7		MCS	CTRB	COPY		0499	Z V53 T88	
3	070	7		MCW	BLANKS- 2	YEAR		0506	M V38 U48	
3	071	4		B	YR			0513	B 524	
3	078	7	YR1	MCW	BLANKS- 2	COPY		0517	M V38 T88	
3	080	8	YR	B	AUTH	0018		0524	B 546 018	B IF NO YEAR
3	090	7		MCW	0018	YEAR		0532	M 018 U48	
3	100	7		MCW	YEAR	CALLNO		0539	M U48 V36	
3	110	7	AUTH	MCW	0038	AUTHOR		0546	M 038 U06	
3	120	7		MCW	0070	TITLE		0553	M 070 U38	
3	130	7		MCW	0076	DATE2		0560	M 076 U44	
3	133	5		B	LC		D	0567	B 637 D	
3	140				*BEGIN CHECK FOR CATEGORY.					
3	150	8		B	LAB	0001	Z	0572	B 609 001 Z	
3	160	4	BGOK	SW	0011			0580	, 011	
3	170	7		MCW	0010	CALLNO- 12		0584	M 010 V24	CALL NO. IN

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	CIRCN
3	180	7		MCW	0016	CALLNO- 5		0591	M 016 V31	CUTTER NO. IN	
3	190	7		A	ONEA	BKCTR		0598	A V67 V71		
3	200	4		B	TEST			0605	B 687		
4	010	8	LAB	B	LC	0002	L	0609	B 637 002 L		
4	020	8		B	JNL	0002	J	0617	B 655 002 J		
4	030	8		B	UNCT	0002	A	0625	B 673 002 A		
4	040	4		B	BOOK			0633	B 580		
4	050	7	LC	MCW	LBCHG	CALLNO		0637	M U70 V36	LAB CHG ITEM	
4	060	7		A	ONEA	LBCTR		0644	A V67 V79		
4	070	4		B	TEST			0651	B 687		
4	080	7	JNL	MCW	JOURN	CALLNO		0655	M U92 V36	JOURNAL	
4	090	7		A	ONEA	JCTR		0662	A V67 V75		
4	100	4		B	TEST			0669	B 687		
4	110	7	UNCT	MCW	UNCAT	CALLNO		0673	M V14 V36		
4	120	7		A	ONEA	ZACTR		0680	A V67 V83		
4	130	8	TEST	BWZ	PRINT4	CTRA	1	0687	V 799 T76 1		
5	050	7	PRINT2	MCW	CALUND	0222		0695	M V36 222	ENTRY PRINT STUP	
5	059	4		SW	COPY - 1			0702	, T87		
5	060	7		MCW	COPY	0228		0706	M T88 228		
5	070	7		MCW	AUTHOR	0249		0713	M U06 249		
5	080	7		MCW	TITLE	0284		0720	M U38 284		
5	090	7		LCA	EDIT1	0295		0727	L V51 295		
5	100	7		MCE	DATE2	0295		0734	E U44 295		
5	110	8		BWZ	CHEM	0077	B	0741	V 760 077 B		
5	120	7		MCW	MAIN	0304		0749	M V60 304		
5	130	4		B	ABLE			0756	B 767		
5	140	7	CHEM	MCW	ICPP	0304		0760	M V63 304		
5	150	1	ABLE	W				0767	2		
5	160	4		CS	0310			0768	/ 310		
5	170	1		CS				0772	/		
5	180	2		CC			J	0773	F J		
5	190	5		B	PRINT3		'	0775	B 784 '		
5	200	4		B	START			0780	B 345		
6	010	4	PRINT3	SW	CTRA			0784	, T76		
6	020	7		A	ONE	PAGE		0788	A T78 V42		
6	030	4		B	START			0795	B 345		
6	040	7	PRINT4	C	PAGE	ONE		0799	C V42 T78		
6	042	5		B	PRINT1		/	0806	B 970 /		
6	046	2	PR4B	CC			K	0811	F K		
6	048	8		BWZ	JLSUM	BKCTR	K	0813	V 849 V71 K		
6	050	7		MCW	MESS4	0212		0821	M Z48 212		
6	060	7		MCS	BKCTR	0212		0828	Z V71 212		
6	160	7		A	BKCTR	BKCTR1		0835	A V71 V91		
6	170	7		MCW	MINUS	BKCTR		0842	M V57 V71		
6	068	8	JLSUM	BWZ	ZASUM	JCTR	K	0849	V 885 V75 K		
6	070	7		MCW	MESS5	0230		0857	M Z61 230		
6	080	7		MCS	JCTR	0230		0864	Z V75 230		
6	180	7		A	JCTR	JCTR1		0871	A V75 V95		
6	190	7		MCW	MINUS	JCTR		0878	M V57 V75		
6	088	8	ZASUM	BWZ	LBSUM	ZACTR	K	0885	V 921 V83 K		
6	090	7		MCW	MESS6	0251		0893	M Z77 251		
6	100	7		MCS	ZACTR	0251		0900	Z V83 251		
7	010	7		A	ZACTR	ZACTR1		0907	A V83 W03		
7	020	7		MCW	MINUS	ZACTR		0914	M V57 V83		
6	105	8	LBSUM	BWZ	PR4A	LBCTR	K	0921	V 957 V79 K		
6	110	7		MCW	MESS7	0271		0929	M Z92 271		
6	120	7		MCS	LBCTR	0271		0936	Z V79 271		
7	030	7		A	LBCTR	LBCTR1		0943	A V79 V99		
7	040	7		MCW	MINUS	LBCTR		0950	M V57 V79		
6	140	1	PR4A	W				0957	2		
6	150	4		CS	0271			0958	/ 271		
7	045	8		BWZ	HALT2	CTRC	1	0962	V /61 -74 1		
8	040	4	PRINT1	CW	CTRA			0970	) T76		
8	050	2		CC			1	0974	F 1		
8	060	7		MCW	NAME	0284		0976	M T75 284		
8	070	7		MCW	DATE1	0295		0983	M T43 295		
8	075	7		MCW	COMP1	0209		0990	M T82 209		
8	076	7		MCW	MESSA	0305		0997	M -66 305		
8	080	7		MCS	PAGE	0309		1004	Z V42 309		
8	081	4		SW	PAGE - 1			1011	, V41		
8	090	7		C	PAGE	ONE		1015	C V42 T78		
8	100	5		B	WRITE		/	1022	B +34 /		
8	110	7		A	ONE	NAMES		1027	A T78 -59		
8	120	1	WRITE	W				1034	2		
8	130	4		CS	0309			1035	/ 309		
8	131	1		CS				1039	/		
8	134	7		MCW	MESSB	0305		1040	M -73 305		
8	137	2		CC			B	1047	F B		
8	140	1		W				1049	2		
8	143	4		CS	0305			1050	/ 305		
8	146	1		CS				1054	/		
8	148	5		B	NOMESS		B	1055	B /05 B		
8	150	7		MCW	MESS1	0310		1060	M X18 310		
8	160	1		W				1067	2		
8	170	4		CS	0310			1068	/ 310		
8	180	1		CS				1072	/		

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	CIRCN
8	190	7		MCW	MESS2	0310		1073	M Y28	310	
8	200	1		W				1080	2		
9	010	4		CS	0310			1081	/	310	
9	011	1		CS				1085	/		
9	020	7		MCW	MESS3	0310		1086	M Z38	310	
9	030	2		CC			C	1093	F C		
9	040	1		W				1095	2		
9	050	4		CS	0310			1096	/	310	
9	055	1		CS				1100	/		
9	060	4		B	PRINT2			1101	B 695		
9	062	2	NOMESS	CC			3	1105	F 3		
9	063	4		B	PRINT2			1107	B 695		
9	070	5	ERROR	SS	START		2	1111	K 345	2	
9	071	7	LABOOK	C	0002	LBCOMP		1116	C 002	-76	
9	072	5		B	START		/	1123	B 345	/	
9	073	4		B	TLRCD1			1128	B 421		
9	075	7	NOLAB	C	0002	LBCOMP		1132	C 002	-76	
9	076	5		B	TLRCD1		/	1139	B 421	/	
9	077	4		B	START			1144	B 345		
9	080	5	CPPOUT	SS	CPPIN		1	1148	K 364	1	
9	081	4	HALT	SW	CTRC			1153	, -74		
9	083	4		B	PR48			1157	B 811		
9	090	2	HALT2	CC			1	1161	F 1		
9	100	7		MCW	DATE1	0295		1163	M T43	295	
9	110	2		CC			B	1170	F B		
9	120	1		W				1172	2		
9	130	4		CS	0295			1173	/	295	
9	140	7		MCW	MESS8	0278		1177	M -17	278	
9	150	2		CC			C	1184	F C		
9	160	1		W				1186	2		
9	170	4		CS	0278			1187	/	278	
9	180	7		MCW	MESS4	0212		1191	M Z48	212	
9	190	7		MCS	BKCTR1	0212		1198	Z V91	212	
10	010	7		MCW	MESS5	0230		1205	M Z61	230	
10	020	7		MCS	JCTR1	0230		1212	Z V95	230	
10	030	7		MCW	MESS6	0251		1219	M Z77	251	
10	040	7		MCS	ZACTR1	0251		1226	Z W03	251	
10	050	7		MCW	MESS7	0271		1233	M Z92	271	
10	060	7		MCS	LBCTR1	0271		1240	Z V99	271	
10	070	7		A	BKCTR1	TOTAL		1247	A V91	W08	
10	080	7		A	JCTR1	TOTAL		1254	A V95	W08	
10	090	7		A	ZACTR1	TOTAL		1261	A W03	W08	
10	100	7		MCW	MESS9	0295		1268	M -31	295	
10	110	7		MCS	TOTAL	0300		1275	Z W08	300	
10	111	4		SW	TOTAL - 4			1282	, W04		
10	120	2		CC			S	1286	F S		
10	130	1		W				1288	2		
10	140	4		CS	0310			1289	/	310	
10	141	1		CS				1293	/		
10	145	4		SW	LBCTR1- 3			1294	, V96		
10	150	7		A	LBCTR1	TOTAL		1298	A V99	W08	
10	160	7		MCW	MESS10	0282		1305	M -43	282	
10	170	7		MCS	TOTAL	0287		1312	Z W08	287	
10	171	7		MCW	MESS11	0220		1319	M -55	220	
10	172	7		MCS	NAMES	0224		1326	Z -59	224	
10	180	1		W				1333	2		
10	190	1		CS				1334	/		
10	200	1		H				1335	.		
81	010	8	DATE1	DCW	*			1343			
81	020	32	NAME	DCW	*			1375			
81	030	1	CTRA	DC	*			1376			
81	040	2	ONE	DCW	*		01	1378			
81	060	4	COMP1	DCW	*			1382			
81	065	4	COMP2	DCW	*			1386			
81	070	2	CCPY	DCW	*			1388			
81	080	18	AUTHOR	DCW	*			1406			
81	090	32	TITLE	DCW	*			1438			
81	100	6	DATE2	DCW	*			1444			
81	110	4	YEAR	DCW	*		19	1448			
81	130	22	LBCHG	DCW	*			1470			
81	150	22	JOURN	DCW	*			1492			
81	170	22	UNCAT	DCW	*			1514			
81	180	22	CALLNO	DCW	*			1536			
81	190	4	BLANKS	DCW	*			1540			
81	050	2	PAGE	DCW	*			1542			
81	200	9	EDIT1	DCW	*		/ /	1551			
81	210	2	CTRB	DCW	*			1553			
81	220	4	MINUS	DCW	*		000-	1557			
82	010	3	MAIN	DCW	*		MTR	1560			
82	020	3	ICPP	DCW	*		CPP	1563			
82	030	4	ONEA	DCW	*		0001	1567			
82	040	4	BKCTR	DCW	*		000-	1571			
82	050	4	JCTR	DCW	*		000-	1575			
82	060	4	LBCTR	DCW	*		000-	1579			
82	070	4	ZACTR	DCW	*		000-	1583			
82	080	4	NAMCTR	DCW	*			1587			

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	CIRCN
82	090	4	BKCTR1	DCW	*			1591			
82	100	4	JCTR1	DCW	*			1595			
82	110	4	LBCTR1	DCW	*			1599			
82	120	4	ZACTR1	DCW	*			1603			
82	130	5	TOTAL	DCW	*			1608			
82	140	32		DCW	*	YOUR POSSESSION OF THE FOLLOWIN		1640			
82	150	32		DC	*	G LIBRARY AND LAB CHARGE MATERIA		1672			
82	160	32		DC	*	LS SHOWN BELOW MUST BE VERIFIED		1704			
82	170	14	MESS1	DC	*	AND THE LIST		1718			
82	180	32		DCW	*	SIGNED AND RETURNED PROMPTLY TO		1750			
82	190	32		DC	*	THE TECHNICAL LIBRARY. ANY QUES		1782			
82	200	32		DC	*	TIONS WHICH YOU MAY HAVE REGARDI		1814			
82	210	14	MESS2	DC	*	NG THIS LIST		1828			
82	220	32		DCW	*	SHOULD BE DIRECTED TO THE LIBRAR		1860			
82	230	32		DC	*	Y INVENTORY CLERK, EXTN. 4314.		1892			
82	240	32		DC	*			1924			
82	250	14	MESS3	DC	*			1938			
83	010	10	MESS4	DCW	*	BOOKS-		1948			
83	020	13	MESS5	DCW	*	JOURNALS-		1961			
83	030	16	MESS6	DCW	*	UNCATALOGED-		1977			
83	040	15	MESS7	DCW	*	LAB CHARGE-		1992			
83	050	25	MESS8	DCW	*	TOTAL STATISTICS THIS RUN		2017			
83	060	14	MESS9	DCW	*	LIBRARY ITEMS-		2031			
83	070	12	MESS10	DCW	*	GRAND TOTAL-		2043			
83	080	12	MESS11	DCW	*	TOTAL NAMES-		2055			
83	090	4	NAMES	DCW	*			2059			
83	100	7	MESSA	DCW	*	ISSUING		2066			
83	110	7	MESSB	DCW	*	LIBRARY		2073			
83	120	1	CTRC	DC	*			2074			
83	130	2	LBCOMP	DCW	*		ZL	2076			
83	200			END	ST					/ 333 080	

274 CARDS

APPENDIX H. BUGLR POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2 L072116,110106,1051178101/199,027A074028)027B00102708026/0991,001/00111710
BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BUGLR
1	010			CTL	33						
1	020				* INVENTORY FOLLOW-UP LETTER. NRTS TECH LIB.						
1	030				* SW B ON WRITES NASTY LETTERS.						
1	040				*						
1	050	7	ST	SW	0001	0013		0333	, 001 013		
1	060	1		R				0340	1		
1	070	7		MCW	0012	MESS1		0341	M 012 706	DATE LOADED	
1	071	7		MCW	0012	MESSB		0348	M 012 T59		
1	072	7		MCW	0024	MESS3 - 11		0355	M 024 802		
1	073	4		CW	0013			0362	) 013		
1	078	1	START	R				0366	1		
1	080	5		B	HALT		A	0367	B 573 A		
1	090	7		SW	0039	0061		0372	, 039 061		
1	100	7		SW	0066	0077		0379	, 066 077		
1	115	7		A	ONE	NAMES		0386	A T67 T63		
1	120	2		CC			1	0393	F 1		
1	130	7		MCW	MESS1	0296		0395	M 706 296		
1	140	1		W				0402	2		
1	150	4		CS	0296			0403	/ 296		
1	160	2		CC			T	0407	F T		
1	170	7		MCW	MESS2	0214		0409	M 713 214		
1	180	1		W				0416	2		
1	190	4		CS	0214			0417	/ 214		
1	200	7		MCW	TO	0203		0421	M 716 203		
1	210	7		MN	0080	0250		0428	D 080 250		
1	220	7		MN	0079	0249		0435	D 079 249		
1	230	7		MN	0078	0248		0442	D 078 248		
1	240	7		MN	0077	0247		0449	D 077 247		
2	010	7		MCW	0060	0229		0456	M 060 229		
2	020	1		W				0463	2		
2	030	4		CS	0260			0464	/ 260		
2	040	2		CC			B	0468	F B		
2	050	7		MCW	0076	0218		0470	M 076 218		
2	060	7		MCW	0063	0223		0477	M 063 223		
2	070	1		W				0484	2		
2	080	4		CS	0223			0485	/ 223		
2	090	7		MCW	MESS3	0297		0489	M 813 297		
2	100	1		W				0496	2		
2	110	4		CS	0297			0497	/ 297		
2	120	7		MCW	MESS4	0296		0501	M 909 296		
2	130	1		W				0508	2		
2	140	4		CS	0296			0509	/ 296		
2	150	7		MCW	MESS5	0296		0513	M #05 296		
2	125	2		CC			S	0520	F S		
2	160	1		W				0522	2		
2	170	4		CS	0296			0523	/ 296		
2	180	5		B	TOUGH		B	0527	B 548 B		
2	190	7		MCW	MESS6	0296		0532	M /01 296		
2	200	1		W				0539	2		
3	010	4		CS	0296			0540	/ 296		
3	020	4		B	START			0544	B 366		
3	030	7	TOUGH	MCW	MESS7	0297		0548	M /98 297		
3	040	1		W				0555	2		
3	050	4		CS	0297			0556	/ 297		
3	060	7		MCW	MESS8	0296		0560	M 594 296		
3	070	1		W				0567	2		
3	080	1		CS				0568	/		
3	090	4		B	START			0569	B 366		
3	100	2	HALT	CC			1	0573	F 1		
3	110	7		MCW	MESSB	0250		0575	M T59 250		
3	120	2		CC			T	0582	F T		
3	130	1		W				0584	2		
3	140	4		CS	0250			0585	/ 250		
3	150	7		MCW	MESSA	0240		0589	M T15 240		
3	160	7		MCS	NAMES	0244		0596	Z T63 244		
3	170	1		W				0603	2		
3	180	4		CS	0244			0604	/ 244		
3	190	2		CC			1	0608	F 1		
3	200	1		H				0610	.		
81	020	32		DCW	*	FROM- NRTS TECHNICAL LIBRARY		0642			
81	030	32		DC	*			0674			

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	BUGLR
81	040	32	MESS1	DC	*			0706			
81	050	7	MESS2	DCW	*		MTR-625	0713			
81	060	3	TO	DCW	*		TO-	0716			
81	070	32		DCW	*	THE INVENTORY LISTING OF LIB		0748			
81	080	32		DC	*	RARY AND LAB CHARGE ITEMS SENT T		0780			
81	090	32		DC	*	O YOU ON	HAS NOT YE	0812			
81	091	1	MESS3	DC	*		T	0813			
81	100	32		DCW	*	BEEN RETURNED TO THE TECHNICAL L		0845			
81	110	32		DC	*	IBRARY WITH YOUR VERIFICATION.		0877			
81	120	32	MESS4	DC	*	PLEASE VERIFY YOUR POSSESSION OF		0909			
81	130	32		DCW	*	THE MATERIAL SHOWN ON THE LISTIN		0941			
81	140	32		DC	*	G AND RETURN THE LIST, SIGNED, W		0973			
81	150	32	MESS5	DC	*	ITHOUT DELAY.		1005			
81	160	32		DCW	*	YOUR PROMPT ATTENTION TO THI		1037			
81	170	32		DC	*	S MATTER WILL BE GREATLY APPRECI		1069			
81	180	32	MESS6	DC	*	ATED.		1101			
82	010	32		DCW	*	CONTINUED FAILURE TO COMPLY		1133			
82	020	32		DC	*	WITH THIS REQUIREMENT MAY RESULT		1165			
82	030	32		DC	*	IN A REQUEST TO YOUR BRANCH HEA		1197			
82	031	1	MESS7	DC	*		D	1198			
82	040	32		DCW	*	FOR YOUR IMMEDIATE COMPLIANCE.		1230			
82	050	32		DC	*			1262			
82	060	32	MESS8	DC	*			1294			
82	070	21	MESSA	DCW	*	TOTAL NAMES NOTIFIED-		1315			
82	080	32		DCW	*	INVENTORY NOTIFICATION		1347			
82	090	12	MESSB	DC	*			1359			
82	100	4	NAMES	DCW	*			1363			
82	110	4	ONE	DCW	*		0001	1367			
82	200			END	ST						

/ 333 080

100 CARDS

APPENDIX I. JBACK POST LIST

CLEAR STORAGE 1 ,008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A074028)02780010270B026/0991,001/00111710
 BOOTSTRAP CARD ,008015,022029,056063/056029 ,0240671056

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	JBACK
1	010			CTL	33						
	010				*JOURNAL RECALL PROGRAM. NRTS TECHNICAL						
	020				*LIBRARY. MAY, 1962						
	030				*PROGRAMMED BY HILLIS L. GRIFFIN.						
	040				* THIS PROGRAM, USED IN CONJUNCTION WITH THE						
	050				*IBM 1401 DATA PROCESSING SYSTEM, SCANS THE						
	060				*COMPLETE CIRCULATION FILE AND PRINTS A LIST OF						
	070				*ALL JOURNALS IN THE FILE, TOGETHER WITH THE						
	080				*NAME OF THE BRANCH FROM WHICH THEY HAVE BEEN						
	090				*BORROWED. CARDS FOR MATERIAL BORROWED FROM						
	100				*BRANCH COLLECTIONS ARE SEPARATED FOR HANDLING						
	110				*AT THE NEXT TIME THE FILE IS PREPARED FOR						
	120				*FOR PROCESSING. ERRORS IN FILING ARE DETECTED						
	130				*AND EJECTED WITHOUT BEING PRINTED. STATISTICS						
	140				*INDICATING THE NUMBER OF PERSONS NOTIFIED AND						
	150				*THE NUMBER OF JOURNALS LISTED ARE PRINTED OUT						
	160				*UPON COMPLETION OF THE RUN.						
	170				*						
1	020	4	ST	SW	0001			0333	,	001	
1	030	1		R				0337	1		
1	040	7		LCA	0008	DATE1		0338	L	008 859	
1	050	5	GO	B	HALT		A	0345	B	807 A	
1	060	1		R				0350	1		
1	061	8		BWZ	STACK	0077	B	0351	V	363 077 B STACK CPP CARDS	
1	062	4		B	OBOE			0359	B	365	
1	163	2	STACK	SS			1	0363	K	1	
1	070	8	OBOE	BWZ	CHK	0080	2	0365	V	419 080 2	
1	080	7		SW	0039	0077		0373	,	039 077	
1	090	7		LCA	0070	NAME		0380	L	070 893	
1	091	7		LCA	PLUS	CTRA		0387	L	/36 861	
1	092	7		MCW	ONE	PAGE		0394	M	/34 /32	
1	110	7		MN	0080	COMP1		0401	D	080 /26	
1	101	7		MCW	0079	COMP1 - 1		0408	M	079 /25	
1	120	4		B	GO			0415	B	345	
1	130	8	CHK	BWZ	JNL	0019	B	0419	V	436 019 B	
1	131	5		B	SEQCHK		G	0427	B	776 G	
1	140	4		B	GO			0432	B	345	
1	150	7	JNL	SW	0019	0021		0436	,	019 021	
1	160	7		SW	0039	0071		0443	,	039 071	
1	170	7		SW	0077	0017		0450	,	077 017	
1	180	7		MN	0020	COPY		0457	D	020 #84	
1	190	7		MN	0019	COPY - 1		0464	D	019 #83	
2	010	7		LCA	0070	VOL		0471	L	070 /16	
2	020	7		LCA	0076	DATE2		0478	L	076 /22	
2	030	7		MN	0080	COMP2		0485	D	080 /30	
2	040	7		MN	0079	COMP2 - 1		0492	D	079 /29	
2	050	7		MN	0078	COMP2 - 2		0499	D	078 /28	
2	151	7		MZ	0081	0288		0506	Y	081 288	
2	060	7		MN	0077	COMP2 - 3		0513	D	077 /27	
2	061	7		MCW	0038	TITLE		0520	M	038 #82	
2	070	7		C	COMP1	COMP2		0527	C	/26 /30	
2	080	5		B	ERROR		/	0534	B	802 /	
2	090	8		BWZ	PRINT1	CTRA - 1	B	0539	V	664 860 B	
2	100	7	PRINT2	LCA	JOUR	0207		0547	L	900 207	
2	110	7		LCA	COPY	0228		0554	L	#84 228	
2	120	7		LCA	TITLE	0249		0561	L	#82 249	
2	130	7		LCA	VOL	0284		0568	L	/16 284	
2	140	7		LCA	EDIT1	0295		0575	L	910 295	
2	150	7		MCE	DATE2	0295		0582	E	/22 295	
2	160	7		LCA	COMP2	0304		0589	L	/30 304	
2	170	8		BWZ	CHEM	0077	B	0596	V	615 077 B	
2	180	7		LCA	MTR	0215		0604	L	/41 215	
2	190	4		B	ABLE			0611	B	622	
3	010	7	CHEM	LCA	CPP	0215		0615	L	/46 215	
3	020	1	ABLE	W				0622	2		
3	026	7		A	ONEA	CARDS		0623	A	/54 /58	
3	030	4		CS	0304			0630	/	304	
3	040	1		CS				0634	/		
3	050	2		CC			K	0635	F	K	
3	060	5		B	PRINT3		'	0637	B	646 '	
3	070	4		B	GO			0642	B	345	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS	JBACK
3	080	7	PRINT3	MCH	PLUS	CTRA		0646	M	/36 861	
3	081	7		A	ONE	PAGE		0653	A	/34 /32	
3	090	4		B	GO			0660	B	345	
3	100	4	PRINT1	ZS	CTRA			0664	-	861	
3	110	2		CC			1	0668	F	1	
3	120	7		LCA	NAME	0284		0670	L	893 284	
3	130	7		LCA	DATE1	0295		0677	L	859 295	
3	140	7		LCA	PAGE	0309		0684	L	/32 309	
3	142	7		C	PAGE	ONE		0691	C	/32 /34	
3	144	5		B	WRITE		/	0698	B	710 /	
3	146	7		A	ONEA	NAMES		0703	A	/54 /50	
3	150	1	WRITE	W				0710	2		
3	160	4		CS	0309			0711	/	309	
3	170	1		CS				0715	/		
3	180	2		CC			2	0716	F	2	
3	190	7		LCA	LINEA	0247		0718	L	942 247	
3	200	7		LCA	LINEB	0279		0725	L	974 279	
4	010	7		LCA	LINEC	0291		0732	L	986 291	
4	020	1		W				0739	2		
4	030	4		CS	0291			0740	/	291	
4	050	7		LCA	LINED	0247		0744	L	*18 247	
4	060	7		LCA	LINEE	0279		0751	L	*50 279	
4	070	7		LCA	LINEF	0294		0758	L	*64 294	
4	080	1		W				0765	2		
4	090	4		CS	0292			0766	/	292	
4	100	2		CC			L	0770	F	L	
4	110	4		B	PRINT2			0772	B	547	
4	111	7	SEQCHK	MN	0080	CKSEQ		0776	D	080 514	
4	112	1		MN				0783	D		
4	113	1		MN				0784	D		
4	114	1		MN				0785	D		
4	115	7		C	COMPL	CKSEQ		0786	C	/26 514	
4	116	5		B	ERROR		/	0793	B	802 /	
4	117	4		B	GO			0798	B	345	
4	120	5	ERROR	SS	GO		2	0802	K	345 2	
5	010	2	HALT	CC			2	0807	F	2	
5	020	7		LCA	LINEG	0226		0809	L	/83 226	
5	030	7		MCS	NAMES	0226		0816	Z	/50 226	
5	040	2		CC			S	0823	F	S	
5	050	1		W				0825	2		
5	060	4		CS	0226			0826	/	226	
5	070	7		LCA	LINEH	0228		0830	L	*10 228	
5	080	7		MCS	CARDS	0228		0837	Z	/58 228	
5	090	2		CC			A	0844	F	A	
5	100	1		W				0846	2		
5	110	4		CS	0228			0847	/	228	
5	120	1		H				0851	.		
91	010	8	DATE1	DCW	*			0859			
91	020	2	CTRA	DCW	*			0861			
91	030	32	NAME	DCW	*			0893			
91	040	7	JCUR	DCW	*		JOURNAL	0900			
91	050	2	YEAR	DCW	*		19	0902			
91	060	8	EDIT1	DCW	*		/ /	0910			
91	080	32	LINEA	DCW	*		JOURNALS ARE LOANED FOR 3 DAY	0942			
91	090	32	LINEB	DCW	*		S -REF AIB 1.60, SEC. 6.11B-. P	0974			
91	100	12	LINEC	DCW	*		LEASE RETURN	0986			
91	110	32	LINED	DCW	*		THEM PROMPTLY TO AVOID LOSS AND	1018			
91	120	32	LINEE	DCW	*		TO MAKE THEM AVAILABLE TO OTHERS	1050			
91	130	14	LINEF	DCW	*		WITHOUT DELAY.	1064			
91	140	18	TITLE	DCW	*			1082			
91	150	2	COPY	DCW	*			1084			
91	160	32	VCL	DCW	*			1116			
91	170	6	DATE2	DCW	*			1122			
91	180	4	COMPL	DCW	*			1126			
91	190	4	CCMP2	DCW	*			1130			
91	200	2	PAGE	DCW	*			1132			
91	210	2	ONE	DCW	*		01	1134			
91	220	2	PLUS	DCW	*		+0	1136			
91	230	5	MTR	DCW	*		-MTR-	1141			
91	240	5	CPP	DCW	*		-CPP-	1146			
91	244	4	NAMES	DCW	*			1150			
91	248	4	ONEA	DCW	*		0001	1154			
91	252	4	CARDS	DCW	*			1158			
91	256	25	LINEG	DCW	*		TOTAL NAMES NOTIFIED-	1183			
91	258	27	LINEH	DCW	*		TOTAL JOURNALS OVERDUE-	1210			
91	259	4	CKSEQ	DCW	*			1214			
91	260			END	ST						

148 CARDS

/ 333 080

APPENDIX J. SAMPLE OF MONTHLY BOOK LIST

87.	U.S. FEDERAL POWER COMMISSION	STEAM-ELECTRIC PLANT CONSTRUCTION COST AND ANNUAL PRODUCTION EXPENSES, FOURTEENTH ANNUAL SUPPLEMENT, 1961. 1963 HD9685.U4A65.1961 MTR	109.	BRADLEY, WENDELL F.	NUCLEAR SPECTROMETER APPLICATIONS. 1962 QCD945.B81 MTR
88.	WORLD POWER CONFERENCE	STATISTICAL YEAR-BOOK OF THE WORLD POWER CONFERENCE, NO.9. 1960 HC80.W93 MTR	110.	FREUND, GEORGE A.	MATERIALS FOR CONTROL ROD DRIVE MECHANISMS. 1963 QCD1351.F88 MTR
89.	WORLD POWER CONFERENCE	SURVEY OF ENERGY RESOURCES, 1962. 1962 HC80.W935 MTR	111.	HARRER, J. M.	NUCLEAR REACTOR CONTROL ENGINEERING. 1963 QCD1551.H29 MTR
MATHEMATICS - MECHANICS - COMPUTATION			REF.	HOGERTON, JOHN F.	ATOMIC ENERGY DESKBOOK. 1963 QC772.H64 REF MTR
90.	ARSCOTT, F. M.	TABLES OF LAME POLYNOMIALS. 1963 QA372.A78 MTR	112.	INTERNATIONAL ATOMIC ENERGY AGENCY	RADIOISOTOPE THERAPY EQUIPMENT. 1959 QCD2483.161R MTR
91.	BELOUSOV, SOLOMON L.	TABLES OF NORMALIZED ASSOCIATED LEGENDRE POLYNOMIALS. 1962 QA4C6.B45 MTR	113.	LAURITSEN, THOMAS	ENERGY-LEVELS OF LIGHT NUCLEI - MAY 1962. 1962 QCD129.A312A MTR
92.	CLIFFORD, ARTHUR H.	ALGEBRAIC THEORY OF SEMIGROUPS. 1961 QA171.C55 MTR	114.	LINTNER, KARL	WERKSTOFFE DES REAKTORBAUES MIT BESONDERER BERUICKSICHTIGUNG DER METALLE... 1962 QCD1351.L76 MTR
93.	CONTROL ENGINEERING	MANUAL OF DIGITAL TECHNIQUES. 1959 QA76.C76 MTR	115.	NEPIRCYSKII, P. E.	NUCLEAR MODELS. 1963 QCD101.N43 MTR
94.	COX, HUGH L.	BUCKLING OF PLATES AND SHELLS. 1963 QA935.C87 MTR	116.	NESTERENKO, G. N.	APPLICATION OF ATOMIC ENGINES IN AVIATION. 1957 QCD3283.N46 MTR
95.	CROWELL, RICHARD M.	CALCULUS OF VECTOR FUNCTIONS. 1962 QA251.C953 MTR	117.	NEW YORK (STATE) OFFICE OF ATOMIC DEVELOPMENT	ATOMIC DEVELOPMENT IN THE STATE OF NEW YORK. 1960 QCD35.U53N44.1960 MTR
96.	DE BEER, EDWIN J.	PLACE OF STATISTICAL METHODS IN BIOLOGICAL AND CHEMICAL EXPERIMENTATION. 1950 QA276.D28 MTR	118.	PAGE, LINCOLN R.	CONTRIBUTIONS TO THE GEOLOGY OF URANIUM AND THORIUM... 1956 QCD2065.P9 MTR
97.	DIXON, WILFRID J.	INTRODUCTION TO STATISTICAL ANALYSIS. 2ND ED. 1957 HA29.D57.1957 MTR	119.	PLUTA, RICHARD P.	ANALYSIS OF NUCLEAR REACTOR FLUCTUATIONS BY METHODS OF STOCHASTIC PROCESSES. 1963 QCD129.P73 MTR
98.	IKENBERRY, ERNEST	QUANTUM MECHANICS FOR MATHEMATICIANS AND PHYSICISTS. 1962 QC174.1.126 MTR	120.	QUIMBY, EDITH H.	BASIC PHYSICS AND INSTRUMENTATION. 2ND ED. 1963 QCD2495.R129.1963.V.1 MTR
99.	JEFFREYS, HAROLD	THEORY OF PROBABILITY. 3RD ED. 1961 QA273.J4.1961 MTR	121.	RAY, WILLIAM E.	FABRICATION OF CONTROL RODS FOR NUCLEAR REACTORS. 1963 QCD1351.R26 MTR
100.	JONES, D. L.	ENERGY PARAMETER B FOR STRONG BLAST WAVES. 1962 QA930.J76 MTR	122.	SYMPOSIUM ON INELASTIC SCATTERING OF NEUTRONS IN SOLIDS AND LIQUIDS. CHALK RIVER, CANADA, 1962	INELASTIC SCATTERING OF NEUTRONS IN SOLIDS AND LIQUIDS. V.1,2. 1963 QCD265.S989.1962 MTR
101.	OGILVY, CHARLES S.	TOMORROW'S MATH. 1962 QA95.C34 MTR	123.	TROMP, ROBERT L.	GAS PRODUCTION AND HIGH TEMPERATURE SWELLING IN REACTOR BERYLLIUM. 1963 QCD1670.T851 MTR
102.	OLDS, CARL D.	CONTINUED FRACTIONS. 1963 QA295.O44 MTR	124.	TYBOUT, RICHARD A.	ATOMIC POWER AND ENERGY RESOURCE PLANNING. 1958 HD9540.6.T97 MTR
103.	RAMSEY, ARTHUR S.	INTRODUCTION TO THE THEORY OF NEWTONIAN ATTRACTION. 1961 QA825.R17 MTR	125.	U.S. ATOMIC ENERGY COMMISSION	CIVILIAN NUCLEAR POWER APPENDICES TO A REPORT TO THE PRESIDENT. 1962 QCD2003.UN58A MTR
104.	SAXON, JAMES A.	PROGRAMMING THE IBM 7090. 1963 QA76.8.125525 MTR	126.	U.S. ATOMIC ENERGY COMMISSION	PM-3A, ANTARCTIC REACTOR. 1961 QCD3275.U58 MTR
105.	STICHTING VOOR INTERNATIONALE SAMENWERKING DER NEDERLANDSE UNIVERSITEITEN EN HOGESCHOLEN	FUNDAMENTAL PROBLEMS IN STATISTICAL MECHANICS. 1962 QC175.S73 MTR	127.	U.S. ATOMIC ENERGY COMMISSION	U.S. STATUTES OF GENERAL INTEREST OF SECURITY OFFICERS IN THE ATOMIC ENERGY PROGRAM. 1957 QCD21.U58U MTR
106.	SYMPOSIUM ON THE NUMERICAL TREATMENT OF ORDINARY DIFFERENTIAL EQUATIONS, INTEGRAL AND INTEGRODIFFERENTIAL EQUATIONS. ROME, 1960	PROCEEDINGS. 1960 QA371.S989.1960 MTR	128.	U.S. DEPT. OF DEFENSE	TECHNICAL INFORMATION BULLETIN ON ATOMIC WEAPONS ACCIDENT HAZARDS, PRECAUTIONS AND PROCEDURES. 1963 QCD3299.U58 MTR
107.	ULAM, S. M.	COLLECTION OF MATHEMATICAL PROBLEMS. 1960 QA43.U37 MTR	PHYSICS - METALLURGY		
NUCLEAR ENERGY			PHYSICS - METALLURGY		
108.	BATT, MELVIN L.	CALCULATION OF TWO DIMENSIONAL MULTIGROUP WEIGHTING FUNCTIONS FOR THE ETRC. 1963 QCD1901.E8833 MTR	129.	CHERNOV, LEV A.	WAVE PROPAGATION IN A RANDOM MEDIUM. 1960 QC231.C521 MTR

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