June 1967

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AUTOMATION IN LIBRARIES

(FIRST ATLIS WORKSHOP)

15-17 NOVEMBER 1966

ARMY TECHNICAL LIBRARY IMPROVEMENT STUDIES (ATLIS) REPORT NO. 13

Redstone Scientific Information Center
Research and Development Directorate
U. S. Army Missile Command
Redstone Arsenal, Alabama 35809

ABSTRACT

This report contains the minutes of the first workshop on automation in libraries. The meeting was sponsored by Army Technical Library Improvement Studies (ATLIS) and was held at Redstone Arsenal, Alabama, on 15-17 November 1966.

Participants were from Redstone Scientific Information Center (RSIC), National Aeronautics and Space Administration (NASA), Defense Documentation Center (DDC), Army Electronics Command, Natick Laboratories, Library of Congress, and Information Dynamics Corporation.

The four major areas covered were:

1) General Systems
2) Current Dissemination Programs
3) Retrospective Searching
4) On-Line Applications.

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CONTENTS (Concluded)

ILLUSTRATIONS

ILLUSTRATIONS (Concluded)

INTRODUCTION

The Army Technical Library Improvements Studies Workshop on AUTOMATION IN LIBRARIES was held at the Redstone Scientific Information Center from 15 to 17 November 1966. This was the first workshop sponsored by ATLIS as part of its effort to improve the effectiveness of Army technical libraries and its purpose was to acquaint Army librarians with some of the developments in the field of automation in libraries closely related to their everyday working environments and to help them gain awareness of how automation has been applied by people who use it every day. It was planned so that participants could discuss the functions which have been automated in other libraries and information systems and the possibility of applying the same approach in their own library environments.

The workshop program was developed in four areas, each illustrated by presentations by people actually involved in these systems on a local and a national level.

The first session had to do with a general system ALPHA (Automated Literature Processing, Handling and Analysis), which was developed in one of the large Army libraries. The people talking about the system actually use the products of the automation effort and, in most instances, are preparing the input as well. It was felt that this was the best way for a librarian to learn about library automation. Following presentations relating to automation of overall library systems, a supervisor's view of the effects of automation on day-to-day library operations provided a practical assessment of the result of this sort of change in an operating environment - not visualizing a push-button library, but one aided by computers in carrying out its daily operations-and the changes from the purely traditional approach as the computer became one of its tools.

The first session also includes information on the Library of Congress MARC (Machine Readable Catalog Data) Program which will probably have great impact on the library community as a whole. Since it will become part of an overall system in one form or another, it was included in the session on general systems.

The next sessions, Current Dissemination Programs and Retrospective Searching, covered specific operating systems and since information concerning them is generally available in report form, only the presentations relating to local library applications are included in this report, with extracts and references for the remainder.

The fourth session was devoted to On-Line Applications - a look into future automation plans. Since these are not operating systems in the same sense as the others discussed, they were covered by people more familiar with the systems aspect than the library functions.

In an attempt to gain immediate benefit from the workshop and to stimulate discussion while participants were fresh from the presentations themselves, a Reactor Panel chaired by Dr. Jerrold Orne, Librarian of the University of North Carolina and composed of Dr. Laurence Heilprin of the Council on Library Resources and Mr. Charles Bourne of Programming Services, Inc., summarized their feelings regarding the implications of automated systems for Army librarians and encouraged those present to summarize their own thoughts on the same subject - not necessarily limited to current operating practices or automated systems as such. A transcription of this discussion and summarization is included in this report.

Dr. Edward B. Taylor, Engineering Extension Service, Auburn University, served as Chairman of the Workshop.

GENERAL SYSTEMS

GENERAL SYSTEMS

ALPHA in General

by

F. E. Croxton

It seems to me that an understanding of the automated system we will hear about in the first few presentations depends in part on a knowledge of the environment in which it originated. Consequently, I will take a minute or two to set the stage before I cover the basic features of the system we call ALPHA 1.

The Redstone Scientific Information Center (Figure 1) is the organization responsible for furnishing scientific and technical information service to all of the elements of the U. S. Army Missile Command and the NASA Marshall Space Flight Center which are located here in Huntsville. It also serves other Army activities located on Redstone Arsenal and employees of the Huntsville Area contractors which support the Army and NASA. Its functional policies are guided by a Joint Army-NASA Board, and its operating costs are shared. This little grey booklet is designed for our patrons and lists the services we furnish. You may find it interesting.

Although the RSIC family tree has roots in the earliest technical libraries on the Arsenal, impetus for establishment in 1962 in its current form (Figure 2) came from its scientist patrons and from a consultant's study of the available local library resources. In 1962 the three really major tasks were: establish the Translations and Research Branches, expand the literature resources of the Library, and start the Information Programs Branch studies of the applications of advanced techniques to library functions.

The Automated Literature Processing Handling and Analysis (ALPHA) System is the major result of the last task. The system was designed for increases in both service and technical sophistication. It has been applied only to library activities.

Figure 3, showing the changes in the Library Branch between 1962 and 1966, most of which were predictable, gives some idea of why ALPHA was needed from a quantitative point-of-view.

But enough for the environment. How was the ALPHA system designed?

Systems thinking was applied to the development of ALPHA. The design pattern is probably best described as an off-line, data base system which uses primarily serial processing techniques. As a result, its coverage includes the functional service, the processing, and the management aspects of the library operation. We have emphasized the latter two since they consume so much manpower. The desirability of covering these three aspects in a single system is quite apparent when the extent of overlap in the data bases is considered.

ALPHA is operated here on an IBM-7010 computer system. The data base contains three types of information (Figure 4):

1) Control of authority data
2) Basic but variable information files
3) Reference and statistical tables

The subject term "thesaurus" and the "patron register" constitute the first type, "bibliographic" and "inventory files" represent the second, and the "inverted subject file" illustrates the third. Each file can be consulted and maintained directly and, in some instances, affected indirectly.

Generally speaking, six kinds of transactions are allowed within the system: additions, deletions, changes, temporally controlled transactions, threaded transactions, and feedback transactions. These are all accepted on an intermixed basis with only subsystem sorts prior to processing (Figure 5).

1) Record additions can be made to each file except the derivative tables and statistical files, using specific transaction codes - usually Code 1.
2) Record deletions are made in much the same way as additions. These are usually referred to as "purge" actions in ALPHA and are ordinarily coded 0.
3) Record changes or revisions to existing records are far more common than additions and deletions. Such transactions, which thus form the bulk of the input, are usually represented by several different transaction codes to permit separate paths for efficient processing.
4) Temporal transactions occur in a number of instances where the passage of time automatically calls for an action. One example of this is overdue notice production in the Book Circulation Module of the Book Control Subsystem. Triggers for such temporal transactions are built into the programs themselves and do not require control cards or other human intervention.

5) Threaded transactions originate as one of the first four kinds - and really most of the ALPHA transactions are threaded - but I find it easy to look at them separately. These occur when a single input action causes several transactions to occur within the file. As an example, the addition of a record in the basic bibliographic data file threads onward to the inventory file, the reference tables, and the statistical table. It might also cause a further threaded action in the language control file.

6) Feedback transactions also originate as adds, deletes, changes, or temporal transactions. I mention these separately mainly because we have found them to be specially useful in ALPHA. Feedback transactions are those in which some step is taken to begin a future action required or implied by the present transaction. We also use them for error correction control. The first illustration of these today will be in the Patron Subsystem.

Obviously I must leave more detail regarding what transactions occur and how they are handled to the speakers who will deal with the specific subsystems. However, it is up to me, I feel, to summarize what ALPHA has let us do.

Quantitatively, it has enabled us to handle a greater workload in 1966 than in 1962, and with fewer employees. We have simultaneously been able to build and make available to our users a reference facility which is vastly larger and more useful.

Functionally, ALPHA has proceeded to the point where RSIC now has operating automation in the following activities:

1) Patron registration and control
2) Subject heading control for books
3) Subject heading for documents
4) Book ordering, receiving, and expenditure control
5) Book circulation and follow-up
6) Cataloging of books
7) Serials routing
8) Serials holdings records
9) Serials binding production control
10) Serials renewals
11) Document inventory assistance

In addition, RSIC utilizes or participates in the use of three non-ALPHA automated systems.

1) NASA retrospective search system
2) DDC retrospective search system
3) NASA SDI program

We consider all of the activities I enumerated to be successful, although some are certainly more polished than others. The schedule for the next two days calls for you to hear about nearly all of them, to receive sample outputs, and to see them in operation if you like.

But now, what of the future? Since no R&D employee worth his salt is satisfied with present systems or with the state-of-the-art in his field, we do have further plans.

We expect our system - ALPHA - to handle an even greater service load, and expect the files to grow much larger, but that is only a quantitative change.

We expect to modify our off-line approach; the input will be put on-line and so will most of the output. Many of the major printouts and the sequencing problems will be eliminated. We call this ALPHA 2. Work is underway on it and downstairs you will see some of our first applications. Mr. Cooney will cover it later in the meeting.

In the next several years we expect to include the storage, retrieval, and forwarding of documents under computer control - call this ALPHA 3 if you like - but here we must recognize that the art and the engineering is just now catching up with our needs. Perhaps in ALPHA 3 we can also store, correlate, and retrieve elemental data as well as documents, and thus furnish simple answers directly.

Thank you for being patient with me while I generalized. If you have any general questions about ALPHA 1, I will try to answer them now before we move on to the specifics of the subsystems and modules of our system.

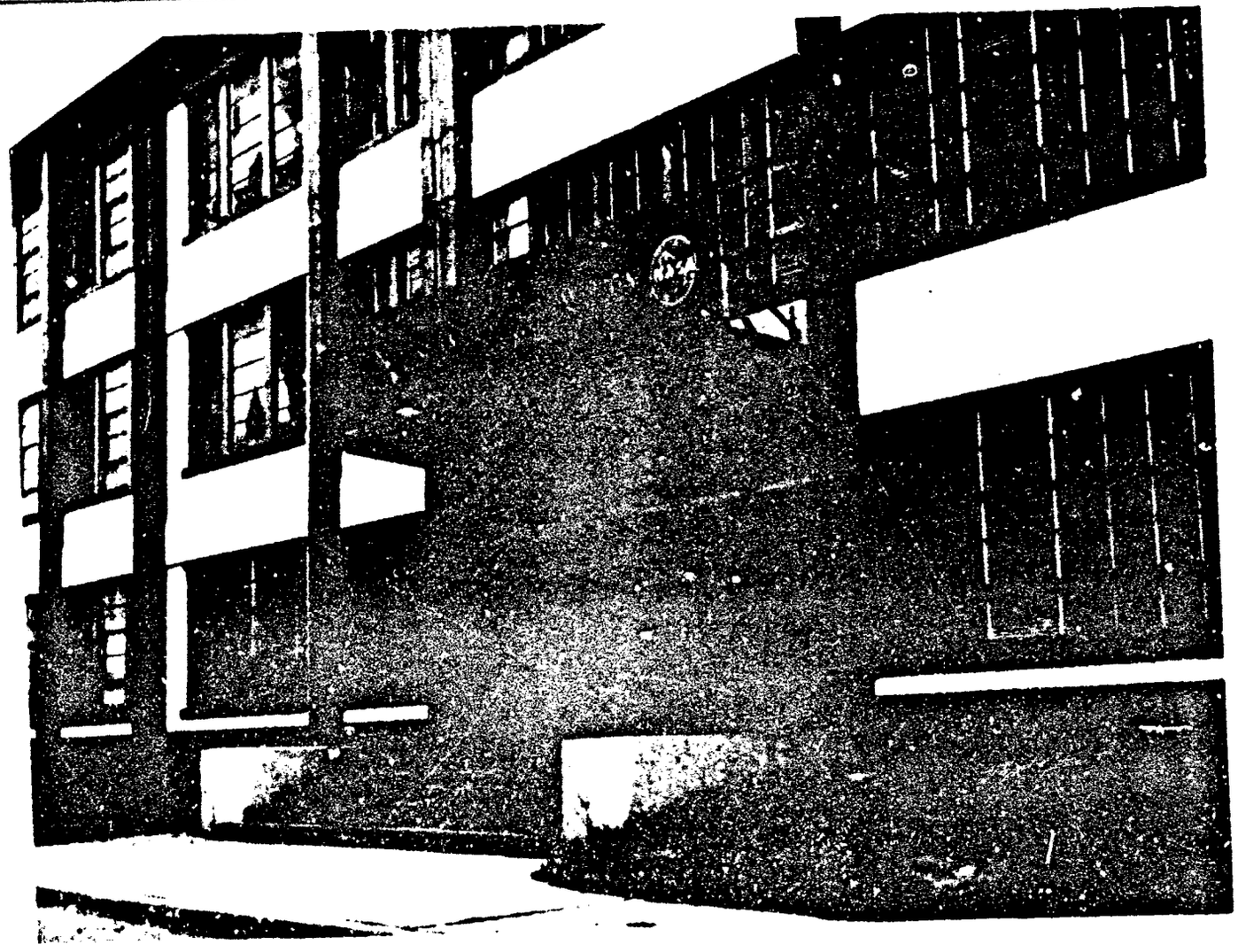


Figure 1. Redstone Scientific Information Center

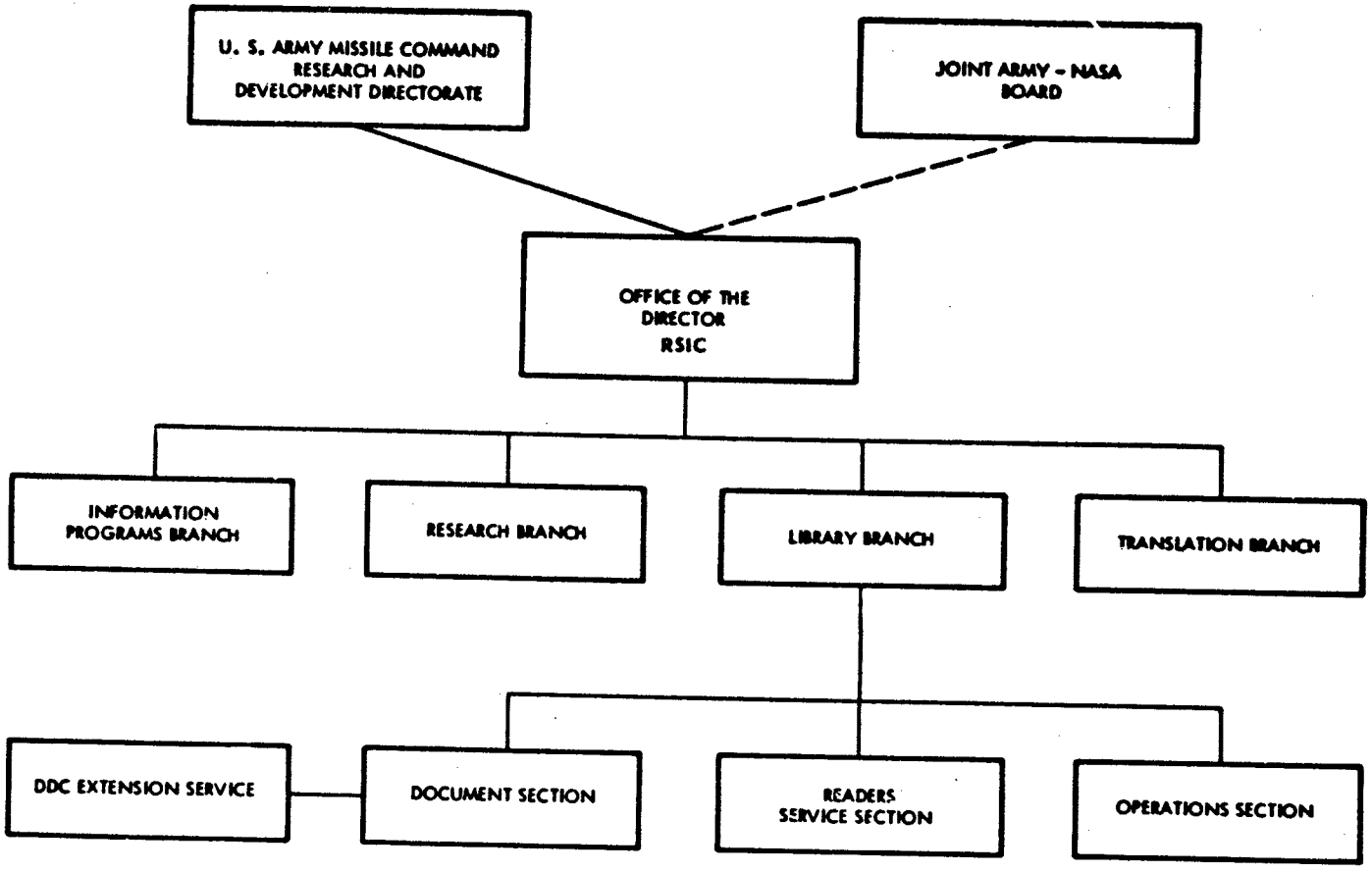


Figure 2. Current Form

WORKLOAD

	1 AUG 1962	1 OCT 1966	% CHANGE
PATRONS SERVED	~4,500	7,968	+77%
PERIODICALS[1]			
TITLES RECEIVED	856	2,485	+190%
COPIES RECEIVED	~2,500	4,570	+83%
TITLES BOUND	457	1,450	+217%
ROUTING-PATRONS (REQUIREMENTS)	864 (7647)[2]	1,237 (6817)[2]	+43% (-11%)[2]
-ITEMS/MO.	1,376	2,137	+55%
BOOKS AND BOUND VOLUMES	~60,000	111,973	+86%
LOANS/MO	1,250	4,000	+220%
TITLES ORDERED/MO	900	1,100	+22%
REPORTS	145,000	800,393	+452%
REPORTS RECEIVED/MO	2,760	8,600	+212%
CIRCULATED/MO	2,250	2,729	21%

1 NOT INCLUDING DISTRIBUTED ITEMS; E.G., TAB, STAR, IAA, NSA, ETC.
2 1962 AS OF 16 MAY; DIRECT ORDERING BY PATRON EXPLAINS SOME OF THIS DECREASE.

CIVILIAN LIBRARY WORK FORCE

FULL TIME (INCLUDES TEMPORARIES)	67	42*	-37%
FULL TIME (STUDENTS)	0	5	-

* TOTAL RSIC WORKFORCE 61 FULL TIME CIVILIANS, 13 PART-TIME STUDENTS, 3 E/M.

Figure 3. Changes in the Library Branch

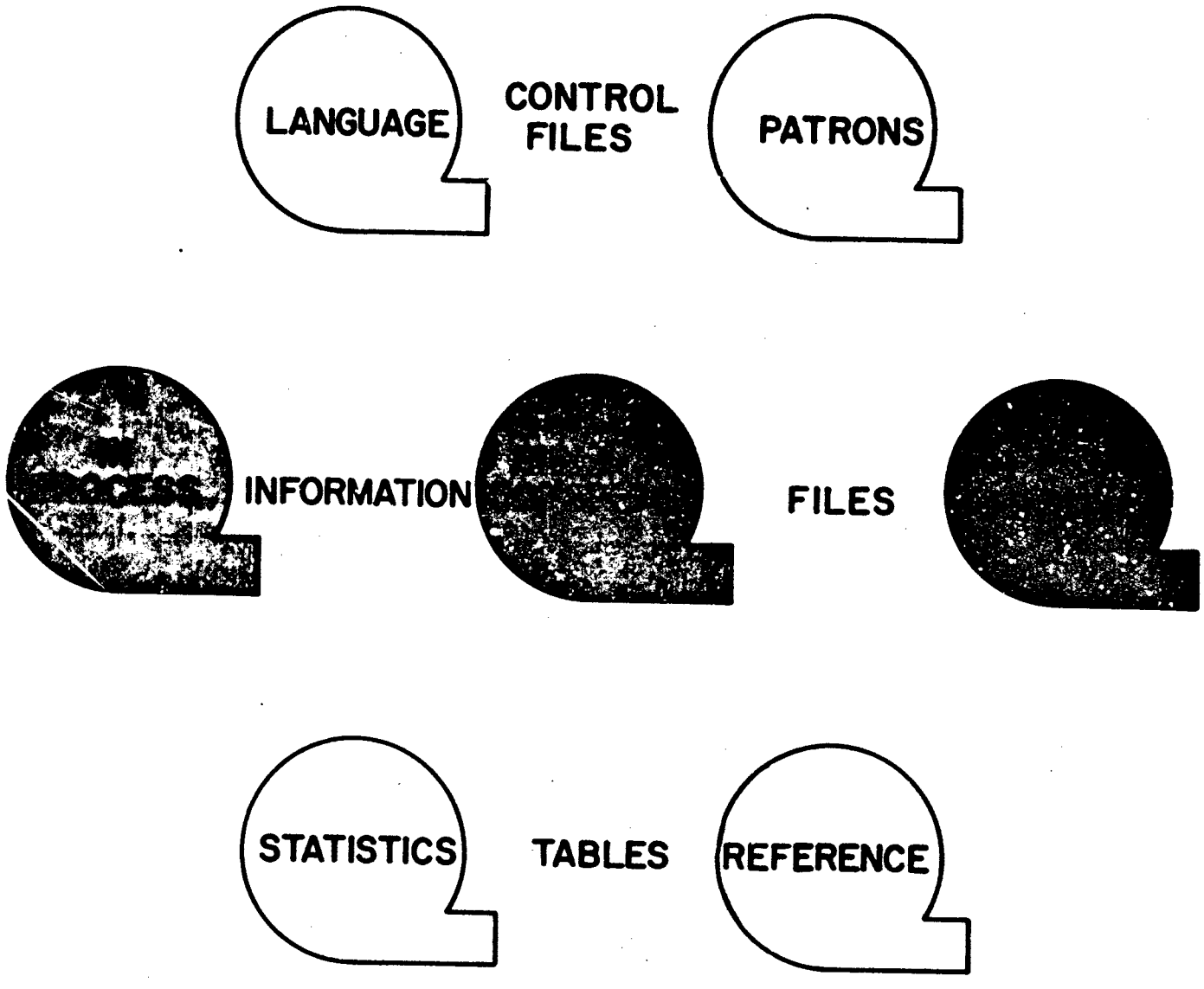


Figure 4. IBM-7010 Computer System

TRANSACTIONS

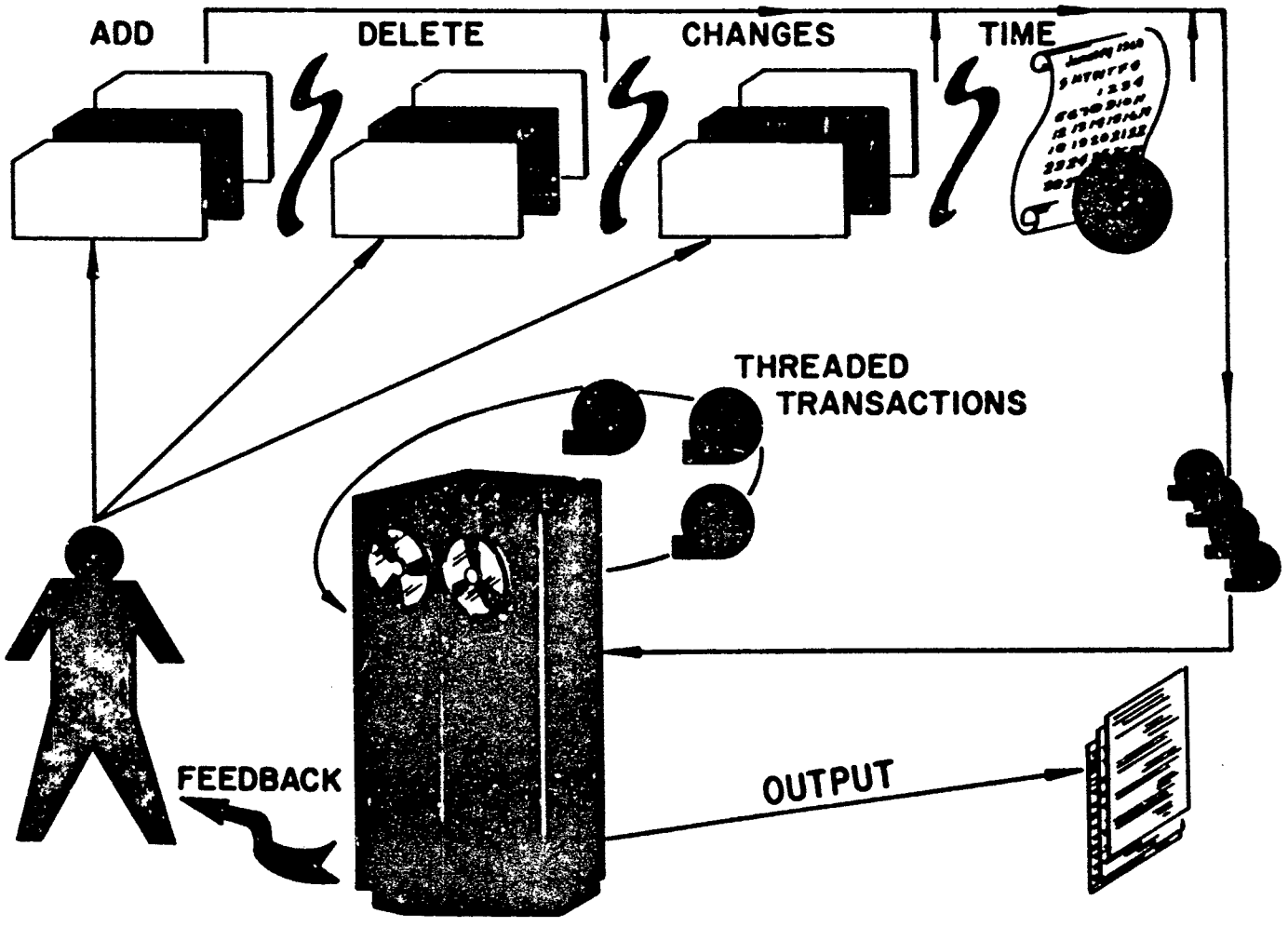


Figure 5. System Transactions

GENERAL SYSTEMS

Patron Control System

by

Clara T. Rogers

Introduction

This morning I would like to describe for you our automated patron control system. Perhaps I need to clarify that statement just a bit. It is not the patrons that are automated, although that would be desirable as we would have better control over the patrons and the library material loaned.

Purpose

The purpose of the Patron Control System is to provide the Redstone Scientific Information Center with an automated procedure for the centralized establishment, maintenance, and display of patron or user information. In many respects this system represents the automation of what is commonly known as a Users' or Borrowers' register. For each authorized patron of RSIC a magnetic tape record is established and maintained and the total collection of these records, one for each patron, comprises the Patron Master File.

The Patron Master File is the central and prime source of patron information both for the librarian and for the other modules of the ALPHA System. Some of the outputs of the Master File are: Listings of Patrons in Name Sequence and Social Security Sequence, Patron Monitor, Need-to-Know Revalidation Notices, and Patron Record Delete Cards. For library usages, the contents of the Patron Master File are formatted and periodically displayed in two listings - The Complete Patron List in Name Sequence and the Patron List in Social Security Sequence (Figure 6).

The purpose of the List in Name Sequence is to provide a comprehensive formatted display of the total contents of the Patron Master File. The list is in sequence by Patron Surname and Given Names and is an optional output of the update of the Master File. All surnames must follow a set procedure. They must be alphabetics or dashes only; all blanks are closed up, thus preventing the names such as McDonald and McMorrow appearing in two places on the list (Figure 7).

The purpose of the List in Social Security Sequence is to provide an abbreviated display of selected elements of patron data (locator and security data) and to relate Social Security Number to Surname and Given Names. Since the Patron File is maintained in Social Security Sequence, this is a particularly important file for reference purposes and in determining name and other data when only Social Security Number is known. It is also a valuable document in researching errors noted on the Patron Monitor. The two patron lists are distributed to various points within RSIC, making the patron data readily available to each one who has the need for it. Among the uses of the Patron Master File by the other modules of the ALPHA System are (Figure 8):

1) Validation of Social Security Number and Patron Name on charged items
2) Providing mailing data for the production of notices to the patron
3) Serving as a source of patron routing requirements
4) Providing security information — clearance, need-to-know, citizenship status, etc.

Maintenance

Provision is included in the Patron Control System for establishing new patrons on the file, revising established patron records, and deleting or purging records when patrons clear the installation.

These actions are accomplished through the submission of appropriately completed Form 10's to the card punch operator who transcribes the information into punched cards which are batched weekly and sent to the computer to update the Patron Master File. When the computer receives changes to the Patron File they are posted and new, updated listings are prepared for the library (Figure 9).

In the establishment of a new patron, a Name Card or an 01 card and either a local address card (02) or an address card (03) is required. The need-to-know (04) and comment cards (05 through 07) are optional and are prepared only when such data is present on the Form 10. To establish a new patron on the file it is first necessary to verify that the patron is not already on the file through the use of the Patron List in Social Security Sequence. If the Social Security Number of the patron to be added is already present in the file it indicates a

little research is needed to determine if:

1) The number being added is incorrect and accidentally agrees with the number of another established patron. If so, the correct number must be obtained and submitted.
2) The patron is already correctly established on the Patron File. If this is the case, a review is made of the Form 10 and the Patron Record to determine if the Form 10 contains additional or more current information. In this case, the change action should be submitted.
3) The number being added is correct and the number which it matches is incorrect. In this case, the record on the Patron Master must be deleted and resubmitted with the correct number.

For each new patron to be added to the file it is necessary to submit a Form 10 to the card punch operator containing the notation "NEW" and the following minimum amount of information:

1) Surname and given names
2) Social security number
3) Office symbol or standard mailing address
4) Security clearance
5) Employee type (NASA, Army, contractor, military, or other)
6) Citizenship
7) Company name, if contractor

If available, other elements of information which should be included are:

1) Building and room number
2) Phone number and extension
3) Need-to-know
4) Comments, if any

Form 10 submitted for the purpose of revising established records must contain the notation "CHANGE" and:

1) Social security number
2) Surname
3) The data elements to be added or changed. If data elements are to be deleted, an asterisk is placed in the information of the element to be deleted. It is possible to add, change, and delete information elements simultaneously. For example,

one may change the organizational symbol of a patron, delete the old room number, and add a new telephone number on one Form 10 submission.

As the patron file is used in connection with security classified materials there have been certain safeguards written into the program. For example: Employee Type and Contractor Code may not be altered by a change transaction. When these elements change, the old record must be deleted and reestablished as a "new." This is necessary because each time a patron changes employment a new certification of security clearance and need-to-know is required.

Because the Social Security Number is the key factor in the Patron Control System, it was deemed advisable to require that Social Security Number changes be accomplished by the submission of a PURGE action to delete the incorrect number, and by the submission of NEW action, establishing a new patron record under the correct number. This would ensure that extra care was taken in making the change.

A special option has been included in the program for revising the name of established patrons. This is accomplished by submitting a Form 10 with the notation "CHANGE" containing the Social Security Number and the Surname, Given Names, and Surname suffix, if any. No other action is included on the Form 10 when a Name Change action is being accomplished.

To completely delete or purge a patron record from the file, it is necessary to verify that the record to be deleted is an established record by examining the Patron File in Social Security Sequence. Form 10 submitted for the purpose of deleting established records must contain the notation "PURGE" and:

1) Social security number
2) Patron surname

During the update of the Patron Master File, several auxiliary outputs are also produced in addition to the patron listings already mentioned. The first of these is the Patron Monitor which has been established for the purpose of monitoring all actions against the Patron File, to assist in the correction and resubmission of error corrections, and to provide a statistical summary of the Patron status. Transactions found to be in error are so indicated on the Patron Monitor by a descriptive message to the right of the transaction (Figure 10).

To facilitate the correction and feedback of transactions found to be in error, a card for each error is returned with the Patron Monitor. It should be noted that in the editing process all data are evaluated in terms of the card code appearing in each card. For example, if the card code is 01 (Name Card) the data on the card, correct or otherwise, is assumed to be name data and is so edited. Therefore, in those instances where a card has the wrong card code and otherwise "correct" data, the resulting error messages can be misleading. Such an example would be a "need-to-know" card correct in every respect except for a Card Code of 01 instead of 04 (Figure 11).

Changes submitted to the Patron File affecting data elements which could influence patron need-to-know result in the production of a Need-to-Know Revalidation Notice which is printed on a 5 by 8 card ready for mailing. These notices are produced automatically when either the organizational symbol, clearance, or citizenship code is changed. The purpose of these notices is to provide a means for revalidation of patron need-to-know since changes in the three elements of information just mentioned could affect it. Although the revalidation notices are produced ready for direct mailing, they are reviewed by the responsible authority in the Document Section prior to mailing (Figure 12).

When a patron record is deleted from the Patron Master File, the complete set of information is printed on a 5 by 8 Patron Record Delete Card, the purpose of which is to provide a historical record of deleted patron data. These cards are filed by surname and retained for two years (Figure 13).

At this point, I would like to offer a little free advice to those who are considering such an automated patron control system. Plan for a review of the entire file at regular intervals to weed out the names of those patrons who either resigned, transferred, retired, or who failed to clear through the Clearing Control Point. We are in the process of such a review at the present time.

In closing, I would like to say that the computer is not as smart as I was first led to believe. It cannot do everything. We have learned, however, that you get from the computer just what you put in. If accurate and reliable data is fed to the computer, the outputs received can be valuable tools for the librarian.

PATRON FILE MASTER RECORD

Social Security Number	Surname	Given Names	Surname Suffix	Title	Type
1-10	11-26	27-44	45-47	48-53	54
10	16	18	3	6	1

Security Code	Citizenship Code	Area Code	Phone Number	Extension
55	56-57	58-60	61-67	68-71
1	2	3	7	4

Contractor Code	Mail Symbol	Building Nr.	Room Number	Street Address
72-75	76-87	88-92	93-97	98-118
4	12	5	5	21

City	State	ZIP Code	Date Put on File	Date of Last Action
119-133	134-138	139-143	144-148	149-153
15	5	5	5	5

Miscellaneous	Blanks	Need-To-Know Type	Need-To-Know Codes
154-163	164-173	174	175-474
10	10	1	300

Comment 1	Comment 2	Comment 3	Decoded Contractor	Special Routing Requirement
475-523	524-572	573-621	622-670	671-683
49	49	49	49	13

Journal Routing Requirements
684-1008
325

Figure 6. Patron Master File Record

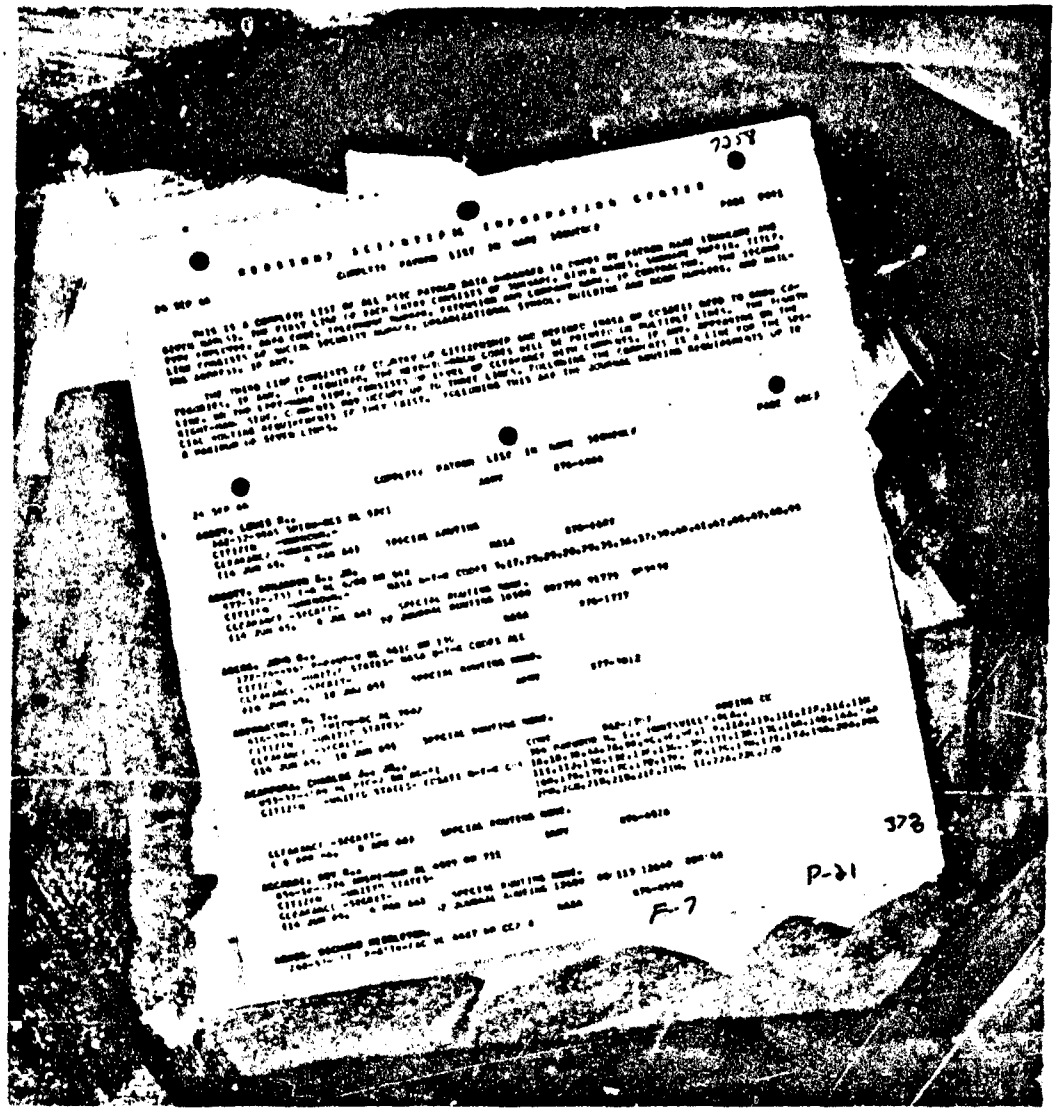


Figure 7. Complete Patron List in Name Sequence

```
                    R E D S T O N E   S C I E N T I F I C   I N F O R M A T I O N   C E N T E R

13 JAN 67                    PATRON LIST IN SOCIAL SECURITY SEQUENCE                    PAGE 0001

     THIS IS A LIST OF RSIC PATRONS ARRANGED IN ORDER BY SOCIAL SECURITY NUMBER.  EACH LINE CONTAINS
SELECTED ELEMENTS OF PATRON DATA ALL OF WHICH APPEAR IN THE COMPANION LIST ARRANGED ALPHABETICALLY
BY NAME.

     THE ENTRIES TAKE THE FOLLOWING FORM - SOCIAL SECURITY NUMBER, NAME, TITLE, EMPLOYEE TYPE, CLEAR-
ANCE, CITIZENSHIP CODE, TELEPHONE NUMBER, EXTENSION; ORGANIZATIONAL SYMBOL, AND BUILDING NUMBER AS
SHOWN BELOW.

410-48-2001 DOE, JOHN Q., JR., LT COL, NASA(S) US 876-5432, EXT 1234, AMSMI-RPB, BL 4491
```

Figure 8. Patron List in Social Security Sequence

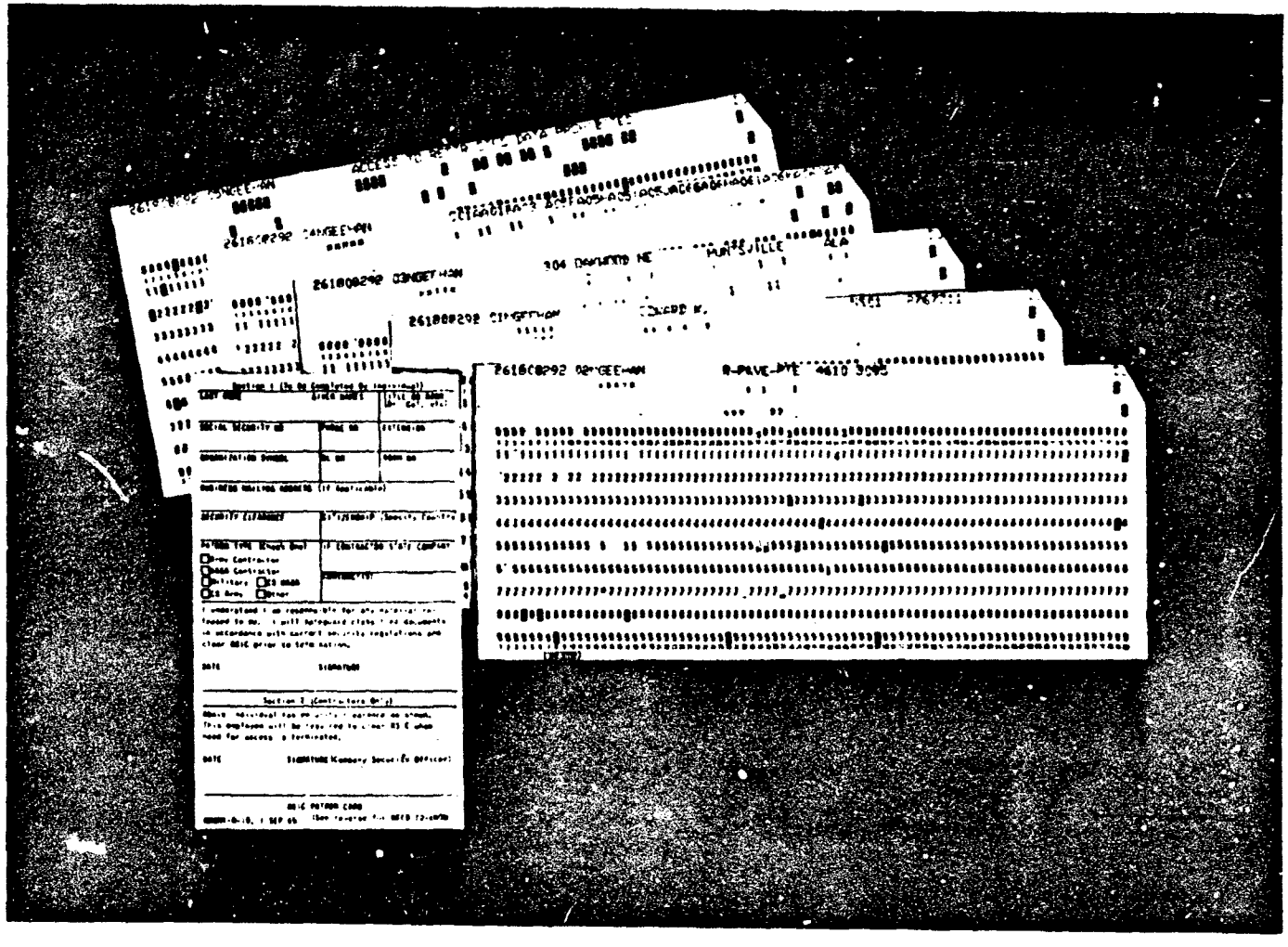


Figure 9. Changes to the Patron File

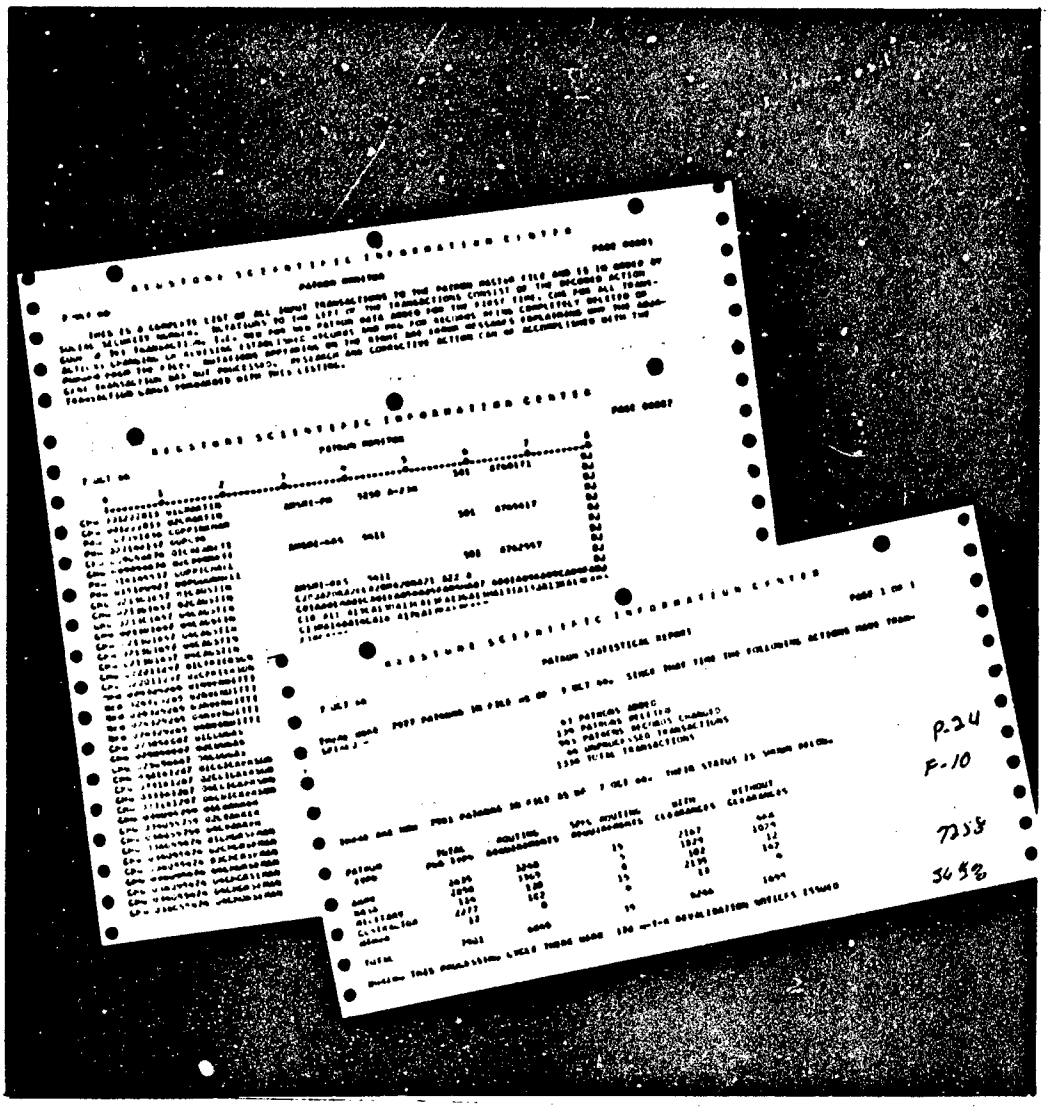


Figure 10. Correction and Resubmission of Error Corrections

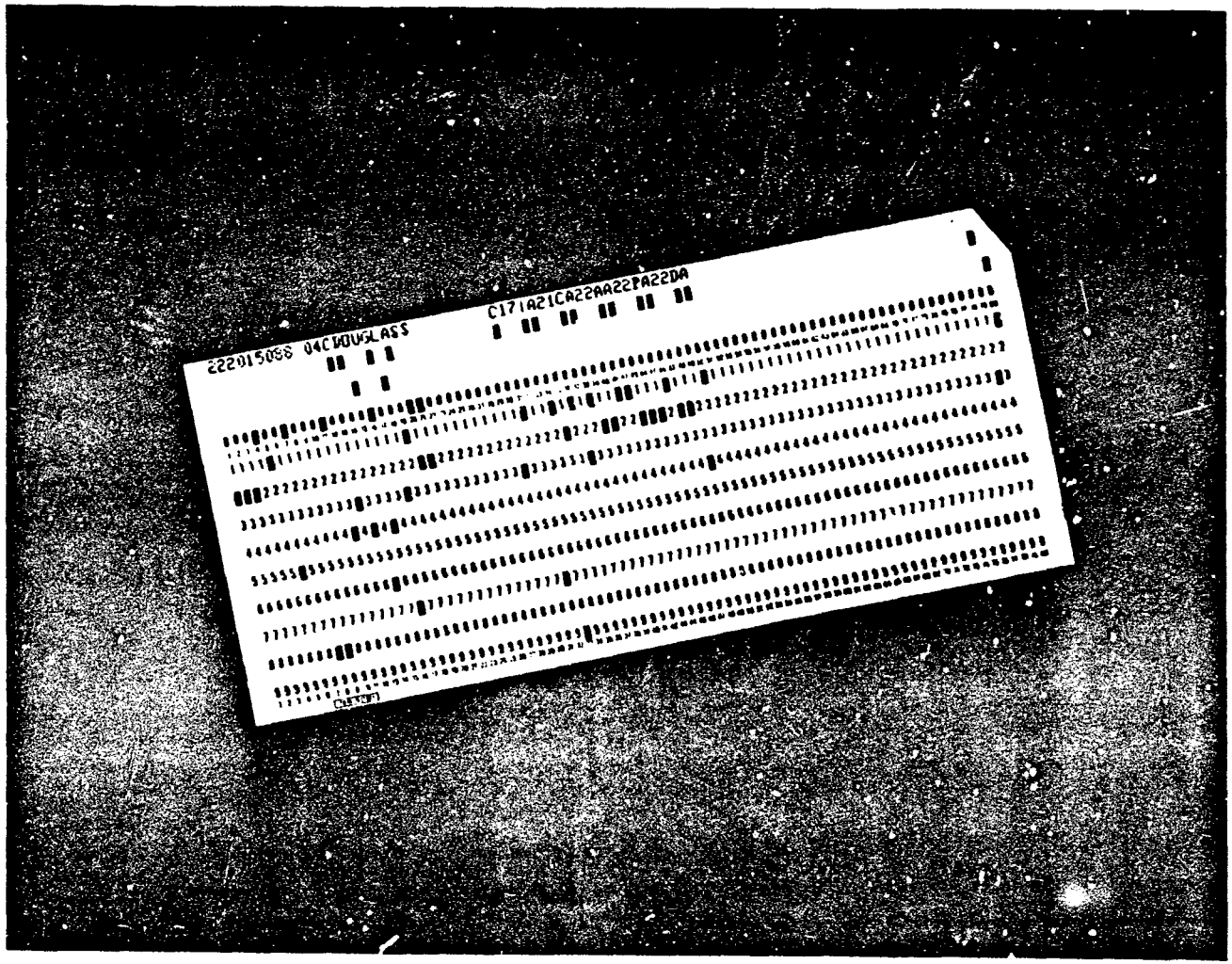
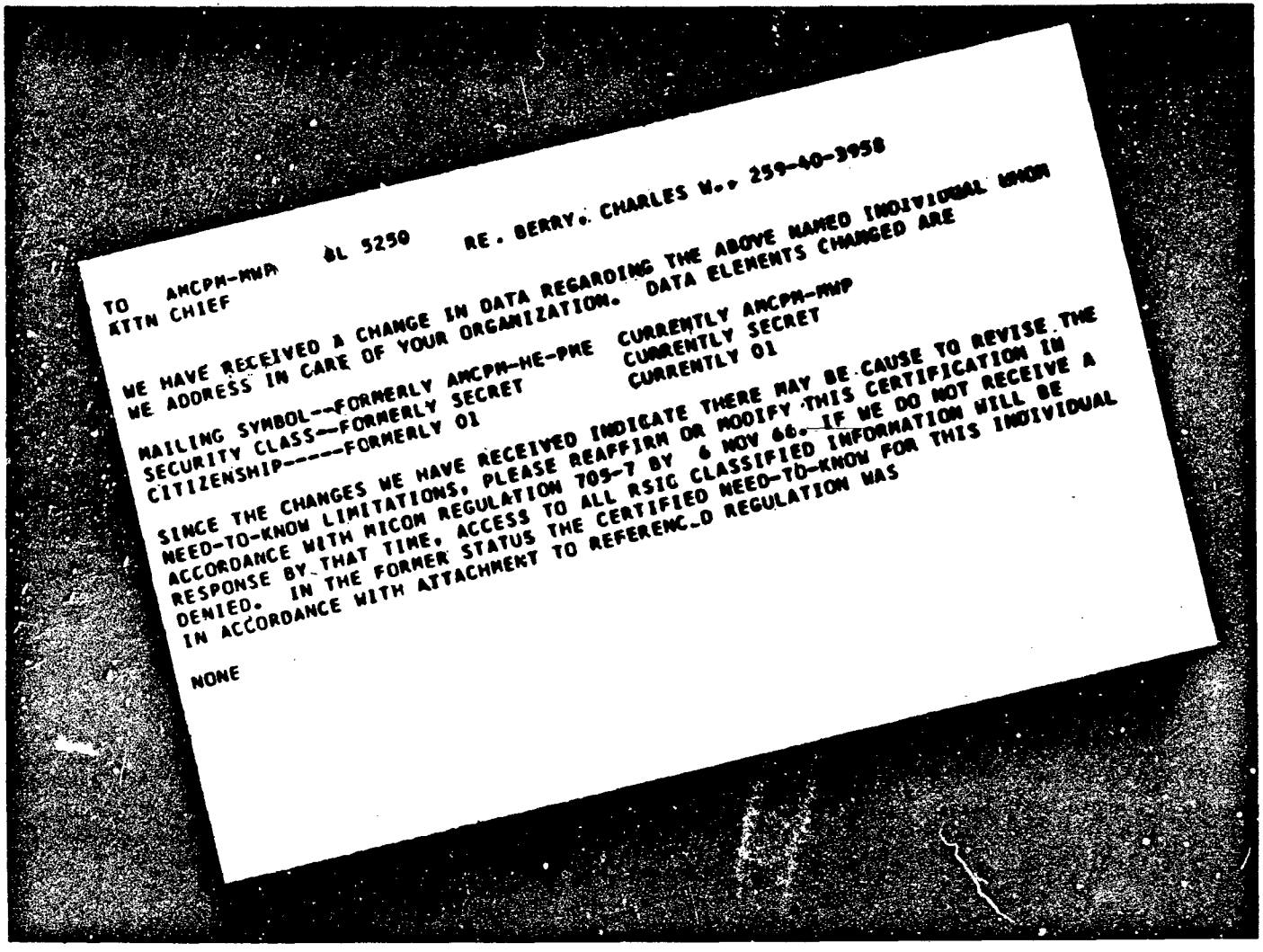


Figure 11. "Need-to-Know" Card



TO AMCPM-MWA 8L 5250 RE. BERRY, CHARLES W., 259-40-3958
ATTN CHIEF

WE HAVE RECEIVED A CHANGE IN DATA REGARDING THE ABOVE NAMED INDIVIDUAL WHOM WE ADDRESS IN CARE OF YOUR ORGANIZATION. DATA ELEMENTS CHANGED ARE

MAILING SYMBOL--FORMERLY AMCPM-HE-PME CURRENTLY AMCPM-MWP
SECURITY CLASS--FORMERLY SECRET CURRENTLY SECRET
CITIZENSHIP-----FORMERLY 01 CURRENTLY 01

SINCE THE CHANGES WE HAVE RECEIVED INDICATE THERE MAY BE CAUSE TO REVISE THE NEED-TO-KNOW LIMITATIONS, PLEASE REAFFIRM OR MODIFY THIS CERTIFICATION IN ACCORDANCE WITH MICOM REGULATION 709-7 BY 6 NOV 66. IF WE DO NOT RECEIVE A RESPONSE BY THAT TIME, ACCESS TO ALL RSIC CLASSIFIED INFORMATION WILL BE DENIED. IN THE FORMER STATUS THE CERTIFIED NEED-TO-KNOW FOR THIS INDIVIDUAL IN ACCORDANCE WITH ATTACHMENT TO REFERENCED REGULATION WAS

NONE

Figure 12. Revalidation Notices

PATRON RECORD DELETES ADDED ON 14 JUN 65 DELETED ON 7 OCT 66

513-82-9131 YOUNG ERNEST A. A U 00 CONT
AMCPM-HAS RM 8314 BL 4488 876-7710
ROUTING REQMTS 37150 000910

Figure 13. Patron Record Delete Card

GENERAL SYSTEMS

The Language Control Subsystem of ALPHA

by

Anita Lewis

The automation program at RSIC has brought considerable mechanization to our library activities. One important phase of the program is "language control." When I speak of "language," I am referring to subject headings, subject terms, descriptors, or terminology used to describe books and documents. In the few minutes alloted to me, I shall describe how the Language Control Subsystem operates, the step-by-step processing required, and the resulting computerized reports or printouts.

The purpose of the Language Control Subsystem is to establish control over the authorization, establishment, and maintenance of subject terms used in the cataloging (or indexing) and retrieval functions of the ALPHA System. The Language Subsystem is so designed to provide one program capable of controlling a separate language for books and documents. The system also provides the capability for using one language for both mediums, if in the future RSIC decides this to be a desirable course to follow. Obviously, for the information to be retrieved, the same language already established must be used. The language for books and documents is processed in the same way and thesaurus is displayed the same, with some slight variations in data elements.

The first step begins with the cataloger. If a subject term has not already been established, the term is created from material being cataloged and passed on to the lexicographer. At RSIC, the lexicographer is a cataloger who is temporarily designated to devote full time to this program. On a smaller scale, or later at RSIC we hope a cataloger could perform these duties as well. The lexicographer then determines the validity of the term and enters it into the program which ultimately generates a printed thesaurus. The thesaurus thereby becomes the language control of subject material in this library for the use of the cataloger, reference librarian, and patron. Therefore, we refer to it as the Language Control Thesaurus.

Although subject terms for books and documents are processed in the same way, they are selected by different rules and conventions. To avoid possible confusion, let me separate the two and first tell you about books. The Language Control Thesaurus describing books

consists of terms based on the subject headings used in the dictionary catalogs of the Library of Congress. The cross reference principles set forth in Sears List of Subject Headings and the Library of Congress Subject Headings have also been utilized. Cross references occupy an intricate and vital place in this program; therefore, permit me to refresh your memory concerning them (Figure 14).

X means "Seen From." That is, a "see reference" may be made from each term which follows the X to the heading under which they are placed.

XX means "Seen also from." That is, a "see also reference" may be made from each term which follows the XX to the heading under which they are placed:

Geochemistry
X Chemical geology
XX Chemistry

That is:

Chemical geology See Geochemistry
Chemistry
See also Geochemistry

SA means "See also." That is, if you are cataloging, consider using the subjects listed, as they are always related to the heading under which they are placed and are usually more specific. If you are using the file, look under the "referred to" subjects for more detail. These terms also snow the scope of the larger, more inclusive subject under which they appear:

Chemistry
See also Geochemistry
Microchemistry
Physiological chemistry
Stereochemistry

The book cataloging section was already operating with a manual system of language control which created a subject authority file (Figure 15). Under the old manual system, a subject determined to be valid was typed on a 3 by 5 card along with the cross references, comments, and suggested LC class number. Two cards were typed for each cross reference, one for the authority file and one for the

public catalog. When changes (additions, deletions, etc.) were necessary, the cards were pulled, the adjustments were made, and the cards were returned to the file.

The automated system has replaced the card authority file with a Language Control Thesaurus (Figure 16). It is displayed to show five data elements:

1) The subject term or base term
2) Comment
3) Suggested LC class number
4) Cross references
5) See references

The subject term and LC class number are self-explanatory. The comment is a note defining the meaning of the term and the scope of the subject. Each comment forms a separate paragraph directly beneath the subject explained. These are included primarily for the benefit of the cataloger, but will also be helpful to the retriever. The cross references include "see also," "seen from," and "seen also from" subject terms. "See references" are separate term records and refer from a term not used to a term that is used.

The subject terms are arranged alphabetically according to the Library of Congress filing rules. A special technique using sort headers was developed that permitted us to sort into this sequence. As you can see, the letters are printed entirely in upper case. We hope to have upper and lower case capabilities sometime in the future. A copy of this thesaurus is sent to each cataloger to use at her desk.

To accomplish this, we began by converting the old book authority file to magnetic tape. This input, with the initial language input for documents, built what we call the Language Master File. The master file is a collection of "terms records" and consists of a base term (the subject term) and all its associated data. Each "term record" is identified by the base term. To update the thesaurus, the cataloger initiates new terms to be entered or requests new term relationships. The lexicographer authorizes the term, adds the cross references, and enters this information, with the proper codes for processing, on a Language Control Input Form (Figure 17). This form is used for both books and documents with each term transaction. It provides space for the term, comments, "see" or "seen from" references, "see also" or "seen also from" references, and the LC class number. Each term is processed according to a "term code" and an "action code." The "term code" not only signifies whether it is a book term

or a document term, but what type of term it is:

Term code A - signifies a valid book term acceptable as an index point.
Term code B - signifies a "see reference" term unacceptable as an index point for books but which refers to a "usable book" term.
Term code V - signifies a "valid document" term acceptable as an index point.
Term code Z - signifies a "see reference" term unacceptable as an index point for documents but which refers to a "usable document" term.
Term code Q - signifies an "ambiguous" term which may or may not be acceptable as an index point for documents, depending on context.

Term code I - signifies an "invalid" term unacceptable as an index point and does not require a "see reference."

The same action codes are used for both books and documents:

Action code 1 - establish a NEW term record.
Action code 2 - REVISE an existing term record by adding, deleting, or changing various data elements.
Action code 3 - CHANGE base TERM of existing term record.
Action code 0 - PURGE complete term record.

As an example, let us enter a new transaction to update the thesaurus and see just how the program operates.

The computer is programmed to enter the term and its associated data in the proper alphabetical position. It automatically generates a "see" reference for each "see from" reference in the proper place. Likewise, a "see also" reference is generated for each "seen also from" reference in the proper place. That is, the computer seeks out CHEMISTRY and adds PHOTOCHEMISTRY in alphabetical sequence; seeks out OPTICS and adds PHOTOCHEMISTRY, etc. (Figure 18).

Suppose we want to purge an entire term record (Figure 19). Acting on the codes given the computer, it seeks the term PHOTO-CHEMISTRY and deletes the entire record. Since the cross references are a part of the record we now wish to purge, the computer seeks each of the "seen from" references and completely deletes the "see" reference. It then seeks each of the "seen also from" references and deletes

PHOTOCHEMISTRY. It is not necessary to repeat the associated data on the input form when entering a purge action — only the base term and the proper codes for processing.

In revising a term record, we may add any one or all data elements to a base term on the same transaction input form (Figure 20). Here we add an LC number and two "seen also from" references. The computer seeks ELECTRIC MEASUREMENTS, adds ELECTRIC CURRENTS AND ELECTRONIC MEASUREMENTS as "see also from" references, and adds the LC number, QC535, Physics. The computer then seeks ELECTRIC CURRENTS and ELECTRONIC MEASUREMENTS and adds ELECTRIC MEASUREMENTS as a "see also" reference. Suppose we have used a "seen also from" reference we now wish to delete. The proper codes have already been entered, since "revise" means "delete" as well as "add" and the term type remains the same. The "seen also from" reference to be deleted is entered in the same field and preceded with an asterisk, which is a signal to delete. The absence of the asterisk is the signal to add. The computer deletes ELECTRIC METERS as a "seen also from" reference to ELECTRIC MEASUREMENTS and seeks ELECTRIC METERS, deleting ELECTRIC MEASUREMENTS as a "see also" reference.

Another type of revision may be a misspelled word in a comment (Figure 20). In the comment field of the term record MOON CARS, we find such a word, "veicles." To correct this, we must enter a revise action to the base term MOON CARS and enter the comment as it should read. The computer seeks MOON CARS, deletes the comment, and enters the revised comment.

To change a base term of an existing term record, we simply enter the proper codes, repeat the incorrect term, and enter the correct one in the "seen from" field (Figure 21). The computer removes the incorrect base term, PLATS (ENGINEERING), and enters it correctly, PLATES (ENGINEERING). Note that the incorrect term has been generated eight times as a cross reference. The computer seeks each "seen from" and "seen also from" reference appearing in the term record, deletes PLATS (ENGINEERING), and re-enters PLATES (ENGINEERING).

We now have some understanding of how the information is coded for capture. These Language Control Input Forms are typed on a flexowriter. As the input data is typed, a paper tape is punched simultaneously. This enables us to apply source data automation techniques by capturing the data in machine-readable form the first time. We also use the paper tape data capture because it is more advantageous where we are using free-form formats as opposed to fixed-fields which are efficiently handled within the limitations of punched cards. The

paper tape is converted to magnetic tape and processed through the computer to create a master file magnetic tape. During the first run, transactions found to be in error are thrown out, printed, and returned to the lexicographer as Language Worksheet Errors with indicative error messages. These errors are the results of improper use of the processing codes, improper formats, etc. (Figure 22). The terms accepted as valid language transactions are sorted according to term type and base term and processed against the Language Master File which has been placed on a disc for random storage and direct access. During this run the Master File is updated, statistics are accumulated, and a Language Monitor is printed which will later be sent back to the lexicographer. The monitor contains an entry for every input transaction, together with appropriate processing or error messages. The messages tell exactly what action was taken or attempted (Figure 23). Since we use free-form paper tape transaction, we cannot easily take advantage of the prepunched transaction feedback capability that was mentioned in the patron file system. Therefore, we must repunch and resubmit, in corrected form, any transactions found to be in error. The Language Statistical Report appears on the last page of the monitor. The totals are given for each term type processed for books and documents according to action performed, beginning with the date of the last update run. New totals are given at the end of the run (Figures 24 and 25).

The updated Language Master File is sorted again alphabetically, arranged for display, and printed as the Language Control Thesaurus (Figure 16). Thus, the printed outputs are: Language Worksheet Errors, Language Monitor and Statistical Report, and the Language Control Thesauri.

Input data for books and documents is processed the same way, but at the present time we use separate update runs which result in separate outputs for each.

Let us take a closer look at the documents portion of the program and the small way it differs from books. The Language Control Thesaurus-Documents consists of terms used to describe documents in the RSIC collection and is based on selected DDC descriptors, identifiers, and the RSIC Wordlist. (The Wordlist is an in-house compilation of new subject terms established by RSIC.) Most of the basic rules and conventions used by Project LEX, in building the DOD-wide Technical Thesaurus, are also utilized in our system. Let me say here that RSIC has supported Project LEX since its inception. Mrs. Sara Dearman, who will speak later, and I have attended several of the sessions in

which panel members worked together, establishing authoritative terms in specified subject fields for the LEX thesaurus. Our entire list was also made available as one LEX input.

Since there was no formalized manual system for controlling the document language, the initial input to the Language Master File consists of subject terms and cross references established in the main document catalog.

The other noticeable differences are the absence of subdivided terms, the absence of an LC class number, and the way in which cross references are used. This results in a slightly different format in the thesaurus (Figure 16). The filing arrangement is alphabetical, word by word, and letter by letter. The one exception is that acronyms are arranged, as in the books thesaurus, at the beginning of each letter. These are really alphabetical the same way by putting spaces between the letters.

As you recall from our discussion on book cross references, XX means "seen also from," and generates a "see also" reference. In documents, XX still means "seen also from" but it also signifies "see also" because all such references are reciprocal. Each reference is qualified by a generic relationship coded (B) for broader term, (N) for narrower term, and (R) for a related term without hierachy. A "see also" reference with an inverted generic indicator is generated from each term which follows the XX to the term under which they are placed (Figure 25):

Image tubes
XX Camera tubes (N)
Cathode ray tubes (R)
Electron tubes (B)

Camera tubes
XX Image tubes (B)

Cathode ray tubes
XX Image tubes (R)

Electron tubes
XX Image tubes (N)

That is, CAMERA TUBES, a narrower term, generates IMAGE TUBES as a broader term to CAMERA TUBES. ELECTRON TUBES, a broader term, generates IMAGE TUBES as a narrower term to ELECTRON TUBES. CATHODE RAY TUBES, a related term, generates IMAGE TUBES as a related term to CATHODE RAY TUBES. To emphasize this important aspect of the document language again, an (N) term generates a (B) term, a (B) term generates an (N) term, and (R) term generates an (R) term.

The X means the same in document language as it does in book language. The "see from" reference generates the "see" reference:

Camera tubes
X Image orthicons

That is:

Image orthicons See Camera tubes

Documents use the same transaction coding system already noted; thus, other than the differences involving content and format, the same operations apply to both lists.

The Language Control Subsystem of ALPHA has given RSIC a formal and precise method of controlling book and document language without the heavy typing load; long, tedious hours of filing and pulling cards; and extra clerical effort required by the manual system. The new program ensures complete referencing and, since the information is typed only one time, it consequently reduces the margin for error in two ways: (1) the computer checks the cataloger, and (2) the fact that it is typed only the one time. Since the computer follows instructions so well and does its tasks precisely as requested, I call it the most reliable coworker I know because it will do exactly what I tell it to do, just the way I tell it to do it.

CROSS REFERENCES - BOOKS

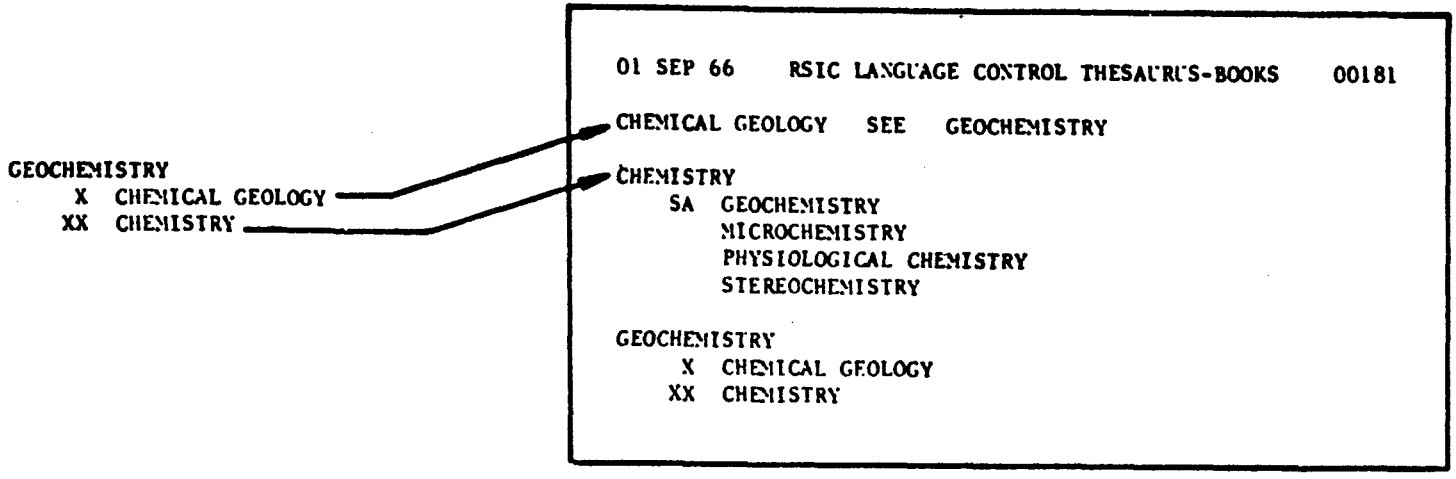


Figure 14. Cross References - Books

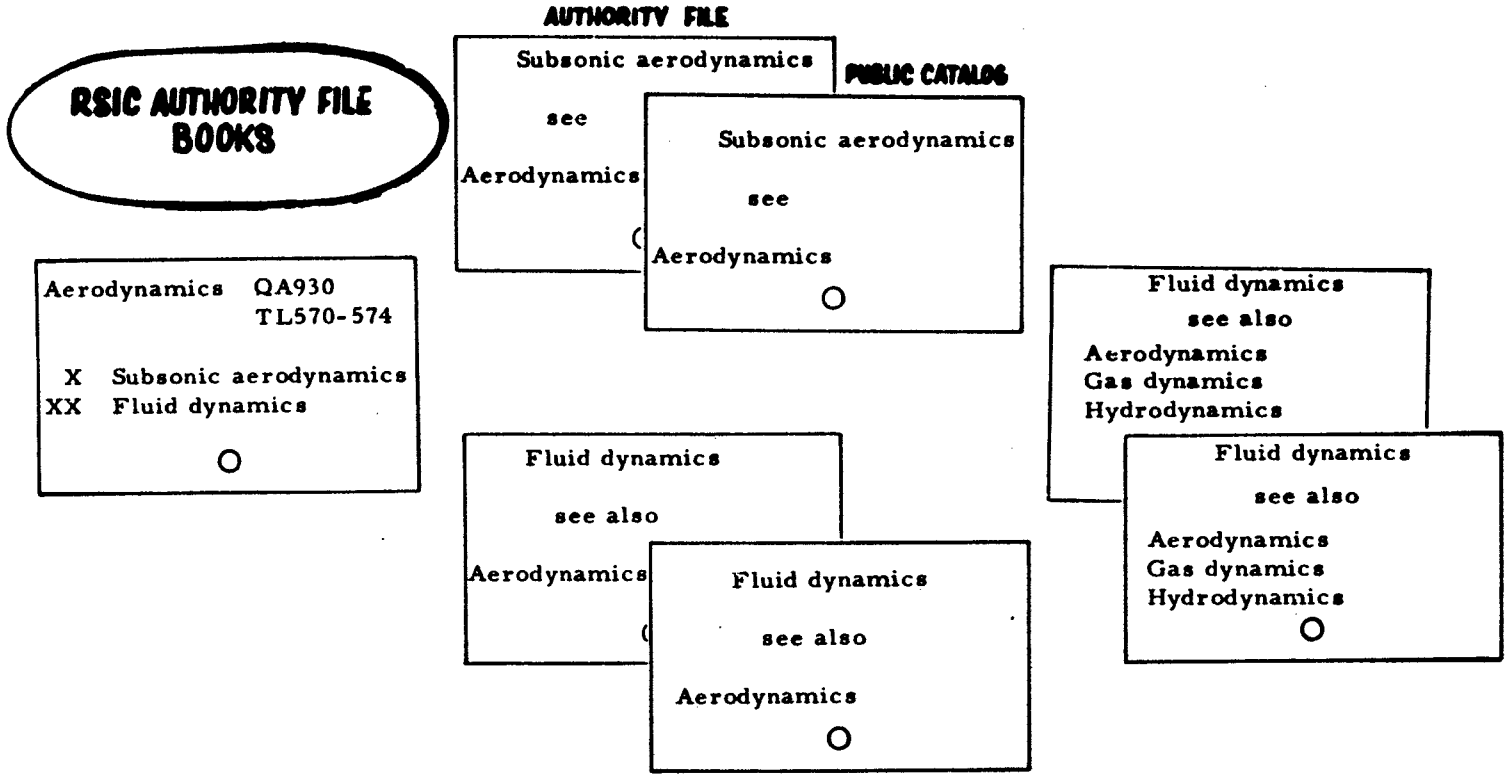


Figure 15. RSIC Authority File Books

THESAURUS FORMAT

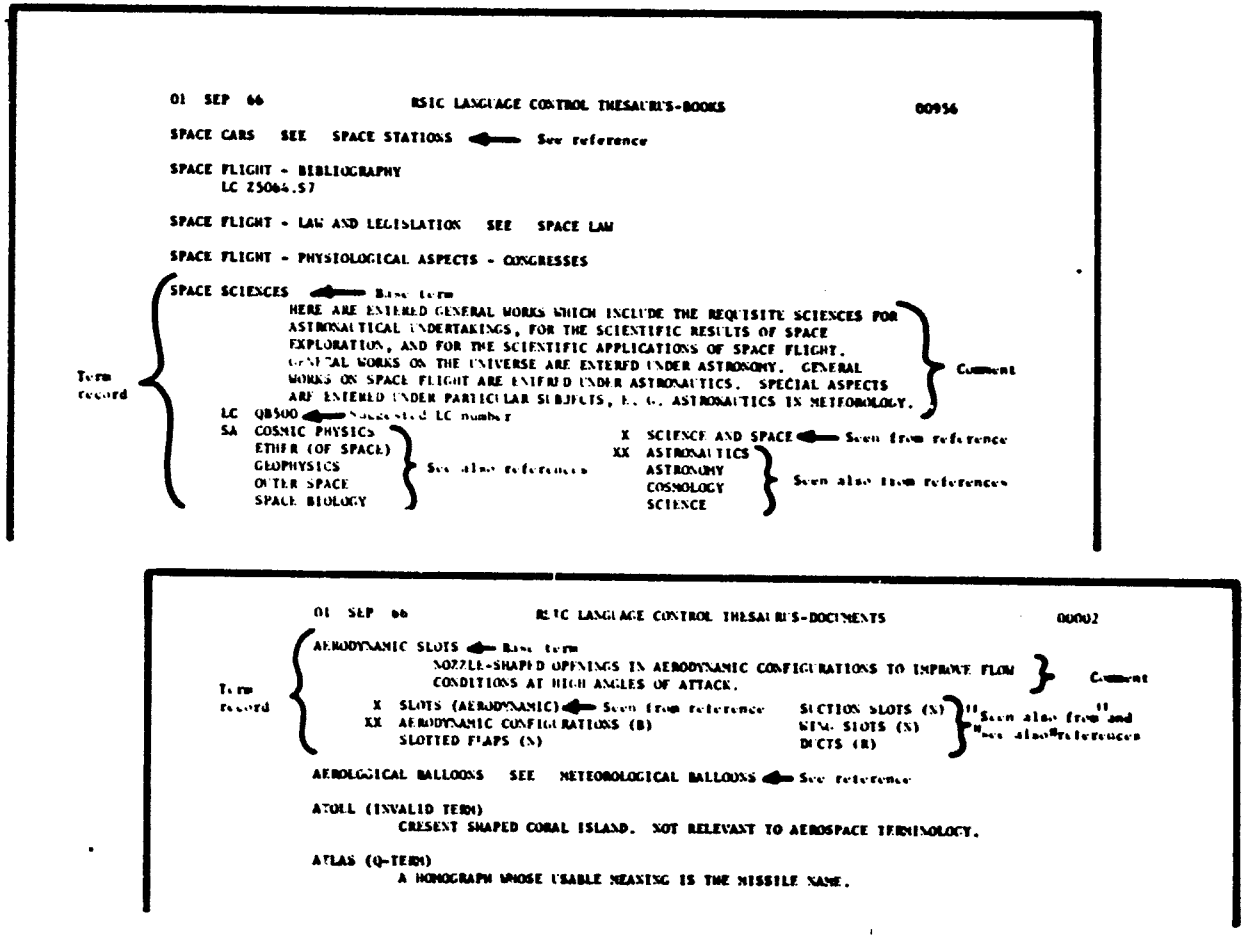


Figure 16. Thesaurus Format

TRANSACTION PROCESSING CODES

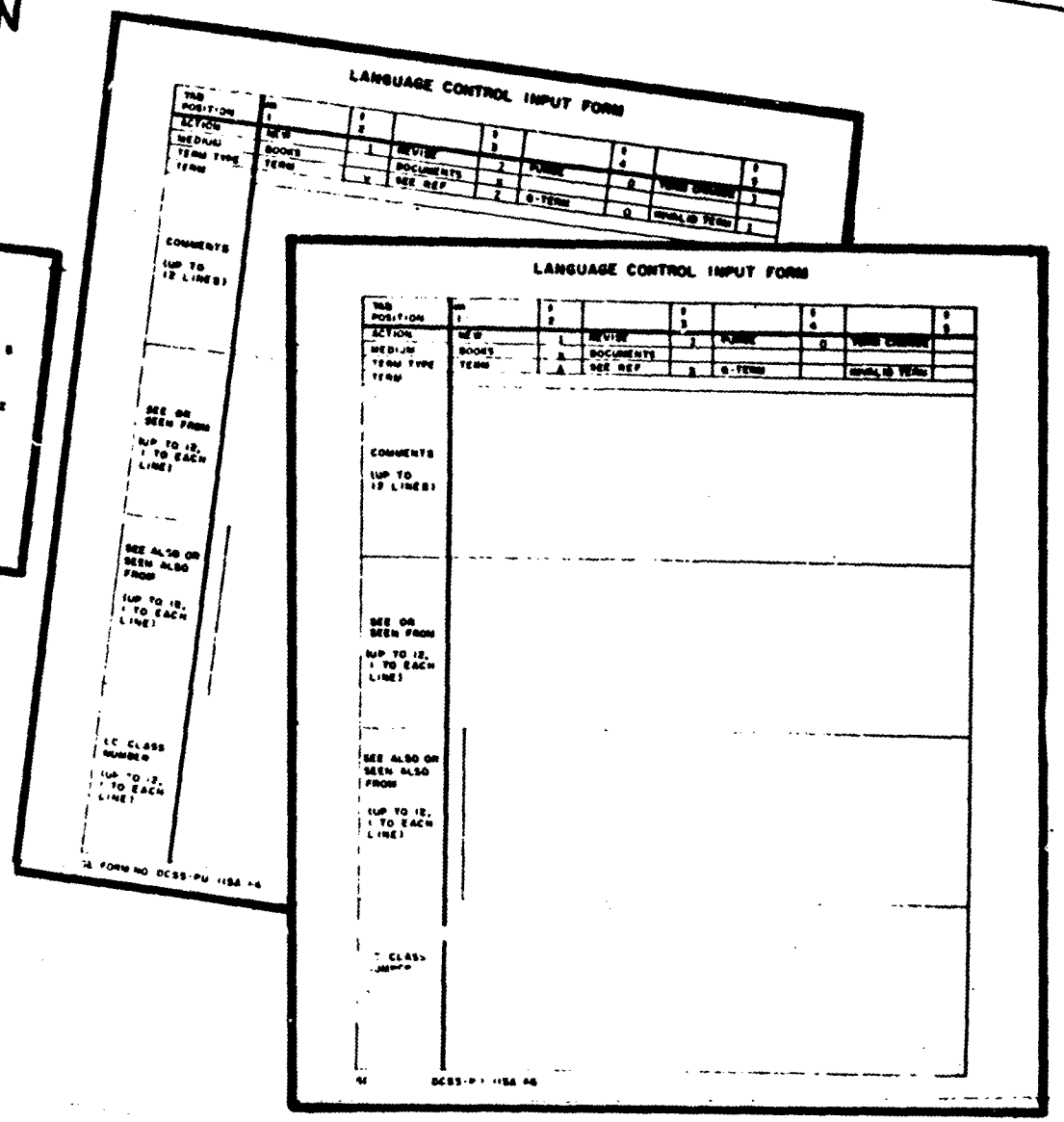
TERM TYPE

BOOKS:
VALID TERM - CODE A
SEE REFERENCE TERM - CODE B

DOCUMENTS:
VALID TERM - CODE V
SEE REFERENCE TERM - CODE Z
AMBIGUOUS TERM - CODE Q
INVALID TERM - CODE I

ACTION CODES

NEW TERM RECORD - CODE 1
REVISE TERM RECORD - CODE 2
PURGE TERM RECORD - CODE 0
CHANGE BASE TERM - CODE 3



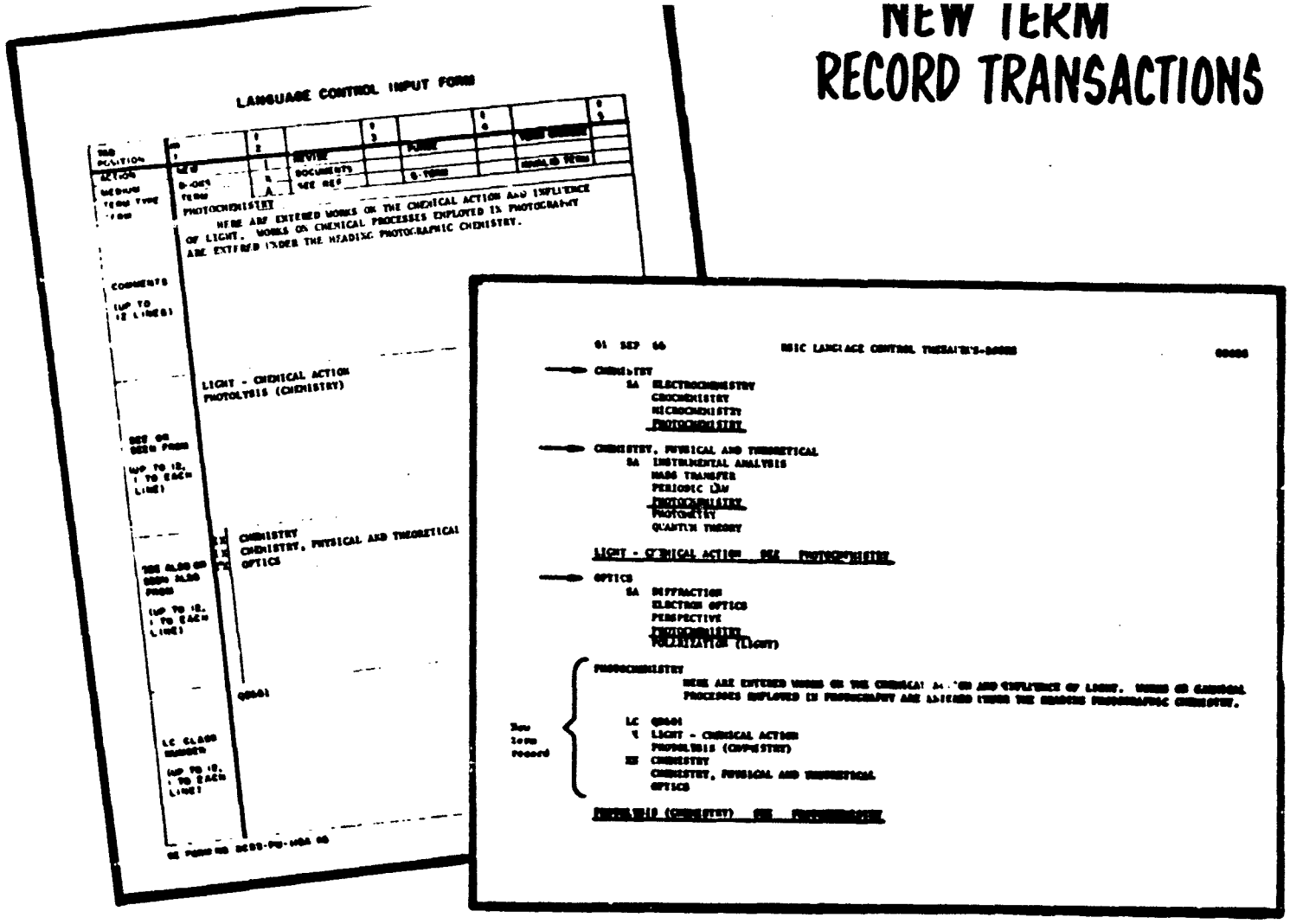


Figure 18. New Term Record Transactions

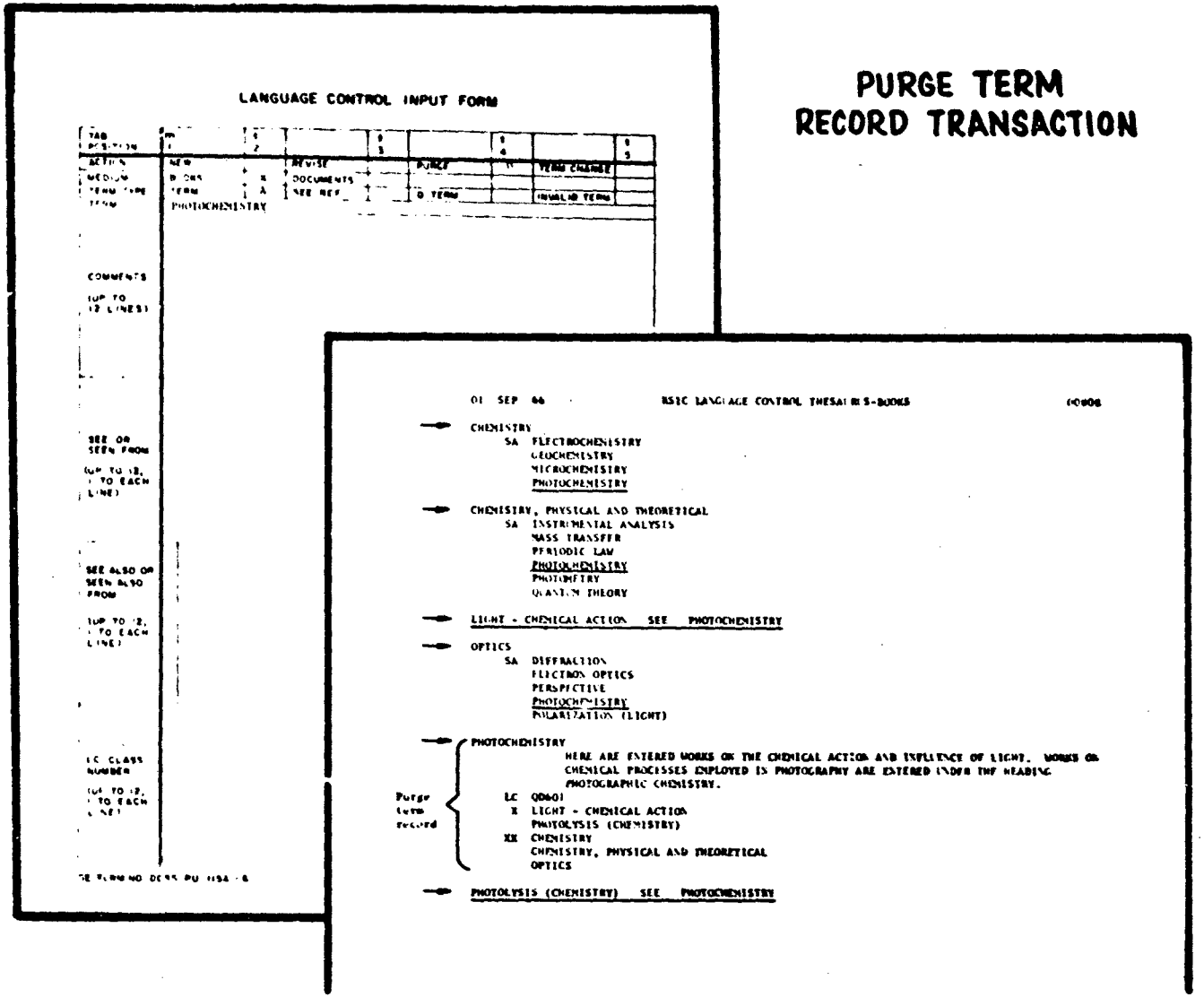


Figure 19. Purge Term Record Transaction

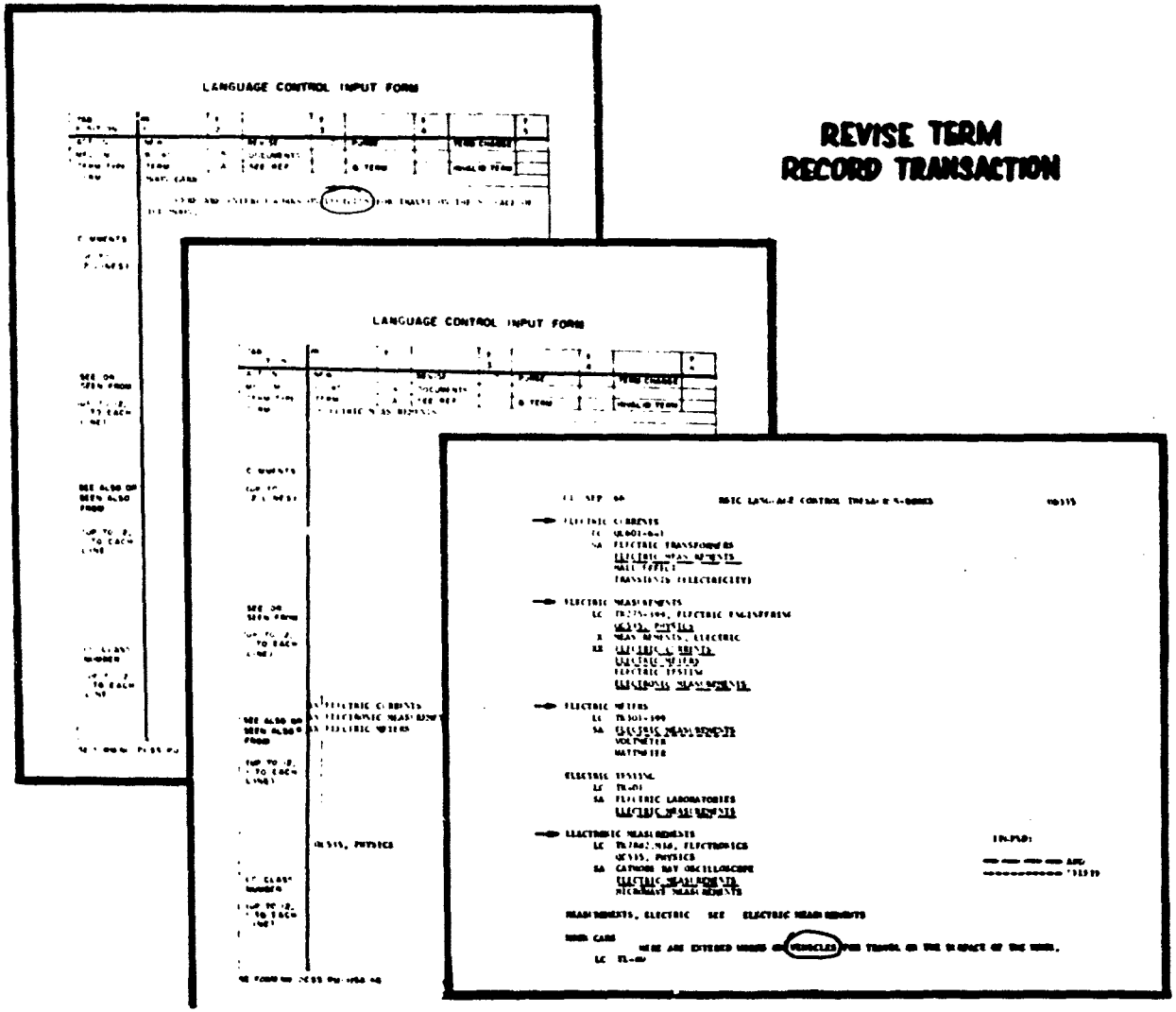


Figure 20. Revise Term Record Transaction

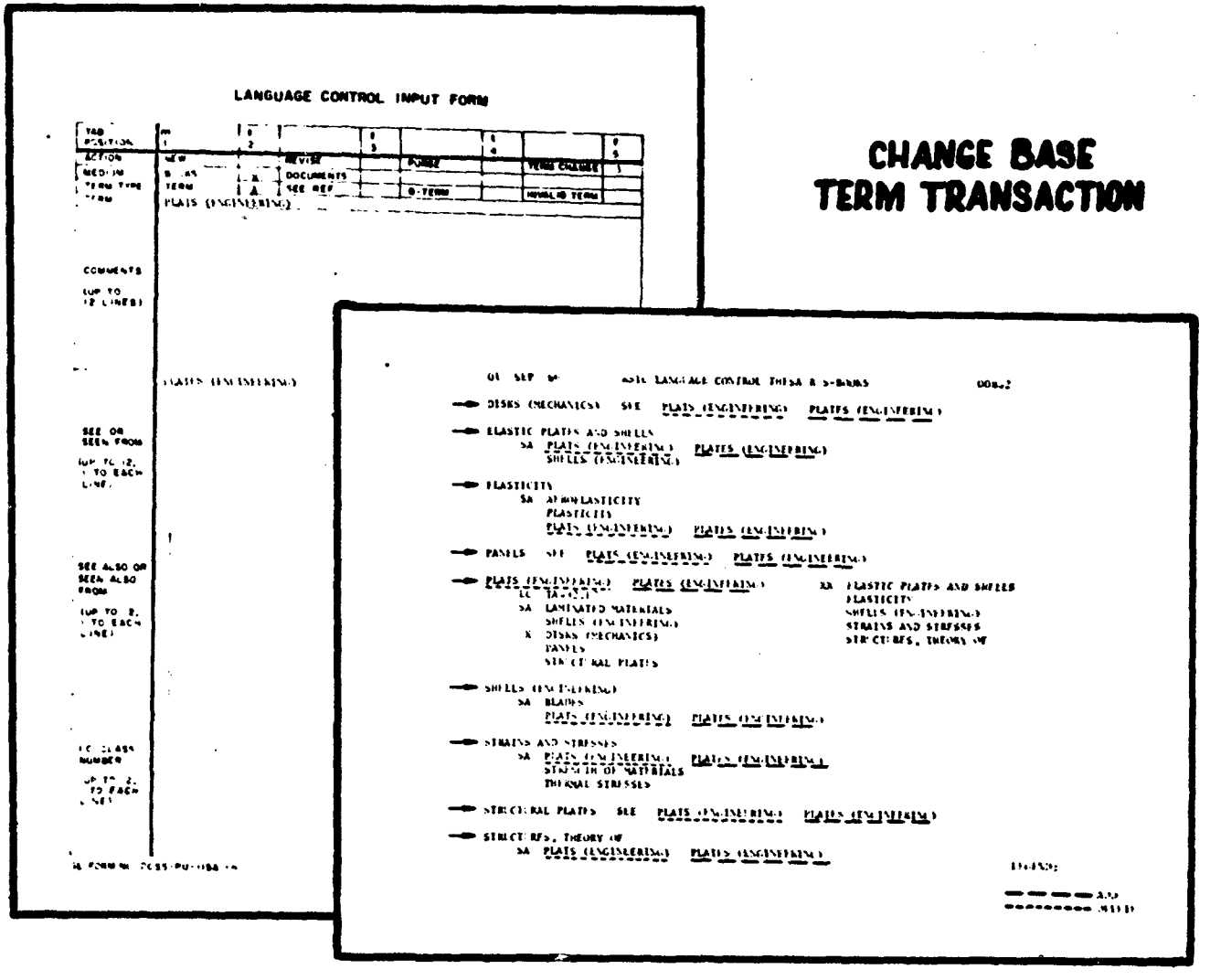


Figure 21. Change Base Term Transaction

01 SEP 66 LANGUAGE WORKSHEET ERRORS-BOOKS 0001

BASE	TERM			
XXXX	X	A	CYBERNETICS	ACTION CODE MISSING
1	X	A, B	DECISION-MAKING	MULTIPLE TERM TYPE CODES
2,3	X	A	ENGINEERING MATHEMATICS	MULTIPLE ACTION CODES
1	X	XXXX	GEOMETRY	TERM TYPE MISSING
2	X	A	XXXXXXXXXXXXX	TERM MISSING
0	X	V	LENSES	INVALID TERM CODE
2	X	A	MATERIALS	TRANS EXCEEDS MAX LENGTH

Figure 22. Language Worksheet Errors - Books

```
 01  SEP  66                          RSIC LANGUAGE MONITOR                          00005

**ANTI-FREEZE SOLUTIONS  (BOOKS TERM)  NOT IN FILE.  PURGE ACTION NOT PROCESSED.

**APOLLO PROJECT  (SEE REFERENCE - BOOKS)  NO SEE TERMS IN FILE, NEW ACTION NOT PROCESSED.

      SEE PROJECT APOLLO  (NOT IN FILE)

**APPARATUS, CHEMICAL  (SEE REFERENCE - BOOKS)  REVISE ACTION NOT PROCESSED. DATA ELEMENTS INVALID.

      SEE CHEMICAL APPARATUS

  ASTRODYNAMICS  (BOOKS TERM)  ADDED.

      XX  ASTRONAUTICS
          INERTIAL NAVIGATION (ASTRONAUTICS)
          NAVIGATION (ASTRONAUTICS)
          SPACE FLIGHT
          SPACE TRAJECTORIES

      LC  TL1050

**AURORAS  (BOOKS TERM)  ALREADY IN FILE, NEW ACTION NOT PROCESSED.

      XX  MAGNETISM, TERRESTRIAL
          ATMOSPHERIC ELECTRICITY
          AIRGLOW

  AUTOMATE CONTROL  (BOOKS TERM)  CHANGED TO AUTOMATIC CONTROL.

  AUTOPILOT  (BOOKS TERM)  PURGED.

**AZO DYES  (BOOKS TERM)  REVISION NOT INDICATED.  NOT PROCESSED.

**BALLISTIC MISSILES  (BOOKS TERM)  MULTIPLE CHANGE TO TERMS PRESENT.  TERM CHANGE ACTION NOT PROCESSED.
```

Figure 23. RSIC Language Monitor

01 SEP 66

RSIC LANGUAGE STATISTICAL REPORT-BOOKS

PAGE 1 OF 1

	BEGINNING 25 AUG 66	ADDED	PURGED	REVISED	TERM CHANGES	ENDING 01 SEP 66
BOOKS TERMS	01525	00000	00000	00000	00000	01525
SEE REFERENCE - BOOKS	00823	02820	00000	00000	00000	03643
SUBTOTAL (BOOKS)	02348	02820	00000	00000	00000	05168
DOCUMENT TERMS	00000	00000	00000	00000	00000	00000
Q-TERMS	00000	00000	00000	00000	00000	00000
SEE REFERENCE - DOCS	00000	00000	00000	00000	00000	00000
INVALID TERMS	00000	00000	00000	00000	00000	00000
SUBTOTAL (DOCS)	00000	00000	00000	00000	00000	00000
GRAND TOTAL	02348	02820	00000	00000	00000	05168

01 SEP 66

RSIC LANGUAGE STATISTICAL REPORT-DOCUMENTS

PAGE 1 OF 1

	BEGINNING 29 AUG 66	ADDED	PURGED	REVISED	TERM CHANGES	ENDING 01 SEP 66
BOOKS TERMS	00000	00000	00000	00000	00000	00000
SEE REFERENCE - BOOKS	00000	00000	00000	00000	00000	00000
SUBTOTAL (BOOKS)	00000	00000	00000	00000	00000	00000
DOCUMENT TERMS	15209	00181	00018	00310	00007	15372
Q-TERMS	00073	00000	00000	00000	00000	00073
SEE REFERENCE - DOCS	01134	00172	00002	00001	00000	01324
INVALID TERMS	00004	00000	00000	00000	00000	00004
SUBTOTAL (DOCS)	16440	00353	00020	00311	00007	16773
GRAND TOTAL	16440	00353	00020	00311	00007	16773

Figure 24. Language Statistical Report

CROSS REFERENCES - DOCUMENTS

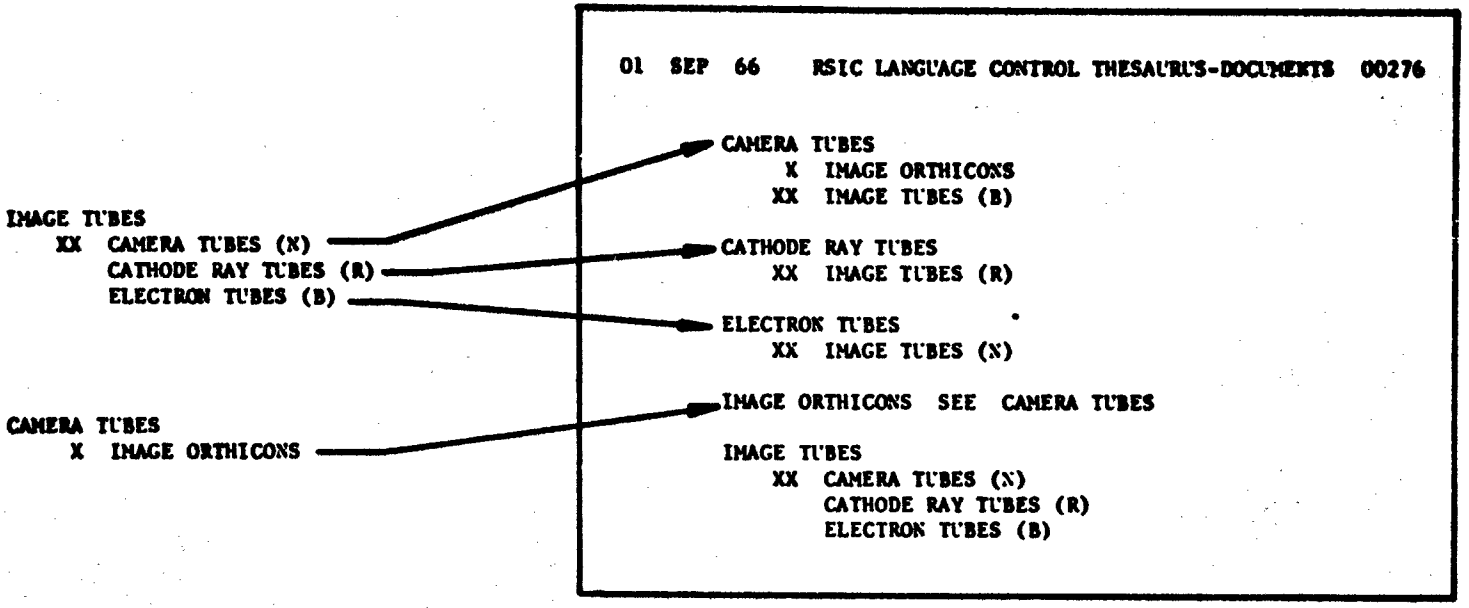


Figure 25. Cross References - Documents

GENERAL SYSTEMS

Automated Book Ordering and Receiving

by

Bettye J. Pride

Automation in the acquisitions program of a library will for some time be limited to machine performance of the nonintellectual processes carried out today. We are entering an era of more sophisticated computer programming instructions organized so that a computer can learn, by processing data, the desired results required. This process is referred to as "computer learning," but the process will not make the decision of what to order for us.

The ordering and receiving method used at the Redstone Scientific Information Center is characterized by emphasis on recording information only once and at the earliest possible time. This module of the ALPHA System offers the following features:

1) It eliminates duplication of filing in ordering and receiving.
2) Cards are prepared for use in ordering, receiving, cataloging, and distribution from the initial keying of information.

Costly and time-consuming manual effort involved in library acquisitions is drastically reduced by automatically handling or preparing most of the documents required. It maintains accurate and quickly available history and cost records and assists in providing timely and flexible user services throughout the library processing cycle. Since this module was the first to be automated, and was put in use before most others were designed, its interrelationship with others is less close and it is less sophisticated internally than some of the others. It has operated reliably, however, from the first.

This is how the Book Ordering and Receiving Module of the ALPHA System works. When a patron request card is received in the Circulation Section, the circulation librarian determines if:

1) The item requested is not available for circulation.
2) The item is not on order - I will tell you about the list he uses later.
3) The item cannot be recalled.
4) The item is not flagged as reserve.
5) The item is not outside the scope of RSIC.

When all these conditions are met, the circulation librarian adds to the request card any other information readily available, such as LC classification number, complete title, author, etc. The request card is then forwarded to the acquisition section.

Here the acquisition librarian verifies the citation or determines exactly what is wanted. Once it is decided to add the book to the holdings, the request card is completed by adding the publisher's address, quantity to be ordered, unit cost, LC card number, and the vendor. These cards are grouped by vendor with similar cards representing items recommended and selected by RSIC staff members and placed in the "to-be-ordered" file.

The basic machine used in the ordering and receiving is the IBM-632 electronic typing calculator. This type of machine is a small but powerful tool for a library. It produces typewritten copy on a typewriter, reads punched cards, and also punches and prints information onto cards. Another time-saving advantage of the machine is that it automatically extends and totals the amount of each purchase. The operator can at any one time check the subtotals and observe the monetary limitation imposed on each account. The result of this one-time typing is the completed purchase order and set of ordering input transactions cards which are used to update the appropriate computer files (Figure 26).

The operator removes the request cards in the to-be-ordered file, groups those for one vendor, and types the order.

When the order is completed, the operator forwards the purchase order, the original request cards, and the key-punched ordering cards to the librarian in charge of checking the orders before the orders are signed and sent to the vendor. The punched cards are then forwarded to the Computation Center (Figure 27).

A Weekly On-Order List of the items ordered and received, but not yet cataloged, and a daily supplement are received from the Computation Center and copies are sent to the acquisition and circulation librarians (Figure 28). Decks of punched and printed transactions cards which are used for receiving, cataloging, and distribution are received with this list (Figure 28). During this processing, a new item control number is assigned. This number is called a Receiving Code number, which is cross-referenced to each item on this list. (We really call the code an IDIOT number because it is machine-sorted to avoid filing.) These cards are already in ascending order and are placed at the end of the existing file, thereby eliminating any manual

sorting or rearrangement. This gives us all future transaction cards for each book on order grouped together in a rough date sequence.

When an item is received from a vendor, the title is checked against the Weekly On-Order List to obtain the Receiving Code number. The set of punched cards pertaining to that item is removed from the file and the date and price details variations (whether there are not) are punched in the receiving cards. We usually use the typing calculator, but an 026 card punch or little desk punch can be used just as well. These cards are returned to the computer to update the master file. The Catalog Information Cards (610 and 611) and Patron Mailing Card (620) are placed in the book and travel with it to the Cataloging Section. The cataloger is able to tell by the absence or presence of an LC classification number whether the item is a new title or an additional copy of a title already in the collection. When the book has been cataloged, the catalog information card is forwarded to the Computation Center for processing, which removes the book from the on-order file.

The book then travels to the circulation desk where it is checked out to the patron whose name appears on the Patron Mailing Card. Since the information on the mailing card includes the patron's name, mailing symbol, and the building number, it is taped to the book as an address label and mailed to the patron. This action completes the ordering, receiving, cataloging, and distribution cycle.

As might be expected with an automated system, several reports are automatically produced as by-products of the updating of the master on-order file. These reports may be produced daily, weekly, monthly, or upon special requests. Examples are financial reports, cancellations records, and outstanding orders. Our use of this file to follow-up overdue orders has kept our obligations within reason and helped us keep our vendors on the ball.

There is a more detailed description of this module in the February 1966 issue of Special Libraries; reprints are available.

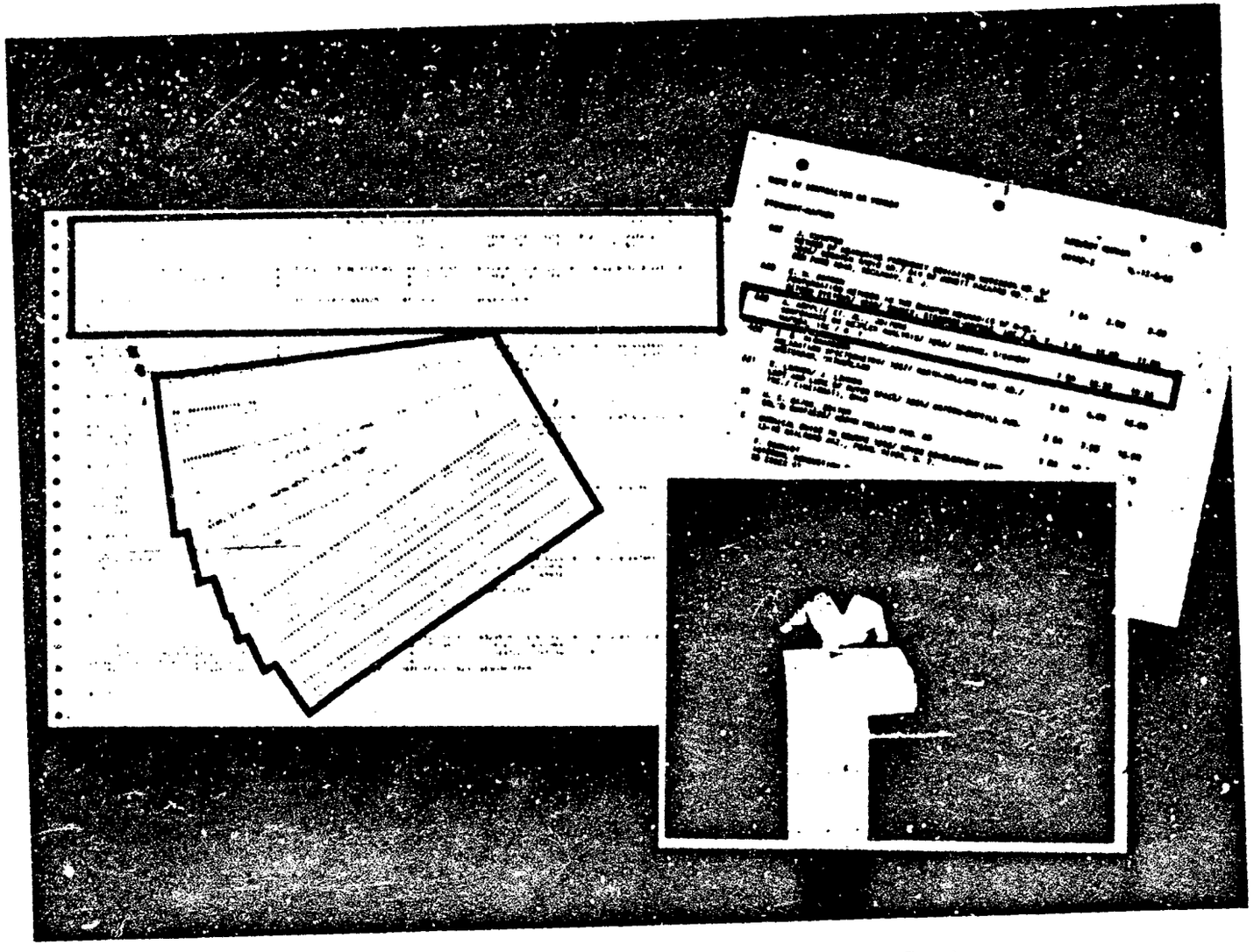


Figure 26. Ordering Input Transactions Cards

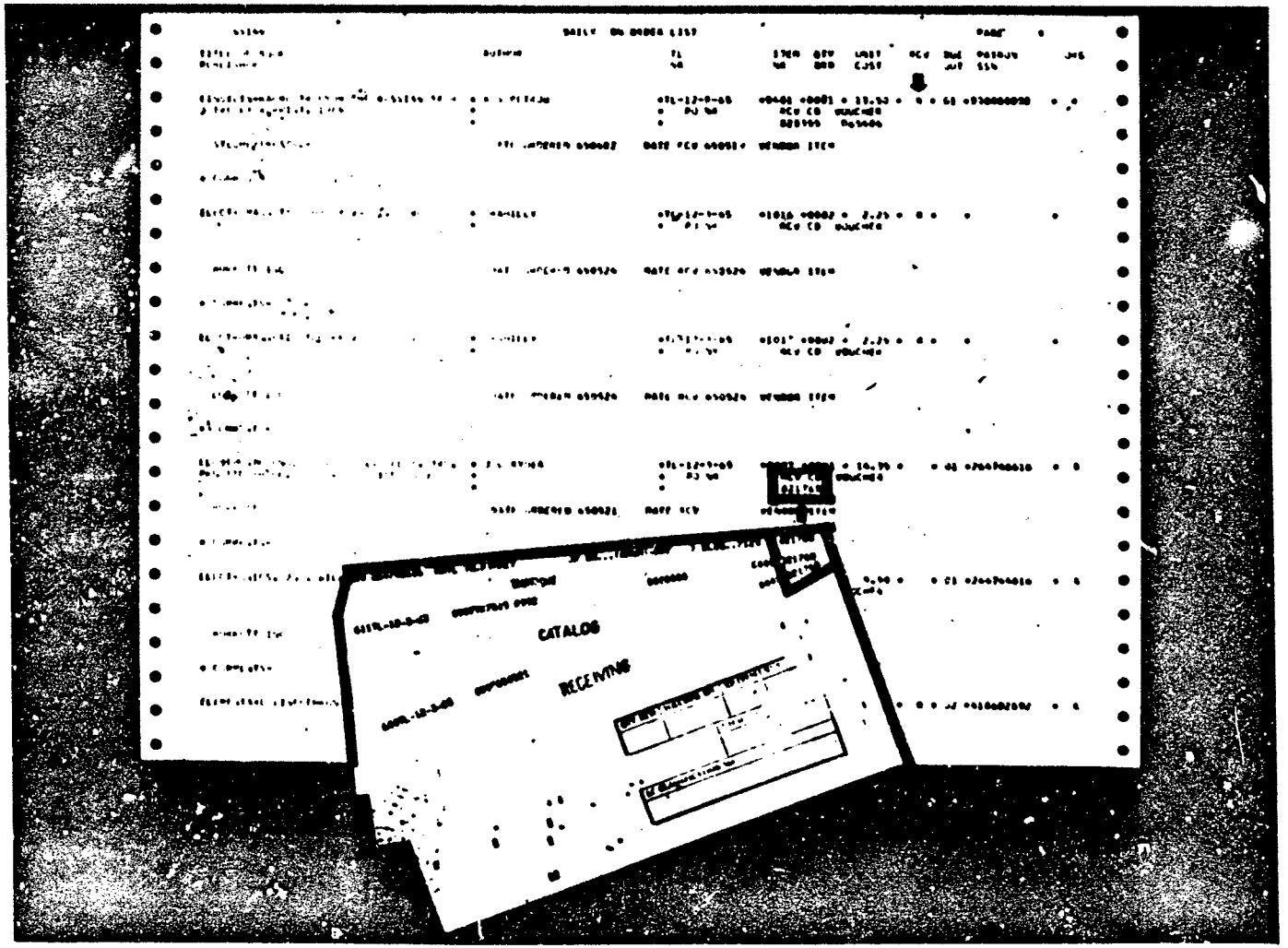


Figure 27. Key-Punched Ordering Cards

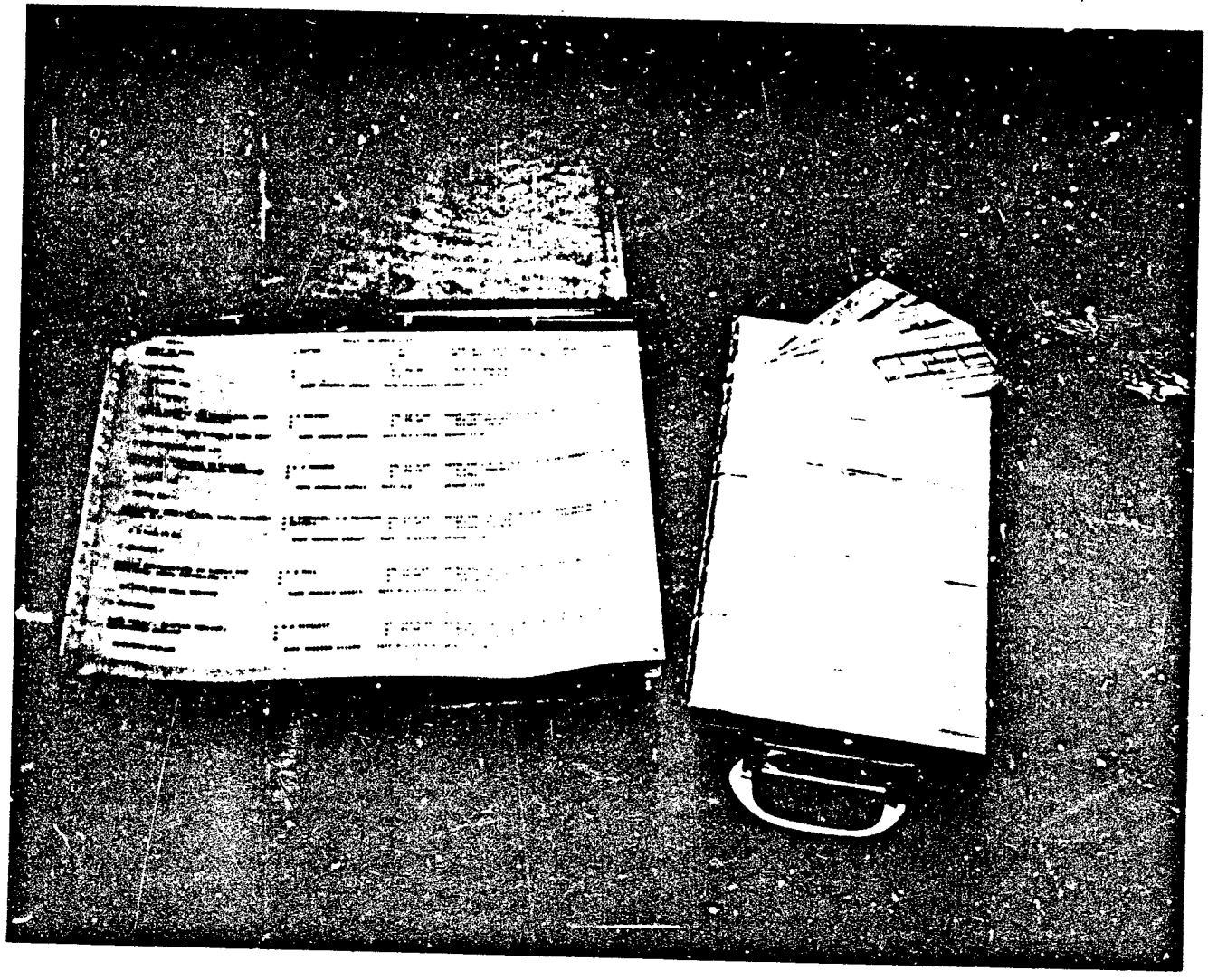


Figure 28. Daily On-Order List Supplement

GENERAL SYSTEMS

Book Cataloging

by

Lillian West

No longer do we challenge the statement that we are living through one of the most imposing revolutions mankind has ever known - the computer revolution. It would have been calamitous, indeed, if the library world had failed to recognize the necessity of adapting itself to the many changing needs of science and technology. After we did a great deal of analysis and planning, the automation of cataloging here at RSIC is emerging from the first generation of ALPHA, and we are taking steps - some bold, some tentative - to make computers work for us in cataloging.

The purpose of the book cataloging module is to establish, monitor, and maintain central control files of bibliographic data for cataloged book holdings of the Redstone Scientific Information Center and to display this information in appropriate formats for use by the Center.

The book cataloging module consists of a series of computer runs designed to maintain the following master files:

1) Bibliographic master
2) Inventory control master
3) Search master

It will also contribute to the maintenance of the subject heading authority master.

The design of this module is based on the concept of inputting bibliographic data consisting of variable numbers of data elements of variable lengths. These bibliographic data elements are identified by standard codes, which we shall present in detail in the data capture procedures. In addition, the preservation of case designation for later display is maintained throughout the system. Because of these and other requirements, input data to the cataloging module is being captured on paper tape and is then converted to magnetic tape.

Primary input to the system consists of:

1) Bibliographic and inventory data for new holdings
2) Deletions, additions, or changes to existing holdings
3) Total deletions of bibliographic data

The system features authority checks on all incoming call numbers and on all subject headings.

With this general scope of the cataloging module in mind, let us now proceed to more detailed procedures that we use in the implementation of this system. (During this explanation, we wish that we could invite you into our future cataloging department with the most modern on-line equipment, but you must remember that we are still in the first generation of ALPHA. We have at present a purely serial system, operating on a batched basis.) At RSIC we are relegating Dewey to oblivion and are using Library of Congress Classification with the three-figure Cutter-Sanborn tables. On Figure 29 we see examples of the way we make call numbers unique. The first and second lines are the classification and Cutter numbers. The third line is the copyright date, meeting dates of conferences or symposia, or, in some cases, the date covered by the material, for example, annuals and yearbooks. Next, we see volumes indicated by V and copy numbers by C. Other symbols are used as needed, for example, P for part or S for section.

When we first planned our automation program, we had a contract with the General Electric Company. After the team of GE computer programmers and analysts oriented the catalogers in computer terminology, the catalogers, in turn, briefed the personnel of this team on cataloging procedures, including explanation of various types of cataloging that might appear on the catalog cards.

Then we were ready to embark upon the arduous task of capturing the raw bibliographic data directly from the shelf list. The concept of identifying the various items of information within an entry is an important one. We do not have to write "author" before the author's name because we (and our library users) are intelligent human beings. It would be nice if a computer were bright enough to look at a card and cull these little tidbits of information from it, but we know that this is not so. Consequently, an author must be identified for a computer, which should know whether it is a personal or corporate author, through some coding scheme. The title must be identified, as must the classification number, imprint, pagination, headings, and so forth. Given such clues, however, the computer can identify and manipulate each of these items of information (or fields) to give the desired end product.

Initial emphasis had to be given to this data capture phase, so a clerical assistant was assigned to take groups of cards from the shelf list file and at the flexowriter operation station (with the use of the following data element codes) capture complete information including copy numbers (Figure 30). We define the bibliographic paragraph as the bibliographic citation less the main entry line when it is separately

stated. Various styles of presenting information in this bibliographic paragraph make it difficult for assistants to identify the data elements (particularly titles), so we capture the whole bibliographic paragraph and indicate it with code N01. Informal notes in this system include collation and any comments, both formal and informal. It is necessary to change the data element code (o01) as the informal notes and paragraphs change.

Now we are ready to accept the new books from the Receiving Department and to see the interdependence of the subsystems - ordering, receiving, and cataloging. The keypunched cards which were generated by ordering and receiving are placed inside the books and indicate to the catalogers through "610 and 611" transactions whether the titles are new or added copies of titles previously cataloged. In this latter case, the LC call number appears on the keypunched card and enables one to record the added copies quickly.

Simultaneous with the capture of previously cataloged materials, hundreds of new titles will be captured and entered on the computer record. Raw input data may be taken directly from a master card or from a cataloging worksheet. (At present we are working directly from the unit card.) In Figure 31 you see information as it might appear on a catalog card. In Figure 32 you see this same information as it would appear on an appropriately filled out worksheet.

Data from the worksheet or catalog card is transcribed to paper tape by the flexowriter operator. The paper tape, in turn, is converted to magnetic tape transactions which are used to post the Books Bibliographic Master. The complete flow of activity is shown in Figure 33.

Now we will look at a typical shelf list card that has had all information captured (Figure 34). You are probably wondering why the upper right hand corner is cut from the shelf list. This is a physical indication which tells the cataloger that the original information on this title has already been captured. If it becomes necessary to submit additions, changes, or deletions to this record, the cataloger must send to the flexowriter operator appropriately filled out cataloging worksheets to update the original input.

Figure 35 presents valid actions codes that are used for additional information to an established record. Now let us look at a sample worksheet used to add another copy number to the established record of the title Fans that was presented in Figure 34. We want to add copy 4 of TJ 960 G81 1966 to the shelf list (Figure 36). By the same reasoning and by the use of a different action code, we can delete a part or all

of the record above (Figure 37). Notice that we are using the action code 0 and are deleting the entire record. (We know that this type of action is necessary, more often than we like, for we must sometimes change to an entirely different classification number for the title or correct call number errors.) On line 3 of this form we have another example of deleting only copy 5 from QA276 B144 1965. In Figure 38 we see another example of a different action - Code 6 - Salvage. The tape prepared by the flexowriter operator will generate a transaction which will flag copy 2 as a salvaged copy in the Book Inventory Master.

So far we have discussed only changes to copy numbers. To correct erroneous data elements that may appear on the bibliographic file printout, or to add new volume titles, etc., to a previously captured entry, we fill out a worksheet (Figure 39). As we look at this sheet, let us pretend that we have seen the bibliographic file printout and that we have found an incorrect spelling for the author, J. A. Benson, in the record which has the unique call number of QA 76.4 B474 1966. We prepare this worksheet by using the following procedures:

1) Indicate the change action by Xing out the code "3" block at the top of the form.
2) Enter the call number in the call number block.
3) Secure the data element code(s) for the data element(s) to be changed from the bibliographic file printout.
4) Enter the correct version of the data element(s) to be changed in their respective blocks.

(Note: Benston was changed to "Benson," so we merely entered Benson, the fourth author, by the data element code - A04; this action placed the correct spelling in place of the incorrect one.)

In an automated system, it is sometimes desirable to put limitations on some of the traditional cataloging procedures and to allow some areas of greater latitude. A few of these we have applied are:

1) Edition cataloging. (It seemed preferable to catalog editions separately instead of trying to enter several editions on one basic cataloging of the title.)
2) Open entries. (These have been somewhat restricted; for example, meetings of conferences and symposia are cataloged separately. This again is a form of edition cataloging.)
3) Dashed-on entries. (Supplements recorded on the same catalog card with the basic title are being cataloged separately.)
4) Ellipses. (These are not to be used in the bibliographic paragraph.)

5) Abbreviations in call numbers. (It is highly desirable but not essential for the abbreviations to be uniform.) Some examples of these are:

Book - B	Volume - V
Copy - C	Part - P

Cataloging also places its restrictions upon the data capture operation, and we have a detailed data capture narrative for the flexowriter operator. If anyone cares to read this part of the operation, you may see a copy and we will make it available to you if you need it. Before the automation of cataloging is entirely operational, the output has to be proofed against the master shelf list record. We are just beginning this terrifying task, so please forgive the errors in the shelf list printout samples you see. We will be happy for you to examine the printout and ask any questions that you may desire.

At this time we still feel we will want to maintain a master shelf list card record for some time, if not indefinitely, but we believe our goal of having a book catalog replace the card catalog is very near. Maybe we can have a great celebration around the bonfire of catalog cards as we realize our dreams of a computerized cataloging system.

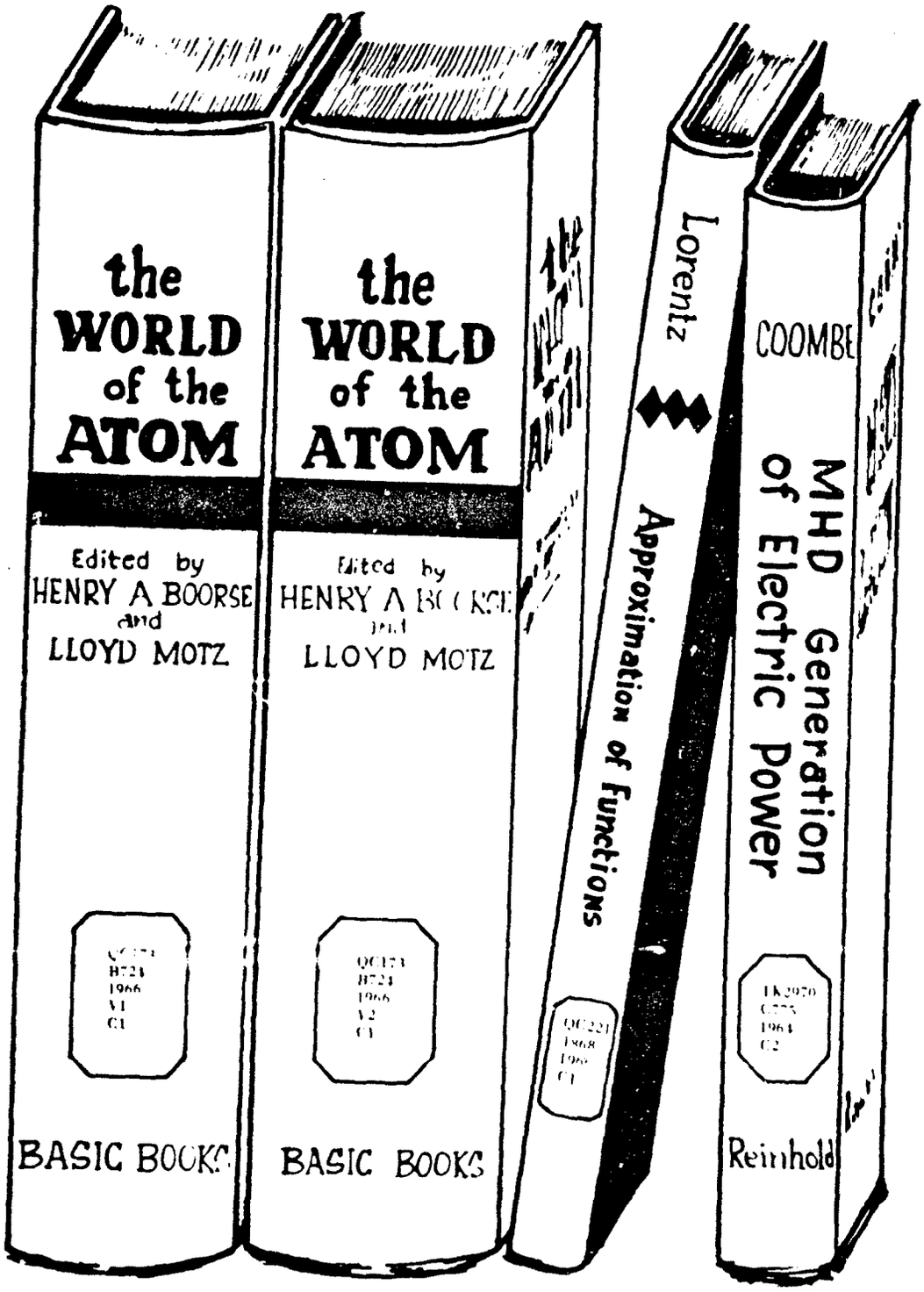


Figure 29. Library of Congress Classification

DATA ELEMENT CODES AND THEIR MEANING

DATA ELEMENT CODE	TYPE OF DATA
A01 - A99	AUTHORS
B01 - B99	TITLES
C01 - C99	CORPORATE AUTHORS
E01 - E99	EDITORS
F01 - F99	COMPILERS
G01 - G99	TRANSLATORS
H01 - H99	ILLUSTRATORS
L01 - L99	LANGUAGE
M01 - M99	SERIES
N01	BIBLIOGRAPHIC PARAGRAPH
001 - 099	INFORMAL NOTES
P01 - P99	SUBJECT HEADINGS
Q01	COSATI SUBJECT CATEGORY CODE
T01 - T29	CONTRACT NUMBERS
T?1 - T59	SUB-CONTRACT NUMBERS
T61 - T89	PROJECT NUMBERS
T91 - T99	GRANT NUMBERS
V01 - V99	REPORT NUMBERS

NOTE: ERROR MESSAGE WHEN DATA ELEMENT CODE IN TX RECORD IS NOT ONE OF THE ABOVE WILL READ - "INVALID DATA ELEMENT CODE."

Figure 30. Data Element Codes and Their Meaning

62

TC176
A663

Aravin, V I

Theory of fluid flow in undeformable porous media [by] V. I. Aravin and S. N. Numerov. Translated from Russian [and edited by A. Moscona] Jerusalem, Israel Program for Scientific Translations, 1965.

xi, 511 p. illus., ports. 25 cm.

Label mounted on t. p.: Published in the U. S. A. by D. Davey, New York.

Translation of Teoriia dvizheniia zhidkostei i gazov v nedeformiruemoi poristoi srede.

Bibliography: p. 475–504.

1. Seepage. 2. Porosity. I. Numerov, S. N. II. Moscona, Aron, ed. and tr. III. Title.

TC176.A713 627 H E 65–701

Figure 31. Catalog Card

s form will be revised.

ALPHA 1 CATALOG WORKSHEET 5 Inventory Adjustment

1 NEW	2 ADD 3 CHANGE 4 LOST 5 SALVAGE 7 FOUND 8 DELETE
LC CALL NO.	TC 176 .I663 1965 COPY 1 NO. OF COPIES 1 CIRCULATE Y
MAIN ENTRY	X PERSONAL CORPORATE TITLE EDITOR
	Aravin, V I
TITLES	Theory of fluid flow in undeformable porous media
AUTHORS	Numerov, S. N.
CORPORATE AUTHORS	
EDITORS	Moscona, Aron
COMPILER	
TRANSLATOR	Moscona, Aron
ILLUSTRATOR	
PLACE	Jerusalem
PUBLISHER	Israel Program for Scientific Translations
DATE	1965 VOLUME PAGINATION 511 LANGUAGE English & Russian
PLACE	
PUBLISHER	
SERIES	
VARIANT TITLE NOTES	
INFORMAL NOTES	Label mounted on t.p.: Published in the U.S.A. by D. Davey, New York. Translation of Teoriia dvizheniia zhidkostei i gazov v nedeformiruemoi poristoi srede. Bibliography: p. 475-504. Translated from Russian and edited by A. Moscona
DESCRIPTORS	Seepage Porosity

Figure 32. ALPHA 1 Catalog Worksheet

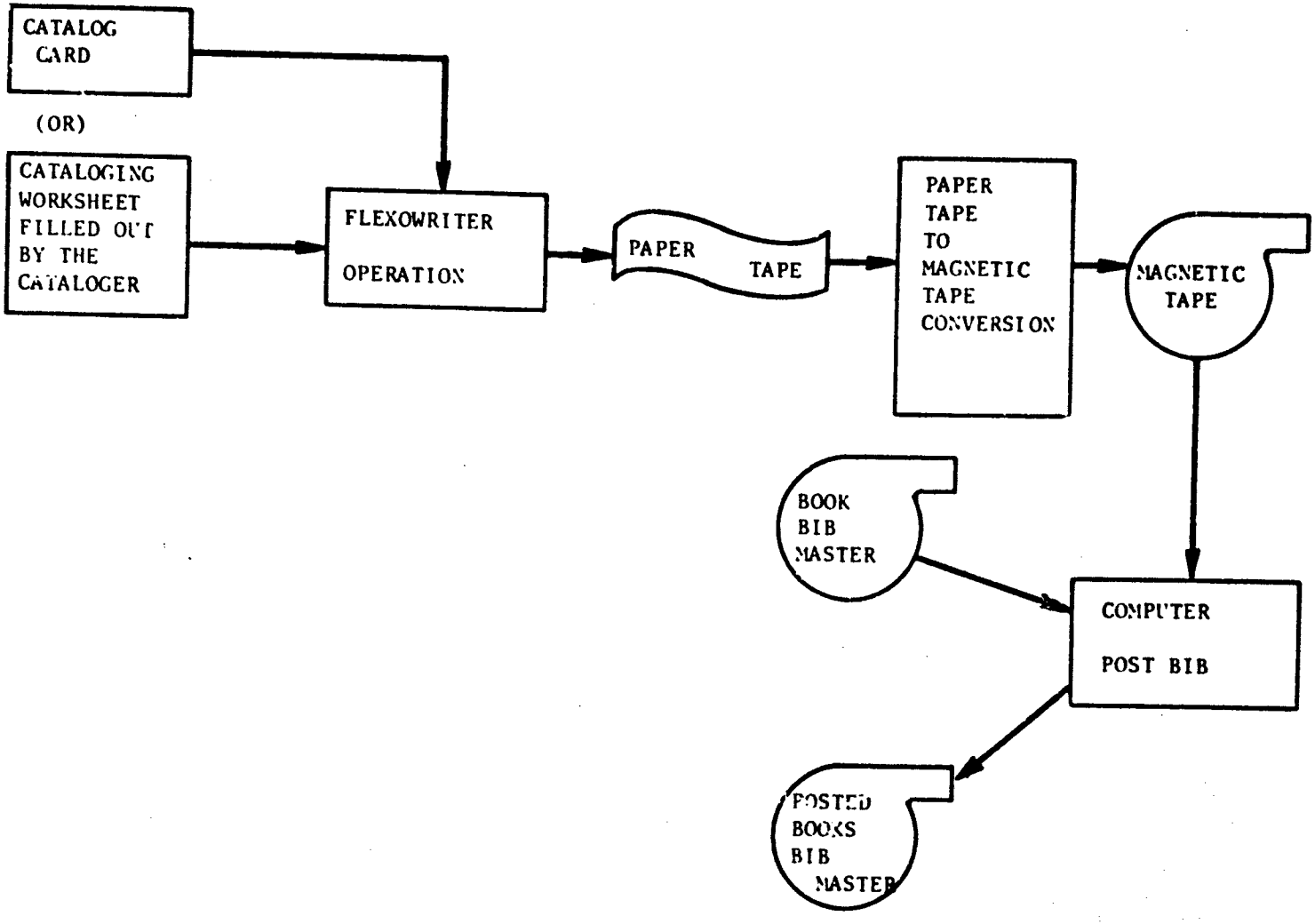


Figure 33. Flow of Activity

TJ960
O81

Osborne, William C

Fans, by William C. Osborne. [1st ed.] Oxford, New York, Pergamon Press [1966]

xii, 224 p. illus. 23 cm. (International series of monographs in heating, ventilation, and refrigeration, v. 1)

Includes bibliographies.

1966 C1
1966 C2
1966 C3

1. Fans (Machinery) I. Title. (Series)

TJ960.O8 1966 621.6 66-18408

Library of Congress [14-1]

Figure 34. Typical Shelf List Card

VALID ACTION CODES AND THEIR FUNCTION

ACTION CODE	FUNCTION
0	DELETE
1	CREATE NEW RECORD
2	ADD DATA TO ESTABLISHED RECORD
3	CHANGE DATA TO ESTABLISHED RECORD
4	FLAG COPIES LOST
5	FLAG COPIES FOUND
6	FLAG COPIES SALVAGED
7	INVENTORY ADJUSTMENT OUT

NOTE: IT SHOULD BE NOTED THAT THE SPECIFIC ACTION IS ALSO GOVERNED BY EVALUATING THE ACTION CODE TOGETHER WITH THE DATA ELEMENT CODE OF THE INCOMING TRANSACTION.

Figure 35. Valid Action Codes and Their Function

2 Add

Cataloger W

ADDED COPIES FOR SHELF LISTS THAT HAVE HAD COMPLETE INFORMATION CAPTURED

LC CALL NO.	COPY NO.	NO. OF COPIES (REC)	(REFERENCE) R	(XP) X
TJ960 081 1966	4	1		

Figure 36. Sample Worksheet - Add

0 ✔	Delete				Cataloger W
COPIES TO BE DELETED					
LC CALL NO.		COPY NO.	NO. OF COPIES (Del)	(REF) R	(XP) X
TJ960 081 1966		ALL	ALL		
QA276 B144 1965		5	1		

Figure 37. Sample Worksheet - Delete

6 ✔ SALVAGE

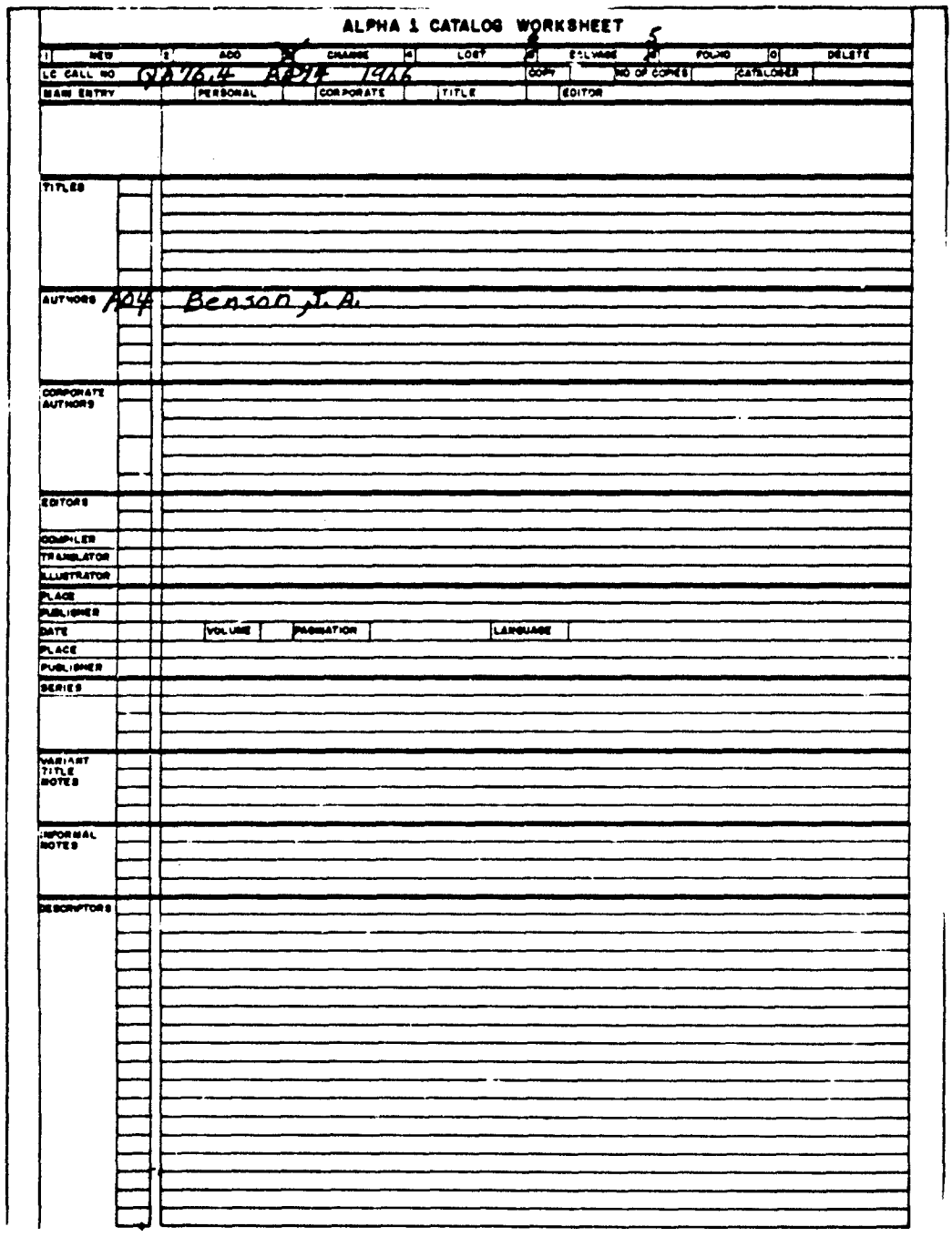
Cataloger ✔

COPIES SALVAGED

LC CALL NO.	COPY NO.	NO. OF COPIES SALVAGED	(REF) R	(XP) X
TJ960 081 1966	2	1		

Figure 38. Sample Worksheet - Salvage

This form will be revised.



ALPHA 1 CATALOG WORKSHEET

1 NEW | 2 ADD | 3 CHANGE | 4 LOST | 5 SELWARE | 6 FOLIO | 0 DELETE

LC CALL NO QA76.4 A874 1976 | COPY | NO OF COPIES | CATALOGER

MAIN ENTRY | PERSONAL | CORPORATE | TITLE | EDITOR

TITLES

AUTHORS A04 Benson, J. A.

CORPORATE AUTHORS

EDITORS

COMPILER

TRANSLATOR

ILLUSTRATOR

PLACE

PUBLISHER

DATE | VOLUME | PAGINATION | LANGUAGE

PLACE

PUBLISHER

SERIES

VARIANT TITLE NOTES

INFORMAL NOTES

DESCRIPTORS

Figure 39. ALPHA 1 Catalog Worksheet

GENERAL SYSTEMS

Book Circulation

by

James P. Clark

The first major steps toward the automation of the entire library was the development of the automated book circulation system. It was felt that automatio of this function would serve to provide much more positive control over the circulating materials than had been possible under the previous system. In addition, it would make it possible to find information more rapidly and would facilitate the handling of the administrative aspects of clearing the accounts of employees who were leaving their jobs. The earliest version was non-ALPHA; for example, unrelated to other library functions; later, the ALPHA versions were designed.

In the period prior to automation, our circulation method was a variation of a fairly standard one. There were two 3 by 5 cards in a pocket in the back of each book available for loan. Whenever a patron wanted to borrow a book from the library, he was asked to sign both cards. A staff member wrote the borrower's name if it was a mail or phone request. The cards were then stamped with the date of the transaction; one was filed under the call number of the book and the other under the name of the patron. By this means we were able to know at any given moment the location of any specific book and we were able to furnish to each patron who requested it a complete and up-to-date inventory of the books charged to his account. This system did not give us a due date and at that time we did not use one. All books, therefore, were considered to be checked out on indefinite loan, although they were all subject to recall at any time, should this become necessary. No overdue notices as such were ever sent out. This philosophy made it necessary that the library have many copies of a great many titles.

In the present system, no files of cards are maintained at all, there are specific loan periods, and overdue notices are sent. Nowadays, each book that is sitting on the shelf available for loan contains a single IBM card in its pocket. This card has been punched with all of the information necessary for the identification of the book.

It contains the complete call number and the author and title in abbreviated form (Figure 40). At the time the book is to be checked out, this card is removed from the book pocket and inserted into a key-

punch machine located at the circulation desk. Into this card, we punch the date of the transaction, a symbol for the type of loan (we have several definite loan periods), a symbol that this item being loaned is not classified for security purposes, the borrower's name (we use his last name and two initials), and his social security number. We use the social security number instead of badge or payroll number because it is not only unique, it is also unchanging. The only people who have presented us with any problem on the use of the social security number have been such people as the British liaison officer or the visiting Chinese priest who came to use our library while working on his doctor's dissertation in physics. For these people we have created a dummy number. When all of this is punched into the card it then contains all that we need to identify both the man and the book.

Next we duplicate the card, place one copy back into the pocket of the book, and put the other into a box to be sent on to the computer; the book is now ready to go.

When the book is returned, all that is necessary for us to do to check the book back in is to take the card from the book pocket, place it in the key-punch machine and punch a cancellation mark in the first column, feed the next card, duplicate it from column 2 through the book identification, send the cancelled card to the computer and insert the new book-card back into the pocket. The book can then be shelved to await its next circulation.

From the computer, we receive a weekly printout of our circulation record (Figure 41). This printout normally displays the same information arranged in two different ways: one in order by patron's name to enable us to furnish instant inventories on demand and the other in order by call number so that we can know at any moment the location of any particular book.

These two printouts correspond exactly to the two files of cards used in the old system, but now this information is also used to send out overdue notices automatically. To have used a due date in the old system would have required either a third card, a more elaborate system of filing, or a manual review. Our loan period has been established as six months for a regular loan, one year for an extended loan, and 30 days for inter-library lending. If at the end of six months, a book on regular loan has not been returned, a notice is sent to the patron (Figure 42) reminding him that the book is now overdue. After thirty days, if he has failed to respond to the first notice, a second overdue notice is sent to him. Should he fail to respond, then in another thirty days a notice is sent to his supervisor (Figure 43). It has been our experience that this generally brings results.

For books on extended loan which have not been returned by the end of the year, a notice is sent reminding the man that he is charged with the book and asking him to indicate if he wants it renewed for another year (Figure 44). If he does, he is asked to sign and return the accompanying punched renewal card and the book will be renewed. This renewal card is a feed-back transaction which requires only a single punch to be ready to go to the computer to record the renewal.

In addition to the foregoing regular uses of the information we have stored in the computer, we can, as need arises, ask for special lists such as a list of all books charged out on extended loan, or all books charged to an institution or to a branch library. We can also use this information to monitor the number of books loaned to individual patrons. For example, we might ask for a list of all patrons who are charged with more than 50 books. Such a list might indicate which of our patrons had squirrel-like tendencies, but it might also be an indication that a branch collection was needed in some particular location. In practice, we do obtain a frequency distribution of books borrowed and cards for each borrower who has over 50 books (25 on extended loan) at one time.

Two other special notices are generated on demand. The patron recall notice (Figure 42) is sent to everyone who is charged with a copy of a book needed for loan and of which there is no copy on the shelf. Notice that this one is a request-type notice and not a demand for the return of the book. The reprocessing recall is sent out to recall books which the catalogers need to revise. Each of these notices - patron recall and reprocessing - is generated in response to a card input transaction grouped with the other circulation cards and prepared at the circulation desk.

Unfortunately, it seems inevitable that in the course of establishing any new system such as this, certain mistakes will be made. Even more unfortunate, in an automated situation minor errors which would have made little significant difference to a human being, suddenly become magnified and multiplied many times by a machine which, in truth, is not nearly as clever as some would have us believe. Perhaps a warning of some of the pitfalls we have discovered will enable some of you to avoid these particular ones and thus give you more time to go on and discover some even finer pitfalls of your own.

One of our first big mistakes was to introduce into the system patrons who were not fully identified by social security number. This helped us give fine fast service at first but caused considerable difficulty later when we were not able to tell which of two Messers T. A. Barr or four L. C. Browns actually had the book in question.

Another difficulty came about when it was discovered that the first version of the program had been set up in such a way that the two arrangements of the printout were out of phase, the one in patron's name order being in some cases a week behind the one in call number sequence. The result of this condition was that when using a man's name we might find him charged with a book he had already returned while under the call number we might find that same book charged to an entirely different man. The system has been reprogrammed since then and this difficulty has been eliminated.

Probably the one that caused the most frustration to our patrons, and the most embarrassment to ourselves, was the one in which the program was so arranged that if a book was charged to a man and discharged from him on the same day, the two transaction cards negated each other and left the situation as it had been before either was entered. This, of course, made it impossible to renew a book. A man might receive his first overdue notice, gather up his books and bring them in for renewal, actually have them renewed, and then be presented in thirty days with a second overdue notice on the very books he had just renewed; this too was corrected in the program.

These particular mistakes have been corrected, but some of their reverberations linger on.

The next important step in the development of our automated system will occur when we go "on line" with direct access to the computer. Mr. Cooney will cover this development to some degree on Thursday, so I shall confine my remarks to some of the more obvious effects that this will have upon book circulation. Access to the computer will be through an IBM-1030-1050 station, part of which you can see at the circulation desk now. There will be no more need for a regular printout of the full circulation record because all of the information now in the printout will be available directly from the computer and will therefore be much more up-to-date. If we want to know what books are charged to a patron, we will simply "key in" his identification and a transaction code and get back the information. It will be the same for any of the other information for which we presently consult the printout. The greatest advantage for use in this will be that the information will always be current instead of up to a week late as is now the case. Also, it will be possible to have terminals in remote locations so that much of the traffic now being handled at the main circulation desk can then be accommodated at stations located more conveniently for the patrons if the need arises.

If there are any questions at this point, I will be glad to try to answer them.

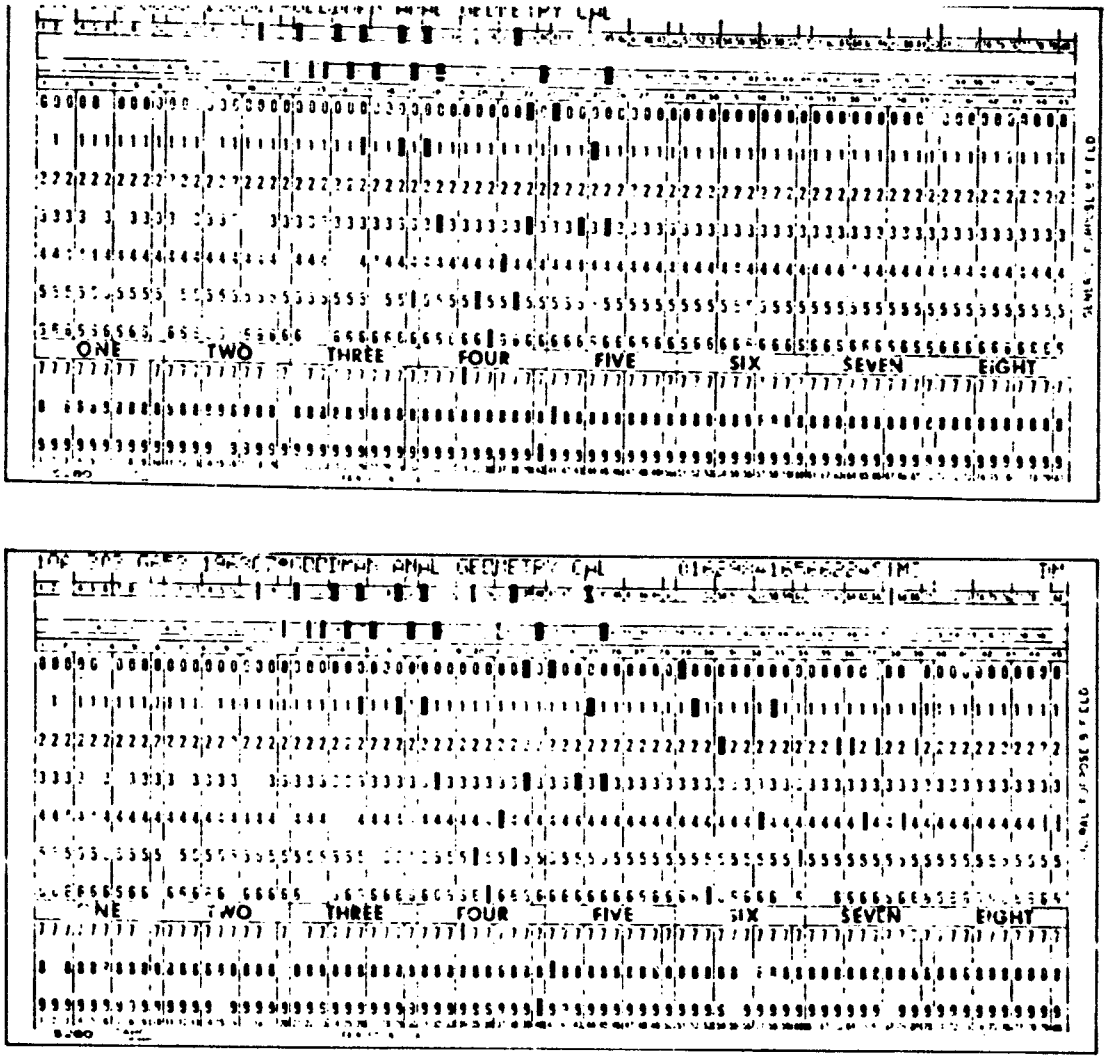
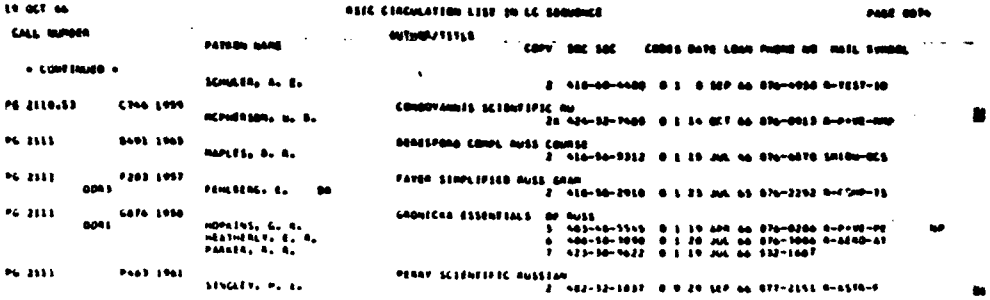


Figure 40. Loan Card



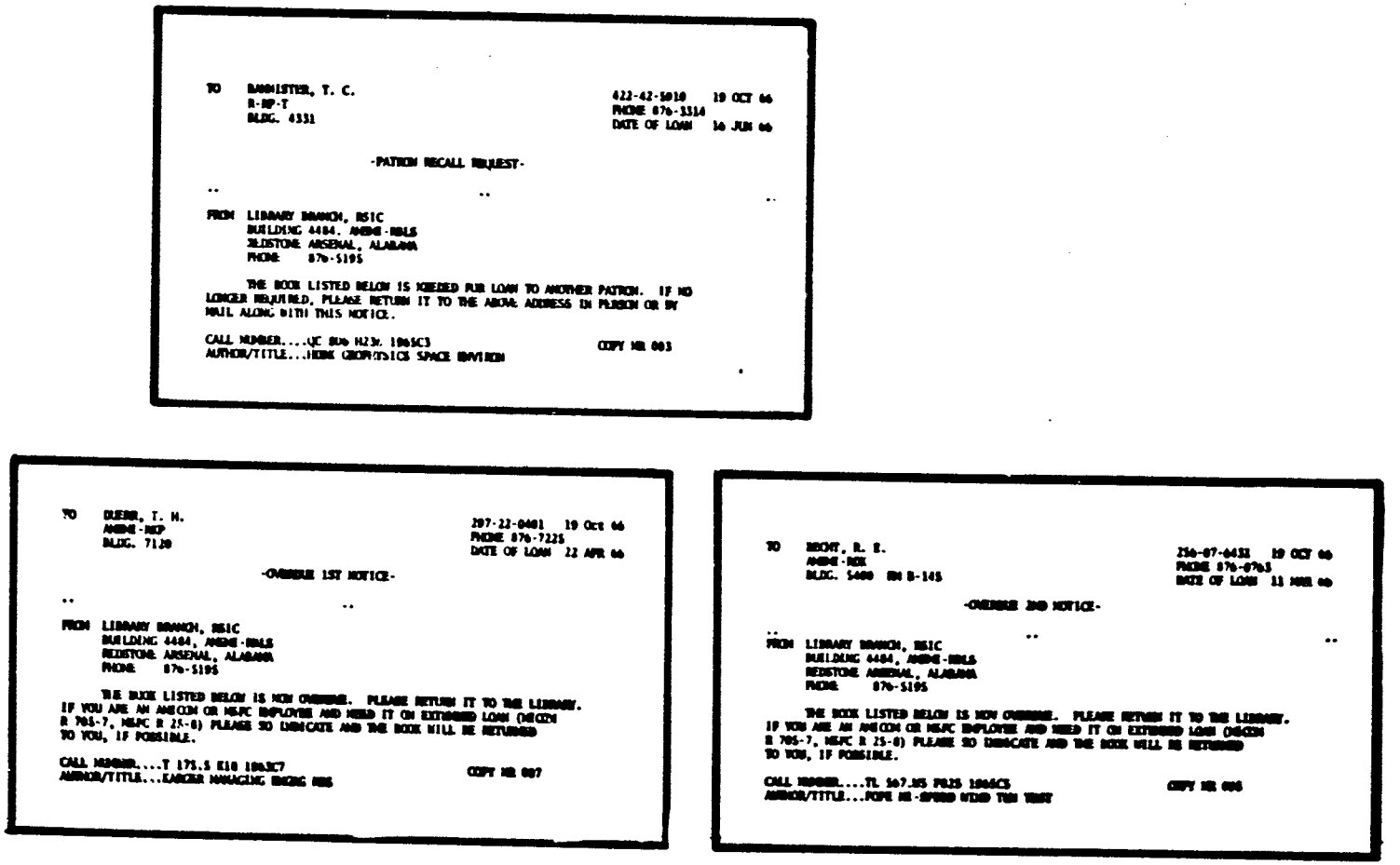
19 OCT 66 — BSIC CIRCULATION LIST BY LC SEQUENCE — PAGE 0004

CALL NUMBER	AUTHOR/TITLE	PATRON NAME	COPY	REC SOC	CODES	DATE	LOAN	PHONE NO	MAIL SYMBOL
* CONTINUED *		SCHULER, A. E.	2	416-60-4480	0 1	8 SEP 66	876-4950	0-TEST-10	
PG 2110.53 C744 1959	CONSERVANCIES SCIENTIFIC AM	MCPHERSON, W. B.	2a	426-52-7460	0 1	14 OCT 66	876-0013	0-0+0E-000	
PG 2111 B491 1969	BOOKSPOKE COMPL RUSS COURSE	NAPLES, B. R.	2	416-56-9312	0 1	10 JUL 66	876-6870	SMI0U-DES	
PG 2111 P203 1957 COPY	PAYEN SIMPLIFIED RUSS GRAM	PENLBERG, E. DD	2	416-56-2910	0 1	25 JUL 65	876-2252	0-F2H0-15	
PG 2111 G876 1950 COPY	GRONECKA ESSENTIALS OF RUSS	HOPKINS, G. R. HEATHERLY, E. R. PARKER, R. R.	5 6 7	403-46-5545 406-56-1090 423-30-9622	0 1 0 1 0 1	19 APR 66 20 JUL 66 19 JUL 66	876-0206 876-1006 532-1607	0-P+HE-PE 0-A440-A1	NP
PG 2111 P403 1961	PERRY SCIENTIFIC RUSSIAN	SINGLEY, P. E.	2	402-32-1037	0 0	20 SEP 66	877-2151	0-A5T0-F	DS

22 OCT 66 — BSIC CIRCULATION LIST IN PATRON NAME SEQUENCE — PAGE 00004

PATRON NAME / AUTHOR/TITLE	SOCIAL SECURITY NO.	PHONE NUMBER	MAIL SYMBOL	BLDG NO	CALL NUMBER	COPY NO	CODES	DATE LOAN	STATUS
BIRCHMAN, C. M.	227-54-1498	876-5357	AMSMI-RGC	4488	* CONTINUED *				
BAKER PAA + RADAR DISPLAYS	TK 6575	8167 1962				5	0 1	7 MAY 65	L
BARTON RADAR SYS ANALYSIS	TK 6575	8203 1964				25	0 1	27 MAY 66	
SACHAIN INTRCD RADAR SYSTEMS	TK 6575	5628 1962				54	0 1	2 JUN 66	
BESSEL, A.	309-46-9991	876-1392	0-AST0-G	4481					
RUDIMENTARY THEORY ORGANIZATION	HC 31	8895 1960				4	0 1	21 SEP 66	
BASIC PSYCHOL MANAGEMT	HC 38	H193 1964				2	0 1	29 SEP 66	
FISHER STAT METH RSCH WORKERS	QA 276	F535 1950				6	0 1	8 JUL 66	
BITTLE, P. A. DR.	095-30-5702	876-9025		7776					
ALLEN AERODYNAMICS	TL 570	A427 1963				4	0 1	25 MAY 66	
SHAPIRO SHAPE FLOW	TL 574.07	S529 1961				68	0 1	8 JUL 66	
FISHLOCK METAL COLOURING	TS 710	F537 1967				2	0 1	30 JUN 66	
HERZBERG MOLECULAR SPECTRA MOLECULAR	539.1 H 750					1	0 1	20 APR 66	
BLABUNDE, W. A.	464-26-4893	837-0108							
US DOD CPR STAT ASSTR US	HA 202	U9 1964				38	0 1	27 MAY 66	
DALE MCMR THEO PRAC	HC 31	D139 1965				2	0 1	11 JUL 66	
BAUM,ARTHUR PROJ MANAGEMENT	HD 38	B346 1965				18	0 1	2 JUN 66	
HEYEL CRUNCH JOB MGMT	HC 38	H615 1960				3	0 1	10 AUG 66	
MILLER SCHE COST PROM CONTR	HD 69.P7	M644 1963				6	0 1	26 AUG 65	CC03
STARCH MEM DEV EXEC ABIL	HC 5560	S795 1963				3	0 1	10 AUG 66	
WINSPEL CO THRY UNDERSTAN	HF 5549.5C8	W863 1960				2	0 1	23 SEP 66	
GLASSTONE SOURCEBK SPAC SCI	QB 500	G549 1963				55	0 1	3 AUG 66	
FEYNMAN FEYNMAN LEC PHYS	QC 23	F495 1963VI				4	0 1	29 SEP 66	CC03
SPP ADVANC PROPULS CONCEPTS	TL 780	S969 1963VI				4	0 1	1 JUL 66	CC03
STUHLINGER SPAC SCI ENGRG	TL 791	S933 1965				5	0 1	10 AUG 66	
LE SALLEY SPA EXPLORATION	TL 796.5	L496 1964				7	0 1	5 OCT 66	
COMLESS SPA PROBE PLAN EXPLOR	TL 796	C799 1965				12	0 1	10 AUG 66	*
BLASINCAPP ASTRONAUTICS	TL 875	B644 1964				2	0 1	28 SEP 66	
WORTHEFT PRINCIPLES OF ASTRONAUTICS	629.4 W C.2					1	0 1	29 OCT 65	CC03
PENNER ADV PROPULSION TECHNIQUES	629.426 P 59004					1	0 1	24 OCT 65	CC03
BLAU, B. L.	277-26-0847	876-6422	0-QUAE-AAT	4700					
BURPHY POS DIGITAL COMPUT	QA 75	M972 1958VI-3				25	0 1	29 SEP 65	L
LEGLER CIG COMP + CONT ENGR	QA 76.5	L473 1960				20	0 1	29 SEP 65	L
FRANKLIN CIFF EQUA ENGR	QA 371	F831 1960				48	0 0	7 JUL 66	
BULLE ADV ENGR MATH	CA 401	W961 1960				21	0 0	7 JUL 66	
BLEIN, C. M.	308-42-4889	842-3763		MIC					
HAYNES MANAGEMENT	HD 31	W634 1961				2	0 1	14 JUL 66	
STRUVE STELLAR EVOLUTION	QB 801	S927 1950				2	0 1	14 JUL 66	
BURAN INTRC ASTRONMY	QB 871	B954 1960A				2	0 1	14 JUL 66	
BLIGER, I. B.	564-36-9696	837-1008							
SPP CN MATH COMPUTATION TECH	QA 264	S900 1963				9	0 1	1 JUN 66	
FLW CP OF DIG CONTR SYS	QA 304	T722 1963				7	0 1	8 JUN 66	
GAFORMAC LIMIT DESGN FOR SHPS	QA 275	G571 1954				3	0 1	6 AUG 66	
GNEDENKO THEORY PROB	QA 273	G571 1962				6	0 1	29 JUN 66	

Figure 41. Circulation Record



TO BANISTER, T. C.
R-RP-T
BLDG. 4331

422-42-5010 19 OCT 66
PHONE 876-3314
DATE OF LOAN 16 JUN 66

-PATRON RECALL REQUEST-

FROM LIBRARY BRANCH, RSIC
BUILDING 4484, AMSMI-RBLS
REDSTONE ARSENAL, ALABAMA
PHONE 876-5195

THE BOOK LISTED BELOW IS NEEDED FOR LOAN TO ANOTHER PATRON. IF NO LONGER REQUIRED, PLEASE RETURN IT TO THE ABOVE ADDRESS IN PERSON OR BY MAIL ALONG WITH THIS NOTICE.

CALL NUMBER....UC 806 H23t 1965C3 COPY NR 003
AUTHOR/TITLE...HERR GEOPHYSICS SPACE ENVIRON

TO DUERR, T. H.
AMSMI-REP
BLDG. 7120

287-22-0401 19 Oct 66
PHONE 876-7225
DATE OF LOAN 22 APR 66

-OVERDUE 1ST NOTICE-

FROM LIBRARY BRANCH, RSIC
BUILDING 4484, AMSMI-RBLS
REDSTONE ARSENAL, ALABAMA
PHONE 876-5195

THE BOOK LISTED BELOW IS NOW OVERDUE. PLEASE RETURN IT TO THE LIBRARY. IF YOU ARE AN AMSCOM OR MSFC EMPLOYEE AND NEED IT ON EXTENDED LOAN (MSCOM R 705-7, MSFC R 25-6) PLEASE SO INDICATE AND THE BOOK WILL BE RETURNED TO YOU, IF POSSIBLE.

CALL NUMBER....T 175.5 E10 1963C7 COPY NR 007
AUTHOR/TITLE...EARCER MANAGING ENGNG RES

TO BECHT, R. E.
AMSMI-RDK
BLDG. 5400 RM B-145

256-07-6431 19 OCT 66
PHONE 876-0763
DATE OF LOAN 11 MAR 66

-OVERDUE 2ND NOTICE-

FROM LIBRARY BRANCH, RSIC
BUILDING 4484, AMSMI-RBLS
REDSTONE ARSENAL, ALABAMA
PHONE 876-5195

THE BOOK LISTED BELOW IS NOW OVERDUE. PLEASE RETURN IT TO THE LIBRARY. IF YOU ARE AN AMSCOM OR MSFC EMPLOYEE AND NEED IT ON EXTENDED LOAN (MSCOM R 705-7, MSFC R 25-6) PLEASE SO INDICATE AND THE BOOK WILL BE RETURNED TO YOU, IF POSSIBLE.

CALL NUMBER....TL 367.N5 P825 1966C5 COPY NR 006
AUTHOR/TITLE...POPE NR-SPEED WIND TUN TEST

Figure 42. Overdue Notice

19 OCT 66

TO CHIEF, R-ME-DIR BLDG. 4712 PAGE 1

FROM LIBRARY BRANCH, RSIC(AMSMI-RBLS) BL. 4484, REDSTONE ARSENAL, ALABAMA 876-3153

SUBJ THIRD RECALL NOTICES

WE HAVE ATTEMPTED RECALL OF THE BOOKS SHOWN BY MEANS OF TWO ROUTINE NOTICES. SINCE OUR RECORDS SHOW THAT THESE BOOKS HAVE NOT BEEN RETURNED, WE REQUEST YOU EXERCISE WHATEVER SUPERVISORY AUTHORITY IS REQUIRED TO ASSURE POSITIVE ACTION UNDER MICOM R 705-7 OR MSFC R 25-8.

SIEBEL, M. P. [illegible]	DATE OF LOAN	8 OCT 65	CB 641 L681 1956C2 LEY THE EXPLORATION OF MARS	COPY NR 002 OVERD
KUERS, H. R. 455-46-92c8	DATE OF LOAN	10 JUN 65	TL 793 S732 1963 SPACE GUIDE	COPY NR 007 OVERD
KUERS, H. R. 455-46-92c8	DATE OF LOAN	1 JAN 58	620.1 M 8620 M+M ENG MATERIALS MANUAL	COPY NR 001 OVERD
KUERS, H. R. 455-46-92c8	DATE OF LOAN	1 JAN 60	651.264 K 26118 KOZEPETSKY ELEC COMP + MAN CONTR	COPY NR 001 OVERD
WUENSCHER, H. F. [illegible]-92-25Ce	DATE OF LOAN	1 JAN 62	629.1341 N 30158 NEVILLE AIRCRAFT DES DATA BOOK	COPY NR 001 OVERD

Figure 43. Overdue Notice

TO CAMERON, R. L.
SMEDM-DLPP
BLDG. 5435

424-36-0838
PHONE 876-0809

27 OCT 66 1

EXTENDED LOAN RENEWAL

FROM LIBRARY BRANCH, RSIC
BUILDING 4484 , ARSMI-RBLS
REDSTONE ARSENAL , ALABAMA
PHONE 876-5195

THE BOOKS LISTED BELOW HAVE BEEN ON EXTENDED LOAN TO YOU FOR MORE THAN A YEAR. ANY WHICH ARE NO LONGER NEEDED SHOULD BE RETURNED. FOR THOSE YOU STILL NEED, SIGN THE ENCLOSED CARD (PERSONAL SIGNATURE REQUIRED) SEND THE CARD TO THE LIBRARY. BUT DO NOT RETURN THE BOOK.
THIS IS A SECOND REMINDER FOR ENTRIES PRECEDED BY ASTERISK.

CALL NUMBER....TJ 940 B276 1963C11 COPY NR 011 DATE OF LOAN 10 OCT 65
AUTHOR/TITLE...BARRINGTON HI VAC ENGRG

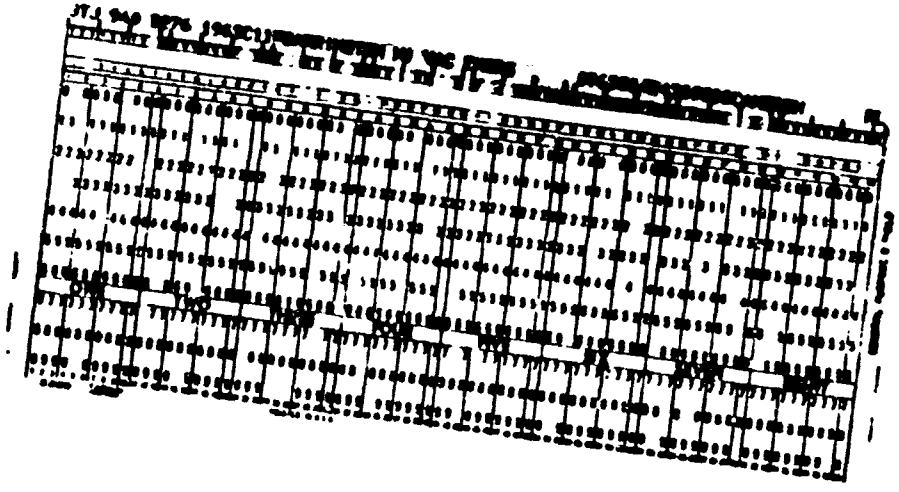


Figure 44. Renewal Notice

GENERAL SYSTEMS

Serials - Basic System

by

Carolyn C. Slayden

About four years ago it became apparent that the Redstone Scientific Information Center should take steps leading to automation of its serials records as an initial step toward automation in the library. First, the serials records could more easily be separated for such action. Second, the rapid growth in the number of current periodical subscriptions exceeded the existing manpower to keep accurate manual receipt records and circulation lists. An excessive number of filing systems had developed. Separate internal files were maintained for check-in record, binding, claims, and renewals. A number of subfiles also existed. Third, to satisfy requirements for research and bibliographic management, it was urgent that a comprehensive holdings record be developed.

It was first necessary to devise a method by which the information already recorded manually could be gathered, organized, and converted into computer language. The information required would be essential for making claims, maintaining accurate, up-to-date inventory files, providing binding control, and describing holdings in such a manner as to denote bound, unbound, and microform.

Many conferences were held between the programmers from the Army Missile Support Command and the library staff before a feasible conversion was effected. As an outcome of the planning, a Periodical Master File List was created. The Periodical Master File List contains the serial data file for Redstone Scientific Information Center and its five branches. A monthly printout of the Periodical Master File List, in 12 copies, based on the data originally stored and the subsequent changes, is provided by the Computation Center. The serials data included in the List covers the general field of serials in four groups. Only the last is classed and covered in our shelf list and catalog. The four groups are:

1) Journal titles, for example, those titles having a publication frequency of more than two times per year.

2) Newspapers, for example, titles published daily.

3) Services, publications having a basic volume kept current by supplementary additions or by supersession of parts.

4) Serials, for example, publications, in any format, issued in parts for indeterminate periods or intervals.

Code letters J., N., S., and C. are used respectively to indicate these materials, as will be noted in later illustrations.

How are these materials selected for the data file? When the system was planned, the original bibliographic data, which had been kept manually, was transferred to key punched cards. Subsequently, data on each selection was key punched from information provided on the order cards like those referred to in the discussion on book ordering. Now, order request sheets are used.

This is the method by which the Acquisitions Unit transmits to the serials librarian a request for a new subscription, either a new periodical title or an additional subscription to provide for the circulation requests (Figure 45). The data on this sheet is recorded on punched cards. The cards, representing orders for new titles and renewals, are sent to the Computation Center on a monthly basis. From the information transmitted on the cards, an order is produced and sent to the library for placement (Figure 46).

The elements requisite for entering new titles and maintenance of the Periodical Master File List will be considered in further detail by examination of illustrations from the List (Figure 47).

This file contains a series of 80 character records for each active subscription title and each inactive title which has bound holdings. The series of records for a given title are tied together by a 6-digit control number and a card number. (Note the similarity to the Patron File technique.) The control numbers are assigned in such a manner that number sequence will alphabetize the titles. The first digits (numeric) of a control number are assigned to a given title. The sixth digit (alpha-numeric) distinguishes the various subscriptions of a title (Figure 47).

The 80 character records required for each control number will vary with the title. Provision for the data elements required has been made by allotting records (or cards) 1 and 2 for title entry (Figure 47). Records 3 to 9 have been allotted to the ordering data. Elements provided are: vendor and/or publisher, publisher's address, language of text, country of origin, price per subscription, number of subscriptions to be entered, indication whether the periodical is a translation or not, the effective subscription period, deliver- order number, item on the delivery order, code to indicate the type of material, addressee,

purchase order, frequency of publication, and indication of the disposition of the subscription. (All elements are indicated in Figure 47.)

Records 7 to 9 are used only if notes about ordering should be recorded.

Records 10 to 29 are used for binding instructions.

Records 30 to 69 are used for holdings records. This record will be discussed in detail later in the program.

Records 70 to 79 provide for entry of cross reference titles. Record 80 has been provided for possible additional information carried over from the 70 records.

Serials, excluding periodicals and newspapers and unbound or self-superceding services, are cataloged before entry in the Periodical Master File. The Library of Congress classification number is included in its entry. (Refer to Figure 47 for a serial title.) Currently, entries for these serials are also contained in the public catalog.

From Figure 47 it will be noted that record 5 indicates that the title is a cataloged serial by use of the letter "C" and is a nonorder, nonroute title. It is an accountable property item under AR-735-7600-1 as indicated by the letter "A," and is to be shelved with the books as indicated by the letter "B". It might have been nonaccountable, (N), and might have been filed in the Reference (R) or Bibliography (C) area. Record 20 indicates the number of copies of each volume. Record 30 shows which volumes are held in the library.

Renewal date is indicated for each active subscription. Each month a review list is provided by the Computation Center for those titles expiring at a specific future date. This review list includes all subscriptions on the expiring titles and all the subscriptions of the same title regardless of expiration date (Figure 48). The review list is examined by the serials librarian who makes necessary corrections, punches change cards, and requests a corrected printout from the Computation Center in the form of orders. (This contains only those items wanted.) Another computer run is made in accordance with the latest data and a copy of the new list is sent for verification to the librarian. When the revised list is satisfactory, the librarian notifies the Computation Center to print the multilith copy of the order lists which is sent to the librarian for a final scrutiny and transmittal to the Command ordering agency. If the subscription is a government publication, the librarian mails the requisition directly to the supplying government agency.

The validity of the data stored in the Periodical Master File List is dependent on the eternal vigilance of those responsible for the data file. As corrections, additions, deletions, and needed information are noted, a transmittal slip containing the control number, title, and record number, with the correction to be made, is placed on the serials librarian's desk for key punch action (Figure 49). The corrections are key punched and the cards are forwarded to the Computation Center for incorporation in the data file.

Record of claims for missing issues on current subscriptions is made by coding the claim on a code sheet (Figure 50). The claim is key punched from the code sheet, sent to the Computation Center, and a record of the claim is entered on the Periodical Master File List (Refer to Figure 47). A notice of the claim is printed as a message to the vendor and/or publisher (Figure 51).

Provision has been made for creation of a routing slip at the time that a subscription is entered for routing purpose. As requests are received from patrons for circulation of a specific periodical, the requester's name is checked against the patron file. If the name appears on the established register of patrons, his request is coded showing copy and routing position (Figure 52). The code data is key punched and sent to the Computation Center with the other punch cards. The patron's name is then printed on the routing slip per coded instructions and in due time the requester should see the periodical (Figure 53).

Records 10 to 29 are reserved for binding instructions and notes (Figure 47). Once it has been decided to bind a title, information required is key punched to indicate the month or months that some type of binding action should be taken. A "Candidate for Binding List" is provided each month (Figure 54). Information pertinent to binding - the rub data - is entered on each approved title. Currently, the library does not enter data on the size and cost per volume since binding charge is made by contract rate. Provision also has been made for indication of binding done for a library branch.

Mention should be made of some of the products and services gained from the serial data file. The stored information can provide:

1) Statistics on the total dollar value represented by the current subscription to foreign and domestic periodicals
2) Lists of subscriptions arranged by country of origin
3) Lists of journals translated into English
4) With each printing of the Master File List, there is a statement of the total number of subscription titles and total number of subscriptions by categories of journal, newspaper, and services (Figure 55).

The system now in effect is under revision, for, as in all undertakings, "hindsight" is better than foresight. And now, after an operational period of approximately three years, the programmers are able to define areas for correction and improvement. The system, even as it operates now, is a great improvement over the former manual method, and with future improvement the patrons and staff may anticipate serial coverage providing even greater advantages.

SUBSCRIPTION ORDER REQUEST

TITLE_____ NEW_____ ADDED SUBSCRIPTION_____

EDITION_____NO. SUBSCRIPTIONS TO BE ENTERED_____ NON VENDOR_____
SUBSCRIPTION PERIOD_____
PUBLISHER'S NAME AND ADDRESS_____

ADDRESSEE (FOR BRANCH LIBRARY) R-P&VE-LIB 4612_____( )
R-COMP-LIB 4663_____( )
MS-IL LIB 4200_____( )
AMSMI-RE-RLL LIB 5400_____( )
AMSMI-RKXPLL 7120_____( )

JOURNAL (J)_____NEWSPAPER (N)_____SERVICE (S)_____
PRICE: Per year_____Per volume_____

FREQUENCY: Weekly_____ Semi-monthly_____
Monthly_____ Volumes per year_____
Quarterly_____ Irregular_____
Bi-monthly_____ Other_____

INITIAL PUBLICATION DATE_____

TITLE CHANGE: Make cross reference from_____
to current title.

LANGUAGE(S) OF TEXT_____

1. Translated into English: yes_____ no_____
2. Contains English abstracts or summaries_____
3. Table of contents in English_____
4. Language of original text_____
5. Original title_____

TO BE FILED WITH:
1. Journals_____
2. Abstracts and continuing bibliographies_____
3. Acquisition Unit_____
4. Basic publication_____
5. Cataloging Unit_____
6. Other_____

CIRCULATION REQUESTED BY: Name: _____
Address: _____

INDEXED IN_____

SOURCE OF INFORMATION_____

REVIEWED AND SUBMITTED BY:_____ DATE_____

Figure 45. Subscription Request

THE FOLLOWING PAGES ARE (FOREIGN) (JOURNALS) SUBSCRIPTIONS TO BEGIN 01 66 TO END 12 66
ORDERED ON DELIVERY ORDER NO. 08 PURCHASE OR C5-14C11Z

MAXWELL

DELIVER THE FOLLOWING PUBLICATIONS PRINTED IN AUSTRALIA

TO COMMANDING GENERAL
U. S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA
ATTN AMSMI-RE-RLL LIB 54CC
P.O. C5-14C11Z C.O. 09

ITEM NO.	NOMENCLATURE	TOTAL SUBS.	UNIT COST	TOTAL COST
0001	INSTITUTION OF RADIO AND ELECTRONICS ENGINEERS, AUSTRALIA. PROCEEDINGS	1	$42.00	$42.00

INSTITUTION OF RADIO AND ELECTRONICS ENGINEERS
BOX 1320
SYDNEY AUSTRALIA

DELIVER THE FOLLOWING PUBLICATIONS PRINTED IN CANADA

TO COMMANDING GENERAL
U. S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA
ATTN AMSMI-RE-RLL LIB 54CC
P.O. C5-14C11Z C.O. Cc

ITEM NO.	NOMENCLATURE	TOTAL SUBS.	UNIT COST	TOTAL COST
0002	CANADIAN ELECTRONICS ENGINEERING	1	$12.00	$12.00

MACLEAN-HUNTER PUBLISHING CO., LTD.
212 KING STREET, WEST
TORONTO 1 ONTARIO CANADA

Figure 46. Order for New Subscriptions

SPECIMEN SHEET FROM PERIODICAL MASTER LIST

```
02516A 01 ADVANCES IN HETEROCYCLIC CHEMISTRY (00400 A244)
       03                    ACADEMIC PRESS
       04                                          NEW YORK NEW YORK
       05 EN                  USA                      . 5                          C 3-NON 0./R. A000
       06 01RSIC 4484                                                                        L
       20 (VOL 1, CVS 1, 2, 3) (VOL 2, CV 1) (VOL 3, CVS 1, 2) (.OL 4, CV 1)

    HLDS..T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.
       30 B       1 1963   4 1965.                   .                      .

03050A 01 AEROSPACE MANAGEMENT                                            (INACTIVE)
       03 0                  CHILTON CO.
       04 CHESNUT AND 56TH STREET                  PHILADELPHIA 39PENNSYLVANIA
       05 EN                  USA             N          0000 0000 00000     0000 J
       06 01RSIC 4484                   0                                     012      L
       10 AERONAUTICS            JAN                                        12 01

    BIND..NTI TPC ICT IND COV ADS P/S SPV        COLOR  SIZE              BOUND-FOR              BIND COST
       13       2        3   4   2               0010  11 1/4 X 8 1/4     RSIC                      0.
       14 STATE OF INDEX UNKNOWN
       20 PUBLICATION SUSPENDED WITH V.7,NO.4(APR 1964)
       21 CALLED AIRCRAFT AND MISSILES UP TO V.4,NO.8(AUG 1961) WHEN IT CHANGED
       22 TO PRESENT TITLE

    HLDS..T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.T SER VOL YEAR VOL YEAR.
       30 B       1 1958   7 1964.U       7 1964         .                      .                          I
       70 C. AIRCRAFT AND MISSILES
05950A 01 AMERICAN CERAMIC SOCIETY. JOURNAL
       03 AFSA DIV OF FRANK SQ  AMERICAN CERAMIC SOCIETY
       04 2525 N. HIGH STREET                      COLUMBUS 2     OHIO
       05 EN                  USA             N  $25.00 0005 1264 00038 02 0166 J
       06 01RSIC 4484                     C5-140102               0             012      C
       07 CERAMIC ABSTRACTS IS PUBLISHED IN EACH ISSUE OF THE JOURNAL, BUT BOUND
       08 SEPARATELY. SUB SHOULD INCLUDE AMERICAN CERAMIC SOCIETY. BULLETIN
       10                        JAN                                        12 01

    BIND..NTI TPC ICT IND COV ADS P/S SPV        COLOR  SIZE              BOUND-FOR              BIND COST
       13       1        2   1   1               0896  11 1/4 X 8 1/4     RSIC                      0.
       14 TP + C + INDEX BOUND IN DEC ISSUE
       20 INSTRUCT BINDER TO SEPARATE ABSTRACTS FROM EACH ISSUE AND BIND IN A
       21 SEPARATE VOLUME

    V-LACKS
       40         47 1964        .                    .                      .
       60 INDEX 1918-1955 TO JOURNAL
       61 INDEX 1922-1955 TO BULLETIN

05950B 01 AMERICAN CERAMIC SOCIETY. JOURNAL
       03 AFSA DIV OF FRANK SQ  AMERICAN CERAMIC SOCIETY
       04 2525 N. HIGH STREET                    COLUMBUS 2 OHIO
       05                     USA                $25.00 0001 1264 00695 02 C166 J
       06 05MS-IL LIB 4200               C5-140102              0             012      D
       07 SUBSCRIPTION SHOULD INCLUDE AMERICAN CERAMIC SOCIETY. BULLETIN
07275A 01 AMERICAN MATHEMATICAL ASSOCIATION. NEW PUBLICATIONS
       03 AFSA DIV OF FRANK SQ  AMERICAN MATHEMATICAL SOCIETY
       04 1950 HOPE STREET                      PROVIDENCE RHODE ISLAND
       05 EN                  USA                 $1.00 0001 1264 00054 02 0166 J

       06 01RSIC 4484                    C5-140102              0             004      L
       07 SEND 1 COPY TO ACQUISITIONS FOR RENTENTION.
       1A C5-140102      02 00054    64-00- 1 ALL ISS FOR 1966
```

Figure 47. Specimen Sheet from Periodical Master List

1 DEC 65 PERIODICAL RENEWAL REVIEW LIST PAGE NO.004
GLADYS JUSTIN 876-3030

675OOA* OFFICIAL AIRLINE GUIDE (QUICK REFERENCE EDITION)

REUBEN H DONNELLEY OFFICIAL AIRLINE GUIDE
209 WEST JACKSON BLVD CHICAGO 6 ILLINOIS
USA $ 38.00 01 12 65 SERVICE
02A*SMI-RNA 45C5 C5-066782

675OOB OFFICIAL AIRLINE GUIDE (QUICK REFERENCE EDITION)

REUBEN H DONNELLEY OFFICIAL AIRLINE GUIDE
209 WEST JACKSON BLVD CHICAGO 6 ILLINOIS
USA $ 38.00 07 12 65 SERVICE
03*MIDW-STT 3684 C5-066782

CLAIMED 12 JAN 65.

675OOH OFFICIAL AIRLINE GUIDE (QUICK REFERENCE EDITION)

REUBEN H DONNELLEY OFFICIAL AIRLINE GUIDE
209 WEST JACKSON BLVD CHICAGO 6 ILLINOIS
USA $ 38.00 01 12 65 SERVICE
02A*CPH-MAD 448B C5-066782

675OOJ OFFICIAL AIRLINE GUIDE (QUICK REFERENCE EDITION)

REUBEN H DONNELLEY OFFICIAL AIRLINE GUIDE
209 WEST JACKSON BLVD CHICAGO 6 ILLINOIS
USA $ 38.00 04 12 65 SERVICE
05TS-T 4249 C5-066782

Figure 48. Review List

CHANGE(S) TO BE MADE IN THE

MASTER LIST DATE_____

CONTROL NO._____
TITLE_____
CARD(S)_____

CONTROL NO._____
TITLE_____
CARD(S)_____

CONTROL NO._____
TITLE_____
CARD(S)_____

CONTROL NO._____
TITLE_____
CARD(S)_____

CONTROL NO._____
TITLE_____
CARD(S)_____

CONTROL NO._____
TITLE_____
CARD(S)_____

Figure 49. Change to be Made in the Master List

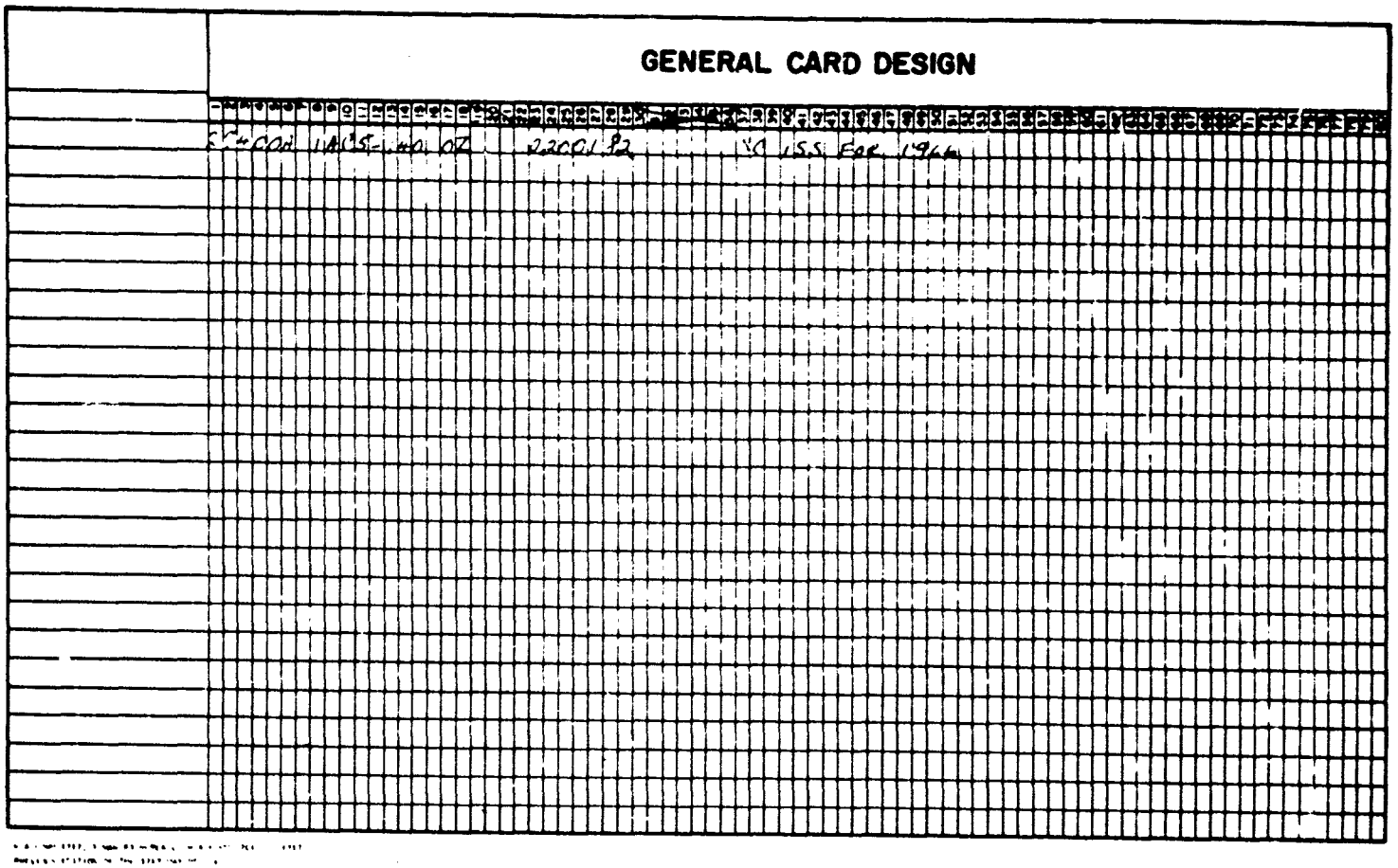


Figure 50. Claim Code Sheet

Claim to publisher or vendor

TC - AFSA DIV OF FRANK SC

29 SEP 66

92

WITH RESPECT TO OUR PURCHASE ORDER C5-14010Z WE CLAIM THE MATERIAL INDICATED BELOW.

DELIVERY ORDER NR. 1 ITEM NR. 00006 COPIES 1 BEGIN 01 66 END 12 66
TITLE - TITULOS SPECTROSCOPIC INORGANIC
PUBLISHER SOCIETY FOR APPLIED SPECTROSCOPY
212 CHESTNUT HILL DRIVE
ELLICOTT CITY MARYLAND
NO ISS FOR 1966

DELIVERY ORDER NR. 1 ITEM NR. 00007 COPIES 1 BEGIN 01 66 END 12 66
TITLE - TITULOS SPECTROSCOPIC ORGANIC
PUBLISHER SOCIETY FOR APPLIED SPECTROSCOPY
212 CHESTNUT HILL DRIVE
ELLICOTT CITY MARYLAND
NO ISS FOR 1966

DELIVERY ORDER NR. 2 ITEM NR. 00013 COPIES 1 BEGIN 01 66 END 12 66
TITLE - ACTUAL SPECIFYING ENGINEER
PUBLISHER MEDALIST PUBLICATIONS INC.
1801 PRARIE AVENUE
CHICAGO ILLINOIS 60616
NO ISS REC FOR 1966

DELIVERY ORDER NR. 2 ITEM NR. 00022 COPIES 1 BEGIN 01 66 END 12 66
TITLE - ADVANCED MANAGEMENT JOURNAL
PUBLISHER SOC. FOR ADV. OF MANAGEMENT + NAT OFF MAN. ASSOC
16 WEST 40TH STREET
NEW YORK NEW YORK 10018
ALL ISS FOR 1966

Figure 51. Message to Vendor

PAGE NR. 0001
(CONTINUED)

INTERIM RSIC ROUTING WORKSHEET

SOCIAL SECURITY NUMBER	PATRON SURNAME	JOURNAL 1			ACD	JOURNAL 2			ACD	JOURNAL 3			ACD
		Number	Copy	Pri		Number	Copy	Pri		Number	Copy	Pri	
506-46-2134	Sharp	09550	02	98	A	64250	05	06	A	68500	01	90	A

Figure 52. Coded Request for Periodical Routing

04 JUL 66 026 CPY 0002 CTL NR 32600

ELECTRONICS

ORGANIZATION	BUILDING	ROUTE TO		RECEIPT INFO INTL	DATE
AMCPM-SES-MS	5250	PETERS		J.D.	I.....I.....I
AMCPM-HA	4488	HENDRIKS		J.G.	I.....I.....I
AMCPM-MAS	4488	HASKINS		J.R.	I.....I.....I
AMCPM-HAEA	4488	FOX		J.	I.....I.....I
AMSMI-XSC	4488	UBERT	2/L	H.J.	I.....I.....I
AMSMI-IEP	4500	JOHNSON		J.D.	I.....I.....I
AMSMI-IEP	4500	KIRSHTEIN		J.E.	I.....I.....I
AMSMI-IESE	4500	HEISLER		A.M.	I.....I.....I
R.S.I.C.	4484	PHONE...876-0347			

Figure 53. Routing Slip

```
                    R E D S T O N E   S C I E N T I F I C   I N F O R M A T I O N   C E N T E R
                              CANDIDATE FOR BINDING LIST  30 SEP 66                              PAGE 0001

C3960A    AIR UNIVERSITY REVIEW

          GEN. SUP. =                                  BINDING SCHEDULE =                                    DEC
             VOL. PER. SUB.     06 ISSUES PER. VOL.      01 VOL. PER. YEAR
          (REPEAT     ) ( DO NOT PUBLISH TPC.) (BOUND FOR BSIC                ) ( REMOVE ALL ADS.                      )
          (COLOR P820) (INDEX NOT PUBLISHED )

     INDEX DATA    NO INDEXES OR TP PRINTED SINCE V.4, SINCE THIS IS INDEXED IN AUPI

     BINDING NOTES TITLE CHANGED FROM AIR UNIVERSITY QUARTERLY REVIEW SEPT. 1963 ISSUE
                   (VOL. 14 NO. 3) WAS LAST ISSUE.

     HOLDINGS       SER VOL YEAR VOL YEAR T * SER VOL YEAR VOL YEAR T * SER VOL YEAR VOL YEAR T * SER VOL YEAR VOL YEAR T *
                     00 016 1964-000 1965 9 *  00 015 1963-000 0000 U *                          *                          *

     ISSUE LACKS    SER-VOL-YEAR ..................................... MISSING ISSUE NUMBERS ..................................
                   * 00 015 1963  0001                                                                                        *
```

Figure 54. Candidate for Binding List

TOTAL INACTIVE TITLES	00403	
ACTIVE JOURNAL TITLES	02520	
ACTIVE SERVICE TITLES	00059	
ACTIVE NEWSPAPER TITLES	00012	
ACTIVE NOT IDENTIFIED	00158	
TOTAL ACTIVE TITLES	02749	
JOURNAL SUBSCRIPTIONS	00567	NR. OF COPIES 006505
SERVICE SUBSCRIPTIONS	00012	NR. OF COPIES 000082
NEWSPAPER SUBSCRIPTIONS	00003	NR. OF COPIES 000017
NOT IDENTIFIED SUBSCRIP	00002	NR. OF COPIES 000013
TOTAL SUBSCRIPTIONS	00584	NR. OF COPIES 006617
TOTAL MISSING TITLES		

Figure 55. Statistical Report

GENERAL SYSTEMS

Serials - Holdings Records

by

Jane F. Bentley

As already indicated, holdings are also maintained on the Periodical Master File. Records 30 through 39 are designated for this purpose and four sets of holdings are provided for in each 80-column entry (Figure 56). A holdings set is comprised of a type, for example, B indicates the item is bound, U is unbound, F is microfilm, M is microfiche, and C is microcard, series, beginning volume, beginning year, the ending volume, and the ending year. A different holdings entry is required each time a break in series or volume occurs. A maximum of 40 sets in a single holdings statement are provided for in records 30 through 39.

In addition to the positive and explicit holdings notations, lacks are indicated in the same form, except the type is omitted and a different record code(number 40 through 49) is used. Record codes 50 through 59 are used to record missing issue numbers by series, volume, and year and 60 through 69 for free form entry of index holdings.

As Mrs. Slayden has already indicated, these records are added or changed by means of the 80-column punch card, including the 6-digit control number of the title in order to link the records on a given title, the card code, and the transaction code to identify the portion of the record being dealt with. Holdings are posted when volumes are sent to the bindery or returned, and when volumes are received and added to the collection from sources other than the bindery.

These records are displayed in the Periodical Master File List, but since this is a large and cumbersome printout (some 3 inches of paper plus binder) it is unsuitable and expensive for extensive distribution. Therefore, information is extracted semiannually to produce a master from which our Periodicals Catalog is reproduced. A copy of this catalog is included in your notebook for further study. We plan some changes in the Preface prior to publication of the next issue and a nicer binding. This Periodicals Catalog is a list of active and inactive journal titles, cross references, and holdings in the Redstone Scientific Information Center. When holdings are not indicated, it may be assumed that the Center has some small unbound holdings of that title for the current year, or for the last year of publication. When

bound holdings are indicated (a B followed by series, volumes, and years held), it may be assumed that unbound issues to date are available for the active titles. This catalog is printed in several hundred copies to meet local requirements and given wide distribution. It is used by patrons to select the titles they want to receive on routing as well as to locate information on holdings for titles in which they are interested.

It certainly would have been unnecessary for me to cover this portion of the serials subsystem separately if this were the only area about which I wanted to talk. Mrs. Slayden could easily have covered our Periodicals Catalog. In reality, I want to talk about two related subjects which will follow on if you like, from this serials subsystem and its catalog of RSIC holdings. First, I would like to describe briefly our revised serials subsystem for ALPHA 1 which is now being programmed (the results of some of the hindsight Mrs. Slayden mentioned) and then one of its implications for interlibrary cooperation - the union list.

Although the periodicals subsystem was intended to be an integral part of the overall ALPHA system, this particular subsystem was implemented long before the others and full integrations was impossible. In the new serials module, several basic improvements are provided.

One Master file will replace the four which are used in the present system, thus eliminating duplication of data and simplifying its use. A hierarchial and modular file organization will permit independent maintenance of order/reorder, holdings, binding, and disposition subfiles under a single entry of bibliographic data for each title. The term "bibliographic data" is used here to refer not only to the conventional bibliographic data elements but also to any other common data which can be considered title-related and independent of other local functions such as ordering, claims, binding, etc.

The present system requires a unique control number for each title which is used for establishing alphabetical sequence in listing by title. This was presumably done to avoid sorting by a lengthy title field and to provide a short "tag" for updating purposes. Many difficulties have resulted from the use of this technique, such as the necessity for expanding the numerical series to provide for additions to the file in the proper sequence and the necessity of changing every occurrence of the old control number when renumbering is necessary. A control number is being retained in the new system in an accession number sense and as a "tag" for updating purposes, but the requirement that its sequence be congruent to title sequence has been discarded. Where

displays in title order are required, they will be produced by sorting of the title.

A certain measure of difficulty in the old system has stemmed directly from the lack of adequate documentation. This is being corrected in all ALPHA modules.

Under the present system, immediate disposition instructions consisting essentially of either detailed routing instructions or unqualified shelving instructions are generated from data in the Patron and the Periodicals Master, and routing position is determined by a library assistant. Under the new system, routing instructions will be generated automatically on the basis of copies available versus routing requirements and will be recomputed as each route slip is produced. Router positions will be assigned automatically but will include priority options for "first," "any," or "last" position. Automatic assignment of patrons to routers will be based on priority requirements, building number, organization symbol, and frequency of issue. Shelving instructions will specify where items should be shelved or filed. Other instructions will consist of any immediate disposition requirements other than route or shelve.

Provisions are made to accommodate records on each title indicating the agency by whom held (qualified by branch location as well, if desired) in addition to the holdings notations and comments. This, together with binding, ordering, and disposition data with subfields existing in multiples and identified by agency, will provide capabilities for generation of a union list of serial holdings for participating libraries. Holdings statements will be expressed in a holdings notation developed locally and patterned generally after the notation used in the Union List of Serials. This notation has been constructed slightly different for ease of machine manipulation and simplicity of display. All statements are positive and explicit. The lacks will no longer be directly noted, but can be ascertained from the holdings. The continuum will be derived algorithmically. The notation uses a dash to indicate a continuum, a comma to indicate a break in the run, and parentheses to indicate incomplete issue holdings, just as in the Union List; however, the numbers inside the parentheses show the specific issues held.

Union List	RSIC
1-(5-6) 7-10	1-4, 5 (1-2, 4-5, 7-12), 6 (1-3, 9-12), 7-10

Further elaboration will indicate whether or not the title is still published and still received. Series numbers will be preceded by the

letter S. Included also in the machine record will be volume dates, volume status (unbound, at the bindery, bound, others as required), and call numbers, if any.

RSIC will use paper tape as one of the forms of input to the revised serials subsystems since it is considered more efficient for initiating the long variable records involved. However, prepunched cards can be generated for participating libraries to add their holdings, binding, or other data without recapture of basic bibliographic data for the title.

Participants in a union list arrangement might be determined organizationally or geographically, as with the University of Alabama, Georgia Tech, or other collections located in the southeast or Army or DoD libraries.

The thing with which we are primarily concerned at this point is the design and implementation of a system that will accommodate records from a number of holdings and provide a viable means of producing and maintaining not only a list of holdings in one library, but a union list of holdings for participating libraries using the same or wholly compatible computer programs and a minimum number of manhours. It seems feasible to approach this as an ATLIS cooperative project and we ask that those of you who are interested contact me here at RSIC (Information Programs Branch, AMSMI-RBP, Redstone Arsenal, Alabama 35809).

```
           PERIODICAL MASTER FILE LIST (COMPLETE) AS OF 30 JUL 66                                  PAGE 0131

11040A 03 APL, JOHNS HOPKINS U  APPLIED PHYSICS LABORATORY, JOHNS HOPKINS UNIV.
       04 8621 GEORGIA AVENUE                      SILVER SPRING MARYLAND
       05 EN                 USA             N      . $ 0001 FREE                  J
       06 01RSIC 4484                                                           02(      L
       10                                MAR
       20 DO NOT BIND. KEEP CURRENT ISSUES + 1 YR PRIOR TO CURRENT

11056A 01 APPLIED PHYSICS LETTERS
       03 AFSA DIV OF FRANK SQ  AMERICAN INSTITUTE OF PHYSICS
       04 335 EAST 45TH STREET                     NEW YORK 17    NEW YORK
       05                    USA                     $15.00 0002 1266 00086 02 0166 J
       06 01RSIC 4484                    C5-140102            0                 026      C
       10                                              JUL                 12 01

    BIND..NTI TPC ICT IND COV ADS P/S SPV       COLOR  SIZE               BOUND-FOR              BIND COST
       13      1       2  1   1                 8852  10 1/2 X 8          RSIC 4484                 $.
       14 INDEX IN NUMBER 12, TP IN NUMBER 1.
       20 BIND TWO VOLS. TOGETHER.

    HLDS..T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•
       30 B       1 1962   4 1964•                  •                        •

11100A 01 APPLIED PLASTICS
       03 MAXWELL              APPLIED PLASTICS
       04 11A GLOUCESTER RD                        LONDON, S W 7  ENGLAND
       05 EN                 Y ENGLAND       N    $7.00 0003 1266 00145 02 C166 J
       06 01RSIC 4484                    C5-14C112            0                 012      C
       10 PLASTICS                   FEB                                   12 01

    BIND..NTI TPC ICT IND COV ADS P/S SPV       COLOR  SIZE               BOUND-FOR              BIND COST
       13                                       8857  11 X 8 1/8          RSIC                      $.
       14 INDEX IN NO.12(DEC). NO TP

    HLDS..T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•T SER VOL YEAR VOL YEAR•
       30 B       3 1960   4 1961•B       6 1963   8 1965•U       5 1962         •
    V-LACKS
       40         1        2 1959•                  •                        •
    I-LACKS SER VOL YEAR......................ISSUE NUMBERS......................................
       50         5 1962   6   7   12
       70 P. PLASTICS NEWS
```

Figure 56. Periodical Master File

GENERAL SYSTEMS

Supervisors' View of Implementing ALPHA I

by

Cleo S. Cason

I. INTRODUCTION

A. Modules in Operation

By way of introduction, I would like to remind you of the specific modules with which we have gained experience in automated operations. These are:

1) The patron file
2) Book acquisition
3) Book circulation
4) Periodical or serials acquisition, circulation, and control
5) Book language control.

B. Stages of Other Modules

We have completed, but do not have operating experience in two more modules, Document Language Control and Book Cataloging. The other modules are still in various stages of development but are not in operation at this time.

C. Transition

You who have not passed through the transition phase of changing from manual to automated operations without an increase in staff have missed a challenging experience. Our existing data has been captured by Contractor personnel without previous experience, by Youth Workers, as well as under more fortunate circumstances - by overworked staff members. The verification of accuracy of data first put into our computer files was limited to certain machine edits which have been built into our programs.

II. FIRST STEP IN AUTOMATION

Let us now begin at our first steps in the automation process which started with a survey of our manual system. To assist in the design and development of an automated system for RSIC, a project

group of systems analysts was employed under contract with the General Electric Company. The recording of our activities on detailed flow charts was their first assignment. Our operations were displayed on two charts: one representing open literature activities and another covering document or controlled literature. These charts are displayed on the wall on your right. You may wish to see them close up at the end of this discussion. Each flow chart is about 16 feet long and covers about 60 square feet. One disappointing factor came in the elimination of unnecessary work phase when it was found that little could be eliminated. Every effort was made to ensure that changes in operations contributed to the ultimate goal of simpler operations suitable for automation.

III. ORIENTATION OF STAFF - SELLING THE AUTOMATED APPROACH

Selling the automated approach is an important factor as you go into automation. We may not have done enough in this direction at the beginning. There appeared to be little or no fear of loss of jobs among our staff, although most of us experienced a feeling of apprehension towards the unknown. Mr. Herbert Holzbauer's description of the in-house training program undertaken at the Department of the Interior prior to commencement of automation of their library appears to be an excellent approach towards orientation of the staff on automation techniques. The description to which I refer was given in a paper entitled "In-house ADP Training" which Mr. Holzbauer presented at the Special Libraries Association 57th Annual Convention, in 1966.

Our first meeting with the systems analysts was kicked off by Mr. Dake Gull who was then working for the General Electric Company, and functioning as a consultant. Then began a period of cross education between systems analysts and librarians.

In the process of educating the systems analysts, it was necessary to discuss each operation in its minutest detail.

IV. DEVELOPMENT OF SYSTEM DESIGN BY SYSTEMS ANALYSTS AND REGULAR STAFF

Then came the design of a system integrating all library functions considered suitable for computer application. Mr. Croxton has a keen interest in automation and spent many hours with the systems engineers and Army Computation Center personnel on the design of ALPHA. In addition, Library Branch operating personnel at all levels participated in the discussion on system design during various stages of development.

V. TRAINING

A. Broad Development

Training in automation techniques became an important factor as we approached automation of some of our operations. Several of our staff members attended courses at universities on library automation. Perhaps you would be interested in our comments on these courses:

> Computer Programs for Library Operations given by the University of Illinois — We considered this one to be excellent.
>
> Clinic on Library Applications of Data Processing, University of Illinois — Excellent
>
> Seminar on Computer Based Systems for Libraries, University of Illinois — Excellent
>
> Information Systems in Libraries, Syracuse University — Too theoretical for orientation of librarians.

Other formal courses undertaken by our staff members were:

> Introduction to Automatic Data Processing, given by Rock Island Arsenal — A good introduction to the language.
>
> Programming for the IBM 1410 Computer, given by IBM — Selectively useful as a stimulant for further reading and study.
>
> One of our staff members has attended two sessions on "The Use of NASA Tapes" and has in turn trained other staff members in their use.

In addition, a quick introductory, concentrated training program on automation techniques which was open to all librarians and library assistants was arranged. It was conducted by the GE team and contributed greatly to a better understanding of the changes which would occur as a result of automation. Many fears and frustrations were removed.

B. Equipment Operation

Training on the IBM 632, 026 card punch machines, and flexowriters has been conducted by manufacturers of the equipment. In addition, some training in the use of the IBM 632 was provided by the G. E. team.

As many of you may know, a card punch operates very much like a typewriter. The main difference that makes it difficult to switch from a typewriter to a keypunch is the placement of the figures on the keyboard. A few hours practice enables one to make the change. Practically every person on the library staff can now operate a card punch machine – it may be a slow process for some – but all are now emotionally prepared for automation and we have no fears that our jobs will be taken over by computers.

VI. BOOK ORDERING AND RECEIVING MODULE

The book ordering and receiving module was one of the smoothest operations which has been automated. The systems engineers and our own staff had learned a few lessons from the first version of the book circulation module described by Mr. Clark which was our first undertaking in automation; so we got off to a smooth start on this one. It has continued to operate in a highly successful manner.

Mrs. Pride has described its operation to you. Before automation in 1962, it took three employees to order and receive 900 books per month. We now order and receive 1100 books a month with a staff of two. Limitations on charge accounts or similar types of fund controls are written into the program. Financial reports, cancellations records, and items received are automatically produced. Among other uses, these records provide excellent data when preparing future budgets.

We have found, however, that it is advisable to maintain a state of alertness until we reach a thorough understanding with the computer. For example, we questioned the total amount which our computer run showed that we had spent on foreign periodical subscriptions for FY 66. In tracing down the separate titles, we found that in that program and its computer language 1 X Free apparently was equal to $69,550.00. Perhaps this was caused by improper input. An off punch on decimals will also run your figures up or down real fast.

VII. SPECIFIC ADVANTAGES OF MODULES IN OPERATION

Some specific advantages which we have found in the automated modules now in operation are:

A. In Acquisitions

Simultaneous purchase order and accounting document production.
Automatic punched card production; this facilitates receiving, cataloging, and circulation of the item.
Reduction of files and elimination of manual filing.
Availability of printout records of items on order or in process at multiple locations.
Controls monetary limitations.
Ease in the collection and automatic production of financial reports and management data.
Better coordination.
Reduction of duplicate orders.
Automatic production of claims.

B. In Circulation

Automatic card filing at machine speeds.
Reduction of files; eliminates manual files and displays up-to-date records in minimum space.
Identification and production of overdue and recall notices automatically.
Control of charges by call number, date, patron name, or organization with a single transaction card.
Collection of statistics automatically.

C. In Serials Control

Automatic renewal of subscriptions.
Printing of binding slips at a predetermined "time to bind."
Updating of bound holdings records.
Printing of Periodicals Catalog.
Automatic printing of journal circulation slips.
Collection of statistics automatically.
Automatic production of lacks. Lists are generated for procurement of gaps in holdings.
Production of lists by various arrangements such as country of origin, language, subject.

D. In Maintaining Patron Data

Patron information is available in numerous locations in the library.
Data verification notices printed automatically.
Automatic compilation of statistics.
Automatic production of lists by
- Social Security Number
- Name
- Organization
- Security Clearance.

E. In General

Elimination of redundant manual recording.
Information is available more rapidly.
People do not handle and file little slips. (Backlogs of card filing are so oppressive.)
Accuracy is increased.
Management data is collected automatically.

Our branches find the patron file and the Serial Master File the most useful products generated by the computer.

F. Warnings

If I may offer a little advice to you who may contemplate automating your libraries, these would be my suggestions:

First and most important, prepare the staff by introducing every member to automation to the degree that Mr. Holzbauer did in the Department of the Interior Library if possible.

Then, make certain that staff members involved in the operation to be mechanized or automated know the how's and why's of all the input and output data, the nature of edits programmed, action required on error lists, and absolute necessity for timely corrections.

Too much cannot be said about the importance of accuracy in data input. Rember GI-GO (Garbage In and Garbage Out) and Zero Defects. In my opinion, all input data should be verified in some way; we find it too expensive to do this in ALPHA, but it would be an immense help.

Foresight in the use of output products must be explored and understood to take full advantage of computerized operations. You really can get more out than you put in by advance planning. There is not much place for hindsight in automated operations.

G. Skills Required

Our regular staff members have been found to possess all the skills required in our automated operations or the ability to acquire them. The highly accurate, logical thinker performs best. At the lowest level, GS-2 card punch operators, when available, have been employed to fill vacancies. On the other hand, Library Assistants became very adept at card punching in a reasonably short period of time. We do as little precoding as possible and library trained personnel are already familiar with call numbers and other required terminology.

VIII. SUMMARY OF OVERALL DIFFERENCES

The main differences I have found in the operation of a manual versus an automated library are these:

A. Routines must be simply and logically defined; regimented might be a better term.

B. Input data must be more accurate as errors multiply at a rapid rate.

C. Increased efficiency results from availability of multiple files without filing. This you can certainly appreciate.

D. Accuracy is greatly increased; once you have accurate data in the computer, there are no typographical or human errors.

E. Clerical time is saved. There is no way our present staff could manually send overdue notices and prepare inventory lists for over 8000 patrons, prepare orders for over 6000 subscriptions, or prepare over 7000 routing slips monthly.

Once the routines are established, the program has been debugged, and the input data has been purified, supervising an automated operation is great until someone decides to change the program, refine or improve the system, or you decide you need something that was not part of the original plan; then you start all over again with a new challenge.

GENERAL SYSTEMS

MARC

by

Kay D. Guiles

A discussion of the efforts of the Library of Congress in establishing the MARC project was presented by Mr. Kay D. Guiles, Senior Cataloger, Foreign Language Section, Descriptive Cataloging Division.

This presentation on MARC was a description of the work already completed or underway, and may be studied more closely (by interested parties) in a preliminary report published in October 1966 by the Library of Congress entitled "A Preliminary Report on the MARC (Machine - Readable Cataloging) Pilot Project."

CURRENT DISSEMINATION PROGRAMS

CURRENT DISSEMINATION PROGRAMS

Selective Dissemination Information

by

Mr. W. T. Brandhorst

The second day of the ATLIS workshop was led off by Mr. W. T. Brandhorst of Documentation, Inc. His remarks on the Selective Dissemination of Information Program stressed the techniques and operational aspects of the central service center in providing this type of information service. No record is available for this presentation. Further information on this program may be obtained from:

Information Systems & Development Branch
Scientific and Technical Information Division
National Aeronautics and Space Administration
Washington, D. C. 20546

CURRENT DISSEMINATION PROGRAMS

Selective Dissemination of Information

by

Mr. Darvey Wixon

Another report on selective dissemination information was presented by Mr. Darvey Wixon of the U. S. Army Electronics Command. The gist of his remarks is contained in a publication entitled "Selective Dissemination of Information (SDI)", 1 October 1966, printed by the Electronics Command.

CURRENT DISSEMINATION PROGRAMS

A Library System for Selective Dissemination of Information

by

Mr. Robert L. Martin
Mr. W. A. Bivona

Mr. Martin, from Natick Laboratories, and Mr. Bivona, from Information Dynamics Corp., presented some views of a library system currently being developed at Natick Laboratories. Phase I of this development has resulted in publication of a report entitled "Selective Dissemination of Information: Review of Selected Systems and a Design for Army Technical Libraries," (DDC document AD-636 916). Phase II is still in the working stage.

CURRENT DISSEMINATION PROGRAMS

NASA/SDI User Reactions

by

Charlotte Dabbs

After listening to Mr. Brandhorst discuss the Selective Dissemination of Information Program from the technical point of view, let us take a look at the functional side of the system. At Marshall Space Flight Center we have 101 profiles aboard the program. In most cases these are personal profiles rather than group or subject oriented. I might add that in two cases we have participants with multiple profiles of which one case serves as group profiles. We are presently rewriting this group of profiles into individual profiles as they have proven to be quite unsatisfactory in their present state.

Before delving into the subject, let us take a look at some facts covering the six-month period of April to September, 1966, which are illustrated on this chart. During this time we had a total of 64,180 announcements.

Total	Document Requests	Interested Not Wanted	No Interest	Microfiche Distributed
64,180	8,082	24,579	31,519	1,948

Weekly Average

Total	Document Requests	Interested Not Wanted	No Interest	Microfiche Distributed
2,468	310	945	1,212	75

On April 1, we had 90 profiles. During this period we added 19 profiles and deleted 8, which completed the six-month interval with 101 profiles. Assuming that the average number of people on board was 95, this means that each participant requested 3 1/4 documents per week. When it is broken down like that, it does not sound too bad, does it!

When a new person asks to come aboard the program, we give him a brochure describing the Selective Dissemination of Information Program. We ask that he study it, jot down his interests, and come to the library to write his profile. We work with him using a copy of the

Guide to the Subject Indexes, the Subject Authority List, and personal profiles related to his interests which are presently on the tapes. By using these aids, we can help avoid excessive and irrelevant announcements. At no time do we encourage him to write his own profile, as we have found that this creates interpretation problems both for us and the analyst at the NASA Facility.

If the man requests material announced in STAR and IAA prior to the beginning of his profile, we encourage him to consult RSIC for a NASA tape search which you will hear discussed later today. It is at this time that we suggest that he might try using microfiche instead of hard copy by explaining all the advantages.

We find that 22 1/2 people who have begun to use microfiche in preference to hard copy, do so because the fiche are of better quality than the reproduced copy and they consume considerably less space. Normally, these are people who request large volumes of material. We supply their request with Kalvar film generated by the Colight system in our own shop.

We have noted that when a new participant starts receiving his announcements, our requests soar. After a couple of months, they drop below normal because he has been so saturated with printed matter that he is overly cautious in his requests. It takes about four months to really be able to judge his reaction to the program.

What the men do with the hard copy material they request is a matter that we have not followed up on. We have heard rumblings from Records Management about files being filled with library generated copies. The people receiving microfiche are keeping the pertinent material for their reference purposes.

The lack of efficient equipment on the market presents a very great problem for our staff. The reader-printer system we are using, which is a Filmac 400, is slow and the quality is only fair. The step-and-repeat-printer available on the market is much too fast for our needs. Perhaps in the near future there will be a medium-speed copier that can be utilized by libraries.

Another problem has been furnishing copyrighted material, which is the thorn that bothers RSIC, as they provide this service for us. This is due primarily to the shortage of personnel and the type of material announced. Reproduction is their major concern and this relates back to the personnel problem.

Throughout the time that participants are on board the program, we are constantly informing the analyst about each one. This includes personality notes, job related events, clippings from the local news media, etc. It is my personal opinion that when the analyst knows the participant as a person rather than a profile she is better equipped to judge his reaction to his announcements.

The analyst communicates frequently with the participants which we encourage, as then the chain of communication is direct without a middle man. Even then communication sometimes breaks down. One day the analyst called one of our men concerning his profile. He was out so she asked his secretary to have him return her call as she wanted to discuss his SDI. She noticed when he returned her call that he was perplexed, but she continued talking. Suddenly the light dawned on him that she was discussing SDI. His message read that the FBI had called!

If you were to go up to any of the people that are aboard the SDI Program at this moment and ask him what he really thinks about the system, he would probably answer you with some complaint such as no abstracts, poor quality reproduced material, etc. If you ask him why stay aboard and wouldn't it be better to discontinue the announcements, it would be like asking him to give up his reference books.

This brings to mind the man that I called one day about revising his profile. Both the analyst and I were concerned because he was showing only 30-percent positive hits. When I explained this, he answered, "But I don't want to change it! I'm as happy as a pig in a mud puddle." But we did change it and he is even happier.

We at the Marshall Library have enjoyed the SDI Program and feel that we benefit from working with all aspects of the program. The participants are people we know even if we have never seen them. There are stories that we love to tell and complaints that we enjoy voicing. The program has given us an insight to the people involved and the operations of the center as a whole. Through this small representation we keep a close eye on the working groups and are better able to serve them by being prepared for their questions and needs.

RETROSPECTIVE SEARCHING

RETROSPECTIVE SEARCHING

Defense Documentation Center

by

Mr. Preston C. Rogers, Jr.

Mr. Rogers discussed the DDC retrospective search system from the point of view of the central service center. Further information on this service may be obtained from:

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

RETROSPECTIVE SEARCHING

RSIC Users and the DDC Searches

by

Jane Crowe

As Army librarians, all of us are primarily concerned with giving our patrons fast, thorough information service. The DDC searches can often help us give this better service. Mr. Rogers has explained to us how the searches are performed at DDC headquarters. Now we will look at the situation in the field. Let us look at the RSIC patron and what happens with the searches he needs here.

Since RSIC serves the Marshall Space Flight Center, Army agencies, and contractors to both, in the local area, our requests for assistance cover a wide variety of subjects. For instance, in one day we may have requests for information on gas lasers, the life expectancy for solid-state devices in a vacuum, and the kill probabilities of a specific warhead. When a patron approaches RSIC for information, we must help him in determining whether he needs reference service, a full-scale technical survey, or whether a bibliographic search would better fill his needs. In any subject area not restricted exclusively to another agency - such as NASA or AEC - a DDC search can prove most useful. Here at RSIC we are fortunate that we have available to our users both the DDC searches and the NASA tape searches. Mrs. Dearman will cover the NASA searches for you in a few minutes. There are many occasions, such as a request for information on high temperature materials, when a search of both systems is profitable.

The beginning of any bibliography search is the determination of exactly what is needed. So, the bibliography request begins with a statement of the requester's problem (Figure 57). We have found that search results are much better when we simply explain, in a paragraph or two, exactly what is needed. We must know also what can be omitted as well as what must be included. In addition, we try to include any special terms or acronyms that may apply. Some of the questions that must be answered are: How far back in time should the search be run? Does the user understand that a request for a classified search may result in a classified bibliography? If the subject area is one that may be heavily posted - such as magnetohydrodynamics - a check of the frequency listing will help us to determine whether we should ask for an asterisk search - that is, one in which only the most pertinent items will be pulled. Lastly, DDC wants the bibliography request to include the requester's name and telephone number so that he may be contacted

should any questions arise after the search request reaches DDC. After all this information is complete, the "DDC Bibliography Request" (or Form 4) is typed and forwarded to DDC Headquarters.

When the completed searches are returned to RSIC, the requester is notified and comes to the library to review his search. In his first review of the search, the patron usually finds several references that he orders in full-size copies. On others he will need to review the document on film in order to determine the relevancy of the citations. This is one instance in which RSIC has an advantage over some of the other centers since we do not have most of the DDC film collection on file here. In reviewing the film, the user may reproduce selected pages as he reads or he may decide to order the complete document.

Results of the DDC searches are usually very good. Only when the request has been made too broad or limited too closely, do we have poor searches. When the requester is not completely satisfied with the results of his search, a call is made to the Bibliography Branch at DDC. A discussion between the requester and the analyst will usually reveal the terms that were added or omitted to cause this misrun. At this time, another search is usually prepared and the results forwarded to the requester.

This is the procedure for the normal bibliography requests received by RSIC. However, there are two other types of searches that are also very useful to us.

One of these is the "Rapid Research Bibliography" or "Telex Bib" as we refer to it here (Figure 58). The bibliography request is sent by Telex to DDC and the answer is usually received within 24 hours. Since only the AD numbers are received for Telex Bibs, and the abstracts must be read in the TAB, the Telex searches are normally used only when the information required or time for searching is very limited. This method has proven most useful for author, project, or contract number searches. The Telex searches are not as useful as the printed searches because of the supplemented manual searching involved. However, they do fill a definite need for a method of rapid searching when time is limited and the material needed cannot be readily located through the TAB indexes themselves.

The other search is the DD 1498 search (Figure 59). Since MICOM has a strong research and development program, the DD 1498 searches are very important to our Army patrons. Through the DD 1498 they are able to find out exactly who is working on what and where. Since this search is designed to cover the current status of all on-going R&D

projects under the Department of Defense, it is especially valuable in preventing duplication of research and needless expenditure of government funds. The DD 1498 searches are not obtained directly from DDC. Requests are prepared as an official letter request rather than on a Form 4 and must be forwarded through Director of Technical Information, ODDR&E, Washington, to DDC. Here at RSIC we have had our best response to these requests (by the way, we do not ask for many) by forwarding them through the STINFO Division of Army Research Office, Washington. In this way, the Army portion of the search, which is more current than possible from the DDC files, is sent to us from ARO while the request is being forwarded to DDC for a complete search of the input from the other agencies.

The DDC searches have proven a valuable help to RSIC patrons. Even though they must be done at DDC headquarters and this causes some delay, we feel they are a vital part of the many services provided by RSIC.

ABSTRACT BIBLIOGRAPHY REQUEST

(See instructions on reverse)

FOR DDC USE

1. ARB NO

2. DATE RECEIVED

3. TO

DEFENSE DOCUMENTATION CENTER
Cameron Station, Alexandria, Va 22314

FROM

Redstone Scientific Information Center
U. S. Army Missile Command
Redstone Arsenal, Alabama - 35809
Attn: Chief, Document Section

5. YOUR REFERENCE NO

6. DATE

7. BASIS FOR SERVICE *(Contract, Grant, Project No., Govt. Agency)*

8. DDC SERVICE CODE

9. INFORMATION REQUIRED

10. TIME COVERAGE DESIRED

PAST YEAR ☐ OTHER ☐ *(Specify)*
2 YEARS ☐
5 YEARS ☐

11. HIGHEST SECURITY CLASSIFICATION

UNCLASSIFIED ☐
CONFIDENTIAL ☐
SECRET ☐
RESTRICTED DATA ☐

12. RESULTS NEEDED BY

13. DDC MAY CONTACT FOLLOWING INDIVIDUAL FOR SUBJECT CLARIFICATION

NAME

TELEPHONE NO. AND EXTENSION

14. AUTHENTICATION

TYPED NAME AND TITLE

SIGNATURE

DDC FORM 4 JAN 64

PREVIOUS EDITION OF THIS FORM WILL BE USED

Figure 57. Bibliography Request

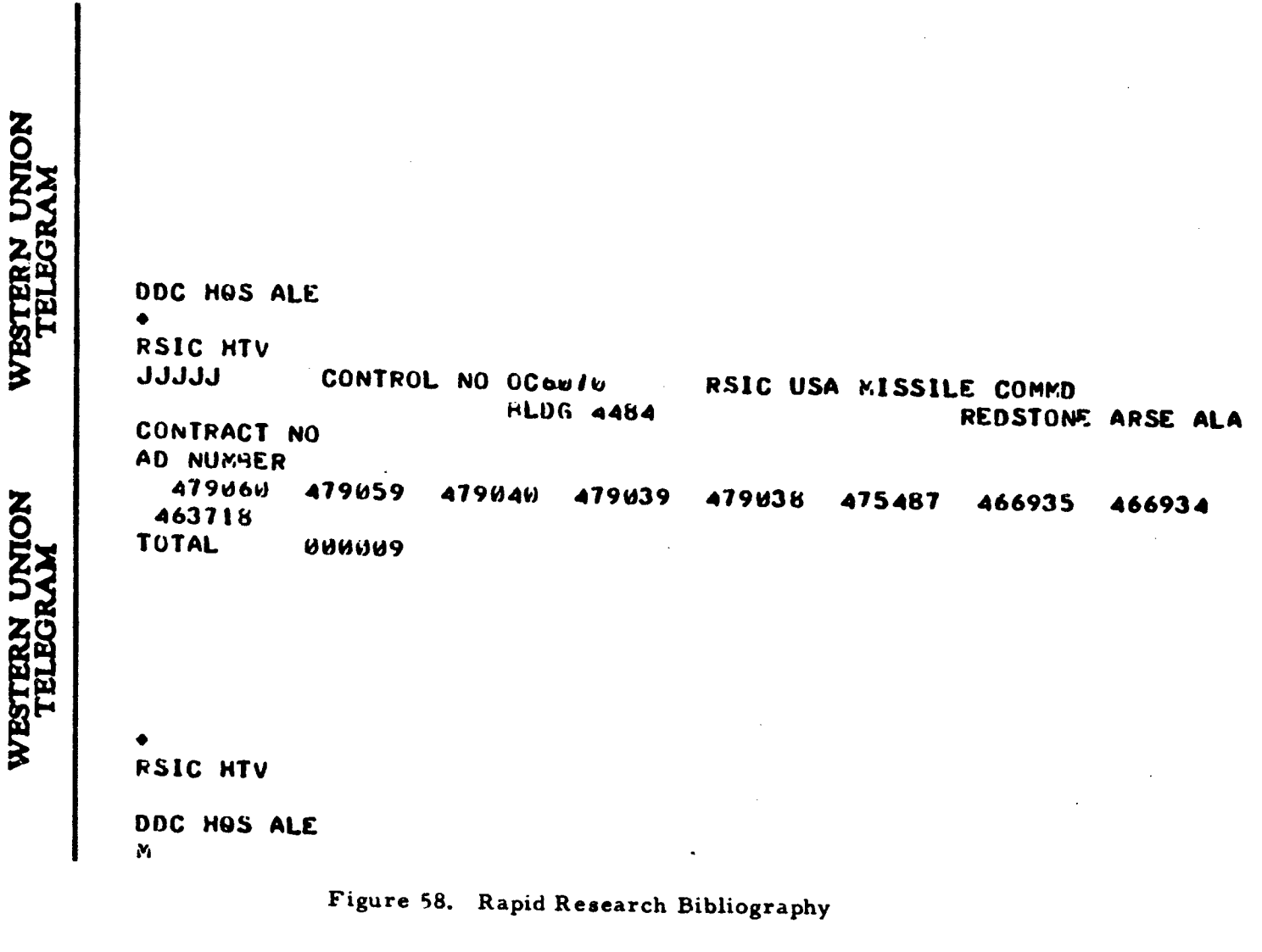


Figure 58. Rapid Research Bibliography

RESEARCH AND TECHNOLOGY RESUME

4 DATE OF RESUME: 30 03 66	5 KIND OF RESUME: A. New	6 SECURITY: U U	7 REGRADING: N/A	8 RELEASE LIMITATION: NL	9 LEVEL OF RESUME: A. Work Unit

10a CURRENT NUMBER CODE: 6 21 32 01 1 2E023201A711 01 03

10b PRIOR NUMBER CODE: None

11 TITLE: (U) Mathematical Approaches to Combat Developments Requirements

12 SCIENTIFIC OR TECH AREA	13 START DATE	14 CRIT COMPL DATE	15 FUNDING AGENCY
Mathematics and Statistics 009700	03 66	08 66	DAMIPR

16 PROCURE METHOD	17 CONTRACT GRANT	18 RESOURCES EST	a. PROFESSIONAL MAN-YEARS	b. FUNDS (In thousands)
B. Contract	a. NUMBER: DA44 188ABC1 a. DATE: 03 66	PRIOR FY: 65		
	c. TYPE: M.CPFF d. AMOUNT: P11,000	CURRENT FY: 66	48	127

19 GOV'T LAB INSTALLATION/ACTIVITY

NAME:

ADDRESS: Army Research Office OCRD
3045 Columbia Pike
Arlington, Virginia 22204

RESP. INDIV.: Moore, H. L., Lt. Col.

TEL: 202 - OX 4-3503

20 PERFORMING ORGANIZATION

NAME:

ADDRESS: XYZ Analysis Corporation
Willsberg, Virginia

INVESTIGATORS PRINCIPAL: Smith, H. N.

ASSOCIATE:

TEL: 703 - 123-4567 TYPE: UM

21 TECHNOLOGY UTILIZATION: N/A

22 COORDINATION: N/A

23 KEYWORDS: Simulation; Development; Combat; Mathematical Model; Vulnerability

24. Technical Objective: To develop mathematical and simulation techniques that will provide methods and open avenues of approach for establishing and evaluating combat developments requirements.

25. Approach: Through mathematical and simulation techniques, combat problems involving all combinations of air-ground action will be investigated

Areas of mathematical model-building activity include: Tank-vs-tank action, tank formations vulnerability, helicopter vulnerability, and night operations.

Develop combat models to:

1. Predict horizontal and vertical miss distances for tanks firing from canted positions;
2. Investigate the vulnerability of tank formations to ground attack;
3. Investigate the vulnerability of tank formations to aerial attack;
4. Investigate the vulnerability of helicopters to small-arms fire;
5. Gain insight into the area of night operations.

26. Progress: None

27 COMMUNICATIONS SECURITY	28	29 OSD CODE	30 BUDGET CODE
[ ] a. CONSEC OR CONSEC RELATED [X] b. NOT RELATED		AR	6

31 MISSION OBJECTIVE	32 PARTICIPATION
N/A	N/A

33 REQUESTING AGENCY	34 SPECIAL EQUIPMENT

35 EST FUNDS (In thousands)	36
CPFF:	

DD FORM 1 NOV 65 1498 REPLACES EDITION OF 1 AUG 64 WHICH MAY BE USED (Items 1 to 26 identical to NASA Form 1122)

Above is a sample DD Form 1498, as properly filled out by a hypothetical agency.

(See lead story, page 1.)

For Work Unit Information, Dial Code 202, OX 8-1991

Figure 59. DD1498

RETROSPECTIVE SEARCHING

National Aeronautics and Space Administration

by

Mr. W. T. Brandhorst

Mr. Brandhorst discussed the NASA retrospective search system from the service center standpoint. Further information on this system is available from:

Scientific and Technical Information Division
National Aeronautics and Space Administration
Washington, D. C. 20546

RETROSPECTIVE SEARCHING

Use of NASA Tapes for Retrospective Searching at RSIC

by

Sara Dearman

For such a program as the NASA search system to be a success, there are three necessary steps - the dream, for which the credit must go to the NASA Scientific and Technical Information Division; the implementation, for which Documentation Incorporated, operators of NASA's Scientific and Technical Facility, may be credited; and lastly, the execution of the plan. I suppose that we at RSIC may be called the executioners. However, since the use of the tapes here has grown steadily from an average of four searches per week in the beginning months to last week's record of fifty, we can assume that the program has not perished in our hands.

In the interests of brevity, I will attempt to parallel Journalism's creed of "Why, When, Who, Where, What" to give you some idea of the actual on-the-spot use of this retrieval system.

The "why" is fairly obvious. Our patrons have polyglot requirements, centered chiefly about space it is true, but ranging widely within that framework from materials, hardware, vehicle design, propulsion systems, and propellants to pure research such as plasma physics, dynamic stability, biotechnology, etc. NASA meets these needs in many respects because, unlike most of the other information services, they also are polyglot in selection, scooping up for tape indexing a wide range of material from a variety of sources - DOD, AEC, symposia papers from around the world, plus of course, reports from their own centers and contractors. With the inclusion on the tapes of IAA coverage, a considerable portion of the open (space sciences) literature is also covered. This means, essentially, that the searcher is presented with a broad sampling of the efforts of all the larger information agencies in a given field.

This brings us logically to the "when" do we resort to the search. If our patron needs material on some phase of the space effort - not just the answer to a specific problem, but comprehensive coverage to find out what has been and is being done - the NASA search provides a great jumping-off place. His printout will surely not pick up everything on a given subject, but should turn up many fine citations from many sources. These will lead him, through the references, back to other references, a snow-balling process which can eventually provide

exhaustive coverage of the area of interest. Of course, the tapes are indispensable to us for locating and obtaining lists of material peculiar to the NASA program such as the SATURN vehicle, APOLLO program, and the GEMINI flights. We also resort to a tape search when it becomes apparent that the specific answer sought can be met more economically by this means than by a manual search. A recent example of this type of question was a request for a Jet Propulsion Laboratory model of the Mars atmosphere. After a fruitless manual search involving several hours, we commanded the computer to find it for us, searching Mars atmosphere against model or modeling from the corporate source JPL. And it turned up, bright and shining, among, of course, a few other studies on the subject by JPL.

The "who" brings us to the role of the RSIC staff in the program. What is the library staff's responsibility in the utilization of the tapes? Locally, this gradually became a function of the reference librarians within the Documents Section, and the tapes are considered a tool for this group. At present, two of the five reference librarians phrase inquiries for the NASA search program, more or less on a "in your spare time" basis. Perhaps all five of us and all the other reference and research personnel should phrase their own but that is not how we work just now.

Our responsibilities involve: first, determining whether or not the subject is one which lends itself to tape searching, or whether the patron would best be served by using other methods or turning to other sources - our own card catalog, a DDC search, or one of the many other available sources; and secondly, if it is decided to search the NASA tapes, to consult with the requester to determine the terminology which will bring him the best possible results.

The answer as to "where" we do the searching is: first, here in RSIC where the problems are prepared and the cards punched; second, in the Missile Command Computation Center, where the tapes are actually run against the directions on the cards. Then of course, the results are returned to RSIC for distribution. We make very little attempt at editing. We check to be sure the answers are in the ball park, and if so, hand them to our patrons intact.

The "what" of the searches are the techniques employed and the results obtained. The actual phrasing or planning of the search varies, depending on the complexity of the problem. Reproductions of some sample searches have been made to give you some idea of the variations which are employed. The system is extremely flexible and offers an embarrassment of riches in the way of options.

As you can see, we can introduce 12 limiting input options, either singly or in any desired combination in addition to the subject terms. We may ask for the output to be sorted by any one of nine methods either singly or in combination. The output format may be in any one of five forms, or a combination of these. The search strategy may be formulated by a logical equation, one of two weighting methods, or a combination of these.

As you can see, the bemused analyst could easily become so involved in making choices that the search might never be completed. To circumvent this difficulty, we have a few self-imposed, time-saving rules. Remember, if you consider this an inelegant approach, that this is strictly an "in your spare time" operation. Unless the request definitely requires one of these search options, we ignore them. Unless asked to bring in the search in another form, we always choose the accession number option. Indeed, if no other choice is indicated, the program automatically selects this option. Unless dubious about the results we will get with our chosen subject terms, we again let the program automatically select accession number, citation for output format. Occasionally we will have the terms printed out, mostly as a basis for reselection of terms for a possible rerun if our results are poor. Again, occasionally we use the sort option of weight and accession number when we wish to limit the number of hits in a very large search (using still another option that I have not mentioned).

The strategy option chosen is dependent upon the complexity of the search. Perhaps some description of the four options would be in order here. The most esthetically satisfying (and the most expensive) is the Boolean approach in which terminology is grouped into appropriate sets, and the logical equation picks up the union, intersection, or complement of sets as desired. Thus, a request for a strictly logical search on lunar craters would look something like this:

3 A LUNAR CRATER
1 B LUNAR
1 C MOON
2 D CRATER

and the logical equation would be $A + (B + C) \cdot D$. Another approach would be the purely weighted problem in which, in this search, each subject term is given an arbitrary weight as seen at the left of each subject term. In this case, if a total weight of three is reached, this method replaces the equation. A third approach would be to give each subject term a weight of one, set the total weight at two, and use a

combination of the logical equation with the weight. The fourth method is a little gruesome and involves setting up group weights, and repeating the terminology for each grouping. A sample of this type has been made, "Nuclear Explosion Effects on Missiles," which illustrates this option.

The one over-riding reason for using the weighted search is purely economic. It has been our experience that computer time is drastically cut by this method. The logical search of 25 problems would run an average of nine hours on the 7010. The same number of questions using the weighting technique runs an average of less than three hours.

As you may have inferred, we batch the week's searches and run them once each week. This is not ideal, of course, but is the best arrangement we have been able to make thus far, with computer time at a premium.

In fact, time seems to be the dominating factor in this entire operation, whether it be the computer's, the analyst's, or the patron's. Because both our staff and the recipient are usually too pressed for time to edit these searches, we strive to achieve a high rate of relevance, knowing full well that our recall rate is thereby definitely reduced. We operate on the theory that, in the majority of cases, our people are better satisfied to receive much that is helpful on their problems, than to receive a few more pertinent references at the price of endless editing.

This brings me to one of my favorite topics of conversation - where does the edit function begin? It seems obvious in the light of the number of citations now being retrieved in this system which is less than four years old (now averaging more than 100 per search), that something should be done on a national scale to relieve the scientist from the burden of so much editing. It is unfortunate, but true, that many of the items retrieved are, while germane to the subject, of a trivial nature. What does it profit a man to reach 100 percent relevance, if he still must sift through a mountain of material to find the handful of really good and significant efforts on his problem? I would like our national agencies to go one step farther for us, and provide us with some screening device. I would not abandon the inclusion of a wide range for selection such as the tapes now provide. Rather, we would ask for an additional tool - a tape, let us say, which would index all final reports, monographs, and theses which represent significant advances; in short, an editing process at the source. In this way we could have the best of both worlds - the regular tape for picking up current progress reports, for finding out what is new and for making "complete" searches, plus this extra tape containing the superior items from the past. Over a period of

years, this would result in tremendous time-saving in editing at the receiving end.

We never ask for just a little bit more from NASA without bringing out our full battery of complimentary remarks. And so in closing, I should like to remark that this retrieval system is, in my opinion, the most flexible and most responsive to the user's needs of any that has been devised by any major agency. The agency has listened to our complaints, rectified their mistakes in all possible cases, has, and is, making valiant efforts to increase the effectiveness of the system, while reducing the costs of operating it. It has been a real pleasure to be in a position to watch this dynamic system grow qualitatively as well as quantitatively. We hope the retrospective searching module of ALPHA will be as useful. It certainly will use the NASA search system as a model even if it does not copy it exactly.

Options provided by the NASA System are shown in Figure 60, and sample searches in the RSIC System are shown in Figures 61 through 64.

OPTIONS PROVIDED BY THE NASA SYSTEM

SEARCH INPUT OPTIONS

1. SECURITY CLASSIFICATION
2. ACCESSION RANGE
3. NEGATIVE ACCESSION RANGE
4. ACCESSION SERIES
5. DOCUMENT TYPE
6. COSATI SUBJECT CATEGORY
7. JOURNAL ANNOUNCEMENT CATEGORY
8. CORPORATE SOURCE
9. CONTRACT NO.
10. PERSONAL AUTHOR
11. REPORT NO.
12. NO FOREIGN LANGUAGE

OUTPUT SORT OPTIONS

*1. ACCESSION NUMBER
2. CORPORATE SOURCE
3. REPORT NO.
4. SUBJECT CATEGORY
5. WEIGHT
6. CONTRACT NO.
7. ACCESSION SERIES
8. PERSONAL AUTHOR
9. COSATI CATEGORY

OUTPUT FORMAT OPTIONS

1. WITH ACCESSION NO.
2. WITH CITATION
3. WITH NOTATION OF CONTENT
4. WITH TERMS
5. WITH WEIGHT

STRATEGY OPTIONS

1. LOGICAL EQUATION
2. SINGLE TERM WEIGHT
3. GROUP WEIGHT

Figure 60. Options Provided by NASA System

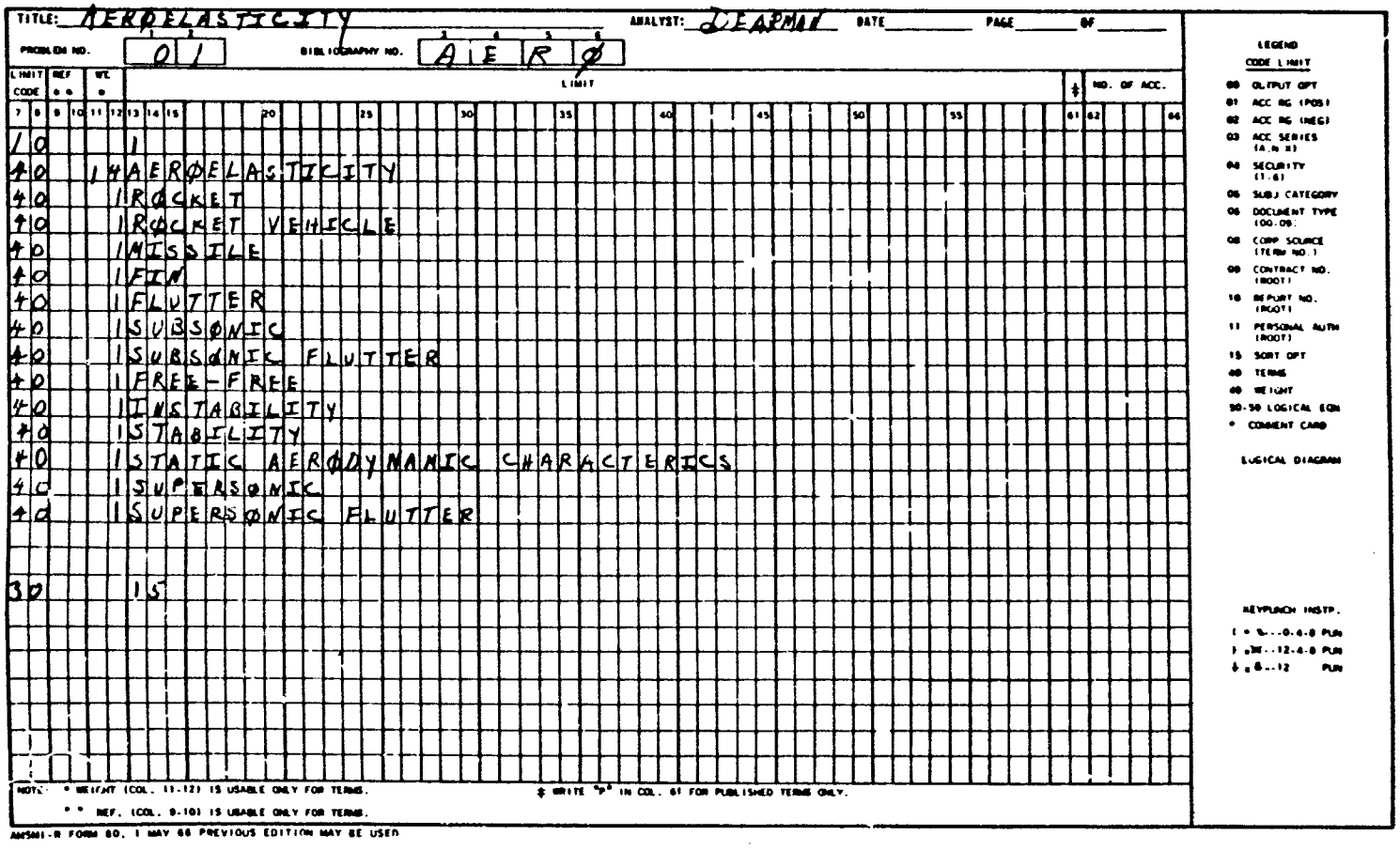


Figure 61. Sample Search

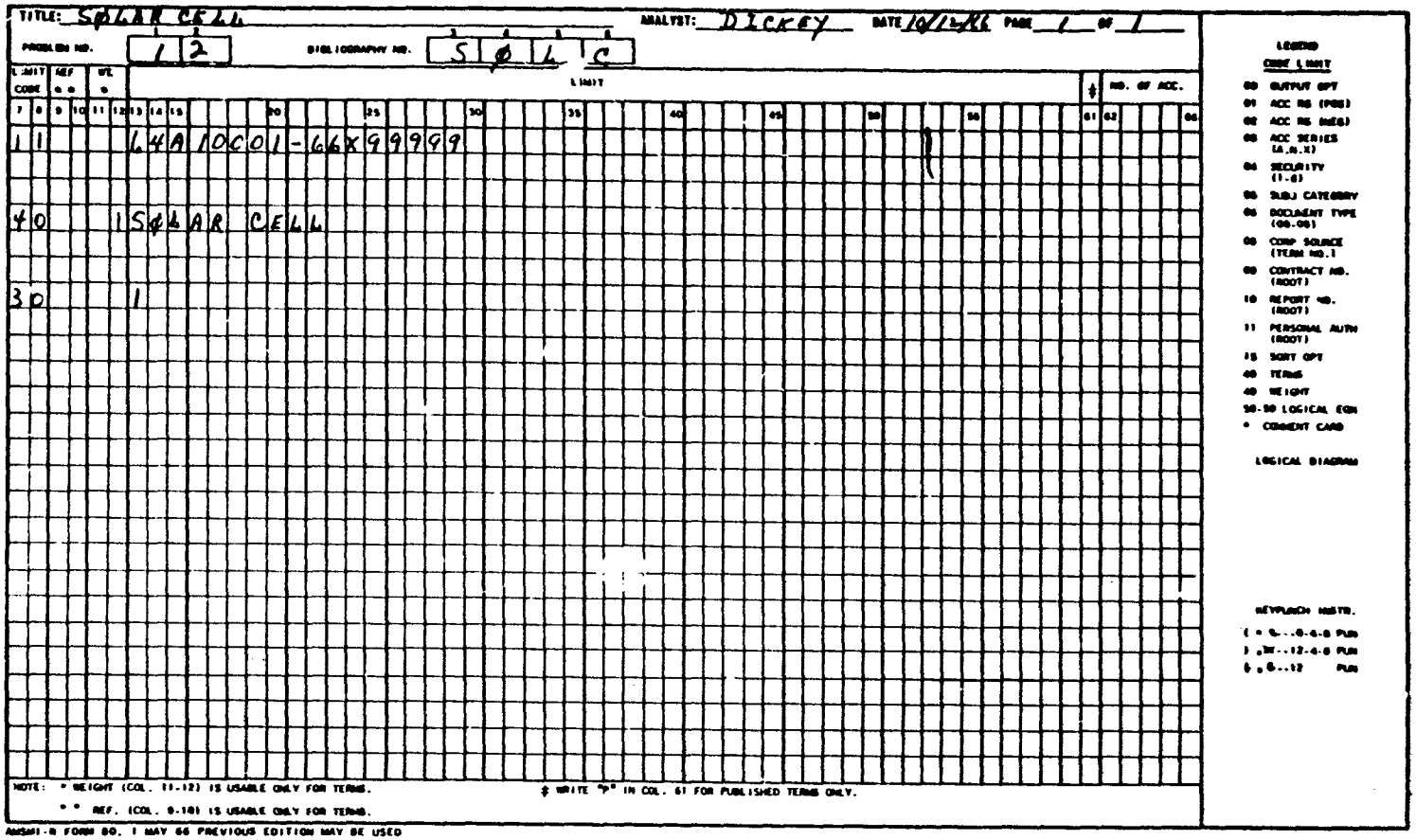


Figure 62. Sample Search

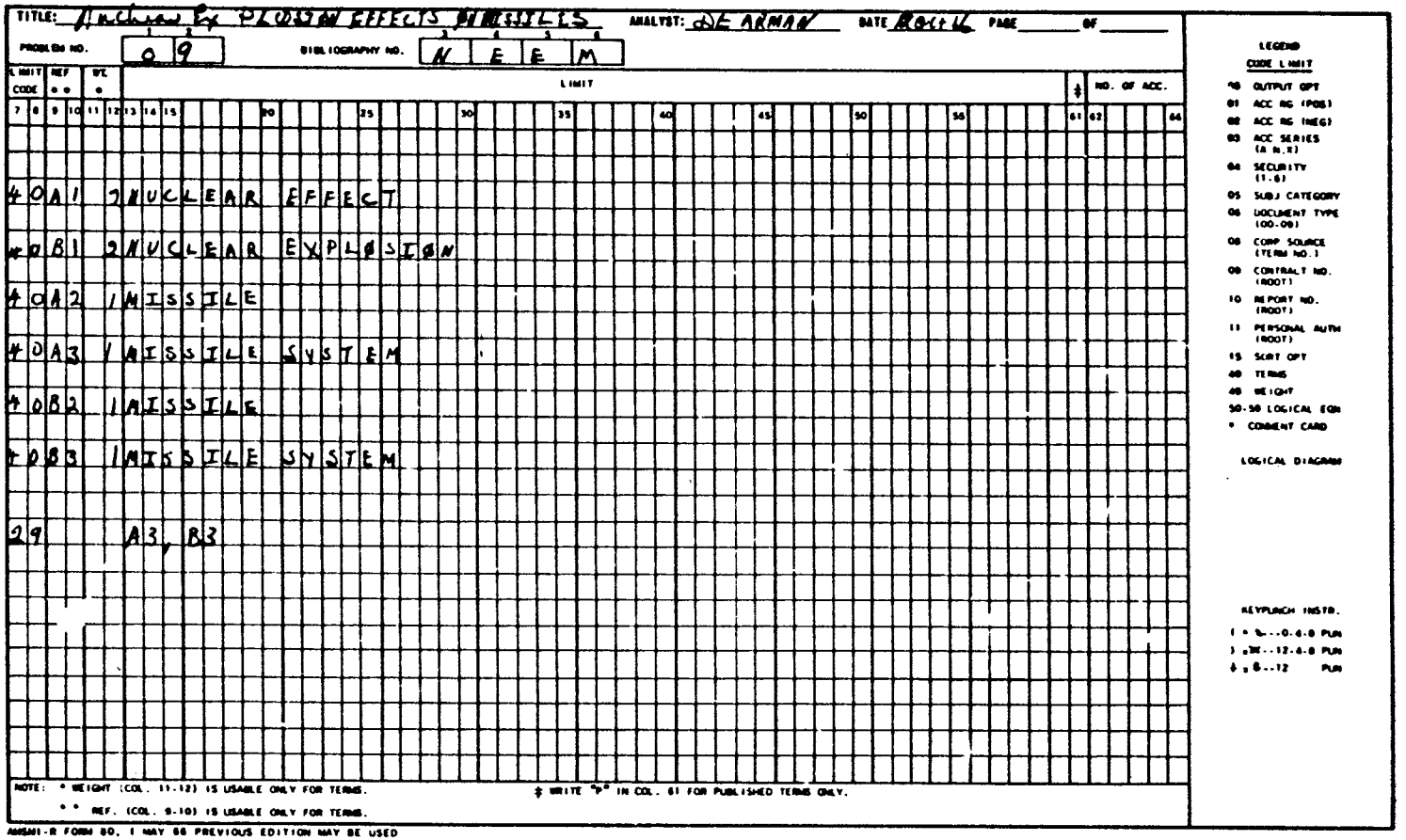


Figure 63. Sample Search

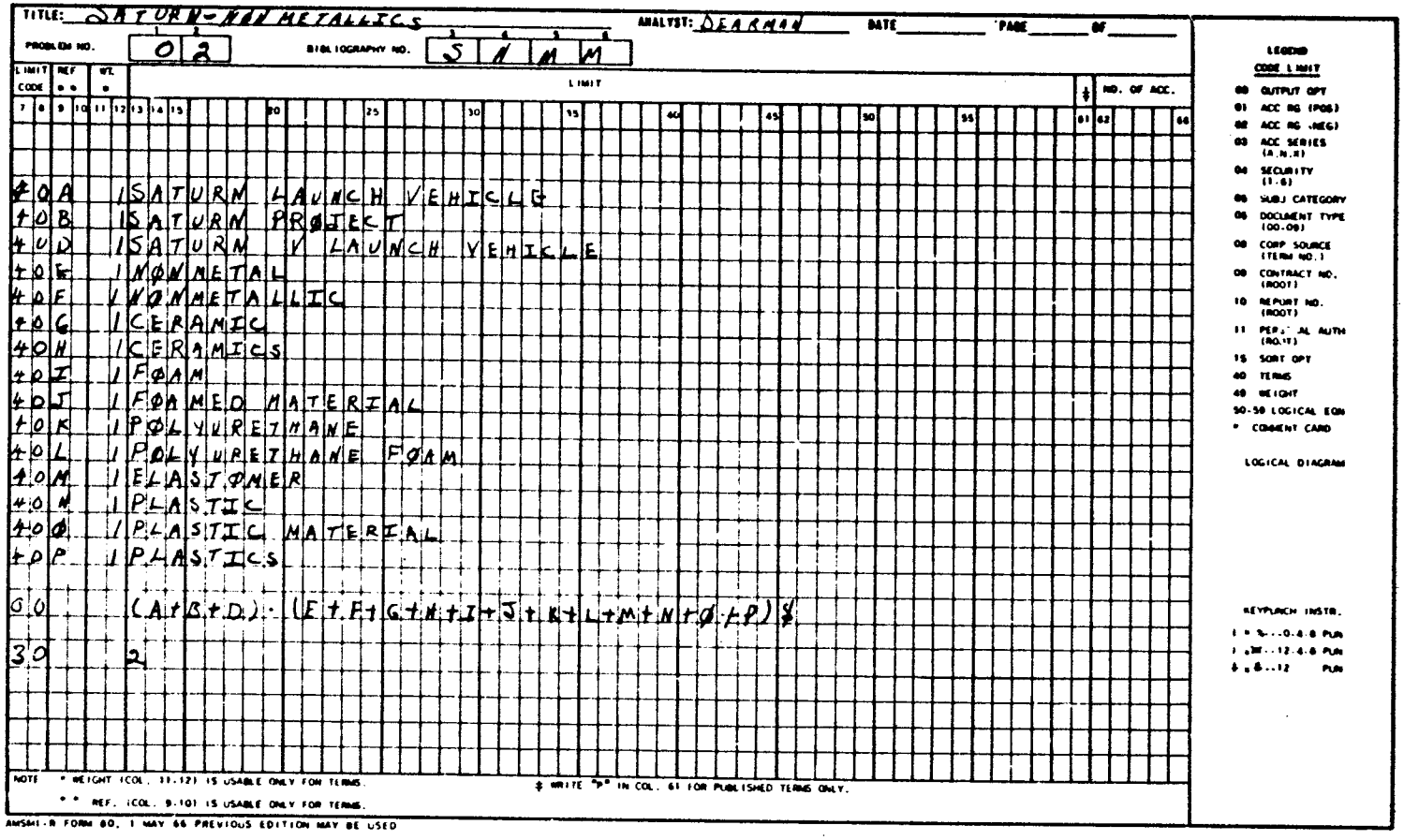


Figure 64. Sample Search

ON-LINE APPLICATIONS

ON-LINE APPLICATIONS

ALPHA-2 and NAPALM

by

Leo J. Cooney

I. INTRODUCTION

The ALPHA 1 System has been discussed in considerable detail in the past two days. Now I would like to say a few words about our plans for ALPHA 2 and then our role in the NAPALM Project.

The ALPHA 2 System is an extension and modification of the basic concepts of the ALPHA 1 System. ALPHA 1 was designed to operate as a batched-serial-processing system. These are computer terms to say the transactions of any one application or module are accumulated into batches for a period of time and transported to a central computer center for processing. At the computer center, the transactions are sorted into the same sequence that the computer master file is organized for processing. Every record of the master file is looked at by the computer to determine if any of the in-coming transactions apply. This technique of computer processing is called serial processing since each record is in order by some predetermined sequence, and to locate any particular record you must in effect start with the first record and read down the file till you come to the record you are seeking. After the processing cycle, the outputs, in the form of updated listings and print-outs of various extractions and by-products, are returned from the computer center and distributed to the work stations. This, in very general terms, describes the batched-serial-processing procedures applied in the ALPHA 1 System.

The ALPHA 2 System is different from the ALPHA 1 mainly in the form of processing. It is to be an On-Line Real-Time Processing System. This implies different computer hardware, different types of programming, and different types of storage of the master files.

On-line infers the user, usually through remotely located terminals, is connected at all t mes to the central computer, is under control of the computer, and can establish contact as soon as any data is entered from a remote station. Real-time is most generally defined as the processing of information or data in a sufficiently rapid manner so that the results appear to be accomplished simultaneously with the input. This type of processing also implies that access to all records is random or by direct access. That is, a record in the middle or at the end of

the file can be located and processed with the same time factor as the first record of the file. This method as mentioned requires different hardware or computer equipment, requires communications equipment, requires different software or computer programs, and different file organization techniques than the batched-serial-processing procedure. It is through this on-line real-time processing method that the ALPHA 2 System will operate.

You may visualize the planned implementation of the ALPHA 2 System as consisting of remote inquiry stations located at seven locations within the three floors of this building. Physical location of the functional work stations, plus the amount of data to be transmitted to and from the central computer, dictates the number of remote stations. The configuration of the stations will consist of combinations of typewriter keyboards, card readers, card punches, papertape readers, papertape punches, and cathode-ray tube display devices. The computer finally used will be a third generation breed, which means it consists of solid state circuitry with extremely fast processing cycles required in on-line real-time processing. Mass random or direct access storage in the area of 1.5 to 2 billion characters will be required by the completed system. This, of course, does not include all the text of the collection but only the keys or references to the holdings and the required programming. Communication from this building to the central computer, approximately 3 miles distant, will be over telephone lines. Inputs to the system will be entered from the typewriter keyboards, pre-punched cards, or pre-punched papertapes. They will consist of inquiry transactions that will search or look-up in the storage specific data and, depending on the volume, display the output back to the requester on the typewriter or cathode-ray tube display device or route it to a tape unit for off-line printing. Other inputs will be the additions of data about new information carriers entering the system; the changing, updating, and revision of the current files; and deletion of items of data no longer required by the system.

The immediate processing of transactions as they occur at the work stations means the files of this completely integrated system are 100 percent up-to-date at any time. Duplications and inconsistent transactions are pinpointed at the instance of occurrence. Entries that fail to pass the edit criteria are rejected and the reasons are cited back to the originator.

Outputs of the system will be in the form of cathode-ray tube display and hardcopy documents typed on both the typewriters and high-speed printers. Large volumes of output dictate the use of high-speed printers instead of the slower remote typewriters. Prepunched transactions for later resubmission may be produced by the remote stations.

II. GENERAL FUNCTIONS AND OUTLINE OF TRANSACTIONS

The ALPHA 2 System may be considered in a first level breakdown as seven subsystems, cross-filing and posting data to operate as an integrated complete system to accomplish the maximum number of information handling and management functions. These subsystems (similar to ALPHA 1 Subsystems) are:

1) Patron Control
2) Book Control
3) Document Control
4) Serials Control
5) Language Control
6) Financial and Statistical
7) Search.

A. Patron Control Subsystem

The Patron Control Subsystem breaks down into two parts: General Patron Control and Selective Dissemination of Information.

1. General Patron Control

The same requirements of the ALPHA 1 System are present in the ALPHA 2 version. However, immediate updata of any data occurs and there are provisions for continued review of data for maintaining current accuracy. New patrons are added, changes are made as they are reported, and patrons are cleared or deleted from the file at the same instant any of this data reaches the library. Any data may be "looked-up" by an inquiry either by a patron's social security number or name. An algorithm that will give all near matches for a name that is not entered exactly as it is recorded in the file is used. Only authorized personnel at authorized remote stations will be allowed to change critical data elements of a patron record.

A whole gamut of statistics, not only about patrons but about all aspects of the system, are available at any time they are requested.

2. Selective Dissemination of Information

Selective dissemination information principles and adaptations have been covered in detail. The selective dissemination information in the ALPHA 2 System will initially cover only those items entering the system for the first time. The patron file contains a field for the maintenance of a patron's profile of interest. We have not yet selected the most appropriate hit criteria.

B. Books Control Subsystem

The Books Control Subsystem breaks down into three parts:

1. Book Ordering and Receiving

This function will be accomplished from an on-line remote terminal. The files may be searched to ensure an item is not available or is not already on order. Items may be ordered or received throughout the day on any purchasing accounts that are authorized and stored in the system. At the close of business, all hardcopy documents of the day's activity will be produced. Transactions are also being provided to delete an on-order item from one vendor and place it on order with another; write claim messages; provide for salvage, transfer, and inventory adjust; receive binding; order translations; and produce the voucher register. The Books Master File record is created at the time an item is ordered and is verified and added to in the subsequent subsystems.

2. Book Cataloging Control

Each cataloger will start the cataloging process at a remote keyboard station. The data in the Book Master Record entered by the ordering and receiving process will be verified if present. The additional bibliographic data will be entered and the subject headings or descriptors selected by the cataloger processed against the Language Control Subsystem. After all data is completed and verified, the proof sheet which will be typed as the data is entered will be sent with the item to the shelf preparation work-station. Upon completion of this operation, it is returned to cataloging for verification. The next step is to request the disposition of the item that has been posted in the master record at the time of ordering. If it was ordered for a patron, an automatic check-out takes place.

3. Book Circulation Control

The Book Circulation Control Subsystem will provide immediate control and maintenance of all the open literature items pertaining to location and status. Data will be maintained in the master record for each individual copy number. Circulation, renewals, recalls, lost and found items, and overdues are processed. A remote terminal with a card reader and card punch is to be located at the main circulation desk. The punch card circulation technique of the ALPHA 1 System will be installed in a real-time application.

C. Documents Control Subsystem

This system will be nearly identical to the Books Control Subsystem in the functions that are accomplished. The primary differences will occur in the identification of items (report numbers versus call numbers) and the problems of security classification. Investigations and experiments to determine the feasibility of automatic indexing on titles and abstracts for selection of descriptors will be undertaken, but this is really a separate problem entirely.

D. Serials Subsystem

This subsystem consists of the following four areas:

1) Serials Order and Reorder
2) Receiving and Routing
3) Holdings
4) Binding.

I will not delve into this area except to say the same products that you have heard about in the ALPHA 1 System will be available, but in a more concise and timely manner. One, for instance, will be in the serial routing operation. When 20 copies of a serial are received from the mailing room, a message is typed to the computer announcing this arrival and the appropriate route slips are produced while the magazines are still in the routing clerk's hands.

E. Language Control Subsystem

This subsystem will not be any different in ALPHA 2 than it was in ALPHA 1. Again, it will operate in a more timely manner, interfacing and used automatically with the books and documents cataloging operation as well as the Search Subsystem.

F. Financial and Statistical Subsystem

One of the advantages of an on-line real-time system is the flexibility and ease of compiling innumerable financial and statistical summaries of the whole system. You can take a look at any of these summaries at any time by a simple inquiry to the system. They can be subtotaled and accumulated over a period of time to form any variation of data reports that will be beneficial for better management decisions and control.

G. Search Subsystem

This system will be designed to accomplish for us the broad task called "information retrieval." The initial version of search strategy or search logic will be very similar to the principles used in the NASA Tape Search System which was discussed yesterday. In addition to retrospective retrieval, we plan to be able to scan our files to answer such unforseen questions as, "How many patrons belong to X organization and have Y type clearances?" We expect to continually refine our retrieval methods based on our own experiences, experiments, and research of our system plus, of course, the work of others in this field.

III. CONCLUSIONS

In conclusion of the ALPHA 2 System, let me again refer to an example to emphasize why an ALPHA 2. You may have noticed at the main circulation desk the two large printouts consisting of about 1150 pages each. These are the open literature items in circulation at the time of the computer run, which is once a week. At best, the lists only reflect the conditions at 1430 hours the day before the lists are received, because the week's transactions are batched and sent to the centralized computer center. This means they are further out-of-date as the days of the week progress. You can visualize how the sequence of events within cycles in the book circulation activity, considering the volume of items in our collection and the number of users, can become jumbled. If the transactions were posted and processed as they occurred, this problem would be eliminated.

There is no predictability of the records that may be required at any time so the complete files are presently printed at each cycle and placed at the circulation desk. In reality, less than 5 percent of these records are ever utilized before the lists are discarded and new lists printed.

The on-line real-time processing method will provide direct access to all files at any instant. Only those records affected by transactions are processed. The requirement for large voluminous printouts will be eliminated. The files will never be out-of-date and the possibility of undetected errors creeping into the system are minimized.

Now, let us take a look at NAPALM, which to us is a project closely related to ALPHA 2. NAPALM is an acronym for National ADP Program for AMC Logistics Management. In general, this project, which began

in 1964, has developed the ADP equipment requirements of all AMC installations for the period 1965 to 1970. It will procure and install standardized hardware (computers) at these installations and is now in the process of developing benchmark standardized systems. Implementation of these standardized systems in all logistics management areas will be accomplished in NAPALM.

The pilot installation of equipment is scheduled here at the Missile Command and at AVCOM in 4th quarter FY 67.

Some 18 divisions, or functional areas, have been specified and assigned to various AMC installations for development, coordination, and implementation of standard systems. Some examples of these are Stock Control, Procurement and Production, Financial Control and Accounting, Project Management, and STINFO.

The Missile Command, specifically, the Information Programs Branch, RSIC, R&DD, has been assigned the responsibility for the systems needed in the STINFO function in NAPALM.

Under this STINFO function there are also Subproponents and Associate Proponents. Subproponents are those organizations who have developed interests in specific areas; for example, the U. S. Army Electronics Command and their selective dissemination information work. Associate Proponents are those organizations responsible for projects and systems that are experimental in nature and not necessarily planned to the production type systems; CIDS, for example.

The Missile Command's design approach is based on extending the ALPHA concept to a set of standard programs that can be adapted and utilized at other installations, since under the NAPALM program all installations would possess the compatible hardware. The ALPHA system is designed on a modular concept allowing any one module or subsystem to stand alone or to operate in combinations of modules.

Because inputs, formats, data elements, computer programs, and computers will be the same, duplication of effort and noncompatibility of data for exchange will be minimized. This would also be the basis for centralized operations for installations not large enough to justify their own separate systems. Noncompatibility of systems, which is probably the greatest problem today of information networks, will be minimized, thereby laying the groundwork for an AMC-wide data network.

The local NAPALM STINFO effort is now in system design, with the first applications being ready for the programmers. Although the computer hardware is still undefined, advance efforts in the areas of design and definition are being accomplished. These NAPALM STINFO system designs are being used initially in an ALPHA 2 System being implemented on second-generation computers as a forerunner of NAPALM, utilizing as many of the same logical operations as practicable.

You may be wondering why we have spent so much of your time describing ALPHA 1 if we have something coming down the pike that is so much better. Let me remind you that the hardware required for ALPHA 2 has not yet been identified, much less installed. Deliveries for other than pilot locations are some time off. The reason we are able to move ahead with systems design and programming is that we have presently at MSFC the second generation on-line capability and support available to RSIC and will soon have the pilot NAPALM equipment. Since we have waited approximately 3 years for the opportunity to work on this type of a system, you can see why we are moving out as rapidly as we can.

REACTOR PANEL

REACTOR PANEL

Chairman: Dr. Jerrold Orne, Librarian,
University of North Carolina

Dr. Laurence B. Heilprin, Staff Physicist,
Council on Library Resources, Inc.

Mr. Charles P. Bourne, Director,
Advanced Information Systems Division,
Programming Services, Inc.

Orne: First let me say that I consider it a privilege to participate in this program with the two gentlemen sitting by me. Then let me say that I may appear to go rather far afield at times, but I assure you we will come back to specifics later this morning. There are some generalities I would like to go over with you first. You will note that this panel is composed of three different kinds of people, thus you will see reactions of three different kinds, and from three directions. I cannot predict these reactions, other than my own, but I feel sure they will be pertinent and may encourage your thinking.

Dr. Heilprin is a physicist. He leads from the scientific point of view and he readily admits he is learning a lot here. His is a valuable opinion, for he represents your kind of user. Mr. Bourne is an implementer, dealing with how and what to do. He will field the questions which have to do with what you can do with machine applications. I am an academic, and from your point of view a civilian, rather than military. I am an academic by choice, but in a professional capacity, I have also been military for some time. When you have problems, I know what they are, both in the Navy and the Air Force, both in and out of the service. This has left an indelible impression upon me.

By way of history, I would like to say that I hope you realize how much you are seeing here today and over the last two or three days that was not possible - was not even thought of - five years ago. One of the bright experiences of my life was to come to Huntsville with two of my colleagues some five years ago, Bob Vosper and Joe Shipman. We were invited then to come here to look at library operations and to make some recommendations for the future development. We were shown what existed then - nothing like what it is now. We made some twenty general recommendations and a dozen or more specific ones from our observations. The implementation, the changes, and the growth since then, believe me, are far more than considerable.

Without Mr. Croxton, the kind of staff he has, and the drive that he has, you could not be learning and doing as much as you can possibly do here. You would not have the possibility of seeing the things you have seen here and many of the things you have heard about. You would not have the potential for investigation of, or for participation in, this kind of growth. And that brings me to one generalization that I would make in my position as a civilian, as an academic library administrator. Just in recent weeks I have become increasingly concerned about the character and position of librarians in their institutions and how they feel, how they act and operate, and what they do. The crux of the matter is that, even in my own library, the organization chart reveals that possibly as much as 70 to 75 percent of the effort is devoted to processing - handling the material and organizing it for use. Perhaps 10 percent is devoted to administration, and 15 percent to service. Now this is a pretty poor proportion, no matter how you look at it. Now this pattern has developed, I am convinced, because of the character of the people concerned, both in the library and in the academic institutions. There is, in a way, a lack of coordination and happy collaboration between the two elements which has led to an impasse, with the librarians gradually withdrawing into the safe haven of processing and the faculty or the academic administration of faculty compressing their relationships with the people who do this until it becomes a vicious circle. The end result is minimum service. Now, I am not blaming my staff. Some of them inherited this, some of them grew up in it, and some of them like it - may be unhappy any other way - and the only reason I have for speaking of this is that you here, knowingly or not, are now about a hundred miles out in front in what you are doing here. There is an awful lot of effort being bent to obtaining the means to provide a maximum of service. If there is, in any of your libraries, an excess of weight on the processing side, on the handling side, on the moving of materials back and forth, watch out! The Library of Congress even has a little trouble with this. We all have problems like this, but I hope you will think of this and try to remember as we talk about the great things that are planned for, hoped for, and striven for. Our primary goal is to reverse the proportions, or to help you to reverse the proportions. If you work hard enough at it, you may seem to be spending a lot of effort and a lot of money and a lot of time on it. Those of you who have mechanized some of your operations know how much it reduces the processing effort in time. The more you put into it, the quicker you get more out, and as you get more out, you will be delivering the service. I am sure that the Command which imposed these tasks upon you, or has suggested that you undertake them, understands this. They cannot describe it; often they cannot tell you why they feel it, but they do feel it, and I would say to you, as I do to members of my staff - I said to my catalogers (when we did a little analysis and found out that their catalog production averaged $3\frac{1}{2}$ books a day) "I am not going to tell anyone on the

campus about this, I am not going to talk about it to anyone around here, they do not know it and I do not want them to know it, but if this does not change, you are dead." And then we set about revising our processing operation so that we can wring the utmost out of the central cataloging product of the Title II-C program in the Library of Congress. You can read some of the story in the Southeastern Librarian, Fall issue, where the effect of Title II-C is clearly stated. It is the key. It is the great single key that enables us to do this. Now there are keys for you, too. They are going to be discussed in some detail here. You have heard a good many of them.

I would make a second observation as a civilian and in connection with my work with the American Standards Association. We have to talk some about standards later in detail, and we will, but as a general statement, let me say that I am, myself, as an outsider, rather taken aback by what I knew already, seeing it come out so clearly here again. There is a tremendous lot of talk about coordination, but almost everyone who has talked here is on his own path. Mr. Cooney gave me heart at the last, because he talked about coordination in ways that we need to have it. Now this is not all bad. We will come back to it. There must be many small units contributing to any whole which is as comprehensive and difficult as is this one. Everyone has a part of it, and they want you to have a piece of it, but there must be, at some point in time, the development of common useful standards. I would say quite frankly that from what I have heard to now, as an outsider, it is a long way off. What is even more important, I sense a kind of - let us say competition - rather than coordination in some areas, and this troubles me a great deal. After some of you have worked on standards as I have over a period of time, and find out how long it takes to develop a standard, you will understand more why this is discouraging. It will happen to every one of you at some time, because in this business, you cannot evade it. The whole operation, which I think Mr. Bourne will tell you about, stems from and starts with how much you can standardize. The level of standardization that you can achieve will determine, absolutely, your success. Perhaps I have talked long enough to start. Let me just add that it is our aim to talk in general terms about our reactions in this first part of the morning and then come back in detail during the second part. And now, I will let Mr. Bourne take up from there, if he will.

Bourne: I cannot take issue with anything that has been said so far, so my comments will be incremental to what has already been stated. There are perhaps a few general observations. The question was asked yesterday after one of our sessions, "Can you give some examples of library automation work that has been done elsewhere or where we may go to find good sources of information on library automation activities so that in our self-improvement activity, or thinking in terms of our own local library, how could we develop or review the background information we need to start on our

own activities?" I will make just a few brief comments on sources of information. First of all, American Documentation Institute and its publications are one source of useful information, both the Journal (American Documentation) and the Annual Proceedings of the ADI Conference. This year there was, for the first time, an annual review of the information sciences published by the ADI under NSF sponsorship; one of its chapters is devoted to library automation activities. That could give you a quick starting point for a place to go to expand out into the literature. Library Resources and Technical Services is another publication that gives you bits and pieces of things people have worked on. There is a mass of scattered report literature on specific topics in this field, but it is difficult to find a single source to point you in the right direction. There is an IBM Bibliography on information retrieval and a quick index of literature in the field. This is available from your IBM salesman, and it will give you another start in the literature. All of these are perhaps starting points for ways to start building up a collection of background information on what has been done elsewhere. Now it would be helpful perhaps to put the activity we have heard during the last three days into some context of what has been done throughout the country in terms of library automation. The programs and the papers that you heard in the last two days were certainly very interesting and indicate definite progress in the development of techniques and systems. It is only fair to point out that RSIC and the other labs represented here during the past two days are not the only people working in this area: let me cite a few examples. There was a discussion on the development of a book catalog, a printed book form catalog. You saw the flexowriter transcription and shelf lists records next door. The book list is an idea that has been proposed for quite some time, now, and there are perhaps a dozen or score of libraries, academic or otherwise, who have book catalogs as such. It is an expanding type of activity for many types of libraries now, so there is nothing unique in it. The point is that there is a great variety of techniques that you might use, both for the transcription of data into machine records, the form presentation of the catalog itself, the degree to which you make use of other people's machine records to help build up your own book catalog and save your transcription efforts. These are the kinds of things that you want to start paying attention to - the differences between the technique or the approach that you use here and the techniques used elsewhere. The use of on-line techniques, again, is not restricted to RSIC. The Bunker-Ramo work that was described yesterday is an example of another such operation. The University of Illinois, or the University of Chicago, I am not sure which, using grant money, is developing and operating an on-line computer system for some of their technical processing in Chicago, and I think doing circulation control on a number of technical processes with on-line techniques.

The RBM Research Lab in San Jose, California, several years ago was using a remote typewriter terminal device to assist in the cataloging operation. The descriptive cataloging and the elements of cataloging information were keyed in during various stages in the processing of the book, stored in computer records, posted to appropriate machine files, and printouts made for book labels and orders and other kinds of printed information. There are several other examples of on-line processing here, and the point to look for now is some of the differences in the techniques. Another generalization of a different type - as you review the literature or talk to other people, you will find lots of bits and pieces of systems being developed. Library A will have developed a mechanized, automated circulation system of a particular type. Library B will have developed a technique for perhaps printing catalog cards using their computer, and Library C will perhaps have implemented an selective dissemination information system. There are lots of examples of these bits and pieces efforts. There are far fewer examples of libraries which have developed an entire operating system in which all bits and pieces fit together in some reasonable form so that they start sharing some of the data and forwarding partial transactions from one subsystem to another in some integrated manner, but there are a few examples of more integrated systems. I think another generalization is that a number of you who are now in the position of operating or running an individual library are faced with the question "What do we do now to start to do some of the same kinds of things for our operation? How can I lift, or modify, or change, or where can I start doing the same kinds of things for my own library," and I think this is something worth pursuing. Perhaps in the discussion period a little later, we can try to get comments from you concerning automation plans we have not heard about yet or about the mechanism or way in which you are going to proceed to do this. What are the first few steps you expect to take? I think it would be interesting to here this. There is no magic way to get started. Probably a word of caution is that I would doubt that you could do this by yourself. I just do not believe that it is effective for a library and a library staff to decide to take it upon themselves to develop an automated or mechanized system or in some way revolutionize their library without calling upon some outside assistance to help with this task. Presumably all of you are on bases or commands which have either computer centers or management analysis offices or some sort of offices where you can turn to get help and where you can say "Please lend us some good systems, analysts, or problem solvers to help us formulate the plans and the procedures and the actual details for operating systems to go on from here, and for implementation, perhaps, arrange to loan us a programmer or whatever is required." I just think it is very inefficient for a library staff to try to take it upon itself to try to do all this work. There is too much background knowledge

on specific equipment and methodology that you need to do a proper job of systems requirements, definitions, design, evaluation and testing, and the actual methodology you need to do a proper job of systems analysis and design. It is not something that you just turn to and start. There is a very definite formalism to it, and it is the type of thing that I think is well worth trying to find assistance. This does not mean that you turn over the entire job for somebody else to do for you. It has to be a partnership involvement. The only point is I think it would be a mistake to try to proceed independently on your own without trying to get some help from neighbors close to you. Now, we have a number of questions we have been asked to respond to, but perhaps that should be saved for the second session.

Orne: Thank you very much. He is a nice fellow. I thought he was going to start passing out business cards until he said "Go to your processor help on the base," but he did all right. And also, I was thinking, "I will now have to give equal time to this fellow." Dr. Heilprin, I think, has probably another point of view, and I would be happy if he would give you his thoughts on it. He is going to use the blackboard, I believe.

Heilprin: I come to this as a person who has been on several sides of the question. For many years I was a scientist at the National Bureau of Standards in ionospheric propagation and later in weapons systems, proximity fuses, etc., and had to use the technical literature. After the war, I became an operations analyst with some of the "brain factories" down in the Pentagon, particularly OEG for the Navy. Later, I went into private industry, where I had to rustle up contracts. For the last nine years, I have been working for a very different organization, one that has to analyze proposals for research in the advancement of libraries and get the most possible good out of a rather small amount of money that they can dispose. From this broad picture, I know that you people are all constrained by the needs of time and money to show results, etc., so I thought that it might be good just to talk about something very different. I would like to talk about what a network really means, and how it can be generalized in thinking. I would not like to be taken as an authority. This is my own thinking, and it is not all necessarily well thought out.

The first thing that you find if you look at a physical network such as a network of resistors, inductors, and capacitors are repetitions of the same kinds of elements. In all such networks you find electromotive forces at nodes, and in connecting parts. In a network which consists of an organization of persons and institutions, you must find something that corresponds to the repeatability and similarity in physical

network elements. This question, that is often covered under "compatibility," can be restated: "What is there that is common between the proposed parts of a network?" I would like to enlarge on this. Automation, of course, involves the handling of many similar instances of any distribution. You do not ordinarily automate in order to do something once (unless, for instance, you cannot lift something without putting a lever under it, and then you might automate and put a branch under it). In general, automation implies repetition. And repetition among groups of people, equipments, and operations implies and practically means the same thing as standardization. Everybody must do the same kind of thing in the same way if we are to have things operate in common. And things must be constructed in common. I do not like the word "commonality," - but it expresses common elements - common elemental parts. This comes down to the acceptance of standards by these groups, and the natural growth of standards. Now I want to make a jump in the subject. In everyday experience, we are constantly taking in little time-sequences of experience, whether visually or through our other senses, and we all know that they are quite unique - they are individual. That is, you are looking this way and and you see these people here: someone else is looking that way and he sees those people there, and the two views are not the same. They are not the same for a person sitting here or a person sitting there, so that each one of us has a unique set of experiences. The question I am asking you to think about for a second is "How do you expect a group of people, each of whom has a unique set of experiences not repeated by any other human being at any other place or time, to be able to communicate?" The only things they have as a basis for communication are their experiences. The answer to that (by a long train of reasoning, which we can short circuit) is that a lot of our experiences are associated in our minds, and out of them something is produced which is much more common to each of use than are our direct experiences. This thing, or these things, that are more common to all - shall we say common to the population - than our individual experiences are what we vaguely call "concepts." They are literally "abstracted" out of our divergent individual experiences in such a way that the common elements to these experiences stand out. And it is those concepts, and only those, after they have achieved a sufficient degree of uniformity (standardization, if you will) that we can use for communication. In other words, the use of a word is the use of something general that has been abstracted from individual, unique experiences. The level that it has reached when it is abstracted is such that it is very, very close to what each of use has abstracted. It is so close that it comes within an "American Standard" for symbolic communication, so to speak. Only as such can it be used for communication. In still other words, an abstraction is the only kind of idea with which people can talk. This is true even of

names, which we think of as particular. Words and concepts are abstract for the reason that we must automate in order to communicate. We want to make a word or concept common among a large number of persons. In that sense then, the words of any language are simply a set of abstractions. They are never concrete things - always symbols. It is for this reason that I made the jump from networks, which require common elements, to the bases of all communications, which are the thoughts that we use. They are abstract, "standardized," or they cannot be communicated. To repeat the point, make this test. You see me here. Can you communicate to your neighbor the retinal image, the picture you see of me now? The best you can do is to say "I see what is commonly called a man (a word-symbol for an abstraction), he's got brown-grayish hair (another word-symbol for an abstraction from experience), he's got the usual number of eyes, nose, etc. All words are abstractions. Therefore, we can communicate abstractions which together reconstruct something like a concrete image, but we cannot use, we cannot put into another person's mind, a direct sensory perception. So I am pointing out, then, that communication is based upon commonality or standardization, or ironing out the differences and retaining the common parts, of experience. And of course, concepts and their word-symbols are more abstract and less pictorial than our direct sensory impressions. All these personal images, or parts of them, disappear in communication, since they are the individual parts of experience. The only parts that remain and can be communicated are the intangible abstract parts - the parts we all experience in common. So, by the elimination of detail, then, we are able to get together on some simpler structure, some substructure of relationship which allows us to communicate.

Now this same process is at the back of all bibliographic access. It is a necessary process in any communication. Therefore, it is necessary in starting a communication network of any kind - local or national. Finally, it underlies the attempt to get NAPALM operational. We will be able to get the various groups together to the extent that they succeed in eliminating non-common detail. So, if we may take this as the general basis or background of how we think, we can consider it in looking at these 18 member groups that we are here to talk about connecting into an information network. And as to the proposed network, we are not considering ourselves here as parts of only one network. There are many networks in which each establishment may take part. But considering just the one proposed network, it is clear that we must look at the differences as the important things to eliminate. The very beautiful systems analysis that was given yesterday showed there was large disparity in the sizes of the installations. Sometimes there is only one

person who has to do everything, while only a few aresenal libraries have 30, 40, or 50 people. So if the type of operation the network is going to perform depends upon having a threshold or minimum of 25 people, those installations with the larger number of persons available could or should be the first to start. The ones with fewer people than the "threshold" should be the ones that should prepare themselves to do what Charlie Bourne says, get advice and see how they can fit in. I think this is enough for an introduction. I will turn the discussion back to Jerry Orne.

Orne: Well, now you have had it. A scientific explanation. Just don't ask me when you are talking in abstraction and when you are talking plain, because I will not be able to tell you a thing about it.

Heilprin: That was abstraction.

Orne: Always happy to have a scientist beside me. I was trained in the humanities. It has always been a mystery to me how I ever got through college without learning a little more about science. Someday, maybe, if I live long enough, I will learn enough to understand this. I thought it was very cogent. I begin to understand - I could really understand what you were saying - I just do not want to have to do it.

We have a little time left. Let me review briefly what we have talked about and prepare you for what we might do in the second hour after we come back. We want to talk after we come back, about questions that have come to your mind about the papers you have heard. I would hope that these questions could be related to problems that appear to be raised as a concern of network - how groups of people or operations can come closer together in some way. I would hope that the there might be some understanding among you all as we come to a close as to what are the areas that are most urgently demanding standardization and what additional efforts can be made towards it. I cite as one example one of the discussions given by Mr. Van Wente yesterday in which he describes the vocabulary which NASA uses. It seems to me that he said there were about 18,000 in his, and LEX has about 23,000. Let me tell you a little bit of history. I have had my thumb in so many things that somehow there is always a little bit of history. In the last eight months I spent in the Navy, under duress, I was sent to the Office of Research Inventions in Washington to help them organize project control for all Naval Research, Navy, and contracts. That was not really what they had in mind. They did not know what they had in mind. What they really thought they had in mind was that I was a librarian and I was going to set up a classification system for them. They had a man who had been a P-5. I do not know what that equates to now, about a

GS-11, I guess, who had been working 10 years on inventing a new classification system under which they would classify all Naval research. He was a competitor and successor to Dewey and the Library of Congress. His system was different. He used letters and numbers. His was different. And in 10 years, he had gotten through the letter "C" and then died. They then ordered me in from another thing I was doing on the West Coast. They thought to hurry up and finish the classification system, then classify all the research, and then have project control. No so, I said, not me. I proposed that they devise a subject heading list and that we go to subject control and to accomplish it quickly. We had about ten divisions by subject in the Office of Research Inventions in the various scientific fields. I got two or three men assigned from each of those, scientists, to lay out the hierarchy of each field and to develop all the known terms that they could produce from any sources, and we put them together. We produced (I had another person with me, a Naval type who was a descriptive cataloger in the Library of Congress for many years before she went in the Navy) the first subject list, and it was published as the first Navy Technical Subject List. Now do not be surprised if you cannot find it, this was 20 years ago - more than that. We went through two editions, and it was a very elemental thing, I assure you. It had in it the proper science aptitudes and it had in it some measure of library form, so it was fine, and within three or four months we were in business, but this is only the first piece of the history. I got out of the Navy, because they had a system that enabled me to get out, and they immediately made contract with the Library of Congress with what was the Navy Contract for their indexing, and that was project control by contract with the Library of Congress. They spent a lot more money that way, I can tell you that, but that was the point where Mort Tauber came into it and he developed a new card. Some of you will remember it - the descriptors on the right side beyond a line. That was the next generation. At the same time, I went to OTS for six months after I got out of the Navy because they had a job like this that needed doing. It was declassified, of course, and involved distribution. While there we turned out another more advanced and more broad subject heading list. These were the predecessors of what is now - well, it went on to DDC. And it went to NASA's vocabulary and now to what is going to be LEX. Now that is a long path. Let us see - I got out of the Navy in 1945 - that is 21 years. I just tell you this as a bit of history, and there may be some point in telling it because it may help you see at least where you are now, and that these things have to be done. Now, I do not know why LEX has not been brought to a conclusion at a given point and promulgated. Mr. Van Wente said that when LEX is available, they will use it. And you know what is going to happen then? You will all use it - because it is the best there is, and if you want on-line, if you want with it, you will have to use it. Now, what can you do about that?

Every one of you can do a piece of it. You will all work in special areas, you will all have the right access, in fact you have to have access, if subject approaches are not adequate or are not working, you have got to complain. If you are working in a special field such as electronics, the field Mr. Wixon talked about yesterday, they really nailed it down and mechanized it. Well, he has probably got more descriptors than anyone else in that given field. He adds, and everyone adds. The important thing is that at some point in time you have got to cut it off, and print it. You have got to standardize it, and that is it, for that time. It does not stand still. At some point in time you fix it. And this is where what we will talk about in the next hour is extremely important. How is each one of you going to share in this? Where will the work be centered, or where will the major inputs come from? How many are needed? This is a program. This is a very critical program for the development of any system. I speak only of subject access because that is the one I know fairly well, but there are other areas such as the development of access codes and coding, there is filing that we spoke about the other day. There are many others. If you will just be thinking on these, while we are relaxing a bit, when we come back we would like to get much more specific in the next hour or so. I have six or seven minutes. If you who are all so patient with me will allow, I would like to take about five of those minutes to talk to you about my work in standards.

Just about everywhere I have gone, I have found that people do not really know enough about the procedures of standardization, and it takes very little to know them well. I am the chairman of a group of what you will hear of and know as Z-39. That does not mean much to anybody. Z-39 is some mystic cabalistic symbol - but it is not difficult. The American Standards Association is divided up into sectional committees, each of which is devoted to some subject area. They are letters - they go A to Z, and they are numbered within the letters, depending upon their classification system. Z is miscellaneous, and 39 is library work and documentation. There is a little talk now about adding related publications efforts to it as publishing - certain kinds of publishing problems.

I have 16 subcommittees in Z-39, each of which is funded to have meetings and to do work on a specific standard. Each of them has a particular field of inquiry. Each of these is a standard which, when developed, will be submitted to the entire user population of the country, through the membership of Z-39. Z-39 membership is made up of representatives from all user organizations like the American Library Association, DOD (has 3 people in it), the Library of Congress has representation in it, the American Book Publishers Council, the

American Chemical Society, ASTM, etc. There are a multitude of organizations. I do not know exactly how many, maybe 50, but they receive these draft standards, then consider them and pass them around among their people in their particular subjects interest, and they comment, and there is a continuous interplay of draft and comment and new draft and comment until all of the common elements that are acceptable to practically everyone are cooked down. That is what gets published as a standard by the American Standards Association, now called the U. S. American Standards Institute. A month or so ago they reincorporated with a new title and became a quasi-government organization. The government does participate actively in it now, where it could not before, when it was a private organization. They have a very rigid system for producing, accepting, and publishing a real American standard. It may take 10 years, for some standards. We had one on trade catalogs which got done in a year, "Standard Methods for Producing and Setting Up Trade Catalogs," but some of them take much longer. I have been working in the field of linguistics. We are working now on the revision of the international standard for the transliteration of Cyrillic letters. I have been on that five years. The revision, not the initial standard, just the revision. It has been 10 years since it was revised. I think this coming year it is going to get published - the new standard. They take varying amounts of time, depending upon the difficulty. But in every case, when there is enough common acceptance, when there is enough material in the standard, when it is put together in a form that everyone can live with, or at least 98 percent of the people can live with it, they will adopt it, making their own additions, but they will adopt that much of it. Then it gets published. Now, perhaps I am just repeating in other words what my colleague has said in logical scientific terms, but this is a system which you all need to know. Now, you need to know what is going on in Z-39. Any of you can know it. There is a quarterly news letter which comes out of the Bowker Company in New York. Mrs. Anne Richter is the Vice-Chariman of Z-39, and she produces this news letter. It reports once every three months on the activities of the subcommittees and where they are, done by the Chairman of the subcommittee. You can write to her, if you like, and ask to be put on the mailing list. She will be happy to put you on the mailing list. It is the Bowker Company. You know the Library Journal, same address, 1180 Avenue of the Americas. Mrs. Richter is the Books Editor of Bowker.

Now, I would be happy to answer specific questions after we adjourn, if you like, on standards methodology, if you are concerned, but mainly, I hope that you think about this process. One of our most difficult problems is in government and in agencies where each develops a standard, and they call it a standard. In fact, it is a standard

for that agency, and you have heard about a dozen references to standards in these last few days. They are local standards and they are fine if they serve the purpose locally, but remember, everytime, sooner or later, in a field like this there has to be a cooking-down, and there will have to be national standards. I think this might be a good place for us to stop.

Part II

Orne: Let me now invite you who have been so patient and kind to take the floor as you choose to talk about anything that we have opened up in your field or anything that you have heard over the last two and a half days that has left you with a burning feeling. I would like to hear some of you comment on the vocabulary, the thesaurus problem. Perhaps someone could describe the present state of LEX, and who is doing it.

Audience: At the ADI meeting in Santa Monica, there was a presentation of the current status of LEX: they said it was more or less complete, and that it would be published around April or May of 1967. The audience asked a lot of questions. One, they did not like the structure, and did not know if the Engineers Joint Council would use it as it was. The representative said he thought they would. Then the question was asked about maintainability of it, how do you keep it up to date. The answer was that they intended to keep it up to date by having various micro-thesauri, and that is about it. Also, they said that the intent was to make it mandatory on the Department of Defense, which may solve some of the NASA-AEC-DOD thesaura problems; however, from the audience reaction, in my opinion, the audience was not very happy with either the way the thing was structured - of course they had not seen the product - or the scope notes or the various arrangements. They described how it would be arranged, slightly different from the DDC, the alphabetical arrangement, the scope notes, etc. I do not remember all the details.

Orne: Was it presented by the Department of Defense?

Answer from Audience: No, the paper was presented by a contractor, who was in the editing stage, and who was responsible for preparing it for publication. I believe it was Systems Development Corporation, but I would not swear to it.

Orne: Contract by the Department of Defense or . . .

Answer from Audience: By the Office of Naval Research.

Orne: ONR. Then it was the Army that was objecting, I suppose. Let me point out one flaw in this whole business, something that you are surely aware of, inter-service rivalry. I do not really get involved in it. I was in the Navy, and I worked six years for the Air Force, I have an Army Colonel who is my business manager. He was my deputy at the Air University. I work with all these folks, and I do not have any predelection for one over the other, but you have to be aware of this, and I think at some point in time you are all going to have to get into it and notice the difference between what has been said about the proposed as a standard and what I have said to you about a system for establishing a national standard. You said they had not seen it. They do not know if they will like it, or why they do not like it, but they know they do not like it. Under the standard system, you have to see it. It goes through numerous drafts before it is settled, and if you do not like it, you can say something about it.

John Hayes: Let us give some justice to project LEX. They did schedule meetings throughout the country on the various separate subject fields and invited those who were interested participants to come there to help define proposed terms and discuss it, so that the reaction of the audience there may not hold true for all units of it.

Orne: Yes, of course. But you have, in fact - to establish a national standard, you have to let the country see it. Anybody who has any interest should have a voice in it. This is done through the American Standards pattern by having the organization's members and the organization itself take part. The organization takes it to its membership, or to its company, or whatever it is, but this is something that I think you can work out. I think Mr. Croxton can work at this. Having here a large - one of the larger experiments in this field - he can bring something to a draft state and distribute it widely, pass comments, and the drafts start moving through those interested, and you can all contribute to it, or tear it apart, or beat it up, and I know that in that sense, it would be an experimental pattern, but it is possible that it will come to something in time.

Bourne: I would like to ask a question of this group, "Does the ATLIS or some equivalent Army publish a survey or a directory of the library research automation programs that are going on in each of the individual Army facilities? Is there a mechanism by which Army Library A can easily determine what the automation plans are for Army Library B?"

Answer from Audience: No, this does not exist as a general pattern, because these activities are funded through several different channels. Those that are funded as specific tasks of the RDT&E program are covered in the 1498 system and could be found that way.

Bourne: As a follow-up to this meeting it would be helpful if a number of contributing libraries just provided a simple statement in a paragraph or two, to describe the activities they have currently in progress so that this could go out as an addendum to the meetings of this conference.

Audience: There are computer priorities set up by AMC, and some of the libraries are bootlegging some of this stuff. The ATLIS group has planned some sort of communication between Army libraries to let them know what is going on and to use it as a basis where problems can be ironed out.

Bourne: At least, in the same command there should not be any surprises.

Audience: I have planned to start a means of communication on what is going on in ATLIS. I have sent out one item. I hesitate to give it a name, because you get in trouble here, but I have put together a basic list of some 107 libraries and added to it since, and for those of you who would like to have this list to be kept informed of our progress, I have it.

Bourne: Do you have any plans for continuing or updating the list? Your letter sounds like a one-time activity.

Answer from Audience: I am keeping it informal, without being regular, whenever the need seems present. For example, the last one was primarily the minutes of the last ATLIS meeting.

Audience: I might put in a plug for DDC. In learning about automation and what other libraries are thinking and what these contractors are writing and so on, I think you will find your TABS have a wealth of material on this subject that will give you good information, maybe not all you want to know, or exactly what you want to know, but at least I have found - I have not read all of them - a big drawer full of things I am sure will be interesting when I get to them.

Bourne: Perhaps DDC and NASA could run a search for RSIC on automation, so that the report bibliography could be distributed to the conference participants.

Audience: There you go. Sounds like a fine idea.

Audience: I think there was also one sponsored project which dealt with the automation of libraries within the department. This was put out as the Hayes-Allen project under contract to the Army and is available

through DDC. There are about 50 consecutive numbers covering each installation on the stauts of automation at the time of the report. This was roughly a year ago.

Bourne: How many here have seen those reports or the particular report that applies to their own library?

Audience: Is there a list of the library research going on in the Army? The information included in Hayes-Allen requires computers. What about microfilm activity and things of this nature?

Audience: I was trying to answer a different question, and I do not believe that the Hayes-Allen report is complete. With all due credit to 1498's, etc., it doesn't exist right now.

Orne: This says one other thing - that the literature is getting voluminous enough so that there now needs to be some simmering down, some selection, and that is where people working in the field could help.

Bourne: One open source place you might turn to is a new publication called Documentation Abstracts which is being started by the American Documentation Institute in conjunction with the ACS Division of Chemical Literature and the Special Library Association. This publication will attempt to completely cover, as an abstract journal, the library automation field, including reproduction techniques and other things you might think of in the documentation area. It will cover report literature as well as the open literature.

Taine: This will be a question directed to Fred. Is there anything that could be considered to be unique about the military library environment that would set it apart from other libraries to the degree that work that has been done in automation and mechanization of other libraries would not be applicable?

Orne: Some parts of it. The security problem, for example. We have been talking now - the questions we have heard have dealt with philosophic ideas, things that it would be nice to do, that are not being done, but let us come back to what is being done, and ask your question another way. Are there parts of the system that we have seen here at this installation which have commonality, which are fairly universal and applicable. The question should be, is this experiment or any part of the experiment going on here useful in other places? Or are there restraints that prevent you from using it? If so, can they be cleared, or can they be handled in some way? From an outsider's point of view it seems to me deplorable that there is so much being done here that seems to have fairly

universal application, but you are all pulling your punches.

Bebee: Let me try to answer that one. Yes, there are many things which are going on here which I believe have been adapted to other agencies, specifically, for instance the serials project. I believe someone from AEC came down and obtained basic information as to the needs of this system. Rather than picking up a new program for AEC, they modified this somewhat to fit the particular needs of the AEC complex rather than adopting a whole new program. This one in turn, I believe, was adopted from the University of California's La Jolla Project, in the beginning, but modified to fit the Army, or at least it is one of the sources. I, in turn, at Dietrich picked up the existing program that AEC had, hired the same firm that produced their programming, made further modifications to it and put it into effect somewhat over a year ago, and we believe that every one of these programs which is in existence at least offers a basis for the next one to start. Currently, Miss Wolfe and I are down here primarily to investigate the acquisitions program as a mixed phase of automation adapted to Fort Dietrich's needs. We may not go into the identical equipment, but most of the basis is already here. We know what is being done, and we are certainly not going to start from scratch to design a complete new program of our own, and I do not believe any of the others who are here are going off into a different direction without this common starting ground.

Orne: You have raised a question in my mind, talking about acquisitions. Would it be practical, for instance, for Fred to run as many cards, additional cards, for a title being ordered as there may be libraries having a subject field of interest and just sending them out to those libraries as a service? Would that be useful?

Bebee: I believe that is one of the subjects that is under investigation as a part of the ATLIS program, but I believe it is funded somewhere in the next couple of years to determine what we can do toward some of these things.

Orne: This would not take much money, would it Fred? A number of cards?

Croxton: Not very much, but of course, you are asking the kind of questions we would like to have answers to. We are supposed to look into that.

Orne: Two years, though, seems like an awful long time getting something like this. I could make up my mind in twenty minutes.

Bebee: One of the problems is the obtaining of money . . .

Orne: I have asked Fred if you have got it . . .

Bebee: Well, how much is much, or how little is much. We have the various individual agencies in this group, and how much commonality do they have, in this connection, and how readily obtainable is this information?

Orne: Well, suppose you took the COSATI subject headings and marked those in your fields of interest and turned them over to Fred and he ran a calculation and found out, knowing about how many books he orders each year and how many in each subject area, how much it will cost him to do it, and he asks for the money? It isn't going to cost you anything. You are going to get a set of cards from which you order the books.

Bebee: At my particular installation I am so far afield in subject matter from his that I probably would not be able to pick up more than five percent of the cards I needed.

Orne: Maybe you should send him a set of yours. This is the kind of coordination that I think you all have to think about. If any one of you is doing something well, you ought to all be using it, or whatever part of it fits. Mr. Wixon, you are in electronics, you have a specialized field, and you are getting a certain limited range books, in your field books, more than most places - as I remember, the books that I bought for the electronics library at the Air University were pretty specialized - but others have peripheral interests, or maybe whole interests - if you were on a system that was compatible, or even if it justified punch cards, you could turn them over and you have got acquisitions information.

Bourne: Would it not be more effective to try to identify the subject coverage and the participants, and then just arrange with the Library of Congress to get that coverage sooner, in proof slip form?

Orne: No.

Bourne: Why?

Orne: Well, I will tell you the mechanics of it afterwards, but let us not talk about it now. While I am still talking, let me say I asked Miss Cason to let me show you this, and I recommend it to you. I edit this Journal now, and I wrote an article for the last issue because I did not have enough articles to make up the issue. It reports on something that was a burning issue with me. Its title is "Title II-C, a Little Revolution." I have been working closely with John Cronin for a number of years and listening to everything he says and discussing with

him everything that has to do with Title II-C. Now, this is the open literature and does not affect you very much. But they are doing something at the Library of Congress that a library like mine, a large academic library, has to use. In one step they have standardized, they have taken the biggest step toward standardizing classification and subject heading that has ever been taken in this country. This is the biggest thing that has happened to large libraries since the introduction of the unit card. They are cataloging now at speed a very large volume of books and sending us a control card for every one they do, often before the book appears. They get the basic information from foreign sources - they are dealing mostly with foreign books and our intake is about 60 percent foreign now, but the use of this material depends entirely upon its standardization and acceptance as a catalog standard. Now, the revision of my processing I told you about a while back will result in results from my decision that we will use the Library of Congress card exactly as it comes. The classification - and we have changed over to the LC classification - the subject headings and the content of the card is adequate. We will use it, exactly as it comes, and if any of my catalogers change it, I will have their skin. Because of this, within a year, 80 percent of our cataloging will be a clerical operation. At least 80 percent of it. And my costs will drop from about $8.00 to about 80¢.

Audience: You are saying in effect that the Library of Congress does not make mistakes.

Orne: That is an old argument. Everybody makes mistakes. I do not say you will not find a mistake, or fix a mistake, but you will fix only the mistakes, and you do not invent for the sake of inventing, as many library people do. This is what runs your processing staff up in numbers.

Audience: You are also saying that you might not want to make the subject category any allowance.

Orne: This operation can only be applied to the ordinary library. It can be applied to the open literature. It cannot be applied to documents.

Baldwin: I do not even feel that it can be applied in the open literature because, a few years ago, General Yarbrough asked me to write to the Library of Congress and ask them what they had on guerilla warfare and counter-insurgency, and I got back about 150 cards that they had under these two subjects. A few of them were things that we do not have, but there are many more things that we do have that they did not so have cataloged.

Orne: You should be feeding into the system. Now, let me say this. I do not say that LC is perfect, either in classification or subject headings or descriptive cataloging, but do you know a better one?

Baldwin: No, but let me tell you what I do. I use LC cards as a basis of all my cataloging, changing only the subject headings to suit my collection.

Orne: The point I would make is that what I am looking for is what the MARC Project is doing now, or trying to do. I am convinced that in my library five years from now, maybe more, but I hope in five years, we will take our copy from a tape or from a computer based on line and we will take it exactly as it comes, and it will fit. Everything will fit. It will cost us far less, it will take far fewer people, and it will operate. Now, I speak of this only because I am sold on standards. I have been working on standards now for about six or seven years, and I have become absolutely convinced that this is a way of life that all must conform to.

Audience: I have one question. How are you going to change at this point going strictly to LC? What are you going to do about your old adaptations?

Orne: We are going to leave them where they are. We will pick up what we need to use, and convert it, but we will not go back. I cannot see reclassifying a million and a half books for the fun of reclassifying. I do not think any of you would undertake such a task. This is an example of the kind of thinking that must enter your heads now. There is no perfect system. LC is not perfect, Dewey is not perfect, and the fellow in the Navy was not perfect, by a long way, and neither is any one of your systems. But if they are all put together and you pick out the common elements, as my colleague has said, then you are on the way. You cannot hold it still, anyhow, especially with what you are doing, you cannot hold it still. It is going to change. Then you change, but you change all together. You still have an argument?

Ward: No, I have a question. You're talking about COSATI and ordering and acquisition, and COSATI has a standard list of subjects, some 20 or more subjects.

Orne: It is one list of subjects.

Ward: One list of subjects which absolutely do not jibe with the Library of Congress sugjects. In other words, COSATI will say something is electricity and as far as Library of Congress is concerned, it is physics,

and a book cataloger is constantly arguing with COSATI. If you use COSATI as part of your ordering system, then I just wonder what you are going to end up with. You are going to be thinking of ordering one thing and come out with something else as a result of subject ordering.

Orne: Then I would say the task is to improve the list.

Ward: The COSATI list?

Orne: Yes. It is a working list. It is only a standard for certain purposes now.

Ward: If we are using Library of Congress as a standard, then it looks like COSATI should be improved.

Orne: I would make an issue of it.

Heilprin: There does not have to be any one authority, but not everybody can build their own gauge railway in the country and still have a communication and transportation system. Somebody has got to have a gauge which is used, and all the other railroads have to conform. If it happens that LC is in the field, they should get the responsibility and then somehow we have to stick with it. Maybe we do not all like the gauge they select, but at least we can move around that way.

Ward: Their gauge right now does not match COSATI's gauge, and here we have two sets of standards.

Orne: Well, I think that this group, as a group, might make an issue of this. COSATI is not God. COSATI is a bunch of people who are trying to do the best they know how to do, but they do not know everything. You tell them what is wrong with it. It can be changed, and it probably will be changed a half-dozen times during the next 10 years. It will be added to and subtracted from. How can it be stable when the fields change?

Ward: How can you say that one subject, that one particular book, can fit always in electricity, always in physics, or always in chemistry. This is not true.

Orne: Well, there is a field of work there, there is no question about that, but you have to have as one objective attainment of the maximum acceptance and usefulness for the greater part of the population and gradually, whether you make it a standard at that point or later, it becomes a standard, and over a period of time, it will be recognized

as such. It will be a standard, and by then, most of the people will be on it, and others will come.

Heilprin: If I might be permitted some more philosophical remarks - the goal of science, of course, is to relate everything to everything else. If a person classifying books tries to adhere to that goal, the process certainly becomes tough. That is, a book which was originally classed as electronics will eventually become part of - well, electronics is part of physics, originally - it may now also become part of chemistry, of biology, etc. The whole process of how we classify, in other words, how we make artificial compartments into which we put ideas, has got to be constantly revised by some central group. Possibly the National Library Advisory Committee may take cognizance of this need.

Orne: That is right, there is this new group now to which you could take this issue. I have a committee of the ARL which is attacking a problem of non-depository documents, and we are proposing that they be converted to one standard form and that one copy - there is already a law requiring deposit which is not observed - but that one copy be placed, preferably, with the Library of Congress in micro (fiche). Then if there is any distribution, it will be to regional centers in the form of a reproducible microfiche which could then supply the country. But we have to get this standardized, we have to get it agreed, and we have to get conformance. It will take time, but we are going to take it to that same group and I think it will be effective. Anybody else have a question they would like to raise?

Jack Horner: Suppose you go with your hat in your hand to your systems analyst, who already has other projects going. Is he not likely to say, "This is part of NAPALM," and when you tell him it is part of NAPALM, then "We will wait until NAPALM is officially implemented before we do anything about it, because otherwise you are duplicating," and he has other projects.

Bourne: I am not sure of the mechanics of how you can work with or get around the NAPALM restrictions. . .

Horner: NAPALM may be a stumbling block in getting any work in automation at this time.

Bourne: I do not know if NAPALM precludes the possibility of developing other parallel developments. I get the impression that single organizations are designated the responsibility of making one generalized system that could be applied to other people's problems. However, that did not seem to preclude the possibility of other people working in parallel on

the same activities, especially if their schedules are somewhat different from the ones of the designated agent.

Audience: I would just like to comment on the question. It is true that you may be duplicating some of the information in NAPALM now; however, if you would like to move out of these areas, it is suggested that there is quite a task involved in file building if you have inputs to that system whenever it is available to you. This can all be accomplished ahead of time. You can be working on this tremendous task now. It is true that the gap between when you might develop a piece that you would like to use and that which will be implemented in NAPALM may or may not be part of the way to justify a separate system now. But I would like to have you consider the building of your files to fit into the standard system when it comes.

Question from Audience: Do we have to know all the card layouts and housekeeping details?

Answer from Audience: Not necessarily. We can give you the data elements, you can code these elements and convert these elements to the official NAPALM system.

Orne: This is a very good question. Could you not give him a pattern?

Answer from Audience: Yes we could.

Orne: Could you give this pattern to anyone who is building a file?

Answer from Audience: We could give them a general pattern. We cannot say that this would be the final pattern because it has not been agreed to.

Orne: But you could establish a skeleton, and as you add to it, you could report the additions, too?

Answer from Audience: We could identify the elements, that is for sure.

Bourne: This has already been done for some of your operations. You have identified the bibliographic elements for your conversion of the book catalog, for example. You could use that for a model. There would probably be a conversion program required anyway, either because of different machines or different machine capabilities, or different character sets, or something like that. Perhaps the prime NAPALM designate might even be willing to essentially farm out or subcontract some of his responsibilities to other interested agencies if it looked like

they might get a quicker start on it. In some cases it might even be helpful to have competitive or parallel development projects where perhaps two or three different Army Posts working in a concerted fashion would try different approaches to a particular problem, and then work together to somehow determine the best elements of each in order to make a more generalized NAPALM system. It would seem unreasonable for NAPALM to say "One and only one organization is going to develop this system or any part of it." There should be some way to take advantage of the interests, skills, and facilities that are available at other than the designated organizations.

Orne: That would help you, would it not?

Audience: I have one more question: None of what has been done here at Redstone is going to help the one-man operations very well. Is there some project going on with centralized processing to help these people out? So that they could spend their time on services, instead of pasting pockets, and all the rest of it?

Orne: I was hoping you would come to that.

Bourne: Look ahead a few years. If you accept the point of view of centralized bibliographic processing, whereas Jerry says he expects to get perhaps all of his cataloging from some other source supplied to him on tapes or on-line or something like that - and if you accept the approach of taking someone else's cataloging without extensive modification and using that instead of your own internal procedures, then you have a possibility and a probability that in the next few years you will see the development and expansion of more available and useful central cataloging information available to you faster and in machineable form. The LC MARC program is one example of this approach in which much of the current LC cataloging will be sent out in machine form just as soon as possible, with magnetic tape as the medium of distribution. A logical extension of that would be to allow people to tie a remote console into the data file of the official LC catalog or a portion of it that has already been converted to machine records. This would permit the cataloger, wherever he might be with the pile of books to be cataloged for that day, to key the LC card number into his remote terminal and get a display or printout there of the full LC card information that could then be transcribed, or copied, or adapted in some way used for their own cataloging.

Question from Audience: Well, I was thinking more of the system in which the book would be sent preprocessed.

Bourne: Let me extend this idea of centralized bibliographic records. In addition to the LC data base, you also have the possibility of an automated National Union Catalog looming in the several years distance, so that you could . . .

Orne: They have got the printed catalog about ready to contract, and it will be twenty years before they can put it on tape.

Bourne: No, I would say it would be a whole lot sooner than that. The point is that these plans are in progress so that this data base will be available for you to tap for the catalog information, if it is available. Similar schemes could perhaps be done on other kinds of cooperative ventures by the Army Libraries; for example, building a centralized pool of catalog information accessible to all participants. Now, that is far ahead. Most of this audience is of more current things to do for the one-man operation, and I guess part of that answer is to try to get perhaps some of the available services such as those that supply you with an LC card with each copy of the book that you order.

Dabbs: Mr. Bourne, you were talking about the on-line systems, that - as on the MARC project - that can move cataloging information from the MARC tapes . . .

Bourne: It need not be an on-line system . . .

Dabbs: Well, let us say, theoretically, that this is an on-line system. I am thinking of our very small technical library with our small staff, which is connected with RSIC. It begins to look like, if we get on the on-line system, we are going to have about four or five machines, one to pull catalog cards, one to pull patron lists, perhaps the RECON from NASA Headquarters - we are going to have about four or five machines, alltogether. I wonder if any of the manufacturers are considering, perhaps, putting out or coming up with a designed machine which a library can utilize to present in the paper form, let us say, or the card form, the information that they need just simply by changing from paper to card form, and vice-versa?

Bourne: Locally, you could probably just supply an IBM card with an LC card number on it and instruct the computer: "Print a full catalog card in a specific format corresponding to these LC card numbers." You have that kind of capability now.

Dabbs: What I am beginning to see is a room full of a collection of on-line equipment.

Orne: And what is worrying her is the volume, is it not?

Dabbs: I am worried about the volume of the equipment - the fact that you are going to have a different piece of on-line equipment for each special project, when we come under standardization.

Bourne: It need not be this way. In your facility here you have planned seven terminals because the functional use of the equipment is spatially distributed throughout the building.

Dabbs: We are remote from this building. We are a satellite.

Bourne: It seems unlikely that you would have a whole set of equipment there. There is no reason, basically, why you could not use the same terminals to tie into the central machine file and to satisfy all these functions.

Dabbs: The central machine file, but what I am thinking of is the terminal equipment. We are remote. We are in a different agency. We serve under a different system, except we do not operate out of here. It is very confusing, but we utilize the ordering book service from RSIC. We prepare these for our shelves after they have been cataloged and sent to us. We do the card preparation, so we would have to go to the MARC project for our cards. Being a NASA center, naturally we assume eventually we will be coming in on RECON, which would be another one. Also, we have been told that we would probably have a terminal to receive the information as far as circulation of books on order, material like this, from RSIC. That is three terminals that I can think of right off the bat.

Bourne: I do not think that you have to have a separate terminal for each function. Historically, it has turned out that you have them because the RECON project is being run by Bunker Ramo who happens to have chosen a terminal of a certain kind. There could have been other types. And although you have a terminal for circulation and may have a terminal for MARC - these functions could be combined on a single terminal. Many other kinds of functions could be combined on a single terminal. Terminal facilities could be provided to give you whatever form of display that you want in visual form as well as printed copy, if you have the demand at the terminal.

Orne: Let us not spend too much time on the MARC project, which is still fairly experimental, and I would not fret about it at this point. You are going to have maybe half a dozen changes you cannot predict before they get to the point of delivering the goods. By then, I am sure that your problems will be the same as many others. I would like to come now to some practical points. There is far better prospect of success in some areas, with the tools at hand. In terms of the practical question that Jack Horner asks, how do we get clear of all this processing

business. Now, here, there is organizing, at this point, a very considerable potential for providing central processing information, and in many cases, even the material. You have noticed in passing through this library a multitude of duplications. In my view as a taxpayer, those duplications ought to be redistributed. If there could be a union catalog of the libraries just in this ATLIS group, and you knew that there were ten copies of a book here that interested you, you could ask for it. You could get it with its cards. They would be happy to let property go on it. Now that is a simple and practical application of machines. Fred, you could do something like that could you not?

Croxton: There are procedures to transfer surplus book material from any Army library to any other Army library.

Orne: And you are building it into your programming, are you not?

Croxton: Yes.

Orne: Now this is one possible application. You can undoubtedly think of others. I think, for example, in the field of documents, you ought to reach considerable reduction of the documents store by getting a combined inventory and reducing out those that are available at any one point, if you have access to them. Fred, do you think of others like this?

Croxton: This is what we were really asking the group, the feedback from them, of course.

Orne: I think the smallest library could take advantage of this. If they could - this is really not a very large library book collection in terms of titles, at least I do not think so.

Audience: Along that line, I would like to mention something that I am trying to do. In the New England area there are two other Army libraries, and I have just gotten from the second of those libraries what I have been waiting for, the journal holdings, and we are going to try to work on a cooperative project of distributing the holdings of the last few journals by the use of photocopies, and try to reduce our collections.

Orne: In many cases, if you do no more than what the Library of Congress is basically doing, just providing bibliographical access, you know where it is. If you get up union lists by a machine so that anyone can have them, you will prevent duplications, and you can redistribute where there are excessive duplications. You will have immediate access to location and you may have it on-line or in some other form. There are dozens of ways the products of the machines, which are costly, can be used.

Bebee: I think here again that we have a very broad field available for this and some things which already exist within the DOD complex. Right now, for instance, in every item published by any of us, there is a single sheet at the back which bears most of the information that is basic to our descriptive cataloging. There are some subject terms which are added to this, and there is an abstract built into it at the point of publication. Once we have a standard thesaurus which all of us will have to use for this, and once the cataloging is done at the point of publication, will this not do much in itself to clean up some of the problems that we are now being dealt with by individual agencies? There are some differences. We may use a document in biologicals which is not primarily designed for biologicals, and we may still have to add a few additional indexing points, but which for the recall of the total system will have to be based on LEX. Currently, we are doing this type of thing in that we are doing this cataloging of the 1473's in our documents unit of the library prior to publication. Our next step is to get them to put compatible machinery there so that when they type the title pages and the abstracts they will make the tape available to us from the point of publication for the percentage of material which is internally published. That is probably something all of us should look at in much more detail.

Orne: Yes, this is very helpful, but it has taken a long time to get to this point. I can remember when they were trying to get some uniformity in presentation of documents and reports, and it barely got started. It will take a big piece of it, but it will not take all of it. It will not handle the open literature in the same way. These control cards which we are receiving under Title II-C are running in the neighborhood of 6000 cards a week from LC. We are filing 6000 cards a week to get out the information we want. If they start pouring in MARC to you at the rate of 6000 cards per week, you will have it up to your ears, and you probably will not use 6 out of the 6000 in a week. This has got to be worked out. This is why I say there is not much point in debating it at this point.

Dabbs: I was visualizing future aspects. As I said, I could see a control room with different terminals set up to different on-line operations.

Orne: Well, a lot of other problems are worse than that, and it is theirs, not yours, so do not worry about it.

Bourne: It seems to me, just from a logical point of view, there are more libraries than there are publishers and I do not know if LC has considered this, that rather than having the library supplied with the MARC tapes and stuff, that you supply to the publishers the fact that you are using the LC classification, you will accept it, and therefore when you order a book, he provides this data with it. The book may cost slightly more; however, he can fast process it.

Audience: This has been tried.

Orne: John Cronin gave six years and six months of his life to this, and he nearly died doing it. Trying to get it done. It did not work. The publishers are commercial. You have to remember they are in business not for fun but for money. They will not spend two cents additional on a book if it means giving you all the information you want. It is as simple as that. If they could give you everything you needed on a book, a picture of the card, and it cost them two cents, you are out. If it costs them half a cent, you are out. You cannot pay for it; it is not figured in their profit margin. This is a real tough one. This is cataloging-in-source. There are some variations, but they all come to the same end. The publishers will not spend money this way. Libraries can go jump. It is a good idea, but wholly impractical. Other questions? Laurence, do you want to comment on any of the specifics we have got?

Heilprin: I can comment, but it will not be too specific. I am staying general.

Orne: Let us see if we have got some more specifics. I think we should speak to people who spent so much time and effort putting this conference on. First, I would like to express my own appreciation for the opportunity to join you here. Being an academic, I expect to learn everywhere I go, and I always do. I have learned a great deal. Many more things that I did not know about before, and I appreciate that. I think we all owe a considerable debt of gratitude to those who worked so hard on it, and as a part of that, it seems to me we ought to let them have a few questions. Maybe they want to ask you something. I think we have opened up some paths. You see here a fairly sizeable and costly experiment in various fields going on, by direction, to be sure. It was intended that that experiment should have fairly broad application, not just here. If any part of it seems to be not going in that direction, you ought to be saying something about it now, before they get into it too deeply, while they can still modify it. Do you have any questions relating to the various - I think Mr. Cooney is the man who ought to speak to this - parts of the projects that you are working on that leave you with questions as they relate to the other libraries? Let us see if Mr. Cooney wants to say something first.

Cooney: I would like to hear from some of the people who will have to use various portions of this operation if they want to use automation in AMC. Now we have not yet had any feedback on the second phase which is a standardized system. I would like to say that we are in the process now of developing what we call cross documentation of systems design

which will be distributed, which is as far as we can go in presenting our concepts, and then we will start this coordination effort.

Orne: You are going to distribute this to the 18 AMC points, and they will have an opportunity to review it?

Cooney: Yes.

Orne: Will they understand it?

Cooney: Hopefully.

Heilprin: This entire system that you are thinking about, ALPHA 2, is directed toward military users or civilian scientists, or both, and I think that you are heading in the right direction in going on-line, etc. The scientist is simply a modern processor. He processes ideas, selling his time. As a matter of fact, every one of us sells the same commodity - his or her time. Time is a basic commodity in our lives. We are paid by the time we put in. I will not say that the scientist's time is more valuable than that of anyone else, but he has to put in an awful lot of it, so it is very important that he has enough of it. As a result, he is constantly optimizing, that is, minimizing the amount of time he spends that is not actually in mental processes. Any access time you can save him is a gain. An on-line system is so far superior in time saving to anything that we have at the present time that there is no question that that is the right direction to go in saving time for these types of users. I might add, parenthetically, that the library field and the field of education are moving much more closely together through the on-line concept. More and more of our teaching is being done by on-line techniques. The older idea of batching people in classes, for example, a class of many people all supposedly learning at the same rate, is gradually being broken down. The new idea is to accommodate to the rate of individual progress. On-line computer teaching makes this feasible. The need is certainly there for the individual user in a library. Both library search and education are moving toward on-line use. Other groups are taking this same approach, for example, the Intrex group and the EDUCOM group. In any case you are almost certainly moving along the right line. This should be encouraging.

Orne: I just had another thought. If you do not mind, I am going to ask Mr. Gibson, who is not a librarian, but who has come here to learn how to apply systems in the library at White Sands, what he has got out of this conference and how he is going to use it.

Gibson: I think, primarily, what I have got is a lot of particular sources of information. I have some detailed information I think I can use. What

I was primarily interested in was particular sources, and also where to start. In other words, based on the experience of other libraries, just where could we start at White Sands. What phase of library operation should we begin work on now? There are several areas that we could work with or start to use computers in the library, and it seems obvious that some areas would be of more help than others. Also, another restricting factor is that we have computer systems working now which do not lend themselves too well to on-line processing, so we have to consider things that are, say, off-line, or something that we can do on a weekly or daily basis. We are primarily interested in having things planned for the third-generation computer, which is a few years off at White Sands, and we do intend to have terminals at White Sands. With the third-generation computers, we will have sufficient storage on-line that we can actually do limited searches or possibly retrospective searches and selective dissemination of information type jobs. We were particularly interested in just what has been done in this area, and in particular, how the vocabularies were built, and who had built what they considered to be good vocabularies. I do not know of any other particular comments to make.

Orne: I think, if we have not done anything else, we have scared you into being pretty worried about that vocabulary out there.

Gibson: I will say. We were worried about the vocabulary to start with. We are still worried.

Orne: Mr. Bourne has a few specific comments he would like to give you. We have just about five minutes more, and he may use less time than that, but I would like to give him his time.

Bourne: One of the general questions that was raised was whether there are areas or elements of the programs discussed here in the last two days which can or should be taken as is in other Army libraries, and I would like to comment briefly on this. Generally, I think you can extract the philosophy, methodology, or approach taken by each of the subsystems that you have heard described here in the last couple of days and perhaps carry these away for consideration and use. However, I think there would be few cases in which you could take the actual mechanized system that had been described here and actually implement it in your own library. This is true in varying degrees. Some of the systems described here seem to be fairly similar and independent of whatever library they happen to be put into; for example, the order processing and some of the on-order listing records that were described here. That basic technique and procedure could perhaps be installed without too much difficulty in most of your libraries without too much modification. It might be a

simple thing to lift this whole system and put it into your operation, and it might not require any great change in your operations. The particular exceptions or special procedures may not be so great as to keep you from using the system as developed here. The same is perhaps true for the procedures described here for the handling and control of serials. It may be that you could also lift that whole system of programs and procedures and implement them in your own shop. However, when you start getting into other areas, such as the patron record and circulation system, a particular system may be entirely inappropriate for some other libraries because of the different philosophies of how to work with the user population. Not all libraries require them to be identified. Some libraries have indefinite loans and do not really have a circulation system that is anywhere nearly as rigid as the RSIC one and would not require such formalism. Consequently, the particular circulation system developed at RSIC may be inappropriate for some other libraries, and thus would not lend itself to just being transferred and put into operation somewhere else. The thesaurus compilation technique and associated programs that you have here seem to be very elegant, and operate well, but I think they would be of very little value to a library unless they had a very well trained and interested staff to use it. The thesaurus programs are really a working tool to aid an individual who is working on a thesaurus compilation, so that the programs themselves could perhaps be used elsewhere, but it really would not do you any good unless you had the right kind of staff to do the work.

The book cataloging and the machine record processing have too many possibilities and too many variables. Different libraries want to catalog differently in terms of the depth of cataloging, indexing language, differences in the way call numbers are assigned, or other factors, so that it might be difficult to lift the RSIC system as used here and put it into another library's operation. However, you could perhaps adopt the transcription system - that portion which does the key punching or flexotyping to get a machine bibliographic record. The same problems exist with selective dissemination information. There are so many possible variations in the way a selective dissemination information system can be operated, and the kinds of data bases that you can work with, that it seems inappropriate to put one into every one of the operating libraries. We do not really know the requirements of all Army libraries so we cannot really say, generally, that this system or this subsystem would be good for all libraries. We cannot say that what is good for Bull Moose is good for the rest of you, or anything like that. I think what you have to do is to determine the requirements that are common to all of your libraries and try to develop a basic module that satisfies all those basic requirements and that is generalizable so that you can extend it to add the separate features that are required by the idiosyncrasies of each local installation. It is a whole lot more difficult for an organiza-

tion to write a generalized program, keeping everybody else's interests in mind, than it is to write your own specific local type of program. The efficiency and cooperation of a general operation can be enhanced by using common or similar automation processes. Even such simple things as agreeing on a standard machine record would aid the exchange of basic information, the compilation of union lists and other kinds of shared cataloging data, cooperative holdings studies, and things of this nature. It seems quite possible that there are areas where savings can be achieved or new processes started by some forms of standardization.

Orne: Fred, he called you Bull Moose. You want to fight him? If so, we will make arrangements after we adjourn. I do not want to make Mr. Taylor unhappy. He was shooting for 11:30, and we are there. I do want to say for the panel that we appreciate this opportunity to work with you and the comments of our colleagues and their great help this morning. Thank you very much.

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This report contains the minutes of the first workshop on automation in libraries. The meeting was sponsored by Army Technical Library Improvement Studies (ATLIS) and was held at Redstone Arsenal, Alabama, on 15-17 November 1966.

Participants were from Redstone Scientific Information Center (RSIC), National Aeronautics and Space Administration (NASA), Defense Documentation Center (DDC), Army Electronics Command, Natick Laboratories, Library of Congress, and Information Dynamics Corporation.

The four major areas covered were:

General Systems, Current Dissemination Programs, Retrospective Searching On-Line Applications.

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