

SUBJECT REFERENCE LISTS PRODUCED BY COMPUTER

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A system developed to produce fourteen subject reference lists by IBM 360/75 is described in detail. The computerized system has many advantages over conventional manual procedures. The feedback from students and other users is discussed, and some analysis of cost is included.

INTRODUCTION

The University of Waterloo, with the third largest enrollment in the province of Ontario, was the first in Canada to institute a "cooperative education plan". Undergraduate students enrolled in cooperative courses (all engineering and some science, mathematics and arts students) spend eight four-month terms at the University for academic studies, alternated with six four-month terms with industry or government for practical experience related to their academic programmes.

An IBM 360/75 at the University of Waterloo is the heart of the largest university computer installation in Canada, and is an important tool for faculty, students and administration. Under multi-processing it can serve many departments through terminals around the campus. One terminal serves the Data Processing Department of the Computer Centre, where all the maintenance and printing of various reports required for the project under discussion are handled for the Engineering, Mathematics & Science Library (E.M.S. Library).

The E.M.S. Library contains approximately 75,000 volumes of monographs, periodicals, technical reports and government documents, and

currently receives 1,650 periodical titles. It serves about 4,500 on-campus students and more than 300 faculty members in the fields of engineering, mathematics and science (in 1967/68), and provides assistance on request to business and industry in the area.

SYSTEM

Since E.M.S. Library users have frequently requested subject reference lists to guide them in the use of library materials, and library reference statistics have proved that there is a justified need for them (1), the reference staff began, in the Fall of 1966, to investigate means of compiling and producing these lists. It was planned that each subject list should first be prepared and edited by reference librarians, but at that point, conventional manual procedures should be abandoned in favor of using the computer available on campus. In this way, operations in revising and updating the lists and in adding new lists in other subject areas would be simplified, manual clerical work would be reduced significantly (no typing would be needed) and titles related to interdisciplinary areas of study could be easily coded to appear on more than one list.

Although library literature contains numerous accounts of library automation programmes (2), it is very obvious that the chief emphasis has been on technical services and circulation applications. So far as "reference services" or "information services" go, many developments have been discussed in recent years in the areas of documentation, indexing, retrieval techniques and systems, selective dissemination of information, inter-library communication, etc. . . Concise summaries can be found in many papers (3, 4, 5, 6, 7). However, in the initial stages of developing our system, we failed to locate any existing mechanized system of producing subject bibliographies for reference use.

Such subject reference lists could be easily generated if the library catalogue were in machine readable form (6, 8), but since a computerized catalogue was not foreseen at Waterloo for some time to come, the library had to design and develop an independent system to fulfil reference needs.

Since December 1965, the University of Waterloo Libraries have achieved success in producing a Serials List by computer. The techniques used in the original Serials Project (using an IBM 1620 with card input) which started in Spring 1965 and was completed in December 1965, were not new, and the fields and codes used were based on modifications of those used by the National Research Council Library (9) and Dalhousie University [the Dalhousie - AAU list] (10). These techniques have also been used with various modifications at several libraries in the United States, such as M.I.T. Libraries (11). In 1966, the Waterloo Serials Project was greatly modified by conversion from IBM 1620 to IBM 360, and from a card system to a tape system, by re-writing the FORTRAN II pro-

gramme in RPG (Report Programme Generator) and by expanding and adding certain data fields.

The reference project was initiated in November 1966. It was apparent that, after the revision of the Serials Project, the newly improved serials system could be adapted to maintain the Master File of the reference subject lists. The project is unique in that it uses a separate code structure that makes possible the provision of information from the Master File by types of materials within each subject area.

It was decided that the existing Library Serials Maintenance Form could be used with minor modifications to produce reference lists. The original form was modified to facilitate maintenance of the Master File by the library reference staff and easy transcription onto cards by keypunch operators. Through the use of these forms, the Master File was created and is kept up-to-date.

Reference Master File

There are four record types in the Master File, each of which is 64 characters in length. They are stored on tape in a blocked length of 6,400 characters for faster processing on the computer, tape being a relatively slow input-output device.

The fields in each of the record types are as follows:

1. Reference 1st Record
 - 1-7 Serial number
 - 8-10 Record type code 1 [blank] [blank]
 - 11 Form type
 - 12-21 Classification number
 - 22-32 Cutter number
 - 33-34 Agent number
 - 35 Country code
 - 36 Language code
 - 37-38 Department code
 - 39 Serial exclusion code (for future use)
 - 40-42 Sequence number
 - 43 Library location
 - 44-64 Filler (for future use)
2. Reference Title Record
 - 1-7 Serial number
 - 8-10 Record type code (2NN)
 - 11-63 Title information
 - 64 Filler (for future use)
3. Reference Holdings
 - 1-7 Serial number
 - 8-10 Record type code (3NN)
 - 11-63 Holdings information
 - 64 Filler (for future use)

4. Reference Notes Record
 1-7 Serial number
 8-10 Record type code (4NN)
 11-63 Notes information
 64 Filler (for future use)

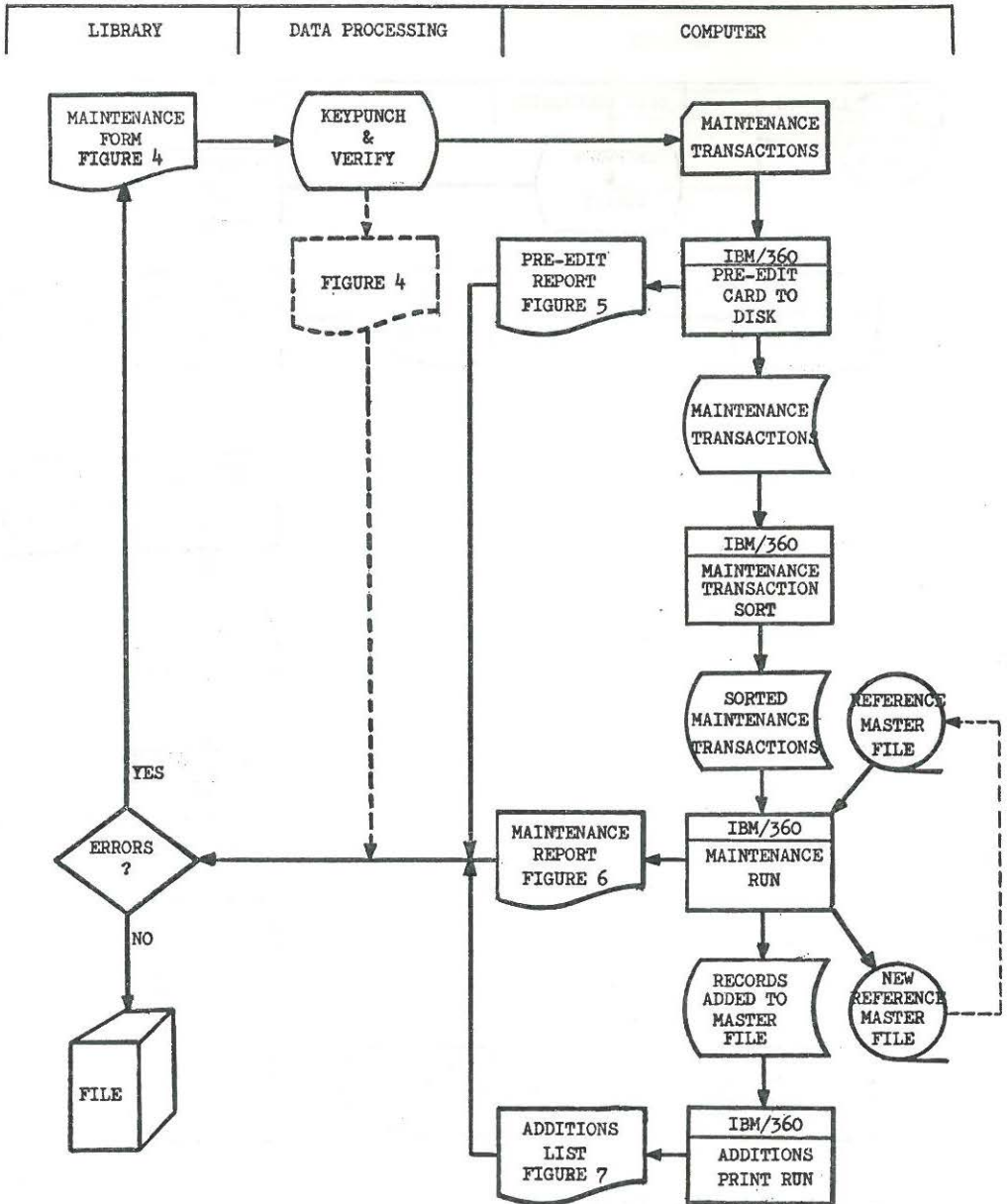


Fig. 1. Flowchart of Maintenance Run.

Programmes were written in R.P.G. (12) to achieve operational status rapidly with a minimum of debugging. R.P.G. is a problem-oriented language designed to provide users with an efficient, easy-to-use technique for generating programmes. A set of specification sheets is required, on which the user makes entries. The forms are simple and the headings on the sheets are largely self-explanatory.

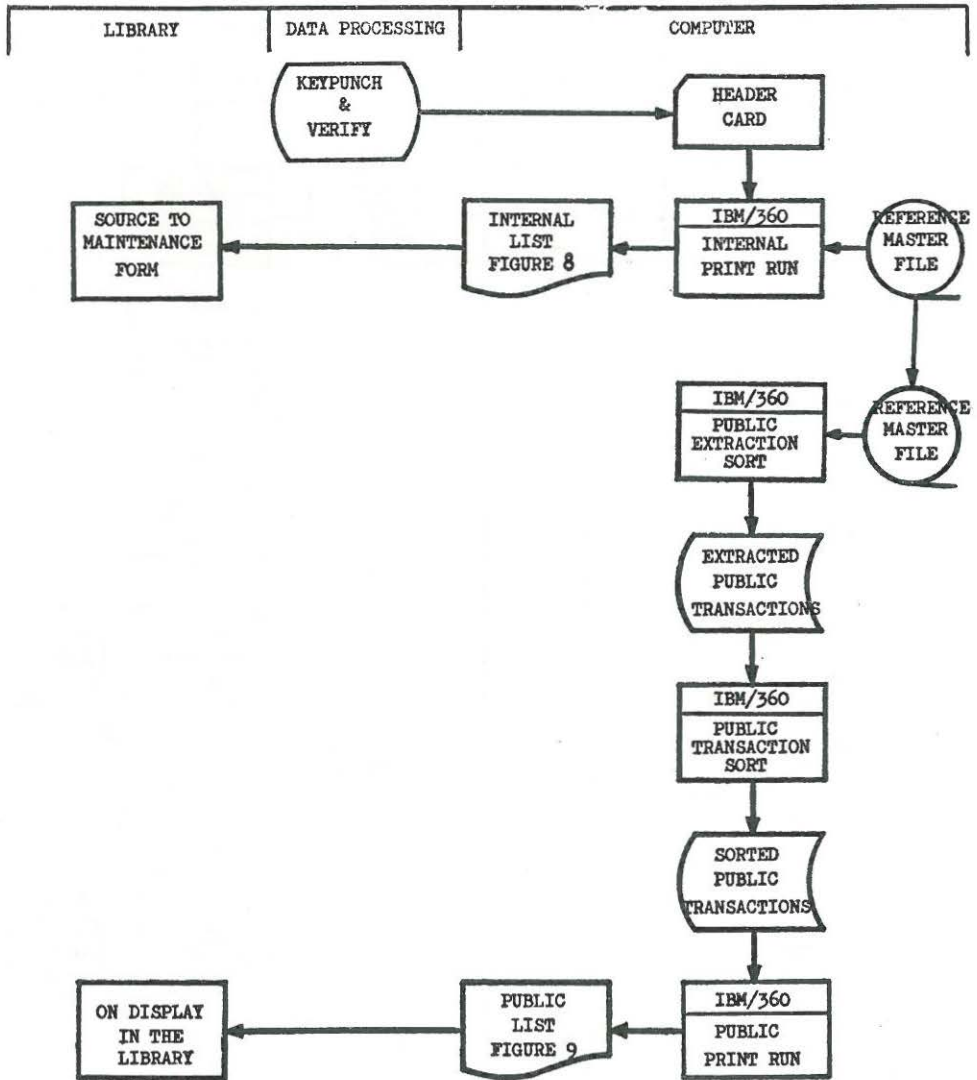


Fig. 2. *Flowchart of Listings Run.*

There are three phases to the E.M.S. computer runs: 1) Maintenance Run (weekly or as required) (Figure 1); 2) Listings Run (monthly) (Figure 2); 3) Masters Run (semi-annually) (Figure 3).

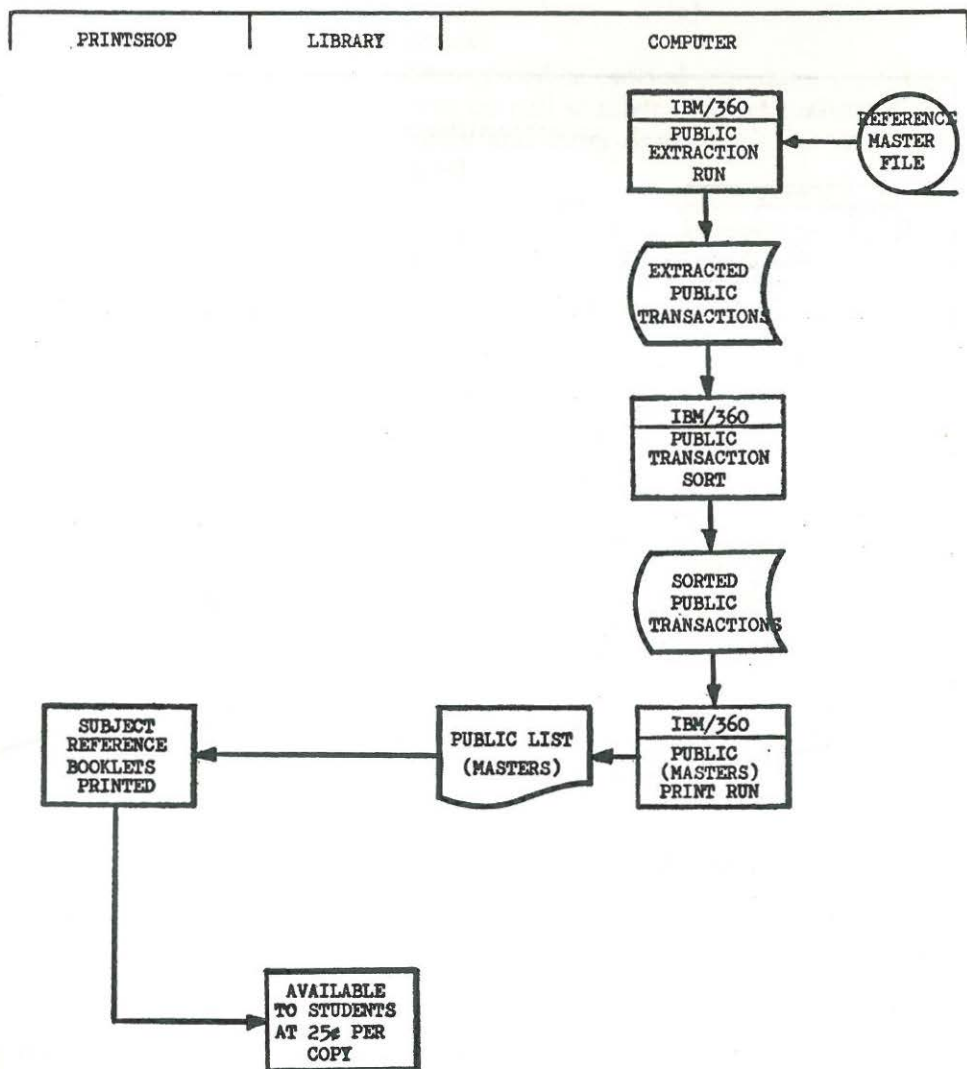


Fig. 3. Flowchart of Masters Run.

Library Maintenance Form

Most of the fields on this form (Figure 4) are self-explanatory; however, the following may need further definition.

LIBRARY MAINTENANCE FORM

SERIALS - WHITE
REFERENCE - PINK

| | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|
| SERIAL NO. | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

INSERT: "A" FOR ADDITION, "C" FOR CHANGE, OR "D" FOR DELETION

| FORM | CLASSIFICATION | CUTTER | AGNT. CODE | COUNTRY | LANG | DEPT. NO. | SER. 'X' | REF. CODE & SEQ. NO. | R | N | N | L.T.B. LOC. N | | | | | | | | | | | | | | | | | | | | | | | |
|------|----------------|--------|------------|---------|------|-----------|----------|----------------------|----|----|----|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |

WHEN "CHANGE" HAS BEEN CHECKED ABOVE - AND - IT AFFECTS TITLE HOLDINGS OR NOTES
INDICATE THE TYPE OF CHANGE WITH A-ADDITION C-CHANGE D-DELETION HERE:

PLACE A LINE TYPE CODE T-TITLE H-HOLDING N-NOTES HERE:

PLACE THE SEQUENCE NUMBER WITHIN THE LINE TYPE HERE:

| | | | | | | | | | | | | | | |
|---|----|-------|----|----|----|----|----|----|----|----|----|----|----|----|
| 2 | 10 | 11-12 | 13 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Fig. 4. *Library Maintenance Form.*

Columns 1 - 2: Card Code

There are six possible codes:

1. A[blank] New entry to Master File.
2. C[blank] Change to Record Type 1 (see Cols. 10 - 12 as described below).
3. CA} Change in lines for an existing entry on the Master
4. CC} File, which add, change or delete respectively
5. CD} title, holdings and/or notes.
6. D[blank] Deletion of an entry from Master File.

Columns 3 - 9: Serial Number (Major Sequence of Master File)

Serial number is assigned to every new entry to maintain the alphabetical order of the complete listing. It consists of one alphabetic character taken from the first letter of the main entry, followed by six numerics which serve to make each entry unique within the letter.

Columns 10 - 12: (Minor Sequence of Master File)

There are four record type codes:

- | | |
|-------------------|--|
| 1. Record type I | One record permitted per entry (information on call number, subject matter of the entry and other data). Cols. 11 & 12 not used. |
| 2. Record type T} | Col. 10 contains "Title", "Holdings" & "Notes" information respectively from Cols. 13-65 inclusive. Cols. 11 & 12 permit up to 99 lines per record type per entry. |
| Record type H} | |
| Record type N} | |

Column 13: Form Code

This alphabetic code represents form of publication, e.g., "A" stands for "Abstract", "P" stands for "Periodical" etc. . .

Column 39 - 40: Department Code

This numeric code indicates the subject list or lists which reference librarians assign to each entry, and there are two code types:

1. Prime department numbers, of which there are 14,
e.g. 20 Physics —————▶ to appear on the Physics list.
2. Implied department numbers: to appear on 2 or more of the prime department lists.
e.g. 41 Math., Phys. & Chem. —▶ to appear on the Math., Phys. & Chemistry lists.
60 General —————▶ to appear on all fourteen subject lists.
etc. . .

Column 42 - 44: Sequence Number

Col. 42 is always "R", which stands for "Reference List".

Col. 43 & 44 is a numeric code which indicates type of reference materials.

- e.g. 12 REFERENCE BOOKS - DICTIONARIES
14 REFERENCE BOOKS - HANDBOOKS AND TABLES
60 ABSTRACTS AND INDEXES

where "REFERENCE BOOKS" & "ABSTRACTS AND INDEXES" are section headings, and "DICTIONARIES" & "HANDBOOKS AND TABLES" are sub-section headings.

Pre-edit Report

The programme that produces the Pre-edit Report (Figure 5) checks the maintenance transactions for the following known error conditions:

1. Card code invalid.
2. Serial number invalid.
3. Sequence number invalid.
4. First record card columns 46-80 should be blank.
5. Agent code invalid.
6. Country code invalid.
7. Language code invalid.
8. Department number invalid.
9. Exclude code should be "X" or blank.
10. Reference code invalid.
11. Library location invalid.
12. Deletion card should be blank card columns 10-80.
13. 1st record card missing on addition.
14. Title, holding or note card sequence error.
15. Title, holding or note delete card should be blank card columns 13-80.
16. Title, holding or note, addition or change card should be blank card columns 66-80.

This step catches approximately 80% of the clerical and keypunching errors.

| PAGE 1 REFERENCE LIBRARY MASTER/FILE MAINTENANCE PRE-EDIT REPORT | | MARCH 03, 1968 | | | | | |
|---|------------|---|----------------------|-----------|----------------|-----------------|--|
| S.B.- | SNRY- | EXPLANATION | -A- ALPHABETIC CHAR. | -B- BLANK | -N- ANY NUMBER | -R- LETTER R | -X- LETTER X |
| CARD COLUMN GUIDE WITH INVALID CARD PRINTED BENEATH | | | | | | C O M M E N T S | |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000001 | RHA17 | F7 | 1A11 R124 | | | CARD COLUMNS LANGUAGE CODE CC 38 S.B.-N- OR -B- |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000001 | RHA17 | F7 | 1A11 R124 | | | CARD COLUMNS LANGUAGE CODE CC 38 S.B.-N- OR -B- |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000001 | RHA17 | F7 | 1A11 R125 | | | CARD COLUMNS LANGUAGE CODE CC 38 S.B.-N- OR -B- |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000001 | RHA17 | F7 | 1A11 X125 | | | CARD COLUMNS LANGUAGE CODE CC 38 S.B.-N- OR -B- |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000001 | FREUND, JOHN E. | | | | | CARD COLUMNS 1ST REC.ADD.CARD MISSING THIS CARD DROPP |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000002 | DICTIONARY/OUTLINE OF BASIC STATISTICS, NEW YORK, | | | | | CARD COLUMNS 1ST REC.ADD.CARD MISSING THIS CARD DROPP |
|5..10..15..20..25..30..35..40..45..50..55..60..65..70..75..80 | A F8000007 | MCGRAW-HILL, 1966. | | | | | CARD COLUMNS 1ST REC.ADD.CARD MISSING THIS CARD DROPP |
| PAGE 2 REFERENCE LIBRARY MASTER/FILE MAINTENANCE PRE-EDIT REPORT | | MARCH 03, 1968 | | | | | |
| | | NO. OF VALID MTCR.CARDS READ | 9 | | | | |
| | | NO. OF INVALID MTCR.CARDS READ | 7 | | | | |
| | | TOTAL NO. OF MTCR.CARDS READ | 16 | | | | |

Fig. 5. *Pre-edit Report.*

Maintenance Report

The Maintenance Report (Figure 6) shows:

1. Additions to and deletions from the Master File.
2. Changes to the Master File displaying the entry as it was before the change and as it is after the change. This permits easy recovery of the previous record when errors are made.

| PAGE | 1 | REFERENCE LIBRARY MASTER/FILE MAINTENANCE REPORT | JANUARY 30, 1968. |
|------------|--|---|--|
| SERIAL NO. | COMMENTS | | DATA |
| A846000 | DELETION | 1ST RECORD DETAIL | FORM NO. P AGENT COUNTRY SERIAL EX CLASS.NO. TL1 LANGUAGE REF.LIST RR80 CUTTER NO. A66 DEPARTMENT 88 LIB.LOCN. 4 |
| A846000 | DELETION | TITLE | T01 AUTOMOBILE ENGINEER. |
| A846000 | DELETION | HOLDING | H01 VOL. 8-24, (25) 1918-1935 |
| D075120 | CHANGE | 1ST RECORD RECORD DETAIL | FROM FORM NO. R TO R FROM AGENT COUNTRY TO FROM SERIAL EX TO CLASS NO. Z6673 Z6673 LANGUAGE REF.LIST RR10 R-10 CUTTER NO. D36 D36 DEPARTMENT 82 40 LIB.LOCN. 4 4 |
| D200000 | ADDITION | 1ST RECORD DETAIL | FORM NO. P AGENT COUNTRY SERIAL EX CLASS.NO. NK1 LANGUAGE REF.LIST R-80 CUTTER NO. E9 DEPARTMENT 60 LIB.LOCN. 4 |
| D200000 | ADDITION | TITLE | T01 DESIGN QUARTERLY. |
| D200000 | ADDITION | HOLDING | H01 1966/67- |
| D520700 | CHANGE | TITLE | FROM DIRECTORY OF BRITISH SCIENTISTS. LONDON, E. BENN, TO TO DIRECTORY OF BRITISH SCIENTISTS. |
| E403100 | CHANGE | HOLDING H01 | FROM LIBRARY HAS VOLS. 1-3. TO LIBRARY HAS VOLS. 1-4. |
| M408000 |ATTEMPT TO ADD NEW RECORD HAS BEEN UNSUCCESSFUL - SERIAL NUMBER EXISTS ALREADYCARD COLUMNS5...10...15...20...25...30...35...40...45...50...55...60...65INVALID CARD A M4080001 HE331 B55 40 R104 | | |
| N173000 |ATTEMPT TO CHANGE A RECORD HAS BEEN UNSUCCESSFUL - ADD T,H OR N SEQ.NO. EXISTS ALREADYCARD COLUMNS5...10...15...20...25...30...35...40...45...50...55...60...65INVALID CARD CAN173000H02 1925-1962// | | |
| N173000 |ATTEMPT TO CHANGE A RECORD HAS BEEN UNSUCCESSFUL - ADD T,H OR N SEQ.NO. EXISTS ALREADYCARD COLUMNS5...10...15...20...25...30...35...40...45...50...55...60...65INVALID CARD CAN173000N01 SUPERSEDED BY ITS HIGHWAY RESEARCH RECORD. | | |
| | | MASTER/FILE RECORDS READ | 6292 |
| | | NUMBER OF RECORDS ADDED | 162 |
| | | NUMBER OF RECORDS DELETED | 55 |
| | | MASTER/FILE RECORDS WRITTEN | 6399 |
| | | NUMBER OF INVALID MAINTENANCE RECORDS NOT PROCESSED | 8 |

Fig. 6. Maintenance Report.

3. Two types of error conditions that fail to appear in the Pre-edit Report due to the absence of the Master File in the pre-edit programme.
 - a. Additions where serial numbers and/or sequence numbers (Cols. 10 - 12) exist already.
 - b. Changes/deletions where serial numbers and/or sequence numbers are non-existent.
4. Master File maintenance statistics on:
 - a. Master File records read.
 - b. Number of records added.
 - c. Number of records deleted.
 - d. Master File records written.
 - e. Number of invalid maintenance records not processed.

Addition List

This list (Figure 7) is an alphabetical summary (in serial number sequence) containing added entries only from the "maintenance" run. Information on call number, complete bibliographical data of the entry, department or subject code (Cols. 39 - 40) and location are printed for each entry. This augments the Internal Reference List between the "listings" run (see Figure 2).

| PAGE 1 REFERENCE ADDITION LIST FOR WEEK ENDING JANUARY 30, 1968. | | | |
|--|----|---------|--|
| SERIAL | AG | CNTRY L | DPT. LOCN |
| A262000 ABS QD1 A53 | | | 85 TO1 AMERICAN CHEMICAL SOCIETY. TO2 ABSTRACTS OF PAPER. H01 1967- |
| D200000 PER NK1 E9 | | | 60 TO1 DESIGN QUARTERLY. H01 1966/67- |
| D565000 REF Z7916 D6 | | | 01 TO1 DOCUMENTS DIGEST. H01 VOL. 16, NO. 7- 1961- |

Fig. 7. *Addition List.*

Internal Reference List

This is a complete alphabetical list (Figure 8) of all entries on the Master File, similar to the Addition List (Figure 7) in arrangement and format. The serial number sequence facilitates the reference staff assignment of unused serial numbers to new entries and the easy location of serial numbers of entries for updating purposes. This document is the prime source of information for maintaining the Master File.

Public List

The main list (Figure 9) is first divided by subjects of which there are fourteen: Mathematics, Astronomy, Biology, Chemistry, Earth Sciences, Physics, Design, Management Sciences, Aero Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering and Nuclear Engineering. Each subject list is further divided into the following sections and sub-sections:

1. REFERENCE BOOKS
 - a. GUIDES TO THE LITERATURE AND BIBLIOGRAPHIES
 - b. PERIODICAL LISTINGS
 - c. DICTIONARIES
 - d. ENCYCLOPEDIAS
 - e. HANDBOOKS AND TABLES
 - f. DIRECTORIES - INDIVIDUALS

| PAGE | 1 | INTERNAL REFERENCE LIST | | | FEBRUARY 5, 1968. | |
|----------------------------|---|-------------------------|---|------|-------------------|------|
| SERIAL | AG | CNTRY | L | DPT. | REF | LOCN |
| A002500 PER TK1 A8 | X | R | | 48 | R80 | ENG. |
| | TO1 ASEA JOURNAL H01 VOL. 32- 1959- NO1 PUBLISHED WITH ABSTRACTS | | | | | |
| A020000 PER QC221 A4 | | | | 60 | R80 | ENG. |
| | TO1 ACOUSTICAL SOCIETY OF AMERICA. TO2 JOURNAL. H01 VOL. 17- 1945/46- | | | | | |
| A028000 PER QD1 A325 | | | | 44 | R80 | ENG. |
| | TO1 ACTA CHEMICA SCANDINAVICA. H01 VOL. 1- 1947- | | | | | |

Fig. 8. Internal Reference List.

| CHEMISTRY | | PAGE 4 |
|--------------------------------|--|--------|
| <u>ENCYCLOPAEDIAS</u> ----- | | |
| REF QD5 E58 | THE ENCYCLOPEDIA OF CHEMISTRY. 2D ED. NEW YORK, REINHOLD PUBLISHING CORP., 1966. | |
| REF QD553 H3 | HAMPEL, CLIFFORD ALLEN, ED. THE ENCYCLOPEDIA OF ELECTROCHEMISTRY. NEW YORK, REINHOLD, C1964. | |
| REF QD5 I5 | INTERNATIONAL ENCYCLOPEDIA OF CHEMICAL SCIENCE. PRINCETON, N.J., VAN NOSTRAND, 1964. | |
| REF QD155 J3 | JACOBSON, CARL ALFRED, ED. ENCYCLOPEDIA OF CHEMICAL REACTIONS. NEW YORK, REINHOLD PUB. CORP., 1946-1959. 8V. | |
| REF QD5 K4 | KINGZETT, CHARLES THOMAS. KINGZETT'S CHEMICAL ENCYCLOPEDIA, A DIGEST OF CHEMISTRY & ITS INDUSTRIAL APPLICATIONS. 9TH ED. PRINCETON, N.J., VAN NOSTRAND, 1966. | |

Fig. 9. *Public List.*

- g. DIRECTORIES - ORGANIZATIONS
- h. INTERNATIONAL CONFERENCES
- 2. STANDARDS AND PATENTS
- 3. IMPORTANT SERIES
- 4. THESES
- 5. ABSTRACTS AND INDEXES
- 6. PERIODICALS

Reference Booklets

It is planned that semiannually the E.M.S. Library will receive from the Computer Centre the computer produced Masters, which are exact duplicates of the public list except that they are printed on unlined paper with a special printer ribbon. The Masters are then sent to the University's Printshop, and the fourteen separate reference booklets are printed from offset masters photo-reduced to 75% of the original. This results in a publication of convenient size (8½"x5½") with clearer typographical representation than the actual computer printout. Figure 10 shows a representative page from the Aero Engineering list of the first edition.

| | | |
|-----------------------|---|--------|
| | AERON. ENG. | PAGE 6 |
| REF TA403 E47 | THE ENCYCLOPEDIA OF ENGINEERING MATERIALS AND PROCESSES. NEW YORK, REINHOLD PUB. CORP., 1963. | |
| REF TA11 .E5 | ENCYCLOPEDIA OF ENGINEERING SIGNS AND SYMBOLS. NEW YORK, ODYSSEY PRESS, C1965. | |
| REF TA9 J65 | JONES, FRANKLIN DAY, ED. ENGINEERING ENCYCLOPEDIA. 3D ED. NEW YORK, INDUSTRIAL PRESS, C1963. | |
| REF TA151 A1E6 | KEMPES ENGINEERS YEAR-BOOK. 72D ED. LONDON, MORGAN BROTHERS, 1967. 2V. | |
| REF Z5C63 A2N62 | MCGRAW-HILL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY. REV. ED. NEW YORK, MCGRAW-HILL, 1966. 15V. | |
| REF Q121 M32 | MCGRAW-HILL YEARBOOK OF SCIENCE AND TECHNOLOGY. NEW YORK, MCGRAW-HILL, 1962- | |
| | <u>HANDBOOKS AND TABLES</u> | |
| TA490 A633 | AMERICAN SOCIETY FOR TESTING AND MATERIALS. COMMITTEE A-10 ON IRON-CHROMIUM, IRON-CHROMIUM-NICKEL, AND RELATED ALLOYS COMPILATION. COMPILATION OF CHEMICAL COMPOSITIONS AND RUPTURE STRENGTHS OF SUPER-STRENGTH ALLOYS. PHILADELPHIA, 1964. | |
| REF TJ233 A572 | AMERICAN SOCIETY OF MECHANICAL ENGINEERS. ASME HANDBOOK. 2D ED. NEW YORK, MCGRAW-HILL, 1965- LIBRARY HAS VOL. 1. | |
| TJ1186 A46 | AMERICAN SOCIETY OF TOOL AND MANUFACTURING ENGINEERS. MACHINING THE SPACE-AGE METALS... DEARBORN, MICHIGAN, 1965. | |
| TA407 A72 | ARMOUR RESEARCH FOUNDATION, CHICAGO. HANDBOOK OF THERMOPHYSICAL PROPERTIES OF SOLID MATERIALS. REV. ED. NEW YORK, MCMILLAN, 1961. 5V. | |
| TL501 A786 | AVIATION AGE RESEARCH AND DEVELOPMENT TECHNICAL HANDBOOK. 1957-1958. | |
| REF QC168 B45 | BENEDICT, ROBERT P. HANDBOOK OF GENERALIZED GAS DYNAMICS. NEW YORK, PLENUM PRESS DATA DIVISION, 1966. | |

Fig. 10. Page (Actual Size) in the Aero Engineering List.

Table 1. Information on First Edition

| Subject | Number of pages | Estimated printing cost/copy | Copies Ordered First printing | Second printing | Copies Sold to Students & Faculty |
|------------------------|-----------------|------------------------------|-------------------------------|-----------------|-----------------------------------|
| Astronomy | 9 | 14c | 30 | 40 | 7 |
| Biology | 16 | 18c | 90 | — | 37 |
| Chemistry | 16 | 18c | 150 | — | 64 |
| Earth Sciences | 22 | 21c | 50 | — | 19 |
| Physics | 15 | 18c | 100 | — | 44 |
| Design | 14 | 17c | 50 | — | 12 |
| Management Sciences | 11 | 16c | 30 | 100 | 88 |
| Mathematics | 15 | 18c | 150 | — | 81 |
| Aero Engineering | 20 | 20c | 30 | 40 | 11 |
| Chemical Engineering | 28 | 24c | 100 | — | 46 |
| Civil Engineering | 23 | 22c | 100 | — | 57 |
| Electrical Engineering | 26 | 23c | 100 | — | 65 |
| Mechanical Engineering | 27 | 24c | 100 | — | 44 |
| Nuclear Engineering | 16 | 18c | 30 | 40 | 5 |

DISCUSSION

First Edition

An estimated number of copies for each list, as shown in Table 1, was ordered on the basis of student enrollment figures in different departments of the faculties of engineering, mathematics and science, and on the subject matter of each list in relation to the academic programmes of the University. It was hoped that those copies could adequately meet the demands of students, faculty and interested people outside the University until the completion of the second edition, tentatively set then for September 1968.

The first edition of the reference lists was available for distribution at the end of November 1967. Experience having shown that free library materials were no sooner received than discarded, it was decided to give some value to these lists by a charge of 25¢ per copy. From the start students responded so enthusiastically to the lists that one week after their

availability, the Library had to order 100 additional copies of the second printing of the "Management Science" list, and by the end of February 1968, 40 additional copies each of the "Aero Engineering," "Nuclear Engineering" and "Astronomy" lists. Table 1 gives information on quantities printed, costs, and sale to students and faculty of first edition lists. The estimated printing cost per copy is based on printing of 100 copies.

After the announcement of the availability of the lists in several library professional journals, the E. M. S. Library received many letters of inquiry and requests for complimentary copies. Complimentary distribution was made of 12 sets and some 80 lists of different subjects. Purchase orders were received for 83 complete sets of lists, 21 from Canada, 58 from the United States, and two each from Australia and England. By the end of March 1968, stock of the first edition was exhausted, and there were still 44 purchase orders unfilled and 28 filled only partially.

Questionnaire

Instead of ordering more copies of the first edition from the University Printshop to meet the requests received thus far, the reference staff decided to work on a second edition, and the original scheduled completion date of that edition was moved ahead to early June 1968.

Although the E. M. S. Library had already received many valuable suggestions and comments on the project from Waterloo faculty and interested librarians in Canada and the United States, including some very enthusiastic library school professors, there was little feedback at that time from the immediate users, the students, on their use of the lists. Since addresses and department affiliations of most of those who purchased lists had been recorded, it was possible to send out questionnaires (Figure 11) to 210 undergraduates, 122 graduate students and 30 faculty members in the beginning of April 1968. By April 20, 65 returns (31%) were received from the undergraduates, 41 (33.6%) from the graduates and 11 (36.6%) from the faculty. A summary of those returns, shown in Table 2, has been of great help in assessing the value of the first edition. From the replies it is certain that almost all who purchased lists found them useful and would be willing to buy the updated edition. Most important, students used the list for research purposes (including term papers and thesis work), thus fulfilling the original purpose of the project. Another fact emerging from the questionnaire was that the number of serial titles included should be greatly expanded.

Second Edition

Reference librarians started at the end of April to update the fourteen subject reference lists by incorporating the valuable feedback and comments received and to compile the fifteenth list, "Optometry" (the University of Waterloo has had a new optometry school since September 1967). Many changes, additions and deletions have been made, and the

UNIVERSITY OF WATERLOO - E.M.S. LIBRARY

According to our records, you have purchased one (or more) of the reference booklets. In order to plan for a second edition, and to assess the value of the first edition, we would be most grateful if you would fill out this questionnaire as completely as possible and mail it to us before April 20, 1968. It is not necessary to sign your name.

1. Have you used your reference list? Yes No

a. If so did you find it helpful? Yes No

b. For what purpose did you use the list? Regular Studies Research (Including Term Papers, Thesis Work)

c. Did you use the list in place of the serials list and card catalogue? Yes No

2. Did the list save you time in your use of the library? Yes No

3. Should the list include more or fewer titles? More Fewer

a. Which areas do you feel should be expanded or deleted?

| | Expanded | Deleted |
|---|----------|---------|
| GUIDES TO THE LITERATURE & BIBLIOGRAPHIES | — | — |
| PERIODICAL LISTINGS | — | — |
| DICTIONARIES | — | — |
| ENCYCLOPEDIAS | — | — |
| HANDBOOK AND TABLES | — | — |
| DIRECTORIES - INDIVIDUALS | — | — |
| DIRECTORIES - ORGANIZATIONS | — | — |
| INTERNATIONAL CONFERENCES | — | — |
| STANDARDS AND PATENTS | — | — |
| IMPORTANT SERIES | — | — |
| THESES | — | — |
| ABSTRACTS AND INDEXES | — | — |
| PERIODICALS | — | — |

b. Which specific titles do you feel should be added?

c. Which specific titles do you feel should be deleted?

4. Would you be interested in buying an updated edition of the reference list?

5. Additional comments

6. Undergraduate Graduate Faculty

Thank you for answering this questionnaire. If you would like to discuss further anything pertaining to the reference lists, please feel free to call us.

Fig. 11. Questionnaire on Use of Reference Subject Lists.

Table 2. Summary of Questionnaire Returns

| Question | Undergr. | Grad. | Fac. |
|-----------------|----------|-------|------|
| 1. Yes | 39 | 30 | 5 |
| No | 26 | 11 | 5 |
| 1a. Yes | 31 | 26 | 5 |
| No | 8 | 3 | 1 |
| 1b. Studies | 16 | 9 | 1 |
| Research | 27 | 23 | 5 |
| 1c. Yes | 19 | 12 | 2 |
| No | 25 | 20 | 4 |
| 2. Yes | 27 | 21 | 6 |
| No | 11 | 11 | 1 |
| 3. More | 45 | 32 | 5 |
| Fewer | 2 | — | — |
| 3a. Handb. exp. | 16 | 18 | 7 |
| " del. | 2 | 1 | 2 |
| Series exp. | 19 | 8 | 3 |
| " del. | 1 | — | — |
| Theses exp. | 15 | 14 | 1 |
| " del. | — | — | — |
| Abst. exp. | 15 | 13 | 3 |
| " del. | 1 | — | — |
| Per. exp. | 28 | 23 | 6 |
| " del. | 2 | 1 | — |
| 4. Yes | 23 | 24 | 6 |
| No | 17 | 8 | — |
| 6. | 65 | 41 | 14 |

serial titles greatly expanded as requested by users. A new sub-section heading has been created under the section "REFERENCE BOOKS" for reference materials of a very general nature; thus materials such as *Encyclopaedia Canadiana*, *Canada Yearbook*, etc. . . are pulled out from sub-sections such as "REFERENCE - ENCYCLOPAEDIA" and "REFERENCE - HANDBOOKS & TABLES" etc. . . to the sub-section "REFERENCE - GENERAL" at the very beginning of each subject list.

It is estimated that the second edition will be available at the beginning of June. A comparison of the two editions is shown in Table 3.

COST

Although up to this time, the Computer Centre has made no internal charge for its services to the Library, it is estimated that with the University's present computer configuration, the monthly cost of maintaining

Table 3. *First and Second Editions Compared*

| Edition | I | II |
|--------------------------------------|---------|---------|
| Completion Date | Nov./67 | June/68 |
| No. of Records on Master File | c.5,500 | 7,446 |
| Up-dating (no. of entries) | | |
| Addition | — | 280 |
| Change | — | 216 |
| Deletion | — | 7 |
| No. of Subject Lists | 14 | 15 |
| Number of Pages of Each Subject List | | |
| Aero Engineering | 20 | 26 |
| Chemical Engineering | 28 | 37 |
| Civil Engineering | 23 | 31 |
| Electrical Engineering | 26 | 34 |
| Mechanical Engineering | 27 | 35 |
| Nuclear Engineering | 16 | 21 |
| Design | 14 | 17 |
| Management Sciences | 11 | 15 |
| Mathematics | 15 | 21 |
| Astronomy | 9 | 14 |
| Biology | 16 | 23 |
| Chemistry | 16 | 27 |
| Earth Sciences | 22 | 27 |
| Physics | 15 | 22 |
| Optometry | — | 15 |

this project is approximately \$40.00. This cost covers about 4 minutes/month computer time, about 2 hours/month for keypunching and verifying and the cost of punch cards, multipart paper etc. . . , but does not cover the initial cost of system analysis and the charges for printing the booklets. By comparison, it would cost approximately \$95.00 per month to produce the copy by hand and this method would not provide the flexibility and other advantages of a computerized system.

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