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Information Technology and Libraries

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Editorial

This is the first issue of *ITAL* under a new editor. Aside from a new color for this volume, however, you won't notice any differences in the journal without comparing this issue's masthead with that of the December 1989 issue. If you do, so you will find some new names on the editorial board. The addition of new names suggests more than a cosmetic change. There will be some new perspectives and some new ideas about how we do things. That is healthy and is one of the reasons that board members (and editors, too) serve term appointments.

The board provides an important function for *ITAL*. It helps the editor select manuscripts for publication and helps keep our editorial policy in line with the changing trends and needs of our readers. But because not all members change at the same time and because all members of the board are also members of LITA, we are able to maintain continuity. There is a certain sameness to the heft and feel and look of *ITAL* that goes all the way back to its early days when it was known as *JOLA*, or the *Journal of Library Automation*. We have kept our identity even as we have grown. Goethe called this "Dauer im Wechsel," or "stability in change."

The "Instructions to Authors," found in this issue, have also changed. We are asking for machine-readable contributions to go with the traditional hard copy. By having manuscripts on floppy disk, we can take better advantage of ALA's prepublication system. Perhaps one day we will be able to eliminate the paper copy completely but for now is it necessary and will be required.

One thing that we hope will not change is the steady flow of manuscripts. We also encourage our readers to write us about possible special theme issues, about articles that appear, and, through the "Communications" section, about research and applications they are involved in. The purpose of a scholarly journal is communication, and we want to make sure that everyone who has something to say gets an opportunity, within, of course, editorial policy and the referee system that we employ. We look forward to hearing from you.—*Thomas W. Leonhardt.*

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Meticulous librarians

Selected Published Work of Henriette Davidson Avram: An Annotated Bibliography

Louise S. Grinstein and Rina Yarmish

The advent of computer technology has revolutionized library functioning at all levels. Traditional modes of operation are gradually giving way to computer-based approaches. One of the pioneers whose efforts have made library automation a reality is Henriette Davidson Avram. This article discusses Avram's life and published work, including a brief biographical sketch; a listing and annotation of all known publications by Avram, with listings only of publications involving conference or workshop summaries, award citations, obituaries, corrections, documents contributed to, and reviews. Also included are an index to reviews of Avram's work, a list of abbreviations used in the text of the article, and references.

The advent of computer technology has revolutionized library functioning at all levels. Traditional modes of operation are gradually giving way to computer-based approaches. Computerized catalogs are becoming more and more commonplace. Library networks have been established enabling ready access to the holdings of not one but many libraries nationwide and internationally.

One of the pioneers whose efforts have made library automation a reality is Henriette Davidson Avram. This article, divided into seven sections including three appendixes, attempts to detail her life and published work.

Part I contains a brief biographical sketch. Part II provides a brief survey of library automation projects in which Avram was involved. Part III lists and annotates all known publications by Avram excluding conferences/workshop summaries, award citations, obituaries authored by, corrections, documents contributed to, and reviews. The last are listed in part IV. Citations in part III are by year of publication. Within a given year works are ordered alphabetically by title and are identified by alphabetical suffixes. Works in part IV are similarly identified but with publication dates prefixed by an appropriate letter, which varies with the category assigned to the entry. Works by other authors are cited in the text by author's name and date; full citations appear in the reference list at the end.

Appendixes A, B, and C contain respectively an index to reviews of Avram's work, a list of abbreviations used in the text of this article, and references.

I. BIOGRAPHY

Henriette Davidson Avram, a computer systems analyst, is noted for her work in the field of library automation. Born in New York City on October 7, 1919, she is the daughter of Joseph and Rhea (Olsho) Davidson. Avram attended Hunter College, George Washington University, and special training institutes. At Hunter she took a premedical course; at George Washington University she majored in mathematics. In 1941 she married Herbert Möis Avram, a systems analyst specializing in computer programs for computational linguistics. They have three children: Lloyd, Marcie, and Jay.

Avram's illustrious career began with successive positions as programmer, methods an-

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alyst, and systems analyst for the Department of Defense at Fort Meade, Maryland (1953–59); manager of the UNIVAC 90 and CDC 160 programming groups at the American Research Bureau (1959–61); and as senior systems analyst for Datatrol Corporation in Silver Spring, Maryland (1961–65). In 1965 Avram joined the staff at the U.S. Library of Congress as assistant coordinator of information systems.

At the Library of Congress, Avram was instrumental in designing the machine-readable cataloging (MARC) format and implementing the MARC Distribution Service (1969). The MARC format has since become the national (Z39.2) and international (ISO 2709) standard for the interchange of bibliographic information. MARC has made possible the sharing of resources among libraries worldwide, facilitating research efforts by enabling wide access to reference sources. Avram's work has provided the impetus for the development of long-distance communications networks linking local libraries to bibliographic utilities and larger national libraries, thus lessening the need for individual ownership of expensive material.

In 1970 Avram was named chief of the MARC Development Office in the former Processing Department of the Library of Congress (later renamed Processing Services), which was responsible for the design and implementation of automation systems for the library's technical processing operations. In 1976 a new Network Development Office (NDO) was established and headed by Avram. The NDO, which centralized programs to support a nationwide library network, has played a leading role in the design of a computer-based, nationwide library network. It has also been invaluable to the development of library network standards in cooperation with professional and library organizations and national and international standards organizations. In August 1980 Avram was made director for processing systems, networks, and automation planning at the Library of Congress, the first individual to hold that position. This role gave Avram responsibility for coordinating the automation of technical processing and national and international bibliographic services. In 1983 she was made assistant librarian for processing services, the position she still holds. Processing services is the largest department in the Library of Congress.

Her work and numerous professional publications have gained Avram recognition both in the United States and abroad. She has received such awards as the Outstanding Performance Award (Library of Congress—1966, 1967); the Superior Service Award "for distinguished intellectual and administrative achievement" (Library of Congress—1968); the Margaret Mann Citation in Cataloging and Classification (American Library Association—1971); the Federal Woman's Award for distinguished achievement in federal service (1974); an Sc.D. (Southern Illinois University at Edwardsville—1977); the Academic/Research Librarian of the Year Award (Association of College and Research Libraries—1979); the Award for Achievement in Library and Information Technology (Library and Information Technology Association—1980); the Melvil Dewey Medal for outstanding creative professional achievement (American Library Association—1981); and the Joseph W. Lippincott Award for Notable Achievement in Librarianship (American Library Association—1988). In August 1987 Avram was elected an Honorary Fellow of the International Federation of Library Associations and Institutions (IFLA), IFLA's highest award.

Avram has been an active member of the Washington Operations Research Council, the American Library Association, the American Society for Information Science, and the Association for Computing Machinery. In addition, she has actively participated in the work of IFLA, serving as first vice-president for 1985–87; the American National Standards Institute; the International Organization for Standardization; and UNESCO's General Information Programs and the Board of Trustees for EDUCOM. She has also served on the editorial board of the *Journal of Library Automation* (1970–72) and as a frequent lecturer in the Department of Library Science at Catholic University in Washington, D.C.

II. LIBRARY AUTOMATION PROJECTS

The following briefly summarizes the library automation projects in which Avram has played an important role and about which she has written extensively. In each case refer-

ences are provided to the pertinent entries of the bibliography.

A. Machine-Readable Cataloging (MARC)

The MARC project developed the standards incorporated in all national automated bibliographic systems. It progressed from a pilot project to an operational system in three years. Begun as a study of the recording of cataloging data performed by Lawrence Buckland of Inforonics and funded by the Council on Library Resources (CLR) (1964), the pilot project evolved through the initial planning phase (February 1966) to its official end (June 30, 1967). The operational MARC Distribution System uses MARC II format, an implementation for the interchange of bibliographic information. For further information see 1965.a, 1966(a,b), 1967(a,b,c), 1968(a,b,c,d,e,f), 1969(a,c), 1970(b,d,g), 1971(a,d), 1972(a,c,e,f,g), 1973.a, 1974(b,c), 1975.a, 1976(a,b), 1978.a, 1979.e, 1980.a, 1984.c, 1987.a, A1974.d, E1970.a, F1973.a.

B. Retrospective Conversion (RECON)

In November 1968 a working task force of librarians and systems analysts began a feasibility study of conversion of retrospective catalog records and their distribution to the entire library community. The final feasibility report (1969.d) recommended that a pilot project be established to test various conversion techniques, ideally covering the highest-priority material (English-language monographs, 1960–68). A two-year pilot project was initiated in August 1969. Progress reports issued (see 1970(c,f), 1971(c,d)), culminating in the final report (see 1972.d), document phases of this project and final recommendations. No additional work was done on RECON due to the projected high cost of converting retrospective records and updating them to reflect the latest cataloging code. For further information see 1969.d, 1970 (b,c,e,f,g), 1971(c,d), 1972(a,d,f), 1973.a, 1983.b, 1987.a.

C. Cooperative MARC (COMARC)

This project (1974–78) evolved after RECON terminated. It attempted to test the feasibility of building a national database for book-form materials by using records converted and contributed by other organizations and updated at a central site. These records were for items that had been cataloged by LC prior to MARC implementation. COMARC was not completed due to lack of funding. For further information see 1976.b, 1979.g, 1983(b,c), 1987.a.

D. Retrospective MARC (REMARC)

A project that gave the private sector a role in the conversion of LC retrospective records was begun in the late 1970s. It involves subcontracting both the microfilming of the LC shelflist and the subsequent partial conversion to machine-readable form. LC purchases the converted records and processes them through its format recognition program. These records, unauthenticated, are then processed into the REMARC database. For further information see 1983.b.

E. Conversion of Serials (now Cooperative Online Serials) (CONSER)

Consisting of two phases, CONSER I (1973–77) and CONSER II (1977–present), this project is designed to establish a national online serials database. Data are input to the OCLC database by participant organizations. The records are then authenticated by both the U.S. Library of Congress (LC) and the National Library of Canada. For further information see 1976.b, 1977.c, 1983(b,c), 1984.c, 1987.a.

F. Universal MARC (UNIMARC)

Differences among various national versions of MARC implementations led to the development of the UNIMARC format, first published in 1977. This format was designed to simplify worldwide exchange of bibliographic data. Using UNIMARC, only two conversion programs need be written and maintained by any nation—one from the national format to UNIMARC and the other from UNIMARC to the national format. For further information see 1981(c,d), 1982.b, 1984(c,e), A1976.a, E1983.a.

G. Name Authority Cooperative (Now National Coordinated Cataloging Operation) (NACO) Project

This project was begun at the LC in 1977 to establish and maintain name authority files. Participant organizations search LC bibliographic tools to ascertain whether or not a

name heading has been established. If not, the participant establishes the name and submits it to the LC. Following authentication it is converted to machine-readable form, added to the existing name authority file, and then distributed via the MARC Distribution Service. Since the Linked Systems Project (LSP) has been operational, approximately ten NACO organizations are using the LSP for sending their records to LC. For further information see 1983(b,c), 1984(b,c,d), 1987.a.

H. Linked Systems Project (LSP)

Begun in 1980, LSP evolved to alleviate the rekeying of information in cataloging and conversion. The goal was to establish communication linkages among existing systems so that users of one system could search databases of other systems and also so that records could be transferred among systems. For further information see 1983.b, 1984(c,d), 1986.a, 1987(a,b).

III. ARTICLES

The entries in this section include articles written or edited by Avram. Each entry is followed by a brief annotation.

1965.a and Ruth S. Freitag, Kay D. Guiles. *A Proposed Format for a Standardized Machine-Readable Catalog Record.* ISS Planning Memorandum #3. Washington, D.C.: Library of Congress, Office of the Information Systems Specialist.

Report of a project conducted by LC staff members to analyze cataloging data from a machine-processing viewpoint. Suggests the contents of a machine-readable record; the first version of a format and identification scheme for computer representation of cataloging data; and a tagging scheme and plan for fixed- and variable-length fields applied to cataloging data. The design is intended to facilitate data retrieval, preparation of bibliographies, and printing of catalog cards. Individual problems and suggested solutions are discussed, as well as areas requiring additional study.

1966.a "The Philosophy behind the Proposed Format for a Library of Congress Machine-Readable Record." In *Information Retrieval with Special Reference to the Biomedical Sciences.* Papers presented at the Second Institute on Information Retrieval, conducted by the Library School and the Nolte Center for Continuing Education, University of Minnesota, November 10–13, 1965, ed. Wesley Simonton and Charlene Mason, p.155–74. Minneapolis: University of Minnesota, Nolte Center for Continuing Education.

Discussion of the major efforts of the automation project at LC. These focus on system study surveys, data gathering, and analyses leading to system specification, as well as analyses and study for design of machine-readable bibliographic data for monographs (other materials are excluded).

Elucidation of problems encountered and of reasons for arrival at particular solutions. It is particularly noted that data studies began prior to system studies. Announcement o plans for future study.

1966.b and Barbara Evans Markuson, eds *Proceedings of the Third Conference o Machine-Readable Catalog Copy.* Washington, D.C.: Library of Congress.

The conference was held to discuss th MARC pilot project with representatives the sixteen libraries that were participating i the project. The conference enabled partic pants to assess the feasibility of standardiz tion, central preparation, and distribution a the desirability of certain bibliographic a machine features of the record under te conditions. Each library representative brie discussed the use of the bibliographic proje tapes.

1967.a and Kay D. Guiles, Guthrie T. Mea "Fields of Information on Library of Cc gress Catalog Cards: Analysis of a Rand Sample, 1950–1964." *Library Quarte* 37, No.2:180–92 (April).

Report of a study designed to collect m precise information about the data eleme to be used on the soon-to-be-develo MARC II format (work began on the format in March 1967), both as to freque of occurrence and numbers of characters i defined element and/or field. The Infor tion Systems Office of the LC used a rand sample of recent catalog cards collected 1965. The Card Division Record Set of re lar printed catalog cards was the file fr which the sample was drawn. The populat was restricted to cards issued for the ye

1950–64. The sample size for the period was 2,224 cards. Statistical methods and mechanics by which the sample was constructed are provided, as is information about the data elements themselves, and frequency of occurrence and numbers of characters in particular defined elements and/or fields.

1967.b and Barbara Evans Markuson. "Library Automation and Project MARC: An Experiment in the Distribution of Machine-Readable Cataloging Data." In *The Brasenose Conference on the Automation of Libraries*. Proceedings of the Anglo-American Conference on the Mechanization of Library Services, held at Oxford under the chairmanship of Sir Frank Francis and sponsored by the Old Dominion Foundation of New York, 30 June–3 July 1966, ed. John Harrison and Peter Laslett, p.97–126. London: Mansell.

Discussion of issues and problems relating to the development of automated systems and to distribution of machine-readable cataloging data. The MARC system is regarded as an interim stage in the development of techniques for library automation. In-depth analyses and planning for automation of library systems are scheduled for the future, building upon the experience gained from the operation of project MARC and from creation of a machine-readable data base. References.

1967.c Ann T. Curran and H. D. Avram. *The Identification of Data Elements in Bibliographic Records*. Final Report of the Special Project on Data Elements for the Subcommittee on Machine Input Records (SC-2) of the Sectional Committee on Library Work and Documentation (Z-39) of the U.S.A. Standards Institute. Washington, D.C.: U.S.A. Standards Institute. ERIC: ED 017282.

The objective of SC-2 was to develop standards for identifying and recording bibliographic and textual elements to be used in machine-readable data systems for libraries and related institutions. This report is a working tool, providing background information intended to help SC-2 determine which data elements should be tagged (identified) in machine-readable records. The study gives a list of elements that may be included in bibliographic records for books, serials, journal articles, and technical reports, without indication of bibliographic form or use. References.

1968.a "MARC Is a Four-Letter Word." *Library Journal* 93, No.13:2601–5 (July).

A report on the first year and a half of LC's MARC pilot project, leading to decisions to continue the project during fiscal 1968 as well as to implement a full-scale subscription service.

It provides feedback from sixteen participant libraries, including criticism, suggestions for improvement, and examination of various uses and applications of MARC. Other institutions are now undertaking similar projects. Future plans include expansion and refinement of the database, automation of LC's central bibliographic system, expanded subscription service and planning for regional networks, and standardization.

1968.b *The MARC Pilot Project: Final Report*. Washington, D.C.: Library of Congress. ERIC: ED 029663.

A comprehensive report describing the evolution of the MARC system, its component parts and interrelationships of the component parts to the whole, and results and accomplishments. It includes background and history of the MARC pilot project; objectives and constraints of the MARC pilot project; MARC tape formats; system description; support programs for participating libraries; codes developed for language, publisher, and place of publication; character sets; cost models; evaluation of MARC I and comparison with MARC II; and potential uses of machine-readable data. Reports of participants and special studies. References.

1968.c "The MARC Project of the Library of Congress." *Drexel Library Quarterly* 4, No.4:279–309 (October).

Report of the experiences of the LC and of participating libraries with the evolving MARC system. Information is to be used by LC and the library community in the continuing development and eventual acceptance of standards for cataloging and processing of machine-readable library data. Details of data collection, preparation, transcription, processing, and output. Long-range goals include provision of more efficient access to literature; use as a focal point in the development of a national library system offering auto-

mated bibliographic services; automation of other library activities where feasible; standardization. References.

1968.d "MARC: The First Two Years." *Library Resources and Technical Services* 12, No.3:245–50 (Summer).

A description of procedures and accomplishments of the MARC project, from an initial study of the recording of cataloging data conducted in 1964, to the initial planning phase in February 1966, through the official end of the MARC pilot project on June 30, 1967. Provision of some details about the MARC system and work then in progress. Indication that a MARC pilot project final report was then in preparation and that the library community expressed great interest in the pilot project and in its continuation.

1968.e and Julius R. Droz. "MARC II and COBOL." *Journal of Library Automation* 1, No.4:261–72 (December).

A report establishing that data in the MARC II communications format can be processed using standard ANSI COBOL (1968), with unblocked, variable-length records. An application of the processing of MARC II records for LC is described, and descriptions of the MARC II communications format and of the MARC processing format are provided. References.

1968.f and John F. Knapp, Lucia J. Rather. *The MARC II Format: A Communications Format for Bibliographic Data*. Washington, D.C.: Library of Congress, Information Systems Office. ERIC: ED 024413.

A description of the structure and content of the MARC II format to be put into effect in the operational MARC Distribution System. Also included are steps followed in developing the format and specifications of such characteristics as flexibility and usefulness of the format for given applications. This publication did not constitute a commitment by LC to include the explicit coding for all the data elements described. The effect of these coding procedures on the cataloging process was subject to review.

1969.a "Implications of Project MARC." In *Library Automation: A State of the Art Review*. Papers presented at the Preconference Institute on Library Automation held at San Francisco, California, June 22–24, 1967, ed. Stephen R. Salmon, p.79–89. Chicago: American Library Assn.

Implications of MARC, the operational system, on the eve of its development, beginning July 1, 1967, and upon completion of the pilot project on June 30, 1967.

1969.b "Using Computer Technology—Frustrations Abound." In *AFIPS Conference Proceedings* 34:42–44. Washington, D.C.: AFIPS Press.

The introduction of computers to libraries poses special problems in file organization, hardware, software, and communication. These include the problems of deciding how information can best be structured for effective retrieval; of large random access stored at acceptable costs; of conversion: of deciding which strategies to use; and of communication between librarians and computer scientists.

1969.c and Alan S. Crosby, Jerry G. Pennington, John C. Rather, Lucia J. Rather, Arlene Whitmer. "MARC Program Research and Development: A Progress Report." *Journal of Library Automation* 2, No.4:242–65 (December).

A detailed description of the MARC processing format used in the MARC database at LC; the MARC system (i.e., a generalized data management system that allows flexible conversion of bibliographic entries to machine-readable form, followed by processing); programming work conducted for the MARC system. References.

1969.d and William R. Nugent, Josephine S. Pulsifer, John C. Rather, Joseph A. Rosenthal, Allen B. Veaner. *Conversion of Retrospective Catalog Records to Machine-Readable Form*. A Study of the Feasibility of a National Bibliographic Service. Washington, D.C.: Library of Congress.

Report prepared by the RECON Working Task Force. In general it was indicated that the MARC Distribution Service should be expanded; there should be no conversion of any category of retrospective records until that category is being currently converted; conversion of retrospective records should be an early goal of the automation effort; standardization of retrospective records should be identical to that of current records; priority

for retrospective conversion should be determined by usefulness of data to the largest number of librarians; large-scale conversion should be accomplished as a centralized project under the direction of LC.

Includes specific recommendations for conversion. Also deals with uses of bibliographic data; master database; technical alternatives; machine and manpower considerations; costs of conversion; funding and other support considerations.

1970.a "Bibliographic and Technical Problems in Implementing a National Library Network." *Library Trends* 18, No.4:487–502 (April).

The underlying concept of library networks is well established. There is difficulty in maintaining a regular flow of up-to-date bibliographic information among libraries and in fostering greater cooperation between libraries. Automated library networks should be designed to facilitate bidirectional flow of information. Regional centers ("nodes") could act as information bases, with informati n transmitted from a regional center or a national center through other specified regional centers to individual libraries. Reversal of this system would provide bidirectional information flow. Design of such a network requires solving problems in two categories: standardization of bibliographic records and technology. Other often-overlooked factors to be considered: the dynamic characteristics of bibliographic records; the fact that method of data organization is dependent on user needs, which may sacrifice optimal efficiency and retrieval capability; composition of a search code; standardization of symbols; the fact that data banks must be housed in different locations; problems of installing data transmission equipment; assignment of user identification codes. References.

1970.b "The National Scene." In *Network Concepts: Four Points of View*. Proceedings of the April 1, 1970, meeting of the College and University Libraries Section, ed. Richard A. Matzek, p.22–30. Boston: Catholic Library Assn. ERIC: ED 059720.

MARC progressed from a pilot to an operational system in three years. A large segment of the library community cooperated in designing the MARC II format.

MARC II is a format implementation for the interchange of bibliographic information. It satisfies the need for *standards*, a requirement for network development. The format is composed of structure (the physical representation of data); content designators (characterization of data elements); and content (the data that constitute the bibliographic record). The MARC II format for books has been accepted by key organizations in the United States and the United Kingdom. LC has applied the same format structure to serials, maps, motion pictures and filmstrips, and manuscripts.

There is a need to expand MARC to other languages and to other forms of material. Expansion will occur as soon as resources permit.

Consistency is another requirement for network development. Since LC maintains the position of superimposition, each library must guarantee that the entries on MARC records are consistent with their individual catalogs. One solution might be to close the present catalogs and start again.

Libraries are moving toward the sharing of computer-based bibliographic information both nationally and internationally. An economical approach is to catalog a title once, record it in machine-readable form, and share the resulting data.

The RECON Working Task Force has worked on bibliographic problems of centrally converting retrospective material for LC and for the rest of the library community. It has been assigned other tasks that have significance for the future of networks and of library automation.

1970.c "The RECON Pilot Project: A Progress Report." *Journal of Library Automation* 3, No.2:102–14 (June).

One of a series of progress reports (1970(c,f), 1971(c,d), 1972.d).

A synopsis of the progress report submitted by LC to the Council on Library Resources (CLR) under a grant to initiate the RECON pilot project. The RECON pilot project served to analyze the scale conversion of retrospective catalog records and to consider the possibility of centralized conversion of such records and their distribution to the entire library community. Duration of the pilot project was set, with a date established for determining whether a full-scale project should be

undertaken. Description of the progress made from August to November 1969 is provided in the areas of training, selection of material to be converted, investigation of input devices, and format recognition. References.

1970.d and Ann T. Curran. "The Identification of Data Elements in Machine Readable Bibliographic Records." In *The Bowker Annual of Library and Book Trade Information*, 15th ed., p.68–70. New York: Bowker. Updated and reprinted as "New Developments in an Information Interchange of Data Elements in Machine Readable Format for Bibliographic Data." In *The Bowker Annual of Library and Book Trade Information* (1971), 16th ed., p.104–6. New York: Bowker.

Acceptance of standards for preparation of bibliographic records involves determining what data should be included in the record, how data should be identified or labeled, what characters should be included in the character set, what bit configurations should be used to represent each character, physical record block size, and other factors.

With regard to structure or format of machine-readable records, the draft "USA Standard for a Format for Bibliographic Interchange on Magnetic Tape"—revised four times—has been accepted by the Council of National Library Associations and approved by ANSI in June 1970 and is now being considered as a standard by the International Standards Organization (ISO).

With regard to data to be included in the record, it is noted that the MARC II structure has been accepted as a standard for library monographs; a format for the content and structure of serial records has been drafted; formats have been developed for maps, motion pictures, filmstrips and other media intended for projection; and work is under way in developing formats for manuscripts and sound recordings, and in developing recommendations for machine-readable citations for abstracting and indexing services.

1970.e and Richard de Gennaro, Josephine S. Pulsifer, John C. Rather, Joseph A. Rosenthal, Allen B. Veaner. "Levels of Machine-Readable Records." *Journal of Library Automation* 3, No.2:122–27 (June).

A report of conclusions reached by the RECON Working Task Force with regard to the feasibility of determining levels or subsets of the established MARC II format that would still allow a library using it to be part of a future national network. Two levels are necessary and desirable for national purposes: bibliographic data and holding data. For distribution of cataloging information in machine-readable form to enable use by library networks, library systems, and individual libraries, the full MARC II format should be used. For libraries reporting holdings to the National Union Catalog (NUC), a less complex subset may be used. References.

1970.f and Kay D. Guiles, Lenore S. Maruyama. "The RECON Pilot Project: A Progress Report, November 1969–April 1970." *Journal of Library Automation* 3, No.3:230–51 (September).

One of a series of progress reports (1970(e,f), 1971(c,d), 1972.d).

A synopsis of the second progress report submitted by LC to CLR under a grant for the RECON pilot project. Description of the progress made from November 1969 to April 1970 is provided in the areas of production, official catalog comparison, format recognition, research titles, microfilming, and investigation of input devices. The status of tasks assigned to the RECON Working Task Force is described. References.

1970.g and Josephine S. Pulsifer. *Bibliographic Services for a National Network*. Washington, D.C.: Office of Education, U.S. Department of Health, Education, and Welfare. Reprinted with minor revisions in *Proceedings of the Conference on Interlibrary Communications and Information Networks*. Sponsored by the American Library Association and the U.S. Office of Education, Bureau of Libraries and Educational Technology, held at Airlie House, Warrenton, Va., September 28, 1970–October 2, 1970, ed. Joseph Becker, p.92–100 (1971). Chicago: American Library Assn.

Efficient functioning of a network is dependent upon organization of bibliographic services so that the basic record for each item is created once. The record must be such that it is capable of serving the needs of at least the following: library and union catalogs; informa-

tion centers; abstracting and indexing services; and national and trade bibliographies. The establishment of a centralized National Bibliographic Service (NBS) composed of various institutions functioning as a unit is proposed. There is a need for a centrally processed bibliographic record and for standardization requirements for such a record. Failure to produce such a record will make it more and more difficult to implement a network as time goes on. References.

1970.h Paul R. Reimers and H. D. Avram. "Automation and the Library of Congress: 1970." *Datamation* 16, No.6:138–43 (June).

A description of the ways in which computer technology has been applied to achieve the automation goals of the LC. Work is currently in progress on a seven-phase program, to include: survey of the current (manual) system, analysis of system requirements, description of recommended systems, equipment and software specifications, system design, system implementation, system operation.

Current holdings of LC are described, as are the maintenance of MARC records, services provided to subscribers, and the RECON project. Also included are comments on the central bibliographic system, extension of bibliographic services, preparation of a list of subject headings, and the legislative reference service. References.

1971.a "The Evolving MARC System: The Concept of a Data Utility." In *Proceedings of the 1970 Clinic on Library Applications of Data Processing: MARC Uses and Users*. Papers presented at the 1970 Clinic on Library Applications of Data Processing, conducted by the University of Illinois Graduate School of Library Science, April 26–29, 1970, ed. Kathryn Luther Henderson, p.1–26. Urbana, Ill.: University of Illinois, Graduate School of Library Science.

A discussion of the MARC system and the MARC Distribution Service, including explanation of the rationale of the system, summary of the accomplishments of the efforts of 1967–69 resulting in the current system, and description of the emerging plans for the next generation of the MARC system (1970–71). References.

1971.b "Library Automation." In *Annual Review of Information Science and Technology* 6, ed. Carlos A. Cuadra, p.171–217. Chicago: Encyclopaedia Britannica, Inc.

A review of library automation literature. The reviews are organized into ten main topics: general (papers providing a macroscopic view), national activity, international activity, networks and multilibrary systems, standards, applications, research, hardware/software, personnel, and costs. Evident in the reviews is a complex intertwining of some aspects of library automation with others. References.

1971.c and Lenore S. Maruyama. "RECON Pilot Project: A Progress Report, April–September 1970." *Journal of Library Automation* 4, No.1:38–51 (March).

One of a series of progress reports (1970(c,f), 1971(c,d), 1972.d).

A synopsis of the third progress report submitted by LC to CLR for the RECON pilot project. Description of the progress made from April through September 1970 is provided in the areas of RECON production, format recognition, research titles, microfilming, and investigation of input devices. The status of tasks assigned to the RECON Working Task Force is described. References.

1971.d and Lenore S. Maruyama. "The RECON Pilot Project: A Progress Report, October 1970–May 1971." *Journal of Library Automation* 4, No.3:159–69 (September).

One of a series of progress reports (1970(c,f), 1971(c,d), 1972.d).

A synopsis of three progress reports submitted by LC to CLR for the RECON pilot project. Description of the progress made from October 1970 through May 1971 is provided in the areas of RECON production, foreign-language editing, format recognition, microfilming, and input devices. The status of tasks assigned to the RECON Working Task Force is described. The RECON pilot project officially ended August 1971; the final report is to be published by LC. References.

1972.a "Automation in Technical Processing at the Library of Congress." In *The Bowker Annual of Library and Book Trade Information*, 17th ed., p.80–85. New York: Bowker. Reprinted in updated form in *The Bowker Annual of Library*