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ABSTRACT

Initiated by the Council on Library Resources, this study assessed the current level of retrospective conversion and explored the primary issues that need attention if libraries are to convert their bibliographical files to machine-readable form. Data were obtained from a literature review, contact with a number of libraries currently engaged in retrospective conversion, and information gathered from three major American utilities, several service centers, and regional networks. The report is organized in four major sections: (1) an overall framework for analyzing retrospective conversion, including a definition, a brief summary of past efforts to develop a coordinated strategy, a description of current activity, and a look at future developments; (2) major approaches to and library strategies for retrospective conversion; (3) the economics of retrospective conversion and the quest for a national database; and (4) five strategic options for a systematic approach, recommendations for a national strategy, and a proposed implementation strategy. A selected bibliography and a brief description of the Association of Research Libraries (ARL) and Research Libraries Group, Inc., National Collections Inventory Project are included. (THC)

ISSUES IN RETROSPECTIVE CONVERSION

Report of a study conducted for the

Council on Library Resources

by

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PREFACE

This report was written by Jutta Reed-Scott with contributions by Dorothy Gregor and Charles Payne. Specifically, Dorothy Gregor was principal investigator for the REMARC sections and prepared the description and analysis of the REMARC database. Charles Payne wrote the section describing the retrospective conversion project at the University of Chicago Library. Both contributed significantly to the development of the recommendations for a national strategy for retrospective conversion.

We wish to acknowledge the many individuals and organizations who were instrumental in the completion of the report. Tina Kass, Director, Library Systems and Operations, The Research Libraries Group, Inc.; Andrew H. Wang, Manager, Online Systems Products & Services Department, Online Computer Library Center; and Caitlin Robinson, Interlibrary Loan Librarian, Washington Library Network provided generous assistance and made available data on retrospective conversion programs. We also received assistance from Christine Barcus, Retrospective Conversion Coordinator for SOLINET; Susan Saunders, Associate Director of the Bibliographic Resource Center of AMIGOS; and the staff of NELINET.

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INTRODUCTION

In the spring of 1983, the Council on Library Resources initiated an assessment of the current level of retrospective conversion and an exploration of the primary issues needing attention if libraries are to convert their bibliographical files to machine-readable form effectively and economically.

During the past year we have reviewed the literature on retrospective conversion activities, contacted a number of libraries that are currently engaged in retrospective conversion projects, and obtained information relating to retrospective conversion programs from the three major American utilities and from several service centers and regional networks. After this initial data-gathering phase, we focused our efforts on the evaluation of current approaches to retrospective conversion, the analysis of major issues and problems, and the investigation of alternate strategies.

This report represents the results of our assessment. The report is organized in four major sections. The first part provides the overall framework for analyzing retrospective conversion today. It includes a definition of retrospective conversion, a brief summary of past efforts to develop a coordinated strategy, a description of the current level of activity, and a look at future developments. The second part of the report deals with the major approaches to and library strategies for retrospective conversion. Against this backdrop, the third part explores the economics of retrospective conversion and the quest for a national database. The final segment of the report discusses five strategic options for a systematic approach to retrospective conversion and presents our recommendations for a national strategy for retrospective conversion together with a proposed implementation strategy.

The analysis and evaluation of the present approaches to retrospective conversion have convinced us that new initiatives must be taken by the research libraries and that some new mechanisms must be developed to ensure

effective bibliographic access to the vast but distributed resources in American research libraries.

Following is a summary of our findings and recommendations:

1. Research libraries should take primary responsibility for working with the Library of Congress and the bibliographic utilities to develop a coordinated program for retrospective conversion;
2. Research libraries and the Library of Congress should establish priorities for converting specific subject collections;
3. Open access to converted records should be provided by the bibliographic utilities;
4. The implementation of the Linked Systems Project should be given high priority;
5. Agreed-upon standards for retrospective conversion should be adopted to facilitate record sharing; and
6. A multi-year fund-raising plan should be developed to provide support for the retrospective conversion of specific subject collections.

We believe that these recommendations create the overall framework for new initiatives in retrospective conversion and will contribute to the development of an effective, coordinated strategy for retrospective conversion. The goals are to maximize access to existing records, to improve the quality of converted records, and to ensure a structured, planned approach to the retrospective conversion of scholarly resources.

PART ONE: OVERVIEW

I. Definition

Retrospective conversion is the process of converting library catalog records into machine-readable form. As Lou Wetherbee noted, "conversion of catalogs is not a new idea -- it has been going on for centuries as the structure of the catalog has evolved."[1] But there is an important difference in present efforts: the use of advanced technology to allow the one-time creation of a machine-readable record that can be used for multiple applications in many libraries.

The term retrospective conversion means both the process by which a library acquires a copy of an existing machine-readable record for its own use and the process by which a printed bibliographic record is converted to machine-readable form according to predefined standards. Libraries utilize four basic approaches for data conversion. The most prevalent is the matching of a catalog record with an existing machine-readable record, to which is added the library's holding symbol. The second is the use of an existing record, to which is appended not only the holding symbol but also local information from the library's manual file. A third approach is the editing of an existing record to ensure conformity with national standards. Finally, retrospective conversion frequently requires preparation of original input for nonmatching titles. Underlying these approaches are two key issues: how to obtain the most economical and effective access to existing records and how to create quality records at realistic costs.

II. Background

A number of critical developments enhance the utility of machine-readable records in libraries. The most important is the distribution of

machine-readable cataloging (MARC) records by the Library of Congress beginning in 1969. MARC provides both a means for sharing machine-readable data among libraries and a standardized format for organizing bibliographic data.

The advent of MARC data made comprehensive retrospective conversion feasible, but many other forces are fueling the current surge in retrospective conversion. It is evident that the conversion of older catalog records provides significant benefits to libraries and the users they serve, including:

1. Building the machine-readable database to support online catalogs, circulation systems, serial lists, and other computer applications within the library.

2. Allowing the consolidation of all bibliographic records into a single integrated system, which enables the library to more easily incorporate changing catalog rules and to upgrade inventory control. It provides savings in filing and catalog maintenance. Most importantly, an integrated technical processing system allows access to the library's bibliographic files from multiple locations for multiple purposes.

3. Preserving the library's bibliographic files and ensuring their security.

4. Improving collection management.

5. Supporting local and regional resource sharing programs.

While it is true that the principal benefits of retrospective conversion accrue to the individual library, there are considerable advantages on the national level, including:

1. Contributing to the enrichment of the national bibliographic database.

2. Assuring national coverage of needed library resources.

3. Supporting enhanced interlibrary loan and public services.

4. Improving bibliographic access for resource sharing programs and cooperative activities.

While the development of online public access catalogs has become a major goal for increasing numbers of librar -- research, academic, public, and special -- the conversion of bibliographic records is also a crucial step toward effective access to the vast but distributed research resources found

in American libraries. But the magnitude of the task of converting millions of records in thousands of libraries presents an enormous challenge to the library profession.

The difficulty of attaining the goal of comprehensive retrospective conversion was made clear in the early efforts to determine a workable, coordinated approach. In the late 1960s major steps were taken to develop a national plan for the conversion of retrospective catalog records. In 1969 the RECON Working Task Force at the Library of Congress investigated the feasibility of several strategies. The final report of the Task Force outlined a comprehensive plan for a centralized, LC-based conversion project. Specifically, the Task Force recommended that the records to be converted should be those in the LC Official Catalog and that the initial conversion effort should be limited to English language records published between 1960 and 1970.[2] The Task Force addressed many of the potential problems of such a strategy, but believed that the centralized approach to conversion had significant advantages. Many of the benefits outlined by the Task Force remain relevant today, including "elimination of the need of libraries to do their own converting and elimination of duplication of effort; reduction in cost and time of conversion; broadening of the available data base, both nationally and locally; a decrease in the need for original cataloging; simplification of reclassification; and promotion of standardization."[3]

Despite these advantages, this centralized approach to conversion never materialized. The RECON Pilot Project demonstrated the high costs of a large-scale conversion project, and lack of available funding terminated this pioneering effort to develop a national approach to retrospective conversion. After the RECON Pilot Project ceased, efforts shifted to the exploration of a distributed strategy. The Cooperative MARC project, known as COMARC, was an attempt to build a national database cooperatively. The project proposed that participating libraries would submit their converted records in machine-readable form to the Library of Congress for central verification and distribution. Lack of funding once more terminated this cooperative effort. The failure to find a workable approach to coordinated retrospective conversion has had a long-term impact. It resulted in a decision by the Library of

Congress not to undertake an in-house, systematic conversion of the pre-1968 holdings. Equally important, it has limited the role of the Library of Congress in building a nationwide retrospective database.

The path pursued by libraries since then is characterized by a shift from national planning to local initiatives. On the one hand, there has been an enormous growth in local efforts to convert catalog records and a concomitant surge in creating machine-readable records; on the other side, there has been a continued absence of coordinated planning and the emergence of a maze of overlapping networks and machine-readable databases.

A number of important milestones mark this path. The first of these is the growth of shared cataloging networks in the 1970s. The OCLC Online Computer Library Center is both the first and largest bibliographic utility in North America. OCLC has more than 3,300 member libraries and serves all types of libraries. The second largest bibliographic utility is the Research Libraries Information Network (RLIN), which serves the 26 member libraries of the Research Libraries Group (RLG), specialized research libraries, and a group of non-RLG members in California. The third major system, the Washington Library Network (WLN), offers its services on a regional basis to 106 member libraries, principally in the Pacific Northwest.

Although the three major utilities -- OCLC, RLIN, and WLN -- differ in their organization and system designs, they all make available machine-readable records created by the Library of Congress, other government organizations, and member libraries. The sharing of cataloging records through computer-based network cataloging not only speeds up processing of new materials, but it also builds the resource file to support extensive retrospective conversion in member libraries. At the same time, retrospective conversion contributes to the financial stability of the networks. Indeed, the three networks subsidize retrospective conversion in anticipation that converted records will in turn generate additional use and income.

Another important factor is the acceleration of library automation. While rising costs of library materials and library services are making automation of labor-intensive processes mandatory, recent technological developments -- foremost the application of online, integrated library systems --

are making it possible. Technological advances provided new opportunities for improved library services, but libraries realized that they could not reap the full benefits of computer-based systems unless they converted older records. As Richard De Gennaro said: "The single most important thing libraries can do to improve management, hasten automation, and reduce the expense and difficulties of maintaining parallel manual and machine systems is to convert their retrospective catalogs to machine-readable form and consolidate all their bibliographic records into a single integrated system."[4]

III. Retrospective Conversion Today

The confluence of three factors -- development of the MARC format for machine-readable records, the growth of shared cataloging networks, and the economic pressures to automate labor-intensive library functions -- shape today's retrospective conversion activities. While the 1970s were a period of building large files of machine-readable records, the 1980s are focused on using those files.

A look at the current size and scope of available machine-readable databases illustrates both the opportunities and problems. The most authoritative set of records is produced by the Library of Congress and distributed to the major networks, individual libraries, and vendors. Other sources of government-supported bibliographic records are the cataloging produced by the Government Printing Office and the National Library of Medicine. Another large source of records is the CONSER Project, which is a cooperatively built file of serial records. These separate data files are the backbone of the three networks and represent almost 70 percent of utility databases. The OCLC, WLN, and RLIN databases are further expanded by the addition of member-created records. Currently, OCLC members are adding records to the system at a rate of about 1.3 million records annually, and RLG members are adding about 1 million records to the RLIN database each year. But it is important to remember that the tremendous growth in the number of machine-readable records is a recent phenomenon. As Table 1 shows, the number of records in each bibliographic utility grew dramatically during the past five years.

Table 1

BIBLIOGRAPHIC RECORD GROWTH IN U.S. UTILITIES
(millions)
as of December 31

Name	1983	1982	1981	1980	1979	% change 1982-83	% change 1979-83
OCLC[1]	10.1	9.0	8.0	7.0	5.7	12.2	77.2
RLG[2,3]	11.9	7.4	5.8	3.8	2.4	60.8	395.8
WLN[1]	2.9	2.6	2.3	2.0	1.7	11.5	70.6

Notes:

1 Figures for OCLC and WLN represent unique titles.

2 Figures for RLG represent unique titles and holdings.

3 The RLG database was increased 42 percent through the loading of archive tapes of 19 member libraries -- most of these records initially had been input into OCLC. The RLIN database contains approximately 7 million unique records.

In addition to the large networks, state and regional utilities are emerging and are adding to the proliferation of machine-readable records. The most striking examples are the AMIGOS Bibliographic Council[5] and SOLINET (a regional network serving the Southeast).[6] Both provide specialized services to libraries and have established "contract" operations for retrospective conversion that have resulted in the development of separate databases for retrospective conversion at the regional level.

Still another source of machine-readable records is the large files created by individual libraries for local applications. Automation efforts at institutions such as Harvard, Northwestern, Pennsylvania State, and the University of Chicago, as well as the New York Public Library, resulted in the creation of machine-readable records. Many other libraries created records for use in circulation systems. Some of these records have been loaded into one of the large bibliographic utilities, while others have not; some of the records are MARC-compatible, while millions of other records -- especially those created for the early circulation systems -- are not.

In recent years, commercial vendors have also entered the field and are creating bibliographic records for individual libraries on a contractual basis, and the number of these specialized vendors has grown substantially. One example of this private sector enterprise is the conversion of the Library of Congress shelflist by Carrollton Press, which created the REMARC database with approximately 5 million records. Other actively marketed retrospective conversion systems include AGILE II, MINI MARC, and MARCIVE. Auto-Graphics introduced AGILE II in California in 1981, and the database contains more than 6.5 million records. MINI MARC is offered by Library Systems & Services, Inc., and provides online access to the 1.5 million records in the Library of Congress MARC database. MARCIVE also markets MARC data and provides a variety of data conversion services. Still another example is the specialized database maintained by Blackwell North America. This database of 3.5 million records includes LC MARC, Canadian MARC, UK MARC, NUC cooperative cataloging, and original input by customer libraries. An expanded authority control system complements the database. These examples illustrate the range of

retrospective conversion services offered by the for-profit sector, and many other companies are marketing similar data conversion services.

The net result of all the disparate activity is the creation of a multiplicity of machine-readable record files for all types of library materials. Although records for monographs are the largest component, serial files constitute a major portion of the databases and the number of records for other formats, such as films, maps, or manuscripts, is increasing rapidly.

Although it is difficult to isolate statistics for retrospective conversion from the overall database growth statistics, at least a general picture of the current level of activity can be established. OCLC systemwide retrospective conversion statistics indicate that user libraries created 9,957,000 retrospective conversion updates in 1981/82 and 10,068,900 such records in 1982/83. RLIN statistics for the same two years are 39,848 and 92,921, respectively. Both statistics undercount, since some retrospective conversion activity was carried out in the regular cataloging function.[6] WLN estimates that 78 member libraries have converted approximately 4 million records since 1979. Although service centers have only recently offered special recon services, the level of current activity is significant. For example, SOLINET anticipates processing 800,000 retrospective conversions this fiscal year. Other contractually provided conversion services show a high level of activity. A case in point is the OCLC Retrospective Conversion Service, which processed 445,264 records in 1980/81, 661,953 records in 1981/82, and 1,130,180 records in 1982/83. In addition, retrospective conversion activity is flourishing at the state level. A common thread that underlies many of the statewide retrospective conversion projects is the development of a shared network system. These emerging networks range from statewide efforts, such as the Wisconsin network[7] serving most libraries in the state or C/W MARS[8] serving 26 public, academic, and special libraries in Western Massachusetts, to the Vermont network system, which will combine the catalogs of the University of Vermont, Middlebury College, and the State Library.

The combined level of retrospective conversion is difficult to quantify in terms of dollars spent. The overwhelming array of options for retrospective conversion, each with varying visible and hidden costs, makes it impossible to estimate aggregate expenditures for retrospective conversion. But it is evident that the amounts spent on retrospective conversion are enormous. Estimates for retrospective conversion using existing machine-readable records range from "75¢ to $2 per bibliographic record."[9] The average cost increases dramatically for original input and for editing of existing records according to national standards. Conversely, costs decrease significantly with the use of one of the MARC-based vendor systems.

Estimates of the number of projects are equally problematic. However, information available from bibliographic utilities, vendors, and service agencies, as well as from individual libraries, documents the dramatic rise in retrospective conversion in the last few years. OCLC reports 1,304 active retrospective conversion projects and the OCLC Retrospective Conversion Service has converted records for 82 libraries; similarly, a large percentage of the member libraries in RLG and WLN are engaged in retrospective conversion projects. The recent book by Ruth Carter and Scott Bruntjen on data conversion lists 100 projects, both ongoing and completed, in special and public libraries.[10] Taken together, the available data indicate that most libraries are either in the process of or are planning for conversion of their bibliographic files.

Moreover, evidence shows that a significant number of libraries have completed the retrospective conversion of their files. This number includes not only many special libraries, but also several medium-sized academic and public libraries. Among them are Pennsylvania State University, Texas A&M, Tucson Public Library, and the State Library of Ohio. An equally significant number of libraries anticipate the completion of their retrospective conversion projects in one or two years. A case in point is the current statewide effort in Wisconsin, which will result in the complete conversion of most libraries in the state.

The rapid increase in the number of machine-readable records has many benefits, but it also is plagued by serious growth problems. The

creation of large bibliographic files was not based on a shared sense of direction and purpose. Because of the development of a number of distinct databases, there is no single national bibliographic database. Many records are duplicated; others do not meet minimal level cataloging standards; still others are uneven in quality. Except for the LC MARC records, which are common to the three networks and many vendor applications, there is little sharing of records among these different databases. The dangers foreseen by Richard De Gennaro in 1970 have become a reality. He cautioned that the absence of a coordinated strategy would result in "the repetitive creation of expensive local conversion systems producing non-standard or sub-standard machine-readable entries."[11]

The problem of phenomenal growth in retrospective conversion lies in the fact that it is market-driven. In response to the growing demand for machine-readable records (a demand driven mainly by the growing popularity of online catalogs), retrospective conversion has become a booming business. While libraries can choose among an array of possible conversion strategies, the magnitude of the task and the urgency to convert narrow the choice to the most immediate, cost-effective method. As Henriette Avram noted, the library community is paying economically and bibliographically for this uncoordinated approach to retrospective conversion.[12]

IV. Progress and Challenges of Building a National Database

Several collective programs have demonstrated the advantages of coordination in retrospective conversion. The conversion of the major public libraries in Indiana provides one example. Others are the statewide projects in California, Florida, Massachusetts, and Vermont. An important effort is also the cooperative retrospective conversion projects of the Research Libraries Group. RLG has developed a coordinated program so that retrospective conversion in individual libraries can be integrated with membershipwide efforts to minimize the amount of duplicative work. Central to the RLG program is the "conversion of coherent, collection-based segments of catalogs."[13]

Still, the development of a nationwide program has remained an elusive goal. Once the early hopes for a coordinated, comprehensive strategy for retrospective conversion had been buried in the late 1970s, efforts focused on technological developments to lead the way toward building an effective nationwide bibliographic system. Currently, a number of important, new initiatives are under way. The most significant is the effort to link the major bibliographic utilities. The Linked Systems Project, supported by the Council on Library Resources, "is a joint effort undertaken by LC, RLIN, and WLN with the goal of building a communications link so that the users of one system can search the databases of the other system and records can be transferred among systems."[14] OCLC has indicated that it will make every effort to become part of this strategy. While there will be no overarching national database, the many separate databases are creating a de facto distributed network and linking technology would provide the means to achieve a national database "in a distributed mode."[15]

V. Future Trends in Retrospective Conversion

The outlook for linkage is guardedly optimistic, but numerous economic and political barriers must be removed before a linked network becomes a reality. Meanwhile, growth in the number of converted records continues. Projections on system use for OCLC and WLN suggest that member libraries will sustain and probably even accelerate the current level of retrospective conversion efforts. For the RLIN system, data on future activity indicate rapid expansion. A spring 1983 survey of RLG libraries provides estimates of planned retrospective conversion in member libraries: six libraries intend to undertake complete retrospective conversion of their collections in the next eight years, with 5,493,000 titles to be converted; sixteen libraries intend to undertake selective retrospective conversion of parts of the collection, with 2,862,500 titles to be converted; and no library intends not to undertake a significant retrospective conversion during the next eight years.

These statistics underscore two important factors: the enormous scope of retrospective conversion on the one hand, and the limits imposed on

retrospective conversion by the magnitude of the task in large research libraries on the other.

What is the future outlook? Although it is difficult to predict how fast the number of machine-readable records will grow in the next decade, it is evident that substantial expansion lies ahead. Current trends indicate a continued high demand for retrospective conversion for the next five to seven years. Three important factors suggest that retrospective conversion will continue to grow. First, the entry of small- and medium-sized libraries into the library automation market will result in a large number of relatively small conversion efforts that, in the aggregate, will create a substantial number of machine-readable records for local applications. Second, participation in statewide and regional resource-sharing networks will encourage retrospective conversion activity in college, school, and public libraries. Third, the pressures to automate will continue to fuel retrospective conversion projects in all research libraries. Faced with the enormous task of providing effective bibliographic access, the conversion of bibliographic records is the means to full-scale, collectionwide automation of library operations.

Where do these trends lead libraries? It is expected that this high level of activity will taper off in the late 1980s and that by 1990 all but the largest research libraries will have completed the retrospective conversion of their collections. This raises a number of crucial questions. What is the long-term impact of omitting significant national resource collections from the nationwide bibliographic system? What options exist for ensuring complete conversion? But the most important underlying issue is whether libraries can afford to continue ad hoc local strategies or whether a more structured and planned approach to retrospective conversion is needed. If, as seems likely, a structured approach is required, how can it be organized and implemented?

Before exploring these questions, it is useful to look at current approaches and proven strategies for retrospective conversion in greater detail.

PART TWO: OPTIONS FOR RETROSPECTIVE CONVERSION

VI. Major Approaches to Retrospective Conversion

As the momentum of retrospective conversion accelerated, the bibliographic utilities, regional and statewide networks, and for-profit providers expanded services for retrospective conversion. Libraries undertaking retrospective conversion projects now are faced with an overwhelming array of options, each with varying costs and constraints.

1. Description of retrospective conversion services of the bibliographic utilities.

The three bibliographic utilities offer the primary options for retrospective conversion in most academic and larger public libraries. While specific approaches vary among the bibliographic utilities, the basic strategy centers around the use of existing machine-readable records, which serve as the resource database for each library's retrospective conversion effort.

a) OCLC. The Online Computer Library Center offers two options. The first allows authorized libraries to process materials for retrospective conversion at reduced first-time update rates. At present, the OCLC rate per record (excluding additional network charges) is 25 cents for non-prime time (weekdays, 7-9 a.m. and 5-10 p.m. Eastern time; and weekends) and 90 cents for prime-time use. Although the hit rate will vary from library to library, general experience shows that larger libraries find 80 percent of the searched records and smaller libraries approach a 100 percent hit rate.

The second option is the OCLC Retrospective Conversion Service. This service is available to all libraries on an individual contract basis. OCLC converts directly from the contracting library's bibliographic files to full OCLC-MARC records through record-matching and creation of new records as necessary. Each library's project costs are determined by such factors as

type of record, language of the records, and amount of editing required. The cost per record to contracting libraries recently averaged $1.20.

Use of OCLC for retrospective conversion projects remains the most prevalent approach used by libraries, and retrospective conversion generates almost half of the Cataloging Subsystem activity in OCLC.

b) Research Libraries Group. Member libraries of RLG receive reduced rates for approved retrospective conversion projects during off-peak hours (before 8 a.m. and after 2 p.m. Pacific time). Rates are 13 cents for derivative, upgraded records and 48 cents for not-upgraded records. During peak times rates increase to 67 cents for derivative, upgraded records and to $2.39 for not-upgraded records.

While there is a significant discount for retrospective conversion projects using RLIN, the major strategy of the Research Libraries Group has been to seek foundation funding to support coordinated retrospective conversion projects. In general, funded projects emphasize the uniqueness and comprehensiveness of the collection to be converted. In addition, retrospective conversion to full level RLIN standards is encouraged.

c) Washington Library Network. WLN supports several types of retrospective conversion activity. The most prevalent approach is the use of the WLN Batch Retrospective Conversion Subsystem, which provides a low-cost method for matching a library's bibliographic records against the records in the WLN database. Rates are 21 cents for hits and 4 cents for non-hits. This service may now also be used by Pacific Northwest libraries that are not full members of WLN. While member libraries submit records primarily through WLN computer terminals, Recon-Only libraries enter recon records through microcomputer floppy diskettes. In addition, WLN enables member libraries to input minimum or "r" level records for non-matching titles. Records encoded "r" must include all access points conforming to authority standards, but the descriptive cataloging may be abbreviated. Finally, WLN has a contract with Carrollton Press for use of REMARC records as an additional resource file. Carrollton Press records will be upgraded to conform to WLN name and subject authority files before being added to the WLN database.

As in the case of the other two networks, retrospective conversion activity is high. Currently 78 libraries have ongoing retrospective conversion projects, and a number of libraries are considering the newly established "Recon by Microcomputer" service.

2. Description of efforts by regional and statewide networks.

In recent years regional and statewide networks have actively supported retrospective conversion efforts. These services differ in two important aspects from those provided by the bibliographic utilities. First, most regional and statewide systems include not only the major academic and public libraries in the region, but also support retrospective conversion in smaller academic, special, and public libraries. A case in point is WISCAT, the Wisconsin State Union Catalog. The database consists of the OCLC archive tape records of the 137 Wisconsin libraries on OCLC as well as records from locally developed systems. Small public and academic libraries, many school libraries, and other non-OCLC libraries use an intermediate microcomputer system to convert their bibliographic files.[16] The result is a statewide database that includes the bibliographic files of most Wisconsin libraries and that provides relatively inexpensive retrospective conversion for smaller libraries. A second important characteristic of the regional and statewide networks is their emphasis on regional or statewide resource sharing. In some cases, state funds are provided to support the retrospective conversion in participating libraries.

3. Description of Carrollton Press REMARC database.

Like many large machine-readable bibliographic databases, the REMARC file got its start as a by-product of a publication project, in this case the Carrollton Press project to publish the Cumulative Title Index to the Classified Collections of the Library of Congress (TLC), which serves as a title index to the Library of Congress records in the various editions of the National Union Catalog. The production of the TLC Index required converting to machine-readable form portions of each Library of Congress shelf list record. For 37 cents per record, Carrollton agreed to include a number of

data elements in addition to those required for the TLC project and to provide those records to the Library of Congress for use in LC's in-house system. This record charge only partially offsets the costs for the extra keying, but the possibility of marketing the 4.6-4.7 million record database to other libraries was the additional incentive for Carrollton to key the fuller bibliographic record needed for use in online catalogs and other library systems. REMARC, then, is retrospective MARC.

a) The REMARC record. Carrollton keys the shelf list records "as is" so the choice and form of entry, subject headings, punctuation conventions, etc., reflect the history of cataloging at LC. LC MARC tagging is provided by LC's format recognition program and some additional machine editing is provided by Carrollton Press staff in Berkeley. (See Appendix 1 for MARC fields not included in a REMARC record.)

b) Conversion methodology. Libraries contracting with Carrollton utilize Apple IIe or II+ microcomputers to create search keys in machine-readable form. The Apple diskettes are sent to the Carrollton office in Berkeley and then to the University of California, Division of Library Automation (with whom Carrollton has contracted for computing services), transferred to tape, and matched against the REMARC database on a quarterly basis. Carrollton charges 50 cents per hit and provides the Apples at no additional cost. REMARC records that match a library's search keys are extracted from the file, appended with local data and keys, written to tape, and sent to the library. Through a special arrangment with Blackwell North America, headings can be updated to the Library of Congress' most recent authority practices at a combined price of 56 cents per record. Because the REMARC database is still growing, the match processing will be repeated quarterly until the file is complete and the subscribing library has completed the keying for its records. At this writing, approximately 30 libraries are using the REMARC file for retrospective conversion.

4. Description of other vendor services.

While the creation of the REMARC database is the largest commercial retrospective conversion project, a growing number of other vendors have

become involved in converting bibliographic records to machine-readable form. The recent survey conducted for Knowledge Industries[17] identified more than 20 vendors in the field; many of these have entered the market only in the past few years. Frequently, vendors offer retrospective conversion services in conjunction with the installation of local circulation systems. The spectrum of services provided ranges from matching a library's bibliographic records against the MARC database to keyboarding and inputting MARC-compatible records. Most vendors offer several different methods for the conversion, and a key feature is the ability to custom-tailor the service to meet the needs of different libraries depending on the size of the libraries' bibliographic files and economic resources. By foregoing many of the other services provided by the bibliographic utilities, vendors can underprice the bibliographic utilities.[18] Not only do vendors offer substantial savings in converting records, but they also provide retrospective conversion services to libraries that currently do not belong to one of the bibliographic utilities. Many small public libraries and special libraries have chosen commercially available retrospective conversion services as part of the installation of their library information systems. While it is impossible to determine the exact number of records converted, it is clear that commercial retrospective conversion services are growing rapidly. The need of libraries for machine-readable bibliographic records is fueling this expanding market, and at the same time creates a growing number of local databases that are not linked to other systems.

VII. Library Strategies for Retrospective Conversion

The choice among these varying options is determined by a number of factors: cost,[19] staffing, time, and quality of the converted records. Given the centrality of retrospective conversion to the implementation of online catalogs, circulation systems, and other computerized applications, the planned and future uses of the records are a vital consideration. In choosing a strategy, every library must analyze a number of factors and evaluate the tradeoffs between several possible strategies for retrospective conversion.

In reviewing the three most prevalent methods for conversion, a number of advantages and disadvantages are evident.

1. In-house conversion with existing staff, using records in one of the bibliographic utilities.

This approach has been used successfully by a number of smaller libraries. Two prerequisites are membership in the bibliographic utility and a flexible, long-range timetable for completing the conversion. It has been suggested that this is a cost-effective strategy for libraries with fewer than 250,000 titles. The major advantages include:

a) The conversion can be done as staff time allows with no additional funding, training, equipment purchase, or space.

b) The staff is familiar with the special cataloging policies and procedures of the library and the converted records will meet the library's standards.

While these advantages make this technique attractive for small collections, larger libraries will experience major disadvantages, including:

a) The conversion will take a long time to complete, "and as the project drags on, both the quality of work and staff morale will suffer."[20]

b) The conversion strains not only staff resources but also entails many hidden costs. While the per record charge is low, total aggregate costs will increase, depending on the size of the collection.

c) Given the lower hit rate in all bibliographic utilities for older and foreign language materials, the conversion cannot be completed without additional original input.

On balance, experience suggests that this approach is cost beneficial primarily in smaller libraries and that larger libraries can only use this approach in conjunction with other conversion methods.

2. In-house conversion with project staff, using records in one of the bibliographic utilities.

To offset the disadvantages of the first method, a number of libraries have used specially hired student or clerical staff to work on retrospective conversion. The obvious benefits of this technique include:

a) Since the special staff is assigned to the project, progress will be faster, and the project can be completed (if sufficient staff is hired) within a specified period.

b) The workload of existing staff will not be affected, yet staff is available to deal with special formats and to resolve problems in interpreting library cataloging policies.

The overriding disadvantage of this technique is the high cost of hiring, training, and supervising the project staff. In addition, the costs for project terminals, network charges, and office equipment can be substantial. Still other disadvantages include the potential for high staff turnover and the difficulty of maintaining consistent quality in this production approach to retrospective conversion. Furthermore, dealing with original input can become a major problem for special project staff.

3. Contracting with an outside agency or vendor.

The range of options includes both on-site and off-site conversion as well as a number of specialized services. As noted earlier, retrospective conversion services are available from service centers, such as AMIGOS; from OCLC; and from a growing number of vendors. There are a number of advantages in this approach:

a) The costs, scope, and timetable for completion are contractually specified.

b) The impact on regular staff will be minimal.

c) The library can benefit from the experience of a vendor that has undertaken previous retrospective conversion projects.

On the negative side of this approach are once more the costs of the conversion project. Depending on the size of the project, the direct costs will be high. Another disadvantage is that quality control is more difficult. Of equal consequence is the inability in most commercial conversions to link these locally created records to the evolving national database.

Evaluating these alternative options is a time-consuming task. Most libraries involved in recon have found that the relative success of their projects is closely tied to a number of key decisions made early in the planning stage."[21] Among the initial decisions are whether to create full MARC records or to accept minimal or non-standard records; whether to undertake a partial or full retrospective conversion; and whether to undertake the conversion in-house or to select an outside agency or vendor. Frequently, a determining factor is economics, but costs should not be the only criterion in choosing a retrospective conversion method. Too often, the short-term savings provided by the cheapest method are counterbalanced by long-term problems. "The goal should not be to accomplish conversion as inexpensively as possible."[22] Rather, it should be to plan retrospective conversion within the context of present and future automated needs.

PART THREE: GENERAL ISSUES AND PROBLEMS IN RETROSPECTIVE CONVERSION

VIII. The Economics of Retrospective Conversion

One general concern that permeates the discussion of retrospective conversion is how libraries can allocate the necessary economic resources at a time when most library budgets are already severely strained. The costs of retrospective conversion are substantial to the library in terms of both one-time costs and future expenses. Not only must the library commit funds to support the conversion of records, but it must also invest substantial funds to maintain the records in computer-based systems. The one-time cost of retrospective conversion to the library will depend on many variables. Key factors include the size of the collection to be converted; the age or currency of the collection to be converted; the language mix of the collection; the degree of uniqueness of the collection; the amount of information desired in each record; and the completeness of existing library bibliographic records.[23] Depending on the specifics, retrospective conversion may require substantial sums, especially in large research libraries.

Although smaller libraries may be able to cover the costs of retrospective conversion from regular library budgets, most libraries must depend on external and institutional funding to underwrite the costs of retrospective conversion. Three important external sources are federal, state, and foundation funds.

Among federally funded library programs, the most significant source of funding for retrospective conversion has been the grants made under Title II-C of the Higher Education Act. Since the start of the program in 1978, $24,205,224, or approximately 70 percent of total funding, has been assigned to bibliographic control in research libraries. As indicated by the awards, retrospective conversion is a major priority of the program. Over the past

years, an ever-increasing portion of the funding has been assigned to bibliographic control, growing from 57 percent at the initiation of the program to 75 percent for the fiscal year 1983 awards.

An examination of the awards for retrospective conversion suggests a few generalizations. Most awards supported the preparation of machine-readable records using one of the three major bibliographic utilities. Most projects focused on unique research collections, and records for all types of materials were created, including serials, manuscripts, pamphlets, and monographs. While some projects resulted in extensive recataloging of materials to meet AACR2 standards, other projects aimed to use existing records without upgrading. Although it is impossible to determine the number of machine-readable records prepared with Title II-C funding, it is evident that the total number of original records is not large. While the funded projects enriched national bibliographic access, the projects were only a small beginning in addressing the needs for the retrospective conversion of scholarly materials in large research libraries. Equally important is the fact that most projects input records into only one utility, and the records created with Title II-C funds are not shared among the networks. Finally, the continued funding of this program is uncertain in light of the current efforts to cut federal spending.

While Title II-C has provided federal funds to research libraries, the Library Services and Construction Act (LSCA) program funds primarily public library projects. LSCA Title II funds have been used in some states to support retrospective conversion in public libraries. A case in point is the state of Indiana, where LSCA funds made possible retrospective conversion in the five largest public libraries.

Another important source of external funding is state funds. A number of states are engaged in building statewide bibliographic networks. To help libraries contribute their records to these networks, a number of states have provided public funds for retrospective conversion projects. For example, the state governments of Arizona, California, Florida, New York, and Tennessee

have underwritten retrospective conversion projects. The major characteristic of these state-supported retrospective conversion projects is the inclusion of the holdings of all types and sizes of libraries. Another important feature of these projects is the fact that retrospective conversion was the means for building a statewide database for resource sharing. As a result of state funds, a growing number of smaller public libraries, school libraries, and academic libraries have completed the conversion of most of their records to machine-readable form. As in the case of federal funding, the future availability of state funds for library projects is overshadowed by the current economic conditions of most state governments.

While federal and state funding has had a major impact, foundation funding has played a minor role in supporting retrospective conversion projects. Exceptions are the significant grants for retrospective conversion by the Pew Memorial Trust, the Andrew W. Mellon Foundation, and the Woods Charitable Fund. The thrust of most funded projects was the enrichment of the national database and the support of cooperative automation efforts. With some notable exceptions, few foundation grants have been made to individual libraries for retrospective conversion projects. The libraries that succeeded in obtaining foundation support primarily were awarded grants for innovations in library automated systems and only secondarily for retrospective conversion. While only a few individual libraries have succeeded in obtaining foundation grants for retrospective conversion projects, a number of cooperative efforts among groups of libraries have been funded. The Research Libraries Group has been awarded sizable grants for cooperative conversion projects. Currently, a number of other cooperative efforts are seeking foundation grants.

Although some libraries have benefited from external funding, it is evident that most libraries must seek institutional support to underwrite retrospective conversion projects. The economic reality is that libraries require substantial funding to prepare machine-readable records. For most

large research libraries, retrospective conversion is a long-term commitment that requires significant investments of funds over a number of years.

IX. The Quest for a National Database

It is useful to consider why, after more than two decades of planning, the goal of a consistent, comprehensive national database has not been accomplished. This question raises a number of crucial issues that affect feasible strategies for developing a comprehensive database for retrospective conversion. Although there may be differences in the specific definition, it is generally agreed that such a database has three basic characteristics: (a) each title is converted only once; (b) it includes in addition to "all of LC's cataloging, prospective and retrospective,"[24] the records of research libraries and many other libraries nationwide; and (c) each record meets agreed-upon standards.

In exploring the first goal -- one-time conversion of each title -- a number of advantages are evident. Foremost, such a strategy would eliminate duplication of effort and reduce costs of conversion to each library. Available evidence suggests that there is considerable overlap in the holdings of the larger research libraries. This was once more illustrated during the recent archive load project of the Research Libraries Group. The loading of approximately 3 million older machine-readable records resulted in only 1 million additional, unique records.[25] There is no question that a coordinated conversion strategy would result in significant savings. Equally important for consideration is the fact that the creation of duplicate records in the bibliographic utilities entails long-term costs related to the maintenance of online access to potentially little-used records.

Despite the advantages of converting each title only once, substantial duplication has occurred as libraries convert their bibliographic files in connection with the imminent installation of a circulation system, implementation of an online catalog, or participation in a regional network. The continued absence of an operating nationwide conversion program or plan, the

ongoing existence of a kind of "network anarchy," the urgency to undertake retrospective conversion without delay, and the pressures to find economically feasible methods have propelled libraries to pursue local strategies. Although the library community as a whole may pay a high price for duplication in the creation of machine-readable records, the costs are less visible on an individual library basis. As the number of recon vendors increased, and so drove down prices, local conversions not only became feasible but also economically advantageous to individual libraries. Another barrier is the continued expressed need of many libraries for custom-tailored records, which limits the opportunity for sharing records created by other libraries. The conclusion seems inescapable that economic forces alone will not ensure the development of a coordinated national database. The challenge lies in balancing local requirements against the substantial benefits of a coordinated approach to retrospective conversion.

The second important question relating to a national database is whether complete conversion is a feasible goal. Faced with the enormous task of meeting the information needs of the academic and scholarly community, the improvement of bibliographic access to library materials is the strongest driving force for complete conversion. Not only would the inclusion of all library holdings create a powerful research tool to assist scholars in locating needed materials, but it would also form the nucleus of statewide, regional, and nationwide resource sharing programs. Complete conversion is also of enormous benefit to each library and provides the machine-readable records needed for local applications of library systems.

While complete conversion is a highly desirable goal, the potential costs to libraries are substantial. Large research libraries remain the major sources of scholarly resources, but these libraries collectively hold millions of yet unconverted records. The primary reason for the partial conversion of research collections is unquestionably economic. Arrayed against the goal of complete conversion is the reality of retrospective conversion of millions of older, unique records. Not only will these records frequently require signif-

icant editing prior to conversion to machine-readable form, but they will also involve extensive and expensive authority work. Furthermore, many of these records are in foreign languages and present difficult cataloging problems. The intractability of the economics of retrospective conversion in large research libraries will continue unless a coordinated approach is found.

The development of a coordinated, consistent national database "comes up squarely against the problems of standards, uniformity, and compatibility"[26] of records, and one general theme that can be traced through the discussion of retrospective conversion is that of cataloging standards.

There is a wide range of opinion on the subject of standards. To some degree, the differing needs of libraries are reflected in the discussions. "Standards fall into three basic categories: (1) those relating to content, (2) those relating to record structure and format, and (3) those relating to data transfer."[27] Records that comply with the current cataloging rules and authority requirements as well as contain all the necessary data elements of the appropriate MARC format are considered full standard records. A major goal in preparing a standard record is to allow use of the record by a number of libraries. Another goal is to enhance bibliographic access. Most librarians would agree that these benefits are substantial, but there are considerable costs involved in creating a full standard record. Many libraries, especially smaller special and public libraries, are not convinced that full standard records are required for local applications, such as circulation systems. Other libraries, in the rush to convert, have chosen to take shortcuts rather than bear the costs of creating quality records. Still other libraries continue local cataloging practices, which create non-standard records.

While creating non-standard records provides short-term savings, "many libraries have learned through expensive and painful experience that it does not pay to settle for anything less than full MARC records in retrospective conversion projects. They have also learned that it is prohibitively expensive to upgrade to full MARC short records."[26] Still, the use of non-

standard records for retrospective conversion remains a barrier to effective sharing of machine-readable records.

What is the impact of the failure to develop a national database for retrospective conversion? Unlike library automation in general, retrospective conversion has not galvanized attention and the long-term implications of the present unsystematic approach to retrospective conversion have been too frequently neglected. Yet there are clear dangers in the present rush to convert. In the absence of a national program or plan, each library has approached retrospective conversion independently, choosing from among an array of options: working alone, as a member of a regional or national bibliographic network, or with various commercial enterprises. Not all options are open to all libraries. Compromises between quality and completeness of records and cost, and between long-term goals and short-term expediency, are evident in almost every project. Issues relating to name and subject headings and authorities have been ignored as often as they have been carefully dealt with. Unfortunately, a great many of the converted records do not have general utility; the libraries have different objectives, and the converted records have different levels of quality and completeness. As a national effort, the current approach has several shortcomings:

1. Converted records are not shared among the three bibliographic utilities and are not available nationally to all other libraries.

2. Records are not converted at consistent levels of quality and completeness; record quality is determined by the objectives of the inputting library.

3. Records are not checked to assure that current cataloging practices and policies are followed.

4. Authority work on the headings is frequently not performed, thereby limiting the utility of the records.

5. Records are not maintained; there is no process for ensuring the currency of records.

6. Lack of availability of records for older, foreign language materials presents significant barriers to effective bibliographic access, both regionally and nationally.

7. Lack of comparative or even detailed cost data makes it difficult to evaluate different options for converting records.

The failure to develop a national database is a major factor contributing to the present unsystematic approach to retrospective conversion. Currently, the primary forces shaping the rapid growth in the number of converted records comprise local decisions by individual libraries. But it is precisely the absence of adequate mechanisms for coordinating retrospective conversion efforts of individual libraries that perpetuates current problems. In the present state of flux in library networks, and in the absence of an operating national retrospective conversion program, each library, to meet its own needs and those of the scholars it serves, must commit more and more resources in order to cope with the inadequate national bibliographic system. Greater coordination and a structured and planned approach to retrospective conversion are needed.

PART FOUR: NEW INITIATIVES

X. Toward a National Strategy for Retrospective Conversion

The preceding sections have reviewed the chief features of the present predicament and discussed some of the past efforts to develop a national strategy for retrospective conversion. The disparity between the enormous momentum of retrospective conversion projects at the local library level and the slowness of framing a nationwide strategy raises the question of whether it is too late to develop a major coordinated approach. Although there have been only a limited number of smaller coordinated programs, their success suggests that substantial benefits can be gained by a collective approach to retrospective conversion. Equally important is the fact that there is a growing consensus on the need for more systematic retrospective conversion and that there is widespread support for new initiatives.

Still the challenge remains: What options exist today for a coordinated, integrated, and compatible approach to retrospective conversion?

Despite widespread recognition of the problems of retrospective conversion, it is far easier to achieve agreement on the abstract goal to improve bibliographic access than on the actual strategy to develop effective programs. Five distinct though related approaches have been identified. Each option represents different strategic choices and has different ramifications.

The five strategic alternatives are:

Option 1. ESTABLISHMENT OF A CENTRAL AGENCY TO COORDINATE RETROSPECTIVE CONVERSION. This first option would involve the establishment of a central agency to develop a coordinated program to convert bibliographic records. The model envisioned is a public corporation that would facilitate planning, organizing, financing, evaluating, and coordinating systematic retrospective conversion. A nonprofit corporation would not have an adverse

impact on current federal library services and would not operate any part of the bibliographic networks.[29]

The advantages of a central agency are manifold:

a) A central agency would establish objectives and plans for shaping a national strategy for retrospective conversion;

b) It would assist in establishing coordinated programs, work toward the implementation of standards, and assist in establishing interconnections between the networks;

c) It would coordinate the allocation of funds to support retrospective conversion; and

d) It would assist libraries in planning retrospective conversion projects.

On the negative side are:

a) The realization that despite repeated efforts, no progress has been achieved in establishing such an agency; and

b) The funding of such an agency has so far proven to be an intractable problem.

Even if it were possible to establish such an agency, it is not clear that this option is either desirable or cost effective. Moreover, it is apparent that it will be difficult if not impossible to achieve.

Option 2. THE ESTABLISHMENT OF A CENTRAL DATA RESOURCE FILE FOR PRE-LC MARC RECORDS. A second option considers the establishment of a resource database of converted records for use by libraries. The primary source for the database would be the REMARC file. The potential role of REMARC as a resource file to support the retrospective conversion of library catalogs can only be outlined within a particular set of goals or values, and these will vary depending on the size, mission, and resources of the library planning a conversion project. From the perspective of this paper, the nation's libraries need a very large, Library of Congress-based file with records sufficiently full to support online catalog applications and with name access points in AACR2 form (or, at least, not in conflict with AACR2 forms of

heading). An additional requirement is a conversion methodology that is efficient and cost effective.

The advantages of using REMARC as a resource file include:

a) REMARC is based on LC cataloging and, when completed, will include a large portion of the foreign language records needed by the nation's research libraries.

b) The REMARC conversion methodology permits a library to enter "keys" into a microcomputer without interaction and with a minimum of time spent in the keying process. Keyers require much less bibliographic training than that required for the online search and capture of records from a bibliographic utility.

c) Using microcomputers frees a library from tying up terminals on which it may also be doing current cataloging.

d) Because REMARC records are based on LC cataloging, records could be converted without the review of individual records. Unless the library's cataloging represents access to specialized collections, it is rarely profitable to spend time evaluating differences between LC and local cataloging, and it is likely that the evaluation would not have been done had the LC cataloging been available at the time the library was doing its original cataloging.

Disadvantages of the REMARC approach include the following:

a) Headings on REMARC records are not in AACR2 form.

b) REMARC records are slightly less full than a full standard MARC record (see Appendix 1), particularly in the case of non-Roman records.

c) The magnitude of the error rate in REMARC records is not known. The number and kind of tagging and keying errors that could seriously impinge on the usefulness of the file still need to be determined.

There are a number of questions about the use of the REMARC file that should be answered before its role in a national strategy for retrospective conversion can be evaluated. While the size, source and method of accessing

the database have much to recommend the REMARC strategy, further evaluation of the REMARC file is needed and would require at least the following:

a) Explore financial arrangement for Carrollton Press to use the LC Name Authority file to upgrade headings on REMARC records to AACR2 form to the extent that this can be accomplished with machine manipulation.

b) Perform a quality analysis of the data represented in the REMARC records that would affect retrievability -- that is, miskeying or miscoding in the access fields -- so that (1) libraries can incorporate this information into the selection of a conversion option and (2) it would be possible to weigh the advantages and disadvantages of using REMARC as a central resource file.

c) Perform studies in several different library environments in order to determine the cost of different conversion methodologies, specifically to compare the cost of using REMARC and one or more of the bibliographic utilities to determine whether the method of entering "keys" on the first pass through the source file is more cost effective than the searching and capturing of records online. The cost studies must include explicit guidelines for editing records retrieved under each conversion methodology.

Option 3. THE UNIVERSITY OF CHICAGO AND THE LIBRARY OF CONGRESS PROJECT FOR RETROSPECTIVE CONVERSION. The third option considers the expansion of the University of Chicago Library and the Library of Congress cooperative project for retrospective conversion of bibliographic and authority records. Online communication facilities for input and update of bibliographic and authority data have been established between Chicago and the Library of Congress. The project is testing the feasibility of research libraries other than LC contributing directly to the LC/MARC database while maintaining LC's bibliographic standards.

The bibliographic records are converted to the standards of the Library of Congress for choice of entry and form of subject and nonsubject access points. The quality and completeness of the bibliographic records are

ensured by transcribing from the most complete and up-to-date records from LC files. Records are searched both online and in LC's card files by project staff and are updated to reflect current name and subject practice of LC. The converted records are made available nationally to all libraries through the LC/MARC tape distribution service. In addition, the records are maintained permanently by LC, and any records that are subsequently changed or updated are redistributed through LC/MARC.

Authority records are created for all entries that are not already represented in the LC name authority database, or that are in the database but not coded for current LC practice. Necessary links are made within the LC database to support LC's authority structure, and authority records are connected with related bibliographic records in the database.

The project has demonstrated that it is possible for another library to enter records into the Library of Congress database and authority structure and to maintain a steady rate of entry with consistent standards of quality. Establishment of policies, procedures, and standards was difficult and time consuming, but provides a useful and necessary basis for future related activities. Staff training and production quality control are also areas where the development and experience of this project can be useful in other similar activities.

For libraries, the values of this approach to retrospective conversion include:

a) The authority work is done once, up front, and not deferred to be done over and over again by individual libraries (the costs of authority work are frequently not included in cost data for retrospective conversion, but for any given record the authority work may be the highest cost component, and authority control is required for online catalogs that can replace card catalogs);

b) The authority work enhances the nation's supply of authenticated authority records in national distribution; and

c) National distribution makes the records available to all networks and all libraries. Through time, the quality of data available to the nation's libraries could be greatly improved if other research

libraries could undertake retrospective conversion projects in this manner.

The difficulties with this approach are:

a) It seems unlikely that the Library of Congress would assume a greatly expanded role as the host system for a large number of libraries. The Linked Systems Project offers the potential that the networks could play, in part, the host role and provide the interface between libraries and LC.

b) The cost per package (i.e., the converted bibliographic record and all associated authority records) is comparatively high for the producing library, but not out of line for the level, quality, and usefulness of the products for the nation.

In any case, such an expanded effort could only be possible with a nationally coordinated program and national funding sufficient to support the additional costs of authority work, telecommunications, and substantially increased participation of the Library of Congress.

Option 4. RECORD SHARING BETWEEN BIBLIOGRAPHIC UTILITIES TO ALLOW ACCESS TO ALL AVAILABLE RECORDS. This option stresses that open access with an agreed-upon pricing structure should be given high priority to allow users of one bibliographic utility to search the database of another utility and to transfer records from that utility to their own. By necessity this would be an evolutionary process. In the short term, libraries belonging to one utility would agree to tape load converted records. In the long term, system-to-system linkages of the three major utilities -- OCLC, RLIN, and WLN -- would be established. "Linkage and governance would develop through group contractual and mutual agreements, with the first group setting the precedent for subsequent groups and with the growth of governance arrangements occurring as more groups participate."[30]

The advantages of this approach include:

a) It builds on recognition that there will be several databases that make up the national bibliographic database;

b) It results in access to the major files of machine-readable records;

c) It allows for wide participation by all types of libraries; and

d) It maintains local autonomy and decision-making.

The aim would be to achieve a nationwide network that allows open access to existing records and evolves over time. The negative aspects of this approach center around three concerns:

a) Without widely accepted standards, the present lack of common standards and consistency of records would continue, to the detriment of libraries and scholars.

b) While the technical processes for tape loading and linkage are available, it is evident that major economic and political barriers must be removed before actual implementation will occur. The problems of compensation for use of records by members of another utility need careful consideration.

c) Finally, reliance on an evolutionary process continues the present unsystematic conversion, which will omit or delay entry of significant research materials.

Although much progress has been made to overcome the technical problems, a number of key decisions must be made before record sharing becomes a reality. Equally important is the recognition that linkages will not solve all aspects of the retrospective conversion problem.

Option 5. PLANNED, COORDINATED PROGRAM BY THE MAJOR RESEARCH LIBRARIES AND THE LIBRARY OF CONGRESS. The fifth approach acknowledges the benefits of system-to-system record sharing, but calls for a more systematic, collective approach. To meet the needs for effective retrospective conversion, a coordinated effort by the major research libraries, the Library of Congress, and the bibliographic utilities is required. This option stresses the necessity for a planned, systematic program to convert collections of national significance and for making the converted records available to all libraries. The coordinated approach demonstrates significant advantages, including:

a) It recognizes the crucial role of research libraries and the Library of Congress in a national program;

b) It results in the creation of records that meet agreed-upon standards;

c) It distributes the workload and makes possible cost reductions through interinstitutional collaboration; and

d) It is a gradual process that can be modified and improved as experience indicates.

At the same time, it is evident that a collective approach raises a number of key issues, including:

a) The organizational complexity of administering the project and of establishing priorities poses many challenges;

b) The process of creating original input for specialized collections may require external funding;

c) Implementation will affect the bibliographic utilities and will require regular mechanisms for shared access to bibliographic records;

d) The complexity of and need for establishing a compensation system for the use of records require careful attention; and

e) Problems of standards, uniformity, and compatibility must be resolved.

Implementation of a coordinated program for retrospective conversion will not be easy. Outside funding and adjustments in local library retrospective conversion programs are clearly needed for such a program to succeed. Many questions concerning the criteria for selecting collection-focused projects and the most efficient ways for coordinating projects are yet to be answered. A difficult problem will be to avoid duplication between the major utilities. Moreover, care must be taken to address the question of standards and to establish agreed-upon cataloging levels. Still, the inescapable conclusion is that a coordinated approach to retrospective conversion is essential. Such a program will not only improve bibliographic access to scholarly materials but will also serve as a basis for strengthened cooperation among libraries.

XI. Recommendations for a Coordinated National Strategy

If libraries now and in the future are to provide effective access to the vast but distributed resources in their collections, they must begin to work toward a planned, coordinated approach for retrospective conversion. Despite the diversity of goals to be addressed in a national strategy for retrospective conversion and the manifold ramifications of specific strategies, at least the initial steps should be taken now. The necessary first step is to chart the broad directions for a national strategy for retrospective conversion. Central to such a strategy are the following key recommendations:

Recommendation 1. RESEARCH LIBRARIES SHOULD TAKE PRIMARY RESPONSIBILITY FOR WORKING WITH THE LIBRARY OF CONGRESS AND THE BIBLIOGRAPHIC UTILITIES TO DEVELOP A COORDINATED PROGRAM FOR RETROSPECTIVE CONVERSION.

The analysis of current efforts indicates that research libraries have the greatest needs and will not be able to fully convert their collections without a coordinated program. Moreover, research libraries hold a large percentage of scholarly materials, and the retrospective conversion of these will make the greatest contribution to scholarship.

Specifically, the Association of Research Libraries (ARL) Committee on Bibliographic Control, which includes membership from a number of research libraries as well as from the Library of Congress, should work with other appropriate groups -- such as Research Libraries Group committees and the OCLC Research Libraries Advisory Committee -- to develop a coordinated program for retrospective conversion.

Recommendation 2. RESEARCH LIBRARIES AND THE LIBRARY OF CONGRESS SHOULD ESTABLISH PRIORITIES FOR CONVERTING SPECIFIC SUBJECT COLLECTIONS.

The development of a coordinated program by research libraries and the Library of Congress to convert subject collections is vital. While the specific subject collections should be identified by the participating libraries, the National Collections Inventory[31] could aid in decisionmaking.

To facilitate the implementation process, a model pilot project should be undertaken. Recently, a group of music librarians submitted a proposal for a cooperative conversion project for printed music. Initial attention should focus on evaluating the feasibility of adopting the music proposal as the pilot project. The goal should be to establish needed information on cooperative decisionmaking, operating complexities, staffing requirements, comparative costs, and different data conversion methods.

Recommendation 3. OPEN ACCESS TO CONVERTED RECORDS SHOULD BE PROVIDED BY THE BIBLIOGRAPHIC UTILITIES.

One of the critical needs is effective access to machine-readable records that are already available or that are being created. Tape loading, in the short term, and system-to-system linkages, in the long term, should provide the needed mechanisms. Equitable compensation for the cost of exchanging bibliographic records may be a necessary part of record sharing.

As a first step, the three bibliographic utilities should agree to send tapes of the records created through cooperative projects to the Library of Congress. The Library of Congress should provide the interim linkage and distribute the tapes through the LC MARC tape distribution service.

Recommendation 4. THE IMPLEMENTATION OF THE LINKED SYSTEMS PROJECT SHOULD BE GIVEN HIGH PRIORITY.

Given the centrality of system-to-system linkages to the development of a national database, efforts to implement the technical links between the major bibliographic utilities are critical to the success of effective access to bibliographic data on a national scale. The Council on Library Resources' Bibliographic Service Development Program has made significant progress toward the development of a comprehensive, nationwide bibliographic system and should provide the institutional framework for working toward linkages among the bibliographic utilities.

Recommendation 5. AGREED-UPON STANDARDS FOR RETROSPECTIVE CONVERSION SHOULD BE ADOPTED TO FACILITATE RECORD SHARING.

The creation of full MARC records is the most desirable approach and ensures quality and completeness of the converted records. To that end, initial attention should focus on acceptance of existing standards for record content and format for cooperative retrospective conversion projects.

Recommendation 6. A MULTI-YEAR FUND-RAISING PLAN SHOULD BE DEVELOPED TO PROVIDE SUPPORT FOR THE RETROSPECTIVE CONVERSION OF SPECIFIC SUBJECT COLLECTIONS.

Such a financial plan will involve participation by universities, foundations, and the federal government. One potential source of funding could be HEA Title II-C.

XII. Implementation Strategy

The above recommendations create the overall framework for new initiatives in retrospective conversion. The central aim is the development of a coordinated program by research libraries and the Library of Congress with clearly defined goals and sufficient funding to carry out the systematic retrospective conversion over a period of five to ten years.

To promote implementation of these recommendations, the following sequence of initial tasks is suggested:

Task 1. Review of the Report and Recommendations.

The Council on Library Resources should arrange a meeting for academic librarians and representatives from the Library of Congress and from the three major bibliographic utilities to discuss a nationwide strategy for retrospective conversion. The primary purpose of the meeting would be to determine which recommendations should get initial attention; to identify groups who should assume responsibility for working toward implementation; to establish a strategy for stimulating action by the research libraries, the Library of Congress, and the bibliographic utilities; and to formulate a plan for identifying funding needs and sources of potential financial support.

The target date for task 1 is August 1, 1984.

Task 2. Implementation of a Pilot Project.

The purpose of the pilot project would be to develop a model for a collection-focused retrospective conversion project among a group of research libraries.

The pilot project would focus on answering several of the underlying questions central to the success of a coordinated, nationwide strategy. The questions include: How can existing records be shared? What are the costs of creating full MARC records? What organizational support and effort are needed to coordinate retrospective conversion among a group of libraries? What is the optimum conversion methodology?

Ongoing evaluation would monitor progress, determine required changes in project design, and assess the impact and value of the coordinated strategy.

The target date for beginning task 2 is December 1, 1984.

Task 3. Establishment of Organizational Support and Governance Structure.

The ARL Committee on Bibliographic Control, working with appropriate groups, research libraries, the Library of Congress, and the bibliographic utilities, should develop and formulate priorities for coordinated, collection-focused retrospective conversion projects. The main focus would be to establish the needed organizational and governance requirements to facilitate the integration and coordination of local retrospective conversion projects on a nationwide basis. A corollary effort would be to assist research libraries in obtaining the financial resources required for the conversion of national resource collections.

The target date for task 3 is January 1, 1985.

By necessity, implementation will take time and will be a dynamic process. The specific strategies to shape coordinated retrospective conversion projects will evolve and change as the national program progresses and

matures. Although the problems of retrospective conversion cannot be solved all at once, this is certainly the time to begin to work toward a more systematic, structured program. In order to create movement toward achieving this goal, the above strategy outlines initial steps and suggests target dates for implementation.

NOTES

1. Lou Wetherbee, "Planning a Retrospective Conversion Project," in Association of Research Libraries, Office of Management Studies, Systems and Procedures Exchange, Retrospective Conversion, SPEC Kit, no. 65 (Washington, D.C., 1982), 30.

2. RECON Working Task Force, Conversion of Retrospective Catalog Records to Machine-Readable Form (Washington, D.C.: Library of Congress, 1969), 11.

3. RECON Working Task Force, Conversion, 121.

4. Richard De Gennaro, "Libraries & Networks in Transition: Problems and Prospects for the 1980's," Library Journal 106 (May 15, 1981): 1047.

5. The AMIGOS Bibliographic Council is a not-for-profit library consortium of 256 libraries in the southwestern United States and Mexico, with the goal of providing bibliographic and other library services to member libraries. AMIGOS has been offering retrospective conversion services to OCLC libraries since 1978 through the Shared Resource System (SHARES). SHARES utilizes the AMIGOS archival tapes for its database. AMIGOS expects to add records to the database, which currently contains 1.3 million records.

6. SOLINET is a nonprofit organization of over 300 libraries in the Southeast. SOLINET initiated specialized retrospective conversion services in March 1980. SOLINET uses its LAMDA online system for retrospective conversion and offers a variety of recon services, including newly organized SOLINET in-house conversion teams.

7. A unique feature of the Wisconsin effort is the availability of a special recon system to assist smaller libraries. Information Transform, Inc., and the Wisconsin Department of Public Instruction developed MITINET/retro as a joint project. The system is intended to support retrospective conversion for small- and medium-sized school, public, academic, and special libraries that do not have access to bibliographic networks. To use the system, libraries require access to an Apple microcomputer, the MITINET/retro software, and a custom-edition COM microfiche catalog of more than 1,100,000 LC MARC titles or an existing COM union catalog.

8. Kate Paranya, "C/W MARS: Automated Resource Sharing in Massachusetts," Technicalities 3, no. 5 (May 1983): 6-8.

9. Deanna Marcum and Richard Boss, "Information Technology," Wilson Library Bulletin 56, no. 10 (June 1982): 765.

10. Ruth C. Carter and Scott Bruntjen, Data Conversion (White Plains, N.Y.: Knowledge Industry Publications, 1983).

11. Richard De Gennaro, "National Bibliographic Data Base in Machine-Readable Form: Progress and Prospects," Library Trends 18 (April 1970): 541.

12. Henriette D. Avram, "Whatever Became of the National Database?" Library Quarterly 53 (1983): 277.

13. "Recon in RLIN," Operations Update 25 (March 1984): 4.

14. Avram, "Whatever Became of the National Database?", 275.

15. Avram, "Whatever Became of the National Database?", 277.

16. Brian Aveney and Sally Drew, "Automated Resource Sharing: Wisconsin Spreads Its Nets," Wilson Library Bulletin 57 (May 1983): 742-46.

17. Carter and Bruntjen, "Data Conversion," 151-59.

18. For example, the recent report on a data conversion project in four Idaho public libraries with MARCIVE gave a cost of 14 to 17 cents per record. Library Hotline 13, no. 9 (March 5, 1984): 5.

19. The basic steps necessary for estimating costs of a retrospective conversion project are discussed in: Stephen H. Peters and Douglas J. Butler, "A Cost Model for Retrospective Conversion Alternatives," Library Resources & Technical Services 28, no. 2 (April/June 1984): 149-62.

20. Carter and Bruntjen, "Data Conversion," 78.

21. Association of Research Libraries, Retrospective Conversion, 1.

22. Peters and Butler, "A Cost Model for Retrospective Conversion Alternatives," 162.

23. Brett Butler, Brian Aveney, and William Scholz, "The Conversion of Manual Catalogs to Collection Data Bases," Library Technology Reports 14 (March-April 1978): 109-206.

24. Avram, "Whatever Became of the National Database?", 269.

25. The Research Libraries Group, Inc., Press Release, August 12, 1983.

26. RECON Working Task Force, National Aspects of Creating and Using MARC/RECON Records, ed. John C. Rather and Henriette D. Avram (Washington, D.C.: Library of Congress, 1973), 34.

27. Velma Veneziano, "Library Automation," Annual Review of Information Science and Technology 15 (1981): 117.

28. De Gennaro, "Libraries & Networks in Transition," 1048.

29. A Nationwide Network: Development, Governance, Support, discussion paper resulting from a meeting held by the Library of Congress Network Advisory Committee, October 1-2, 1980 (Washington, D.C.: Library of Congress, 1981), 5-6.

30. A Nationwide Network, 6.

31. The Association of Research Libraries' National Collections Inventory Project is a cooperative effort that will involve the major research libraries of North America. Using the methodology and tools developed by the Research Libraries Group, the goal of the project is to build an online inventory of significant research collection strengths in North America. The inventory would provide the capability to link collection strengths to recon priorities, within libraries as well as regionally or nationally. (See also Appendix 2.)

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APPENDICES

APPENDIX 1

The following MARC fields are either incomplete or lacking in REMARC records:

008-2	Conference publication
008-3	Festschrift
008-11	Fiction
020	ISBN (rarely available for these records)
082	Dewey call no.
086	Superintendent of Documents no.
245$b&$c	Title--The $b is usually not included and the $c (statement of responsibility) was not keyed.
260	Imprint--Only the first place and publisher is keyed.
300	For the first several months of the project the collation was not keyed and a dummy " p. cm." was supplied by machine in those records. Since that time, full collation statements have been keyed.
350	Price
4XX	Traced series which include "His," "Hers," or "Its" are not tagged in the 8XX fields and the indicators are set in the 4XX fields so that the main entry is provided for the series.
490	Untraced series.
500	Used only to record the fact that the record was originally in a nonroman alphabet and that the record has been abbreviated, i.e., the 245 is fully transliterated, but the 250 and 260 are not transliterated and therefore only partially keyed.
8XX	Series added entries that would be tagged as 4XX are shifted to the 8XX fields. Series added entries normally tagged as 8XX are included in the 8XX fields.

APPENDIX 2

NATIONAL COLLECTIONS INVENTORY PROJECT
A BRIEF DESCRIPTION*

The Association of Research Libraries, working with the Research Libraries Group, Inc. began the National Collections Inventory Project in July of 1983 as a cooperative effort intended eventually to involve research libraries throughout North America. The project's long-term goal is to develop an on-line North American inventory of research collections which can assist scholars in locating materials needed to support their research. It is also hoped that the inventory will assist libraries by supporting the coordinated management of national research collections and by helping to determine shared responsibilities for maintaining these vital resources.

The development of a national inventory of research collections is the cornerstone of a national cooperative effort, and through this overview of specific collection strengths, librarians and scholars will gain enormous benefits. The inventory will:

-- help assure national coverage and the identification of lacunae;

-- serve as the basis for distribution of responsibility for collecting, cataloging, and preserving materials, both nationally and regionally;

-- serve as an interlibrary loan and public service referral tool, again both nationally and regionally;

-- provide a consistent tool for the development of institutional collection policies;

-- serve as a communication device for indicating changes in collection development policies, locally, regionally and nationally;

-- provide the capability to link collection policy to processing and preservation priorities, within institutions as well as regionally or nationally;

-- provide information for determination of national, regional, and local needs in relation to possible fund-raising activities; and

-- stimulate changes in the way librarians and their clients think about cooperation.

Central to this effort is the expansion of the RLG Conspectus On-line into a national database of information about existing collection levels and current collection policies for all research libraries. This inventory of research libraries' collecting patterns is arranged by broad subject divisions within the framework of the Library of Congress classification and uses detailed subject descriptors. Libraries undertaking the assessments of their collections assign standard codes to characterize their collections and to indicate the language coverage. After bibliographers have completed the assessments, the results are reported on standard worksheets. The final step is the entering of each participating library's data into the Conspectus collections of most RLG libraries and the Library of Congress and is available through the Research Libraries Information Network.

The Project, which is being managed by ARL's Office of Management Studies, has three phases. The first, which was funded by the Council on Library Resources, Inc., ran from July 1, 1983 - December 31, 1983, and included the development of a detailed manual which includes technical instructions for bibliographers, as well as an approach to organizing and implementing the inventory project in individual libraries. Training resources and methodologies for library staff were also developed during this phase as was a clearinghouse for standardized validation studies. Finally, during this initial phase, ARL and RLG developed guidelines, procedures, and a pricing structure for adding data to the Conspectus database.

The second phase of the project will run through calendar year 1984 and is funded by the Lilly Endowment. This phase will include tests and further development of the materials designed during Phase I to the point where they can be applied in libraries throughout North America. Pilot test libraries are those at the University of Notre Dame, Indiana University, and Purdue University. These diverse ARL libraries provide an opportunity to not only test the manual and training resources, but also to test approaches to statewide coordinated collection development. Bibliographers in the test libraries will complete collection assessments for selected divisions of the Conspectus, compare results among the libraries, and develop procedures for cooperative decision-making. This phase will also include the development of a methodology for identifying specialized collections in other libraries in Indiana and including those collections in the inventory.

The third phase, beginning in January 1985, will consist of implementing NCIP throughout North America. Planning procedures, manuals, training, and supporting documentation will be made available to the library community by the Office of Management Studies, which will also provide, through its consultant program, skilled librarians to assist research libraries in undertaking the assessments of their collections.

The implementation of the National Collections Inventory Project can have great significance for scholars and research libraries. It will make possible on-line access to information about existing collection strengths and current collecting intensities in research libraries, thus laying the foundation for effective planning and action in coordinated collection development and resource sharing.

*This description of the National Collections Inventory Project was prepared by the Office of Management Studies of the Association of Research Libraries.