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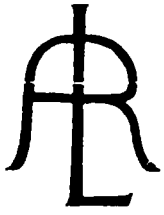
ABSTRACT

At the meeting of the Association of Research Libraries in Chicago, the principal program element focused on the future of card catalogs, a topic of special concern to large research libraries, whose catalogs are becoming cumbersome, expensive to maintain, and complicated by changes in cataloging rules. Papers by William Welsh and John Rather of the Library of Congress were prepared in advance of the meeting and distributed to a group of panelists whose reactions were followed by discussions from the floor. Concerns and possible resolutions were discussed from the viewpoints of the Library of Congress and of large research libraries. This volume provides a transcript of the meeting. (Author/SL)

THE FUTURE OF CARD CATALOGS

Report of a program sponsored by the
Association of Research Libraries

January 18, 1975



ASSOCIATION OF RESEARCH LIBRARIES

APRIL 1975

FOREWORD

When the Association of Research Libraries met in Chicago for its Eighty-fifth Membership Meeting on January 18, 1975, the principal program element focussed on the future of card catalogs, a topic of fundamental concern to libraries of all types, but especially to large research libraries. Papers by William Welsh and John Rather of the Library of Congress were prepared in advance of the meeting and distributed to a group of panelists whose reactions were followed by discussion from the floor.

The program was an obvious success. The papers that formed the basis for discussion were of outstanding quality and value; the several prepared responses were thoughtful and provocative; and discussion was lively and candid. Immediately following the session it was suggested to the ARL officers and staff that the transcript of the program be edited as promptly as possible and brought out as a separate publication. That suggestion met with enthusiastic approval and this publication is the result.

Program participants edited the transcript of their remarks for accuracy, after which Suzanne Frankie, Assistant Director of the ARL, did final editing and prepared the text for publication. In due course the record of the meeting will appear again in the rightful place among the published Minutes of the Eighty-fifth Meeting of the ARL. Meanwhile, we are pleased to be able to make available in this form a record of the discussion of an important topic -- one that may profoundly affect the future performance of libraries.

To all who helped to bring this issue before us - to Joseph Rosenthal for the original idea, to Richard Dougherty and Hugh Atkinson who developed and extended the concept, to William Welsh and John Rather for their position papers, to moderator and panelists - we express our appreciation for their collective efforts to illuminate a complex subject.

John P. McDonald
Executive Director
Association of Research Libraries

April 1975

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THE FUTURE OF CARD CATALOGS

Introduction

RALPH H. HOPP (University of Minnesota): Almost from the beginning of its organization, the Association of Research Libraries has had an intense interest in the bibliographic record of the holdings of libraries. At its 1936 meeting, 39 years ago, Harvie Branscomb, then librarian at Duke University, suggested the possibility of obtaining a printed catalog of the contents of the Library of Congress. To quote from the Minutes of that meeting: "This problem was the principal topic of discussion at the meeting, which was a long and varied one." As a matter of fact, a review of many of the concerns have surfaced in previous ARL discussions.

Because of the several letters from ARL members expressing the desire for ARL to explore the issues involved in closing card catalogs, the Board of Directors proposed establishing a Task Force on the Future of Card Catalogs. Members of that Task Force are Hugh Atkinson, Richard De Gennaro, William Welsh and Joseph Rosenthal, Chairman.

In appointing the Task Force, we suggested that a report be prepared for our consideration by the January, 1975 meeting. This meeting this morning is an outgrowth of the work of that Task Force. I am pleased to acknowledge that the ARL Vice President, Richard De Gennaro, has kindly consented to planning this morning's program, and I am now going to turn the meeting over to him.

* * * *

RICHARD DE GENNARO: We librarians have always been concerned about the growth of our catalogs, but this concern has been particularly acute ever since Fremont Rider dropped his bombshell on the library world in 1940 and announced his findings that research libraries grow at an exponential rate and tend to double in size every 16 years. Using the Yale Library as his example, he said that by a series of successive doublings, it would by the year 2040 have 200,000,000 volumes and that its card catalog (if it then had a card catalog) would have nearly 750,000 catalog drawers which would occupy eight acres of floor space. New material would be coming in at the rate of 12,000,000 volumes a year and would require a staff of over 6,000 persons to catalog it.

The key phrase there was "if it then had a card catalog." Yale probably will not have a card catalog by then, or if it does, it will certainly not be a continuation of the present one, and it will not occupy eight acres of floor space. Something has got to give, and within the next decade or so, not only at Yale, but in all the large research libraries. The New York Public Library has already closed its card catalog and started a new computer-based continuation in book form.

The Library of Congress is seriously considering various alternative ways of closing its catalogs, as you will hear shortly. By 1979 the main catalog at LC will contain 22,000,000 cards and the Official Catalog about 26,000,000 cards, and they will be growing at the rate of nearly one million cards a year. Clearly LC is going to have to do something in the next few years, and whatever it does will have very serious consequences for all libraries. We are going to have to learn about the various alternatives and options that are open to us, and soon we are going to have to make some very critical decisions about our own catalogs. This is why we selected this subject for our program -- to help you prepare for these changes that are coming. In the area of card catalogs, the future has almost arrived.

We are very fortunate to have as speakers and panelists a few of the principal actors in this impending drama, along with a few critics and enthusiasts. In the interests of brevity and since you know most of them anyway, I will dispense with formal introductions and merely identify the characters here on the stage in the order of their appearance and say a word about their roles in the program.

Joseph Rosenthal is Chairman of the ARL Task Force on the Future of Card Catalogs, Associate University Librarian at Berkeley, and formerly Chief of the Processing Department at New York Public Library, in which capacity he played a key role in making and implementing the decision to close the NYPL's catalog and to continue it with a computer-based book catalog system. He will lead off with a brief introduction to the subject.

William Welsh, Director of the Processing Department at the Library of Congress, will give some history and background on the problem facing LC and its long range plans and concerns in this area.

John Rather, Chief of LC's Technical Processes Research Office, will summarize the contents of his paper [See Appendix A], outline LC's alternatives and tentative plans, and discuss how they might affect other libraries.

Following a brief intermission Joseph Rosenthal and Mrs. Judith Corin, who is Assistant University Librarian for Planning at UCLA, will discuss the various problems and possibilities of two large research libraries that have already embarked on a serious consideration of alternatives.

All of this will be followed by a reactor panel and a discussion period. Members of the panel include: Rutherford Rogers, who, in addition to having to worry about the 8,000 acres of catalog cards that are coming to Yale by the year 2040, is a member of the Universal Bibliographical Control Committee. Basil Stuart-Stubbs is interested and actively involved in planning for the future of his catalog at the University of British Columbia, and will give us a view from Canada. Paul Fasana is Chief of the Preparation Division at New York Public Library, and before that he was head of systems development at Columbia. Our last panelist is Hugh Atkinson, and those of you who do not know that Hugh is going to close his catalog at Ohio State on the 4th of July, 1976, come hell or high water, have been very inattentive at these meetings.

Joseph Rosenthal and Richard Dougherty were the ones who initially suggested that ARL should have a Task Force on the Future of Catalogs.

Each of the panelists will have about five or ten minutes to make a statement, and then the floor will be open for questions and discussion until we adjourn at 12:30.

Joseph Rosenthal will be our first speaker.

* * * *

JOSEPH A. ROSENTHAL: My interest in library catalogs -- past, present, and future -- is long standing. Thoughts about the future focussed about a year and a half ago when I prepared a very short paper in an attempt to pose some questions with regard to the Library of Congress plans. That paper [see Appendix C] outlined some considerations of the consequences of the steadily increasing size of our catalogs. John Rather, in the paper which has been distributed to all of us [see Appendix A], has developed those consequences and implications. My short paper of May, 1973, attempted to raise some questions about the consequences of LC action in this area and to ask for an announced decision by the Library of Congress. We were interested at that time in whether the Library of Congress would continue its policy of superimposition -- of keeping certain rules that were not in accord with the Anglo-American Cataloging Rules, and in what LC might do about filing rules, about the continuance of its own back catalogs, and a number of other matters.

Even in the brief interval since mid-1973, the problems arising from and associated with card catalogs have demanded an increasing share of our attention. What we are discussing today is not simply a question of closing the card catalogs, but of how we want bibliographic access to function in the future. In considering this larger question we need to consider our future actions and products and their relationship to what we have done in the past. We need to try to plan for the most effective use of available technology. We increasingly realize that we must spend our available resources wisely and effectively, not simply as individual libraries, but as a library community.

To review very briefly a few factors that are pertinent to all of this and with which I am sure you are all familiar -- factors that affect and relate to the question of the future of catalogs -- I would like to first mention budgetary constraints. Many of us operate with a stable budget, and all of us operate with a budget which we feel is quite limited. Many of us desire to spend more of our available resources in both absolute and relative terms on innovative public services and resources, including the machine-readable data bases that are becoming available, in comparison to the amount now expended for technical services. In a very short time there has been a very rapid increase not only in the utilization, but also the input by our libraries of bibliographical data in machine-readable form. There has been greatly increased emphasis on network involvement.

I think a lot of us realize more sharply than ever the inadequacy of our existing catalogs. For example, we find at Berkeley that certain materials are inadequately represented in our catalogs; we do not give our users enough access to on-order information, to in-process information, to information about Berkeley dissertations; we find that there are many monographs in series that we do not have fully represented in our catalogs.

We are also dissatisfied with the speed in which bibliographical information appears in our catalogs. We think subject heading structure and subject access is inadequate. The data that we do produce or receive from other sources and display in our catalogs is not as distributable as we would like. We do not give enough information about our total holdings to library units on our campus. We do not give enough information as rapidly as we would like, to other libraries with which we cooperate, in both an interlibrary loan sense and in more intensive involvements.

Another factor to consider in all of this is that we are increasingly dependent. We have hitched our wagons to the Library of Congress star. We depend on Library of Congress cataloging, on Library of Congress catalogs, on Library of Congress data bases, the MARC data base (for both monographs and serials), and other products such as the commendable new publications Monographic Series and Library of Congress Name Headings with References. Many more of us than before are following more closely the Library of Congress policy and practice in bibliographical matters, and we are more consciously explicit about doing this.

Nevertheless, we are ingrates. We are not only dissatisfied with the Library of Congress, but with the Library of Congress as an expression of change. The Library of Congress cannot be held responsible for many of the factors inducing change, and yet, the results are made evident through the Library of Congress and its products which we all receive and use. We are dissatisfied with the delay with which the Library of Congress distributes data. For those of us utilizing machine-readable data -- and there are more and more of us -- the scope of MARC coverage is insufficient. The subject headings to which I alluded before are unsatisfactory, especially for those of our units and clientele which constitute special libraries -- the branch libraries, the libraries of particular subject interest.

We find that it is very difficult and costly to receive and to incorporate changes in bibliographical data as the Library of Congress issues those changes, or as the Library of Congress catalogs differently something that we have already cataloged. In particular, we find it difficult to keep up with subject heading changes, with entry (especially corporate author) changes, with changes in serial data, and with major changes in cataloging policies or rules such as the ISBD for monographs and dropping of Rules 98 and 99 in the AACR.

Some of our difficulties, in my opinion, relate to the occurence of bibliographical or bibliothecal activities at a number of levels, and the imperfect communication and coordination among these various levels. This is particularly true in matters of bibliographic control and access; we in North

American research and large public libraries are acutely aware of this. There are, I believe, at least five identifiable levels: 1) there is an international level: the level of IFLA, of ISO, and of the multipartite formulation and issuance of the Anglo-American Cataloging Rules; 2) there is the national level: that of the three national libraries and the work in which the ALA Descriptive Catalog Committee and the Catalog Code Revision Committee is engaged; 3) there is the emerging regional level, the regional organizations which are primarily focused on machine-readable bibliographical data bases such as the OCLC and NELINET. Also there are the regional organizations which are concerned not only with the control and the distribution of bibliographic data, but with other matters as well, such as the Research Libraries Group, SLICE, the libraries in the University of California system, SUNY, the Indiana consortium, MIDLNET, etc.; 4) there is the level of the individual library, particularly our research libraries; and finally 5) there is the level of the units within a large research university or research library or even a large public library system -- units which frequently engage in bibliographical activity of their own. The relationship among these levels is very difficult and poses a number of problems for the future of bibliographical access and catalogs.

* * * *

THE VIEW FROM THE LIBRARY OF CONGRESS

WILLIAM J. WELSH: Judging from some of the comments made to me l you this morning before the program began, which suggested I am a bury the catalog, I am seriously tempted to begin by saying, "Dea but, of course, I am not going to do that. I am going to give yo of the problem, and I am most fortunate that I follow Ralph Hopp De Gennaro, because Ralph told about the first discussion of the and Richard talked about Fremont Rider's concern in 1944, so in t one-upmanship, I am going to begin with 1897.

The reason I am providing this history is an attempt to put in the perspective that I think it deserves. It is not a new pro been a problem for the Library of Congress since 1897, and it wil unless we collectively recognize that there is a problem and then find a way to resolve it.

The Early History

The card catalog became a problem for the Library of Congres beginning of the modern era. Here is how the Librarian's Annual 1925 described the situation at the turn of the century:

> When the reading room was opened to the public in 1897 catalogue (on large manuscript cards) was inside the central ence desk in drawers below the circular counter, where it wa inaccessible to readers, and wholly without room for growth. was the only place for a catalogue provided in the building The building lacked and still lacks any space in the vicinit reading room that could be converted into suitable quarters public card catalogue of any mentionable size. Apparently t possibility of meeting the situation lay in displacing a few desks and installing modern equipment adequate for immediate Before the year 1900 six of the readers' desks were removed dictionary card catalogue containing 90,000 cards had been i in the space thus obtained.

During the next 25 years the dramatic growth of the catalog be a matter of concern. Even studies of the optimum thickness of cards in 1905 took note of the fact that a thinner stock would tak less space. The decision to prefer a heavier stock because of its handling quality was, of course, an important factor in determini the catalog was destined to occupy.

In the Annual Report of 1916, we read that: "The expansion card catalogue is a subject of concern requiring immediate attenti to show the befuddling nature of the problem, the report goes on my favorite examples of administrative obfuscation to say: "Limit bility of provision for immediate necessity suggests consideration mining a fixed policy." No wonder there was difficulty in coming with this problem!

By 1925, when the public catalog was growing at the rate of 160,000 cards a year, the shortage of space had become really acute because further expansion could only be at the expense of accommodations for readers. After assessing the relative merits of card and book catalogs, the Annual Report asserted that: "Beyond dispute card catalogues are extravagant consumers of both time and space." Then, for the first time, it was suggested that at least parts of the catalog be closed:

> A practical way out of the difficulty will probably be reached by printing in book form large portions of the card catalogue (subject groups or country groups or accession-period groups) and removing from the public catalogue the corresponding card entries. The card catalogue will, of course, be continued for all later accessions to such groups until the annual accumulation of about 160,000 new cards make the printing of supplementary volumes desirable.

But this forward-looking idea came to little because in the next two years it was decided to add 1,344 trays, thereby displacing 16 readers' desks and two reserved tables, reducing the reading room space for readers to exactly 75 percent of its original capacity. And the growth continued unabated so that by 1936 the catalog had to be expanded into the East Room adjoining the Reading Room.

Since this was not a long-range solution to the problem, it comes as no surprise to read in the 1944 Annual Report that:

> An inevitable consequence of the work already accomplished in recording the Library's collections has been the growth of the Library's catalogues and, in particular, the growth of the Public Catalogue. This Catalogue, which on April 1, 1942, contained 5,925,000 cards, had grown by June 30, 1944 to include an additional three-quarters of a million cards. Such a rate of growth threatens the efficiency of a tool, the mere size and complexity of which may well interfere with its usefulness.

The 1950's

Even apart from the size of the catalog, its condition was a matter of concern because its defects (misfiled cards, worn and illegible cards, inconsistencies, lacunae) impaired its usefulness. In 1952, Sumner Spalding, then Chief of the Catalog Maintenance Division, prepared a detailed study describing the imperfections of the Main Catalog (as it was now called) and proposing that it be edited concurrently with the Official Catalog. This effort was estimated to require 68 man-years at a cost of nearly $725,000. Not surprisingly, the project failed to win strong administrative support.

Of course, this proposal did not address the question of the growth of the catalog, but it was not long before the problem was met head on. In 1955, Seymour Lubetzky, then Consultant on Bibliographic and Cataloging Policy, outlined a program for the future development of the Library of Congress general catalogs. Although his recommendations marked a considerable departure from the traditional form of catalog organization, they had been partly foreshadowed

by the 1925 proposal. Specifically, Lubetzky recommended:

1) Division of the catalog into name/title and topical subject components.

2) Subdivision of the topical subject file into two parts by imprint date (before 1951, and 1951 and after) with the intention of publishing the older part in book form; although maintained on cards, the newer part was to be replaced periodically by published book form supplements.

3) Eventually, division of the name/title catalog and issuance in book form according to similar criteria.

4) Abandonment of the Annex Catalog, which had been established in 1938, but never fully developed. The outline of these proposals did not include estimates of either the costs or the time required to accomplish them, but it hardly mattered, because the time for these ideas had not yet come and they did not surface again for many years.

The 1960's

More than ten years passed before the idea of a retrospective Library of Congress subject catalog in book form was revived. In 1967, it was estimated that the cost of preparing such a publication would be a minimum of $720,000 and that, with normal staffing, the job would take five years. For a variety of reasons, however, this topic was not raised for discussion at the top administrative level at this time.

Still the problem refused to go away and at the end of 1968 a paper on the crisis in the card catalogs, prepared by Stephen Salmon, then Assistant Director for Processing Services, analyzed their shortcomings and made recommendations that combined those of the earlier Spalding and Lubetzky reports. This time something happened. Early in 1969 the Official Catalog was divided into name/title and topical subject components and later that year the Annex Catalog was closed. However, the Main Catalog remained in its original dictionary form.

The effects of superimposition had begun to cause concern and within the Processing Department there was renewed discussion of such possibilities as freezing the catalog and starting a new card catalog on new principles, freezing the past and depending on machine-readable records in the future, or somehow combining these approaches. Various documents prepared in the Department reviewed the status of the card catalogs, enumerated the problems of maintaining them and suggested alternatives for solving and alleviating them. The merits and demerits of unified and segmented catalogs were analyzed in terms of various functional requirements, and various types of display of cataloging data were assessed in terms of flexibility, cost, durability, space, ease of duplication, and browsing.

Again, however, no consensus could be reached within the Library. The Reference Department, which is responsible for the Library's reader and

reference services, did not find in any of the proposals adequate insurance for the optimum continuance of these services and for the protection of the needs of current and future research. It proposed the upgrading of the present catalog as a serious alternative. In effect, the Reference Department took the position that, in view of the lack of any convincing proposal, "the chronological or topical division of the public catalog...would be a serious disservice to the public and unacceptable to our reference divisions."

It is worth noting that, in an effort to broaden the forum for consideration of this problem, I proposed at the June 1969 meeting of the Technical Services Directors of Large Research Libraries that it be discussed at the next midwinter meeting. Some interesting points were raised at that time, but afterward there was little or no response to my request that members of the group write to me about problems and suggest dates for freezing the Library of Congress catalogs.

The 1970's

In view of the difficulty of securing a consensus in the Library on solutions to the problems of the card catalogs, the Processing Department made only intermittent attempts to revive the issue in the next several years. One of the most extensive statements of the problems and possible solutions is embodied in the 1972 paper that was distributed to you before this meeting. [The paper referred to here is included as Appendix A.] It reached the following conclusions:

1) Revision of Library of Congress subject headings cannot be carried out in the framework of the present Main Catalog; closing at least the subject component is a mandatory condition for their improvement.

2) A case can be made for maintaining an open-ended name/title catalog by using the linked-heading technique to introduce changes with the hope that its effect on the texture of the catalog is not too adverse.

3) Adoption of a new filing arrangement is possible only for components of the catalog that have been closed, because the cost of refiling the existing catalog is too great.

4) A case can be made for the proposition that subject catalogs and bibliographies are best organized on the basis of defined time periods. Thus, consideration could be given to dividing the Library of Congress subject catalog in card form by ten-year periods.

5) Chronological division of the name catalog would not reduce the cost of establishing new names if the old file must be taken into account.

6) Loss of benefits of a unified catalog could be offset by the advantages of the new one.

7) A cut-off date by cataloging date is preferable from an administrative and operational viewpoint.

8) None of the proposed alternatives is specifically directed to the improvement of the physical and editorial condition of the present catalog, but chronological division of the catalog would make the old part more amenable to efforts to achieve those objectives.

At the time the 1972 paper was prepared, the prospects for early automation of the catalog did not appear very bright; it seemed that many years would elapse before all current catalog records would be converted to MARC form as they were produced. Moreover, the RECON studies had made it clear that large-scale conversion of retrospective records was not a realistic possibility. Nevertheless, the Reference Department felt that no decision on the fate of the card catalog could be made until there was a Library commitment to the extension of MARC to all current cataloging. The Reference Department generally held that automation offered the greatest promise for resolving the problems of bibliographic control, at least on a current basis. So, once more, active discussion was suspended.

Then, just this past year, the prospects began to improve and the likelihood of a complete, current, on-line catalog by 1979 or 1980 now seems quite strong. This led to the formulation of a new approach that John Rather will describe in his presentation.

I am pleased to tell you that this approach has elicited favorable reaction from the Reference Department, although there is a natural disposition to wait and see whether the promise of automation will indeed be fulfilled. This favorable reaction is also premised on further study and discussion of the future of the old catalog, which is the means of access to the existing collections of the Library, and on an adequate supporting reference structure. Thus, we seem to have a basis for planning the future of Library of Congress catalog control in a way that will at last resolve a problem that, in one form or another, has troubled the Library for nearly three-quarters of a century.

* * * * *

JOHN C. RATHER: Somebody, speaking no doubt from bitter experience, said a card catalog is a place where bibliographic records get lost alphabetically. So as not to get lost in this presentation, I am going to try to give you an overview of some problems that are endemic to card catalogs before getting to the substance of our present thinking.

I am not going to review the paper that has been distributed to you. [The paper referred to here is included as Appendix B.] There are many aspects of this problem that could be discussed, but it appears to me that the one that is really central to all of our concerns has to do with the strong probability that we will, in fact, have fairly complete machine-readable data bases in the foreseeable future. When we do have those data bases, will it be feasible to continue to maintain a dual system, and if we cannot maintain a dual system, what relationship should exist between the machine data base and the existing card catalog?

There are lots of things that could be said about what the machine system would be like, or what you would do with the old catalog if you had closed it off, but, interesting as those topics are, I will not get into them at this point. No doubt some of these questions will surface in the reactor panel, so let us concentrate on the central problem.

In my whimsical remark, I referred to the card catalog as a place, but that is not quite right. Strictly speaking, the card catalog is a living organism and, as a living organism, it is subject to growth, to change and to deterioration.

Let us look a little bit at how this has worked in terms of the Library of Congress card catalogs.

[Figure 1] shows graphically the rapid growth of the Library of Congress catalogs over the period for which we have fairly accurate figures about their size -- that is, from approximately 1942 until 1974 with a projection to that magical date of 1984.

In 1944, the Main Catalog contained about 5.0 million cards. Today, it has 18.3 million cards, so it is more than three times bigger than it was 30 years ago. Interestingly enough, to show the perils of predicting growth, in 1955, Seymour Lubetzky thought it would take until 1978 to reach the figure that we reached on June 30th last year.

The growth of the Official Catalog has been similarly dramatic. In its first recorded period, it had about seven million cards, and today it has in excess of 21 million cards. It is a larger catalog because it contains various types of catalog control records (name authority cards, series treatment cards) and records for certain types of materials that are not represented in the Main Catalog. Included are such things, for example, as cards for music which are available to the public in the catalog of the Music Division, but are not included in the Main Catalog itself.

You see in Figure 1 a very sharply ascending growth line nothwithstanding the fact that this is plotted on semi-log paper. There is no indication that, at the present rate of cataloging, the growth will tend to taper off. If this is so, we can predict that in another 20 years the catalog will have doubled in size, which is not a nice thought.

The thing about growth, you know, is that the catalog is a little like the camel with its nose in the tent. A useful beast no doubt but, on a cold night, he has a way of elbowing the Bedouin out in the open because he is so big and smelly.

It is perfectly obvious that growth has very serious effects on the quality of the catalog. As the catalog grows in size, it becomes increasingly less amenable to change. There are many people, mostly those who have not much to do with the maintenance of catalogs, who are unaware of the rate at which they change. Figure 2 shows some material from a study of changes in Library of

FIGURE I

GROWTH OF THE LIBRARY OF CONGRESS CATALOGS, 1942-1984

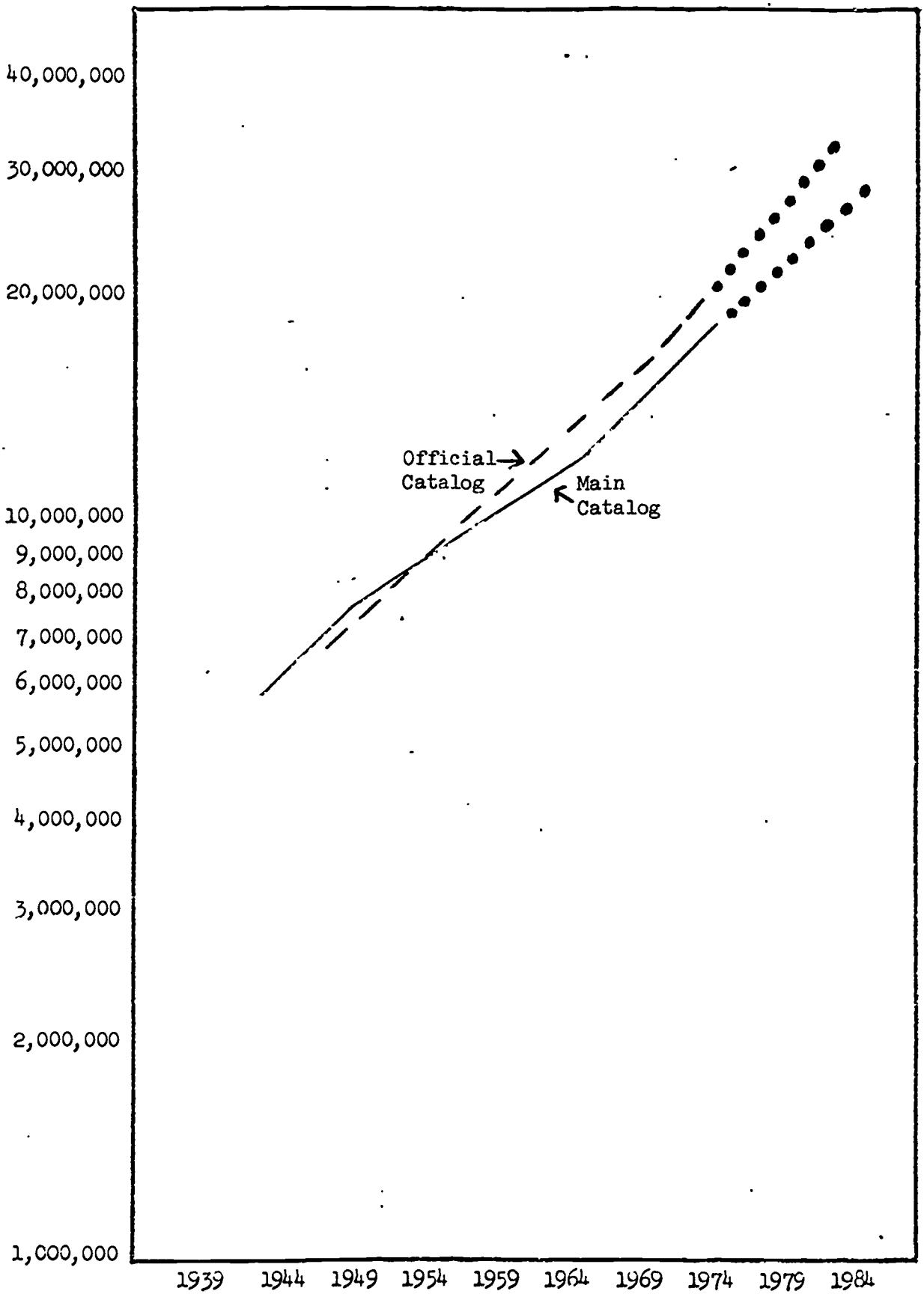
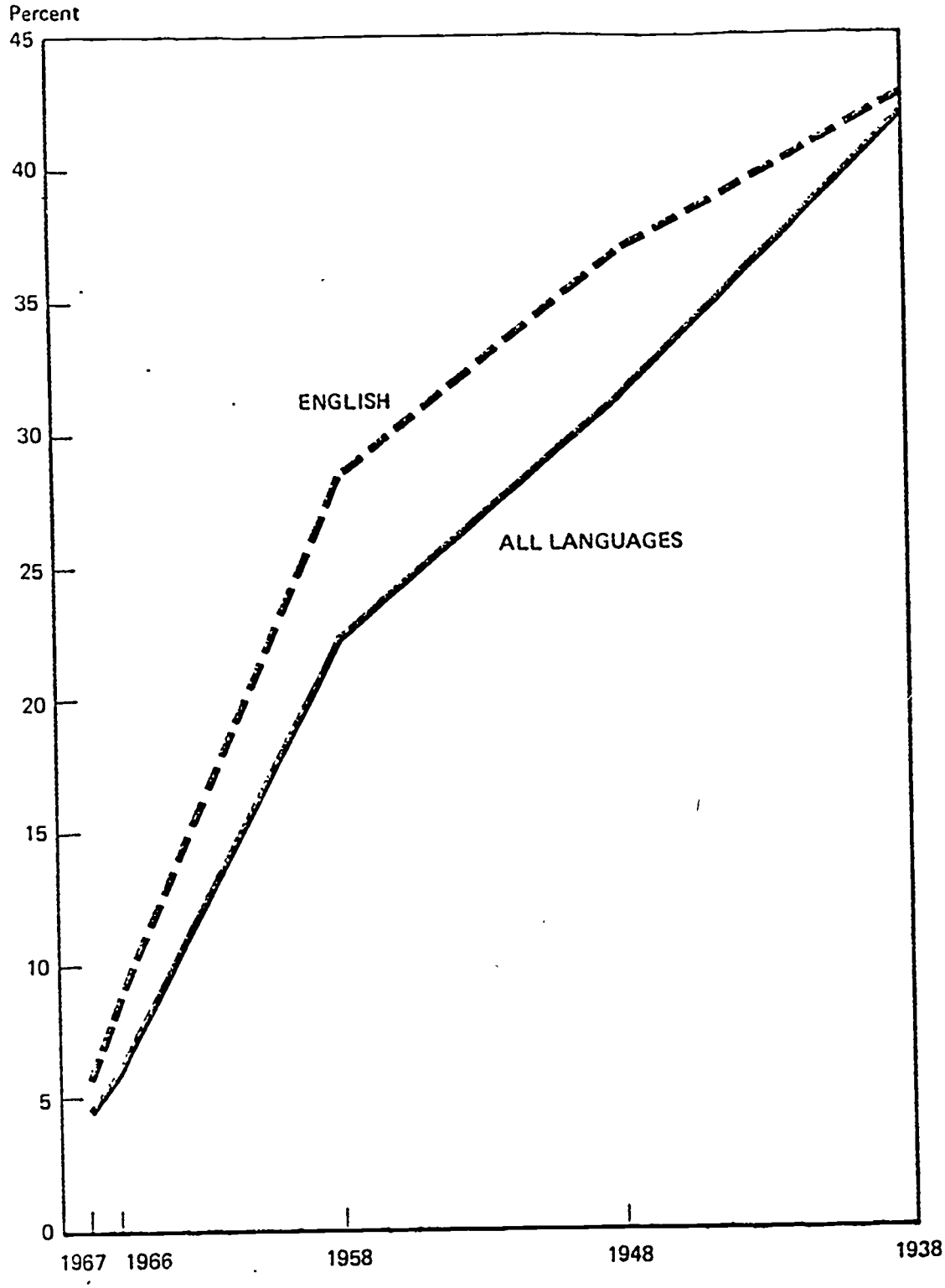


FIGURE 2

PERCENTAGE OF CHANGE IN FIVE SAMPLES
OF LC PRINTED CARDS



Excerpted from RECON Working Task Force. Conversion of Retrospective Records to Machine-Readable Form. Washington, Library of Congress, 1969. p. [146]

Congress printed cards. This was done with a series of samples of printed cards of different dates, and the rise in percentage of change going from left to right shows what happened five years after the cards were printed, ten years, 20 years, etc. Again you see a sharply ascending line.

This figure is from an analysis that we did about the time of the first RECON study. It separates English from other languages because the MARC pilot project was then limited to the English-language records. What we have here is the evidence that change continues as long as the card catalog remains alive. At the end of a 30-year period in this particular study 40 percent of the oldest cards had been changed at least once during their lifetime. This was a comprehensive study of change. It should not be confused with matters so drastic as changes in form of headings. It encompassed any type of change, but, as you may have judged from remarks you heard earlier, changes in subject headings were a fruitful source of these statistics.

Change is not attributable merely to the correction of outright errors. To a large extent, it is a consequence of the activity of the law givers, who are bent on evolving the perfect cataloging code; the do-gooders, who bleed for somebody; and just the general gadfly, who tells you, "Don't you know that, on the basis of scholarly opinion, this cannot possibly be the right birthdate?"

Now the problem of deterioration is evident to anyone who has dealt with an old catalog. You see the worn and smudged cards. This does have a positive benefit. A good many years ago Nathaniel Goodrich did one of the pioneering studies of catalog use and published his results in an article called "Top Soil," because he based the analysis of use on the cleanliness of the cards or, to be more exact, the lack of cleanliness. Clearly, the ones that were smudged had been used. So you see, we get positive benefits from deterioration. Unfortunately, as the fingers of generations rub over penciled call numbers, the wear does tend to have an adverse effect on retrieving books.

I have attempted to show in Figure 3 a matrix that examines methods of effecting cataloging changes. I will go over it carefully, so do not assume that you must comprehend it at a glance. Basically, this table relates to rule changes that alter the filing forms of name or subject headings. It is not an analysis of what one does to cope with ISBD(M), ISBD(S), or things of that sort. Furthermore, the change is assumed to be limited to those cases where a new work involves an entity that already has an outmoded heading. It is not realistic to apply a new set of cataloging rules, however marvelous they may be, to dormant headings, so to that extent the catalog will always be a reflection of the past. It is important also to realize that new rules do not automatically make all old headings obsolete. So, when we talk about the effect of new rules on the card catalog, we must remember that we are talking only about a subset of the old headings to be used in current cataloging.

Basically, there are five methods of making catalog changes set forth in this matrix. The revision of old entries is the usual Library of Congress practice. This has traditionally involved reprinting the cards so that you have complete wiping out of the past and a neat representation of the brave

FIGURE 3

EVALUATION OF METHODS OF EFFECTING CATALOGING CHANGES

Method	Compatibility with new rules	Consistency of entries	Dispersion of entries	Cost
Revision of old entries	Yes	Yes	No	$$$$$
Relocation of old entries	Yes	No	No	$$$$
Superimposition	No	Yes	No	$
Linked headings	Yes	No	Yes	$$
New catalog	Yes	No	Yes	$$$

new world. It can be, of course, done by hand, but that is a matter for an individual library to determine.

The second method of relocation of entries is sometimes called the guide-card technique. In this one, you simply move the old entries with the old form of heading to the location of the new heading and trust that a guide card will make everything completely clear. Of course, this entails very severe problems in file management. If an old entry is removed from the catalog, a filer must somehow recognize that this old heading, no matter what it really says, belongs someplace else, and interfile it under the new form. Nevertheless, relocation of old entries is a technique that has been used in libraries. At the Air University some years ago, guide cards were used instead of writing the subject headings at the top of the card, so they were in a fine position to adopt new subject headings because they only had to change the guide card.

Superimposition hardly needs any introduction. It is a policy of simply continuing to use old headings where they exist without making any change in them at all. The new rules are applied only to brand-new headings.

The linked-heading technique says that for new entries you will use the new headings and provide a reference to the place where the old entries under the old heading will be found and vice versa. Yale University apparently has done this for many years with subject headings, so that both the old and new forms co-exist in the catalog with the entries that are appropriate to them. The new catalog, of cource, is a positive way of saying closing the old catalog.

The first column considers the compatability with the new rules, and basically, it attempts to answer the question: Are all headings used in current cataloging compatible with the rules? Clearly, if you revise the entries, the answer is yes, and similarly with relocation. Indeed, it is only superimposition that does not guarantee a new form of heading for a new entry. This first column might be dedicated to the law givers, who want to see everything very neatly laid out. Of course, obviously the "no" opposite superimposition is an offense to all they hold dear.

The column on consistency responds to the question: When a heading is changed, are headings used on old entries consistent with those on new entries? Clearly, if you revise the old entries, the answer must be "yes," but if you merely relocate them as in the guide-card technique, it stands to reason that the old entries still have the same old headings on them, or at least, they have them to the extent that they may only be corrected by pencil, if that is possible. So that if you were in the business of supplying copies of such entries, they would be quite inconsistent.

Whatever the other drawbacks of superimposition may be, it gives you consistent entries. Good or bad, the heading is the same on all of the entries to which it applies. But in the linked-heading technique and in the new-catalog technique again you have a cleavage between the present and future and the past, because the old entries remain unchanged.

The column on dispersion of entries addresses a question of vital concern to reference librarians: When a heading is changed, is it necessary to search in more than one place to see all of the entries? And you see that, in the first three methods, the answer is "no," because by one means or another all entries have been brought together, but in the last two methods, linked headings and new catalog, you do have two different files.

Owing to the nature of this matrix, it is not possible to show the real difference between the linked-heading method and the new catalog. The linked-heading method applies only to those headings that are actually changed, whereas starting a new catalog makes a cleavage among all entries. To be more precise, if an entity is represented in both the old and the new catalog, there is an automatic cleavage, whether the heading is changed or not, and of course, this is a very serious consideration.

The last column attempts to suggest the relative costs of these methods impressionistically by the number of dollar signs. This column is of lively interest to administrators for whom the price tag is important. Obviously, revision of old entries is the most expensive method. Superimposition, with its adherence to the status quo, is the least expensive and therein lies much of its appeal. The only costs accrue from the occasional need to provide new references or to reprint small groups of cards. Offhand, it might be supposed that relocation of old entries under a guide card for the new heading would be a fairly cheap solution to the problem. But shifting blocks of entries in a multi-million card catalog is a labor of Hercules with a price tag to match. The potential confusion caused by unaltered cards also may prove expensive in its own way. The linked-heading method is quite thrifty with the added costs stemming from the interlocking references. Starting a new catalog costs a little more because an entirely new reference structure must be built.

We have reviewed the methods by which change has been effected in the past, and by which it might be effected in the future. You might bear this chart in mind when we talk about the implications of the Library of Congress activities for other libraries.

The advent of the machine-readable catalog records -- the initiation of MARC in the middle of the '60s, and quite specifically in 1968 with the start of the present MARC Distribution Service -- has clearly introduced a new factor, because what the Library of Congress has been doing for itself and also for other libraries is bringing into existence a body of machine-readable data which at some point may serve as the source of bibliographic information in the same way that the card catalog now serves.

In my paper[1] there was a discussion of some of the milestones that we hope to reach within the next five or six years. The expectation is that by the end of this decade that all current cataloging of the Library of Congress would go directly into machine-readable form. By that time we will have developed the Core Bibliographic System and the associated user systems that will

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[1]See Appendix B.

permit the data base to be consulted with at least the degree of flexibility afforded by the present card catalogs. When we come to that point, we will be faced with a critical administrative problem.

The present expenditure for the maintenance of the card catalog is in excess of $600,000 a year. It is anybody's guess what the cost will be in 1980. It follows, therefore, that one comes hard up against the question: Is it feasible to maintain a dual system, to have a machine data base which is complete with respect to current output, and at the same time to continue to file entries for these same records in the card catalogs, which by that time would be of really very great size? It seems to us that it would be fiscally irresponsible to chart a course that took that as a necessary operating condition. We simply could not afford to maintain these huge instruments at the cost that will then be necessary and allow the camel to continue to sleep in our tent if, indeed, he has not knocked the whole tent down. So we will be forced to close the catalog. There is nothing problematical about the inevitability of this decision. The date when it will have to be made may be uncertain but the necessity of making it is not. When this situation occurs, we will face this critical question: What should be the relationship between the MARC data base at that time and the existing catalog of non-MARC cards?

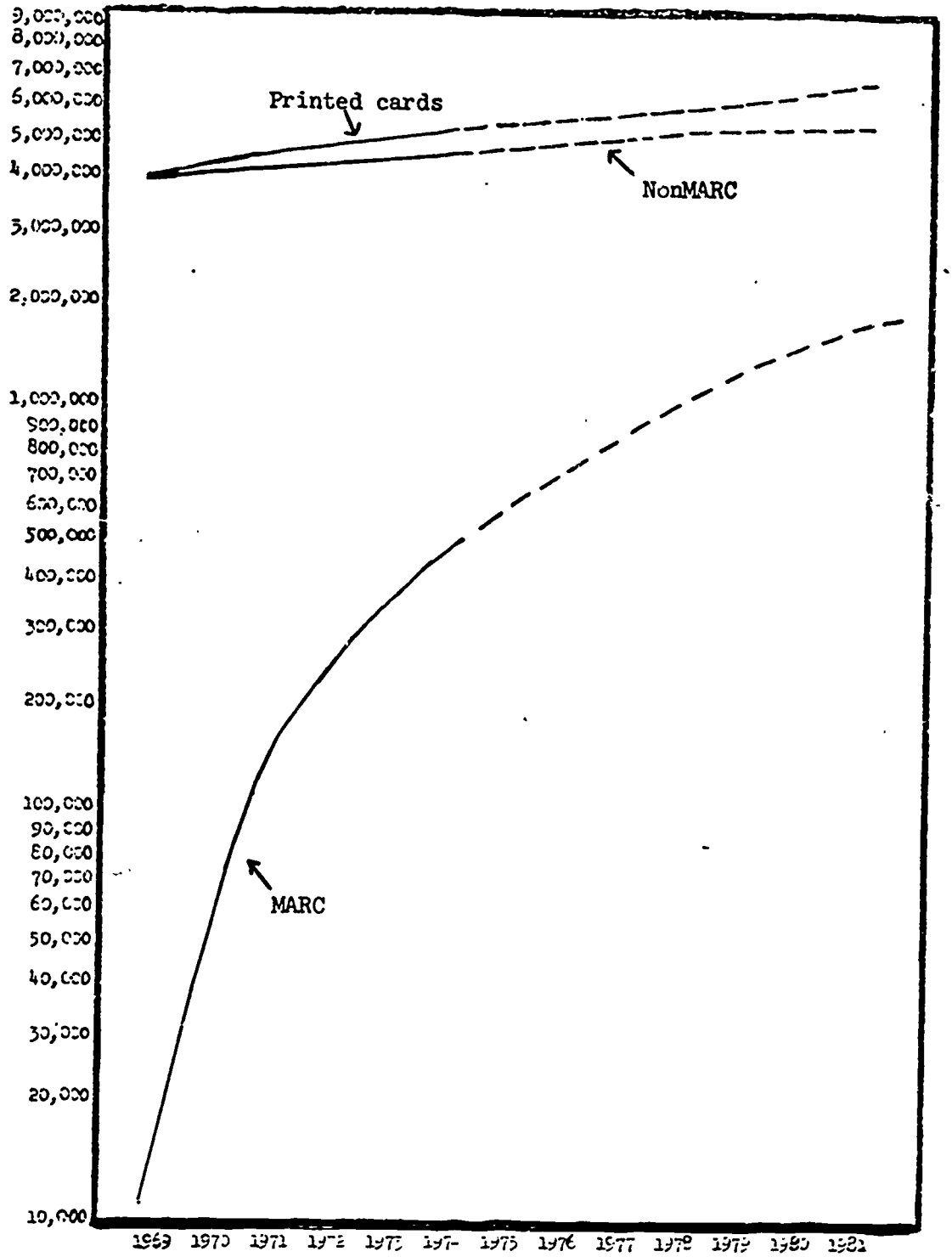
There are several conditions we want to consider. As a preliminary, let us look at Figure 4. It traces the growth of printed cards and the MARC data base, and as a separate line, the number of printed items that are not in the MARC data base. This also is plotted on semi-log paper. The rise of MARC is dramatic but, as you can see, the gap between the two files is nevertheless very wide. At the present time we estimate that there are about 5.3 million printed cards. The MARC data base is slightly under 500,000 titles, so there is a deficiency of about 4.8 million records. As we expand MARC coverage, we will gradually move to the point where that deficiency will stabilize, and if it is indeed true that by 1979 or 1980 we will be converting all current cataloging to machine-readable form, we will at that point have a deficiency of about 5.1 million cards. That is to say, 5.1 million of all of the items that the Library of Congress has ever cataloged will not be in machine-readable form. On the other had, we will have a machine data base of about 1.3 million cards at that point.

Now the RECON studies have shown that the probability of a large-scale retrospective conversion project is practically nil. If you consider how long it has taken us to get to this point in converting our current cataloging and how much longer it will take before we can expand to all areas, you will see that the likelihood of being able to convert some five million retrospective cards in any useful time is very slight indeed. So that gap is going to remain for a long time, if not forever.

Now what is the significance of that gap? If we wish to rely on the MARC data base as a source for current cataloging information so that we can develop within the Library of Congress a true on-line cataloging system -- not something you simply go to after you have done all the cataloging someplace else and input your record, but a place where a cataloger could sit and consult the necessary files (the name authority files, subject authority files,

FIGURE 4

Actual and projected growth of Library of Congress cataloging records, 1969-1981



shelf lists, etc.) in the machine data base, and be able in a hi
of the cases to produce his catalog record at the terminal -- th
that one must regard this machine data base as self-sufficient.
consider it self-sufficient, if you obligate yourself to the nec
ing to another source, the card catalog, to complete your catalo
line cataloging as such cannot exist.

I will return to this in a moment. We also have very stro
tions -- I think very well considered representations -- that th
a greater effort to achieve meaningful, decentralized input to a
base. Once again, if there is going to be decentralized input,
tory to have the name authority and the subject authority files
this data base equally well known to all potential participants
effort. Clearly, that would not be the case if a substantial pr
the names that affected cataloging were not in machine-readable
but simply residing in the Library of Congress card catalog.

It is sometimes suggested that publishing such a list woul
and so it might be up to a certain point, but I think it is easy
strate that a mere list of established forms of headings is not
you lack any means of relating that name to particular works.

Figure 5 is a list of 46 headings that the Library of Cong
established where the forename and surname are identical. It is
embellished in various ways. I can assure you that those are al
forms, but if I were to pass among you, say, ten books that said
page "By Hans Muller," good luck to you in matching them up. So
lishing a list of established forms of names and their associate
does not solve the cataloging problem. There really has to be s
hang the heading on, and that is the bibliographic record.

That leads us back to the total conversion problem. My pa
some lesser alternatives for retrospective conversion. I will no
those now. They are interesting to consider and discuss, but in
number of records, even the least of them involves a tremendous
expense.

So this brings us finally to what we see as a necessary co
continuing. That is, taking the point of view that when we have
automated system, a way of consulting the records that is at lea
the card catalog in its present form, and all of our current cat
machine-readable form, we must consider that it is the machine da
against which we are cataloging.

To operate in an on-line mode, LC catalogers and catalogers
libraries who wish to contribute to a central data base must be a
tablish new headings in relation to the machine data base without
any other data base. This means that if you had a Hans Müller ca
MARC data base had only a third of those names on that list, you
concern yourself at the moment of establishing a heading whether

FIGURE 5

HEADINGS FOR AUTHORS WITH A COMMON NAME AS ESTABLISHED IN THE LC OFFICIAL CATALOG

Müller, Hans
Müller, Hans, 1854-1897
Müller, Hans, 1867-
Müller, Hans, 1872-
Müller, Hans, 1876-
Müller, Hans, 1880-
Müller, Hans, 1880-1945
Müller, Hans, 1882-
Müller, Hans, 1883-
Muller, Hans, 1886-
Müller, Hans, 1891-
Müller, Hans, 1896-
Müller, Hans, Apr. 20, 1900-
Müller, Hans, Oct. 22, 1900-
Müller, Hans, Oct. 27, 1900-
Müller, Hans, 1902-
Müller, Hans, 1906-
Müller, Hans, 1907-
Müller, Hans, 1908-
Müller, Hans, 1908- (of Granichen (Aargau))
Müller, Hans, 1912-
Müller, Hans, 1913-
Müller, Hans, 1914-
Müller, Hans, 1918-
Müller, Hans, 1920-
Müller, Hans, 1921-
Müller, Hans, 1925-
Müller, Hans, 1927-
Müller, Hans, 1928-
Müller, Hans, auto mechanic
Müller, Hans, Dr.
Müller, Hans, electrical engineer
Müller, Hans, Gewerbelehrer
Müller, Hans, lawyer, of Berlin
Müller, Hans, military surgeon
Müller, Hans, of Altstätten
Müller, Hans, of Berlin
Müller, Hans, of Bremen
Müller, Hans, of Karlsruhe
Müller, Hans (of Nürnberg)
Müller, Hans, of Vienna
Müller, Hans, of Zürich
Müller, Hans, writer on art
Müller, Hans, writer on law
Müller, Hans, writer on moving-pictures
Müller, Hans, writer on social policy

heading for this person might have been established in the past as Müller, Hans, of Vienna. If the book gave you some equally good way of differentiating his name -- for example, if it revealed when he was born -- you could use that, and thus would be establishing the heading only in relation to the 15 or 16 names in the MARC file. You would not be concerned with what existed in the past.

This is really an essential condition for efficiency, because if you do not free the cataloging operation from the necessity of constantly relating to the past, there is no possibility of having any true on-line cataloging and no possibility of meaningful, decentralized input.

There are a series of problems here, of course, because when you get to things like shelflisting, you have the same problem. Shelflisting is done in relation to the totality of all of the call numbers that a library has established in that class, and particularly as done at the Library of Congress, where shelflisting is a form of close classification, this is a very intricate and costly process. For that reason, among others, we have been considering the possibility of a different form of shelflisting that would emancipate us from having to see the whole file in order to add a new item to the classified order of materials.

The relationship between the old catalog and the new machine data base is a very delicate one. After all, if at the time of closing the catalog, we have established according to our estimate more than three million headings, many of them at considerable cost, we have a considerable investment in a large body of valuable information.

It is reasonable to ask: How would this information be used with respect to corporate names? I think one can safely say that, since the Library of Congress rarely establishes any corporate name without research, the first place that the cataloger would look would be in the old catalog and he would, in fact, make use of this information. It would not be lost, and the possibility would be open to make a link, a reference in the new data base, that pointed to the form of name used in the old catalog. In the case of personal names, however, one could not undertake to do that. It stands to reason that going through all of those Hans Müllers for the luxury of being able to point to the old form of name is not a realistic way to operate. As a matter of fact, it is very difficult to operate as we do now, and it is not unknown for us to make misattributions.

The serious question for this group, of course, and the one that we will want to get into with the reactor panel and later, is: What are the implications of such an action by the Library of Congress for other libraries? Clearly, each library has to consider, in the light of its own resources, its own needs, and clientele, many, many conditions that the Library of Congress cannot possibly anticipate. Each library has to decide what is the best solution for it. The methods for effecting change that were described earlier are the methods that are open to any library faced with large-scale or, for that matter, relatively small-scale changes. Some libraries beginning to feel the strains that the Library of Congress does, would opt for starting a new

catalog. This has been done in the past. The New York Public Library did it as a way of coping with the growth and deterioration of its catalog. The National Agricultural Library did it as a way of adopting the Anglo-American cataloging rules. So closing a catalog cannot be so unthinkable, because these libraries not only thought about it, but they did it. Of course other libraries having smaller catalogs and compelling reasons for doing so might resort to one of the other techniques that have been suggested.

I think it may be helpful to say in this connection that we are not dealing with a problem that is capable of a perfect solution. I am not even sure there are any good solutions, but I am reasonably sure that there are some solutions that will, at least as far as the Library of Congress is concerned, be forced upon us. John Updike once wrote that actuality is a running impoverishment of possibility. I think that those of you concerned with the administration of large research libraries see the truth of that every day in your careers.

There is a tendency in talking about problems of this kind to consider them from the standpoint of some intellectual framework, to deal in terms of concepts and what ought to be, and to yearn for perfection. This is where we frequently fall into the hands of the law givers, whose task is frequently limited to chiseling things in stone and not to really implementing what they decree.

As an antidote for this kind of thinking, I would like to close by quoting an observation that a wise old coot named Sam Lewis once made. He said: "People are hung up on concepts. They can't solve problems because the solutions interfere with the concepts."

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MR. WELSH: For those people who tend to think in negative terms, it is easy to dismiss this problem simply in terms of closing the card catalog. For those of us who try to think in positive terms, this is an opportunity to start something afresh and utilize the fantastic power of the computer. It would take the Processing Department at least a full day to try to impart to you our feeling of confidence about the state of automation. You cannot have a Henriette Avram on your staff without coming away with the feeling that we are on the threshold of brave new developments. In fact, they are already here.

It is unfortunate that there is not time to give you the full preview. I hope that all of you have read John Rather's paper because there are many assumptions there that are important to all of us. We are, for example, producing some of our book catalogs from machine-readable copy now. The plan is, and it is moving along very rapidly, to have all of our book catalogs produced from machine-readable copy, which will decrease the delays in the issuance of bibliographic data that Mr. Rosenthal spoke about. Specifically, on the MARC data base, we now have all current English-language cataloging, all French,

and all AV. As of the first of January, we are beginning to input German, Spanish and Portuguese. The 1976 budget request includes staff for the records in Italian, Romanian, Scandinavian and Dutch. Hopefully, the 1977 request will include Cyrillic; 1978, other roman-alphabet languages; and 1979, nonroman languages. This is the plan, but the important thing now is that by the end of calendar year 1975, we will have all English, all French, all AV, all German, all Spanish, and all Portuguese, about 60 percent of our current cataloging going into MARC form. These languages are terribly important to all of you out there, so we are moving ahead as rapidly as possible and the plan is quite clear. Thank you.

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THE VIEW FROM THE LARGE RESEARCH LIBRARY

JUDITH CORIN: Mr. Rosenthal has provided a view of broad trends and long-term developments in the large research library. I would like to share with you some of the more immediate concerns related to specific changes that have taken place or appear to be imminent.

There has been a great deal of discussion, much has been written and we have heard impassioned reactions to desuperimposition, proposed LC subject heading changes and LC's Cuttering system. These reactions are hardly surprising, for large libraries under the best circumstances look forward to change with some trepidation due to the size of their collections and records. When you add budget constraints, the problems may seem insurmountable. Concerns expressed relate not only to processing, but shelving arrangements and to library users, both patrons and staff.

Desuperimposition, it is felt, would require us to discontinue some long standing practices and to alter many of our records. We are presently establishing only those entries which are new to our records according to the Anglo American Cataloging Rules. With the implementation of desuperimposition the AACR would be used regardless of any previous entry. How to or whether to link old and new entries is a major issue. The largest number of these changes would occur in corporate entries, which would be entered directly under the name of the group rather than by place or the parent institution, resulting in a large volume of cards under nondistinctive words, such as "university" or "institute."

Personal author entries will also be affected as new entries will be made under the form of the name favored by the author. Pseudonyms and initials will be used rather than full or established names. Prefixes in foreign names will pose another problem. We will be entering the Italian name "D'Annunzio" rather than "Annunzio, D'" for example.

These changes will also create discrepancies between old Cutter numbers and new entries. Unless a program of reclassification is undertaken, this change will affect the arrangement of volumes in the stacks. Processing departments will be addressing questions relating to card modification, shifting of cards in the Public Catalog, and the preparation of needed reference and authority files. The ordering sections, process and standing order files and serials records may have to be reviewed. Bibliographic search staffs will desuperimpose entries from existing bibliographies and public service units will have to devote time to the retraining of library patrons and staff.

In addition to desuperimposition, LC is considering subject heading changes. It is probable that if they close their catalog, new subject headings will not necessarily relate to previous headings. If they do not close the catalog the scale of change is uncertain, although based on what we see

as the current rate change, we presume that changes will still be substantial. There are many benefits to be derived from a revamping of LC subject headings, such as modernization, reform and simplication of terminology: "European War, 1914-1918" to "World War I, 1914-1918" or "Electronic Calculating Machines" to "Computers" or "Women as Doctors" to just plain "Women Doctors." It is also possible that fuller coverage may be provided in the use, for example, of duplicate but reversed headings for local geographic interest -- "Agriculture - California - Los Angeles" and "Los Angeles - Agriculture." This would increase the number of cards for affected entries by 40 percent.

We have discussed three alternatives for dealing with desuperimposition and subject heading revisions:

1) Maintaining a single card catalog with both forms of entry and providing a "see also" network.

2) Starting a second catalog using AACR and providing a "see also" network between the old and new catalogs.

(In both of the above instances, a decision would have to be made as to whether division would be based on date of imprint or date of cataloging.)

3) Maintaining a single card catalog, changing headings on short files to agree with additions under AACR and physically moving long files into AACR locations without changing entries. "See" references rather than "see also's" would be provided. This option would require maximum single time work, but a minimum long-range time investment.

The question of adopting the LC Cuttering system must be considered as a local issue and resolved individually. Those libraries maintaining closed stacks will have less of a problem in adjusting to this change. However, the value of consistency in classification for open-stack collections is a question that must be considered. Open-stack collections with scattered holdings of works, editions, translations or authors will have potential effect on the user who may have developed a dependency on these volumes being shelved together in the stacks. The benefits, however, of adopting LC Cutter numbers would derive from time saved in processing. Any way of getting books on the shelves more quickly and economically, while reducing variations in cataloging between libraries has much to commend it. And so the trade-offs must be considered.

These are some of the issues that we have been studying, and we are going to be raising many questions, but not for the purpose of trying to influence LC to desist from any plans for change. We do not question LC's need to plan for change. We recognize their problems of coping with internal work loads. We also recognize the great value of developing a systematic and consistent bibliographical data base which appears to be their goal. Our growing

dependence on and cooperation with LC however creates a need for more communication and dialogue between us -- and here we do have feelings of concern and uncertainty. We would like to feel assured that changes occur in an organized sequence of events and know that LC will announce its decisions regarding changes well in advance of implementing them. Large research libraries need as much as six months to a year for preparation, depending on the extent of change.

There are questions that I think we should be raising such as whether or not LC plans to desuperimpose headings already in the MARC data base and if so, how would this be accomplished? We would like to know if authority information on newly desuperimposed headings will be available, as this would facilitate local generation of machine-produced authority cards and cross-references. We have questions regarding the handling of serials: 1) Is LC considering desuperimposing serials at an earlier date than monographs; if so, why and how would they reconcile the conflict in the public catalog? 2) How is LC planning to handle catalog and serial department records for current serials and multi-volume monographs? And many more.

Should we not be planning together and responding to these questions in advance of LC implementations so that we may all realize the possible advantages in these changes?

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JOSEPH A. ROSENTHAL: As Ms. Corin implied, both Berkeley and UCLA have had groups addressing these problems during the past year, and both groups recently submitted preliminary or Phase I reports, partly in preparation for this program. In the work that these groups have done, we have been very appreciative of the willingness of the Library of Congress to talk with us and to make available pertinent documentation. I am not a member of the Berkeley group, but I have close liaison with them, and I would like to mention a few of the most significant points in the Phase I Berkeley Report.

The Berkeley and UCLA Groups considered much the same options that Ms.Corin outlined, and those options were regarded as the most viable and possible in relation to desuperimposition. The Berkeley recommendation at this time (and I should indicate that this is the report of the Future of the Catalogs Subcommittee and will not necessarily become the policy of the Berkeley Library) is that we should not close our catalogs simply because of impending desuperimposition. Although desuperimposition by the Library of Congress would be a very strong inducement to close catalogs, nevertheless, we do not feel that it is a sufficient inducement. If desuperimposition is adopted by the Library of Congress, the feeling of the group at this time is that we should continue our existing catalogs, transferring files under superimposed headings to new desuperimposed headings. We should not start

a new catalog either by date of cataloging or date of imprint or continue our existing catalogs with split files.

The Berkeley Group, and I think the UCLA Group as well, has identified two very important technical goals. We feel it is most important to aim for the reception and/or the input of all current cataloging in machine-readable form. Why? Because the machine-readable format will give us the flexibility we need to accommodate change and the capability to distribute and to exchange data within our own library and with other libraries. A second goal to which we are very much committed is a machine-based authority file. Here we are talking particularly about name authorities and series information, because in large part the goal of a machine-based subject authority file has already been met, thanks to the efforts of the Library of Congress and other libraries.

We recognize certain areas as being particularly difficult. These problem areas are not mutually exclusive; when you get then in combination, they are really bad news. One is serials. A second is one that I talked a little about before -- bibliographic communication and coordination with the immediately adjacent levels of activity, the branch libraries, other University of California libraries, other libraries in California and the West, and, of course, our direct contact and communication with the Library of Congress. The reception and exchange of data between and among these adjacent levels of activity, and our ability to communicate what we believe are areas of common interest and common problems is of prime importance, as well as prime difficulty.

I would like to read just a few statements from the Berkeley Committee's Report concerning branch libraries.

> Special problems are posed by the Berkeley system of 21 branch libraries, each with its own card catalog. Although the branch catalogs are exceedingly costly to maintain, there are no simple substitutes. Each branch is a special library with a special collection serving a specialized clientele. If it is to satisfy branch needs, a future catalog should provide: 1) some means of incorporating into a central record materials now locally cataloged; 2) some mechanism for accommodating local modifications to centrally cataloged materials, and as a subset of that latter point, an indication in local public records of special locations for reference, reserve and other branch subcollections and adaptation of central cataloging to meet needs of special clientele; for example, additional added entries, modified subject headings, addition of geographical and foreign subdivisions, etc.

I mention these points not necessarily because I am completely sympathetic with them. They are, however, vitally held concerns of our line librarians, librarians who serve a large and vocal clientele in our libraries, and I think they are problems with which many of the libraries represented at this meeting are well acquainted.

I would ask: Apart from the consequences of the closing of the catalog of the Library of Congress and apart from the consequences of desuperimposition, are there compelling reasons per se for the University of California, Berkeley, and other research libraries to close card catalogs right now? A vital consideration here is the present and future costs of maintaining what we now have. Do we know what those costs are? We at Berkeley have some figures, but we have not presented them, for we have not yet outlined them adequately. Can we compare these costs and the future expenses of continuing our present card catalog with alternatives? We know, for example, that in all probability it costs us upwards of $100,000 a year simply to file into our catalogs. And these are by no means the only costs. Although we can estimate current costs, we find it difficult at this point to know with any precision what future catalog options will cost, much less to guage satisfactorily the benefits or disadvantages that these options will have for our users.

A consideration in favor of closing card catalogs is the present unsatisfactory distribution of data. The branches have access only to what they hold, and we do not in our central cataloging facility provide them with adequate links, adequate cross references. In fact, we do not provide them with any cross references; they make their own. At Berkeley we do not have a satisfactory way of indicating all changes in central cataloging to the branch libraries and to the catalogs that they maintain. We would hope that with new catalogs we could provide some, if not all, of these services.

There might be compelling reasons to close off our catalogs (and I am not speaking for the Berkeley Committee, I am speaking for myself now) if the product after closing were a marked improvement, if it answered some, or a great many of our present inadequacies. Unless we can be reasonably certain of significant improvement, however, we should proceed very cautiously. The card catalog system has a great deal to recommend it, despite all the slurs that we have thrown at it this morning. Moreover, we know that if we close the present card catalogs we will necessarily face the consequences of having to conduct many, if not all, searches in two files. Therefore, improvement must be great enough to more than compensate for this fundamental disadvantage.

How, then, do the anticipated actions of the Library of Congress affect the rest of us, and how should we be influenced by them? Both desuperimposition and the closing of the Library of Congress catalogs are attractive in some ways. In my opinion it is unfortunate that the two actions are not occurring simultaneously. Desuperimposition, although its effects will be costly and troublesome in the short run, might be most easily handled by splitting the catalogs. Conversely if the Library of Congress splits its catalogs, there would be a number of advantages on the local scene to acting in concert with the Library of Congress. We could change filing rules. We could plan our own cataloging to be entirely machine-readable in form, and we could organize our bibliographic products so as to give significantly greater service to our users than we do now.

We at Berkeley are not ready to place all of our cataloging in machine-readable form, and we have not decided what the future outputs should be. We recognize, however, that if we do have all current cataloging in machine-readable form, there is great potential advantage in flexibility of outputs, whether they be in card form (which ranks rather low on the totem pole), in book form, in microform, in on-line access or in some combination of these.

Desuperimposition now or in the next couple of years will add to the present inadequacies of our bibliographic system, not help them. It will lead to a very considerable amount of effort on the part of catalogers in every research library and in many other libraries as well, in changing headings, in planning for physical reorganization of the catalogs, and in making connecting links. Is this effort justified? There is much that I find admirable in John Rather's paper on the future of catalog control in the Library of Congress, but it is written from the viewpoint of the Library of Congress, and particularly of the Processing Department of the Library of Congress. Although implications for other libraries are mentioned, I do not think that Mr. Rather would claim to have considered those implications comprehensively or exhaustively. They are serious implications, and in all likelihood, they will have expensive consequences for us.

If the Library of Congress sees a clear need to close the catalogs in 1979 or 1980, should we not all attempt to work together in order to realize possible advantages in collectively closing our catalogs? Would it not be advantageous to consider the institution of desuperimposition at that time and to plan for it in the interim? Among the planning aids that our librarians at Berkeley envision as helpful, is to have the Library of Congress give us in advance a list, not necessarily exhaustive, of headings that would be affected by desuperimposition for the purpose of checking such headings against our own catalogs and files and making adjustments at our own pace.

A second area in which we might be able to work together is that of the development of a machine-based authority file control system at the Library of Congress, which would be available to the rest of the library community on-line and in book form or microform.

Between now and 1979 or 1980, could we not plan to study intensively subject heading structure with a view to significant improvement after closing the catalogs?

Speaking from the Berkeley viewpoint, we feel there is a very definite need to assemble cost data relating to present operations from the point of view of the future of the catalogs. We need to assemble what is available, and we need to do this on a continuing and updated basis in the way of cost projections for the most likely options for the future, including such things as equipment for microform catalogs and displays, machine and software costs (both developmental and operational), the production cost of book catalogs and microform catalogs. We need to experiment with some of the product options. At Berkeley we are beginning to be in a position to do this. For example, we are experimenting with a microform in-process list, with a

microform list of serial publications, with the Mansell NUC catalog as a substitute for a depository catalog in card form, and we need to determine user receptivity to these options.

Finally, and this is implicit in everything I have said so far, if and when the Library of Congress closes its catalogs, we need to plan for both desuperimposition and the closing of our own.

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MR. PAUL FASANA: I have been asked to summarize the New York Public Library's experience in closing its card catalogs and implementing a computer-based catalog system. I propose to do this primarily in terms of The Research Libraries. It should be kept in mind, however, that two vast and separate catalog systems were involved. The size of The Research Libraries' card catalog system in 1972, the year it was "officially closed", was 30 million cards filed in more than 14 separate divisional catalogs. The Branch Libraries' card catalog system consisted of more than 150 branch catalogs.

In January 1972, The New York Public Library implemented an automated book catalog (ABC) system simultaneously for The Research Libraries and The Branch Libraries. The systems, though based on the same set of computer programs, are separate. The major product currently produced in each is a photocomposed book catalog. Since the implementation of the system, more than 200,000 titles have been cataloged and input to The Research Libraries' bibliographic data base, and 180,000 titles in the Branch Libraries' system.

During the three years since the ABC was implemented, The Research Libraries have gained considerable firsthand experience in implementing and experimenting with new procedures and computer technology, while simultaneously phasing out a large, antiquated cataloging system. Though painful at times, the results have more than met our expectations. I would like to focus my comments today on two aspects of our experience:

1. The implementation of the automated book catalog system and its effect on procedures and productivity.

2. The phasing out of the retrospective card catalog system.

Implementation of the ABC

Within the context of system implementation, two facets of NYPL's experience are pertinent to today's discussion:

1. Technical Efficacy
2. Productivity

Technical efficacy. The design of the ABC is based on the concept of building a data base of bibliographic records under full and automatic control. No other system currently in use that I am aware of achieves this same objective to the same degree. The data base is made up of an authority control file and a bibliographic file. The system, as evaluated and tested during the past three years of full production operation, indicates that the initial effort and expenditure of money (estimated at two million dollars) was justified, and has allowed the Research Libraries to abandon its retrospective cataloging policies, catalogs and procedures and fully adopt LC practice and AACR, main-

taining all the while systematic linkages with the retrospective catalog system. The system, in addition, is able to accommodate current changes in policy and practice, and allow rapid and automatic upgrading of records and entry data. Recently, for example, LC changed the heading Canada. Bureau of Statistics to Canada. Statistics Canada which affected more than 275 entries in the catalog. With a simple change to the authority file, all records using the heading - main, added, or subject - were changed and appeared in correct form in the next month cumulation. A computer system can, if properly designed, enhance changing standards and practices.

Productivity. The most dramatic advantages of the system can be seen in terms of productivity. In the area of cataloging, for example, there has been during the past three years more than a 50 percent increase in the number of titles cataloged (from approximately 50,000 new titles in 1971 to approximately 78,000 in 1974). During the same period, there actually has been a reduction in the number of catalogers employed. This is a result in part of changing to AACR, but it also reflects changes in procedures which could only have been done because of computer support and products, especially in the area of searching and authority work. Increases in productivity of the same magnitude have been realized in other areas as well, including such operations as filing, typing, and searching.

It was estimated a year or so ago that the cost of running the system (a very difficult matter to pin down with precision) was almost entirely offset by the number of positions eliminated in filing and card production. If one adds to these savings the value of the additional positions that would have been required had the manual system been continued to maintain the existing level of processing (or to increase the level of processing to compare with productivity in the automated system) the system is probably costing less.

The Retrospective Catalog System

Though a great deal of detailed planning had gone into the design and development of the book catalog, little preliminary planning was done relative to the phasing-out and locking-up of the retrospective system of card catalogs. This was probably due in large part to the fact that virtually no experience existed at that time to guide library planners. This lack of pre-planning had proved both positive and negative. I personally feel that had we attempted to do exhaustive pre-planning in this area before making the decision to close the catalog, the problems would have seemed so overwhelming that we might not have undertaken the effort.

There are at least four major areas of concern that must be dealt with: retraining of staff; phasing-out of procedures and cleaning up of materials in process; the physical closing of catalogs; and preservation of catalogs. I would like to comment briefly on each.

1. Retraining of Staff. Since the implementation of the book catalog meant that we were abandoning unique NYPL cataloging policies and practices and adopting AACR, the amount of training that was necessary may not be indicative of what can be expected in other libraries. However, it might be of interest for comparative purposes. Retraining of Cataloging Branch staff took place over a period of 18 months and began with intensive lecture/demonstration

sessions lasting for about two months; six to eight months of prac application followed during which time catalogers were required to "dual" cataloging (that is, cataloging the same title according to retrospective rules and again according to AACR); and finally, a p of ten to 12 months during which all cataloging had to be exhausti Even after this expenditure of effort, continued vigilance has bee to keep catalogers from reverting to past practices. We find even out of a staff of 34 professional and 18 paraprofessional cataloge there are at least three or four catalogers who have not, and prob will be able to make the change.

2. Phasing out of procedures and materials. Changing from on another requires cleaning up of materials that are in process, whe cess" can mean, as we found, something that has been around from or to ten to 15 years. We began by deciding that all material having or later imprint had to be input to the ABC, while other in-proces could for a year be processed for either system depending upon dif This proved to be unwise and too permissive. Before the end of th year a new directive was issued stating that for monographs, all n would cease and that all catalogers would be given a month or so t snags and current backlogs. The "month or so" for certain catalog on for several months. Serial catalogers were initially given a s reprieve; this dragged on to almost a year. To enforce these targ we eventually had to declare that all official catalogs were "clos even then it was not until we actually began to put the main offic on microfilm and withdraw the cards from use were we sure that all cataloging activities had stopped.

3. Closing of the Catalogs. In order to accommodate filing a serial work, and cleaning up of snags, the official closing of the card catalog network was spread out over a three-year period. The closing a system of catalogs as large and interrelated as ours has be quite difficult. A primary objective is to ensure that the clo catalogs is synchronized; by that I mean that all catalogs as of a date are frozen. If this is not done, differences and discrepanci exist among catalogs which if allowed to continue for any length o become critical. Within The Research Libraries the following sche used to close and "lock-up" catalogs: Official (or work) Catalogs as of January 1973; Public Catalogs (except for the main Public Ca closed as of January 1974; and finally, the main Public Catalog wa of 1 January 1975.

A word about the amount of effort spent to date on the Public of interest. The Public Catalog is a file of more than 11 million of 1 January 1975, three years after the official closing of the c had finally reached that point where all cards had been interfiled "snags" had been reconciled. This clean-up effort required a staf working virtually full time. We have not yet undertaken the rehab and preservation of the Public Catalog, an effort that we estimate take three to four years and cost on the order of 1.5 to two milli Overall, I estimate that during the past three years we have spent 75 man years of effort cleaning up and closing the various officia

public catalogs within The Research Libraries.

4. Preservation. The thorniest problem to deal with in closing a catalog is what to do with it once you have closed it. A catalog will continue to be used, therefore will have to be maintained and preserved. Because of the importance of the collections and catalogs, most (12 out of 14) of the Research Libraries' divisional catalogs have at one point or another been filmed and published in bookform by G.K. Hall & Co. Our preservation strategy, therefore, for divisional catalogs has been to work with G.K. Hall to produce supplements for all previously published catalogs which dovetail with ABC. Most Divisions have at this time in bookform a complete book catalog of their collections. This solution is neat and straightforward.

Filming and printing a card catalog resolves the problems of preservation; in turn however, a new set of problems is created. How does one cope with a record which is frozen at a point in time? What does one do about serials? Lost books? There are no simple solutions.

With the Main Public Catalog, we have a different set of preservation problems to contend with. Because of its size and physical condition, we feel that we cannot simply close it and photograph it "as is" as we have done with divisional catalogs. Instead, before filming, cards must be "rehabilitated." The cost however, is enormous. We estimate that rehabilitation alone will cost on the order of 1.5 million dollars. Once rehabilitated the Public Catalog would then have to be microfilmed for preservation. The cost of filming is on the order of $300,000.

The problem is critical. The Libraries do not have the money to undertake these essential efforts, yet they cannot afford not to. We know that if we do nothing, essentially abandon the Public Catalog, that deterioration of cards will continue and probably accelerate. At present, we estimate that 25 to 30 percent of the cards in the Public Catalog are severely affected by deterioration; we project that within the next five to ten years, if we do nothing, the number of cards affected will increase to 30 or 40 percent. The cost of rehabilitation if delayed will increase dramatically.

Conclusion

In closing, I would like to emphasize the following: computer technology has advanced to a stage where it can effectively and economically be used to replace manual cataloging procedures. More importantly a computer-based cataloging system, if properly designed, can provide the capability of linking retrospective and prospective catalogs, and facilitate future change and innovation. These capabilities enhance the possibility of being able to close one's card catalog yet maintain continuity in terms of a library's bibliographic record.

And finally, the idea of closing one's card catalog is frightening and bold. If one attempts to identify and resolve in advance all problems to everyone's satisfaction then probably nothing will get done. Both ideas require decisive action. The real need at this point, in mind, is to make the decision and go forward.

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MR. HUGH ATKINSON: Since the Library of Congress is going to close its catalog, it seems to me none of us should underestimate the effect such closing will have on our libraries. No matter what the plans the Library of Congress has for continuing any of its present services, such decisions do affect us even more radically than we believe.

The thing that interests me most about the Library of Congress decision is the analysis of why LC should choose the option toward which it seems to be moving. No matter the differences of scale, many of the same problems are facing each of us. The first of these problems is the expense -- the costs of keeping up our catalogs is an amount totaling over six figures a year. Second, we all have a continuous demand for a unified file of current materials. That is, access to the order file, the in-process files, the catalog of what we have received recently, and the shelflist and official catalogs in a single source has been demanded by either library staffs or library patrons.

The provision of that kind of unified file of current information does not seem to be practical with the card catalog as we know it. If one can build such a file, it is very, very expensive. We do not now have the ability to add very well the kind of indexing and cataloging and access that agencies other than the Library of Congress or certain other libraries have been willing to develop. The content of the ERIC indexing, of the indexing and abstracting provided by the professional societies and abstracting services, has not been seriously disputed. The problem is we have not been able to find a way to translate the data into the form that we wish to use it, and this inability has arisen generally because of the form of the card catalog. The changing language of the access to our collections has been a continuous problem. Some libraries, such as those in Great Britain, tended to ignore the problem and just not try to have consistency. It is to this problem that those who speak of superimposition referred, as well as to the other problems of "linkage." These, I believe, are the general problems which we hoped to ameliorate when we at Ohio State made the decision that we cannot continue to provide access to the collections through the card catalog.

In our particular case we have a few other problems that some of you share and some do not. First of all, we are committed to decentralization, even greater decentralization than we have now. We now have 22 department libraries and four graduate reading libraries. I would assume that the future will bring us closer to 30 or 35, but the concept of the Main Library is going out of style, even more rapidly than it was before.

We have a steady state budget, more or less, and the demand for reallocation of the library's resources is felt both within the library staff and on the part of the university community. We simply cannot continue to perform the expensive kinds of analysis required for original cataloging for example, of books in physics in order to preserve consistency when we cannot afford to keep the physics library open; when we cannot afford to continue some of the journals. Under such circumstance choices will be imposed on us. I am sure you have all heard statements such as "Why do you have to catalog everything at $14 a volume when that $14 would buy us a journal subscription?"

The only way I can see of making such reallocations is to change what goes on in the back room, or at least, change the system to one which allows an individual group, a department, a college, a library, to choose out of its total allocation of resources of book budget, of journal subscriptions, of cataloging, of acquisition costs, of reference costs and circulation costs, how much it wishes to allocate to each of the four major activities of libraries: circulation, reference, cataloging and acquisition. Such allocation will vary from department to department. As long as we are centralized, we cannot make those reallocations department by department, at least not well.

Another thing that I note is that large libraries are unhappy places in the back rooms. I am now pretty well convinced that no library unit should be larger than the "primal tribe" of some 12 to 13 people; somehow large groups do not function well in this age of the greening of American libraries. They may have worked in the past, but not now. The only way that I can see to get us down to the primal tribe, to decentralization, is, in fact, through electronic centralization, through the electronic imposition of certain kinds of standards and certain accountability. That means, in fact, closing the card catalog.

Another aspect of librarianship which is beset with problems is the interlibrary loan activity. The costs are outrageous and I would like to see a drastic reduction in such expense. The electronics may provide us with the ability to do so. Electronics are distance independent. Maybe we can reduce the amount of labor it takes to get an interlibrary loan in or out. The ability to query machine files, computer catalogs, would allow us to both reduce the cost and improve the speed and accuracy of the service.

It seems to me the complexity of most research libraries is growing even faster than the size of the Library of Congress catalogs, and additional complexity means that the library responsibility to provide systems which handle complexity is even greater, especially since library systems are expected to be used by the patron in a "self-service" fashion. That is we assume by where the catalog is placed, by the form of the catalog, and by the instructions in its use that people will use it themselves. We may provide that gesture called the Catalog Information Desk only because we do recognize that some of our students and very few of our faculty are not able to read in consistent ways. Nevertheless, it is but a gesture.

Through the continuation of our bibliographic access through computers we can then provide the ability of the system to impose professional knowledge between the records and the patron. It is no longer so clearly a self-service operation; those who can use the catalog will do so knowing that they are using a complex tool. The way our card catalogs are now set up, libraries imply that these are easy tools to use.

Even if we all agree that we should change the form of our system of bibliographic access it is still a most difficult change to effect. I think that many of the problems that the UCLA-Berkeley Study Groups have come up with exist in our present system. I do not see them any more difficult than the "see also" reference and the whole question of superimposition. In fact,

with some kinds of computer searching you do not have to deal with concepts of single points of entry; most of the general search programs do allow you to search word by word. Italian surnames might not be a problem if you are using Lockheed's DIALOG system or SDC's ORBIT or BASIS-70. Most computer systems will search either way, and the patron does not have to choose one way and one way only. The ability to search either by the subject heading, by added entry or by any word in the title may get us out of many of the problems outlined with the linkage.

In Ohio we have been aided by the OCLC decision to purchase one of the three great commercially available searching systems, BASIC-70, ORBIT or DIALOG. It will be implanted in the OCLC system some time in this coming year. This will provide us with the ability to have subject access and word-by-word access to the records that we have cataloged in the last three years.

We will by the end of this coming year all be in the same situation that the Library of Congress is expecting to be in in 1979 or 1980 -- that of producing all cataloging in machine-readable form. Once the decision is made at the Library of Congress to transliterate, which was one of the big stumbling blocks before now, we will be able to take even further advantage of the OCLC system to produce catalog records in such a form. The OCLC will also be providing the basic program that we will use to continue the catalog.

The hardware, whether you analyze it by the actual cost or per unit stored cost or any of the other ways of analyzing, is becoming cheaper. We can now rent dumb terminals, not smart ones, but still terminals, at $100 a month. Even if we have to rent 20 for the Main Library, and three in each of the department libraries, we can provide bibliographic access still cheaper than through human labor, which is compounding at 15 percent a year (at least, that is what our clerical employees seem to have gotten in the last three years). The catalog is not just a one hundred-some-thousand dollar operation to maintain; it is a 200,000 dollar item in five years, and that is an expense that we can not afford. Thank you.

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MR. RUTHERFORD ROGERS: We have talked a lot about the catalog as a problem. I hope we will not forget (as John Cronin repeatedly reminded us at the Library of Congress) that the Library of Congress catalog is the greatest bibliographic instrument in the world, and I think it always will be. The same assessment applies to the catalogs within our own institutions.

I would like to compliment the other people who have preceded me, and particularly those from the Library of Congress, on their presentations. Even though the terrible things that Fremont Rider predicted have not come to pass at Yale, I happen to think our days are numbered, and that we cannot go on maintaining a card catalog, both because of the expense, and because of the real estate problem: we are simply running out of space. We have just expanded our catalog substantially. That will probably get us through five

years. By desecrating the main library, we might make other expansion that might take us through another ten years; so I am saying that by 1985 or 1990, we are simply going to be forced to do something different.

I think there has been a lot of loose talk over the last couple of decades about how library processes are falling apart. I really believe that we are moving into a period when we are going to have to do something about the card catalog. I fully believe the Library of Congress when they say there really is no other option. They are going to have to close their catalog, and it is not just the cost of the Catalog Management Division that requires the move, there are a lot of other reasons.

I happen to have been at the Library of Congress when the decison was made to superimpose. It is easy to look back now and say what a lousy decision that was; I recognize that it was a bad decision. But I do not think the Library of Congress at that time had any more stupidity per capita than the rest of the library profession, and I doubt that it does now. There were reasons why that decision had to be made, and I believe we are going to work our way out of the problem thus created by closing the catalog. It seems to me that the Library of Congress has suggested some very ingenious solutions and, like all great discoveries, very simple ways of dealing with this problem.

I have never heard an art historian talk about the Library of Congress subject headings or its classification in their field, without their declaring: "They're impossible." I do hope that if we are going to start a new catalog, that we will not rush into it so fast that we do not solve some of the infirmities that now face us at the Library of Congress and at other places. Transliteration is a big problem in this country. It is also a problem that is engaging those concerned with universal bibliographical control at the international level. Believe me, this is something that is not going to be solved overnight. I know that some people are a little concerned about what will happen as far as Cuttering is concerned if there is a radical change in the Library of Congress, but this does not concern me in the least. Anybody who has gone through a reclassification as I have done in two large university libraries, knows that people find very readily that they can work with at least two major divisions in a book collection, and I think that this problem is really de minimis.

All of the research libraries of any importance outside of the Library of Congress are going to have to continue to follow the Library of Congress, and I think inevitably this means we ought to be looking without any reservation toward an automated on-line system. My question is: Are we going to be ready in time to take advantage of this system when the Library of Congress feels that it has to move?

I hope no one will go away from here today without remembering something that has been said repeatedly, and which will bear reiteration: we simply have to have an authority file that can be used by everybody. I do not see how that is going to be possible without following what the Library of Congress has proposed.

Is there any chance that we might be able to look to LC as a direct source of machine-readable records? I think there are already danger signals as far as regional bibliographical systems are concerned. The data base is already becoming immense; it is going to become much greater, and there are major difficulties in maintaining it.

Finally, I wonder if perhaps we might be worrying a little too much about subject access. Those of you who have read Ben Lipetz' bench mark study on this realize that subject access is not of prime importance to our users. It is not even the indispensable thing in a research library. As a matter of fact, it is surprising how little subject access comes into play in a big collection.

Is there any chance that we could rely more heavily on the Mansell Catalog as a retrospective record and not worry as much as we do about the fate of the existing system?

The division of the catalog into two parts does not concern me any more than having the book collection divided into a couple of parts in the stack. Any scholar who does research in depth is likely to work in a half-dozen libraries. The fact that he might have to work in two files in one of our libraries, I think, is something that users will soon adjust themselves to. Right now we have supplemented our card catalog with a computer-output microfilm in-process list. People learn to use this with ease, and they are glad that it is available. This suggests to me that we should not underestimate the capacity of our users to adapt to new developments.

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MR. BASIL STUART-STUBBS: Question: why are you hitting your head on the wall? Answer: because it feels so nice when I stop. That is such an old joke that it does not get many laughs, but I cannot comprehend the orgiastic pleasure that we are all going to experience if eventually we conclude that we are all going to close card catalogs. I do have this feeling of conservatism welling up from the audience that there is just going to be a tendency to go on studying the problem and delaying the decision.

Now in terms of my library, I have already made that decision: we have to close the card catalog. We have to close it because it is costing too much, and it is going to cost more, and we have to close it as Mr. Rogers has to close his for reasons of physical space.

I also have to be concerned about the fate of the National Union Catalogue in the National Library of Canada, because I am the Chairman of the Task Group investigating that. We have investigated that now for three years, and we are still looking at the complications of closing catalogs, but I am equally convinced that that has to stop too, and there is only one replacement, and that is a machine-readable catalog.

But how do we take advantage of machine-based systems soon? It is all very well that terminals are becoming less expensive. I do not think the

users are ready for terminals, so there has to be some intermediate step that we explore to make the machine-readable information available to the users. So I am going to take this opportunity to ride a hobby horse and to describe for you the approach we plan to take in dealing with our own catalog.

As part of the inquiry on behalf of the Canadian Union Catalogue, I made a trip to England in 1973 to look at the use that the British libraries, (mostly public, one or two university) were making of computer-output microform (COM), and I was persuaded by what I saw that in computer-output microform, we have the intermediate answer between the conventional catalog and the on-line catalog and the sophisticated users who will be able to use terminals as simply as they are able to drive cars.

There are great virtues to computer-output microform, and several people have already mentioned that they are using them for in-process files in their libraries. It is very inexpensive in comparison with conventional forms of printout, and certainly in terms of maintaining card catalogs. It is easy to create. It is easy to accumulate. You can put in a lot more information than you can on paper printouts. It is very compact. It is easy to copy and the content is flexible. It is as flexible as anything that you can dream up with a machine-based system.

Here I would plead with people to stop thinking card catalogs and start thinking in terms of machines. That is now the way to go. You can do many more things with machine-readable records. You can present your information in different ways. We seem to be tied to the notion that everything is going to be just as it was. We are trying to reproduce something that really is as dead as a dodo.

Obviously COM has its uses in branch libraries, but it also has its uses in networks. I am sure that many of you are in the position that I am in -- as the major library in the region you are going to have to play some kind of role as a resource library and how can you do that unless people have copies of your catalog? I suggest that COM is an answer, long before the terminal will be an answer. One could go a step further. Why do we have individual catalogs at all? Ultimately I can see the possibility that through the machine we may no longer have individual catalogs, but will simply tap into one giant catalog, probably based on regional or state or provincial lines. The other aspect of machine-readable systems that is attractive to me is the possibility of taking totally new approaches to the way we present information.

The other thing that the British experience persuaded me of is that we really give the users more information than they need. It was easy enough to do when we printed everything on the card, one card after the other off the same die. You do not have to do that anymore. For purposes of locating materials, which is really what most of our users want, you do not need all that stuff. You can keep the bibliographic information somewhere else, or you can produce it when you really need it, but you certainly do not have to burden the system with that information.

It is all very well to divide catalogs, but what about the retrospective one? I would suggest here that there is a need for research into the microfilm reproduction of retrospective catalogs. It is being done as, for example, in the Illinois IMAC Catalog. But if we start using COM in the one direction, we need something that is compatible and consistent with COM in the other, if we are not going to have two pieces of machinery to deal with.

There again, I suggest that the conversion of retrospective catalogs to microfilm for purposes of dissemination to branch libraries within networks and so on may be an intermediate step, but I am not going to do a RECON project. I am going to wait for everybody else to do that. Everybody else is taking the same line. Eventually we may get it together. There may be one machine-readable data base. We may all tap into terminals, but I think right now, when we are all faced with these space and economic problems, it is time to look for an intermediate solution, and I suggest again that it is COM.

I want to draw your attention to two papers that you might want to consider if you are not familiar with this medium. One is by Joseph Becker entitled "Computer Output Microfilm (COM) for Libraries" in the UNESCO Bulletin for Libraries for September-October, 1974. There is another excellent article by Elizabeth Stecker, which is in the Australian Library Journal for September, 1974.

I will conclude my remarks with a word on user access and approach to microforms. Actually, we have found that the users are not concerned about the fact that they have to use a microfiche instead of consulting a list or a card catalog. They adapt very readily, but we have trouble with reference librarians. They are the most conservative people in the whole world, and my answer to those reference librarians is this: I have got a responsibility too. My responsibility is to the public, and the way I use their funds, and I feel that they, too, stubbon though they are, will have to adapt.

* * * *

Discussion

MR. WELSH: Just a few quick comments. The reason I gave the history statement was to anticipate the questions that Judy Corin would ask about our dialogue with the library community. I did make the presentation, I am going to remind you again, in 1969 to the Technical Services Directors, your people, and there was no response, nor did I really expect one. But I wanted to begin the dialogue. This meeting is, I believe, the fruition of that beginning.

There were a number of reasons why we thought that the question had to be brought to the floor. One was superimposition. Another was the complexity of filing rules. It is becoming more and more difficult at the Library of Congress for the filers to understand our filing rules. John Rather came up with a new set of filing rules which we would like to adopt. We cannot adopt them, however, for the retrospective catalog. Romanization or transliteration,

as Mr. Rogers said, was another problem. The deterioration of the card catalog, both the intellectual and physical deterioration is a source of difficulty. We wanted to make some subject heading changes. And, as Mr. Rogers also said, space is a problem. All of these considerations were brought to bear, and they are in the documentation that we presented.

The question of superimposition was something that I thought we could deal with separately, and I naïvely made some representation to that effect when we came up with the term "desuperimposition." Now I leave you with the thought that we are talking about "undesuperimposition." Cornell, Indiana, Northwestern, UCLA, and Berkeley all have made strong representations that we postpone the decision on desuperimposition. Tomorrow at the meeting of the Technical Services Directors, we will probably have a show of hands which will result in our decision to delay it.

The reason we advanced the timetable on abandonment of superimposition was because of the great interest on the part of the participants in the CONSER effort. It was determined, and I think there was unanimous agreement, that it would be desirable in the development of this serials data base that we follow one set of cataloging rules. That remains, I think, a desirable goal. There are other considerations now that have been advanced that suggest that we will have to reconsider that. Incidentally, the British Library approached us a number of years ago and suggested that the Library of Congress and the British Library join hands in closing the catalogs together. They had in mind some strange date of 1976.

And the last question Mr. Rogers raised we can answer this way: among our proposals to the National Commission was one that we establish a bibliographic distribution service that would rework the Card Division concept. We recommended that we provide on-line access, all sorts of access, bookform catalogs, cards if you want them, but on-line, if it suits your particular need.

We are prepared to deal with this problem. We are here to communicate. This is a very difficult situation because, as I meet with you now, there are some school librarians out there saying that we have not met with them. There are public librarians out there making the same charge, but we believe that our first constituency is in fact the research community. So let us hear your questions.

MR. DAVID WEBER (Stanford University): Did you say, or would you indicate, when you may be on-line for remote access from other universities or research libraries?

MR. WELSH: It will be several years away. I am not going to make any promise that I cannot deliver on, and this, as all of you know, is a very complex question. We do have to get our authority files up. We are moving on very rapidly, but my own view is that every effort in automation takes much longer and is a lot more costly than anticipated.

MR. JOSEPH LEITER (National Library of Medicine): I commented to John Rather that the larger the library, the sooner the problems come to it, and the more difficult and longer it takes to reach a solution. I listened to what seemed to be a generally favorable approach, but there appears to be some concern about moving too rapidly. My only concern would be that since the Library of Congress has made the decision to act, that our principal objective is to see that they do it, not to raise any questions about things that they should not do.

I am a little bit distressed that there are some pressures on Mr. Welsh to defer the superimposition or whatever you want. I do wish to remind you as a nonlibrarian, that libraries have existed hundreds of years before this and will exist many years thereafter, and that the time is in favor of change. The sooner you make the change, the better off you are. Time will take care of it. Do not think in terms of your problems; think of problems of the future. There has been every indication that the longer you defer, the more costly it is. It has also been emphasized that you look at the economics, and what it is going to cost you if you do not act, as well as if you do. Any rational analysis of this will indicate that the time to do it is as soon as possible, and any deferral is going to cost more.

MR. DAVID SPARKS (Notre Dame University): I would like to speak to the question of transliteration. I hope we do not see this as too much of a problem. The Western European and American libraries got themselves into what I think is a pseudoproblem of transliteration. I do not see why it is not possible for the Library of Congress to print a Cyrillic catalog or Arabic catalog. As a matter of fact, the British Museum and the Bibliothèque Nationale do adopt this approach in certain languages and scripts, and our third world librarians are going to vote for multiple script libraries. I would hope that this did not become a difficulty for us. Regarding the question of automation, you have only to look at the Swiss bankers who are able to produce balance sheets in Arabic for AMCO. There are technical devices for computer people who can handle multiple scripts. I just hope we do not waste time on a problem which may not be a problem, and give more thought to this.

MR. STUART-STUBBS: We did look at the question of the Cyrillic, Arabic and Oriental scripts in relation to the Canadian National Union Catalogue, and concluded that we might as well have a separate manual file for as long as we can build it, because of the number of times the Catalogue is actually assessed for these things. I do not know what the situation is in the U.S., but there is a very small minority of the academic community that is able to read those languages. I really ask myself: Is it worth the effort of transliterating, keypunching and all that for that small minority? I would just as soon have a separate catalog, and they may be happier for all I know. It just does not make any sense to me when I open the Catalogue and find many languages in there that I cannot read.

MR. SPARKS: The truth is that the people who can read these languages are better served by having the language presented in their original form. I believe that Mr. Rogers will testify that as far as the East Asian libraries

at Yale are concerned, they have a separate catalog which I believe is in the ideographic scripts.

MR. ATKINSON: I am getting letters from the Chinese and Japanese who have realized that the cost of original cataloging or manual cataloging is high enough so that it means a delay in processing of about half the number of items that are received in the library system. There is a big backlog in those languages. These users are perfectly willing to say we would rather have them translitered if it means getting the items on the shelf more quickly. I am beginning to get letters from the departments suggesting that we stop producing cataloging in the vernacular, not because they would not prefer it, but because it causes too much of a delay. The foreign language librarians are opposing this, but the department tends to win under such circumstances.

MR. WELSH: We are conducting an experiment now. One of the results of the Nixon-Brezhnev agreements is that the USSR and the U.S. are exchanging tape in machine-readable form. We have agreed to send the USSR tape on a small collection of English-language records. They, in turn, are going to send us a tape. The tape will go to the Atomic Energy Commission, and AEC through one of its programs will do the transliteration to see whether they can reduce the high cost of this process.

MR. HYMAN KRITZER (Kent State University): I am a little surprised that Frederick Kilgour is not here. What consideration is being given at the Library of Congress to more formal relationship with OCLC?

MR. WELSH: Mr. Kilgour has just recently invited us to send staff to his various advisory committee meetings. We are enthusiastic about OCLC and all the other networks. We believe that all of our efforts will increase OCLC capability, including on-line. If Mr. Kilgour can access our data base on-line, if that proves to be economically feasible, this is the right direction. All of our additional cataloging that we are talking about converting into machine-readable form will, of course, move in that direction. So we are trying to work closely with OCLC.

MR. BEN BOWMAN (University of Rochester): Should not the CONSER be mentioned in response to that?

MR. WELSH: Mr. Livingston is going to present a paper this afternoon that will tell about the close relationship between the Library of Congress, the National Library of Canada, and the other participants in the CONSER effort. A contract has been signed with the Council on Library Resources, which has agreed to manage the CONSER effort. This has really quickened the pace considerably.

MR. DE GENNARO: Seeing that there are no further questions, I thank the participants for this most interesting program.

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APPENDIX A

THE LIBRARY OF CONGRESS CARD CATALOG; AN ANALYSIS OF PROBLEMS AND POSSIBLE SOLUTIONS

by

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BACKGROUND

In reviewing the condition and performance of the Library's devices for bibliographic control, Processing Department officers find that the card catalogs are beset by major problems and inadequacies. Some of these shortcomings are attributable to the size of the catalogs; some to the conditions of their use; some to the need to improve their responsiveness to the requirements of the staff and of the public. This paper describes the condition of the card catalogs; expounds certain problems in their construction and management; suggests solutions to the problems; and explores the prospective advantages and disadvantages of these solutions.

Size

The present size and projected growth of the card catalogs through 1975 are shown in Table 1. The size of the catalogs is a function of the size of the classified collection. Their rate of growth is a function of the Library's acquisition program. Since the volume of acquisitions tends to expand, there is little reason to expect a decline in the annual growth of the catalogs.

It is obvious that maintenance of catalogs of this size is a very expensive enterprise, requiring increasingly large allocations of equipment, space, and staff. Certain other consequences of large catalog size also are self-evident:

1. The larger the catalog, the higher is the unit cost of adding an entry to it. The rise in cost stems from the increased time required: 1) to establish personal and corporate names that are distinguished from those already in the catalog; 2) to establish and revise subject headings; and 3) to file the entries. There is no effective way to prevent an increase in this unit cost as the catalog grows.

2. As the catalog grows, the addition of tens of thousands of new headings and the distinctions they require make it more complex. As a consequence, searching becomes increasingly difficult for the staff and public, and browsing is inhibited as large numbers of entries accumulate under many headings.

Table 1.--Size and growth of the LC card catalogs, June 1971-December 1975

Catalog	Numbers of cards June 30, 1971	Additions per year[1]	Estimated growth July 1, 1971-December 31, 1975	Estimated size December 31, 1975
Main	15,994,000	782,000	3,519,000	19,513,000
Official Name/title (65 percent)	(11,838,000)	(594,000)	(3,673,000)	(14,511,000)
Topical (35 percent)	(6,375,000)	(320,000)	(1,440,000)	(7,815,000)
Total	18,213,000	914,000	4,113,000	22,326,000
Both catalogs	34,207,000	1,696,000	7,632,000	41,839,000

[1]For this estimate of annual additions to the catalogs the number of new titles cataloged in 1970-71 (225,000) is taken as a constant figure for future years. This results in a conservative projection of catalog size, since new cataloging is more likely to increase than decline in volume. To this base figure of main entries for each catalog is added the associated non-main entry cards which these entries will generate: added entries, subject entries, authority cards for new name and subject headings, cross-reference cards to these new headings. There are two reasons for the difference in the figures for the Official and Main Catalogs: 1) authority cards are filed in the Official only, 2) cards for works cataloged but not added to the collections are filed in the Official only.

3. The larger the catalog the less responsive it is to change. expense of making changes tends to inhibit the adoption of better c rules for entry and heading, the revision of outmoded subject headi the introduction of simplified filing rules.

Editorial Condition

A card catalog can, in principle, be kept continously up-to-dat additons and changes as the need arises. However, this apparent fl entails certain disadvantages as inescapable corollaries. The proc adding, withdrawing, revising, cancelling, and returning cards to t is subject to human error. Careful supervision can reduce the rela incidence of these errors, but they grow in number as time goes on. in the course of the 70-year development of the Library's catalogs, been possible to prevent sizable accumulations of deficiencies in t respects:

Filing: misfiled cards in the Main Catalog estimated at five percent

Call numbers: incorrect, illegible, missing

Headings: discrepancies, conflicts with cross references

Cross references: obsolete, missing

Entries: cards missing, superseded cards not removed

Guide cards: inadequate in number and content

Physical Condition

Cabinets for a card catalog are expensive and trays become brok require replacement. These and related factors are part of the cos taining a growing card catalog that is subject to hard use. The in condition of the card catalogs has a more direct bearing on their s ability. Inevitably, there are many worn and mutilated cards, part the Main Catalog. This physical deterioration requires the adoptio increasingly extensive countermeasures if the catalog is to remain and reliable instrument for access to the collections.

Preservation

Consideration of the problem of physical deterioration leads di a recognition of our responsibility to preserve the integrity of th catalogs. Their vulnerability to multilation, damage, or loss of e one of the adverse consequences of the flexibility of the card form There is also a need to safeguard the catalogs against major damage hazards to which all property is exposed.

Staff Considerations

Implicit in these observations is the need to maintain and enlarge a staff capable of and interested in performing a variety of highly technical tasks. In recent years the Library has barely managed to recruit and train a staff that can keep abreast of the current work load. Unfortunately there is evidence that even this marginal situation may not be attainable in the future. Jobs that require stamina, mastery of intricate procedures, and willingness to perform repetitive tasks are not attractive to many applicants.

IMPROVEMENT OF BIBLIOGRAPHIC ACCESS

It has already been observed that improvements in the catalogs are needed to make them more responsive to user requirements. The deficiencies that should be remedied are a direct consequence of the size of the catalogs because, given the need for consistency, the expense of changing old practices inhibits the adoption of new ones. The importance of three critical areas justifies further elaboration.

Cataloging Rules for Entry and Heading

The publication of the Anglo-American Cataloging Rules presented the Library with the opportunity to adopt the beneficial results of a thorough restudy and revision of the rules for entry and heading--an activity in which it had played a prominent part. The difficulties of such adoption were, to be sure, obvious: the choice seemed to lie between establishing a new catalog or revising all headings that were in conflict with the new rules. As a compromise (called "superimposition") the new rules were adopted for choice of heading but not for form if the heading is already established. Thus the benefits of the new rules have been withheld in considerable measure, not only from the Library, but also users of our bibliographic services, except at the cost of users revising our printed cards.

Subject Analysis

Of the two means of subject access to the Library's collections, classification is not affected by catalog size and organization since we do not maintain a classed catalog. In the case of subject headings, however, there is an integral relationship. For two obvious reasons a subject catalog is in a state of constant change: new fields and topics and new relationships between established subject areas are developing, and present topics are being given new names. New terms can be accommodated in our subject heading system and in our catalog, although the form of the new heading may be adversely influenced by the desirability of conforming to an established pattern. Changes in headings, however, in catalogs the size of ours can only be accommodated at great expense.[1] Since we have not always been staffed to keep

[1]In fiscal year 1971, 702 subject headings were changed or cancelled. The number of cards affected is not known. No record is kept of the number of headings that should be changed but are deferred for lack of resources to carry out the work.

up with the cataloging of current accessions and also to revise headings to reflect changes in usage, semantic shift, abandonment of earlier orthography, and similar matters, many inconsistencies and anomalies have developed in our subject heading list. Moreover, the number of entries under many subject headings has grown so large as to make the resulting file of questionable service for common reference purposes.

Filing Arrangement

It is generally agreed that our filing rules are complex, that they require of filers and users a knowledge of distinctions not evident in catalog entries, and that they abound in exceptions. As long ago as 1956, the Library's Processing Committee recommended the adoption of certain alternative rules to effect simplications and improve entry arrangement, but it was not possible to introduce them into the catalogs. A more thoroughgoing revision of the LC rules has been completed[1] and is now under study in the Library. The Processing Department is persuaded that they would greatly improve the efficiency of catalog maintenance and use. At the same time there is no doubt that applying them in the present catalogs would be an undertaking of very great difficulty.

GENERAL CONSIDERATIONS ON CATALOG PLANNING

The problems and inadequacies of the catalogs are under continuing study by Processing Department officers. In the effort to find measures to forestall or alleviate them, we have considered many alternatives and have attempted to assess the probable effect of certain future developments on the catalogs.

The Library's automation program is an important element in these studies. Our consideration of this program has led to the following assumptions and conclusions:

1. The Library will eventually succeed in establishing a machine-readable bibliographic store that provides access at least to current materials in the classified collections.

2. This store will provide improved means of access to those parts of the collections and will be the preferred instrument for many kinds of searches.

3. The date at which sole or principal reliance can be placed on the machine-readable bibliographic store for access to the collections is indefinitely far in the future.

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[1]Rather, John C. Filing Arrangement in the Library of Congress Catalogs. Provisional version. April 1971.

4. This and other libraries will need to maintain card catalogs of their collections for an indefinitely long period.

5. Therefore, solution of the problem or amelioration of the conditions of the present catalogs should be effected as soon as possible.

6. Plans for these catalogs should take account of the growing machine-readable data base so that the manual and machine systems will develop as complementary means of access to the collections.

SOLUTIONS AND ALTERNATIVES

The fundamental tenet of catalog construction is that works by and about an author or works about a topic should be brought together in one place in the catalog. This principle underlies the practice of establishing the form of heading for persons, places, corporate bodies, topics, etc., and using references from alternative forms to allow a variety of access points. In the absolute sense, this principle can be satisfied only by a single, open-ended catalog, provided that it remains continuously responsive to its users. As has been shown, however, the policy of revising older entries when a heading is changed entails many problems and a catalog with millions of entries gradually becomes so ponderous that it cannot be readily and economically kept up-to-date. This circumstance forces us to consider ways of modifying the pattern of catalog construction to achieve a viable compromise between principle and practice.

Two ways of altering the pattern of catalog construction are worth considering:

1. When an established heading is no longer desirable, the preferred heading could be established without changing any entries under the old heading and both headings could be linked by explanatory references.

2. All or part of the catalog could be closed on a given date and a new catalog begun. When a heading existed in different forms in the two catalogs, a reference could be made only from the new catalog to the old one, or references might be put in each catalog.

Linked Headings

The linked heading technique has the following advantages:

1. When usage changes, new headings can be adopted without having to revise old entries; thus, it becomes economically feasible to make the catalog responsive to user expectations.

2. Using up-to-date headings substantially increases the probability that a user will find a desired material directly instead of having to reach it through a reference.

3. Rationalization of the pattern of headings in a given category (e.g., Libraries) will enable a user to more readily predict the form of heading for a topic that interests him.

4. Old and new literature would tend to be divided when two headings for the same subject appear in the catalog.

The disadvantages of the linked heading technique are:

1. The technique is not serviceable for all types of changes. For example, while some unsatisfactory headings can be matched one-to-one with their preferred forms (e.g., Aeroplanes to Airplanes), the division becomes inexact when there is general acceptance of a new term representing an aspect of another topic or topics (e.g., Political sociology developing out of both Political science and Sociology). In the case of name headings undergoing slight changes (e.g., American Society for Testing Materials to American Society for Testing and Materials), the existence of two adjacent groups of superficially similar headings would be confusing to filers and users.

2. This technique appears to preserve the single catalog, but in fact it would result in maintaining two catalogs in the same physical apparatus whenever a heading was changed. For example, to see everything under a topical subject heading that existed in two forms, a user would have to look in two places that could be as widely separated as if they were in different catalogs.

3. The coexistence of separate groups of entries for the same entity in a single catalog contravenes the basic principle of bringing related entries together in one place. It introduces the inconvenience of sometimes having to look in two places, but what is more serious for the user is the difficulty of making him aware that this is necessary. References have only a limited ability to resolve this problem because the mechanics of searching in a card catalog do not always lead to the discovery of every reference. Thus, a user would sometimes fail to realize that a group of entries did not constitute the totality of relevant items.

4. To provide maximum assistance to users, it would be necessary to place explanatory references with virtually every subdivision of the superseded heading. In the case of a long file like that under Aeroplanes, this practice would require making dozens of references.

5. At best, the linked heading technique can be applied only to name and subject headings; it does nothing to facilitate adoption of new patterns of filing arrangement.

Starting a New Catalog

Closing the entire present catalog and starting a new one would offer the following advantages:

1. The entire list of subject headings could be rationalized; headings that are obsolete, inconsistent, imprecise, or awkward could be eliminated.

2. The Anglo-American Cataloging Rules could be supplied across the board; superimposition could be abandoned.

3. New filing rules could be easily adopted.

4. More generally-accepted romanization schemes could be adopted for certain languages.

5. The establishment of a new subject component would have the advantage of simplifying subject searches when currency is one of the search criteria.

The disadvantages of closing the catalog are:

1. The probability of having to look in two places is increased.

2. Since it is difficult to establish an entirely satisfactory criterion for dividing a catalog chronologically, users might sometimes be in doubt as to which catalog to use.

3. At the outset, the new catalog would be serviceable for only a small proportion of the uses.

4. The decision to close the catalog acknowldeges the possibility that the new catalog may have to be closed in its turn if size again becomes a serious constraint to change.

The principal patterns for chronological division of the catalog are as follows:

1. a) Divide the present catalog into two sections: name/title and topical subject. The first part would contain names and titles even if used as subjects.

   b) Start a new topical subject catalog on an agreed date.

   c) Maintain the name/title catalog on an open-ended basis by means of the linked heading techniques.

2. a) Start a new dictionary catalog.

   b) Leave the old catalog in its present form.

3. a) Start a new name/title catalog and a new topical subject catalog.

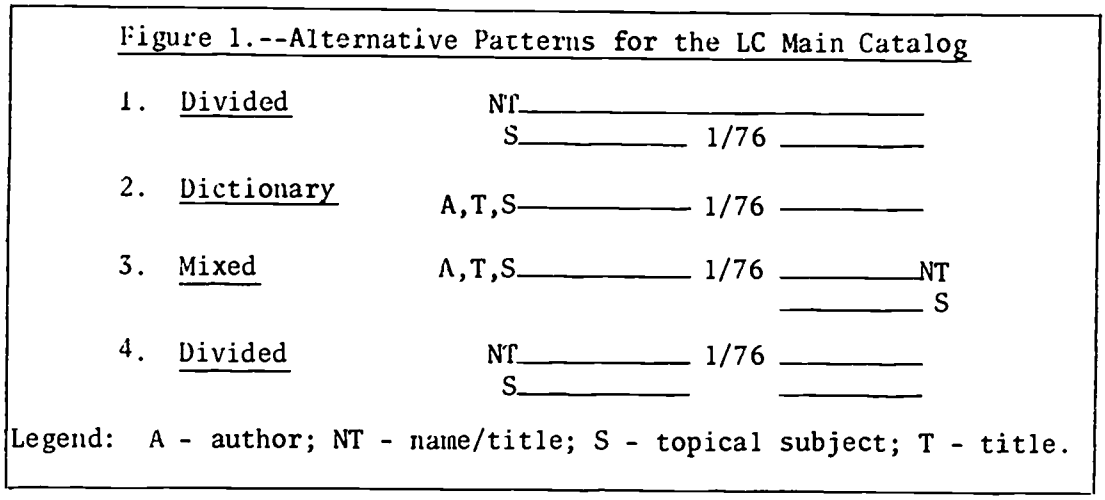
   b) Leave the old catalog in its present form.

4. A variation of alternative 3 would be to divide the old catalog into name/title and topical subject parts.

Figure 1 shows these alternatives, incorporating the suggestion that the proposed division be made on January 1, 1976.

Adoption of alternative 3 or 4 would make it possible to establish a separate title catalog for entries made after the catalog division date. A separate title catalog is an efficient tool for bibliographic searches for a known title (e.g., accessions searching). Extraction of title entries also simplifies the organization of other entries, whether in a divided or a dictionary catalog.

Figure 1.--Alternative Patterns for the LC Main Catalog



Legend: A - author; NT - name/title; S - topical subject; T - title.

Finally, a title catalog is relatively easy to maintain since filing is quite straightforward. For the sake of simplicity, this option is not shown in the figure.

Entry Allocation in a Chronologically Divided Catalog

If a catalog is to be divided chronologically, two decisions are required: the date for starting the new catalog, and the basis for allocating entries between the old catalog and the new.

In this presentation, December 31, 1975 has been used for illustrative purposes as the date for closing the present catalog. This date should allow sufficient time to prepare for the transition. Moreover, by that time the Main Catalog may have reached a size that represents the upper limit of manageability.

The second decision is the criterion for designating entries for the new catalog. From a bibliographic point of view, imprint date is the correct basis for division because, when that date is known to a user, he can be in no doubt about which catalog will contain the entry. If imprint date is chosen, the new

catalog will grow at the rate at which entries for works published in the prescribed period would have been added to the old catalog. Therefore, if the search for a new published work proved unproductive, it would have been equally unproductive in a unified catalog and it would have taken longer.

Dividing on imprint date obviously entails many difficulties, however, because consistency within each catalog could only be achieved by maintaining two modes of practice in descriptive cataloging, subject cataloging, and filing arrangement. Although the proportion of entries going into the old catalog would diminish with the passage of time, a significant number of older imprints would continue to be acquired. As evidence of this, a recent group of 3,100 titles being cataloged showed 11 percent with imprint dates more than ten years old and seven percent with dates more than 20 years old.

In view of these difficulties, cataloging date is the preferred basis for division from an administrative point of view. If cataloging date is chosen, the new catalog could still be relied on as the sole source for new imprints. In principle, it would be necessary to search in both catalogs for older imprints but, in practice, the double search would not be necessary in all cases. There would be a high probability of finding a particular work in the first catalog searched and many subject searches could be confined to the new catalog, furthermore their number would increase with time. Alternative 1 has the advantage of requiring a double search only for comprehensive surveys of topical subjects. On the other hand in alternatives 2-4 both catalogs would have to be used for all full subject surveys, order searches for older imprints not in the collections, and holdings of an author's work.

The relative merits of each criterion for division should be explored fully to identify the optimum choice.

Linking Chronologically Divided Catalogs

It is recognized that catalogs in successive time spans must be connected in such a way that comprehensive searches in all time periods can be conducted. Since works published in the period of the new catalog are to be cataloged according to new rules or procedures adopted for that catalog, it is proposed to make references between the catalogs for any new headings that differ from their counterparts in the old catalog. For example, if a corporate body is entered under place in the old catalog and under its name directly in the new, a reference under the new heading would inform users that works cataloged before a certain date were to be found under the former heading in the old catalog; a reciprocal explanatory reference would appear in the old file. New subject headings would be treated in the same way. As a way of minimizing maintenance of the old catalog, it would be worth considering whether references from the old catalog to the new catalog could be confined to cases not covered adequately by internal references in the new catalog.

References to and from name headings used in the new catalog without change would be duplicated for the new catalog. For topical subjects, however, it is assumed in advance that one result of the revision of the subject heading list will be the elimination of many see-also references.

ASSESSMENT

After considering the merits of the major alternatives in the light of the catalog deficiencies, the Processing Department has reached the following conclusions:

1. The revision of LC subject headings cannot be carried out in the framework of the present Main Catalog; closing at least the subject component is a mandatory condition for their improvement.

2. A case can be made for maintaining an open-ended name/title catalog by using the linked heading technique to introduce changes and hoping that its effect on the texture of the catalog is not too adverse.

3. Adoption of a new filing arrangement is possible only for components of the catalog that have been closed off because the cost of refiling the existing catalog is too great. If the name/title portion remained open-ended and the subject portion were started anew, only the subject portion could be filed by new rules. The result would be use of two different sets of filing rules; one for the name/title catalog as a whole and for the old subject catalog; and another for the new subject catalog. Such a situation seems unreasonable from the viewpoints of both users and management.

4. An affirmative case can be made for the proposition that subject catalogs and bibliographies are best organized on the basis of defined time periods. Thus, consideration could be given to dividing the LC subject catalogs in card form by ten-year periods. Even if this decision is not made now, a separate subject catalog has the merit of preserving this option for later action.

5. Since it will remain necessary to differentiate new personal and corporate names from those previously established, the cost of original cataloging will not be affected by the chronological division of the catalog. There should be savings, however, because the workload of revision of name and subject entries will be materially lessened. Filing costs for the new catalogs also should be significantly lower because the new filing rules will be easier to learn and to apply.

6. None of the alternatives is specifically directed to the improvement of the physical and editorial condition of the present catalog. Separate measures will have to be taken to achieve these objectives. However, closing the catalog would slow the rate of deterioriation, thereby creating a situation in which a comprehensive editing project would be of maximum effect.

CONCLUSION

Any major change in the organization of the card catalog of the Library will have important consequences, for the staff, for the public, and for libraries and other users of our bibliographic services. Accordingly the need

for change and the benefits of change must be substantial and, as far as possible, demonstrated in advance to be so.

Securing the benefits of chronological division of the catalog entails foregoing the advantages of a single bibliographical instrument. Within the obvious limits of the materials a catalog covers, having "one place to look" gives searchers a sense of confidence that an inquiry has been answered reliably. We believe, however, that a new pattern of catalog organization can be chosen that will dispel uncertainties and compensate for giving up an absolutely unified catalog.

It should also be recognized that any set of optimum objectives and characteristics of catalog organization will contain irreconcilable elements. The arrangement of a dictionary catalog containing millions of author, title, and subject entries cannot also be self-evident to the uninitiated. A catalog that displays in one place the entries for all of LC's monographs on economics cannot also give rapid access to the latest ones in the English language. Whether it is decided to prefer scientific to popular terminology or the reverse (a necessary choice for a general subject heading system), the specialist and the general reader can both be served, but not with equal efficiency. It is unnecessary to multiply instances of conflicting objectives to suggest that the inescapable necessity of formulating alternatives, weighing them in the light of stated objectives, and choosing those that seem to offer the best prospect of achieving the largest part of the Library's principal service obligations.

The Processing Department offers this review of the Library's catalog problems in the belief that it could form the basis for a Library-wide consideration of alternative solutions and so lead to the adoption of a plan by which we can confidently chart our course for the years ahead.

April 1972

APPENDIX B

THE FUTURE OF CATALOG CONTROL IN THE LIBRARY OF CONGRESS

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LOOKING FORWARD

The growth of the MARC data base and progress on the design, development, and implementation of the Core Bibliographic System[1] for processing activities are moving the Library of Congress steadily closer to the establishment of fully automated bibliographic files. According to present projections, if certain essential conditions are satisfied, the following milestones will have been reached by 1979:

1) All current catalog records, regardless of language or form of material, will be converted to MARC as they are produced.

2) The MARC data base will contain more than 1.5 million records and the Automated Process Information File an additional 250,000 records. The MARC Names file will comprise about one million names and the MARC Subjects file about 200,000 subject headings.

3) The Multiple Use MARC System will be operational. MUMS is a generalized system for input, output, storage, and retrieval of bibliographic data in both on-line and batch modes.

4) The machine organization of the data bases will allow on-line access to all of them by a variety of indexes.

5) A program will be available to produce a book or microform catalog in the register/index format.

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[1] A brief description of the Core Bibliographic System and its components can be found in "Automation Activities of the Processing Department of the Library of Congress," by Henriette D. Avram, Lenore S. Maruyama, and John C. Rather, Library Resources and Technical Services, 16:195-239, Spring 1972.

Achieving these milestones depends to a large extent on the following conditions:

1) The LC hardware configuration must be improved to support both the developmental work on the Core Bibliographic System and the volume of anticipated use when it is operational.

2) The staffs of the MARC Development Office and the MARC Editorial Division must be enlarged and space must be found for the added staff.

3) Modifications to the physical plant may be required to allow installation of on-line terminals in all parts of the Library.

If these conditions are met and present plans can be successfully completed, the Library will at last be on the threshold of a new era of catalog control over its collections. Therefore, to ensure proper development of this enhanced capability, it is mandatory to examine how the new system may function and what its implications will be for present forms of catalog control.

Catalog Use in an Automated System

The primary attribute of fully developed automated catalog control will be flexibility. First, users will be able to query the files in various ways. Second, they will have several options as to the speed, detail, and extent of the response. Finally, they will have a manual back-up device to satisfy simple queries and to avoid delays that might occur in waiting to use the machine files.

Users will be able to approach the MARC data base by truncated search keys (e.g., 3-3 author/title key, 3-1-1-1 title key, and short keys for personal and corporate names), name heading, subject heading, title, LC and Decimal classification numbers, LC card number, International Standard Book Number, and International Standard Serial Number.

Automated catalog control will allow a coordination of data elements in searching that cannot be attained in card and book catalogs. Thus, it will be possible to qualify a search by such criteria as the language of the item, date and/or place of publication, geographic area of the topic, chronological scope of the topic, and the presence of various bibliographic features (e.g., illustrations, bibliographies).

For quick response, users will be able to use the files on-line. Terminal display will be by CRT console, or, if necessary, in hardcopy from an adjacent printer. Several options for specifying the amount of detail in the response will be available. It may range from key elements to the full bibliographic record. In an on-line mode, it will be possible to browse in the name, subject, title, and call number files without having to make an exact match on the full entry. When a query yields many records, a user can either redefine the original search parameters by introducing new qualifications or limit the number of records to be examined.

When there is less urgency and long printouts are desired, queries can be processed in a batch mode. Such queries should be made far enough in advance of actual need to allow the system to respond economically. Complex searches, particularly if they involve the compilation of bibliographic listings, should be processed in this delayed response mode so that they do not interfere with queries that should be properly conducted on-line.

This is an important option because exclusive reliance on on-line access is no more valid than depending entirely on the telephone and never writing letters. To begin with, on-line access to a machine data base is obviously limited by the number of terminals installed in the system. And one can safely predict that, even if the machine configuration could support them, the cost of providing enough terminals in each location to prevent queuing at peak periods would almost certainly be too great to consider. Therefore, some form of batch processing will be a safety valve to relieve overload in the on-line operation.

Despite the attractiveness of direct access to the machine data base, some form of manual back-up is both necessary and desirable in the following situations: 1) when queuing occurs at a terminal; 2) where no terminal has been installed; 3) when reliance on batch processing would result in serious delay; 4) when certain types of browsing must be done. And, of course, the back-up device is a safeguard in the event that the machine system is not operating for some reason.

In the new system, the back-up device will be a register/index catalog in either book or microform (for simplicity, hereafter this will be called a book catalog). In this format, the register contains the full bibliographic record. The indexes by name, title, and subject present an abbreviated display that is adequate for most purposes. If it is not, the register number points to the location of the full record.[1] Simple location queries (e.g., what is the call number of a book for which the author and/or title are known?) could usually be answered more economically by consulting this printed source. If the wisdom of this approach seems doubtful, consider the fact that the telephone company goes to great expense to print directories and to promote their use. On-line telephone assistance is primarily to supply numbers not found in a directory. Surely, this practice tells us something worth taking into account.

It may be asked, why should the back-up device be a book catalog instead of a card catalog? Several compelling reasons can be adduced:

1) A book catalog can be produced entirely by computer; a card catalog requires manual filing.

2) A book catalog can be replicated inexpensively; each card catalog must justify its own creation and maintenance costs.

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[1]A fuller description of this type of catalog appears in National Aspects of Creating and Using MARC/RECON Records, prepared by the RECON Working Task Force. Washington, Library of Congress, 1973. pp. 19-21

3) A book catalog, by virtue of its compactness, can be situated adjacent to each terminal location, wherever it may be.

4) A book catalog can be formatted so that varying amounts of information are displayed for different types of access points. For example, a title index might show far less data than a subject index. This allows significant compression in the various indexes. In a card catalog, each access point requires a card that occupies the same amount of space regardless of what is on it.

The prime drawback of a book catalog is the cost of arranging large cumulations, even by computer, and the heavy costs of paper, printing, and binding. A microform catalog would eliminate the latter costs, but the expense of arranging entries would still be a deterrent to continuous cumulations.

To recapitulate: the new system of catalog control should offer a judicious mix of automated and manual approaches to the LC bibliographic files: 1) on-line access at a CRT terminal; 2) batch processing for extensive searches requiring hardcopy; and, 3) a book catalog for simple searches when a terminal is not readily available, or when the search is too undefined for efficient machine processing.

LOOKING BACKWARD

Once automated catalog control is a reality, the question will naturally arise, what about the card catalogs? By 1979, the Main Catalog will contain an estimated 22 million cards and the Official Catalog about 26 million cards. The annual rate of growth of these catalogs will be about 800,000 and one million cards respectively. The Catalog Management Division will require a staff of about 70 persons to maintain them. Even at present salary levels the manpower costs would amount to over $600,000 a year. It is hardly arguable that continuing to file cards for new entries into these catalogs when the same information is in the MARC data base would be fiscally irresponsible. Moreover, allowing the card catalogs to grow continuously would permanently saddle the Library with the old problems of maintaining them and effecting improvements. Therefore, once automated control has been achieved, additions to the card catalogs must stop.

When the catalogs are closed, what will become of them? There are two aspects of the problem: to what extent will their contents be represented in the MARC data base, and what disposition should be made of the physical catalogs themselves?

These questions could be answered most completely by undertak comprehensive RECON project. This would eventually allow the car to be discarded without further concern. However, earlier studie shown that this would be a gigantic undertaking in terms of time And unless an expensive editing project were carried out concurre would imposed on the automated catalog many of the drawbacks of s imposition, inadequate subject headings, and nonstandard romaniza Properly done, the whole job would cost millions of dollars and t to accomplish.

A middle way would be to prepare a machine index to all non-M This would be based on specially prepared brief records that cont enough information for most purposes. Availability of these reco permit the entire LC data base to be searched by computer. Given Library might be able to complete such a project at a cost commen its benefits. However, past inadequacies of the catalog would ha accepted and the disposition of the full records would still have decided.

An even more limited approach would be to embark on a selecti project. Converting all records only back to 1969, the starting complete English-language coverage, would be more feasible, but e project would be costly and time-consuming. More seriously, sinc fail to make the MARC data base comprehensive, it would not signi lessen dependence on the manual files.

As noted, only the first alternative in and of itself conclus resolves the physical disposition of the card catalogs. In the o natives as well as in a decision not to make any RECON effort, th must be tackled another way. The possibilities are:

1) Edit and publish the catalog in book and/or microform. T take time and money. The sheer size of the catalog precludes cor of its faults and even a modest attempt at editing would be extre

2) Publish the catalog as is. This has the unappealing aspe embalming the catalog, warts and all, but it may be the only prac alternative.

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[1] RECON Working Task Force. Conversion of Retrospective Catalog R Machine-Readable Form. Washington, Library of Congress, 1969.

----- National Aspects of Creating and Using MARC/RECON Records,

RECON Pilot Project. RECON Pilot Project. Washington, Library o 1972.

3) Leave the Official and Main Catalogs as they are, never replacing them. This has the severe disadvantage of leaving the catalogs dangling like albatrosses around the Library's neck forever. (In passing, it should be noted that, even if the Official Catalog is published or completely converted, it will have to be housed in the Madison Building for some time to come.)

But the really critical problem involves the bibliographic relationship between the card catalogs and the MARC data base for cataloging purposes.

Cutting the Gordian Knot

Under present policies, many cataloging functions cannot be performed properly unless the entire LC catalog is taken into account. The establishment of new name and subject headings and the assignment of new call numbers depends on the availability of complete information to ensure the distinctness of the new forms. Thus, as matters stand, the MARC data base cannot be relied on exclusively for these functions and it will usually be necessary to consult manual files as well. This will be a serious impediment to the development of a true on-line cataloging system within the Library and to the realization of a national system based on decentralized input of cataloging data.

It should be clear from the discussion of alternatives for retrospective conversion that full-scale conversion is highly improbable, and even a less ambitious project like an index would take years to accomplish. Expedients like microfilming the entire 2.2 million name authority file would allow distribution of the file to other libraries, but this does not really address automation of the file. Moreover, the information on a name is the desired one; this association often requires examination of the bibliographic records on which it has been used. For these reasons, to make on-line cataloging a reality we must cut the Gordian knot that ties the present and future to the past.

This can be done by considering the MARC data base to be complete for cataloging purposes. Taking this position would allow the following policies to be instituted:

1) The name authority file would be limited to names on MARC records and new name headings would have to be compatible only with them. The old name authority file would be used as a reference source, but there would be no requirement to use old headings or to make references between old and new forms for the same entity.

2) The subject authority file would be limited on the same basis. This would considerably alleviate difficulties in effecting changes in the form and structure of subject control.

3) The machine shelflist would consist only of call numbers on MARC records. To avoid confusion in the recovery of the physical items, a simple means could be devised to distinguish numbers that were assigned without regard to the old shelflist.

As far as cataloging is concerned, these policies would relegate the card catalogs to the status of a reference source, although naturally they would remain indispensible guides to the vast LC holdings not represented by MARC records. Radical as this course of action may seem, it offers the only hope of making the MARC data base self-sufficient in the foreseeable future. It is worth considering that, at present cataloging rates, even without a RECON project, the MARC data base will exceed the non-MARC data base in 20 years. So perhaps it is not such heresy to recommend that the future no longer be constrained by the past.

Closing the card catalogs also would afford an opportunity to make desirable changes: abandonment of superimposition, improvement in the structure and application of subject headings, and adoption of international standards for romanization (particularly for Cyrillic alphabet languages). Once the card catalogs were set apart, such changes could be made without regard to the thousands of old cards that would otherwise be affected.

Of course, the problems of updating the MARC data base would still remain. It now includes more than 500,000 records and by 1979 it will have grown to 1.5 million records. Since many of these records will embody defects of the present manual system, it would seem logical to take immediate steps to prevent the growing data base from becoming a graveyard of past derelictions. Nevertheless, because major changes would have a serious impact on existing card catalogs both at the Library and elsewhere, it seems advisable to defer such changes until a complete break with the past can be made.

Implications for Other Libraries

Since the Library of Congress is the primary source of cataloging data in the United States, changes in its policies and practices have a significant impact on libraries that use these data in their own catalogs. Thus, if a new LC catalog is begun under the conditions described, continued acceptance of LC cataloging data--whether in machine, books, or card form--will require major adjustments on the part of individual libraries. If new LC cataloging data were no longer invariably compatible with older LC records, what would be the best course of action for a user library?

There are five methods of making cataloging changes when they affect headings on existing entries:

1) Revision of the old entries by reprinting or by handwritten corrections.

2) Relocation of the old entries without change under a guide card for the new heading.

3) Superimposition: continued use of old headings even for new entries. This would mean that a library using LC data would have to make the headings conform to its own catalog.

4) Linked headings: allowing groups of entries to appear under both old and new headings which are linked by reciprocal references.

5) Starting a new catalog.

Libraries that have automated or plan to do so would probably decide in favor of starting new catalogs. Libraries with no immediate expectation of automating could consider the feasibility of making whatever adjustments are necessary to assimilate new LC entries into their existing catalogs. It is reasonable to suppose that large research libraries would prefer to avoid the expense of this approach, whereas smaller libraries might prefer to adjust their old entries as the need arises. In each case, the choice of method would be influenced by local factors such as funding, staff, and physical plant as well as the concurrence of the library's users.

It is regrettable that cutting off the non-MARC components of the LC catalog would create problems for libraries using LC data. Nevertheless, the action would benefit them in the long run, for it would make possible a machine-readable data base with name and subject authority information that is complete in itself. This, in turn, would lay the foundation for a national library network involving the decentralized input of cataloging data. On the other hand, if the ties to the past are not severed, the MARC data base will remain insufficient for cataloging purposes no matter how large it grows. Thus, to realize the full potential of automation, we must free ourselves from this constraint. As has been truly said, no one can walk backward into the future.

SUMMARY AND CONCLUSIONS

At the present rate of progress an automated system of catalog control using the MARC data base will be available by 1979. Timely development of this system is contingent on resolution of basic problems relating to hardware, software, staff and space.

The prime characteristic of the new system of catalog control will be flexibility. Bibliographic data will be available on-line, in a batch mode, and in book or microform.

When all current cataloging is being converted to MARC, the card catalogs should be closed. For cataloging purposes, the most radical but realistic decision would be to regard the closed catalog only as a reference source. According to this policy, the MARC data base would be complete in itself, thus allowing name headings, subject headings, and call numbers to be established solely with regard to related elements on MARC records. The non-MARC catalog entries could then be considered for publication in book or microform.

These are decisions that cannot be taken lightly, especially in view of their implications for other libraries. Nevertheless, the immediate difficulties will be far outweighted by the long-term benefits of the new system of catalog control and the enhanced possibilities for collaborative effort on a national scale.

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APPENDIX C

CATALOG CUTOFF

by

Joseph A. Rosenthal

Catalog size presents, or soon will, a serious complex of problems for most American research libraries. The difficulties are manifold: space and its related cost; the cost of cabinets and related equipment; increased costs and difficulties of filing into catalogs of enormous and growing size; complexity of arrangement which makes the catalogs more and more error-prone, and, even if "perfectly" arranged, makes reliable and facile access difficult for all users; obsolete headings; maintenance (correction and change) tasks which become severe when large numbers of cards require alteration because of changes in cataloging rules or forms of headings; protection, preservation and replacement of cards which are subject to mutilation, deterioration, and loss.

As with all complex problems, no easy solution exists. One avenue, however, does provide opportunity to solve or at least to alleviate many of the difficulties: a chronological cutoff of existing catalogs and the beginning of new ones. At least two major libraries have taken this step: The National Agricultural Library and the Research Libraries of The New York Public Library. A number of others are contemplating such a decision, and it is widely known that the Library of Congress is among those considering the move. Most other libraries are hesitant to act before LC's decision is known, and for good reason, since related changes in policy which may accompany a cutoff of the Library of Congress catalogs could have profound effects throughout the library community.

Would a Library of Congress cutoff apply to all of the catalog or only to some portion (subject entries, for example)? Would a cutoff enable the Library of Congress to abandon the superimposition policy adopted when the Anglo-American Cataloging Rules were published? What filing arrangements might Library of Congress adopt for new catalogs? What would be the relationship of Library of Congress's internal policies and practices regarding the new catalogs to catalog data distributed through the Card Division, the MARC tapes, and the National Union Catalog? What policies would be adopted regarding continuing serials (especially monographic series) which overlapped the chronological span of old and new catalogs?

Although chronological cutoff itself poses major problems in planning, technical execution, and resultant access to bibliographical data, the case in favor will probably become stronger as the passage of time intensifies the ills of the present catalog systems. The renaissance of book catalogs,

the emergence of microform catalogs, and the rapidly increasing incorporation and utilization of bibliographic data in machine-readable form all provide significant alternatives to card catalogs as we know them.

Time -- on the order of several years -- is necessary to plan for this sort of change. If the decision of the Library of Congress on this matter remains in doubt for the indefinite future, it is likely that several other major libraries will decide on a catalog cutoff within the next year or two. As a result, increased diversity in cataloging practices and policies, and increased difficulties in merging of records for a national bibliographic data store may well occur. In view of the multiple advantages to research libraries and their users which might accrue from closing catalogs in concert with the Library of Congress, a thorough examination of the questions, and a consequent decision (or series of decisions) should be attempted at the earliest possible date.

May 1973

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