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Photoduplication in Libraries

JAMES E. SKIPPER, Issue Editor

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Introduction

JAMES E. SKIPPER

For the past several centuries the codex book and, more recently, the periodical, has been the dominant medium for the transmission of ideas. During this time great progress has been made in the techniques of reproducing the printed page and in developing effective bibliographic control over the contents and location of titles.

The use of photographic methods for recording and transmitting information is relatively new. Although the principles of microphotography have been known for a full century, it is only in the last twenty years that photoduplication has come to have real significance for libraries, and only in the past decade have most of the large microtext subscription projects been developed. Considering the fact that we have not completely solved the problems of the book, it is little wonder that today we are trying to extricate ourselves from the bibliographic complications inherent in this new medium.

It is generally acknowledged that photoduplication will not cure all of the ills of the library. It is further recognized that microforms will not replace the codex book but will supplement it as a method of obtaining lesser used material. However, it is in this precise area of “lesser used” materials that most problems of a library occur. This is the area which has most of the poor paper, the greatest bulk, and represents the largest expenditure of money for acquisitions, processing, and servicing. It is in this area that most of the photographic opportunities lie.

What should be produced on microforms, by whom, in which format, and how should they be distributed and bibliographically controlled? It is generally accepted that newspapers and similar materials are prime candidates for photocopying because of their bulk, poor paper, binding cost, and rapid decrease in popular demand. For a

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number of years commercial companies have been filming and selling prints for a variety of newspaper titles. Some libraries have also sold prints as a by-product of local filming.

More recently, libraries have come to the realization that pride of possession for much of this material was an expensive illusion. Their needs could be adequately met at a lower cost by cooperatively subscribing to the creation of one master film which could be borrowed from a central location when needed. The development of the Xerox-Copyflo method of electrostatic enlargement printing from microfilm should do much to promote the concept of a central file of film with selective orders for needed items, rather than simply spending money on an unselected mass of titles which happen to be listed in a bibliography or pertain to a particular subject.

The minuscule characteristics of microforms should make them ideal for interlibrary lending, and indeed, many reels of newspapers and dissertations are exchanged. However, how many of us have borrowed or lent an item from the Microcard Rolls Series, the Microprint Evans’ project, or a volume of the Sessional Papers? A union list of materials on microfilm has been compiled in Southern California. Is this type of regional or national bibliography necessary before the lending of microforms will be as effective as lending the book?

We accept the fact that reel microfilm is most suitable for newspapers, and that text material can be used satisfactorily on most types of microforms, but how satisfactory is it to use a bibliography, an index, or a documentary source work on microform? What complications will the scholar face when using the Monumenta Germania Historica on microfiche, or Migne’s Patrologia on microcard? Why should we not have some method of examining and reporting on this type of problem, just as we have expert reviews of books?

Is it always desirable to have cards in the public catalog for all titles held on microforms, or will printed bibliographies suffice? It can be argued that Pollard and Redgrave, Tremaine, Sabin, Sowerby, and Evans are sufficiently well known by the scholarly community to serve as an index to the microform files. However, this type of bibliographic control by familiar association does not exist in a check list of several thousand assorted microform titles selected to represent a subject or a chronological grouping of material. If cataloging is desirable, should the producers of microforms be expected to provide “cataloging at source,” or to actually furnish the cards as an integral part of the subscription? It is interesting to note that the International
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Documentation Center in Sweden is providing catalog cards for all the microfiche titles that it issues.

What type of bibliographic control is needed for the individual titles of newspapers, books, serials, documents, and manuscripts that are being produced in an ever increasing number? Is it sufficient to report titles in the National Union Catalog, or should these microforms be recorded in a separate listing such as the Union List of Microfilms? The Microcard Foundation issues a consolidated catalog, and individual microfilming companies publish lists, but is there a need for a master "Microforms in Print" catalog which would integrate the titles available from all commercial producers?

"Sales catalogs" of microforms produced abroad have started to make an appearance, unknown to many librarians. Should not these catalogs also be consolidated to avoid the necessity of having to solicit and work with a variety of individual lists? It takes quite a bit of digging to discover whether the Journal of the Marine Biological Association is available on film. It happens that this title, as well as many other unique offerings, are available from an English commercial firm.

How many librarians are aware of such catalogs as the following: Microtheque-Française. Catalogue des microfiches et microcartes editee en France; Hungarian Academy of Sciences. Library. Catalogue of the rare Hebrew codices and manuscripts and ancient prints in the Kaufman collection reproduced on microcards. Budapest, 1958; Duchein, Catalogues des microfilms de securite et de compléments conserves dans es Archives des départements, Paris, 1955. There are a score of additional catalogs representing institutional holdings on microforms from Cracow to Panama City. The present situation would certainly suggest a bibliography of microform bibliographies that would extend the recent list compiled by J. L. Dewton at the Library of Congress.

The problems which have been noted are only a few of many which are considered by the contributors to this issue of Library Trends. Several of the articles cover topics which admit positive suggestions or solutions to library photographic problems. Other writers are concerned with difficulties for which there seems to be no immediate answer. It is believed that a major contribution has been made if some of the difficulties in photoduplication have been defined, since, once a problem has been accurately circumscribed, the solution is more easily attained.

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LESTER K. BORN

The history of microfilming operations in libraries has its origins in the development of predecessor programs that employed antecedent methods. (A statement of the obvious is always a safe beginning.) Certainly no one would deny that copying is a very old and time-honored method of acquisition. The institutional and private libraries assembled before the advent of printing could have acquired duplicates of works in other libraries by no other method than copying. Nevertheless this writer does not propose to begin his selective historical synthesis of microfilming operations by a recital of the wonders of the medieval scriptoria.

In the modern period manually produced transcripts of records and other manuscript materials, whether these transcripts were handwritten or typewritten, were the direct forebears of the great filming projects that were to start in the second quarter of the twentieth century. Transcripts, as everyone knows, were limited in use to producing copies that would enable a reader to exploit the text of an original otherwise inaccessible, or accessible only at very great expenditure of time, effort, and money. To a great extent photography in its first applications as a library tool was likewise an acquisitions tool. Its more economical successor, for a great many purposes, was photostat. This method, although not cheap, was inexpensive enough to permit its general use in replacing the original copy under a number of diverse circumstances: in lieu of interlibrary loan when only a small number of pages out of a bound volume was the desideratum; reproduction of manuscript or printed material so fragile or costly that a facsimile substitute was desirable for all but the exceptional uses and users; replacement of lost or mutilated pages (or even entire volumes) by a reproduction made from another exemplar; and, of course, acquisition of materials not available in original form.

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It was not until the advent of microfilm (which, for general discussion, may be placed in the third decade of this present century), however, that reproductions could not only do what they had done heretofore, but could also reduce space required in repositories, reduce costs (under varying sets of conditions and on the basis of varying criteria) in the custodial aspects of library management, eliminate binding of ephemeral materials by preserving—in fact, replacing—they in a new form, facilitate cooperative acquisitions by central storage of the master copy and wider distribution of film copies, and provide a new form of publication by reproduction of multiple, identical copies from a single conventional original. The last phase, as so often happens, nearly brings the theme to full circle. Microreproductions on an opaque base return the reproduction by photographic means—in this case, microfilm—to a paper format. The end product may be in microform as with microcard or microprint, or may be full scale as is the situation after reproduction by xerography.

From the foregoing it is clear that copying—a more specific term is purposely avoided here—has two facets as a library process. On one face we see the managerial responsibilities of a library, and on the other the functional features. It is the latter which have attracted the greater attention in the literature up to now. Perhaps this is due to the unglamorous nature of housekeeping no matter what its scale.

Before proceeding to the operational history of microreproduction, especially as it is reflected in selected examples of projects and enterprises, it is essential to add one word more on the genesis of the movement. In all probability no coincidence is involved in the fact that the same year, 1929, saw the “discovery” of microfilm and the interest of the Social Science Research Council in “initiating and participating in plans to discover, select, edit, publish, or otherwise reproduce basic data in the social sciences, which are difficult of access to students or likely to perish.” This interest led to the establishment, in conjunction with the American Council of Learned Societies, of the Joint Committee on Materials for Research that sponsored the Manual on Methods of Reproducing Research Materials compiled by R. C. Binkley and published in 1936.

The internal or administrative uses of microforms have developed over the years but there have been no projects, no cooperative ventures, whose vicissitudes made history. It has been said that 1912 marks the beginning of the technological era in libraries. In that year the Library of Congress installed its first photostat machine.
Most university and large public libraries had them by the 1920's. Microfilm equipment was not generally available, however, until a considerably later date. For example, the photoduplication laboratory at the Library of Congress was not installed in its present scale until a gift from the Rockefeller Foundation in 1938 made it possible to embark on this "new" type of library venture. Another excellent illustration is in the New York Public Library.

Complicated and exceedingly expensive equipment for storage and retrieval of bibliographic information such as the Rapid Selector, has not, for obvious reasons, as yet been included in any library budget. On the other hand, simple devices, such as the Photoclerk, have gained considerable acceptance. Microfilm in lieu of interlibrary loans has not achieved its anticipated success because of human factors (people want books, not scrolls, if possible) and the surprising lack of essential equipment in many research libraries. On the other hand, not a few sizable institutions appear to be subscribing to microfilm copies of such bulky items as newspapers, or else to be making their own copies in lieu of binding and retaining the unstable originals as long as possible. The controversies over relative costs in such matters, as well as over the suitability of converting some types of research-reference materials (notably that which is archival in nature) to microform still continues unabated.

On the domestic scene most of the projects, whether internal operations of a single institution bent on salvaging rapidly deteriorating properties, or cooperative acquisitions enterprises planned to increase the collections of several institutions at a substantial saving to each, have concerned themselves with newspapers. The third edition (1957) of Newspapers on Microfilm, for example, contains approximately 8,000 entries. This represents a growth—due in part, perhaps, to better reporting—of more than 50 per cent over the figures in the 1953 edition. The history of this colossus is necessarily the history of a number of independent and, especially in the earlier stages, uncoordinated efforts.

In more recent years several patterns, or modes of endeavor, have emerged. A number of newspaper publishers have started microfilming their back files, and The New York Times has offered a microfilm in lieu of its former rag-paper edition. Commercial microfilming companies offer for sale multiple copies of film files of hundreds of newspapers. These activities are reflected in the advertisements placed in professional and trade journals, and, since March 1951, in the re-
ports on them which appear from time to time in the Microfilming Clearing House Bulletin, an irregular appendix to the Library of Congress Information Bulletin.

Other plans have been organized by one or more libraries or professional groups to cover newspapers of a particular type. An outstanding example is the Harvard Microfilm Newspaper Project which was initiated a little more than twenty years ago with the objective of increasing the number of foreign newspapers generally available in the United States and of doing this at a cost which libraries could afford. The successor scheme, the Foreign Newspaper Microfilm Project sponsored by the Association of Research Libraries and executed at the Midwest Inter-Library Center, was started in 1956. This was predicated on the assumption that more could be accomplished at no greater cost if lending copies were provided from a central source rather than individually owned multiple copies stored at each of the cooperating institutions. Roughly 150 titles are available by this plan to more than fifty participating libraries. In preparation for the final discussions leading to the development of the plan, the Library of Congress compiled a 70-page brochure listing 1,219 titles rated in three orders of priority and providing coverage for the entire world. A six-page introduction discussed the criteria on the basis of which selections for microfilming should be made. This brochure, which was prepared as a working tool, is little known because it was distributed only to the members of the A.R.L. committee.

Another example, this time regional in interest, is the cooperative copying of certain Latin American newspapers, which was initiated in the 1950's at the instigation of the University of Texas and executed by the Photoduplication Service of the Library of Congress. Since January 1954 the University of Kentucky has been copying all Kentucky newspapers not otherwise being copied. In 1957 the University of Tennessee began systematic work on the newspapers of that state back to 1920. Statewide projects in one form or another now exist in a considerable number of states. The Canadian Library Association's project for copying Canadian newspapers has been going on since 1951. Different in approach from any of the schemes just mentioned is the project that microfilmed some two hundred Negro newspapers. This project was sponsored by the Committee on Negro Studies of the American Council of Learned Societies and was carried out under the direction of Armistead Pride, director of the School of Journalism at Lincoln University over a period of several years.
LESTER K. BORN

Somewhat similar to the newspaper projects, especially in their efforts to preserve material that is deteriorating, provide permanent copies that will not be prohibitively expensive in binding and storage costs, or to make available material scarce or little known, are the projects to microfilm or otherwise microreproduce periodicals or sets of official journals. These schemes are largely quite recent and are without exception, as far as this writer is aware, commercial. (Perhaps they should be denominated enterprises rather than projects, but the popular term is retained.) Examples are University Microfilms’ “American Periodicals of the Eighteenth Century” and Readex Microprint Corporation’s extensive series, which it began publishing in 1943, of the “Sessional Papers” of the House of Commons, 1731-1900. Extensive projects, largely, but not solely commercial, are also devoted to reprinting materials long unavailable or procurable only at prohibitive prices. Examples are Microcard Foundation’s reprint of the Rolls Series, that is, the “Chronicles and Memorials of Great Britain...to Henry VIII,” and the reproduction on microcards by the Lost Cause Press of E. M. Coulter’s Travels in the Confederate States.

By far the most extensive, and perhaps expensive, domestic project is the joint endeavor of the University of North Carolina and the Library of Congress known as the State Records Microfilm Project and executed under the direction of W. S. Jenkins. Between the years 1941 and 1950, with interruptions due to the war, 160,000 feet of film were assembled containing the legislative proceedings of the American colonies, territories, and states along with statutory laws, constitutional, administrative, executive, court, and a few local records. This extensive operation was divided into three phases: first, a considerable period of planning and of travel to locate and copy the desiderata; secondly, the organization of the collection; thirdly, the preparation of the Guide, an 800-page volume in conventional format. Details of the project have been given at some length in several places. Unquestionably the most extensive internal operation that is intended for general use is that of the National Archives, which has been in continuous operation since 1941. The latest catalog (1953), lists 4,666 rolls of film, and the number now is approximately 9,500 reels.

One of the most far-reaching projects, and one that is both domestic and foreign in its operations, is that of the Genealogical Society of the Church of Jesus Christ of the Latter Day Saints which has been going on for more than twenty years. The sheer quantity of material resulting from this concerted, carefully planned effort, with its large
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staff of editors, camera operators, and inspectors stagers the imagination. In 1952 the copying rate was two million pages per month, and the number of 100-foot reels of film already available to researchers had nearly reached 78,000. Although the author of one of the very few articles on the subject has written that “we can in truth and modesty say that we have on microfilm unquestionably the most extensive purely genealogical collection in America or in the world,” he goes on to say that “we feel that our program is really just at its beginning and that it must continue for years.”

The glamorous projects are those that take place abroad, and most especially those that have been executed in far distant lands or under exciting circumstances. The activities of the Library of Congress, carried out in cooperation with the American Schools of Oriental Research in Jerusalem and on Mt. Sinai, and the projects of the same library and other domestic and European institutions on Mt. Athos qualify and make the years 1949-53 the glamour years.

It was, however, “Project A”—the great copying project, so unimaginatively named, beginning necessarily with photostats and ending with microfilm—that introduced mass copying by fast and inexpensive means. This project, financed by J. D. Rockefeller, Jr. at a total cost of $490,000, and directed by S. F. Bemis, ran for seven years. In those years, 1927-34, nearly two and a half million manuscript pages were copied in Europe, Canada, and Mexico to become available to all at the Library of Congress. Who knows how much more might have been accomplished if the films had been retained as the end product instead of a medium from which enlargements (not too dissimilar to the familiar photostats) could be made?

When World War II threatened, the technique of microfilm already had been proved as an aid to scholarship. Accordingly, when the American Council of Learned Societies set up a committee, under the chairmanship of K. D. Metcalf, to plan a project whose dual purpose was to preserve from the hazards of war the content of valuable historical, scientific, and literary manuscripts in European repositories, and to provide American scholars with important materials for research, the only medium considered was microfilm. The subcommittee on selection of materials, whose chairman was H. H. Kellar, prepared consolidated want lists, on the basis of hundreds of reports submitted by scholars in many fields, for materials on the Continent as well as in the British Isles. The war moved too fast, however, and the project necessarily became known (correctly) as the British
Manuscripts Project. Carried out under always difficult and sometimes hazardous circumstances, the project has brought to this country nearly five million pages of manuscript and, in a few instances, rare printed materials which are recorded on more than 2,600 reels of film. The Rockefeller Foundation made this possible with a grant of $130,000. The material is housed and serviced by the Library of Congress. A positive print of the complete series is located at the University of Michigan which prepared the catalog. The copying was done in 1941–45, the cataloging in 1944–48. A check list published in 1955 brought to a close this project which extended over a seven-year period.

A number of programs have been the direct result of World War II, specifically of the availability in Allied custody of extensive records of the German and the Japanese governments. In 1957, when American scholars learned that numerous records of the Japanese Army and Navy ministries and lesser numbers from other agencies were to be returned to Japan, they secured funds, largely from the Ford Foundation, for microfilming approximately 400,000 pages. A unique feature of the project was the presentation of a positive film copy to the National Diet Library in Japan. Greater in size, and much longer in duration is the project that microfilmed the archives of the Japanese Ministry of Foreign Affairs between the years 1949–51. This work was done in Tokyo under the direction of G. W. Shaw and is the result of a cooperative effort between the Department of State and the Library of Congress. The records of the German Ministry of Foreign Affairs have been extensively copied over a much longer period of time and by a variety of agencies, many of them non-governmental. The Department of State, in conjunction with the British and (at a later date) the French governments, began copying selected records in 1945 at various locations in Germany. Subsequently moved to London, the project continued over the years until the last of the records were returned to the government of West Germany in 1958. Several American universities, notably the University of California, have made extensive copies of records for the years 1867–1920 thereby complementing the official program for the years 1920–45.8, 7

One of the earliest programs under sponsorship of a professional group, and one of the most durable under any sponsorship, was the Rotograph Project (later, of course, microfilm) of the Modern Language Association which existed for a little more than twenty-five
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years. This project aided a very considerable number of scholars to get into the United States small quantities—often individual manuscript works—of research materials essential to their own needs and for which they could claim exclusive use during the first year. The materials are deposited in and serviced by the Library of Congress.

In 1939 Brown University, through L. C. Wroth and H. B. Van Hoesen, directors of the John Carter Brown and John Hay libraries, respectively, conceived the scheme for microfilming selected titles in the Biblioteca Nacional de Santiago de Chile, the Biblioteca Nacional de Peru, other South American libraries, and in Mexico. After five years of effort which was beset by difficulties such as the destruction of the library in Peru before anything had been copied there and the onset of World War II which made film scarce and transportation complicated, the actual copying was brought to a close. Catalog cards were printed over a number of years by the Library of Congress, and the 2,339 titles are fully represented not only in Brown University’s check list but also in the Library of Congress’ published catalog. The great collection of transcripts, photostats, photographs, and microfilms assembled in the Bancroft Library of the University of California is an outstanding example of work done by a single university in a number of lands. The Preliminary Guide to the Microfilm Collection in the Bancroft Library, compiled by Mary A. Fisher in 1955, is the key to approximately two million exposures made in France, England, Mexico, The Netherlands, Portugal, and Spain.

The great “scoop” of the century, of course, is that of St. Louis University which, with the generous permission of the Vatican and the generous financial support of the Knights of Columbus, has microfilmed some 30,000 codices of the world-renowned Vatican Manuscript Library. Conceived early in 1950 by Father Lowrie Daly, S.J., of the history faculty in St. Louis, the plan was approved on December 23 of that same year by Dom Anselmo M. Albareda, Prefect of the Vatican Library, with the stipulation that this was to be the only depository in the western world. Financial support had not yet been secured, but at this point the Knights of Columbus offered their assistance. Through the Foundation for the Preservation of Historic Documents in the Vatican Library, the organization not only underwrote the cost of microfilming but cooperated in establishing at the university a permanent depository for the collection, which was to be provided with a full-time librarian and the equipment necessary to make it available to scholars. The negatives are stored in a specially
conditioned vault somewhere in the United States; one positive copy is held by the Vatican; and a second positive copy, which may be consulted only in St. Louis, is housed in the Vatican Microfilm Library. The copying was completed in June 1957. Because many hundreds of manuscript catalogs, indexes, inventories, as well as 250,000 cards from the card catalog of the manuscript department of the Vatican Library, have likewise been reproduced, the project brought to the United States not only an incomparable body of source material in many diverse disciplines, but has also provided American scholars with access to bibliographic tools of prime importance.  

It has been pointed out more than once, and doubtless it will be pointed out again and again, that a major desideratum in American microfilming activities is a coordinating plan. Proposals for elements of such a plan were embodied in Dan Lacy’s paper, “Microfilming as a Major Acquisitions Tool: Policies, Plans, and Problems,” which he read at the Midwinter Conference of the American Library Association in January 1949. A general plan was outlined by the present author in 1950 and again, from a different point of view, late in 1954 at the annual meeting of the American Documentation Institute. The international aspects of a general plan were outlined in the writer’s paper entitled “International Cooperation to Preserve Historical Source Materials,” wherein he cited the over-all plans, going back to 1947, of the American Historical Association’s Committee on Documentary Reproduction, for copying essential research materials in many of the countries of the world, and likewise the plan, very little known, prepared by S. B. Child in 1946 to use reparations charged against Germany for extensive copying abroad.

Still another approach is found in the “Statement of Principles to Guide Large Scale Acquisition and Preservation of Library Materials on Microfilm” which was prepared by the A.L.A. Committee on Cooperative Microfilm Projects and published in several places about 1953. An interesting suggestion from abroad for general microfilming of research material by institutions in the United States was advanced by R. J. Hayes, director of the National Library of Ireland. His thesis, in overly simplified form, is this: Europe has the original source materials for the study of Western culture, and it has scholars capable of exploiting them, but it has no money; the United States has almost no original sources, but it does have money and it has scholars who could be weaned from technology to culture; therefore, the way to preserve and secure the exploitation of European resources is to encourage Americans to microfilm the maximum quantity of materials
located in European archives and libraries. That there has been no general endorsement of this plan by Hayes’ confreres on the Continent will surprise no one.

Other plans, some more general in nature, some restricted or specialized, were propounded at about the same time. In January 1955 a Conference on Problems of Acquisition, Preservation, and Dissemination of Library Materials was convened at the Folger Shakespeare Library in Washington with the financial assistance of the Ford Foundation. One direct result of the cerebrations was the establishment in 1956 of the Council on Library Resources, Inc. A scheme limited to newspapers was advanced by A. J. Eaton, and in 1953 W. J. Wilson presented a detailed study which would lead to a plan whereby the National Library of Medicine (then still the Armed Forces Medical Library) could acquire on microfilm, so far as the budget permitted, all genuinely medical literature of the fifteenth and sixteenth centuries, together with selected materials from later centuries. The principles embodied in the study were capable of a more general application.

And planning continues. In 1954 Hayes, this time in his capacity of delegate to the cultural committee of the Council of Europe, was instigator of the plan for all national archives to microfilm their unpublished inventories and to exchange the films reciprocally as desired. This scheme, even if carried out only to a limited extent, is of great potential value to American researchers who may in the future be enabled to consult thousands of finding aids otherwise unavailable. A grandiose scheme for copying and exploiting essential documentation in Europe, 1200–1700, was proposed in 1955 by W. L. Winter of the University of Connecticut, the details of which are set forth in a processed memorandum.

In 1956 the present author published his proposal for a universal guide to the catalogs and inventories of the world’s collections of manuscripts and archives. A project resulting from this proposal could be an end in itself; it could also be the indispensable point of departure for future planning on the basis of information never before available in one place. Coordination, never yet achieved to the desirable degree, is still recognized as a desideratum of great moment. In the past few months, for example, the American Council of Learned Societies called a small meeting of executive representatives from several groups embracing diverse disciplines to study once again the approaches to a coordinated effort in microfilming projects. Qui nihil tentat, nihil facit.
LESTER K. BORN

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Microforms as Library Resources

LAWRENCE S. THOMPSON

For over twenty years libraries have had the opportunity to develop resources through microfacsimiles.\(^1\) There are other virtues of microfacsimiles, above all, condensation (e.g., to save space and, incidentally, to eliminate binding costs) and preservation (e.g., to preserve fragile paper such as newsprint). These uses of microfacsimiles will not be considered in this paper.

The problems associated with the use of microfacsimiles in developing library resources may be stated in broad terms: (1) How are we to set up and implement acquisition policies that will satisfy specific needs of individual libraries as well as the broad needs of the national library economy?\(^2\) (2) What can we properly expect from publishers of microfacsimiles in the way of quality of the product, and what should be the nature of the relationship of the libraries owning the originals and the publishers?

Even the greatest libraries must depend on microfacsimiles. The larger the library, the more voracious its appetite, the more difficult to acquire what it must have, the more necessary the use of microfacsimiles. The Library of Congress has filmed the manuscripts of St. Catherine’s Monastery. Brown University has filmed Medina items not in Providence. The University of California at Berkeley has copied the German Foreign Office records from 1867 to 1920.

Today it is possible for virtually any library to have nearly any text for which it is willing to pay the price. The specific acquisition problem of the individual library, therefore, is to separate the world’s printed manuscript literature into three categories: What is so important for our purposes that we must have it for immediate reference? What is of secondary importance, so that we may decide to share it in a pool with others, to depend on other libraries for a loan when it is needed, or simply to rest secure in the information that it may be filmed at any time or that a negative exists somewhere? What is so unimportant for us that we may take no responsibility for its future?

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\(^1\) The author is Director, University of Kentucky Libraries.
availability. This paper can provide no sure-fire formula for making these decisions. At this time it is possible only to identify the problems involved in establishing such a formula and to indicate the lines along which producers and consumers of microfacsimiles should cooperate in broad programs for building library resources. The major problems that must be considered are the cost of microfacsimiles, selection of material to be reproduced and the specific medium or media acceptable for reproduction, the appropriate agency for production and distribution, standards for processing and servicing microfacsimiles in individual libraries, and the composition and scope of any over-all agency for policy in these matters.

Contrary to popular belief and even to a vague superstition among some librarians, good, legible microfacsimiles are not cheap. A 16 or 35 mm. negative is perhaps three or four times as expensive as an ordinary trade book; and if difficult materials (in terms of form or location) are involved, the expense may be ten times the original. Even in edition processes such as those used by the producers of opaques, the expense is two or more times the cost of a small trade edition for the simple reason that microfacsimile editions are necessarily small.

If a sale of as many as 150-200 copies can be assured, an edition legible to the naked eye is nearly always possible and preferable. Let us not fool ourselves: despite all the arguments of some of the promoters of microfacsimiles, the original is nearly always preferred by the reader, even at the cost of a greater expenditure for space. Most libraries will be well advised as a general policy to provide for comprehensive coverage of significant new publications in their field so that the next generation will not have to resort to microfacsimiles.³

The great cost of microfacsimiles gives us pause. The various microfacsimiles (exclusive of local newspapers) announced in 1956, 1957, and 1958, which might have had a real usefulness in the average university library, would have to run to roughly $75,000, $80,000, and $105,000 respectively for the three years. And the cost of the pieces for which libraries will be tempted in the future will probably continue to rise. This situation, by the way, is a healthy sign for the microfacsimile publishing industry. As both a publisher and a consumer, this writer is eager to see the business proliferate in an orderly fashion, for proliferation will compel librarians to be selective in their acquisitions and publishers to be more keenly aware of the need for a quality product in every sense of the word.
The consideration of cost is a primary one for the librarian in the matter of selection of microfacsimiles for building resources. He should not be concerned with problems of cataloging and the cost thereof; for, as will be indicated later, the production of cataloging information should be the responsibility of the publisher. The librarian may properly be concerned with the physical quality of the product in making his selections, and he should feel free to return to the vendor any illegible or partially legible microfacsimile. A producer who consistently turns out an inferior product or who tries to work with material for which his medium is not well adapted will not stay in business very long if librarians actually look at what they buy from him, and he will represent no serious problem in the total microfacsimile economy.

While individual decisions on microfacsimiles offered for sale must be made by each library, it cannot be too strongly emphasized that the selection of materials to be reproduced and the methods of distributing them are more than an individual responsibility. If resources are to be built on a logical, systematic basis that will make sense both for the individual library and the total library economy, librarians and producers of microfacsimiles must plan together in an atmosphere of good will. When the use of microfilm began to become fairly general in the latter part of the thirties, libraries at once seized the opportunity to acquire microfilm of everything that they had long coveted. There is no recognizable pattern whatsoever in the list of material that was available on microfilm in 1937. The sad part of this story is that J. L. Dewton’s Tentative List of Catalogs of Microforms and the articles describing various microfacsimile projects (e.g., those by R. B. Downs and L. S. Thompson) will reveal no more system or logic in selection of material reproduced in the following quarter of a century.

Very early in the history of the development of microfacsimiles in the United States it was realized that there ought to be some sort of control for the selection of material to be copied and its distribution. Fremont Rider, in his first enthusiasm for microcards, assumed that the microreproduction of most books and periodicals would be preempted by the microcard, and he proposed a “Library Micro-Card Committee” which would be sure that all fields were covered, yet without duplication, and would formulate sales and marketing policies to govern library distribution. A year later K. D. Metcalf echoed these problems: “Who will sponsor the microcards? Who will print
them? Who will distribute them? Who will decide what books should be placed on microcards? Are we to have a central organization for the United States or for the whole world, or are we to leave the matter to individual libraries? Here are problems where an international court would be needed to settle things." He recognized the problem clearly but offered no answer, and there is still none. In the first volume of *American Documentation* L. K. Born made an effort to formulate a definite outline for a national plan for microfilm operations, but there have as yet been no perceptible effects of his proposal. Neither can this paper offer any solution for these problems other than to emphasize that there is a most serious problem and that it requires earnest consideration from all concerned.

There are many specific problems in the matter of selection of material to be copied, but one all-important aspect deserves special mention here; the matter of duplication. The Lost Cause Press has spent time and money in checking the various items in T. D. Clark's *Travels in the Old South*, now being issued on microcard, against the un-indexed *Bibliography of American Culture, 1493–1875*, Tremaine's *Bibliography of Canadian Imprints, 1751–1800*, and E. Millicent Sowerby's *Catalogue of the Library of Thomas Jefferson*. While the Lost Cause Press offers the entire group of titles recorded in *Travels in the Old South* on microcards, it also offers at no penalty subscriptions which exclude items in these bibliographies or which are already held by subscribers in the original or in some other form of microfacsimile. Any microfacsimile producer must recognize this very grave responsibility to protect his customers from unnecessary duplication. Duplication of microfacsimile editions in different media is not unethical or even undesirable in itself, but the buyer must be forewarned of possible duplication by the vendor and given an opportunity to make adjustments in the conditions of his purchase.

If the lack of a plan for the selection of material to be copied has plagued the microfacsimile publishing business, the rivalry between the proponents of the various types of microfacsimiles has been equally as serious. Extravagant claims made by the various supporters of one medium or another have contributed to sceptical attitudes among librarians about microfacsimiles in general. Perhaps the only type of microfacsimile that does not have its supporters or detractors in America is the microfiche, and this fact is due only to the unfortunate circumstance that the microfiche has not yet been naturalized in this country. It is natural that the proponents and
producers of the various media attempt to exploit their product's virtues as much as possible, and they will continue to do so. However, the consumers, the libraries, must insist on clear-cut definitions of the fields of publication for which each type is best adapted.

We have, in general, some notion about the utility of certain varieties of microfacsimiles for certain types of publications. We know that translucent film is likely to give the best image of the original simply because it is closest to the original, that the microcard—a second step removed from the original—is likely to be somewhat less sharp, and that microprint—a third step removed from the original—is likely to give a still less faithful image. We know that available reading equipment gives a better image of a translucent film. Still, none of these implied strictures against opaques are necessarily absolute in view of the constant probability of technological improvement.

Experience has told us to a very limited degree what not to do with certain microfacsimile media. We know from the attempt to publish the Louisville Courier-Journal on microcards that modern newspapers ought not to be reproduced in this form with present equipment. The unsatisfactory reproductions of many of the early American imprints on microprint suggest that this is not a desirable medium in its present stage of development for anything that does not have sharp contrast or which has continuous tones.

In addition to the problem of the selection of the material to be copied and the form to be used, there is a third major issue in the production of microfacsimiles to increase resources: should the job be done on a commercial, profit-making basis, by a nonprofit corporation, or by the photographic laboratories of individual libraries? If the answer is to choose the third alternative, it would also seem logical to advocate that libraries undertake the publication of research based on the use of their collections, or, even more broadly interpreted, of all scholarly books. If the answer is to choose the second alternative, then we might set up a national equivalent of the Midwest Inter-Library Center to handle not only this but also many other cooperative projects. It is this writer's inclination, as a producer and consumer of microfacsimiles, to leave the production and distribution in the hands of commercial firms for a number of reasons, above and beyond the sentimental one of supporting the American free enterprise system. In general it may be said that the large-scale producers of microfilm have a better degree of quality control than the great majority of research library photographic laboratories. No
library laboratory is equipped to produce opaques in quantity, and it is not likely that any will make the necessary investment to do so. Moreover, libraries are geared to giving away books, not to selling them, and they are likely to be far less effective than commercial firms in making the product known to libraries that need it.

The possible use of a nonprofit corporation of national scope for the production and circulation (not necessarily distribution) of microfacsimiles is suggested by the highly successful Foreign Newspaper Project and the nascent Foreign Official Gazette Project. There are many types of material which are valuable as library resources but whose use is so infrequent in individual libraries that the cost of their acquisition cannot be justified. The Midwest Inter-Library Center's much-too-modest acquisition program has already demonstrated the validity of this idea, and it is likely to be extended.

Perhaps even more suggestive is the notion that every bibliography should be backed up by a reproduction in microfacsimile of the material it records. The idea of binding in the microtext of works listed in the bibliography as a supplement is an atavism. We have defended the codex book against microforms so long that the notion has become an obsession with us. For some centuries we have been able to give effective service with unbound manuscript collections, and we will be able to do the same with unbound microfacsimiles of any type. The notion of a nickle-in-the-slot machine (rather a quarter-in-the-slot machine a decade and a half after Rider and E. E. Williams spoke of such a device) is a fundamentally sound idea for providing expendable copies of material on microforms, either in the original size or as a microcopy. However, why should every undergraduate college library or public library or even larger research libraries be compelled to buy whole sets of microfacsimile editions so that an occasional reproduction can be made on the spot? It would seem more economical for all libraries to pay relatively small fees, possibly on the now classic "service basis," to one or more major depositories of negatives from which prints would be available by return airmail, either in microcopy or legible to the naked eye, to be given to the reader for his permanent personal file. Better still, some sort of wirephoto or ultrfax transmission is technically possible.

If readers could be quickly provided with personal copies of texts they need, there is no reason why substantial portions of research library funds could not be diverted for this purpose. Most of us would welcome the possibility of clearing our shelves of much of the junk
with which they are loaded and make space for the "good books"—source materials, reference works, and texts in steady demand.

The microcard publishers and the major microfilm producers (with their continuous electrostatic reproduction equipment and possible future variations thereof) are prepared to develop such a program whenever it is proposed on a large enough scale and with adequate bibliographical planning. It is also likely that producers of micro-offset (microprint) could offer the same service, since their work is ultimately based on the 16 or 35 mm. negative. If a program of this type were ever to be initiated, it would require the closest possible cooperation of libraries (which control the material to be copied), bibliographers (who can work out the most practical and inexpensive methods of describing and disseminating information on books and manuscripts), microfacsimile producers and publishers (who have the best technical devices for production, storage of negatives, and distribution or circulation), and, finally, letterpress publishers and publishers' associations (who control copyright and copying policy for twentieth century publications).

The librarians hold the ultimate key to the development of the microfacsimile as a library resource simply because comparatively few great research libraries own the basic material that needs to be made available. But they should not overlook the contributions that the other groups (bibliographers, microfacsimile producers and publishers, and letterpress publishers) can contribute. Any agency set up to work out policies on microfacsimiles as library resources must include adequate representation from each group. To attempt to define further the composition of such an over-all policy group would be futile at this stage. We have already noted abundant reason for the existence of such a group, and responsible librarians will have to work out its activation.

If a policy agency is to advise on the selection of materials to be reproduced and methods of distributing or circulating them, such action should always take place before any microfacsimile project is initiated, and this action should be expeditious. It would be distinctly unfair to a microfacsimile publisher to allow him to go ahead with a plan which will subsequently meet with disapproval; and it would be equally unfair not to give him an opinion within a reasonable period of time, quickly enough for the publisher and yet deliberately enough to protect the interests of the consumers.

Internal policy in handling microfacsimiles is fully as confused to-
day as is the national policy. In part this circumstance is due to the accumulation of large masses of material furnished without cataloging information, in part to failure to understand the proper use of the various types of microfacsimiles, and in part to ignorance. The last element seems to be predominant in more instances than we would like to admit, and it is only too often exposed to the producer. A small university library serving an institution which offers a few masters degrees and a single wobbly doctorate in education once wrote this writer to ask whether it would be legitimate to count as separate physical volumes each item listed in an offering of a microfacsimile business with which he is associated. Forgetting any finesse as a salesman and reverting to the primeval instincts of a librarian, he replied in the politest terms he could muster in the third redaction of a letter that the library should feel free to use any variety of count that served its particular objectives most effectively, but that it would be best advised to depend on X University Library, thirty minutes away by rapid transit for this material. Certainly the total resources of that community would have been increased had the librarian followed this advice. Perhaps the only answer to situations of this type is to educate the consumers to the true functions of microfacsimiles as library resources. More attention to microfacsimiles in library school curricula and more attention to them in all sections of state and regional library association meetings would be helpful. We have too much money tied up in microfacsimiles to fail to make every effort to educate all professional librarians to their proper and effective use.

The day will come when research libraries will have their millions of titles and public library systems their tens of millions of books. Title or volume count will mean little. The best libraries will be those which base their claims to excellence not on quantity but on the completeness of their reference collections, the quality of their special collections to support institutional research programs, and the degree of their integration with national and international schemes for quick access to little-used material, mainly in microfacsimile.

A basic issue is whether or not a library should have its own photographic laboratory, a problem to be analyzed in detail in another essay in this issue but which deserves brief comment from the standpoint of building resources. A few large libraries still do not have such a facility but depend on local commercial firms. A decade of experience with a fairly well equipped laboratory has convinced the writer that any research library which does not own equipment at least com-
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parable to the Recordak Model E (portable) and have an operator available at all times is constantly missing significant opportunities for acquiring material pertinent to its collections. Dozens of instances can be cited in which manuscripts and newspaper files have been offered on loan for filming to the University of Kentucky Library on a now-or-never basis. In several instances these materials have subsequently disappeared, and in many others they are still housed in highly combustible buildings.

In general a large-scale microcopying program which can be planned in advance is likely to be done most economically and most effectively by the larger commercial firms (except in the case of an institution whose photographic operations are on a comparable scale, such as the Library of Congress, the Genealogical Society of the Church of Jesus Christ of Latter Day Saints, the New York Public Library, and perhaps a few others). An exception to this general rule may be a statewide newspaper filming project. In the case of most local papers no library except the one logical regional depository is likely to want prints. A good example is Kentucky, in which only one current newspaper, the Louisville Courier-Journal, is wanted beyond the borders of the Commonwealth with any frequency. Occasional needs for others can be and actually are satisfied by interlibrary loan of positive prints.

Assuming that it is the part of wisdom to relegate most large-scale microfacsimile projects to commercial firms, what procedures should the commercial agent follow in order to abide by ethical business standards and ultimately to provide the highest possible quality in his product? In the very beginning we must assume that these people are the servants of scholarship, but, just as the traditional publishers, the binders, the manufacturers of bookstacks, or the library supply houses, they must expect a reasonable profit, certainly enough to pay for their own time, their production expenses, and their overhead. We must also assume that they are technically competent and that their media for reproduction are legible. Shortcomings on this point will be more quickly detected than deficiencies in any other field of their activities.

Probably the most important demand that the librarian, as the consumer, can make on the vendor of microfacsimiles is that he provide adequate bibliographical information, again a problem to be discussed in detail in a subsequent paper in this collection, but one which deserves some attention in a discussion of the role of the
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microfacsimile producer in developing library resources. Provision of adequate bibliographical information means simply that the vendor should provide either catalog cards or copy from which cards may be typed by any Grade I typist. In the early days of microfacsimile reproduction, we concentrated largely on serials, newspapers, and long runs of journals, and manuscript collections (generally already calendared, e.g., the Draper Papers of the Wisconsin Historical Society). Today we are becoming increasingly aware of the need for making more generally available the some 20,000,000 to 50,000,000 separate, nonserial books and pamphlets that were printed between 1456 and 1904 (the terminus ante quem for anything in the public domain at this publication date—the problem of reproducing copyrighted or possibly copyrighted materials in quantity is one that we cannot consider here). As a general rule, it may be stated that no publisher of microfacsimiles of separates should deliver his product and expect the consumer to do individual cataloging. For one thing, it is simply uneconomical for fifteen to fifty subscribing to a project to do their own individual cataloging. For another, it is simplest and cheapest to do cataloging at source; and here we can enforce this policy far more easily than we can with the thousands of publishers of letterpress material.

As a producer, this writer has been associated with three microcard ventures, the Lost Cause Press, the Falls City Microcards, and the University of Kentucky Press microcards of original publications. In every instance each publication is provided with a heading which constitutes adequate descriptive cataloging, and there is one subject heading and both Library of Congress and Dewey class numbers. The Library of Congress card number, when available, is provided on all Lost Cause Press publications, and it is legible to the naked eye. The Louisville Free Public Library’s series of Americana in Thomas Jefferson’s library provides the option of buying printed cards for each title. In one microfilm project the material offered will be furnished only with catalog cards. This latter procedure seems to be by far the best, since penny-wise, pound-foolish librarians will be compelled to catalog adequately the material they are buying in bulk. This cataloging at source costs money, and it means that the product is more expensive, and yet this expense is infinitely less than if individual libraries attempted to do their own cataloging.

One of the grave shortcomings of some microfacsimile publishers seems to be a lack of understanding of fundamental library pro-
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cedures. Virtually all of us in libraries which hold rare or unique material have been annoyed at times by certain microform publishers who assume it is a right rather than a privilege to copy our holdings. It is our obligation to provide copies of our unrestricted materials to responsible scholars, but we have no special obligation to commercial firms. The microfacsimile publishers who ask for copies of rare and unique materials without recognizing the service cost factors and without offering some sort of a return courtesy for using these materials deserve no special consideration. The publisher should always offer to pay incidental expenses (shelf service, packing, shipping of negatives, etc.), and he should have a standard policy for giving some sort of a token reimbursement to the owner-library. The Lost Cause Press has followed the policy of offering the owner-library either a set of the microcard prints or credit to the extent of the cost of these prints. There have been no objections to this policy, and it is at least as generous as that of any other microfacsimile publisher.

The assumption of many microfacsimile publishers that their product is superior to the original and efforts to persuade librarians on this point seem to skate the dangerous brink of the unethical. In only two instances, viz., modern newspapers and current bulky records, can we properly prefer microfacsimiles to the original. Otherwise, the codex book is here to stay for the foreseeable future. Until the microfacsimile can do everything that the book can—go fishing, go to bed, ride on the subway, and provide aesthetic enjoyment in its physical state, it will never take the place of the book as we know it.

Some librarians who have entertained notions of vast filming projects have been as unrealistic as the visions of certain publishers. One parvenu library, with dollars at its command which it did not properly appreciate, ordered negatives of an entire manuscript collection of more than 5,000 pieces, but it could give no specific reason for wanting the material other than that it would be a desirable acquisition. The request was properly rejected, although the owner-library would undoubtedly be willing to reconsider if there were some strong, legitimate reason for filling such an order.

Some very few of the have-libraries (nearly always medium-sized institutions) have followed a policy of sitting on manuscripts for years in the vain hope that one of its patrons or faculty members will exploit them. It would seem legitimate to withhold manuscripts from microfacsimile reproduction for a limited period of time, but not indefinitely. The length of this period must be decided in individual
cases, but, in general, five years would seem to be a reasonable limit to hold off outside scholars if a collection is not being used locally. Most donors of special collections give not to establish a monopoly, but rather to deposit their collection in the institution likely to give it the most effective use.

What seems to be most urgently needed in any program for building resources with microfacsimiles is the same precious quality that is essential for all other aspects of library administration: common sense. The disrepute into which microreproduction has fallen in some quarters is due not so much to the reactionaries who reject any deviation to the traditional form of the book, as to foolish policies of selection and unwise publishing programs. The microfacsimile, like the codex book, is here to stay. Its utility is well nigh unlimited, but both librarians and publishers must show common sense, flexibility, and foresight to help the microfacsimile achieve its maximum potential.

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10. Other types of agencies may also serve as a depository for negatives. The Arab League's Institute of Arab Manuscripts seems to have made substantial progress on one of the most urgent needs of our times, the microcopying of the whole corpus of Islamic manuscripts. Over 15,000 Arab Manuscripts Filmed. Unesco Bulletin for Libraries, 12:218-219, Aug.-Sept. 1958.

11. In some instances libraries are voluntarily making negatives of their most valuable manuscript holdings, e.g., the University of Leyden, Leyden Manuscript Collections. Unesco Bulletin for Libraries, 10:158, July 1956.

12. It is altogether possible that the ease of operation and the relative cheapness of future equipment may enable nearly all libraries to have push-button laboratories. Scott, Peter: The Miraculous Bubble: A Look at Kalfax Microfilm. Library Resources and Technical Services, 3:40-46, Winter 1959, suggests that libraries may well do their own printing of translucent positives of 16 and 35 mm. film in the future instead of waiting a week to a month for service from a commercial processor.
The State of Microtext Publications

JOHN A. RIGGS

It is well over a hundred years since the first practical applications of microfilm were realized; microphotography as a means of publication was first proposed as early as 1853.\(^1\) While nothing came of this early proposal at the time, today microphotography plays an increasingly important role in building library resources. This relatively new medium raises for the librarian questions which are both intellectual—the content of the material filmed, and practical—the quality of the filming from a bibliographical and technical viewpoint as well as the cost to acquire, process, and service.

While its most common use has been the single copy to order, today almost every mail delivery brings a new proposal for the transfer to microform of some material—books, documents, manuscripts and the like—which is then offered for sale, either in whole or in part as microfilm, microcard, or microprint. These publishing projects generally involve large bodies of material whose publication is directed toward the preserving or the assembling and disseminating of a corpus of hitherto scattered material which may or may not be legitimately related.

Because of the growing multiplicity of these projects, we ought to consider their value in terms of the contribution they make to research; their relation to the collecting policy and budgetary limitations of each library; and the direction such projects could take in the future. After brief comment on these points this article will discuss more particularly certain technical problems and hidden costs.

The first obligation of any library is to the community it serves and which supports it. Its collecting policies must be designed to meet the demands of this primary responsibility. A university library must be prepared, not only to maintain its existing collections, but to expand them in accord with the needs of the faculties it serves. The growing enrollment in our colleges and universities, of which we are now ex-

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periencing just the beginning, poses an immediate problem for the librarian: more students mean more books. Further, the library must be prepared to acquire and service the necessary resources for new areas of study and research. The world has suddenly become larger, both physically and intellectually. For years Africa and many parts of Asia were considered mere colonial appanages of Europe and not worth study. Today the emergent nationalism on those continents has provoked a scholarly as well as a political response, and libraries have no choice but to adjust to this situation. Similarly, the realization that Russia is a power with which we must learn to live has resulted in a claim on the library to provide the material essential for an understanding of this major force in world affairs.

Every research library is faced with the problem of paper deterioration. With one or two notable exceptions, little has been done to apply microphotography to a situation which yearly sees volume after volume reduced to not much more than shards of paper. Unless something is done to preserve these books, the day may come when the systematic study of, say, nineteenth and twentieth century French or German literature, will be impossible because the material for such a study no longer exists. With regard to Latin American publications the situation is even worse, while it is impossible to view the current publications of India, the Middle East, and Africa with anything but despair for their survival. Mere acquisition of these materials will discharge only a part of our responsibility; we must actively seek means for their preservation.

All of these responsibilities must be assumed within the limits of fixed budgets constantly placed in a state of imbalance by increasing costs. The librarian, if he is to exercise proper stewardship over the funds provided for his use, must examine very critically any project requiring the expenditure of a large sum of money. Microtext publications must compete actively with books and manuscripts for each dollar of the book budget. Many requirements of scholarly research can be met only by the use of the book or manuscript itself. There are frequent opportunities to purchase large collections of significant material or important manuscripts, and it can be cogently argued that many of these acquisitions represent a far more significant addition to the library resources of the country than would the support of several of the current and proposed microtext publication projects.

There is one primary question that should be asked of any microtext publication: "Is this really necessary?" An honest answer in many
cases must be no. Consider, for example, one of the earliest of the microform publishing projects, the Short Title Catalogue on Microfilm. Here we have a body of material on a variety of subjects and of unequal merit, related only in point of language, or place of origin and of having been published within an arbitrarily defined period of time.

One can question the value of publishing such a collection on microfilm. This material has been controlled bibliographically with locations established for each item. The needs of any library could, and to some extent still must, be met by using single copy orders. Although the S.T.C. Microfilm Project has been going on for over twenty years, Harvard, and other libraries now subscribing to it, undoubtedly have had to resort to single copy orders for items not yet filmed. Since the project is approximately at the half-way mark, this condition is going to obtain for several years to come.

An even stronger case against this project can be made when one considers that perhaps the most frequent scholarly use of S.T.C. items is for textual criticism. The existence of the project to film all S.T.C. titles is of no advantage in meeting the requirements of this research. Collation of all known copies is necessary if the scholar is to do a thorough piece of work; and unless he is prepared to travel to each library listed as owning a copy of the book he is working on, he will order microfilm.

A more egregious example can be found in a recent proposal which is unlikely to be acted upon; but it does represent a kind of thinking which from time to time gains currency. An English librarian has suggested that the whole of the works listed in the current edition of Winchell be microfilmed. "This would mean," he says, "that a complete reference library could be planted in the smallest county branch in Britain and thus make the basic resources of a great city reference library available to a market town population of ten thousand or so." He goes on to say, "Naturally books do not alone make a reference library: the staff of the branch would need some training to enable them to exploit such a tool properly. But the great difficulty of providing a full town service to a country area would largely be solved: and this without obliging the county to build costly extensions to their branches or to employ large numbers of extra staff. In introducing such an adjunct a number of new problems would undoubtedly arise, but none that a capable librarian could not deal with."

It is difficult to find any justification for such a project. No small
town library could use all the books listed in Winchell if it had them. For those few it would use, it would soon find that microfilm is of all forms the most inconvenient and unsuitable in which to use dictionaries, bibliographies, check-lists, encyclopedias, and the like which comprise such a large part of the Winchell listings. It is unrealistic to think that such a collection deposited in every library serving a population of ten thousand, or even a hundred thousand, would contribute appreciably to the needs of the community. The all important question of where the money to acquire and service such a collection would come from is for obvious reasons not touched on.

Closer at home, R. R. Shaw has described, perhaps half in jest, the Lamont Library Collection in terms of five hundred boxes of microprint occupying eighteen linear feet of shelf space. From these examples we can derive two principles which ought to guide us in the use of microtext as a form of publication. We should avoid supporting microtext publication where the single-copy-to-order can be used effectively and where there is no compelling reason such as preservation for transferring to microprint. Secondly, we should avoid using microtext publication to distort the function of the library. The size and content of the library should be governed largely by the public it serves and not by the fact that duplication on a vast scale is now possible.

It is tempting to project into the future the line of thought behind such proposals as the microfilming of the contents of Winchell. After Winchell, why not the contents of the English Catalogue, the Catalogue of Printed Books in the British Museum, and so on?

This is essentially a matter of maintaining a proper perspective. To equip a library with tools too elaborate for its needs or too difficult for it to use effectively is to do it a disservice; to create a research library where none is called for is wasteful and extravagant. There would be no more justification for this than there would be for Harvard's attempting to acquire on microfilm the contents of the Bibliothèque Nationale. Indeed, it is the existence of national libraries, archival repositories, and large research collections that enables each librarian to cultivate his own garden and not worry about trying to grow exotic fruits which he knows thrive best in their native environment.

Furthermore, travel provides benefits both to the scholar who undertakes it and to the librarian whose domain the scholar quits for research abroad. Working on the spot, the scholar, through personal
contact, may turn up leads to hitherto unsuspected sources of which he would never learn working from microfilm alone. For the university librarian, there is not only the feeling of sheer relief at having Professor X out of his hair for a summer or a year, but also the possibility that Professor X may return more tolerant of the minor inconveniences of his own library after experiencing some of the major inconveniences found in many foreign libraries.

At the same time Professor X very frequently performs a valuable service for the library. Because of his knowledge and his contacts and because he is on the spot he often enables the library to make desirable acquisitions which it would be unable to get through its regular channels.

Microtext publications are generally expensive to purchase and, in the case of microfilm, always expensive to process and service; therefore particular attention should be paid to their actual usability in terms of format and bibliographic control and to their ultimate full cost.

We should ask about any proposed microtext publication if the format to be used is the most suitable one for the material to be reproduced. Ideally the publisher of microtext should be able to publish in the form that is best suited to his subject matter. Unfortunately he is too often committed to the use and propagation of a particular medium which may, but equally may not, be the best one for his subject. If the format is not dictated by the subject matter, the librarian should keep in mind that the cost of processing and servicing microfilm is greater than for other types of microtext.

Perhaps the greatest weakness of current and past microtext publications has been their lack of adequate bibliographic control. Librarians have the right to expect that the elementary canons of bibliography which govern ordinary book publishing should also be applied to microtext publication. No book publisher would think of trying to publish without a competent editorial staff. For some strange reason sponsors of microtext publications, and this includes libraries, so far have felt that little or no editorial work was necessary once the material to be filmed had been assembled. As a result we have reels of film containing disparate items lacking a table of contents or even an elementary title page. We have reels of film of related material with nothing to show on any reel that it belongs to a larger publication or where it belongs in the sequence of the whole publication. Frequently the all important information about the location of the original is lacking.
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There are, of course, microtext publications which combine technical excellence with admirable bibliographic control. Outstanding in this respect are the Adams Family Papers, published under the sponsorship of the Massachusetts Historical Society, and Facts on Film, published by the Southern Education Reporting Service. Any microtext publication which fails to meet the standards exemplified in these two publications must be considered unsatisfactory.

Unfortunately, control in general has ranged from the merely inadequate to a chaotic lack of any control at all. That this latter condition does exist is obvious to anyone who has ever tried to catalog or use the Codex Topographicus Pompeianus of Tatiana Warsher.

Finally, but of not inconsiderable concern to any library, is the question of cost. The usual method of pricing is to set a flat price to be paid either in a single payment or as a subscription over a given period of time. This has the advantage of giving the library actual possession of the material at a fixed cost. This cost may be, however, beyond the means of the library. The S.T.C. on microfilm, for instance, will cost ultimately more than $20,000, and, although the payments will have been spread over a period of years, such an investment is beyond the means of all but a few libraries.

An alternate method of pricing and one particularly suited to projects with no fixed terminal date is the cooperative plan of the Association of Research Libraries Foreign Newspaper Microfilm Project where, by paying a moderate annual fee the subscribing library has access to a large body of material the outright purchase of which would be beyond its means. The chief disadvantage of this plan is that the subscribing library receives no equity in the material filmed and may find its use of such material insufficient to justify this continuing annual expense. In the case of the Newspaper Microfilm Project, it is generally agreed that the advantages outweigh the disadvantages.

The initial cost is never the ultimate one. Microfilm, if it is to be preserved, requires storage conditions with controlled temperature and humidity. Cataloging microfilm is an expensive process and if there is insufficient bibliographic control, this cost may skyrocket. If the film has been poorly produced, there is the added cost of filming and splicing in targets together with adequate leader and trailer.

Microtext publication is at present on an extremely haphazard basis; frequently the first intimation a library has of actual or projected publication is a prospectus soliciting purchase or subscription. This has long been standard practice in book publishing but the same con-
ditions do not as yet exist in publishing in microform. It is up to the libraries to take a more active role in determining what material it is most important to transfer to microform. Librarians should take the lead in establishing criteria for future microtext publication. This would require close cooperation with scholars to determine the value, in terms of scholarly research, of any transfer to microform; with publishers to insure adequate bibliographic control and to work out equitable solutions to problems of cost and distribution; and with photographic experts who would bring their specialized knowledge to bear on the technical problems. In this connection an encouraging development which will be watched with great interest is the establishment of the American Library Association Subcommittee on Micropublishing Projects.

We need more information about what individual libraries have done in the past and what they would like to see done in the future. Generally speaking, we know practically nothing of acquisitions in microform by other libraries, with the result that an unnecessary amount of time is sometimes spent in trying to get from abroad a film which is already in this country. Prompt reporting of microtext acquisitions particularly of master negatives, to the National Union Catalog should be encouraged, while it is to be hoped that the Subcommittee on Micropublishing Projects will act as a clearinghouse in the dissemination of news concerning suggested projects.

We need to pay more attention to the technical quality of microtext. For this we need trained specialists. We need to disabuse ourselves of the idea that transfer to microtext automatically insures preservation. Unless stored and used under optimum conditions film may deteriorate to the point where it is unusable. Excess dampness or dryness, dust, scratches, and generally careless use are constant hazards against which we must guard. Unless collation is very carefully done, preservation may be an illusion. Pages can be skipped in filming; filming may be done in such a manner that pages are unreadable. If the original has been discarded in the belief that it has been preserved on film, irretrievable loss may occur.

We can now look back on a quarter of a century of steadily increasing applications of microphotography to library problems. It has been a quarter of a century of accomplishment in which librarians can justifiably take pride. Crumbling files of newspapers have not only been preserved but reduced to manageable size in terms of the shelf space they occupy. Thanks to microfilm, the contents of libraries
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and archives throughout the western world have been made more readily available to scholars working in their own studies or libraries. Recently the development of two processes, the Haloid Xerox-Copyflo printer and the Pennybooks of G. K. Hall offer interesting new possibilities in the preservation and publication of material no longer available for purchase in its original form.

We have in microform publication a technique of inestimable value, but one whose full potential can be realized only by the imposition of rigid standards of selection and technical performance. This has not been done in the past; failure to do so in the future will be an inexcusable dereliction of duty on the part of American libraries.

References


ADDITIONAL REFERENCES


The Bibliographical Control of Microforms

GEORGE A. SCHWEGMANN, JR.

On June 11, 1853, John Stewart wrote to his brother-in-law, the astronomer, Sir John Herschel: “Should your old idea of preserving public records in a concentrated form on microscopic negatives ever be adopted, the immediate positive reproduction on an enlarged readable scale . . . will be of service,” and Herschel, in a letter of July 6, 1853 commented: “I will only add that the publication of concentrated microscopic editions of works of reference . . . and innumerable other similar applications is brought within the reach of everyone.”¹ Years passed, and Herschel’s “microscopic” editions became a fact.

Unfortunately, Herschel did not suggest a system of bibliographic control for the type of microform he advocated, nor at this late date have librarians and bibliographers become fully cognizant of the need for an adequate system of bibliographic control over the sea of microforms in which they are being engulfed. Seemingly, as one writer has put it, “Microforms have come to be one giant headache for library administrators, bibliographers and researchers.”²

Although the subject heading “Microfilms” found its way into the indexes of Library Literature only about 1940, libraries had been accumulating microfilms in ever-growing quantities for more than a decade before that date. The origin of the use of microforms in connection with rare or difficult-to-handle materials, as well as the need of reading machines for the use of microforms generally, have made the microform holdings of libraries annexes to their rare book rooms where the servicing of both the materials and the reading machines takes place. As a consequence, from the very beginning, microfilms and later also microcards, microprint, and other forms of microreproduction, have acquired the character of remoteness and the aura of the extraordinary which, to a degree, has limited both the use of microforms and a library-wide appreciation of the need for their biblio-

¹ The author is Chief, Union Catalog Division, Library of Congress.
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graphic control. As so often is the case with rare books or with special collections, entries for microforms are often excluded from a library's card catalog, and the key to the contents of such collections is in the memory of the curator, or in arbitrary schemes of shelf arrangement or of special limited cataloging. Within their limitations such substitutes for conventional catalog entries in the public catalog have served as a stop-gap arrangement, but because of the present rapid expansion of library collections in microform, this type of control has become both unsatisfactory and unworkable.

The present state of bibliographical control of microforms is such that even in a center of bibliographic controls and of information on such controls, as for example the Union Catalog Division of the Library of Congress, information on the existence of major microform projects throughout the world, and on the specific holdings of the libraries, is only fragmentary. No systematic practice exists in regard to the reporting of microform projects by their producers, or by libraries of catalog entries for microforms of individual titles. Better controls of materials in microform are needed by the users of libraries, by librarians, and by the producers of microforms.

Readers ask for library materials primarily to obtain the information they need and frequently they are shocked to learn, when the original publications are locked in rare book collections and not subject to interlibrary loans, that copies of the desired material are widely available in microform, or that the difficult-to-locate original of an issue of a newspaper, serial, or other document could readily be consulted in microform.

The group most aware of the needs for bibliographic controls are the librarians, especially the reference, interlibrary loan, and acquisition librarians. If all publications in microform were subjected to full regional or national centralized control like other printed materials, the problems of the reference and interlibrary loan librarians would be lessened and labor and money would be saved. Also, the existence of such controls, especially if published, would enable the acquisitions librarian to know quickly about the existence of microform publications of monographic works or of runs of serials where the acquisition and assembling of the ink print originals are difficult or costly. Such a bibliographical tool also would assist libraries within a region to make decisions on microtext purchasing, either institutional or on a cooperative basis. One of the few existing tools designed for this specific purpose is A. H. Horn's Southern
George A. Schwemmman, Jr.

California Union List of Microtext Editions, issued by the libraries of Occidental College and the University of California in Los Angeles in 1959. Although it is not a regional list, mention might be made in this connection to Eva M. Tilton's union list of microcards, originally published as a master's thesis and scheduled for publication in a revised form by the Scarecrow Press in the fall of 1959.

The interest of producers and commercial manufacturers of microforms in bibliographic controls is motivated by considerations of economy. Working with a limited market of consumers, they want to avoid costly duplication of microform projects. Realizing the need for better bibliographic control several of the commercial microform publishers already have begun to practice cataloging in source by copying available Library of Congress cards or other catalog entries as the first exposure in their microforms. For example, University Microfilms, Inc. endeavors to obtain and photograph Library of Congress printed cards in the microfilms it prepares for its O-P Book Program, and the Microcard Foundation, beginning in 1959, photographs available Library of Congress printed cards on the first cards of microcard sets, in addition to supplying author, title, and imprint information in legible type on first cards.

It is now fully realized by those who are close to the problem that the present situation is chaotic and that there should be developed a system of bibliographic controls for microforms capable of informing the custodians, the users, and the producers of microforms of the existence of at least the negatives of all microforms that have already been produced, regardless of type, both as cataloged items in libraries and other depositories, and as potential items of acquisition from worldwide sources. The acquisition librarian in a relatively small university library with limited book purchase funds, who is contemplating the purchase of a set of Monumenta Germaniae Historica for $8,000 should know that this complete series is available in a micro edition at $850. Many such examples can be cited.

That the existing system is inadequate is attested by the concern over the problem that has been recently expressed by the American Library Association, Resources and Technical Services Division Copying Methods Section, the A.L.A. R.T.S.D. Committee on Resources of American Libraries, Subcommittee on Micropublishing Projects, and the American Historical Association Committee on Documentary Reproduction.

At a meeting in Washington on April 4, 1959, the agenda of the
A.H.A. Committee on Documentary Reproduction included several topics on the subject of bibliographic control of microforms. This group recommended that there be created an agency to centralize all information concerning the existence of microforms and to publish one or more catalogs of such material. It brought out the fact that there were two distinct needs—one for a record of microforms that are owned by American libraries—the other, a central record of all types of microforms that are available from producers of microforms, particularly those in foreign countries.

The group also recommended that a study be made of the type of central organization needed to carry out the desired objectives of obtaining data and publishing suitable catalogs and suggested that such a study should be sponsored by the library profession, but in such a way as to maintain contact with the A.H.A., the Modern Language Association, other scholarly organizations, and with commercial producers, and that the study should be conducted by an individual who could cross lines among librarians, catalogers, archivists, scholars, and technicians. The group also hoped that after such a study, financial support could be secured for setting up a central organization which would operate as a clearinghouse for all data relating to microforms. On the basis of these recommendations, the secretary of the A.H.A. invited the A.R.L. to seek the necessary funds and to sponsor such a study.

At its 1959 Midwinter meeting the A.L.A. R.T.S.D. Copying Methods Section Executive Committee approved the following resolution:

WHEREAS: A serious situation exists concerning the lack of centralized cataloging or indexing for multi-title microform projects; and, as a result, libraries are expending an unnecessary amount of duplicate effort in cataloging this form of material.

RESOLVED: That action be taken by an appropriate section or committee of the American Library Association to provide the most desirable type of bibliographic access to these publications; and that these bibliographic controls be produced as an integral part of these projects.

This resolution was forwarded by the American Library Association to its Subcommittee on Micropublishing Projects which, on May 20, 1959, prepared "A Preliminary Report on a Proposal That There be
Established a Cooperative National Microfilm Deposit" which includes the following statement on the bibliographic control of microforms:

A second step is the creation of adequate means of reporting bibliographically the existence and availability of microforms. This is a very complex problem, the gravity of which is evinced by the fact that many presently existing microforms cannot readily be discovered. A consistent, continuing, and comprehensive system of reporting is fundamental both to the coordination of micro-production and to the wide availability of the materials so produced.

It appears unlikely, for the present at least, that the National Union Catalog could absorb the task of currently publishing the locations of microfilms produced and owned by libraries. The problem extends also to the control of microfilms that are commercially available and to other types of microforms, such as microprint, microcard, and microfiche. It has been suggested that control might be achieved by means of an enlarged Union List of Microfilms. A general Microforms in Print has also been suggested. The problem extends further to the "cataloging in source" of microforms.

The Committee on Documentary Reproduction of the American Historical Association is deeply interested in the bibliographic control of microforms and it is proposing that A.R.L. sponsor a study to determine exactly what needs to be done, how it should be done, and how much it would cost. The Subcommittee endorses this proposal. A thorough exploration of this complex problem through all its ramifications seems necessary if a satisfactory solution is to be found.

Meanwhile, each library is urged to report currently its own locally produced microfilms, title by title, to the National Union Catalog, where at least a tentative central file can be maintained.

In keeping with the recommendations of the A.H.A. Committee on Documentary Reproduction and the A.L.A. R.T.S.D. Committee on Resources of American Libraries, the secretary of the A.R.L. has appointed a committee to draft a request for funds and to select a competent librarian to make a comprehensive study of the entire problem of bibliographic control of microforms.

What are the elements of the “very complex problem” noted by the Subcommittee on Micropublishing Projects? As this writer observes the weaknesses of the present system from the vantage point of the National Union Catalog and the Microfilming Clearing House, the major problems fall within three basic categories, namely, problems relating to the production of catalog entries for individual titles in-
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cluded in microforms, problems relating to the bibliographic control and publication of such entries in the form of appropriate lists and catalogs, and the need for centralizing and publishing information about microform projects that are contemplated.

Elements of the problem relating to basic bibliographic controls include: the question of adequacy of the rules for cataloging microforms in the light of the present situation; the need for uniformity of catalog entries for microforms; the need for the presence of targets in microforms which will provide catalogers with the necessary bibliographical information; the systematic incorporation of Library of Congress cards or other catalog entries as first exposures in microforms, and the desirability of acceptance by all producers of the theory of cataloging in source.

Elements of the second phase of the problem are: the need to determine the extent to which centralized catalog controls should be established over all forms of microforms owned by American libraries and institutions, and the need to determine whether there should be centralized catalog controls over microforms of library materials of foreign or domestic origin of which no copies are owned by American libraries.

The third phase of the problem is concerned with the centralizing and publishing of information on contemplated microform projects.

The rules for main catalog entry of microforms are identical with the rules for the entry of the original material and in general, when cataloging microforms, the cataloging staffs of all libraries follow the A.L.A. Cataloging Rules for Author and Title Entries. Such is not the case with the rules for descriptive cataloging, which are presented in Sections 10:4 and 10:5 of the Rules of Descriptive Cataloging in the Library of Congress. These rules distinguish between the treatment of microfilms and microprints. For microfilms distinction is made in regard to the imprint, depending upon whether a microfilm represents a reproduction of a previously published work of a microfilm edition. According to these rules, entries for microcards shall show the imprint of the micro-edition in all cases. In terms of Library of Congress practice this means that cards for microfilms will be printed only in relatively few cases, and the majority of entries for microfilms will be "dashed-on" in printed or typewritten form on existing Library of Congress catalog cards for the original publications.

The rules for description do not seem to be followed to any ap-
preciable extent outside of the Library of Congress. The typical catalog card received by the National Union Catalog for any type of microform represents a cataloging of the original work with an added note “microfilm,” “microcard,” “microprint,” “microfilm edition.” Frequently the cards do not indicate the name of the producer of the microform, the date of the reproduction, or the source of the original copy. Adoption of the Library of Congress rules by libraries is necessary if a more effective centralized bibliographical control of microforms is to be achieved. The influential position of Library of Congress cataloging practice in American libraries and among publishers and bibliographers makes the Library of Congress printed cards a unifying force in bibliographical control and the lack of printed Library of Congress cards for microform reproductions appears therefore as a matter of great practical consequence.

That there is a lack of uniformity among libraries in the matter of cataloging microforms is evidenced by the answers to a questionnaire sent in 1957 by C. H. Cantrell, director of libraries, Alabama Polytechnic Institute, to twenty-one libraries, mainly in the southeastern part of the United States, in a quest to discover the best way to process catalog cards for the microprint edition of Early American Imprints, 1639–1800, i.e., the titles listed in Charles Evans’ American Bibliography. Of the fourteen libraries that subscribed to the microprint series, four had decided not to catalog, five had not reached a decision in regard to cataloging and five had given the microcards some cataloging treatment. In no instance were cards made on a full dictionary catalog basis. However, two libraries provided reference cards from the series entry “Early American Imprints” to the listing of titles in Evans’ American Bibliography, and four libraries added notes on the catalog cards for Evans’ American Bibliography indicating that all titles listed therein are available in the library in a microprint edition. In the replies to the questionnaire several libraries stressed the need for cooperative cataloging of microforms.

The need for all producers of microforms to provide bibliographical information cannot be stressed enough, since the omission of such information might invalidate the whole project. J. A. Riggs, in a paper read to the A.L.A. Copying Methods Section on June 23, 1959, indicted the producers of microtexts for their lack of editorial work. (Riggs discusses this fully in the preceding article on p. 376.)

The amount of cataloging information that producers might reasonably be expected to provide in microforms necessarily must vary in
relation to the sponsorship and size of the micro-edition, the type of material being copied, the existence of catalog cards for the originals, etc. The ideal would be for producers to embrace the cataloging in source theory in full and supply catalog entries which would uniformly follow the general rules for entry and the rules for description of microforms. If the ideal procedure is not possible, existing L.C. printed cards or catalog entries from other libraries representing the originals should be photographed as first exposures on the microforms along with targets which should indicate the name of the producer, the date of production of the microform, the location of the original and, if in a series, the title of the series. As an absolute minimum, producers should include the target information enumerated above.

The cost of integrating such bibliographical information into a microform should be considered as one of the costs of producing microforms. The probable small resulting increase in the subscription price of a microform series would be inconsequential as compared with the advantages that would accrue to the libraries, the users of the microforms, and even to the manufacturers themselves, who as a result, would find it easier to compile their sales lists and who would be safeguarded against unintentional duplication of reproduction of identical works by other producers.

There is no uniformity of opinion among librarians concerning the extent to which centralized bibliographical controls of microforms should be provided. Most librarians seem to agree that there should be centralized controls of microforms of newspapers, serials, American dissertations, and of manuscript collections, and that such lists should be published separately.

The *Union List of Microfilms* and its two supplements include nearly 60,000 entries for microfilms of mainly books and serials in several hundred libraries which reported such holdings to the Philadelphia Bibliographical Center during the period 1941-55. Although many librarians argue that entries for books in microform need only be filed in library card catalogs with the entries for the original books, and that there is no need for a separate union catalog of books in microform, the fact that libraries have purchased approximately one thousand copies of the *Union List of Microfilms* appears to be substantial evidence of its usefulness. Because publication of this union list will cease with the issuance of the cumulative supplement which is now being edited, librarians should be greatly concerned about the question of whether a successor publication should be undertaken.
Pending determination of this question Eleanor Campion, director of the Philadelphia Bibliographical Center, urges libraries that now cooperate with the *Union List of Microfilms* to continue to report their holdings of microfilms to the Center. Some questions that must be answered in this connection are: should the scope of the successor union list be enlarged to include all types of microforms? Should it record only items that are owned and cataloged by libraries, or should it record also at least the long runs of serials and sets of books that are available in microform from domestic and foreign sources? Should it record only the existence of master negatives, or should it also attempt to indicate the locations of positive copies? Who should do the job and who should pay the cost? Would the publication of such a list be commercially feasible?

The majority of the special catalogs and sales lists of microforms that will be found in American libraries represent microforms that were produced by libraries, commercial firms and other agencies in this country. From this fact it might be argued that American librarians are adequately informed of the existence of microform projects and the availability of microforms that are produced in the United States, but passage of time and the rapidly growing number of catalogs and sales lists that are appearing on the American scene (not to mention the fact that in many instances the editions are exhausted), suggest that the time has arrived when the record of both microform projects and of individual titles in microform should be consolidated and published in a list of annual frequency such as *Books in Print*, or of a cumulative pattern such as the *Cumulative Book List*.

Any case that might be made for the need for publication of annual or cumulative lists of all microforms produced in the United States would be even more valid for a similar control of microforms produced in foreign countries. Whereas the major domestic producers of microforms usually publish catalogs, or distribute sales lists to American libraries, no such general practice exists for microforms produced abroad. Because European producers have undertaken to reproduce extensive runs of rare and sometimes unique materials, American librarians, archivists, and scholars cannot afford to be uninformed of the availability of such microforms. The International Documentation Centre, Stockholm, is an excellent example of a foreign producer who, as is illustrated in its monthly *Micro Library*, can supply monumental out-of-print publications in microform.
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An attempt to centralize information concerning contemplated microform projects was initiated in 1949 when, upon request of the A.R.L., the Microfilming Clearing House was established in the Union Catalog Division of the Library of Congress for the purpose of centralizing information on extensive microfilming projects involving newspapers, serials, and manuscript collections either contemplated, under way, or completed. The Microfilming Clearing House maintains files on such projects, offers a reference service based on the data in its possession, and from time to time publishes information in the Microfilming Clearing House Bulletin which appears as an appendix to the Library of Congress Information Bulletin. To date seventy issues of the Bulletin have been published. It also published the Newspapers on Microfilm, a union list presently in its third edition (1957), with a supplement in the press. This clearinghouse could very well form the nucleus of an expanded information service covering all projects regardless of subject matter or type of microform employed. Centralization and publication of all such information would not only prevent duplication of microform projects, but it would also enable librarians and scholars to evaluate the contemplated projects, to advise in regard to bibliographical standards, and in effect to exercise a veto power over projects of uncertain need or where the proposed type of microform reproduction is not best suited to the need. In any case the clearinghouse would have to depend on the cooperation and good will of all domestic and foreign producers of microforms to provide reports on their contemplated projects.

An attempt has been made to outline in this paper the problems connected with the bibliographical control of microforms. It is hoped that a survey and evaluation of the situation, presently sponsored by the A.R.L., and the findings and recommendations of the expert to undertake this survey will result in actions satisfying the needs of all concerned with the acquisition, production, and use of microforms.

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GEORGE A. SCHWEGMANN, JR.


ADDITIONAL REFERENCES


The Organization of Microforms in the Library

H. GORDON BECHANAN

The literature of micro-media which has been appearing in professional library journals since the late 1930's has now become extensive. A large proportion of this literature has concerned itself with the possibilities of solving problems besetting scholars and librarians. More often than not it has been visionary; sometimes it has been controversial; and occasionally it has been of a debunking nature; but of the total output, comparatively little of practical value has been written by librarians on the subject of the physical administration of microform collections. The average librarian, who in 1959 is confronted with the necessity of fully integrating his microtext holdings into his daily services, will find very little detailed, nontechnical guidance in his own literature which will help disperse some of the mystery and pain which, for most, still surround the use of microforms. Against the background of the extensive literature of the subject, this lack of practical information at first seems surprising. On further thought, however, the absence of detailed data on a subject so much talked about is not too startling. After all, the efficient utilization of the techniques involved is still a quite recent affair insofar as the production of “recorded knowledge” is concerned. As everyone knows, it was some time after Gutenberg that the world saw the large-scale beginnings of the bibliothecal science.

Undoubtedly, this condition results from the fact that microforms, despite all the talk, have not until recently loomed very large in the workaday life of the average research library. There seems no doubt now, however, that the latter 1950's have seen the beginning of a new period, a second phase as it were, in which it is no longer necessary to evangelize the merits of microtext. In the libraries of the United States, microfilm, microcards, and microprint already occupy

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fairly well recognized positions; and there is growing today a more balanced, realistic understanding of the role micromedia can play. That they will not soon replace the codex book seems quite clear—this is not desirable and furthermore it would be too costly. Instead, as has been pointed out in the preceding articles, they will be used increasingly to meet those demands which cannot easily be met in any other way; that is, demands of preservation, accessibility, and publication where the more traditional methods are not commercially or physically feasible.

If this assessment be true, it would seem that the more urgent business connected with microforms in libraries at this time is the codification of a small body of knowledge and experience that can serve libraries in their attempts to bring these aliens into the perspective of daily routines. As one librarian has put it, it is now time to make first-class citizens of our microtexts. We need to introduce them to more scholars and above all to our librarians. To do this effectively is costly. At the same time, it cannot be done overnight and we should not soon expect a final “doctrine” for the management of microtext.

In this essay, the physical administration of microtext collections within libraries is the subject. Cataloging as a part of this process is omitted as it is being treated elsewhere in this issue. Other steps in the normal sequence of the technical processing of materials will set the pattern, however, with acquisitions, classification, and storage being treated in that order. This will be followed by consideration of servicing. Certain limitations which have been adopted should also be mentioned. First, only those microforms most commonly encountered will be dealt with. These are actually the aliens already on hand who need to be made the first-class citizens. No reference will be made, then, to the newer forms which are still under development and for which, quite often, specialized uses are intended. The most common forms are, of course, roll microfilm and those opaque microforms known by the trade-names Microcard and Readex Microprint. Of these, microfilm presents by far the greatest number of technical and handling problems. As a consequence, it will receive the most attention. Second, only the problems that are met in the general research library will be covered. Business, industry, and many specialized libraries have problems which are particular and not generic to our concern. Their use of microtext is most often unique and hence has no immediate application in the general re-
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search library. Finally, efforts will be made to avoid the highly technical aspects of microreproduction and, where the literature is thin, the recent experience of the Harvard College Library will be cited.

It may be worth-while to start by looking briefly at the matter of personnel. If the incorporation of micro-media into the normal routines of the library is to be successfully accomplished, there is a genuine need for staff members to become more knowledgeable with regard to them. Each department should have at least one individual, preferably more, informed on the characteristics of microforms and on developments in the field. All too often, those charged with the administration of libraries have in the past accepted commitments involving microtext without looking enough into the question of the qualifications and training for staff necessary to fulfill the commitments. Now that microtext is finding a more and more established position in libraries, it seems quite clear that the library profession as a whole should become better acquainted with at least the more common microforms. Such familiarity ideally would begin with personal research or in the library school, but library administrators in particular must insure the development of qualifications within their individual libraries. No doubt this will tend to become firm administrative policy in time. Certainly the growing realization of the high cost of microforms will work in this direction.

A point at which a great many of the frustrations connected with the handling of microtext, especially microfilms, can be eliminated is acquisitions. A step forward was made in 1954 when the American Library Association-sponsored Guide to Microfilming Practices was finally approved and published. Under study and preparation for some length of time, the Guide was aimed primarily at improving standards of laboratory production. Though it must be viewed as still less than perfect, it can be extremely useful to the acquisition librarian responsible for ordering microfilm. It provides a terminology and explains the major characteristics well-produced film should possess. If the acquisition librarian is familiar with the Guide, he can place orders with specifications which will remove much of the guesswork for the producer. Also, he can more readily spot deficiencies, both physical and bibliographical, and reject the new film acquisition if it does not come up to the prescribed standards. One can argue even that this is a duty of the acquisition librarian; for, if enough poorly produced film is rejected by libraries, laboratories will tend to turn out better work, work which meets currently prescribed stand-
ards. Apropos of this responsibility of the acquisitions librarian, an article by V. W. Clapp, F. S. Henshaw, and D. C. Holmes on the permanence of microfilm is highly recommended for all those who heretofore have felt a reasonable sense of security regarding the preservation which allegedly has already been assured through microfilm.²

If the library has its own photographic laboratory, all new film acquisitions should be sent there upon receipt for “technical editing.” This includes inspection of the film to determine if it is safety film, a step still necessary for some film coming from other parts of the world; reeling; addition, in many cases, of leaders and trailers made from unexposed but processed film; inspection for qualities of legibility, density, and the like; and, if the film is sub-standard, so reporting. With this, the acquisitions librarian is then in a far better position to reject intelligently or send the film through the cataloging process. Quite often in the case of a negative film which is not readily replaceable, or which is unique in the country, he may wish to have a positive copy made for public use and send the negative to the master film collection. There are countless variations on this same theme, but as a basic principle where re-filming is not feasible either because of the condition of the original or because of difficulty of access the negative should be treated as a master and a positive copy made for public use.

Another precaution which the acquisitions staff can take, especially in the gift and exchange section, is to avoid acquiring on film items which constitute less than a bibliographical unit. Current experience in the Harvard College Library, for example, has proved that acquiring portions of books, single or scattered issues of serials, and excerpts from manuscript files causes additional cataloging effort, creates problems of accessibility, and inhibits ease of use. The resulting confusion oftentimes causes far greater expense than would have been incurred if the complete item had been acquired in the first place. In other words, a library will benefit if it looks on microfilm as a legitimate acquisition and not as a stop-gap.

Finally, the acquisitions staff is in the best position to provide adequate identification of film for cataloging purposes. Locations of originals, locations of master negatives, and information on content and restrictions, if any, should be provided. Especially with gifts, there is the possibility of inadequate information and, as policy, a gift of unidentified film should not be accepted. If all these matters
are looked after at the time of acquisition, many of the problems which evolve in the course of microfilm processing and servicing can be avoided, with savings of money, time, and effort. Essentially, no such extensive precautions are necessary for opaque acquisitions.

The relationship between acquisitions and microforms has been stressed here in the belief that, of all the departments in the library, it is in the acquisitions department that there is the greatest need for staff acquaintance with the technical and bibliographical limitations of those microforms now commonly used. A firm understanding of these limitations will serve as a good foundation for a clearer understanding of the possibilities for exploiting to a good end the techniques at hand. From the library view and in its best interest, current production standards need improvement and clarification. The problems of reduction ratios which are frequently too high for the reading equipment available, the many frustrations encountered in trying to piece together from diverse sources a complete bibliographical unit on microfilm, and the effective utilization of the potentials of xerox all require a knowledge, and even more important, an accumulation of practical experience which can best be gained in the acquisitions process. With this kind of experience the library profession will become better qualified to contribute to the improvement of standards and will be able more adequately to acquaint the producer with its needs.

Regarding classification, there has been so little experience with large microtext collections in general libraries that it is difficult to anticipate the real needs of the future. It is fairly obvious, though, that subject classification in the usual sense is not the answer. The physical nature of microtext denies the open-shelf philosophy of access; and it does not seem that we will soon reach the point where the user can be allowed as much freedom with it as he is allowed with books. Microfilm can easily suffer damage that renders it almost useless, whereas books can sustain considerable damage but continue to be usable. Likewise, the surfaces of opaques can be damaged by scratching in such a way as to greatly reduce their usability. We may eventually see the day when inexpensive, portable reading equipment will become common and from this it may develop that easily replaceable and inexpensive microtext will be loaned as readily as books are today. For the next few years, however, it seems quite probable that the economics of microphotography will force us to allow access to our microtext collections, particularly microfilm, only
by way of the card catalog. Similarly, use of the collections will generally have to be made in the library building proper.

Since we must assume that such collections are bound to become larger and more heavily used, maneuverability and flexibility will be highly desirable. Classification, whether it be by very broad subject, by the form of the original, or derived more pragmatically from the characteristics of the materials condensed, is about the only method by which the desired flexibility can be built into a collection of microfilms. Classification for opaques does not yet seem necessary. This is the case mainly because opaques, primarily an “edition” micro-media, either readily lend themselves to an alphabetical arrangement as with microcards or are keyed to a printed index, or bibliography which renders classification superfluous as in the case of some of the Readex Microprint publications. One can even say that some Readex Microprint publications—U.S. non-depository documents for example—arrive in the library in a classified state. A large number of microfilm titles, on the other hand, are of the “single-copy-to-order” variety or have come into existence for reasons of preservation. If the experience in the Harvard College Library can be taken as an indication, it would seem that an ever greater proportion of future microfilm holdings will be of the more costly “single-copy-to-order” nature.

K. D. Metcalf \(^3\) and W. E. Wright \(^4\) were among the earliest librarians to write on the cataloging and classification of microfilm. Both wrote from experience gained in the New York Public Library and both advocated a broad classification, the nature of which would be largely dependent on the subject departments in that library and on the location of reading equipment. H. W. Ballou and John Rather writing in 1955 have described in general terms the evolution of thinking on the classification of microfilm and there is no basis today for questioning their conclusion,\(^5\) confirming that of M. F. Tauber in 1950,\(^6\) that the trend toward some form of broad classification has been general. This result would seem to be the fruit of experience and it is now evident that the early discussions of microfilm classification fell into some semantical difficulties; that is, classification was naturally enough being equated by librarians with subject classification.

To refer to Harvard again, it has been found that a very broad and simple scheme of classes based upon the characteristics of the microfilm holdings is the most satisfactory answer for the present. No classification for opaques is attempted, but with microfilm the new scheme developed two years ago is roughly as follows:
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FILM A  All non-serial material, including manuscript, of six reels or more.

FILM M  Manuscript, of less than six reels. (Does not include dissertations.)

FILM NB  Newspapers which ceased publication before 1900.

FILM NC  Newspapers carrying into twentieth century, regardless of beginning dates.

FILM R  All restricted materials, regardless of number of reels.

FILM S  Serials, incomplete or being received currently.

FILM SC  Serials, held in entirety on film and no longer being published.

FILM W  Monographs, pamphlets, dissertations, etc., including tract reels.

FILM U  Incomplete bibliographical units or film in poor condition, both of which are not intended for permanent retention but which eventually will be discarded or replaced.

FILM MAS  Master negatives (or occasional positives) which are to be held from public use for preservation and copying purposes.

With this very general breakdown into ten classes, it is believed considerable flexibility has been built into the collection. If the accumulation becomes so great that the holdings have to be dispersed, say newspapers to a newspaper reading room or manuscripts to a manuscript reading room, this can be accomplished without reclassification and long disruptions in the public servicing of the collection.

The use of two classes each for newspapers and serials represents a partial solution of the conflict between fixed location for the sake of space economy and the possible future addition of a continuation of a title already held in part. If volumes 1–10 of a nineteenth century journal, for example, were recently acquired on film while volumes 11–20 are already owned in the original which was printed on poor paper, the class designation “S” would be used for the volumes on film, while the boxing, labeling, and shelving given will not be of the level provided for items ready for fixed location. Suppose, however, that it subsequently is decided that the only way to preserve volumes 11–20 is to reduce them to film also. The changes necessary
in the storage area consist of providing permanent boxing, labeling, and shelving.

With newspapers, the problem has not been as much minimized. What has been done, however, has been based on the belief that there is less immediate likelihood of acquiring current newspaper material on film. Such cooperative efforts as the Association of Research Libraries Foreign Newspaper Project will largely remove the necessity for this kind of acquisition. There is less probability that such cooperation will soon extend to retrospective files, and it is believed that preservation requirements as well as normal acquisitions will tend to bring into the microfilm collection complete files of earlier newspapers.

Much of the classification question depends, of course, on the local situation and it is inevitably tied to the manner of storage adopted by the individual library. In new library buildings with air conditioning the problem of storage has a different dimension than it does in older buildings. Nevertheless, the recent establishment of standards for storage and preservation along with the need for providing well maintained reading equipment point toward centralization of both collections and service. Before concluding on classification, it is worthwhile to point out H. H. Fussier’s excellent discussion of the subject. Though his treatment is short and comparatively early, there has been scarcely any improvement since in defining the problem and outlining the alternatives. Finally, a recent article by Wei-Ta Pons is of interest because it describes the current method of arranging microfilm in the Columbia University Library.

As indicated in the foregoing, the method of storage adopted for microfilm will have a significant influence on both classification and servicing. As early as 1944, standards for microfilm storage had been promulgated by the British Standards Institution and these were revised and brought up-to-date in 1955. Also in 1955, the Eastman Kodak Company brought out its Storage of Microfilms, Sheet Film, and Prints. These were followed in mid-1957 by the approval and publication by the American Standards Association of American Standard Practice for Storage of Microfilm. Sponsored by A.L.A., this latter publication received considerable publicity and can be said to be the culmination of a series of steps, all based on experience and testing; it offers to the nontechnical librarian firm guidance on how to achieve what is currently believed to be archival permanence for his microfilm collection. Taken together, these three sources throw
considerable light on most of the technical questions which arise in connection with storage. The standards set are high indeed, and the clear implication for the library that attempts to meet them is an extra jump in its cost-of-living index.

The implications of the standards as now spelled out would seem to run as follows. Since fairly rigid conditions of temperature, humidity, and air control are required in order to preserve microfilm, economic necessity would point toward centralization of storage until such time as the accumulation would become so great as to require a new solution to effective servicing by either dispersal or some kind of deposit storage. If an area large enough for storage, public use, and expansion can be found, the solution by centralization would appear the most feasible—at least for several years to come.

To carry the logic further, one must assume that there will be a correlation between increased microfilm holdings and increased use. With increased use, more pieces of reading equipment requiring maintenance will be necessary thus implying a need for a full-time attendant. This, in fact, is precisely what has happened at Harvard in the last two years during which the entire microtext collection has been undergoing centralization, re-cataloging, re-organization, and augmentation.

Since dust settling into the parts of a microfilm reader can easily damage microfilm, scheduled cleaning and minor maintenance is highly desirable. Though it has been assumed that opaques do not require storage under controlled temperature and humidity conditions, the reading equipment for them also collects dust and suffers burned-out bulbs and minor maladjustments just as microfilm reading equipment. Efficiency, economy, and good service as well, are probably best served then by complete centralization of all microtext holdings in the one area for which controlled conditions have been established for protection of microfilm. In time, of course, when sizable collections have accumulated in subjects for which there are major departmental libraries, this will no longer be as effective a solution. For the time being, however, a fairly specialized grouping of responsibilities can be centered at one point and better executed. It should be kept in mind, of course, that any library taking such a step will find itself, either potentially or in fact, with a new type of staff position and with another full-fledged public service division.

To return specifically to the topic of storage, the installation of expensive air-conditioning, humidity-controlling, and dust-removing
equipment is only the first step, albeit the most costly, to be taken in honoring the present standards. Clapp, Henshaw, and Holmes point up the problems confronting the library already owning an extensive collection of microfilm. If such a retrospective collection has not been so searched, an important step to take is the checking to insure that no nitrate film is retained. In the first place, nitrate film is a poor investment for permanence and should be either replaced with safety copies or discarded. Further, nitrate film is unstable and can be a possible source of hazard. In 1950 a technical article described the instability of nitrate-based film and cited instances where, given certain storage conditions, such film has spontaneously ignited at surprisingly low temperatures. Though the probability is slight that a library will own large enough quantities of nitrate microfilm to represent a major hazard, the better part of valor in this case would seem to be a piece-by-piece inspection of all film in order to identify and remove all that may be nitrate-based.

This is not the great task it might at first seem since most safety film carries the notation “safety” spaced periodically along its edge. There are exceptions, however, and actual testing is needed for film which cannot be verified visually as safety. Guidance in testing methods can be found in the Clapp, Henshaw, and Holmes article and in a more technical piece by A. L. Cobb which describes the burning characteristics of film in terms easily comprehended by the non-technical librarian. Only one precaution should be mentioned. Quite often, older film has had leader and trailer spliced on and the person examining film should always remember that a piece of leader film may be safety while the main body of the film in question can be nitrate.

Other aspects of storage for which measures should be taken in accord with the 1957 standards approach the category of end-processing. Here the standards are more generalized and the presence in local markets of a multiplicity of brands and makes of the paraphernalia of end-processing such as reels, boxes and reel containers, wrap-arounds, and filing cabinets gives rise to the problem of choice. Such choice, of course, should be made in accord with the specifications enumerated by the standards. In practical terms, this can be quite a problem and sometimes involves lengthy inquiry and negotiation with manufacturers and distributors. Undoubtedly, this is an area in which improvement will come only after the use of microfilm in libraries has become much more widespread. Such projects as the
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Library Technology Project sponsored by the Council on Library Resources, Inc., also will contribute, it is hoped, toward clarification of this kind of problem.

One aspect of the standards must be questioned, it seems, on the basis of economy and space. This is the requirement for metal filing cabinets of the drawer-type. Provided the air, humidity, and dust problems have been resolved, fire is, excepting human misuse, the remaining major threat to archival permanence. If the master film collection is stored under fire-proof conditions separately from the one available for public use and if the building housing the public collection is reasonably fire-proof, the stated necessity for metal filing cabinets may be deemed too stringent. This at least has been the thinking at Harvard and the method which has been used for six years is one of cartons in which six reel boxes may be placed. The cartons are then shelved on standard, inexpensive steel shelving. This makes for easier access by the attendant, cuts costs considerably, and saves much space. D. C. Weber has described this shelving method and a photograph is included with the article.16 Pending tests on the relative moisture content of microfilm thus stored under controlled conditions for a number of months, it is believed this system is entirely satisfactory.

The manner of labeling boxes and of affixing call numbers is a matter that must be solved by the individual library also. One question, however, is the identification of film itself. After experimentation at Harvard with India ink and wax pencils and consideration of perforation, a pen and ink made by Pelikan-Werke of Hanover, Germany, and designed specifically for writing on plastic, was found on the local market. India ink and wax pencils have proved unsatisfactory while perforation unnecessarily weakens the film. For this reason the German pen and ink will be used exclusively for identification of film, the belief that heavier future use of microfilm holdings will make it desirable to identify each reel with at least its call number. In this manner, the matching of reels with their boxes will be facilitated. For the identification and shelving of opaques, problems are minimal and, once again, local needs in all likelihood will dictate the procedures followed. Because opaques are more susceptible to loss than most library materials, each piece at Harvard is identified in the traditional manner used for books—that is, rubber stamp and indelible ink. Readex Microprint comes in boxes which are readily shelved. A simple and inexpensive scheme for arranging microcards
alphabetically is to place separate titles in separate envelopes which have been identified with the author's name and a shortened title. For multi-card titles, an arbitrary number of cards per envelope can be set.

If the argument is valid that the new standards can best be met through centralization, what are the desirable services to be provided for users? Referring again to Harvard experience, this time in connection with its two-year old Microtext Reading Room, there is available reading equipment for all the forms of microtext owned in the library. Of this equipment, microfilm readers are in far the greatest demand and the optical parts and screen surfaces of these readers receive cleaning and maintenance on a routine basis. Good lighting consisting of low-wattage fluorescent lamps at each piece of equipment is available and most overhead lighting can be kept turned off. Adequate work space is available at three tables specially designed to accommodate three pieces of reading equipment each. Typewriter stands are also available. The attendant provides instruction for new patrons on the use of the equipment and, since the storage area and the reading area are adjacent, quick access is possible. Finally, a small collection of reference materials has been assembled. In addition to printed items which are integral parts of titles held in microtext, foreign language dictionaries, bibliographies of microfilm collections, and documents indexes are typical of the materials it has been found useful to have on hand. In addition, a microfilm card catalog has been placed in the room. In this connection, the decision to establish a microfilm card catalog was made after it was concluded that there was insufficient basis for deciding either for or against it. Hence, it was reasoned that it would be better to establish the catalog and discontinue it if experience demonstrated that it was not needed; but it would be very costly to start such a catalog some years hence after the collection had become large.

Shortly after the opening of the Microtext Reading Room it became apparent that there was a demand for reeling, cleaning, splicing, and adding leaders and trailers to personally owned microfilm. Previously, this "small-time" work had been done in the Photographic Laboratory at the cost of delays for the customer and interruption in the schedules of the Laboratory. With rewinds and a splicer in the room, friendlier attitudes toward microfilm are now being fostered for a minimum service charge and with considerable savings in time and red-tape for both users and staff. One further word on this aspect of
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the services offered may be useful. A practice of cleaning personally owned microfilm prior to allowing its use on Library owned reading equipment has been adopted. This step became necessary after experience taught that the film brought in by users more often than not was dirty or had undergone “do-it-yourself” splicing. As a consequence, the glass flats on the table model readers were being badly scratched and gummed by a variety of tapes. Cleaning the film proves less costly than frequent replacement of the flats and is excellent for public relations.

The services which have been here described have had the effect of overcoming much of the resistance to the use of microforms. The incidence of use of the room has risen from an average of two or three persons per day at the time of opening to an average of more than a dozen at present. Similarly, this period has seen an increase in the total number of reels of microfilm from about 12,000 to 13,000 while the opaques have numbered about 20,000 pieces. Statistics kept during the past year have revealed that almost 50 per cent of this use has been for personally owned microfilm, with an occasional user coming in with his own title on microcards. As an interjection at this point, this fact tends to deny the traditional argument that the public will always be reluctant to use microtext. In fact, one can hazard the opinion with some impunity that the scholarly community has moved ahead of the library profession in accepting microtext as a normal part of its daily activity. The use of microtext and the safeguarding of it are different matters, however; and if the librarian is lagging behind, it is for reasons which have little impact on the user. The point of this digression is that a full-time attendant for the Harvard Microtext Reading Room soon became a necessity after its opening and there is now pressure for longer hours. Certainly, this new facility has met with favorable reception on the part of both users and staff—so much so that it is now a question of how much longer one attendant can meet the demand.

Before concluding on public servicing, the matters of inspection and maintenance and of the choice of reading equipment should be mentioned. As a matter of principle, the master film collection should be periodically inspected to verify that its preservation is not threatened for some unseen or unexpected reason. Since the preservation of film is a full subject in itself and since the new storage standards detail what must be done, the hazards will not be treated here. In lieu of this, the attention of the reader is invited to an article published in
1950 by D. F. Noll which discusses the major dangers which have been experienced in the past.\textsuperscript{17}

Regarding reading equipment, the most familiar cry has been for the all-purpose microtext reader which can be bought at prices and in quantities that the library can afford. The second most familiar question is the one concerned with brand, model, and price. A great deal has been written and talked about this topic, but this is not the place to summarize the opinions and preferences of the past. The library community at large and librarians concerned with microtext in particular are now in the debt of H. W. Ballou, the editor; the National Microfilm Association, the sponsor; and V. D. Tate, the individual who suggested it, for the recent appearance of the \textit{Guide to Microreproduction Equipment}.\textsuperscript{18} This publication brings together for the first time in one source technical data, prices, illustrations, and names of manufacturers for microreproduction equipment available in the United States. It carries a section on reading equipment which should be an excellent reference for any prospective buyer. The one comment that should be made here is, as before, based on the experience at Harvard. It has been found that table model readers are extremely satisfactory for most microfilms. They are not always adequate, however. Many newspapers, particularly nineteenth-century ones for which small type, bad ink, and bad paper stock were used have been filmed at reduction ratios which make them all but impossible to read on table models. Any ideal reading room for microfilm should have at least one floor model reader and in time probably more.

By way of conclusion, it can be said that this article has in a sense looked backward rather than forward. This has been a deliberate choice, however, which has been based on the belief that the legitimate use of microforms by libraries has never reached its true level. Understandable though it is, there has been too little comprehension of them on the part of rank and file members of the profession; and it is still more constructive to look to mastery over past developments than it is to dream of future ones.

Especially does microfilm deserve wider understanding. It remains the cornerstone of most of the newer techniques under development and as a means of preservation, either cooperatively or by the individual library, it is the most versatile medium at hand while at the same time offering the most promise of “permanence.” Not to understand it is to do it a disservice and to prejudice one of the long-stand-
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ing traditions of librarianship, the tradition of preserving materials for the future.

Meantime, the high cost of incorporating microforms into the library’s daily services is an administrative problem of no small magnitude. It is paradoxical that the establishment and improvement of standards for microfilm storage increases costs in the short term while decreasing them in another but longer-range direction. Even so, it is a cost that is ultimately valid and, perhaps, economical if the distant future is considered.

In the face of this cost, one avenue which will lead to fuller value for microfilm investment is that of cooperation. Though cooperation is oftentimes brought forward as the panacea for any problem which the individual library cannot solve, steps of a cooperative nature regarding microfilm are desirable. Cooperation on any realistic basis cannot be successful, however, until there exists greater familiarity with microfilm on the part of a much larger proportion of librarians. Until that time, and to look forward rather than backward, librarians can hope for the appearance of the substitutes which do not require such rigid controls for storing and servicing.

References

10. Eastman Kodak Company. Storage of Microfilms, Sheet Films, and
Copying Methods as Applied to Library Operations

ROBERT E. KINGERY

Although the reference department of The New York Public Library established a photostat service in 1912 and added microfilming facilities in 1935, it was not until 1940 that system applications of photography to library operations began. In the following year the use of photographic charging at the Gary Public Library was formally announced.

Curiously, Richard Garnett envisioned some of the current system applications as he wrote in 1882: “when the British Museum shall have adopted photography as it has adopted electricity . . . the scattered portions of the nearest approach the world will have made to a universal catalog may be brought together, digested into alphabetical order, and reproduced in facsimile by this beautiful art—fit mate of printing in that she too preserves what would else perish, and brings light into many a dark place . . .”

C. F. McCombs in 1920 pointed out that photostat was a substitute for the typewriter in transcribing material in reference work. He did not, however, pursue the logic of his observation. This came in 1948 when the pilot model of the Photoclerk was put in operation by the United States Department of Agriculture Library.

Though this span of years may be discouraging, K. G. Slocum found it newsworthy in 1959 that photography was finally being used for industrial trouble-shooting, that is a substitute for the human eye and mind.

After two years of successful experience with the Photoclerk, the United States Department of Agriculture obtained a grant in May 1950, through the American Council of Learned Societies from the Carnegie Corporation of New York for a cooperative experiment in photoclerical operations. Thirteen large public, university, and federal libraries participated. Mr. Kingery is Chief, Preparation Division, The New York Public Library.
libraries participated. At this point, system applications began in earnest.

Webster defines “system” in part as a “regular, orderly way of doing something. . . .” Thus this article is concerned with the use of any method of photocopying to do something in libraries. It is not concerned with the use of copying as a direct substitute for manual or typewritten transcription.

Aside from the inspection function of photography which industry is just embracing, and which librarians may come to in due course, library system applications of facsimile reproduction are based on a simple idea which may be called the concept of the one-time-writing down. Given something put down on paper, that initial record can be used for a variety of purposes through the agency of reproduction. The user is not necessarily the originator. The method of the original writing down whether handwriting, typewriting, or printing does not matter.

In that section of the report on the cooperative Photoclerk experiment on “management implications of the Photoclerk,” it was pointed out that photography among other things reduced error, shortened elapsed time, increased accuracy, and assisted in making maximum use of lower grade skills. The other implications he reported are less basic and are generally effects of those noted above.

Looking at those points more closely it is undoubtedly true that whenever a human being transcribes something, there is opportunity for error. Machines simply copy, create no new errors, and are always consistent in reproducing both accuracy and error. As for the amount of elapsed time, reduction of this depends on both the machine used and the person replaced. Increased accuracy is but the positive expression of reduction in error. However the point that photoclerical procedures allow for the maximum use of lower grade skills is an important one. A clerk capable of typing order slips in a wide variety of languages will not be satisfied with that job for very long. A machine operator often aspires only to the operation of more complicated machines. But the machine is quite indifferent to promotion!

There are three desirable elements of facsimile copying: reproduction, reduction, and enlargement. Given these, one has the opportunity to create copies different in size and form, for altering the sequence of copied elements, and for combining discrete originals. In a sense, “copy” is a poor word here. The original may be a temporary, artificial creation enduring only long enough for exposure
Copying Methods as Applied to Library Operations

—yet it serves its purpose. It is this opportunity to create, first demonstrated in photographic charging, that makes the system applications of photography worth the attention of all librarians. Many system applications of photography are obviously creative in their conception but mainly manipulative and mechanical in operation.

Examples taken from the experience of The New York Public Library may help to clarify what is meant by the creative potential of photography. For one, a flexoline record was made by photostating the face of a visible index, then cutting the sheets into strips for insertion in the flexoline frame. The photostating was done at a carefully calculated enlargement ratio. For another, information on the fronts and backs of visible index cards were migrated photographically to new 3 x 5 cards by cutting the old cards apart, turning one part of the card over, and then photostating at a reduction. Again, entries in bibliographies are photographed with overlays to create orders for library materials.

A thorough survey of the literature of photography in libraries from 1950 to the present was made by Adelaide Smith, research assistant in the Preparation Division of The New York Public Library. Her survey indicates that the existing material is not generally written from a system point of view unless it is concerned with a single library application, although there are several important exceptions.

Since photographic charging represents the initial break-through in system applications, it deserves at least brief attention. Helen T. Geer has described in various writings through 1956, the use of photography in circulation routines. However, a thorough evaluation of the various systems including the photographic has been lacking. Hence, one welcomes the August 1959 announcement that the Council on Library Resources, Inc., has embarked upon a “preliminary inquiry into library book-charging systems.” Bro-Dart Industries have been active in this area with their Brodac Automatic Book Charging System based upon Thermography. Recently, Bro-Dart announced SYSDAC, “Systematized Automatic Book Charging,” which does not employ facsimile reproduction but is intended to couple with copying devices for sending out overdue notices.

One would expect libraries to be the first to see the advantages of photography, particularly through miniaturization, in records management yet there is no evidence in the literature that photography is being used widely for this purpose. Among the few uses Constance Parché has described the Microtak system of reducing research note-
books in the Library of the Carborundum Company to editions-of-one microcards. Also, the New York Public Library is studying the application of Microtak as a substitute for the filing and storing of originals of correspondence and invoices from book dealers. Likewise it records gifts on microfilm at periodic intervals and stores architectural drawings of its central building and branches in a unitized microfilm system from which full-size xerox copies are made as needed.

While the simple reproduction of an original is not a system application, the use of reproductions for either interlibrary loan or intralibrary routing is. G. von Busse, A. Seidell, G. Pleskit, C. H. Melinat, L. J. Van der Wolk, and Margaret D. Uridge, among others, have given consideration to the use of microfilm as a substitute for originals in interlibrary loan. W. H. Simon has reported the use of copies of journal articles, made on Contura, for routing purposes in the library of the Olin Mathieson Chemical Corporation. He also describes the circulation of copies of tables of contents of magazines as a basis for individual requests for originals or copies of specific articles. As yet, however, there is little if any written on the possible role of electrostatic reproductions in interlibrary loan.

The simple reproduction of catalog cards is outside the scope of this discussion. However, L. Polly-Bassitta reports the use in the Padagogische Zentralbibliothek in Berlin of reproductions of title pages on standard catalog cards, with entries, paginations, sizes, and call numbers added. W. T. Mason describes the use of an "abstract overlay" process, based on microphotography, for cataloging technical reports. F. C. Francis outlines the techniques now being used for printing the full card catalog of the British Museum, recalling Garnett's forecast in 1882. R. E. Kingery describes the techniques of G. K. Hall Co., Inc., for publishing card catalogs in book form by laying out the original cards in page form, microfilming, and then preparing offset plates from the film by xerox, and the photographic creation of full sets of catalog cards with subject and added entries.

If one criterion of a system application is that it represents a machine method of doing something formerly done by hand, then the photocomposing machine for Chinese, Japanese, Korean, and Cyrillic alphabets manufactured by Shashin-Shokujiki Kenkyusho of Tokyo certainly qualifies. This machine is presently in use at the Library of Congress for preparing catalog card copy for offset reproduction.
applications in libraries, R. R. Shaw’s report to the American Council of Learned Societies on uses of the Photoclerk remains the pioneer, germinal account to date. In listing 129 different applications to many library operations the point is well made that the “Photoclerk was used for many more things than those included in the original planning. The normal experience was that after one set of experiments demonstrated what could be done, other staff thought of new applications, and the whole had a snowballing effect, with the program starting slowly and rapidly gaining momentum.”

Recently, J. Burkett has provided an excellent summary of system applications of all kinds. He notes that “librarians may wish to consider the medium of microphotography as a possible factor in reducing costs under such headings as: the acquisition programme, binding, storage, cataloguing, charging.” Also, M. F. Tauber has provided a standard text with references to the application of photographic methods to a variety of library operations.

Just as the general accounts of system applications are few, so too are those of applications in single libraries. Dorothy B. Keller has reported on the use of photographic reproduction with overlays by the University of California Acquisition Department for requesting invoices from dealers, cancelling orders with dealers, requesting quotations on out-of-print items, obtaining faculty recommendations on securing back files of serials, etc. J. H. Treyz, although primarily concerned with the xerographic reproduction of catalog cards at Yale University, briefly mentions “the making of a weekly accessions list, reproduction of reports, forms, articles that are out-of-print, and holding cards for serials.” This writer has outlined the use of photography in the reference department of The New York Public Library for ordering, making process records, updating serial records, and offering exchange items. Finally, F. S. Henshaw reports numerous system applications at the Library of Congress, using a converted Model E Recordak, among them order and process records.

The meagerness of the literature suggests the need for more accounts of system applications of photocopying in individual libraries. Aside from the cost studies made on the Photoclerk, there is little information available on the economies of system photocopying. A comprehensive study of possible applications in different kinds of libraries of varying size is highly desirable. Especially needed is an evaluation of presently available photocopying devices from a system application point of view.
Shaw has pointed out "that if the technology of photography could be built into the equipment, so that the camera work and the processing could both be done by people who knew nothing at all about photography, a powerful new office tool would be forged." His Photoclerk was a giant step in that direction. Future hope probably lies with electrostatic methods rather than with photography. In 1957, the Council on Library Resources, Inc., entered into a contract with the Radio Corporation of America to prepare an engineering design plan for a "cataloger's camera." Subsequently, the Council entered into a further contract with R.C.A. for the construction of a working model. It is expected that the machine will be capable of reproducing catalog cards from a full size master and will demonstrate the feasibility of Electrofax as a reproduction method. Some system applications could undoubtedly be made of this device if it becomes available.

References

5. McCombs, op. cit.
Copying Methods as Applied to Library Operations

17. SYSDAC; Another New Idea for Book Charging. Los Angeles, Bro-Dart Industries, [1959?].
33. Shaw, op. cit., ref. 6.
34. Burkett, op. cit.
40. Shaw, op. cit., ref. 6, pp. 48-84.
41. Ibid., p. 1.
Policy Questions Relating to Library Photoduplication Laboratories

ROBERT H. MULLER

With reference to photoduplication of documentary materials, the library administrator is primarily concerned with questions of policy. Although he does not underestimate the importance of attention to details of photographic techniques and equipment, it is his special responsibility to determine functions and objectives, to clarify organizational relationships, to produce a meaningful economic structure for operations, to establish priorities, to explore possibilities of cooperation, and to be generally alert to new applications to improve library service.

The extensive literature dealing with photoduplication laboratories of libraries is replete with discussion of techniques, apparatus, historical origins, as well as with propaganda and crystal-gazing. Outstanding among those who have critically and penetratingly focused attention primarily on questions of policy, have been H. H. Fussler and Günther Pflug. Fussler’s Photographic Reproduction for Libraries has almost achieved the status of a classic in the sense that even seventeen years after its publication many of its conclusions and recommendations are still valid; and in comprehensiveness of treatment of fundamental issues it has no rivals. Pflug’s much shorter contribution deals with organizational problems and relationships with special reference to the economics of a photolaboratory in a European country. Others who might be mentioned because of their attention to fundamentals of function, organization, or relationships are Erich Zimmermann, E. G. Hill, and R. H. Muller. The purpose of the present review is to identify some of the more significant policy questions relating to photolaboratories.

It is not easy to determine when a library should establish a photolaboratory. One reason for the difficulty is that the issue of a service

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need tends to become mixed up with an issue of economics. It is one
thing to make provisions for meeting an anticipated demand for
documentary reproduction; it is quite a different matter to be required
to set up a service that will operate as a sound business venture. Be-
cause of this inherent conflict, it is well for librarians not to forget
that, like interlibrary lending, the first and foremost function of a
photolaboratory is to render a current service to scholars located far
away rather than to solve local space problems, preserve the content
doctoring documents, or copy documents for local patrons.

The most essential photocopying service called for is the speedy
documentary reproductions of short runs in response to demands by
serious students or scholars anywhere in the world; and such service
should be provided with a minimum of fuss and at the lowest possible
price. Libraries still are far from having reached this goal. The
reasons why it has not been reached are four: (1) There exists no
regional or national plan in the United States, to say nothing of an
international plan, which would distribute responsibilities on a coopera-
tive basis. (2) Institutional altruism is often lacking because libraries
tend to give budgetary priority to the meeting of local needs in
preference to scholarly needs outside their jurisdictions. (3) Supply-
ing photocopies to scholars in distant locations, involving as it largely
does the production of short runs, tends to be less rewarding to the
operator from the point of view of production statistics and laboratory
income than the production of long runs. (4) Institutional business
practices and legal requirements tend to involve library photolabora-
tories in an extraordinary amount of red tape.

Any library owning unique or outstanding collections should con-
sider itself obligated to make provision for the prompt supply of a
photocopy of any items in its collections at a reasonable price. Such
 provision can conceivably be made through a contract with a com-
mercial laboratory or through an arrangement with a laboratory of
another library or a campus laboratory outside the university library.
The important thing to keep in mind, however, is that any such
arrangement requires close attention to the prices that customers will
be charged and to the question of how long it will take to obtain a
reproduction.

A survey published in 1951, for instance, showed that, whereas the
New York Public Library estimated the “time elapsed” at twenty-four
hours, another great library estimated that the filling of an order
took no less than thirty days. Similar variations were revealed in
prices charged. For instance, Harvard University charged thirty cents for an 8½ x 11 inch photostat whereas another large university library charged fifty-five cents for the same. If the prices charged by a given institution are greatly out of line with prices charged by other libraries, or if the time for filling an order is excessive, the librarian of that institution should seriously consider the establishment of a laboratory in his own library, even at the risk of burdening his library with a service that may have to be subsidized to a considerable extent. There may, of course, be other advantages than lower prices. As Director H. M. Lydenberg pointed out in 1940, in a letter quoted by Fussler, with reference to the establishment of microfilming services at the New York Public Library: “By institutional operation rather than contractual operation much more careful handling of material is assured; quicker service is provided; scholarship benefits because the price charged is based on the mere rate of labor and material, with elimination of profits, taxes, and similar elements.”

In Europe, in contrast to the United States, commercial firms have made a business out of supplying photocopies of parts or excerpts from published works, especially scholarly or scientific journals. Zimmermann raised the question as to whether publicly supported libraries are justified in contributing free bibliographical and circulation services to profit-motivated enterprises. Such a symbiotic relationship may call for a contract providing for full payments to libraries. Zimmermann also contends that photocopies of manuscripts, rare works, and unpublished dissertations should be supplied to commercial firms only in the form of positive prints, with the library keeping the negative.

Although evidence has apparently never been published to show whether prices charged by commercial or other nonlibrary connected laboratories doing work for libraries tend to be higher than prices charged by photolaboratories connected with libraries, there is reason to expect that commercial rates and rates charged by institutional laboratories that must operate on a self-sustaining basis are higher because such laboratories cannot afford to operate at a loss whereas libraries can and do justify subsidization of their photolaboratories. On the other hand, a laboratory which has a large sustained volume of work, whether it is commercial or not, can operate more efficiently than a library that receives only an occasional order. Whether the heightened efficiency of nonlibrary-connected laboratories actually
Policy Questions Relating to Library Photoduplication Laboratories

results in low prices rather than high profits depends, of course, on the extent of competition and other factors. O. H. Spohr reported that in South Africa library rates for photocopies were much lower than commercial rates.9

With reference to conditions in Germany, Pflug10 expressed the opinion that prices charged by university libraries must not be higher than those charged by commercial firms for comparable work. This objective is difficult to achieve if the authorities insist on the library photolaboratory to be self-supporting. The reasons for the difficulty are that (1) billing is more costly when it has to go through the business office of a university; (2) a library must handle every type of order, even unprofitable ones; (3) a library cannot readily lay off its employees during slack seasons; and (4) the bibliographic searching burden placed upon the staff is considerable. To be competitive with commercial firms as far as prices are concerned, Pflug concludes that subsidization is necessary. On the other hand, Pflug feels that a library photolaboratory that is not self-supporting will find it difficult to obtain needed personnel increases or new equipment. Since the volume of work an institutional laboratory will be called upon to perform is beyond the control of the laboratory’s manager, the only way for a laboratory to become self-sustaining (without subsidy), according to Pflug, is to set its rates high enough to yield an income sufficient to pay its expenses.

Directories of institutional photoduplication services reveal wide differences even among rates charged by different institutions that have institutional (but not necessarily library-connected) laboratories. For instance, Brinkley’s Directory,11 listing seventy-seven institutions, showed that while most American libraries in 1959 charged between $.03 and $.05 per microfilm exposure, six charged $.025 or less and three charged $.06 or more; a scholar needing microfilmed reproductions will be charged per exposure $.02 by the University of Maryland, $.03 by Princeton University, $.04 by Massachusetts Institute of Technology, $.05 by Dartmouth College, $.06 by Johns Hopkins, and $.07 by the Huntington Library. (Princeton and M.I.T. have photolaboratories in their libraries, whereas Dartmouth, Johns Hopkins, and the University of Maryland have microfilming done through their campus laboratories; the Huntington Library has its filming done in an institutional laboratory that also serves its art gallery and botanic gardens.) Minimum charges per item range from $.50 to $3.00. These illustrations indicate that a few important research li-
libraries operating no photolaboratories under their direct control do cause customers to be charged relatively high rates as compared to what some library-connected laboratories charge. It is difficult to keep prices at levels comparable to those charged by other libraries if a photolaboratory is outside the control of the library and is obligated to operate on a self-supporting basis as is often the case.

A lone voice in this price wilderness has been Atherton Seidell's. He argued that microfilm copies of journal articles should be given to patrons free of charge in publicly supported libraries. He presented data from the Army Medical Library (now renamed "National Library of Medicine") to show that the total cost of lending a volume is appreciably higher than the cost of making and sending out a microfilm. He felt it was most unfortunate that microfilming had become a subsidiary operation conducted on a self-sustaining basis rather than an integral part of library service. Seidell's advocacy of free microfilming service, however, has not received ready acceptance by library administrators of large research libraries. The National Library of Medicine supplies free photocopies through libraries to a strictly limited certified clientele of scholars in the field of medicine. No other significant instances of free service are known to the author. Fussler pointed out that the advocates of "free" microfilming overlook that the service might be exploited by a minority of users. This may explain why the idea has not been widely adopted, quite apart from the fact that most laboratories have been set up on a self-sustaining basis and depend on the income from microfilm orders. What is collected as income for short runs is often less than the total expense of bringing the documents to the camera, completing the photographic work, conducting correspondence, and doing the accounting, billing, collecting, and auditing operations. Although free microfilm service would eliminate costly business procedures, it would require a judgment-making operation to distinguish legitimate and reasonable orders from those that represent abuses and exploitation. It is not unlikely that the cost of applying judgment to each order might exceed the cost of the eliminated business procedures and would, therefore, represent no advantage over the system of priced microfilm. Charging for photocopying services functions as an automatic mechanism designed to prevent irresponsible demands from reaching the laboratory and thus performs an indispensable function. Within this framework, Seidell's argument that specialized libraries should offer free microfilm of journal articles because microfilming requires only
inexpensive equipment and inexperienced help becomes irrelevant, for there is nothing to prevent such a laboratory from being overrun by orders that cannot be handled without a sizable subsidy. If an institution such as the Harvard, Yale, the University of California, or the University of Michigan were to offer free microfilm, they would soon find themselves inundated by a flood of orders that their reference and bibliographic staffs could not cope with. It is evident that the idea of free microfilm initially requires a cooperative arrangement among all significant research libraries whereby each would be assigned specified regional and/or subject-matter responsibilities. Even then, abuses would not be easy to control unless all orders were required to be placed through bona fide scholarly libraries willing to assume the burden of strict screening of orders according to criteria cooperatively agreed upon.

A compromise solution might be found in a nationwide agreement on price ceilings, adopted annually by action of national professional associations of librarians and documentalists. Although the establishment of such price ceilings will be criticized by some as impractical or a restriction of institutional freedom, it will be a boon to scholars, will eliminate much correspondence, and may help to provide justification for subsidies in many institutional situations. As a matter of fact, an informal kind of price-aligning is probably going on among some photolaboratories in any case. It was reported in 1955 that a small number of libraries admitted that they merely intended to keep their prices in line with those charged by similar institutions rather than basing their prices on careful cost analyses.17

Returning to the question as to when a library should establish a photolaboratory, the actual current situation in the U.S. is probably quite an improvement over the situation of 1942 when Fussler noted "the anomalous position of having reproductive facilities in at least a few institutions which do not need them, while they are lacking in certain libraries from which reproductions should be made available." 18 Fussler did not supply any data to show which libraries then did or did not have photolaboratories, nor did he indicate which specific libraries then lacking reproductive facilities should consider installing them. He did envisage, however, a regional pattern consisting of (1) a few fully equipped laboratories and (2) a much larger number of less elaborately equipped laboratories in university and special libraries distributed along regional lines.19 This pattern has so far failed to emerge.
If the demand for photocopying in a library is quite negligible and the collections of the library concerned are insignificant from the point of view of research or unique holdings, the establishment of a laboratory obviously need not be considered. As R. C. Gremling has pointed out: “You must have something to reproduce, something other libraries will need.” Nevertheless a few relatively small libraries that may presume to own quite limited, if any, research materials have established photolaboratories for purely local service; an example is Fenn College. On the other hand, a few large libraries, notably the Universities of Indiana and Wisconsin, have all their work done by commercial firms. The following twenty-one very large libraries have photolaboratories of their own:

<table>
<thead>
<tr>
<th>Library</th>
<th>Approximate number of volumes in Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library of Congress</td>
<td>11,411,475</td>
</tr>
<tr>
<td>Harvard University</td>
<td>6,000,000</td>
</tr>
<tr>
<td>New York Public Library</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Yale University</td>
<td>4,000,000</td>
</tr>
<tr>
<td>University of Illinois</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Cleveland Public Library</td>
<td>3,000,000</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>2,600,000</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
<td>2,300,000</td>
</tr>
<tr>
<td>Columbia University</td>
<td>2,275,000</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>2,000,000</td>
</tr>
<tr>
<td>University of Pennsylvania</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Princeton University</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Enoch Pratt Free Library</td>
<td>1,450,000</td>
</tr>
<tr>
<td>Duke University</td>
<td>1,390,000</td>
</tr>
<tr>
<td>Ohio State University</td>
<td>1,250,000</td>
</tr>
<tr>
<td>University of California, Los Angeles</td>
<td>1,000,000</td>
</tr>
<tr>
<td>National Library of Medicine</td>
<td>1,000,000</td>
</tr>
<tr>
<td>University of Washington</td>
<td>1,000,000</td>
</tr>
<tr>
<td>U.S. Department of Agriculture Library</td>
<td>1,000,000</td>
</tr>
<tr>
<td>University of North Carolina</td>
<td>960,000</td>
</tr>
<tr>
<td>University of Virginia</td>
<td>942,000</td>
</tr>
</tbody>
</table>

The University of Minnesota Library has microfilming done through a campus Audio-Visual Education Service, but the film is developed by a commercial firm in Chicago; photostats are supplied through another agency. Among very large libraries, Johns Hopkins University Library has its photographic work handled through a campus agency,
Policy Questions Relating to Library Photoduplication Laboratories

as was mentioned in another connection. Northwestern University has its work done through the University of Chicago. At Cornell, the library depends on a central photographic campus laboratory. At the University of Texas, microfilming camera work is done in its newspaper collection, but the film is processed by a commercial firm elsewhere; other types of photocopying are done by several campus agencies.

To summarize the following seven very large libraries in the U.S., apparently manage to get along without full-scale photolaboratories operated as part of the library organization: the Universities of Indiana, Wisconsin, Texas, Minnesota, Cornell, Northwestern, and Johns Hopkins. These listings omit only a few large libraries not included in Brinkley's Directory, about which information has not been obtained.

Among libraries listed in Brinkley's Directory that own fewer than 900,000 volumes, twenty-six have photolaboratories within their organizational structure. By size, these libraries are distributed as follows:

<table>
<thead>
<tr>
<th>No. of Volumes in Library</th>
<th>No. of Libraries with Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 299,000</td>
<td>5</td>
</tr>
<tr>
<td>300,000 to 599,000</td>
<td>8</td>
</tr>
<tr>
<td>600,000 to 899,000</td>
<td>12</td>
</tr>
<tr>
<td>Volumes Not Reported</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

This distribution reflects the fact that as the size of a library increases, the likelihood of its operating a photolaboratory of its own also tends to increase. This tendency would show up even more dramatically if the number of libraries having no laboratories of their own were shown for each size-interval. The question as to how large a library has to be before it should consider installing a photolaboratory cannot be definitively answered. All that can be concluded is that some libraries owning less than 300,000 have photolaboratories while others owning over a million volumes operate with impunity without such services.

The forty-seven photolaboratories in the U.S. that form parts of libraries vary greatly in size all the way from the Library of Congress with its seventy employees to those having less than the equivalent of one full-time employee. The forty-six of these forty-seven libraries
for which information on the number of employees has been supplied distribute themselves as follows:

<table>
<thead>
<tr>
<th>No. of Employees</th>
<th>No. of Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3</td>
<td>26</td>
</tr>
<tr>
<td>3 to 5.9</td>
<td>9</td>
</tr>
<tr>
<td>6 to 8.9</td>
<td>5</td>
</tr>
<tr>
<td>9 to 11.9</td>
<td>2</td>
</tr>
<tr>
<td>14 to 70</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
</tr>
</tbody>
</table>

It has been carefully calculated by Pfug that it is uneconomical to operate a photolaboratory (in Germany) if the volume of work is too small to require a minimum staff of three employees. If this standard is applied to library photolaboratories in the U.S., it appears that over half of the libraries in the tabulation above cannot operate on a self-sustaining basis and, therefore, need subsidization.

In order to reduce the amount of subsidy required, library photoduplication laboratories have tended to take on additional photocopying tasks. Typically, they have become involved in the microfilming of long runs of newspapers, serials, dissertations, manuscripts, etc. The danger of doing such work is that it may cause the more crucial but unprofitable short-run work to be pushed into a low priority group by tying up limited camera and developing facilities. Other work taken on includes work totally unrelated to library materials, such as the filming of office records, the preparation of slides, the copying of transcripts, etc. On the face of it, there is nothing wrong with a library photolaboratory's undertaking extraneous jobs if the profits from such work help to reduce the subsidy required to support the primary task of supplying short runs to scholars promptly and at minimal prices. Librarians have been coy about bidding for extraneous jobs, and at least, one commercial operator has expressed opposition to this sort of enterprise on the ground that it represents unfair competition by tax-exempt institutions. Only one case is known in which a library-connected laboratory admits that it is its policy to participate in competitive bidding situations.

The subtle relationship between subsidization and the need for library cooperation has not been brought out in the open in library literature. Many librarians are under the illusion that their photolaboratories are self-sustaining when in fact they are not. In cases where
Policy Questions Relating to Library Photoduplication Laboratories

Laboratories are not self-sustaining, a hidden subsidy in the form of rent-free space, utilities, telephone, regular library salaries and wages (for bibliographic searching and circulation work) and/or equipment replacement may be involved. In other cases, librarians readily admit or proudly proclaim that their photolaboratories are operated as a service which is subsidized like interlibrary lending or other regular local library service for which no charge is made. Wherever a subsidy is involved, whether hidden or openly recognized, a library has the right to expect that other research libraries will assume a similar burden. A large research library that does not operate laboratories of its own while countenancing high rates charged by a commercial firm or campus photolaboratory, with which it has established an agreement, is in fact failing to do its share by causing customers in its region to apply for service to libraries in other regions, thus increasing the burdens carried by these other libraries in cases when the documentary materials wanted by customers are also held in its own library.

Once a decision has been reached to establish a laboratory in a research library, the appropriate dimension of the laboratory must be determined. What photographic processes should it be able to handle? How much of a capital outlay is required? To convey an approximate idea of the cost of a fairly sizable basic laboratory, the following list of major equipment, with estimated current prices, included in the Photoduplication Service of the University of Michigan Library is presented:

1 — 18” x 24” Photostat Camera with Conveyer ..................... $ 3,280
1 — Two Cell Print Washer (for photostats) ..................... 360
1 — 30-inch Print Dryer (for photostats and microfilm enlargements) ... 450
1 — 20-inch Paper Trimmer (for trimming photostats)............. 45
3 — Planetory-type 35 mm. Microfilm Cameras (for book and manuscript copy) @ $3,425 ........................................... 10,275
3 — Book Cradles @ $135 (for holding books and paper flat while filming) .......................................................... 405
1 — Rotary Type 16 mm. Camera (for office records and cards) .... 1,100
1 — Continuous Microfilm Processing Machine ..................... 7,900
1 — Continuous Microfilm Printing Machine (for making positive microfilm) ...................................................... 1,900
1 — Densitometer (for printing microfilm positives and density control) ... 115
1 — Microfilm Enlarger (for enlarged microfilm prints) ............. 595
1 — Print Washer (for enlarged microfilm enlargements) ......... 375
1 — Interval Timer (for exposure control of microfilm enlargements) ... 30
1 — Enlarging Easel (for microfilm enlargements) .................. 25
ROBERT H. MULLER

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 — Microfilm Reader (for inspecting microfilm)</td>
<td>475</td>
</tr>
<tr>
<td>1 — Film Measuring Machine (for measuring the length of film)</td>
<td>95</td>
</tr>
<tr>
<td>1 — Splicer (for connecting parts of microfilm)</td>
<td>45</td>
</tr>
<tr>
<td>2 — Pairs of Rewinders @ $30 (for handling and editing roll film)</td>
<td>60</td>
</tr>
<tr>
<td>1 — 18-inch Paper Trimmer (for miscellaneous trimming)</td>
<td>20</td>
</tr>
<tr>
<td>1 — Diffusion Transfer Copier (for quick copies)</td>
<td>300</td>
</tr>
<tr>
<td>1 — 4” x 5” Press Type Camera (for copying photographs and continuous tone material)</td>
<td>310</td>
</tr>
<tr>
<td>1 — 4” x 5” Condenser Type Enlarger (for making glossy prints)</td>
<td>355</td>
</tr>
<tr>
<td>1 — Photoclerk Camera (copying cards, etc.)</td>
<td>800</td>
</tr>
<tr>
<td>1 — Photoclerk Processor (developing photoclerk paper)</td>
<td>1,700</td>
</tr>
<tr>
<td>1 — Reel-type Manual Microfilm Processor (for emergency processing of microfilm)</td>
<td>300</td>
</tr>
</tbody>
</table>

Total: $31,315

Added to this list should be construction of partitions, three small dark rooms, built-in sinks, chairs, desks, file cases, and an intercommunication system, plumbing and light fixtures, storage facilities, and air conditioning (humidity and temperature control) for the dark rooms and the film developing and inspection area.

A laboratory of this sort is capable of speedily producing photostat prints, negative and positive microfilm, quick copies of pages from books, microfilm enlarging, and photoclerk prints. It occupies an area of about 2,500 square feet, employs the equivalent of eight full-time staff members, handles about 3,000 separate orders a year, including 140,000 exposures of negative microfilm, and produces annually about $24,000 worth of services. Photographic equipment which the Michigan Laboratory does not have, but two other major laboratories own are a continuous Xerox Copyflo printer costing $52,000 (of which two are in the Library of Congress and one is in the National Library of Medicine), an ozalid printer (Yale), and a Thermofax-reader-printer (University of North Carolina, Duke University). Most laboratories would find the Xerox Copyflo printer a most useful machine to add, but the cost is as yet so high, that only the very largest laboratories have a sufficient volume of work to justify the capital outlay. The possibility of a joint purchase and use by several libraries, which has been explored by the author, has so far not proved feasible. Among the libraries that are currently having continuous xerox work done by commercial operators are the University of California and the University of Michigan. The use made of this process by the National Library of Medicine is particularly noteworthy; in 1958–59 this library produced about three million exposures of negative microfilm, which
Copyflo could quickly convert, and conceivably did convert, into enlargement prints.

The few libraries that have larger laboratories than the University of Michigan Library differ from it largely in terms of ownership of more cameras and duplication of other machinery. For instance, the Library of Congress owns nineteen microfilm (35 mm.) and two photostat cameras, and has two automatic film processors; the New York Public Library owns eight microfilm cameras, including one continuous feed type, and five photostat cameras; the University of California owns four microfilm and two photostat cameras; the National Library of Medicine owns seven microfilm (35 mm.) and two photostat cameras; and Yale University owns five microfilm (35 mm.) and two photostat cameras.

If a library must reduce the amount it can spend for an initial outlay, the price of equipment most likely to fall by the wayside is the automatic film processor. Among large libraries that have been getting along without this equipment are the following:

<table>
<thead>
<tr>
<th>Library</th>
<th>Approximate No. of Exposures of Negative Microfilm Produced Annually (1958/59, except where indicated otherwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yale</td>
<td>575,443 (Processor on order)</td>
</tr>
<tr>
<td>Harvard</td>
<td>300,000 (Processor desired)</td>
</tr>
<tr>
<td>University of Illinois</td>
<td>141,130</td>
</tr>
<tr>
<td>Columbia University</td>
<td>95,000 (1957/58)</td>
</tr>
<tr>
<td>University of North Carolina</td>
<td>54,803 (1957/58)</td>
</tr>
<tr>
<td>University of Virginia</td>
<td>47,500 (1957/58)</td>
</tr>
<tr>
<td>Princeton</td>
<td>47,000 (1957/58)</td>
</tr>
</tbody>
</table>

On the other hand, a few libraries with relatively small processing volumes do own automatic processors:

<table>
<thead>
<tr>
<th>Library</th>
<th>Approximate No. of Exposures of Negative Microfilm Produced Annually—1958/59</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Missouri</td>
<td>20,000</td>
</tr>
<tr>
<td>University of New Mexico</td>
<td>39,862</td>
</tr>
</tbody>
</table>

An automatic film processor installed at one large university library in 1958 had an estimated capacity of over 600,000 feet of film a year, assuming an eight-hour shift, five days a week. At the time of installation, the initial processing need was estimated to be only 50,000 feet.
a year, or about one-twelfth of capacity. This meant that the processor was expected to be in operation less than four hours a week. The question obviously arose as to how such low utilization of an expensive piece of automatic machinery could be justified.

Manual processing (e.g., with a Nikor reel) of a one hundred foot roll of film could be assumed to take about sixty minutes, whereas an operator is tied up for only about an average of fifteen minutes per 100 foot reel in automatic processing, including time for chemical mixing and cleaning of equipment. (The exact time manual developing consumes is difficult to determine. It involves spooling the film on a Nikor reel, developing, fixing, washing, drying, and winding the film on a spool. Even with close scheduling and the use of two reels, it is doubtful whether an operator would normally process more than eight one hundred foot rolls in an eight-hour day, or sixty minutes per roll. The same eight rolls of film can be processed in two hours with the automatic Canadian Applied Research Tri-Film Processor, which is used at the University of Michigan.) Assuming an hourly wage rate of $3.00 for a skilled photographic technician and an annual production of five hundred one hundred foot reels (50,000 ft.), the annual labor cost for manual processing is $1500 as against $375 for automatic processing; to the latter figure, about $200 a year must be added for a machine maintenance contract, giving a total of $575. The difference between the two processes is $925. The automatic processor under consideration costs $7900, and the reel-type manual processor, $300; the difference between the two pieces of equipment is $7600. On the basis of an annual saving of $925 under automatic processing, it will take about eight years and a quarter to recover the capital outlay. Since the automatic processor can be expected to last a minimum of ten years, it appears that the installation of an automatic processor will be advantageous despite a low volume of processing in relation to capacity.

There are other advantages connected with automatic processing: (1) It readily allows for an expanding volume of production. (2) Less skill is necessary. (3) The skilled photographic technician will not be tied up with processing work for so many hours per week nor in so engrossing a fashion as he would be with manual processing and can, therefore, devote himself to a greater extent to other tasks requiring photographic, technical, and supervisory skills in connection with photostat, xerography, multilithing, enlargement printing, positive microfilm printing, microfilm inspection, correspondence, and
Policy Questions Relating to Library Photoduplication Laboratories

customer relations. (4) An automatic processor makes it possible to take care of a possible peak load of over two thousand feet of film a day if necessary, which would not be possible with the use of a single reel-type developer and one operator.

There are other pieces of equipment that a photolaboratory can initially do without. Among these are particularly the continuous microfilm printing machine for positive microfilm. The question as to whether a laboratory can be started with a small number of indispensable pieces of equipment and installations and be gradually built up as the demand warrants or requires, or whether it is better to start with a full-fledged installation is controversial. For instance, Gremling stated: “To play safe, start small and allow the needs to grow with demand.” 24 Fussler, on the other hand, contended that “starting on a ‘shoe-string’ works to the disadvantage of the client.” 25 The following quotation discusses this question in greater detail:

Many present-day microfilmmers are of the opinion that this field should be approached with great caution. Even where adequate funds exist, these over-cautious administrators will purchase secondhand or inferior materials for their laboratories to see if the venture will prove successful. Since a complete investigation of all sides of this question should have been conducted before any expenditure whatsoever was made, what then is the question of the success or failure of the endeavor? Unless the positive outcome of the project is assured by such a study, microfilming on a productive basis, regardless of the scope of the production, should not be attempted. When, however, the results of such a study are affirmative, there is no reason for this wasteful step-by-step approach to the desired end. More money in the form of cash outlay for second-hand cameras, readers, etc., as well as money in the form of man-hours has been expended in this manner than will ever be known. A microfilming unit will carry itself financially only if it produces in quantity, and quantity production can come only from quality equipment, supplies and facilities. 26

The library administrator may have no choice; but in most cases it would seem advisable to wait until the necessary funds for a well-rounded laboratory can be secured. It is difficult to maintain archival standards in the product of a laboratory unless proper equipment is available; and it is important to maintain such standards since customers tend to accept the product on faith rather than examine it exposure by exposure upon receipt. J. P. Danton and Charles Elfont, describing their experiences in operating a medium-sized microfilming laboratory at Temple University, where the work was handled by a
ROBERT H. MULLER

total of three student assistants, warned that only large libraries can undertake efficient microfilming. It is possible for a photoduplication service to operate even without manual developing equipment. In such cases, rolls of film can be processed commercially. The disadvantage is that a period of seven days usually elapses before a film is processed and returned from the commercial laboratory. Since inspection of the film is recommended before the documents are returned to the shelves, this delay causes the documents to remain in the laboratory for a much longer time than may be desirable from the point of view of service to readers. Moreover, if retakes are necessary, film will have to be sent to the laboratory again, causing a further delay in the delivery of the finished product. Fussler expressed the view that, if this inspection is to be made without undue delay, developing equipment near the camera is required.

If the volume of processing is about 50,000 feet a year (or about ten one hundred foot rolls a week) and if the cost of commercial processing plus postage and insurance is about $2.50 per roll, the annual cost of processing would be $1,250. The cost for ten years would be $12,500. If, instead, the library had purchased an automatic processor for about $7,900, the cost of labor for the processing of 500,000 feet would have been $3,750 plus $2,000 for a machine maintenance contract for ten years; hence the total cost would have been $13,650. This very rough cost comparison suggests that, assuming a ten-year amortization period, the cost of automatic processing in a library’s own laboratory need not be much higher than the cost of having film developed by a commercial laboratory, provided that the volume of processing is not less than about ten rolls a week. For a twenty-year amortization period, which would not be unreasonable to assume, a lower volume would justify automatic processing equipment, quite apart from the question of speed of service, which may be the overriding consideration in any case.

Some librarians, in their enthusiastic acceptance of microfilm as a means of space-saving, have attempted to justify the establishment of a photolaboratory on the ground that many less frequently used publications in library stacks could be microfilmed and the originals discarded. It has been found, however, that such conversion is economically possible only if several libraries agree to share the cost of producing the negative film. A recent example of such a project is the microfilming of certain Chinese journals by the Photoduplication
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Service of the Library of Congress in 1958 and 1959. In such projects it is necessary to circularize the list of titles microfilmed and ask other libraries for commitments as to subscriptions. The larger the number of subscribers, the lower the subscription price. For instance, volumes 1 through 22 of *Hsiao-shuo yueh-pao* (The Short Story Magazine), published in Shanghai from 1910 to 1931, involving 3,600 feet of microfilm, costs $500 if three subscribers can be found, but only $305 if ten subscribers can be found. Photolaboratories of libraries are fully justified in undertaking projects of this sort to earn reasonable profits that will help subsidize their short-run work by taking fuller advantage of their camera and processing capacity.

R. T. Esterquest has shown that the production of a positive film of a long run of an infrequently used journal costs fifty-five times as much as the annual cost of storage of the originals in an inexpensive storage building. Thus it would take fifty-five years before the cost of microfilming could be recovered unless several libraries undertook such a project on a cooperative basis. J. Burkett refers to a British study which refutes the general acceptance that microfilm is a low-cost substitute for storage and binding and shows that record costs over a period of twenty to sixty years equal the cost of microfilming. The establishment of a microfilming laboratory must, therefore, be justified on other grounds than space-saving.

A final word about the future: Are photolaboratories of libraries here to stay? The photostat camera, introduced into libraries around the time of World War I, is still in wide use. Where speedy reproduction meeting archival standards is called for, the photostat is still a useful piece of equipment; photostat prints can usually be supplied within twenty-four hours or less. A few libraries that do not own a photostat camera supply microfilm enlargements instead at lower prices. The obvious disadvantage is that such enlargements cannot be produced with equal speed.

Quick-copying machines, which have not been considered in this review because they are not necessarily associated with a laboratory, have found their way into most libraries and have proved to be acceptable wherever the observance of archival standards has not been required.

For the copying of short runs, microfilm is impractical when the number of pages to be copied is so small that photostats would cost less than the minimum rate charged for a microfilm order.

Microfilming, which began as a novelty in libraries around 1935, is
now accepted as a matter of course in many places. The dry continuous electrostatic xerography process began to appear in libraries about 1958 in the form of the automatic Xerox Copyflo machine, producing enlargements from microfilm at a fantastic rate. Libraries have unfortunately not been able to take full advantage of this invention to date. The next stage will be a more widespread use of Xerox Copyflo, conceivably on a cooperative-use basis, as well as the increased use of the microfilm reader-printer, which has been much improved since its introduction in 1958. Photocopying in place of interlibrary lending may be expected to become standard procedure in most research libraries. Hill \(^{32}\) goes one step further and envisages the adoption of closed-circuit television with personal receivers of individual scientists being fitted with printers. If and when this development has become a reality, photocopying by research libraries will, according to Hill, be uneconomic and unnecessary and, therefore, become extinct. Meanwhile we may expect to witness the establishment of new photolaboratories in all major research libraries that do not now operate such installations and the enlargement of existing laboratories.

Note: The author wishes to acknowledge the assistance on technical matters received from J. G. Gantt, head of the University of Michigan Library’s Photoduplication Service.

References

7. Fussler, op. cit., p. 54.
Policy Questions Relating to Library Photoduplication Laboratories

10. Pfüg, op. cit., p. 82.
15. Fussler, op. cit., p. 56.
17. Muller, op. cit., p. 265.
18. Fussler, op. cit., p. 36.
19. Ibid., p. 37.
22. Brinkley, op. cit., p. 3.
Photocopying by Libraries and Copyright: A Precis

Miles O. Price

To what extent may a library legally photocopy copyrighted materials in its collections, either for its own purposes or on order by patrons for their private use? Should patrons be permitted to do their own photocopying in the library, by means of one of the numerous portable devices now available for the purpose?

These are problems which have long vexed librarians. Accordingly, the proposed general revision of the copyright statutes is of particular interest to libraries, and has resulted in a great deal of discussion, furthered as to the photocopying aspect by a recent grant from the Council on Library Resources, Inc., to the Joint Committee of the Association of College and Research Libraries and of the Special Libraries Association, to enable it to retain legal counsel to study the pertinent law.

It is the purpose of this paper to give a brief precis of the presently available literature in English, but while it is believed that the significant items are covered, no attempt at completeness is made. Certain Copyright Office publications have been relied upon heavily, as might be expected. The most useful, temperate, and certainly the most authoritative commentaries have come, either officially or unofficially, from the experienced copyright lawyers on the Copyright Office staff, or those retained by the Office for special investigations and reports.

Copyright protections are afforded both by statute and by common law, but under quite different conditions. Although a great deal has been written about statutory copyright, there is comparatively little on the common law aspect.

Although U.S. Code Title 17, sec. 1(a) grants to the copyright owner the exclusive right "to print, reprint, publish, copy and vend

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the copyrighted work;” for a period of twenty-eight years, once
renewable for the same period, such rights have always been held to be
modified or restricted by the doctrine of “fair use” (probably inap-
plicable to common law copyright). Since the statute fails to define
fair use, it must be left to the courts to do so, and they have been
anything but clear.

The problems involved in the photocopying of statutorily copy-
righted materials were summarized recently at a panel discussion on
copyright matters by E. G. Freehafer, director of the New York Public
Library. Quotations from this summary appear below. In comment-
ing upon, or quoting from the summary, or from other sources noted
in this paper, the authorities relied upon by the various authors will
not be cited:

One definition of fair use tells us that it “. . . may be defined as a
privilege in others than the owner of the copyright, to use the copy-
righted material in a reasonable manner without his consent, notwith-
standing the monopoly granted to the owner of the copyright.” Or
again, fair use has been defined as such use as is “reasonable.” An-
other writer states, doubtless with conviction and some frustration,
“There is one proposition about fair use about which there is wide-
spread agreement: it is not easy to decide what is and what is not a
fair use.”

It is clear that fair use or reasonable use lies somewhere between
the exclusive rights of the proprietor and those of the user, who, for
one reason or another, denies that his use of the copyrighted material
infringes upon such rights.

Certain uses of copyrighted material appear to be in the public
interest, and in general are held to represent fair use. These have
been identified as incidental use, use for purposes of review and
criticism, for a parody and burlesque, for scholarly works and com-
plings, for nonprofit or governmental purposes, use in litigation,
and personal or private use.

It is in this last area in which libraries have long been active, exer-
cising what they consider to be their traditional obligation to make
their collections of maximum service to their readers. Probably no
one denies the right of a reader to copy in long hand a published
work, even though copyrighted, for his personal or private use. The
same might be said of copying by typewriter or by some other
mechanical or photographic method in lieu of manual transcription.
It would seem reasonable to copy, for personal or private use, in lieu
of loan either for convenience, or when lending is precluded by policy
or by loan regulations. It has been stated furthermore that “anyone may copy copyrighted materials for the purpose of private study and review.” It has also been stated that “private use is completely outside the scope and intent of restriction by copyright.”

... recognizing, even as far back as 1935, the growing use of photographic methods of reproduction, the so-called Gentlemen's Agreement of that year laid down certain guide lines for copying by libraries. Generally speaking this provided for the making of one copy of part of a copyrighted book or periodical volume for a scholar representing in writing that he desired such reproduction in lieu or in place of manual transcription and solely for purposes of research, provided that he is notified he is not exempt from liability for misuse of the reproduction, and that the reproduction is made without profit to the maker. The agreement is no longer operative as such, but is still influential as a guide in the copying of material for use in personal research. ... Meanwhile, some copyright proprietors view with concern the emergence of quicker and simpler devices for photoduplication. Quite understandably, they fear the possibility of easy duplication by almost everyone and easy duplication of multiple copies, with detrimental effect on the sale of the work in original form.

In addition to copying for personal use, there are other purposes for which libraries need to copy. Books wear out, get lost, are even stolen, mutilated or otherwise damaged. ... There arises a question as to what the librarian's course of action should be in fulfilling his obligation to make the materials for study and investigation readily available as economically as he can. Should he copy? ... And how is the public interest best served in the case of research materials if permission is refused? ... A similar question arises when libraries need to copy or preserve the text of materials disintegrating on their shelves. ... In addition careful consideration must be given the special problems of copying unpublished material subject to common law copyright.

... There are several avenues of approach to solutions in respect to the problems mentioned. One is through revision of the statute. This is the approach adopted by several foreign countries. ... Another lies in the direction of some broad system of royalty fees. Another looks to the development of a working code of reasonable practice by libraries in terms of their responsibility for furthering scholarly investigation and research. The Joint Committee has been deliberating all of these in its consideration of the problem. The Committee now has the help of legal counsel recently retained under a grant from the Council on Library Resources in studying the background and gathering pertinent information and data needed for the considered formulation and recommendations.
The emphasis in all comments on the problems as related to statutory copyright has been on "fair use," how it is defined and limited. Every general work on copyright attempts some definition, but with little success. Since the statutes themselves make no attempt in this direction, the meaning of the term must be extracted from the decided cases. These, themselves, afford little aid, since "... the issue of fair use ... is the most troublesome in the whole law of copyright ...".

In this compiler's opinion, by far the best statements of the fair use doctrine—by competent copyright lawyers—are those by Alan Latman, L. C. Smith, and Borge Varmer. Latman's treatment is concerned chiefly with multiple copies, which is not really a library problem; while Smith and Varmer deal specifically with photoduplication by libraries. A layman's interpretation of the statute and case law relating to fair use, and with a library slant, is by R. R. Shaw, dean of the Rutgers University Graduate School of Library Service.

Although Latman emphasizes fair use as applied to multiple copies—essentially a commercial operation—his analysis of the bases of the doctrine is of major interest to librarians:

Fair use may be viewed from two standpoints. It may be considered a technical infringement which is nevertheless excused. On the other hand, it may be deemed a use falling outside the orbit of copyright protection and hence never an infringement at all. One theory behind permissible copying is the implied consent of the copyright owner. In other words, as a condition for obtaining the statutory grant, the author is deemed to consent to certain reasonable uses of his copyrighted work to promote the ends of public welfare for which he was granted copyright. This concept has at least a surface harmony with the general assumption that the fair use doctrine does not apply to common law literary property.

The theory of "enforced consent" suggests another rationale which relies more directly upon the constitutional purpose of copyright. It has often been stated that a certain degree of latitude for the users of copyrighted work is indispensable for the "Progress of Science and useful Arts." Particularly in the case of scholarly works, step-by-step progress depends on a certain amount of borrowing, quotation and comment.

Although the case law is apparently silent on the point, at least one writer has concluded that "anyone may copy copyrighted materials for the purposes of private study and review." It has, moreover, been vigorously argued that "private use is completely outside the
scope and intent of restriction by copyright.” It is difficult to assess the effect of the absence of litigation in this area. It may reflect the acquiescence on the part of copyright owners to copying by scholars for their own use. That such acquiescence is not complete is indicated by attempts to regulate, by agreement, the role of libraries in supplying copies to scholars. The increasing use of photoduplication processes will undoubtedly require continuing attention to this area. For the purposes of the present study, it may be observed that the categorical statements set forth above can neither be supported nor attacked on the basis of authority. It may well be, however, that the purpose and nature of a private use, and in some cases the small amount taken, might lead a court to apply the general principles of fair use in such a way as to deny liability.8

Latman then discusses at length proposals for legislative revision since 1909, particularly those of the Shotwell Bill of 1940, in which Subsection (h) permitted libraries to make single copies of works which were unavailable to scholars and researchers. This provision, which was strongly attacked by the publishers, provided for a trust fund in the United States Treasury, consisting of payments made by libraries for the reproduction of books which were out of print and unavailable. The legislation was not enacted.

Latman analyzes the laws of foreign countries on fair use, noting that private or personal use is sanctioned explicitly in some degree by more than twenty countries. The United Kingdom Act of 1956 is analyzed at length, as will be noted later in this paper.9

Latman’s Section V, “Analysis: The Issues Underlying Fair Use and Their Possible Legislative Resolution,” discusses at some length the proposition, often advanced, that an insignificant amount of copying does not involve the question of fair use at all. The theory of implied consent is also studied. Whether there should be statutory definition of fair use, and rules for its interpretation, is an important consideration. “We find no reported cases directly involving . . . use of material for the purposes of personal or private use, or copying by libraries for scholarly use. . . . The possibilities for treatment of the problem of fair use in a new statute include the following:

(1) Follow the approach of the Senate Committee in 1907 and maintain the present statutory silence on the question. . . . (2) Recognize the doctrine and grant it statutory status in broad terms, without clarifying the meaning accorded fair use by the courts. . . . (3) Specify general criteria; . . . (4) Cover specific situations. . . .”10
Photocopying by Libraries and Copyright: A Precis

A “specific situation” discussed in this connection is in the field of personal use, much stressed by those who believe there is no copyright liability when libraries photocopy for patrons desiring the copies only for personal use. “Photoduplication devices may make authors’ and publishers’ groups apprehensive. The Copyright Charter recently approved by C.I.S.A.C. emphasizes the concern of authors over ‘private’ uses which, because of technological developments, are said to be competing seriously with the author’s economic interests. On the other hand, it has been argued that, at least with respect to books, ‘one of the photographic processes can compete with the book in print either in price per page or convenience of use.’”

The legal aspects of photocopying by libraries are best treated by Smith and Varmer. Other fairly extensive discussions which stress the library aspect are by Shaw and M. O. Price. Varmer begins by stating that:

The various methods of photocopying have become indispensable to persons engaged in research and scholarship, and to libraries that provide research material in their collections to such persons. Effective research requires that the researcher be informed of the findings and opinions of others and have an opportunity to study the materials written by them. . . . It is here that the libraries provide an indispensable service . . . by furnishing the individual researcher with the materials needed by him for reference and study. . . . In response to the needs of researchers, most major libraries are equipped to provide them with photocopies of materials in the library’s collections. . . .

However, much of the materials needed for scholarship and research is of recent date and is under copyright, and the question arises whether the making and furnishing of photocopies of copyrighted material without the permission of the copyright owner is a violation of his exclusive right to copy secured by Section 1(a) of the Copyright Law.

In general the justification for the photocopying of copyrighted material would seem to be founded on the doctrine of “fair use.” . . .

Aside from the aforementioned practice of furnishing photocopies to researchers . . . libraries make photocopies for a variety of other purposes. Rare books and manuscripts are photocopied . . . to secure against their destruction or loss. . . . Similarly, for the purpose of preservation, photocopies are made of newspapers and other items printed on fast-deteriorating pulp paper. Common for them all is that they mainly serve intra-library purposes. . . . Photocopying for these purposes may also raise some problem as to copyright infringement.
Varmer then reviews the major criteria in court decisions as to what constitutes fair use:

... the courts have shown a tendency to apply the doctrine of fair use more liberally to scholarly uses than to commercial uses. It is, of course, a matter of conjecture as to how the courts would apply the doctrine of fair use to photocopying libraries ... it seems tenable to argue that the supplying of photocopies to individual researchers for the sole purpose of reference and study might be regarded as fair use in some circumstances; ... Whether the publisher's market would be affected materially would seem to depend upon a number of factors such as whether the work is in print, how much of the work is photocopied, how many photocopies of the same work are supplied to various persons, and the relative cost of a photocopy and a publisher's copy.

Text writers on copyright have rarely dealt with this problem. One text writer goes so far as to say that it would constitute an infringement "in principle, at least, ... if an individual made copies for personal use, even in his own handwriting." Another writer has gone to the other extreme in saying that the only copying restrained by copyright is the making of multiple copies for publication, and that anyone is free to make single copies of an entire work for the personal use of himself or of another person. Both of these views seem dubious, with no clear support in the court decisions. It may be that copying for one's own private use, at least by hand, is sanctioned by custom; but other factors would seem to be involved in the making of copies by one person for the use of others.

The point made above is one commonly ignored by those arguing the right of libraries to photocopy: the library is not copying for its own use, but, for compensation (even if it loses money on the operation) is copying for the use of another. The distinction at law is a real one.

Varmer then discusses the "gentlemen's agreement" of May 1937, between certain learned societies and the National Association of Book Publishers (a predecessor organization of the present American Book Publishers' Council, Inc.) This agreement (an informal one and by no means a contract or adhered to by all publishers) stated in part as follows:

A library, archives office, museum, or similar institution owning books or periodical volumes in which copyright still subsists may make and deliver a single photographic reproduction or reduction of a part thereof to a scholar representing in writing that he desires
such reproduction in lieu of loan of such publication or in place of manual transcription and solely for the purpose of research . . . [then stating certain restrictions].

The statutes make no specific provision for a right of a research worker to make copies by hand or by typescript for his research notes, but a student has always been free to “copy” by hand; and the mechanical reproductions from copyright materials are presumably intended to take the place of hand transcriptions, and to be governed by the same principles governing hand transcription.

Varner notes that this “agreement” is no longer in force (the successor American Book Publishers’ Council, Inc. not having ratified it), but that it still is regarded as having provided a fair balance between the interests of researchers and libraries and the rights of copyright owners. The statement that “a student has always been free to copy by hand; and mechanical reproductions from copyright material are presumably intended to take the place of hand transcription,” is questioned by him: “It may be that hand transcription created no practical problem because the extent of copying by hand was ordinarily limited by its nature, while mechanical reproduction by modern devices makes it easy to copy extensively and quickly in any number of copies. Moreover, the fact that hand transcription by a scholar himself has long been considered permissible does not necessarily justify the making of photocopies by others for scholars; thus, the supplying of photocopies as a commercial enterprise could hardly be justified on that premise.”

Here, again, is the distinction between making copies for one’s own use and copying by libraries for patrons. As to the “commercial enterprise” aspect of photocopying by libraries for patrons, Price contends that even though an enterprise loses money on its photoduplication service, it is still conducting a commercial operation, and the legal situation is different than with the patron who copies for himself. Profit is not a factor. Neither is the good faith of the library, except perhaps in mitigation of damages. (There are no library cases, but the principle involved is settled as to other enterprises.) On the subject generally, the work of Latman and W. S. Tager discusses the liability of innocent infringers of copyrights.

On the other hand, Smith states:

Throughout the cases dealing with fair use one cannot help but feel that the thoughts of the court are upon the use of the work for purposes of publication, performance, exhibition and the like, without
giving any consideration to situations which arise solely because the material is needed for private scholarly research and no other use. We know of no reported case in which the courts have passed upon the right of a reader to make a single complete copy in longhand, by typewriter, or other device of any item in the collections of a library not covered by specific contractual or donor restrictions.¹⁷

This is in accord with Shaw's views, which may be summarized as follows:

No cases have ever been brought into court. Fair use has never referred to the making of a single copy by a scholar, or lawyer or author, or anyone else, for his own use. The term, as an incident of literary property, appears to apply solely to production and/or sale of multiple copies, or, what has the same effect, the presentation to a group of people. . . . The making of such single copies, for private use, was never in the minds of those who developed the common law or the statute and such use of literary property is not affected by either. It violates no law at all and is a right of scholars.¹⁸

Quite clearly, making a copy is not copying in the sense of the copyright law; and quite clearly it was never intended that private use was to be affected in any way by the copyright. . . .

Actually, it would be impossible to stop private use. . . .

Furthermore, if libraries were accessories to a crime in providing copying services, they would also be accessories by providing chairs for the scholar to sit in, tables at which to write, and light and other services to enable him to do it. . . .

The only reasonable sane solution is to realize that private use is completely outside the scope and intent of restriction by copyright. If a later public use is made, that may be a violation of a copyright; but that would be independent of whether the violating use were made from the original, from a copy written out in the man's own hand, or from a photocopy provided by a library. . . .

Furthermore, it should be noted that none of the photographic processes can compete with the book in print, either in price per page or in convenience of use.¹⁹

Varner would seem to question this stand, in view of the problems created by modern devices for speedy and relatively cheap photocopying, and Carl Braband ²⁰ believes that the development of new means of selection and reproduction poses new problems not present in old manual copying. Varner has expressed doubt as to the extent of copying claimed to be permitted by the above. Attention should also be called to the fact that the absence of court decisions is no proof
of non-infringement by photocopying, as to date the injury, if any, has been regarded by the copyright owners as de minimis. There seems to be restiveness on this point, however—as witness the failure of the American Book Publishers’ Council, Inc., to ratify the “gentlemen’s agreement.” Furthermore, the compiler of this paper has received a letter on this point, dated August 8, 1957, from a large publisher of law books, stating his firm’s fear that by continued acquiescence in photocopying it may in time lose its right to forbid it; and that it has adopted a policy of warning copiers, with the implied threat of injunction and action for damages. So far, this has sufficed, but the firm definitely contemplates legal action if copying, in its opinion, so warrants.

It should be noted that infringement of copyright is not a crime, as might be inferred from the above summary statement, but a civil wrong. The standards of proof are quite different, and one person alone may often do things by himself, lawfully, which would be quite unlawful if done in concert with another—as in the case of library copying for a patron who might lawfully copy for himself. It seems to this writer that the argument that library copying is lawful, just because copying by the individual for his personal use may be, begs the question. We are here considering chiefly the liability, if any, rather than the individual copier’s. Shaw would seem to disagree, as implied by the statement in materials prepared in 1957 for use in a Rutgers University Graduate School of Library Service seminar on photocopying:

The copying for private use is not a “copying” in the intent of the law or of any decision of the courts; it is a public use that is potential violation, and whether that public use is made from an original, a manuscript, or a photographic copy, whether prepared by the scholar or his agent acting for him is immaterial. . . . and the pettifogging by librarians, in cooperation with the whims of copyright owners . . . has materially and improperly interfered with the rights of scholars to have access to and to use material for their private use by any and all means. The suggestion that permission be obtained in advance has been tried by a number; it is no solution to this problem; it recognizes an alleged right to restrict private use that does not exist and it fails to give protection.

There is here a fundamental difference of opinion which it is devoutly to be hoped the eminent counsel retained by the Joint Committee will resolve.
So far in this paper, statutory copyright implications of library photocopying have been discussed. Common law copyright, however— that which protects materials not "published"—has received scant attention by text writers, although it is one of the most troublesome aspects of the libraries' copyright problems. The longest treatment seen is by K. E. Walden. The scholars' and libraries' point of view is set forth by Shaw.

Common law copyright provides protection only before publication, but that protection is wider in scope than the statutory, and endures until it is lost forever by publication. It is commonly stated that the "fair use" doctrine has no application to common law copyright, and that the owner has the exclusive right to control the making of copies until he has released or dedicates the work to the public. While common law copyright is thought of most as applying to unpublished manuscripts, other matter, such as printed publications, maps, pictures, and the like are available for such protection. Since the protection is forever lost by publication, the question of what constitutes such publication as to forfeit the right at once arises.

Shaw devotes an entire chapter to this (including in his discussion also statutory copyright). With the usual concept—the printing or multiplication of copies—we are not concerned, because library photoduplication does not do that. Price summarizes the criteria:

What constitutes "publication" is vital in common law copyright, and is unsettled. Making copies freely available to the public is certainly publication. Deposit of a document in a public office where it is available for inspection has been so regarded, but there is authority contra. In order to mitigate the harshness of this rule, the doctrine of "limited publication" has been evolved, under which common law rights are not forfeited. Limited publication has been defined as one "which communicates the contents of a manuscript to a definitely selected group for a limited purpose, and without the right of diffusion, reproduction, distribution or sale." This doctrine is severely limited, however, by the requirement that communication must be restricted "both as to the persons and the purpose." If either is not so restricted, then there is general publication, and forfeiture results. Where communication is to a selected number on condition, express or implied, that no rights are released, that has been held to constitute limited publication.

Do the readers who use a large public or university library constitute a restricted group within this definition? It seems doubtful . . .
Photocopying by Libraries and Copyright: A Precis

citing cases where the public display of printed books was held to constitute communicating to the public.

The question here is whether the group is a "definitely selected" one. If it is, there is only limited publication, since the use is restricted, and there is then no dedication to the public. It is the writer's opinion that a group of 5,000,000 people eligible to use a public library (as in Chicago), or 26,000 university library readers (as in New York University) is by no reasonable definition a "selected one" in these circumstances. If it is not, then the free availability of an unpublished document for reading in such a library would constitute general publication, regardless of the purpose for which read, and common law rights would be forfeited. Even more so, photocopying by the library... for [such] use outside the library would seem to be general publication.

In university libraries, this is a particularly vexatious problem with manuscript master's essays. Commonly, these do not circulate, but may be freely used within the library building, in the absence of specific restrictions imposed by the author.

Walden goes so far as to state that "The literary property in theses and writings as performed by students in colleges and universities is of concern, for the institution may require the placing of a copy in the library with the result, unknown to the school or author, being a general publication." Shaw would seem to agree. Price states that "The present writer believes that circulation of unpublished material to relatively large groups of eligibles, even for limited purposes, constitutes general publication within the test set up by the courts, and that the added publicity by copying for sale to a reader is general publication," and urges that authors depositing copies in libraries be advised to the possible dangers they run of forfeiting copyright protection. Shaw, reporting on a study by Melinat indicates that "Only five percent of all the libraries studied consult the owner of the literary property rights. . . Since the author must consent to the deposit of copies of his thesis in the institution, it appears that in all except five per cent of the cases, it which he is consulted, and the six per cent of the institutions which never lend theses, he has unquestionably lost his common law literary property. Even in these eleven per cent, the copy being deposited in a place where it can be consulted by the public, with the author's permission, the manuscript thesis has been published and has lost its common law protection."

Some libraries have endeavored to protect themselves from losses from infringement suits for photocopying, by absolving statements
signed by the patron ordering the copy, usually integrated with a disclaimer of liability by the library. "There is little available information as to the current practices of libraries generally in making and supplying photocopies. Perhaps this much can be said: that libraries differ widely in their practices, and that many of them feel that the present uncertainty as to the permissible scope of photocopying hampers their researchers and needs to be resolved."  

R. S. Bray, in reporting on the results of a questionnaire returned by eighty-five libraries, states that only seven had a written statement of policy; seventy-three had no written policy to guide their staff; ten per cent advise applicants of copyright implications or require a signed statement restricting his use. Almost none required a signed statement of assumption of responsibility by the patron ordering photocopies. No library reported any complaints from copying their property.  

Bray's report indicates the rejection of blanket permissions in advance, as being wholly inadequate. He comments that while the legality of these absolving statements could be argued, there are advantages in having the recipient of photocopying services fully aware of the conditions surrounding the service. The Library of Congress has published and circulated its rules. Copies are made only from its own collections, solely for research and in lieu of loan or manual transcription; all responsibility in the use made is assumed by the applicant; copyright material will ordinarily not be copied without the signed authorization of the copyright owner. The Library has on file releases from certain publishers, allowing it to make single copies of their publications for scholarly use. Price questions the legal efficacy of these disclaimers to protect copying libraries, believing them to be effective, if at all, only as between library and patron, but of no effect as between library and copyright owner. Varmer, in commenting upon a similar paragraph in the "gentlemen's agreement," says "The 'agreement' contains a paragraph which purports to exonerate the library from liability for possible infringement. This would not seem to absolve the library from liability [if any] to the copyright owner, but it might make it possible for a library to recover from a patron any damages paid as a result of an infringement suit."  

Prior to the enactment of the recent United Kingdom copyright revision act (Copyright Act of 1956), British library associations and other learned societies exerted considerable effort to formalize and expand libraries' photocopying rights, but the results were scarcely encouraging to American libraries seeking to do the same thing under
the proposed general revision; Section 7 of the new Act gives libraries less than they had under the old law. As analyzed by Latman and Varmer, and as set forth in regulations in Statutory Instrument No. 868 of 1957, the provisions essentially restrict such copying to articles in periodicals, or to instances in which the library does not know and cannot ascertain by reasonable inquiry the name and address of the copyright owner. For practical purposes, books would seem to be excluded from photocopying privileges. This is of interest now in this country, since our nation has subscribed to the Universal Copyright Declaration of September 6, 1952, under which copyright protection in the United States is conferred upon the nationals of other signatories. Formerly, most foreign publications, including English, were in the public domain.

Varmer suggests alternative approaches to a solution of the photocopying problem: by statutory provisions laying out in terms the rights of copyright owner and scholar; or a non-statutory working arrangement perhaps similar to the “gentlemen’s agreement” of 1937 and the British “Fair Copying Declaration of the Royal Society.”

“This would have the advantage of flexibility and the further advantage of reflecting a practical accommodation between the views and interests of the several groups. Those groups might agree on a code of practice with which all concerned would be willing to experiment, and such a code could be changed from time to time as experience and changing conditions show to be necessary.”

Conditions and rationale for such an agreement were suggested by Smith. The salient features were that the scholar would have to give assurance of his bona fides; that only one copy would be made for one scholar; that each copy would show the source of the material and state that it is copyrighted; and that the scholar would be required to pay the full cost of the photocopy.

With respect to photocopying for a library’s own collection, Varmer believes that “as long as the copies needed are not available from the publisher, photocopying for a library would not appear to prejudice the interests of the publisher or copyright owner.” Needless to say, that does not go nearly so far as the libraries would like.

For purposes of comparison, both Latman and Varmer summarize pertinent legislation in other countries. Price has suggested liability insurance carriage by libraries, and an insurance executive has agreed that it is feasible; in fact, at least one large library has been offered such a policy.
MILES O. PRICE

It is to be hoped that the counsel report to the Joint Committee will cover the common law aspects of the photocopying problem, as well as the statutory.

References


9. Ibid., pp. 30-33.

10. Ibid., pp. 36-38.


13. Ibid., p. 4.


17. Smith, op. cit., p. 201.


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36. Latman, op. cit., ref. 4, pp. 30-33
38. Ibid., pp. 29-31.
41. Varmer, op. cit., p. 28.
42. Price, op. cit., p. 453.
Microfilm as Used in Reproduction and Transmission Systems

CHARLES G. LAHOOD, JR.

The rebirth of microfilm some thirty years ago (microfilm was first invented in 1859 by Dagron) opened for the scholarly community the door to the world's knowledge. Because of its inherent versatility the uses of microfilm have broadened far beyond the dreams of its early developers. It is fair to state that in view of past developments the horizon for microfilm is relatively limitless. A review of the multitude of applications of microfilm to various techniques and systems seems appropriate in view of recent advances in the area of documentary reproduction and leads to some tentative conclusions regarding changing emphasis and potential developments.

The basic application of microfilm in the library should not be glossed over. Although microfilm may be used as the primary means of disseminating information as, for example, the American Documentation Institute Auxiliary Publication Program,1 University Microfilms Doctoral Dissertation Program,2 and the Publication Board Project,3 its major application is to stand in as a substitute for the original document which for some reason is not available to the library or scholar.

Microfilm in roll or unitized form (as employed in aperture cards or jackets) requires an intermediate optical arrangement to facilitate its use. In this regard, microfilm is relatively difficult to use. This inconvenience, however, is offset somewhat by the basic lower cost of the microfilm itself (provided of course that the original document is out of print or otherwise unobtainable).

In practical application, the use of roll microfilm for long runs of material, particularly newspapers, as a substitute for the original file is increasingly accepted by the librarian and scholar. To a lesser degree the substitution of microfilm for serials is also gaining acceptance.

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In both applications, there is justification for use of the roll microfilm, inasmuch as each roll of microfilm can be utilized in substantially the capacity for which it was intended without jeopardizing reference usage.

The potential use of microfilm in the field of rapid searching or selection of specific information or types of information has lead to the development of a multitude of sophisticated machines. Their names, among others, are well known—the Bush Rapid Selector, Filmorex, Minicard, and more recently Film Library Instantaneous Presentation (F.L.I.P.). Common features of this group include, beside the use of microfilm (roll film or bits of film or sheet film), a photographic code consisting of dots or bars arranged in predetermined patterns. The film containing the coding is read by a scanning device which has been instructed to act on a specific code pattern, either stopping the film for viewing on a screen or activating a copying device which may reproduce the document or documents desired.

The Microfilm Rapid Selector, originally developed at Massachusetts Institute of Technology under the name of "The Bush Rapid Selector," was one of the earliest machines of the type which provided for the storage of abstracts and other data in microfilm form and which, in addition, contains a special coding to permit the speedy selection of required data and, when required, the copying of the information by means of high speed photography. In the Rapid Selector, the choice of a desired abstract is accomplished by means of photoelectric scanning devices coupled electromechanically to a high speed flashtube and a rapid-advance recording camera. The selection is accomplished through comparison of a code area, associated with each abstract on the film with a code card inserted in the Rapid Selector.

The master microfilm utilized in the Rapid Selector is prepared by a specially designed camera which provides a continuously variable reduction ratio from the abstract to the film. A bank of lights, representing abstract code numbers, is photographed along with the abstract. The code bank light target forms a dot-pattern code which is photographed on the film along with the abstract material, while a standard card, punched on a specially designed card punch, is used to interrogate the microfilm selector. The punched card, containing the code which is complementary to the desired film dot pattern, is inserted into the Selector. When the film code area dot pattern and the punched card are exactly complementary, no light passes through the card holes, a blackout occurs, and the abstract is reproduced. The
Rapid Selector, as experimentally developed by Vannevar Bush in 1940 at the M.I.T. was further refined in 1949 by the Engineering Research Associates, Inc., of St. Paul, Minnesota, under a contract cooperatively sponsored by the Departments of Commerce and Agriculture. As finally constructed, the E.R.A. Selector is said to have a frequency response adequate for film speeds from twenty to five hundred feet per minute.*

Another high speed microfilm selector has been developed in France by Jacques Samain. This device, known as Filmorex, utilizes microfilm in sheet form measuring 72 x 45 mm. The right-hand side of the film contains two pages of text and the left-hand side contains the code area where electronic selection is made. A special camera designed for 70 mm. film is required for producing the microsheets. This selector has also been designed to utilize 35 mm. film.

The sheet films in the Filmorex system are stored without regard to classification. Information can be extracted at the rate of six hundred sheets per minute with selected microsheets automatically ejected when the pre-selected codes correspond with each other. No method of reproduction is incorporated in the Filmorex system, rather the selected sheets of microfilm are read in a microfilm viewer or enlarged photographically.5

The most recent addition to the field of rapid selectors utilizing microfilm as the storage vehicle has been developed by the Benson-Lehner Corporation of Los Angeles. This device which has been christened "Film Library Instantaneous Presentation"—F.L.I.P., for short—is basically similar to the Bush Rapid Selector. The machine is designed to quickly locate a desired frame in a 1,200 foot reel of 16 mm. microfilm and to project the frames on a built-in viewing screen. A binary coded number is photographed in the form of black bars on a clear background. The film scanning speed of the present existing model of F.L.I.P. is said to be approximately sixty inches per second. An entire 1,200 foot reel can be scanned in about four minutes. A detailed description of F.L.I.P. has been published in a recent issue of Library Resources and Technical Services.6

Another device for rapid selection of data, similar in principle to the other selectors, though distinctive in its approach, has been developed by the Eastman Kodak Corporation under the name "Minicard." Although the Minicard System is potentially capable of handling information of all types, its initial application has been in the area of documentary information.
Microfilm as Used in Reproduction and Transmission Systems

The minicard itself is a piece of microfilm 16 mm. x 32 mm. in size, near one end of which has been inserted a slot which permits the card to be handled by means of a metal “stick.” The minicard contains either digital information in the form of clear or opaque dots and images of documents, or digital information alone. A single minicard may carry from zero up to twelve image areas, each area of which may record a copy equivalent to a legal-size page 8¾ x 14 inches. Digital information, when no graphic images are made, amounts to seventy columns of forty-two bits each or a total of 2,940 bits. The metal sticks in which minicards are handled have a capacity of two thousand cards. A sorting speed of 1,800 cards per minute is attained for sorting and selecting operations.

The Minicard System combines many of the desirable features of the punched card and the microfilm systems. The concept of rapid and automatic selection of desired information stored on microfilm has yet to make an appreciable impact on library operations. However, this is not meant to imply that the future may not see developments facilitating greater usage in libraries.

The Minicard System, for instance, makes use of high reduction (60 diameters) and R. R. Shaw mentions the theoretical possibilities of reductions ranging in the area of three hundred times. How long it will take such advanced technology to reach the library and/or library laboratory is difficult to predict. Whether extreme high reductions would prove feasible in anything but film to film reproduction on a production or reference basis seems problematical. In discussing the microfilm reproduction of libraries, particularly with regard to mechanical retrieval of masses of data, it is essential not to overlook the disparity of the stock in trade of the research library—books, serials, pamphlets, manuscripts, newspapers—all in various sizes, formats, both as to external dimensions and size of type and, more importantly, in all conditions of legibility.

Another application of microfilm, which has been demonstrated only on an experimental basis, is in the field of rapid communication. Known as “Ultrafax” and developed by the Radio Corporation of America, this process was demonstrated several years ago at the Library of Congress. Applying principles of television and photography, the device was said to be capable of transmitting “at the speed of light” a facsimile (microfilm) image over a distance up to twenty miles (further distances with the use of relay stations) at the rate of thirty leaves of text a second. Coupled to the system was a rapid film
processing or "hot photography," which delivered a single frame of film ready for printing or projecting in forty-five seconds. To date Ultrafax as such has not reached the stage of commercial development even though the concept of image transmission is commonplace. Recent developments indicate that commercial applications are being made in the transmission of motion pictures by wire. Perhaps this will stimulate advancement of the transmission of facsimile reproduction of research materials between stations (libraries) as speeds approaching the "speed of light."

The potential of the transmission concept as demonstrated by Ultrafax, however, must be tempered by consideration of other elements of the process—namely, the production of the microfilm used for transmission, the developing time at the receiving station. These factors, among others, tend to diminish the "speed of light" concept in this day of rapid communication. Perhaps more feasible would be the rapid transmission of existing microfilms or "live" research materials to receiving units capable of making a facsimile film copy quickly and economically. There is little doubt, in concluding this discussion of rapid selectors and a rapid transmission system, that the tools exist. Whether they are the appropriate tools for applications to library operations has yet to be demonstrated.

It is in the hands of the microphotographic technicians that microfilm has become increasingly more useful and important for research. The impact of current laboratory usage of microfilm as evidenced in the production of research materials, although not always immediately or obviously recognized by the consumer, is of significant importance. Specifically microfilm is the all important factor in the production of micro-opaques and enlargement prints, the latter use having been stimulated in the past few years by the successful introduction of dry printing known commercially as Continuous Xerography, and Electrofax.

In discussing the micro-opaque, it seems unnecessary to point out that it should not be confusedly considered as synonymous with microfilm, although the headline in a recently published journal announced a "Journal on Microfilm," when the headline ought to have read "Journal on Micro-opaque" (in this instance on microcard). The term "micro," which is prefixed to the term "film" yielding the word "microfilm," is equally applicable to the term "opaque"—hence "micro-opaque." Perhaps the common use of the term "micro" lends to confusion. In practice, the term "micro-opaque" is equally applicable to
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such commercial products as microcard, microlex, and microprint, among others.

As an integral step in the production of micro-opaques, microfilm may be compared to “cold type,” as utilized in the printing of a book. The production of a micro-opaque begins with the photographic reproduction of a document on either 16 or 35 mm. microfilm, the arrangement of the micro-images on the film in a desired format, and finally the photographic contact printing, as in the case of microcards, or the production of multilith prints as in microprint. The principles involved in the manufacture of micro-opaques are basically identical to conventional photographic production of a contact print from a film negative, or the production of a multilith plate from photomechanical film. The obvious and important difference is the miniaturization of the original text down to a normal maximum reduction ratio of sixteen times.

The microfilm used in this process must adhere to rigid specifications, which may vary with the peculiar requirements of various commercial producers. Inasmuch as the microfilm employed in the production of micro-opaques must be a reverse image of the finished product, it is imperative that the master negative appear in reverse as an image of the highest quality without annoying blemishes, and so arranged as to produce a positive image of pleasing symmetry. In order to achieve this end, the micro-images are arranged on the film in such dimensions as to achieve equal length lines of images on the micro-opaque and an equal number of micro-images on each line. Spacing between images is equal within reasonable tolerances. Microfilm thus prepared is cut into “lines of type” and these in turn are grouped together in a “stripping” operation in sufficient number to complete the micro-opaque format. From the microfilm negative thus arranged, it is possible to reproduce as many copies as required. In this manner, microfilm is adapted to serve the needs of libraries by making possible the “publication” of research materials which might not otherwise be available.

Another important use of microfilm as utilized in photographic laboratories is the production of enlargement prints either on photosensitive paper, developed by standard photographic processes, or on untreated paper stock printed by electrostatic principles.

The process of providing enlargement prints by the conventional photographic process of projection printing from the microfilm to cut sheets or rolls of sensitized paper had been the standard in photo-
graphic laboratories up until some fifteen years ago. Drawbacks in lack of speed, small production, led to the development of automatic equipment with the elimination of many manual methods. The development of the V-Mail enlarger during World War II and a continuous processor met the needs for mass production. In the few years of its availability on a commercial basis, however, continuous xerography has penetrated activities in the field of documentary reproduction by enlargement printing to a significant degree. This process which has wrought a “revolution” in laboratory operations makes use of the best optical features of the older continuous enlargers coupled with the dry electrostatic printing. The xerographic process itself, the physical factors such as the size of copies obtainable, format of images on the microfilm, and economic factors have been excellently described by W. R. Hawken in a recent issue of College and Research Libraries.10

While continuous xerography is available in several production models, one of which reproduces only from loose-sheet originals, another which reproduces only from microfilm, and a third model which combines both methods, those models utilizing microfilm are of direct interest in this discussion.

The successful commercial application of continuous xerography has rapidly advanced the production of enlargement prints through the use of microfilm and has to a very large extent, though by no means entirely, supplanted the production of enlargement prints by conventional photographic methods. While the electrostatic principles as applied in continuous xerography offer excellent results in the production of textual material, graphs, etc., where the width of the printing does not exceed $\frac{1}{8}$ inch, the process does not reproduce satisfactory half-tone illustrations. Doubtless, further developments will overcome this deficiency in the application of the electrostatic principles.11

The flexibility of the microfilm camera coupled with that of the continuous electrostatic printer (within the twelve inch maximum paper width)12 permits the satisfactory, economical reproduction of an appreciable portion of research literature. The development of continuous xerography has opened the door to the relatively inexpensive reproduction in “hard form” of materials hitherto unavailable for economic reasons.

The creation of storehouses of microfilms specially prepared for use with the Copyflo Xerography has been undertaken by at least
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one large commercial producer of microfilm, University of Microfilms in Ann Arbor, Michigan. Proposals have been made to form cooperative ventures for the orderly replacement of deteriorating research materials on microfilm (something that might have been done in the last twenty years) with the added feature that the microfilm be prepared to fit the requirements of the xerographic process. One is tempted to surmise whether today’s specifications may not be tomorrow’s stumbling block.

A promising use for the continuous electrostatic process, particularly at the Library of Congress, is the reproduction of single or limited quantities of out-of-print Library of Congress printed cards. There has been a persistent demand over the years for inexpensive single copy reproductions of catalog cards from existing card catalogs. The National Union Catalog, for instance, has reproduced substantial holdings of regional union catalogs through the use of microfilm and continuous enlargement prints on silver paper. The resulting photocopies have proved adequate from the point of view of legibility; however, they have never been accepted wholeheartedly by librarians principally because the cards tended to curl. This characteristic of the photographic paper, in addition to a greyish background in the finished product, precluded against their wholehearted acceptance as a final solution. In the hope that the continuous electrostatic process would resolve the difficulty, the Library of Congress Photoduplication Service has developed a system to microfilm standard library catalog cards for subsequent duplication on the xerox continuous printer. As perfected, this system will produce a library card on 100 per cent rag card stock, if necessary, entirely suitable for permanent interfiling with the usual printed cards. The keystone of the system is a microfilm camera which has been adjusted to provide sufficient overlap between each exposure so that all film is exposed between the images. The camera is permanently set over a table with the reduction ratio fixed at approximately ten times. The cards are photographed over Plexiglass, with underlighting supplied to eliminate all shadow problems. As a final touch to the system, an index mark is filmed at the edge of the roll and located between each card so that the roll of paper may be cut on an automatic cutter.

The same electrostatic principles employed in xerography are utilized, with some technical variations, in other processes commercially available. One of these, developed by the R.C.A. and labeled Electrofax, omits the intermediate step of sensitizing a selenium-coated plate
or revolving drum and substitutes a special zinc-coated paper. This machine, which prints up to fifteen engineering drawings (17" x 22") per minute from 35 mm. microfilm positive, has also been combined with the Filmsort equipment so as to permit a loading of up to five hundred Filmsort aperture cards.13

More recently the Bruning Corporation has placed on the market an electrostatic printer, also utilizing zinc-coated paper in lieu of the selenium-coated plate or drum, capable of producing multilith mats or single copy reproductions at the rate of four copies per minute up to fourteen to sixteen times larger than the size of the microfilm.

For the librarian the most effective and practical application of microfilm and microfilm techniques in recent years has been the successful introduction of continuous electrostatic printing. While it is quite true that the means have been available for many years to reproduce continuous enlargement prints from roll microfilm onto rolls of photosensitive paper, yet the enlarging and processing equipment, its initial and maintenance expense, the cost of the silver-coated paper, in addition to the double task of exposing and processing—all these factors militated against the production of inexpensive enlargement copy. It seems too obvious to argue for the preference on the part of the consumer for the enlargement print over the microfilm itself. The evidence at the Library of Congress seems to indicate that the use of electrostatic prints, at least where short articles are concerned (and these represent a substantial proportion of consumer demand) are preferred. The technical break-through offered by continuous xerography has made for microfilm an even more important place in the field of documentary reproduction.

Bibliographical Notes

1. The American Documentation Institute Auxiliary Publication Program has as its purpose the formation of an archives of research data which is related to published material but which for some reason cannot be included with the published article. All material in the archives is available to scholars in the form of microfilm or photoprint. A reference as to the availability of the unpublished data is included with the published article to which it is related. The Auxiliary Publication Program is under the custody of the Library of Congress Photoduplication Service, Special Services Section, Washington 25, D.C.

2. This Program is essentially patterned after the Auxiliary Publications Program. Publicity is incorporated in special lists prepared by the University Microfilms, Inc., Ann Arbor, Michigan.

3. The Publication Board Project contains captured documents from former belligerent countries and government-sponsored research reports (familiarly
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known as PB's). The Department of Commerce, Office of Technical Services, acquires, catalogs, and publishes a list of new acquisitions in its monthly bibliography: U.S. Government Research Reports. (Government Printing Office, Washington 25, D.C.). The Project also contains a collection of Atomic Energy Commission Reports. Beginning January 1, 1959, a collection of technical translations has been made available to the public. The translations are listed in: Technical Translations, prepared by the Office of Technical Services and available from the Government Printing Office. All documents in these collections may be acquired in the form of microfilm or photoprint. The collections are in the custody of the Publication Board Project, Library of Congress, Washington 25, D.C.


12. The Haloid-Xerox Company recently made available a Copyflo Model, Copyrama, which produces material in widths up to twenty-four inches. Copyrama is primarily intended for the reproduction of engineering drawings.

Advances and Goals in Microphotography

PETER SCOTT

Progress in microphotography for library applications may be likened to the building of a bridge. Pillars rise out of the valley and this is promising, in a way it spells progress. Yet until the bridge is completed we cannot use it, and if we look closely we see that the pillars are not growing at an equal pace. The complete integration of microphotography into the library requires the bridge to be finished. If names were to be given to the sections of this bridge they would read as follows:

1) Microfilm Equipment
2) Materials
3) Public Education
4) Systems Study
5) Research Activity
6) Standards

Vannevar Bush is credited with the suggestion that the reader of a microfilm hold a book in his lap and turn the pages from time to time. Public education in the use of microphotography which is discussed elsewhere in this issue of Library Trends is one of the least developed “pillars” of our bridge.

The public no longer rejects all microforms but any reader is justified in refusing to accept bad films, poor reading machines, and limited systems, and it will be necessary to prove to the potential user that microfilm systems have matured before they will be widely accepted.

Figure 1 shows the basic microforms and indicates the organization of this article. It is important to note that all current production methods for micro-opaques involve the prior creation of a micro-transparency. This fact and certain limitations in equipment and materials make the micro-opaque essentially a method of publication.

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Smaller volume publication by micro-opaque is more than feasible; it is desirable, but in the author's opinion there is little to recommend the micro-opaque for making single copies. One can envision technological advances which would eliminate the transparency as an intermediate to the opaque. Then the micro-opaque might become an effective competitor to the transparency as a single copy medium. On the other hand, the transparency is economically no match for the opaque in small or large publication upward of about twenty copies.

In the matter of suitability of the various microforms for library application one cannot improve on V. D. Tate's excellent table (Fig. 2) which previously appeared in the April 1955 issue of Library Trends. Since it was first printed there have been some technological changes which are reflected in slight modifications of the table made with Tate's approval.

In the introductory paragraph it was stated that the successful integration of the micro-image into the library required simultaneous effort in various fields. The unequal development of the various components, all of them vital to the concept of microphotography, has unnecessarily limited the present usefulness of this medium. There

![Diagram of Micro-Image Components](image-url)
PETER SCOTT

Typical Library Uses of the Microtechniques

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<th>Library Use Or Application</th>
<th>Microtechniques</th>
<th>Micro-opes</th>
<th>Photographic</th>
<th>Printed</th>
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<td></td>
<td>Microfilm 16 and 35mm.</td>
<td>Sheet Microfilm</td>
<td>Strip + Card Mounted Film</td>
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<td>Complete books etc.</td>
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FIGURE 2

have been technical improvements in cameras, readers, and photographic materials without commensurate advance in the service which microphotography can render to the library. The most serious shortcoming of microphotography in the library lies in its systems development.

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The word system is used here to denote a complete answer to a need. It presupposes a thorough analysis of this need. It may include only a reader and a roll of film, but it is more likely to consist of equipment, a suitable microform, proper storage provisions, an indexing system, means for speedy filing and retrieval, means for further duplication or fragmentary re-enlargement, user instructions, and, most important, standards.

Considering the obvious potential of reduced size data in the library, the present state of microphotography may be regarded as embryonic. The lack of systems has led many to a state of disillusionment, to a feeling that no more may be inherent in micro-methods for the benefit of scholarship. Nothing could be further from the truth.

While in commercial application the development of a microfilm system is a matter of careful analysis of specific requirements followed by the development of custom-designed equipment, material, and special methods, the library is generally faced with the need for adaptation of existing equipment, and with the impossible job of reshaping alien systems to its own requirements. This cannot be very successful.

Libraries must start with their own unique systems. One of these may be aimed simply at storage space reduction but with retrieval characteristics superior to those provided by present roll film methods. Another system will be intended to provide copies quickly and economically on request in lieu of a loan. A further system will be designed as a method of publication. A system may be the answer to several needs, but a feeling has always been prevalent that one system should contain all the advantages of microphotography while retaining every functional aspect of the book. This is asking too much. Librarians should incorporate whatever commercial equipment fits into their systems, but will have to demand additional special equipment and supplies as they require them.

Designers and manufacturers are quite naturally lured first to the potentially greater profits of equipment designed for commercial application. While there is room for improvement, the basic needs of industry with respect to microphotography of checks, records, and engineering drawings have been met and manufacturers are showing more interest in additional markets now than ten years ago. One such market is the library. An examination of current library microfilm systems reveals only two, and these hardly worthy of the name system. One is a limited system based on 35 mm. roll film, with good
facilities for production, reproduction, and enlargement, but very poor facilities with respect to retrieval, and insufficiently governed by standards. The other is built around the micro-opaque. The microcard, the Readex Microprint card and, in the legal library, the microlex card are better than roll film for filing and retrieval and come closer to being a system than any other microform, but it is a system restricted to consultation of published material, impractical as a means of making a few copies only, difficult to reproduce and not sufficiently controlled by standards. Beyond this there are no widely adopted library systems.

In the following pages each division of microphotography is discussed separately with comments on the status quo and developments in equipment, materials, systems, and standards peculiar to that microform. An exhaustive treatise on this subject would fill a book. It has been necessary therefore to omit some processes which at the time of writing seemed less important.

Roll film is available in 16, 35, 70, and 105 mm. widths, although it is questionable whether 105 mm. qualifies for the name microphotography. A continuous ribbon of film is normally stored one hundred feet to a reel and housed in a small cardboard box. These boxes may be stored in special microfilm cabinets or kept on shelves.

In the library 35 mm. roll film is used to almost the complete exclusion of all other forms of microtransparency. If a one hundred foot reel is completely filled, excellent savings in storage space are achieved. However, since a standard microfilm box occupies a fixed twenty-four cubic inches, considerably less storage space reduction is achieved if the reels are only partially filled with film. In an extreme case, as for instance the filming of leaflets less than thirty pages in length and without hard covers, microfilming and storage of the film on one hundred foot reels in individual boxes would achieve no saving in storage space whatsoever.

There are three primary reasons why a library would add roll microfilm to its holdings:

(1) the material is published in that form as an economy measure; (2) the microfilm constitutes a master copy and positive film is supplied to users in lieu of loan; and (3) to reduce storage space. It is obvious that a minimum amount of film must be on each reel to justify the use of roll film on the latter basis.

A major disadvantage of roll film has always been the difficulty in locating specific items of information on a long roll of film. While
a book may be opened at a specific page quickly, direct, fast access to data on roll film has never been possible. Moreover, most roll films are not properly indexed.

Although it has been regarded as satisfactory for commercial applications involving only occasional reference to the film, 16 mm. microfilm has been considered inadequate for recording of material intended for reading and study. It will be entirely possible to utilize 16 mm. film as soon as better cameras and readers for this purpose are designed, and further development of 16 mm. systems may be anticipated in the near future.

While the use of 16 mm. film with currently available equipment would be premature, 35 mm. appears to be entirely adequate for the reproduction of all normal library holdings. It is conceivable that 70 mm. systems for microfilming of large maps may be an advantage in specialized libraries, but in this application also 35 mm. usually will be adequate. The main use of 70 mm. film has been in the engineering drawing field although it has not been used extensively. It is difficult to envision any need for 105 mm. roll film systems in the library.

From the earliest uses of 35 mm. roll film in the library it has been obvious what improvements are required and the following pages contain an examination of recent technological advances in equipment, materials, and standards to determine whether they have enhanced the usefulness of roll film in the library or have the potential to do so. Approximately sixty different microfilm readers and viewers are currently available, and a study of these machines, and of the list of reading devices for micro-images, past and present, published by Rutgers University Graduate School of Library Service last year reveals that the preponderance of readers in no way reflects a great variety of technical principles. The best readers available are all entirely adequate in their optical properties and the image is sharp and legible.

Placement of the reel on the reader continues to confound many users. This is partly due to the complex threading operation necessary on some readers. With the majority of the better readers which have a relatively simple threading system the difficulty may be attributed to a lack of public education in the use of these machines. Standard methods of spooling film on reels exist but are frequently ignored. The observation of these standards and prominently posted threading diagrams on each reader are essential.
One brilliantly designed new reader which does not merely simplify threading but eliminates it deserves special mention. This is the Lodestar made by Kodak and available through the Recordak Company or Recordak dealers. It is a 16 mm. reader only, which is regrettable, but otherwise it has everything one might want in a reader. Film used with the Lodestar is placed permanently into a magazine which serves as storage box. When the film is to be read, an inch or two of film leader is pulled from the magazine. The introduction of the magazine into a slot on the side of the reader automatically turns on viewing lights and a drive motor. No further threading of the film is necessary. A lever controls the motorized film drive and after use the film is returned into its storage magazine without having been touched. The Lodestar also incorporates the Kodamatic indexing system which is discussed below. This reader has the film handling characteristics needed in every reader. It is to be hoped that the concept will soon be extended to 35 mm. film.

Micro readers may be divided into two basic categories: translucent screen reader and opaque screen reader. Either type lends itself to designs yielding good legibility. It is inherent in the translucent screen design to produce readers with more comfortable screen placement, while the opaque screen approach is the more economical. Since there is a choice of technically adequate readers, the main clamor has been for less expensive and more portable readers. An expansion of the roll microfilm system calls for a reading device, briefcase size at most, and priced in the general vicinity of $100. While no really compact reader for roll microfilm has been marketed, the best available are the Griscombe Portable, selling for about $180, and the German Lumoprint reader which costs approximately $350. Several less expensive readers resulted from a design by Bell and Howell. This company designed a reader intended to accommodate aperture cards for use in its own drawing offices. The design utilizes a 35 mm. slide projector which, being mass produced, provides a more economical projection system than most microfilm enlargers incorporate. Bell and Howell decided not to market this reader but permitted others to use the basic concept. There are already two readers on the market based on this design, and others have been announced. The Webco viewer by Western Blue Print Company is designed for aperture cards or roll film, the Draftsman by Microdealers, Incorporated, is set up for aperture cards only but will have a roll-film attachment shortly. Both of these readers will be good economy additions to the
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market, but neither one, despite manufacturer’s claims, is actually portable. The individual, compact, portable, and inexpensive microfilm reader is still the major missing item in the library roll microfilm system.

Perhaps the greatest deterrent to the use of roll microfilm has been the user’s inability to move quickly from one section of the film to another and the necessity of having to stop a dozen times before finally pinpointing the desired item of information. A motorized film transport, and there are such devices, is not sufficient. There is a need for a new type of indexing system which would enable the user to scan the film rapidly and view an index while the film is in motion.

The Recordak Company’s Kodamatic Indexing System is a step in the right direction. Two readers, the Lodestar and the Recordak Monitor Reader BM-2, include a numerical reference scale at the edge of the screen. Both readers are designed for 16 mm. film only.

The Kodamatic Index consists of black lines which are added to the micro-image of the material at the time of photographing. On the screen these black lines appear to run across the film behind the material photographed. When the film coded in this manner, is run through the reader at fairly high speeds, the code lines running parallel to the direction of the film motion appear sharply outlined while the images blur. Incorporation of the Kodamatic lines requires use of the Recordak Reliant 16 mm. Rotary Camera. To find a particular item on the film, a catalog is consulted and the item number is ascertained. When the lines which move slowly across the screen as the film is advanced point to the desired number on the reference scale along the edge of the screen the film is stopped and the approximate location of the wanted item has been reached. Unfortunately this system is currently confined to 16 mm. film, a size not yet adequate in every respect for library application. Furthermore, a numerical code system of this type, while it is an excellent step forward, does not meet the ultimate requirements of the library. A numerical code requires a reference catalog. Roll film systems should be provided which would produce a continually legible index while the film is in motion and this index should be in textual form. Technical means are available to provide such a system with little increase in reader cost, and with relatively little extra labor in the preparation of the film. A proposal for the development of a certain microfilm system providing such a continuously legible index, and enabling the producer of the film to put a considerable amount of information
into the index is being prepared at Massachusetts Institute of Technology. The index in this system may be in the form of single words or sentences, numbers or code symbols, whatever is desired. Regardless of whether this particular proposal finds favor or not an indexing system of this sort is absolutely necessary. Another benefit from this type of index will be that it will permit many more microfilm reels to be filled to capacity. Since a one hundred foot roll of film may be scanned rapidly by means of such a system and a motorized drive, there will be less need to store short items of related material on separate reels and the ultimate in storage condensation with 35 mm. film may be achieved.

It will be argued that an even better method of retrieving material will be a pushbutton method of electronic searching. This is true, but electronic finding mechanisms involve a completely different economic approach. A manual index-finder system could probably include readers, selling for $600 to $1000, and film whose preparation would be little more expensive than normal microfilming is now. Any automatic selector such as that of the Rapid Selector or that inherent in the F.L.I.P. requires an investment of tens of thousands or hundreds of thousands of dollars. There is no doubt that there will be justification for both the small and the more complex systems which is discussed later.

One of the requirements of most roll microfilm systems is that it allows convenient re-enlargement from the small image back to standard page size. It should be possible therefore to obtain paper enlargements at any time without removal of the microfilm from the reader. Only when re-enlargement of large sections of the film is desired is it practical to take the film to a darkroom for silver prints. For the occasional selected page, convenient reader-printers are necessary.

Until recently there was only a makeshift manner of doing this. Opaque screen types of microfilm readers were used to expose a piece of diffusion transfer paper, which is used in quick copy machines such as the Copease. This could be done in moderate room light. The paper was then put in contact with the positive diffusion transfer paper and the sandwich was put through the processing section of a rapid copy machine in the standard manner. This method required long exposures and the result was a poor copy laboriously obtained. A welcome addition to the market, therefore, was the Minnesota Mining and Manufacturing Company's Reader-Printer, a microfilm reading machine which contains a built-in quick enlarge-
ment mechanism. The machine can be used to read film (although
it is not the most comfortable reading device) and when the page
which is to be enlarged is found, the push of a button automatically
prints a copy. The process involved is based on electrolytic principles,
a new process in the photocopy field. The reader, which sells for
$629, may be used for both 35 and 16 mm. film. If the film is reason-
ably light, copies may be made with printing times as short as eight
to ten seconds, but the versatility of the process is not yet sufficiently
great to accommodate all film densities encountered in library hold-
ings. Film containing blocked lettering is either not reproducible at
all or may be enlarged with excessively long exposure times only. No
doubt the near future will bring further technical improvement of
this reader which will enhance its usefulness to the library.

Several commercial machines, intended for reading and occasional
printing of microfilm of engineering drawings, are based on monobath
or developer-stabilizer principles and are too specialized for the li-
brary.

Kodak's Medalist reader has a monobath attachment selling for
$40 which will process prints exposed in the reader, but the Medalist
is a 16 mm. machine only.

The Documat Company has announced a new reader-printer which
will produce 8½ by 11 prints from 35 mm. microfilm. This reader
which is promised for the last part of 1959 will use a developer-
stabilizer principle and will produce prints by the pushbutton method.

A machine which is obviously required and which would appear
to be feasible in the light of current technology is a microfilm reader
incorporating an electrostatic enlarger. Experimental units of this type
exist in the development divisions of several companies, but there has
been no announcement that one of them is nearing the market stage.
Librarians should demand this particular reader-printer which would
be independent of chemical solutions and would produce good copies
cheaply. The most likely process to be used for this purpose would
be the Radio Corporation of America's Electrofax method.

Since original production of microfilm in all major libraries is an
inherent part of successful roll microfilm systems, it is necessary to
examine cameras, film processing equipment, film duplicators, and en-
largers also. Since the author does not envision any immediate major
application of 105 or 70 mm. microfilm in the library, this discussion
will omit the more recently introduced Micromaster and similar equip-
ment. Declassified Atomic Energy Commission drawings have re-
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cently been recorded on 105 mm. film and some libraries acting as
depositories for A.E.C. materials have accepted this type of film. The
drawings are also available on 35 mm. film and in that form take up
considerably less space.

The 35 mm. microfilm camera market has seen only one interest-
ing newcomer: the Microline camera. Other cameras have undergone
little change for many years and although they are quite useable would
profit from redesigning. The most widely used camera is the Recordak
Model D which Eastman Kodak Company is now redesigning with a
promise of the new model late in 1959 or early in 1960.

Generally speaking 35 mm. cameras are fairly adequate but im-
provements resulting in consistently sharper images will be welcome.
The library needs several pieces of accessory equipment: a better
manual book cradle and a book cradle which incorporates an auto-
matic page turner. Another necessary item is an efficient small unit
which would add identifying information to each frame photo-
graphed. Such a unit might be part of a new book cradle.

The Lumoprint cameras are of interest since they incorporate a
principle new to the microfilm field. This is an automatic exposure
control device utilizing a photoelectric cell which reads the light re-
lected from the copy and automatically adjusts the shutter speed
compensating for variances in the reflection density of different
originals. One of the two cameras available, the so-called MT/O
camera, is intended for and most suited to microfilming of engineering
drawings. This camera competes with the Eastman Kodak Model C
camera. The other Lumoprint camera designed for microfilming
smaller originals would be more suitable for library use. It incorpo-
rates the same photoelectric cell arrangement and has a built-in book
cradle, but lacks some of the practical attributes of the Recordak
Model D camera, and its price of $5,300 is considerably higher.

If the Microline camera could control exposure automatically, and
produce good film consistently, the sacrifice of some of the con-
veniences of the Eastman camera and the additional cost might be
justified. It does not appear, however, that the incorporated book
cradle is sufficiently versatile and the automatic exposure control quite
adequate for microfilming material for scholarly use. The design of
a good exposure control unit should take into consideration line width
of the text and contrast between background of copy and the text,
not merely the over-all amount of light reflected from the copy as is
the case with the Microline camera. The Lumoprint MT-1 camera is
not quite good enough, but it moves in the right direction and with
some improvement will become extremely useful. There are a variety of other cameras, but none which incorporates any advanced design principles.

General use of 35 mm. microfilm in libraries suggests the need for a portable microfilming kit. Over a period of years scholars have often made their own kits, consisting of a 35 mm. amateur camera, portable lights, and copy stand, arranged so that the components could be broken down and fitted into a small suitcase. No complete portable microfilming kit has as yet appeared on the market. The word “complete” here means camera, lights, copy stand, facilities to hold book-pages, and processing tank, so that the photography and processing can be done with equipment easily accommodated in a small case. Closest to this type of equipment is the recently marketed Copyflash manufactured by Camcopy, Incorporated. This has the necessary exposure features but lacks a processing unit. It incorporates a collapsible copy stand, a frame which can hold down book pages and a circular strobe light which, it is claimed, will provide even illumination. It also has its own power unit involving a dry cell battery. The author has not been able to obtain one of these units for experimentation and cannot comment on its mechanical efficiency, though its basic design is good.

Since it is important to process the prints where the original material is located, a compact processing unit should be included. Silver film presents a special problem because of the transportation and preparation of developers and fixers and their dependence on facilities providing running water. Here the use of a monobath developer which is a combination developer and fixing solution suggests itself. There has been a considerable amount of experimentation with monobath formulae, and indeed in many photographic fields excellent solutions have been perfected. In microphotography it has been a problem to develop a formula which would combine sufficient speed and high contrast with a low fog level, but it seems that perfection of such chemicals is imminent. This will not only facilitate design of portable camera-processing kits for microfilming, but should simplify laboratory processing.

A film and monobath combination has recently been imported from Germany and is distributed by the Filmsort Company. The Cormack Company has marketed a number of monobath formulae for various photographic applications and has promised the addition of a microfilm developer to this series.

Ultimately, a portable microfilming kit will be developed based on
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dry-processed photographic materials. Further research in this field is necessary and no immediate solution appears to be possible. Although excellent dry processed materials are available in diazo film and Kalvar film, neither medium as yet has the speed and spectral characteristics to provide a solution to the portable microfilming kit. More of these films later.

A machine badly needed is a good-quality low cost film processor selling between $4,000 and $7,000. A good commercial processor must provide even processing, archival washing of the film, and be reasonably foolproof. The only thing which most library photoduplication services could sacrifice would be high speed processing. A rate of six feet per minute should be adequate for all but the large library laboratories.

Although several machines priced from $8,000 to $15,000 are adequate in most respects, none is ideal. The ideal machine for a photoduplication laboratory would be a good spray processor. A number of relatively inexpensive processing machines have recently appeared on the market. There is no point in looking at those which clearly state that they cannot achieve archival washing of the film. Of the others, the Unipro marketed by Remington Rand and selling below $2,000 looks promising for small volume installations. Microfilm has to be processed at 89° F. in this machine and special solutions marketed by Remington Rand have to be used. The machine has not been available for testing and therefore cannot be evaluated here.

Two other machines made in Holland recently have entered this country. One is the Recordak Microfilm Processor K 136 selling for just under $3,000. It is a darkroom operated machine of low speed. Processing controls are limited. The machine might do for a low-volume installation where film quality is not too critical. The same evaluation would apply to another Dutch machine which reaches this country via the Lumoprint Company of Germany and is distributed through the Microline Division of the Ozalid Company as their MEA-6 processor. By virtue of their reasonable price both of these machines certainly will fit into some installations. In the final analysis, however, microfilm processing equipment for the library photoduplication laboratory is not satisfactory at this time.

Excellent progress has been made over the last few years in the production of better, more versatile negative microfilm. A number of excellent microfilms are available. Type B Recordak film, which is the most recent Eastman Kodak addition to the microfilm market,
is considered outstanding for its latitude and its resolving power. Ansco is producing a new microfilm which may be marketed under the Microline label. This has so far not been available freely but test rolls indicate that it will be another excellent product for the microfilm user.

Another important tool is the continuous film printer, the microfilm duplicator. The ability to generate contact copies is one of the finest features of the roll microfilm system. It enables a library to store the master negative and to provide inexpensive copies on request. No area of the microfilm field has made as much progress as film duplication. Silver print film used for making additional microfilm copies from a master has improved enormously. The introduction of Kodagraph (now Recordak) fine grain print film marked the advent of an outstanding film for image definition. The natural loss in image sharpness from negative to copyfilm has been reduced substantially with this new film and its latitude, that is its ability to accept a variety of negatives of different densities, is also impressive.

In addition to the classical method of duplicating by means of silver film there is diazo film and Kalvar film. Both of these films are sensitive to ultraviolet or near-ultraviolet light. It has not yet been practical to employ either of these films directly in a camera.

An experimental camera using Kalvar film has been built but it seems probable that some time will elapse before Kalvar film can be used routinely for creating the original negative microfilm. The same applies to diazo film which is even slower than Kalvar film. Diazol and Kalvar film are giant forward steps. Both films dispense with wet processing. While diazo film is already well established commercially, Kalvar film is relatively new.

There are two reasons why diazo film did not become established in many library photoduplication laboratories. The basic machine which prints and processes the film is quite expensive (approximately $7,000) and the film, which may be produced less expensively than silver film, cannot be rated as archivally permanent. There is evidence to support statements by commercial producers of diazo film that the film has considerable stability, and it is not unreasonable to expect that it will remain unimpaired for about forty years. However, libraries are reluctant to accept dye materials which may be affected by light.

The resolution characteristics of a film, that is its ability to render distinct lines in close proximity, are extremely important in micro-
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photography. Yet it is equally important to realize that resolution obtained in a film depends to no small degree on the camera and processing equipment available for a specific film. When, as in the case of diazo and Kalvar, relatively few pieces of equipment to expose and process exist, it becomes preferable to determine the resolution of a system consisting of camera, or printer and processor than to evaluate the resolution of the film alone. Potentially diazo film by virtue of its grainless emulsion, is capable of better resolution than any other film employed in standard microphotography. In practice, however, the best available diazo reproduction system is but equal to the best silver film reproduction system. This is not to imply that the normal resolution loss in going to one or two additional generations is highly critical. It is desirable, at any time, to achieve maximum sharpness, but in the case of most documents, provided that the original negative is of good quality, a considerable resolution loss could be tolerated without serious impairment of legibility. Since the diazo film image is inside the film rather than on the surface, the film is more abrasion resistant than its competitors. Diazo film is processed with ammonia gas and this requires the printer-processor to be situated where ventilation of the machine to the outside of the building is possible. Advantages of diazo are the low cost of the material, small labor costs, and high speed of film reproduction.

Kalvar film or more specifically Kalfax Microfilm differs from diazo film in several respects. Processing of this film is accomplished by means of heat. No liquid or gas is required. The roll-to-roll Kalfax Microfilm Printer-Processor sells for $2,000, a most reasonable investment for a machine which will produce copyfilms instantly. The Kalfax Printer does not produce Kalfax film as rapidly as diazo equipment prints diazo film, but faster machinery is being developed. Since they are completely different there would be no point in subjecting either Kalfax or diazo film to standard tests designed to ascertain the permanence of silver film. But according to all tests possible Kalfax microfilm is extremely stable.

The Kalfax image is made of plastic and the film base is mylar. Torn film has been an objection to the use of microfilm in libraries. It is virtually impossible to tear mylar film. Theoretically the resolution of Kalfax film is not quite equal to that of diazo film, but it is capable of further improvement in a printer-processor with superior optical properties. Even the current definition of Kalvar film is en-
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tirely adequate for all normal library purposes. There is little doubt that before long the great majority of photoduplication centers of libraries will acquire this type of equipment for fast and economical film copying.

Cost comparisons between Kalfax and silver film methods are complex. The basic expenditure of less than $2,000 for the Kalfax printer-processor is extremely small. Kalfax film is more expensive than silver film but reduced labor costs with Kalfax more than compensate for the difference in most applications.

Kalfax film has an appearance very different from traditional films. It is light in color as compared to the black image of silver film. But when it is placed on the reader the projected image is black. In this writer's opinion the advent of Kalvar film is the most important advance in microphotography in the last decade, and it will probably have far-reaching effects in other fields of photography. Considering how new this medium is, it has made remarkable progress and there is every hope of further improvement and refinement. No doubt in due course this film will be used directly in the camera, and that will be the beginning of the end for wet-processing methods. In library application it may be that certain attributes of Kalfax film with respect to its use for producing microsheets, as will be discussed later, will turn out to be even more important than the benefits derived from Kalvar in the roll film system.

There is one fundamental difference between diazo and Kalfax films in addition to those already mentioned, and that is the type of image which they produce respectively. Diazo film will produce a negative appearing film from an original negative, while Kalvar film (like silver film), produces a positive image from an original negative.

The change from wet to dry processing exemplified by Kalfax and diazo constitutes a revolution in film processing and both should play a prominent role in an expanding micro-library field.

While the films just discussed still go through separate printing and developing stages, however simple, the next dozen years will probably bring materials which combine the two steps. Several companies are trying to harness a process called photopolymerization. A demonstration of this process begins with a test tube containing a clear, heavy liquid. Under the effect of a narrow beam of light directed at a small section of the test tube, the clear liquid in the area struck by light becomes solid and turns opaque. From the basic
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experiment to the final control of the process including the achievement of desirable photographic characteristics, good definition, and ultimate stability may be a long road.

One useful attribute of the roll microfilm system is its ability to supply paper copies by re-enlargement. In fact, many installations are using roll film merely as an intermediate to obtain a full size paper copy. This approach has proved to be a highly economical method of producing paper prints. It seems curious at first that the introduction of an intermediate step should bring about a reduction in costs. Yet a thorough study of all essential equipment, labor, and technical processes involved in direct paper to paper, as against paper to microfilm to paper reproduction shows the logic of the system. It is a matter of going around the mountain instead of over it. Microfilm will remain a good intermediate until considerably more versatile and more economical equipment is designed. In addition, the equipment required in the paper-film-paper approach is all needed in the straightforward production and reproduction of microfilm.

The normal method of enlarging from microfilm is by standard photographic enlarging technique onto silver paper. This process yields excellent reproductions. Darkroom equipment available for this purpose is superb and if the microfilm is carefully produced and the print correctly processed an archivally permanent print is obtained whose legibility is either equal or superior to the original document.

The major revolution in microfilm enlarging has been the electrostatic print. Xerography, the Haloid Company’s version of electrostatic printing and enlarging, has gained steadily both in quality and in areas of application. Until recently the field was dominated by equipment designed for very large volume operations only and few libraries could justify the rental, let alone acquisition of the equipment. At the time this article is written, two machines have been announced which are intended for smaller volume operations. Both machines make enlarged electrostatic prints from 35 mm. microfilm. One is Haloid’s 1824 machine, the other the Bruning Company’s Copytron. The latter has been demonstrated for some time but has not yet been delivered in response to orders. Both machines were designed for films of engineering drawings, yet both may be quite useable in the library. Until the machines are actually on the market they cannot be properly evaluated, but the specifications for both machines hold the promise of copies somewhat less expensive than silver prints.
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Unfortunately the economy inherent in these machines will not compare with that achieved with the large Xerox Copyflo equipment. In addition, it is open to question whether the Copytron has mastered all the technical problems involved in its process. The Copytron utilizes the Electrofax principle rather than the xerographic process. The main difference between xerography and the Electrofax process is this: xerography creates an image first on an intermediate plate or drum. The image in the form of loosely gathered particles is then offset to a plain piece of paper and fused permanently to it by means of heat. The Electrofax process by means of the same photographic and electrostatic principles creates a loose powder image, but this time directly on a specially coated piece of paper. The image is then fused into the paper just as it is in xerography. In other words the Electrofax process cuts out the intermediate plate at the cost of having to use a special zinc oxide coated paper. Zinc oxide is not expensive, and presumably once it is in mass production Electrofax paper could be produced at a cost only slightly greater than that of plain paper. At the moment, the appearance of the zinc oxide coating and its affinity for abrasion-marks somewhat impair the quality of the copy. The Electrofax process appears to have the potential of printing at higher speeds and of doing a better job of halftone reproduction than xerography, but comparing the two processes, it should not be forgotten that an established and successful method is being compared to a potentially great but unproven system. By virtue of its greater simplicity, the Electrofax process can be incorporated into other machinery such as microfilm readers more easily than the xerographic process. As soon as good electrostatic machinery capable of reproducing halftones and geared to a lower volume of work than the Copyflo becomes available, electrostatic enlarging should gradually replace all silver printing methods in documentary reproduction.

Another electrostatic method, the Huebner process, also called smoke printing, seemed the most promising of all some years ago, but unfortunately it appears to be stuck in the development stage.

Since diazo copy paper, now widely used in direct paper to paper copying, is extremely inexpensive and may be processed rapidly in either a liquid developer or an ammonia gas, it has been hoped for a long time that an enlarging speed diazo paper would come along to be substituted for the more expensive silver paper. Recently two microfilm enlargers to function with diazo paper have been intro-
duced. They are the Helios enlargers, both of which are distributed by Keuffel and Esser. Diazo paper has not really achieved proper enlarging speed. The new papers are somewhat faster than contact speed diazo paper, but it is really the modified enlarger with its abnormally strong light source which makes enlargement from microfilm onto diazo paper possible. The two machines sell for $3,300 and $4,900 respectively. This method produces direct positive prints which means that a negative microfilm will result in a negative print and a positive microfilm in a positive print. With better electrostatic equipment in the offing it is unlikely that diazo enlargers will be given space in the library.

An interesting and different piece of equipment called the Microbox has recently been imported from Germany by the Filmsort Company. The Microbox system, according to the specification sheet, will do everything. It serves as a 35 mm. microfilm camera, a microfilm reader, and a microfilm enlarger. Metamorphosis from one stage into another is achieved quickly by means of attachments. A separate unit in the Microbox system is a monobath developing tank.

The equipment is fairly compact, although it cannot be described as portable. The entire system probably does not fit into many operations, but if the box is used merely as a stationary rapid microfilm camera it will, in conjunction with the processing tank, be useful in some libraries. The Microbox camera is normally loaded with a thirty-six exposure cartridge of 35 mm. film, although a special magazine holding one hundred feet of film is obtainable. When six pages have been photographed the camera, containing a stainless steel film-holder carrying the exposed strip of film, may be transferred to the developing tank in daylight. Frame and film are dropped from the camera into a monobath solution for development. This is followed by a brief immersion in the wash tank which is part of the developing unit, with subsequent transfer to a quick drying chamber. The whole process, from exposure to completed film strip may be executed in less than ten minutes. This is, of course, not an archivally washed film, but it does enable the user to produce a short strip of microfilm extremely rapidly. The Microbox is capable of photographing books about as easily as the rapid copying machines which are found in the library. Re-design of the entire Microbox system into a completely portable unit would provide a useful tool.

The Microbox film-monobath combination, produced by the Adox Company in Germany, might prove useful independently of the Microbox machinery.
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The use of color film for microphotography is on the increase. No special color film has as yet been designed specifically for this purpose nor are present day cameras particularly adaptable to color microphotography. Kodachrome film by virtue of its high resolution has been used successfully. No color film is quite as stable as black and white microfilm and color photography is expensive. Color is vital in the preservation of certain documents and more thought should be given to the development of special emulsions and more suitable cameras for this purpose.

When roll microfilm is cut into short pieces each containing a few frames, the sections are called film strips. The film strip has been a neglected tool for the scholar or researcher. If a single item of information from one to ten pages long is kept by itself on a one hundred foot reel, it is hard to handle and no storage space is saved. But if the roll of film is reduced to strip form, it becomes a highly useable and very economical research material. The strips are filed into plastic sleeves or jackets. These are either transparent plastic sleeves holding one or more short film strips with provision for a typed title at the top of the sleeve, or they are cardboard frames with cutouts into which the film is slipped. The over-all sizes of these sleeves or jackets conform to standard card sizes from $3 \times 5$ to $6 \times 9$ and may be housed in appropriate file cabinets or boxes.

The microstrip system is practical for small collections. Microfilm in this form is more accessible than the current type of unindexed roll film. A title legible without magnification at the head of the film strip sleeve makes it possible to find the material quickly. If the original negative is made into strips, the system will become a one copy installation since further duplication or enlargement from these strips is cumbersome. If there is any possibility that duplicates may have to be made from the original film, it had better be kept in roll form and a positive copy film cut into strips. Under these circumstances it might be better, however, to make a microsheet positive.

A machine mechanizing the loading of film into transparent sleeves is now available, and this will enhance film strip systems since manual loading is time absorbing. Acquisition of this machine is justified only in volume operations. Some of the smaller sleeves and jackets may be read on roll film readers. The larger ones require microsheet readers. Once microsheet equipment has been properly developed the need for film strip will probably disappear, except in a few special applications.

Most librarians prefer the micro-opaque to roll film. This is understandable since storage and handling of the opaque is simpler than
that of roll film and a macroscopic legend at the head of each micro-opaque readily identifies it.

As has been stated previously, the microcard has not been developed into a copying process but is a method of publication. This limits the material obtainable in this form. Nevertheless the bulk of micro-opaques is growing and there must be few libraries indeed which have no holdings of these cards.

Micro-opaques are normally encountered in one of three sizes: 3 x 5, 6½ x 8½, and 6 x 9 inches, the 3 x 5 card being dominant. The 3 x 5 and the 6½ x 8½ cards are printed on photographic paper. The 6 x 9 format, called microprint card and supplied only by the Readex Microprint Corporation, is offset printed.

In practice it is not normally economical to prepare an edition of less than twenty copies in micro-opaque form, and it is not particularly advantageous to publish a microprint edition of less than one hundred. Upward of one hundred copies microprint becomes the least expensive method of publication in existence.

Another form of the micro-opaque which has had numerous industrial applications but has not entered the library field to any extent is strip micro-opaque. Several service agencies offer to contact print 16 mm. or 35 mm. microfilm onto one hundred foot ribbons of paper with a pressure-sensitive adhesive backing. The paper roll can be cut into strips and single frames which can then be attached to ordinary cards of any size. Producers of these micropaper ribbons will not normally undertake to copy other than full one hundred foot lengths of film. While the use of these strips is undoubtedly valuable in certain industrial applications, one would hesitate to recommend them for library systems. A card bearing small strips of paper tends to be awkward for filing and retrieving, and with heavy use the micropaper might become detached from the card despite the fact that the inherent adhesive properties of the strips are impressive.

The five main readers available for the micro-opaque are the Readex Microprint reader, the American Optical reader, the Microlex reader, the Eastman Kodak Microprint reader, and the Microcard series of readers. All the readers are useable. They vary somewhat as to their ability to produce sharp images towards the edges of the screen, and they differ in the ease with which the micro-opaque may be manipulated to bring the desired page on the screen.

Four of the readers have translucent screens and the image is projected from the rear of the screen. The most recent addition to the
group, the American Optical reader, projects the image down onto an opaque screen. This reader is normally sold with a card stage which requires the card to be moved manually, but a more complex card manipulator is now available as an optional accessory, and it considerably enhances the usefulness of this instrument. Reader prices vary from $125 to about $385.

Despite the fact that the micro-opaque has been in use for quite a number of years, no standard specifications of any kind exist. Standards for the dimensions of the over-all card size and pertaining to the size and arrangement of the micro-images on the cards are close to completion and will probably be published in 1960. Additional standards governing the quality of micro-opaques with respect to permanence and legibility are under consideration, as are standards for opaque readers. If a micro system involves further reproduction of the micro-images the micro-opaque is not at this time the right system, since adequate facilities for re-enlargement from a micro-opaque are lacking. The Microlex reader has an attachment which enables the user to make an enlargement provided that darkroom facilities also exist, but it is not a particularly practical method. Some time ago the Readex Microprint Corporation demonstrated a prototype micro-opaque reader-enlarger. This consisted of an American Optical reader and an attached electrostatic reproduction unit. The prototype machine utilized the R.C.A. Electrofax process and looked promising. Another machine to make enlargements from micro-opaques by means of the same process was developed by the Microlex Corporation, but there has been no announcement as to when either machine will become available. At present the micro-opaque constitutes an excellent means for storing information in libraries, provided that reproduction from the micro-opaque is not required.

In Europe experimental micro-opaques have been printed on diazo paper at reductions of 100 and 200x. Diazo micro-opaques could be produced very cheaply. The eventual advent of diazo opaques will extend the use of this form from publication to single copy process. Furthermore diazo materials will probably be capable of providing sharper reproductions than the currently used silver paper. High reduction diazo opaques, although they may not have the permanence of silver paper, should become an important product in the future.

The microsheet, or microfiche, consists of a transparent film, 3 x 5 to 5 x 8 inches in size, containing several rows of micro-images. The microsheet so far has been used primarily in Europe. It requires no
crystal ball to predict that microsheet systems will be the most important addition to American libraries during the next four or five years. There is in fact no logical explanation for the backward development of the microsheet in this country. It may be that this will become the most prevalent form of the micro-image in libraries within a relatively short span of time.

It should be pointed out that the name microfiche is preferred in Europe, although the term microsheet occasionally appears in Great Britain. On the other hand the word microfiche has not yet been accepted universally as indicating a transparency. It is sometimes called “Transparent microfiche” in differentiation from “Opaque microfiche” which is a term occasionally used for a micro-opaque. Despite the establishment of the term “fiche” in Great Britain the author would favor acceptance of the word microsheet in English speaking countries. Microsheet conveys the nature of this microfilm and can be added to trade names of microsheet systems more easily than the word fiche. Thus Kalvarsheet and Actifilmsheet are more acceptable than Kalvarfiche or Actifiche.

The microsheet, a transparent version of the microcard, inherits from the opaque all the advantages inherent in that form while lacking some of its disadvantages. A comparison of the microsheet and roll film in their present state of technological development suggests that information on microsheets may be retrieved more easily than roll film images. It is easier to store sheets in conventional, readily available library file cabinets and reading equipment for sheets is somewhat less complex than that for roll film. Particularly where the material involved runs from a few pages to approximately 200 to 250 pages, the microsheet is much more practical in the library than roll film.

While the general picture of microreproduction finds the United States ahead of other nations, certain European countries are almost nine years in advance of the United States in the use of the microsheet. The microsheet originated in Holland, where the foremost exponent of this type of microphotography is L. J. Van Der Wolk, librarian of the Delft Technical University. While the earliest microsheets were intended only as a single copy process, this form soon came to be regarded as an excellent medium for small edition publication also. Other European countries, notably France, Germany, Sweden, and England followed the trend, and many current journals from all over the world, including some U.S. publications, are now available
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in this new form. Many European libraries boast of substantial collections of microsheets in addition to their roll film holdings.

The only two important applications of the microsheet in the United States are both somewhat unusual. One is the micro research card, used for publication of geologic information. Although it is called the micro research card it is a micro-sheet, a transparent film bearing micro-images of seventy five pages, spread over approximately two-thirds of the film area available. The rest of the film is punched with code holes which enable the reader to use a needle sorting technique for quick retrieval of the desired data. The other application of the microsheet is the C.I.M. card of the Douglas Aircraft Company which uses tab size Actifilm sheets prepared from 35 mm. roll film. Since the film prepared for the C.I.M. cards is produced on rotary cameras, this particular microsheet will at times bear a continuous image of an engineering drawing stretching across the entire card. A rotary camera photographs material while film and original drawing are in synchronized motion, and it is possible therefore to produce a microfilm image much longer than the conventional frame of 35 mm. microfilm. The C.I.M. cards are printed by means of a machine called the Actifilm Printer.

In recent years several articles on the microsheet have appeared and their authors are not in accord in every respect as to the relative merits of microsheet and micro-opaque, but they all agree that with present day equipment the micro-opaque is primarily a medium for publication, while the microsheet may be either a copy or a publication medium. The micro-opaque cannot easily be further reproduced. It will be an end result until new equipment for copying opaques is developed. The microsheet may be reproduced or enlarged more easily than the micro-opaque and reader design for the sheet is simpler than that for opaques. On the other hand, in Europe the micro-opaque has been considered sturdier than the microsheet. This is true for microsheets made on silver film, it does not hold good for diazo and Kalvar microsheets. Writers on the subject are agreed that there are many instances when it is desirable to produce a microcopy possessing the superior filing and retrieving attributes of the card, but retaining the advantages of the translucent image with respect to reading and reproduction. The answer is the microsheet. A comparison of the production costs of an edition of twenty-five microsheets on silver film and of a similar number of microcards would favor the microcard by virtue of the relatively smaller cost of photographic paper. However,
equipment was developed recently which makes it possible to print microsheets quickly and easily on dry-processed non-silver materials.

There are several ways in which a microsheet may be produced. The direct method is the exposure of a film sheet in a so-called step and repeat camera. This type of camera is loaded with a sheet of silver film, and after each exposure the film magazine is advanced by a step so that the subsequent image is placed next to the previous one. As soon as a row of images is completed the magazine moves back so that the next row of images falls directly below the first. This type of film has to be processed in a tank or tray. There are difficulties involved in the direct production of the microsheet by means of a step and repeat camera. Only one camera of this type has been offered commercially, and this is the Dutch NDR camera designed by J. Goebel and used almost exclusively in the preparation of microsheets in Europe. While this camera is useable, it leaves much to be desired in speed of operation. The basic approach of the step and repeat mechanism is subject to criticism since first of all this method makes correction for a camera operator's error more difficult than the roll film camera does, and furthermore sheet film is not processed as easily as roll film.

An alternative manner of producing microsheets is to prepare a standard roll film with subsequent transfer of the information to a microsheet. Considering that roll film cameras will be needed in the microfilm laboratory anyway, the latter method appears to be preferable in the library, though not necessarily in industry. Kalvar film and diazo film, as described earlier, are vital tools in this method called "roll-to-sheet" printing. Potentially both materials can be produced quite economically, and there is no doubt that they offer advantages which cannot be matched by any other type of microfilm.

The Kalvakard as it is called (and the name is unfortunate, since it conveys an opaque) is the Kalvar Company's microsheet. It has certain important advantages of its own. The fact that it is heat processed makes it the most simply produced microsheet of all, and since heat can conveniently be confined to a small area a new concept in microphotography is possible. A system can be created in which an individual micro-image may be printed and processed on a section of Kalvar film without desensitization of the remaining portion of the sheet. Kalvar calls this method the "add-a-frame" system.

Equipment for roll-to-sheet printing is manufactured by two companies. The Ozalid Company makes a highly mechanized unit called...
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Actifilm Printer selling for $2,600 and available on a rental basis, also. In addition Ozalid markets the Uniprinter, a small manual unit selling for $180. The Actifilm Printer is a well designed instrument, suitable for medium to heavy production of microsheets. It is intended for production of Actifilm sheets (the diazo sheet manufactured by the Ozalid Company), but the machine can be modified to make it suitable for use with Kalvar sheets as well. The preparation of Actifilmsheets in addition to the printer requires an Actifilm processor which must be vented since it uses ammonia gas.

The Kalvar Corporation offers several pieces of equipment designed for roll-to-sheet printing. A basic unit is the Kalvakard printer, similar to Ozalid’s Uniprinter, and also low priced. The small Kalvakard Processor which is essentially a revolving hot roller works cleanly and efficiently and is designed to process entire sheets, not single micro-images. The Kalvakard printer may be used with accessory masks to print a single page onto a section of a Kalvakard, and a processing unit which will develop such a small area only, is also available. All this equipment is low-priced. The add-a-frame principle of this system will probably prove sufficiently valuable in the library field as well as in office records application to justify the introduction of more expensive, mechanically more advanced equipment. If the Kalvar sheet is used with the add-a-frame method, it must be stored in a translucent, ultraviolet absorbing envelope. The film can then be used while in its envelope, since the yellow or orange colored sleeve in no way interferes with viewing of the image. When an add-a-frame Kalvar sheet is filled with micro-images, the sheet may be fixed and removed from its envelope. This removal is of course not mandatory and the protection against scratches which the envelope affords the sheet may make permanent retention of the envelope worth-while.

Microsheets as well as roll film are subject to abrasion, and it would be desirable to find methods of making the film more immune to scratching. Perhaps the answer to this problem lies in a product marketed by the Permafilm Company. It is a solution with which the film is impregnated and which has found favor in recent years with motion picture laboratories. Before this solution may be used for microfilm it must be shown that it will not affect either legibility or stability of the film. Certainly a scratch-proofing solution would be immensely valuable in this field.

One of the reasons why libraries in this country have been hesitant to produce and to acquire microsheets, is the almost complete
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absence of microsheet readers from all libraries. There are, however, a number of good microsheet readers available in this country and abroad. It would be a pity if the advent of the microsheet in the American library were to be delayed due to reluctance on the part of librarians to purchase a sheet reader. The logical procedure from this point on would be to consider the microsheet as an alternative when a microfilm project is planned, and to acquire a reader along with the first microsheets. This in turn will lead to greater consideration of the microsheet as a copy and publication medium. Certainly the reading machine will not stand idle for long. It would be highly desirable to write an American standard or at least a library standard for the microsheet while it is still in its infancy in order to prevent a flood of illogical card sizes, image sizes, and image arrangements.

An announcement from England promises the early introduction of a reader to handle both microsheets and micro-opaques. It will be marketed by Micromethods, Ltd. If this machine has good reading characteristics it will be a valuable asset, particularly in smaller libraries.

It has often been suggested that a microsheet may be read by backing it with a piece of paper and inserting it into a micro-opaque reader. Since micro-opaque readers require a much more intense light source, and since to date no specifications for micro-opaque readers have been published, some of these readers might damage microsheets with excessive heat.

It is of the utmost importance that the microsheet enter the library only in the form of complete systems. Title or identification on each microsheet ought to be legible with the naked eye, as in the case of micro-opaques.

In order to get the microsheet into general library use, librarians and photographic engineers should convene and decide on preliminary standards and suitable equipment in order that not merely one or two but all libraries could respond to a request for microsheets as an alternative to roll microfilm. These arrangements might well be made through the Photoduplication Committees of library associations. When the benefits from this microform to the user and to the library are evaluated, the slight additional cost of preparing a microsheet will be considered more than justified.

A microform which in recent years has seen greater expansion in commercial application than any other is “unitized microfilm.” This is another offshoot of roll microfilm, and this time the roll is cut into even smaller segments than is the case with strip film. Normally the
term “unitized microfilm” refers to single frames inserted into aperture cards, but on occasion the name is misleading and short strips rather than single frames are involved. For the sake of convenient categorization and in anticipation of new developments expected in the near future, it is recommended that the term “unitized” be eliminated once and for all and the name aperture card be used exclusively. The prime example of this form is the Filmsort Card, a tab-sized, punched card with a cut-out containing a single frame of microfilm which is held in the card by means of a special adhesive. In view of the rapid commercial expansion of this microform one wonders what possible application for it the library might have. So far the aperture card has been used primarily in the engineering drawing field. Compared to normal page size an engineering drawing is either large or very large, and the space saving when engineering drawings are microfilmed is considerably greater than it is with standard pages. In addition an engineering drawing is frequently consulted by itself rather than as part of a series. There is little material in the library which, like the drawing, is single item information, difficult to file, frequently consulted and which must be copied either frequently or intermittently. The aperture cards’ inherent economy and efficiency in industrial application is not easily transferred to library applications and it will be a special library indeed which would justify the acquisition of business equipment involved in punching and sorting such cards in addition to the considerable cost involved in the purchase of aperture cards. If card sorting equipment is present in a certain library for other purposes or available for use by that library, material may occasionally be found which would justify the expense of an aperture card system.

While the Filmsort card can be produced only by commercial microfilm services because of the complex production equipment required, a different type of aperture card may be home made. This new aperture card system marketed by Remington Rand is limited to plain, not punched cards. Single frames or short strips of film are placed into special plastic sleeves so constructed that they can be snapped into cutouts in plain cards. These cards serve not only as a convenient handle for manipulation of a single frame of film, but they can bear index and other information in normal text size. This type of plain aperture card system is less expensive than Filmsort cards but still is not cheap. It would seem that the aperture card in its present state of development will not find ready application in the library.

It is difficult to envision mechanization of a library of books. The
picture of overhead cranes picking books off the shelves in response to electric impulses and delivering them to users two hundred feet away, is ludicrous. Yet when information is microfilmed, particularly at high reductions, the original document becomes extremely manageable. A wealth of information may be stored in a small area and the film, minute in size and weight, can be handled easily by small machines. A union of electronics and microphotography seems desirable. There are two types of systems which have been subject to experimentation. One is a microfilm storage unit with a retrieval mechanism, a keyboard operated machine which in response to a button push produces a desired document. This machine is incapable of a subject search, and a reference catalog with call numbers for each item is required for retrieval.

The second system contains an intelligence unit which will not only retrieve a particular item but will execute a subject search. This system requires film which bears not only reduced size information but coded indexing as well. While technically there is no limit to the mechanization possible with this kind of system, and while it seems likely that micro-images at extreme reductions will greatly facilitate the building of information storage and retrieval systems, the economic aspects of such machinery are complex. Moreover problems involved in the intellectual aspects of indexing have not been solved at a rate equal to that of technological progress.

Prototypes of various machines have been built. There is the Rapid Selector of the Department of Agriculture which has a retrieval system with limited search facilities. Information is recorded on 35 mm. roll film bearing the text images along one edge and the code dots along the other. During a search the film is in continuous motion and when the machine finds a relevant item of information it copies it by means of stroboscopic light.

A more recent and far more complex example of a microfilm storage-search-retrieval system is the Minicard system. This is by far the most complex and advanced system utilizing microphotography to date. It incorporates a host of machines including special high reduction cameras, storing, searching, and retrieving equipment as well as viewing, enlarging, and processing equipment. In addition there is an assortment of sorters, cutters, duplicators, etc. The system is built around a tiny microsheet. The cost of installation is expensive, starting at several hundred thousand dollars and going much higher for complete installations. Obviously this is not an individual library unit,
although one might envision its application to a new concept in information handling: the central microfilm library with transmitting facilities to branches all over the United States. The successful application of this kind of system to libraries will certainly depend largely on improvements in indexing.

The Filmorex system is a French little brother to the Minicard. A less complex and less versatile system than the Minicard, it is also considerably less expensive. It is based on a microsheet made from 35 mm. film, and 60 mm. in length. Each sheet bears a single image plus code information. The system, which so far has found no commercial application in the United States, merits closer investigation.

Microfilm plays an important part in yet another data processing system. Machines have been developed which are referred to as mark sensing readers. These machines are capable of detecting pencilled crosses and similar marks made on printed forms. One example of this is the Bureau of Census form which the census taker completes by crossing the relevant boxes. The completed form is microfilmed, and the film is fed into a mark sensing machine which electronically examines the film. The machine does not scan the entire film, but it concentrates on the spots which it knows to contain a pencil mark or a blank area. There are three machines of this type, called Fosdic I, II, and III. I and III were developed by the National Bureau of Standards for the Bureau of the Census, Fosdic II is used by the Weather Bureau. Fosdic I and III read the data out of the microfilm and place the information on magnetic tape to be fed into Univac. Fosdic II, after examining microfilm of punched cards and searching for specific information, automatically reproduces the desired data.

Other storage search and retrieval systems based on microfilm from 16 to 70 mm. in size have been reported. Normally single prototype machines exist with uncertain production plans.

The alternative system of electronics plus microfilm omits subject search facilities and concentrates on compact storage and quick retrieval. The Benson Lehner Corporation, F.L.I.P. (Film Library Instantaneous Presentation) Machine, contains up to 72,000 frames on a single roll of 16 mm. film, and on electronic activation will produce a desired frame and project it on a screen. F.L.I.P. was designed for a specific purpose and it can hardly be said that it is a complete system. Literature on F.L.I.P. contains no information on the machinery needed to produce the special 16 mm. film involved. The F.L.I.P. selector-reader sells for approximately $50,000. It is an interesting piece
of equipment but it will have to become a more versatile system before it can be used in libraries.

Of major interest is a current development at the Crosley Division of the Avco Company called the Mechanized Library System. This equipment is also intended for dense storage of information in the form of high reduction microphotography, but the material is stored on film sheets, each containing about 10,000 pages. By means of an orthogonal motion of the selector mechanism, direct access to any one of a million items is envisioned in less than one second. Unfortunately further details pertaining to the Avco system are at present confidential, but from the information available this equipment is the most promising in its field. An incidental benefit of machine-stored information is the possibility of studying reader habits, that is, their searching techniques. It would not be difficult to design machines which would accumulate statistical "reader habit" data in addition to fulfilling their basic storage and retrieval function.

It is contended, and for good reasons, that the substitution of a micro-image for full sized pages in facsimile transmission systems will increase their efficiency. This concept was used in the Ultrafax which electronically transmits a microfilm image and again exposes microfilm at the output end. So far no equipment of this type practical for general interlibrary use has been built, but sooner or later there will be facsimile systems between libraries using microfilm or micro-opaque as an intermediate.

Of interest is a report by Roger Bristol on experiments conducted at the University of Virginia to transmit microcard images by closed circuit television. One of the problems, the report indicates, was an insufficiency of light in the projection device for the purpose of transmitting the image. This would not be a problem with a microsheet and better definition should also be possible with the latter. The report does not discuss the reasons for choosing the microcard for this particular experiment. Perhaps the microsheet's greater affinity for surface scratches was one reason. It is to be hoped that further projects in this field will appraise the merits of the microsheet along with those of the card.

There is a growing public awareness of the information handling problems of libraries and a number of companies are looking to electronics and microphotography for their solution. New companies solely concerned with information processing systems are being founded, among them the young Itek Corporation which appears to be con-
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scious of the value of the microforms and is developing special microfilm systems.

Although there are highly advanced techniques in certain areas of microphotography, for instance high-speed microfilm enlarging by means of electrostatic equipment, and high reduction storage and retrieval systems as complex as the Minicard with its wealth of superb equipment, there is nevertheless not a single complete, universally acceptable micro-system for the library.

The question frequently arises: “How much research is done in this field?” The author was privileged recently to address the National Microfilm Association on the subject of research in microphotography. The essence of this talk was a proposal for the formation of a research center under the auspices of the National Microfilm Association with a program roughly as follows:

1. Technical Research
   a. Development of new products and equipment
   b. Testing
   c. Systems analysis
   d. Customer service

2. Technical Education
   a. Technical information service
   b. Publication of technical information bulletins (in microform)

3. Market Research
   a. Search for new markets for microphotography, including study of competing techniques
   b. Appraisal of the economic aspects of new ideas submitted by consumers and members

4. Standards

The matter is currently under study. Certainly such a research program would give major consideration to the requirements of libraries. But long before there is a development of this kind libraries should analyze their requirements and suggest systems, suggest and possibly sponsor research for the missing links in these systems, and write additional library standards.

Industrial research at this time is concerned with further improvements in the optics of microfilm cameras and readers. The Lodestar
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reader is certainly a good innovation. Needed more than an improvement in lenses, condensers, and light sources are microfilm indexing techniques. The Avco Mechanized Library System has been discussed and this promises to be a useful piece of equipment in the library. This project is supported by the Council on Library Resources which is also responsible for two other recent noteworthy grants, one to Tate to investigate the possible development of a device for producing microsheets and another to the DeFlorez Company for construction of an automatic book cradle-page turner, a much needed device.

Other equipment particularly needed in microphotography besides the book cradle-page turner now under investigation are a small electrostatic microfilm enlarger to be used as a self-service unit in libraries, the elusive inexpensive portable film reader, and a unit which will automatically feed single sheets to a microfilm camera without need for a camera operator. This type of unit would probably be a combination of printing press feed mechanism and exposure activator. To round out general use of microfilm a fool-proof lightweight travel microfilm kit is needed, a combination of simple camera, exposing lights, book holder, and daylight processing kit.

At the Massachusetts Institute of Technology the Microreproduction Laboratory cooperates with the School of Engineering and students are writing theses on subjects related to microphotography under the supervision of the head of the laboratory. In addition, there are class projects involving minor design problems, which bring many undergraduate students into direct contact with microreproduction. Inevitably this has led to increased interest in this medium. Other library photographic laboratories in so far as they are not already engaged in this type of activity might find it interesting and useful to pursue a similar course.

An association of Library Photoduplication Laboratories for the purpose of research on specific library problems would be highly desirable.

With popular imagination dwelling on moon rockets, it is becoming increasingly difficult to retain one’s sense of proportion. Today’s methods of handling information are primitive and vision is needed. But visions which dwell too far in the future can become idle dreams. Consideration of computers and of magnetic tape has led many to neglect more immediate tools, among them microphotography.

No doubt revolutionary changes will occur at some point, but today the library requires people willing to consolidate available techniques into practical systems.
Advances and Goals in Microphotography

General References


Forthcoming numbers are as follows:


The numbers of *Library Trends* issued prior to the present one dealt successively with college and university libraries, special libraries, school libraries, public libraries, libraries of the United States government, cataloging and classification, scientific management in libraries, the availability of library research materials, personnel administration, services to readers, library associations in the United States and British Commonwealth, acquisitions, national libraries, special materials and services, conservation of library materials, state and provincial libraries in the United States and Canada, American books abroad, mechanization in libraries, manuscripts and archives, rare book libraries and collections, circulation services, research in librarianship, cooperation, legal aspects of library administration, book publishing, public relations, library administration, bibliography, adult education, and newly developing countries.