The Microform Revolution

ROLLAND E. STEVENS

Librarians have tried replacing some of their books and journal files with microfilm copies or other microforms in order to save valuable space in the bookstacks, instead of or in addition to extension of the stack area, decentralization, compact shelving, separate storage warehouse, or any of the other solutions to the storage problem discussed in earlier chapters. As a final paper, this solution for the storage of library materials will be discussed. Although the distinct forms will not often be designated, “microform” is used here to mean the four forms most common in the United States: 35 mm. roll microfilm, microfiche (now standardized in the United States and Great Britain at 4 by 6 inches) and the two micro-opaque forms—3 by 5 inch Microcard, and 6 by 9 inch Microprint.

Library materials in microform are acquired for a variety of reasons: 1) to obtain rare books, journals, manuscripts, archives, and other needed information sources that are either unobtainable or prohibitively expensive in their original form; 2) to replace items that are printed or written on badly deteriorating paper; 3) to furnish a working copy of rare and fragile books; 4) to replace large, bulky volumes such as newspaper volumes with a compact form that is easier to handle and to use; or 5) to replace printed sources with copies in microform in order to save stack space. Each of these is a separate and distinct purpose, yet the librarian is seldom motivated by one of them alone. Usually the acquiring of microform materials is intended to answer several of these purposes, even in the case of a single title. Microfilm copies of newspapers already owned by the library are usually substituted for ease of use, for saving of shelf space, and to replace originals on deteriorating paper. Working copies of fragile books are acquired both to prolong the life of the original work as long as possible, and as a safeguard against the day of its final

Rolland E. Stevens is Professor, Graduate School of Library Science, University of Illinois.

JANUARY, 1971
crumbling. British sessional papers may be purchased in microform both because of their relative scarcity and, therefore, the expense of getting a complete file in its original form, and in order to save shelf space. Insofar as possible, this paper will concern itself only with the space-saving aspect of acquiring materials in microform. While it is recognized that motives other than this are usually present, no examples will be used in which the motive of space saving is not the primary reason for microform acquisition.

Saving of shelving space has not always been one of the motives for reducing books to microform. Microphotography was invented by J. B. Dancer in England in 1839, when he produced the first microphotographs at a reduction of 160:1. The invention suffered the fate of most new ideas for which a social need is not yet well developed, however, in not being taken up either by librarians or individual collectors for many years. Interestingly, microfilmed dispatches were flown into news-hungry Paris by carrier pigeon during the war of 1870. Other than this, or probably including this use, microfilming was regarded more as a stunt or a curiosity than as a method for promoting scholarly or other serious activities. Not until the 1920s was microfilm taken up for serious purposes. By this time a pressing need, essential for the development of an invention, was arising, and cameras and other equipment adapted to microfilming had been produced. The Leica camera, marketed in 1924, is mentioned as especially valuable for this purpose. The great impetus for the development of microfilming at this time and especially in the 1930s was from the scholar, who now found that he could microfilm manuscripts, archives, and other needed records in much less time, with less effort, and, most important, with greater accuracy than by his previous method of copying extracts by hand. This was especially important to him because the libraries in which these documents were kept frequently permitted only severely limited hours of use. When in the same decade the largest research libraries began to purchase microfilms and to produce their own, they used the method for acquiring information sources that could not be purchased in original form or for preparing microfilm copies for other libraries from this kind of research material held in their own stock.

Not until the following decade was there a concern for microforms of library materials as a means of reducing the storage space needed. In 1944, Fremont Rider published The Scholar and the Future of the Research Library, a Problem and Its Solution. In it he called atten-
tion, in his characteristically dramatic style, to the exponential rate of growth of the nation's research libraries and extrapolated from statistics of growth over the past century to indicate the probable size of the largest ones by the end of another century. Yale, for example, in the year 2040 would have about 200 million volumes occupying more than six thousand miles of shelves; its catalog would cover eight acres of floor space, and cataloging of the twelve million volumes acquired annually would require a cataloging staff of more than six thousand persons. Rider then went on to propose the following solution to this problem of growth: the entire book collection of the research library would be microfilmed and photographically printed on micro-cards. These were 3 by 5 inch opaque cards of which the front was a standard catalog card plus an abstract of the work; the reverse side contained the complete text of the book at a reduction of about 20x to a maximum of 250 pages. No bookstack would be needed in this library of the future since the entire contents of the collection, excepting perhaps a few of the more frequently used reference books, would be on the back of the micro-cards, filed in the card catalog in the usual dictionary arrangement. When a reader wished to use a book, he would remove the micro-card from the catalog, leaving in its place a call slip, and charge out the micro-card for home use. Or he could make his own copy of the micro-card in a coin-operated camera. The saving in space, as Rider pointed out, would be 100 percent, since the bookstack would be completely eliminated.

Rider's book had little practical effect on libraries. No library converted any significant part of its collection to micro-cards. Microcards, containing the text of rare, out-of-print, and little-used research materials, such as accounts of early travel in the United States, theses, and other unpublished papers began to be produced commercially. Such research materials had been issued on a subscription basis in the form of microfilm since at least 1937, when University Microfilms began to distribute its Short Title Catalogue series, and since 1950 on Microprint when the Readex Microprint Corporation began pub-

---

* Rider was the first to use this term, hyphenated and uncapitalized, as used here. The currently used Microcard is a trade name.

† The caption under the frontispiece illustration of a micro-card reads in part, "This photogravure reproduction of the original micro-text is merely an attempt to show the general appearance of the card; for, being a reproduction of a reproduction, it is not readable." He does not explain, however, why the reproduction of a micro-card made in a coin-operated camera would be more readable.
lishing its famous series of scarce research sources. But purchases of
these series by libraries have been for the purpose of adding otherwise
unobtainable titles to the collection, not for saving space. Again in
1951, Rider urged librarians to consider the great saving in space,
and therefore in cost, of substituting micro-cards for books in their
original form. In this article he no longer considers the earlier idea
of converting the entire book collection to micro-card form and filing
these in the card catalog. Only the infrequently used books will be
converted. Presumably these micro-cards would be housed in cabinets
in or near the conventional bookstacks, would be represented by con-
ventional catalog cards in the catalog, and would be charged out for
home use in the same manner as regular books, rather than being
duplicated by camera. As far as using this method primarily for space
saving, librarians paid no more attention to Rider's reminder than
they did to his initial proposal seven years earlier.

In the same issue of American Documentation as the article just
referred to, there appeared an article by Eugene Power, president of
University Microfilms, pointing out the economy of substituting micro-
film copies of older files of periodicals for bound volumes. He sought
to demonstrate mathematically that the cumulated difference in an-
nual storage cost between bound volumes and microfilm copies in
several years would be about equal to the difference in cost of bind-
ing and microfilming and that thereafter the saving in storage cost
for the microfilm copy would be actual saving to the library. The de-
tails of these mathematics need not occupy us here, since they are
taken up at more length below. The point is that this, together with
Rider's publication of the micro-card idea, is the earliest consideration
of microforms purely from the viewpoint of saving storage cost. Since
that time there have been several other papers on the subject, but
this aspect of microform acquisitions has never ranked foremost with
the average librarian, certainly not with those in large public and
research libraries.

The purchase of microforms for the main purpose of conserving
storage space has been favored more by librarians in the largest and
best high school libraries and in small junior college and college li-
braries than by those in public, university, or research libraries. Even
among the former group, the practice is by no means universal or
even common. The writer is informed by University Microfilms that
the largest proportion of its current periodicals service is to college
libraries, followed by university libraries, with high school libraries
Microform Revolution

and public libraries using the service less. A recent trend is observed in technical libraries, where bound volumes of journals are being replaced, in order to conserve space, with 16 mm. film in cartridges for use in motor-driven reader-printers. Users find the ease of loading cartridges, the speed of searching the film, and the convenience of getting an immediate, take-home copy of any desired page preferable to using the original bound journal.

The kind of microform material that is most often used for conserving shelving space is back files of periodicals and newspapers on microfilm. Libraries which do not retain back files of periodicals and newspapers, such as the average school library or small public library, would, of course, have no need for such files on microfilm. On the other hand, libraries in which back files are not only kept but also frequently used do not want the inconvenience of microfilm copies, even though they may need to conserve shelving space. The latter group would include large public and college libraries and all university and research libraries.

In order to partially solve the storage problem by substituting microform copies for the original form of infrequently used materials, the librarian has several alternative methods. He may make his own microforms of materials in his own collection. He may send his volumes or papers to a commercial firm to have microforms made. He may share the cost with a certain number of other librarians, each of whom will then receive a microform copy. Or he may purchase microform copies of certain journals, theses, or other works, which are offered for sale by a commercial producer on a mass basis. In general, the larger the number of microform copies made of the same material, the lower the cost of each copy, since the most expensive part of the process is making the initial microform. For microfilm the initial negative costs at least five times as much as each copy made from that negative. If one hundred microfilm copies were made of a book, each would cost only a little more than one-fifth the cost of a single copy.

The best buy in microfilm or some other microform, then, is a title that many other libraries will also be interested in acquiring in that form. Thus, the kind of library material for which microform is most often acquired in place of the original, which the library either has already or could easily get is the general journal or newspaper, such as Atlantic Monthly, Christian Century, Current History, Harper's, Life, or the New York Times. These and similar titles, both back runs and recent volumes, are not infrequently purchased in microfilm.
ROLLAND E. STEVENS

copies by strong high school libraries and some junior college and college libraries for three reasons: 1) a substantial saving in storage space can be realized by the substitution for the original volumes, 2) microfilm of these runs is relatively inexpensive, and 3) in these libraries, back files of such journals are needed but are not used with great frequency. With respect to the second reason, a check of several general periodical titles shows that the cost of microfilm is about the same as the cost of binding for current volumes and even lower than binding costs for earlier volumes. In elaboration of the third reason, practices vary among libraries as to the length of back run to be acquired, if any. High school libraries may not have a need for purchasing any back runs, although they would keep the microfilms they acquired on standing order; college libraries usually need good files of most journals.

Whether or not the library purchases back files of these commonly held journals on microfilm, it may want to subscribe to a microfilm of the current year, to be sent soon after the volume is complete. The library retains the unbound issues as long as they are heavily used and discards them when use has decreased sufficiently. The cost of the microfilm is usually no greater than binding the volume would be. The publishers of such general journals expect libraries to subscribe to the journal and not to get the microfilm copy in place of the journal itself; the microfilming firm, therefore, requires evidence that the library does subscribe to the journal.18

When a librarian determines to save storage space by substituting microforms for the original bound volumes, the kind of library materials which are considered first are these standard, general periodicals and newspapers. The writer is not aware of any other category of library materials which is widely converted to microform primarily to save storage space. The purchase of microfilm or microfiche technical reports and scientific or technical journals in place of original format is sometimes done in the special library in order to save space.14 A detailed examination of several studies of the cost of microfilming printed matter, outlined below, will make clear why the general periodical or newspaper is the favored material for this purpose. Up to the present time, furthermore, the substitution of microform is the least used method of solving the storage problem. What factors must the librarian consider in reaching a decision about microfilming or going to one of the other microforms for this purpose? David Peele listed the following factors to be considered in deciding whether to
bind and keep periodicals in their original form or to substitute microfilm copies: 1) The likelihood of theft or mutilation of the material if left in its original form. 2) The nature of the material. Is it an abstract index or other reference work which would be unsatisfactory on microfilm? Does it have many color illustrations which would make black and white microfilm unsatisfactory? Does it have ads and text on the same page, which would make binding expensive, since ads cannot be removed? 3) The user. Is he a high school student to whom microfilm may be an adventure, or is he a college professor, to whom it is a pain in the neck? 4) Cost. Admittedly, the decision to bind or microfilm is not quite the same as the one we are considering in this paper; the likelihood of theft and mutilation does not enter into the latter decision as it does in the former. But the other three factors can be examined further here. The cost factor is the one most often considered by librarians in the past. Rider’s and Power’s articles on this aspect have already been mentioned. Rider’s exaggerated claim for the economy of substituting micro-cards for the original volumes was pure gobbledygook. He maintained that the library would realize a substantial saving of money by discarding bound volumes of little-used sets and purchasing micro-cards in their place. In order to prove his case he contrasts the cost of micro-carding with the capital investment needed, from which the annual interest would pay the storage cost of the bound volumes. This seems fair enough. But what he neglects to draw attention to, although he does not actually hide the detail, is that his estimates of the cost of preparing micro-cards are based on the agreement of about one hundred libraries to purchase micro-cards of the same titles and to share the cost. Nowhere in his estimates does Rider include the cost of cabinets for storing the micro-cards, of machines for reading the micro-cards, of maintaining and replacing these reading machines, or of the additional space required for the reading machines.

The analysis by Power is much more realistic than that by Rider. It shows that the cost of microfilming an average city newspaper is less than half the cost of binding and shelving the bound volumes for fifty years. If two libraries share the cost of microfilming, each receiving a print, the cost to each library would be about the same as binding and shelving the bound volumes for ten years. Beyond ten years, the cost of storing the bound volumes would be substantially higher than storing the microfilm copy. Power’s formula does not include the costs of reading machines. But he acknowledges that these costs
should be included in the librarian's estimates and even suggests the
number of machines required and the probable replacement costs,
although his prediction that reading machines will have a useful life
of twenty years now seems optimistic.

Several thorough studies of the economy of microfilming in place
of conventional storage have been made since the one by Power.
Alan B. Pritsker and J. William Sadler reported a study they had
made in the Columbia University School of Engineering storage li-
brary. They stated that many undesirable economies would have
to be made in order to bring the cost of microfilming down to a com-
parable level with that of storing the original books. These economies
included cutting the bindings off the books to be filmed, thus removing
the possibility of reducing the cost by selling the volumes after they
were filmed; the use of the faster rotary camera, although it results in
poorer quality filming than that possible with a planetary camera;
elimination of final editing of the film for pages missing or mutilated
in the original or illegible in the film; and, worst, the use of the master
negative as the working copy. “If a positive copy of the film is re-
quired,” they report, “the cost of microfilm storage is prohibitive.”

But by making these economies, they were able to get a microfilming
cost of the order of one-tenth and even one-twentieth the amount
charged by commercial firms. Pritsker and Sadler, however, con-
sidered only the case where a single library bears the cost of micro-
filming. Six years earlier, Dallas Irvine had reported that a study made
by the U.S. National Archives showed “that micro-reproduction is not
a generally applicable means of reducing the costs of storing records.
For records that are not to be preserved beyond thirty years and for
records that cannot be microfilmed at a very low cost, it is simply
cheaper to provide suitable warehousing.”

More recently, Verner W. Clapp and Robert T. Jordan sought to
re-examine the comparative cost question, by considering the sharing
of the cost of microfilming among several libraries. They were able
to reach somewhat more favorable conclusions than Pritsker and
Sadler. By assuming twenty libraries to share the cost, each of whom
would receive a positive print of the film, they could match the cost
of conventional shelving without making any of the sacrifices required
in the earlier study except that of shearing the backs off the volumes
before filming. With fewer than twenty libraries, the cost of micro-
filming in their plan would be higher than the cost of storing the
bound volumes; with more than twenty libraries participating, it
Microform Revolution

would be cheaper to microfilm and discard the original volumes. Their proposal would allow both pre-inspection of the books and post-inspection of the film, use of the higher quality planetary camera, color filming where required, and retention of the negative as a master copy, from which further positives could be made on demand. If the participating libraries would be satisfied with the product of the faster rotary camera and/or with all black and white film, further economies could be realized. This study was limited to storage and microfilming costs; it did not consider binding costs, on one hand, nor reading-machine costs, on the other. Nor did it take into account building maintenance, servicing, or altering catalog records, each of which would be different for the two methods of storage.

It now becomes clear, since the cost of microfilming can be comparable to the cost of conventional storage only when a number of libraries share in the cost of filming, why librarians wishing to save space acquire microfilm of general periodicals and newspapers rather than of infrequently used monographs, archives, manuscripts, local reports, and other research materials that are not commonly held. The latter represent the type of library material which Rider supposed would be appropriate for micro-carding. But the former are the serials that are widely needed; therefore, the kind of material for which there would be more demand. Only microfilm has been considered in these studies of cost, except by Rider. The reason for this seeming neglect of the other microforms is that the micro-opaque forms, of which Microcards and Microprint are considered in this paper, cannot be produced economically in small editions. From the cost standpoint, Microcards should be made in editions of no less than twenty-five, although in large editions they can become cheaper than microfilm. Microprint requires a still larger edition and is even cheaper in large editions than Microcard. Even in these larger (and cheaper) editions, however, there are deterrents to the use of micro-opaques. The chief problems are the number of pages of original text that will fit on a single card and the optical problems of the opaque card. A double-sided Microcard or a single-sided Microprint card will hold about 100 to 120 pages of the original text; a 100-foot microfilm roll will hold about 1,200 to 1,500 pages. The Microcard has the advantage for pamphlets and small booklets, but to reproduce a typical 400-page volume of a periodical on four separate cards has some drawback. More serious are the optical problems of the micro-opaques, for which reading machines have never been as satisfactory as those developed
for transparencies and for which no feasible reader-printer has ever been developed. The fourth form mentioned at the beginning of this paper, microfiche, also suffers from the first disadvantage, but not from the second. Furthermore, it has so many advantages, mainly its ease of handling, that it is soon likely to supplant the microfilm roll as the most widely used microform in this country. That it has not done so already is most likely the result of our brief experience with it and the caution with which we cling to old and familiar habits. It is no credit to librarians or the microform industry that we were so slow in the United States in adopting this form, which Europe has long used successfully, and which has long been acknowledged to be superior to roll film.\(^{21}\)

In addition to these considerations of cost, however, are the far more important, and too often neglected factors of the material involved and of the user's convenience. Reference books are rarely, and never should, be issued in microform. Even the reference features of non-reference books, such as the index, are more and more frequently issued in original size, when the text is reduced to microform. The *New York Times* on microfilm with its *Index* in bound form is a familiar example of this. A more recent example is the "dual media" proposal by the United States Historical Documents, Inc., to issue the various series of the proceedings of the U.S. Congress on microfilm with index volumes in bound form.\(^{22}\) Other kinds of library material which are least suitable in microform, if original form is available, are texts which must be compared with other similar texts for the purpose of collating or editing, early printed books which are to be studied in their original state for the placement of watermark or the positioning of separate pages, books of art reproductions or other books in which the quality of illustrations are important, reserve books, and other books which are used frequently. Often these books are not available in original format and must be acquired in microform or not at all. Such use of microform, however, is not the subject of this paper.

Even more important than the nature and probable use of the material is the convenience of the user. The reluctance of most readers to use microfilm or other microform is too well known to argue.\(^{23}\) Those who seldom need to use it waste time learning how to use the reading machine; those who must frequently use it complain about eyestrain. Criticisms from both groups of users are mostly well founded. Physical discomfort of using microfilm for long hours comes
**Microform Revolution**

not only from eyestrain but also from sitting and holding the head in the same position for an extended period in order to get the best possible view of the projected image. Both sources of difficulty in the use of microfilm can be corrected on the basis of our present knowledge. The difficulty of inserting the roll microfilm in the reading machine is overcome by the use of cartridge film and microfiche. The difficulty of readily finding the desired frame can be solved by coding the frames and using an automatic reader, such as Eastman’s Lodestar. Eight years ago, L. E. Walkup and his colleagues at Battelle Memorial Institute experimented with different levels of magnification, definition, page brightness, ambient light, and other factors that affect reading ease. They were able to identify the features that should be incorporated into a microfilm reader in order to promote optimum ease of use, and they constructed a breadboard model of this ideal reader. The model was made to simulate ordinary reading of a book by projecting the image onto a gray opaque reading surface held in the lap; the projector was light and small enough to enable the user to change his position and even to move about the room while reading. Testing of the model showed that a user could read microfilm for long periods of time with no more discomfort than he would experience in reading a book. It is interesting to note that the investigators worked only with transparencies because of “the projection difficulties encountered with opaque microimages.” Unfortunately, the study, which was implemented by a grant of the Council on Library Resources, Inc., was never followed up and the indicated microfilm reader was never commercially developed.

It was noted above that if storage space is conserved by substituting microfilm copies for the original volumes, they are usually general periodicals and newspapers rather than little-used monographs or other kinds of library material, even though these would seem to be good candidates for microfilming. It was further noted that this general practice results from the duplication of these periodicals and newspapers in most libraries and, therefore, from the potential market for microfilm copies of them. But we know that there is also high duplication of monographs among libraries of the same type: high school, public, college, and university libraries. A study of duplication among collections of members of the Association of Research Libraries made in 1942 by the late LeRoy C. Merritt showed a duplication among these libraries averaging between 15 percent and 25 percent. This study included monographs and serials alike and indicated
a core of titles held commonly by most of the libraries. A more recent study of a highly homogeneous group of smaller university libraries showed an average duplication of monographs of 40 percent to 45 percent. There seems to be no reason, then, why agreement might not be reached among a hundred or more libraries of like type on the infrequently used monographs they would buy on microfilm or microfiche to replace the original bound volumes. In the light of past experience, however, the move will come probably not from librarians but from microform publishers, who will offer a compact package library on film or fiche.

At this time no counterpart of the current periodicals system has been offered for monographs; that is, one in which microform copies are purchased by the library to replace the bound volumes, which can then be discarded in order to save space. A number of "package libraries" have been offered on microform, since University Microfilms began to distribute the Short Title Catalogue microfilm in 1937, as mentioned earlier. Typical projects have been "Russian Historical Sources," "Three Centuries of English and American Plays," and "British Sessional Papers" on Microprint, titles from Clark's *Travels in the Old South*, on Microcard, and "American Periodical Series," on microfilm. When a library subscribed to these, it was almost always to acquire texts of sources not generally available in original form; saving space by discarding bound volumes and substituting microform copies was not a motive in this acquisition. The market for these source collections was usually the research library. In the present year, several package libraries on microform are being offered to a different market—the new junior college library or college library which must quickly build a collection to support undergraduate study. What is needed in these libraries is a collection of 50,000 to 100,000 or more volumes on various subjects in the sciences, social sciences, and humanities. Only a small part of these needed books will be in print and readily available. Current titles must be backed up with a large collection of books considered standard sources in various fields. Such collections, selected by subject specialists or from standard bibliographies, are now being offered in microform. The collections range from several hundred to several thousand volumes on a related subject field such as American civilization, British history, Black studies, Shakespeare, etc. Two such projects are now being offered in a new microform that has not yet been tested outside the industrial field. The original, patented name of this microform is PCMI, for photochromic micro-image, a process developed by the National Cash
Microform Revolution

Register Company (NCR) about 1960. Essentially, the technique is to microfilm a text at the conventional ratio of 15x to 20x, then to reduce it further onto a grain-free coating that allows high resolution at linear reductions of 200:1, or area reductions of 40,000:1. The photochromic coating has certain properties different from those of conventional microfilm, which are not important for this paper but which make feasible the storage of a 300-page book on a single square inch of film. The National Cash Register Company is producing a series of PCMI Library Collections, with initial delivery date announced for fall, 1970. Each collection will consist of one hundred 4 by 6 inch transparencies containing the text of seven to ten books on closely related subjects. The National Cash Register Company has already developed a reading machine for PCMI fiches made at 150:1 reduction. It is in use at many Ford Motor Company service departments for consulting the Ford parts catalogs, which have been issued on PCMI fiches. The image projected on this reader is sharp and clear, although refocusing is frequently necessitated in moving from page to page. Loading the fiche and moving to the desired frame are easy and fast. The vertical position of the screen may lead to discomfort in long hours of reading. This reader is also capable of producing hard copy, although the writer has not seen an example. Library Resources, Inc., a division of Encyclopaedia Britannica Company, has also announced a series of Microbook Libraries on a similar microformat, which will be a 3 by 5 inch fiche containing a maximum 1,000 pages, but no more than a single title. These will be made at a variable reduction up to 90x, depending on the size of the original book. Library Resources does not yet have a reading machine in production, but promises a table reader and a smaller lap reader early in 1971, when the first shipments of Microbooks will be made to libraries. A reader-printer is promised later. The first Microbook will be the Library of American Civilization, consisting of over 12,000 fiches. It will contain the texts of books on politics and government, foreign affairs, military government, science and technology, and other aspects of American life. Later libraries offered by Library Resources will include the Library of European Civilization, the Library of English Literature, the Library of the History of Art, and the Library of the History of Philosophy. Most titles in the series of both firms will be out of print and very difficult to find in original form, although the National Cash Register Company says that about 10 percent of its PCMI titles are still under copyright.

New projects of this type are being announced more and more fre-
quently, some, like the Newberry project, being directed primarily at the large research library; others, like the two described above and NCR's *Books for College Libraries*, appealing more to the new junior college or college library. While it cannot be claimed that any of these are acquired primarily in order to conserve space, they have been described because they approach the "all microform" library, which has for some years been a predicted form of the future library. Probably the ancestor of this idea was a classical paper by Vannevar Bush, in which he proposed the ideal scholar's library, a "memex," as he called it. This would be the size of a desk; in it would be reels of microfilm on which were reproduced all of the papers and books of even potential interest to the scholar. Each document would be coded for its subjects. The user would merely tap out subjects of his immediate interest on a keyboard on top of the desk; this would cause each pertinent document to be displayed on a screen, and hard copy could be produced of any document at will. Furthermore, memex could record an associative trail among the documents, as the scholar threaded his way from one subject to a related one, so that any of these search trails could be called up in the future. Ralph Shaw, then librarian of the United States Department of Agriculture, developed a working model based on this idea; he called it the Rapid Selector, although it seems never to have been produced commercially.

These, however, were specialized collections and led to a number of information retrieval systems, based on microfilm storage, in industry and in government. Of the all-microform library in a more general sense, Verner Clapp, then President of the Council on Library Resources, Inc., explored the possibilities and obstacles in his 1963 Windsor lecture at the University of Illinois. By all-microform library in this general sense should be understood one in which most of the collection has been miniaturized, but reference books and other materials that need to be used frequently and quickly would remain in easier to use form. Several years before that, L. B. Heilprin, then a senior staff member of the Council on Library Resources, Inc., had gone considerably more deeply into the concept of a D-library, that is, a duplicating-library. This kind of library never circulates its books but duplicates them on demand. The library copy of the book remains in the store, where it is immediately available for the next request. The stored master copy may be a microfilm negative or another form which can be duplicated quickly and cheaply. The duplicate copy may be kept by the user and need not be returned to the library. This
Microform Revolution

concept has been a familiar one, of course, for about a decade in construction firms, architectural firms, map services, and similar very specialized uses, where the drawing, blueprint, or map is copied for the user and refilled for other requests. In the D-library there is no need for loan records, overdue notices, or fines. No books are mutilated, lost, at the bindery, or charged out. Heilprin faced but did not solve, the problem of copyright. If microfilm negatives are used as master copies, it is because they are easy to handle and make inexpensive, high quality copies. It must be admitted again that this proposed all-microform library is not strictly within the scope of this paper, since saving space is not its principal purpose. Compactness, however, is valued for reasons other than saving space. Most readers would prefer to use a microfilm of a 1915 newspaper than the heavy, dirty, crumbling bound volume. Also, in the all-microform library, manipulating, retrieving, copying, replacing, and inventorying are much easier with microfilm copies than with originals.

Do we have in Heilprin's D-library a model for the future library? Peter Scott, in a flight of fancy but one based on present technical capability, has given a vision of the information center in a university library of the near future. It is Vannevar Bush's memex multiplied many times to accommodate a number of users simultaneously. This is a search room, where the reader can retrieve and display by computer all documents pertinent to his needs, following associative trail patterns worked out over the years by some of the best thinkers of our time. In the adjacent reading room, to which the user had retired with the titles of the documents he needed, were the newest and best reading machines. These had screens adjustable for magnification, background color, and orientation of position, all of which help to eliminate reading fatigue. Loading of film in the machines was completely automatic. Even in this library, the user observes, about half the collection was still in book form, but with a rapidly increasing ratio of film to paper.

The kind of library envisioned by Scott is no more science fiction than the atom bomb or moon travel was when the writer used to read about such fantasies some forty years ago in Amazing Stories. We can perform now all of the operations and make all of the equipment required in Scott's dream library. There are, in fact, libraries making use of coded microfilm on rolls or micro-chips in specialized information retrieval systems. Further development both of coding systems and of equipment to extend these techniques to the general library
may require another twenty-five years, or about the length of time it took to adopt microfiche in this country following its widespread, successful use in Europe. But there is no real obstacle to this development, and there are apparently many advantages that are either not possible or very difficult with the book in its traditional form. Space saving will not be the principal motive in conversion to an all-microform library, but the value and uses of such a compact library will be evident.41

References

2. Ibid., pp. 70-82.
6. Ibid., p. 12.
7. Ibid., pp. 168-70.
8. Ibid., pp. 101-02.
17. Ibid., p. 296.
Microform Revolution


24. Ibid., pp. 283-310.

25. Ibid., p. 290.

26. Ibid., p. 287.


40. Bagg and Stevens, op. cit.

This Page Intentionally Left Blank