



The Present and Future of Government Documents in Microform

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ALL U.S. GOVERNMENT documents, with a few exceptions, are available in microform. This article is concerned with sources of such microforms, and elaboration on the particular forms used. Current trends in micropublication and future systems are also discussed.

The word microform is often misunderstood to mean a specific form of microimage. Properly used it refers to the entire family of techniques used in microreproduction which incorporates the microtransparencies and micro-opaques. These two major divisions of the microimage are further subdivided into (1) roll microfilm in various sizes, (2) the microfiche which is a sheet form of microtransparency, (3) the aperture card, which is an E.A.M. card with a rectangular hole holding a microfilm transparency, and (4) a variety of assorted strip microfilm systems. On the opaque side, there is the photographically produced cardboard sheet bearing microimages, which is well represented by the Microcard, and the printed form of micro-opaque known as Microprint and produced solely by the Readex Microprint Corporation which is so prominently involved in the publication of U.S. government documents.

It is quite proper to question the justification for publishing government documents in a form other than the traditional paper form. While the changeover from paper to film in industrial and business applications has made rapid progress, libraries, with some exceptions, have but limited holdings in microform, and most libraries have inadequate micro-reading facilities.

In 1963, Helen McReynolds discussed the advantages to be derived by librarians from publication of U.S. documents in microform, and

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she added the following criticism: "Problems have arisen as a result of rapid growth and technological changes in the field of microreproduction, and a lack of planning has resulted in the confused state of micro-reproduction. As it emerges from its embryonic stage, it will achieve its maximum potential through the cooperation of librarians, bibliographers, and microfacsimile producers and publishers."¹ The progress toward such cooperation will be examined later in this article.

The basic reasons for disseminating material in microform are (1) low cost of publication, (2) speed of preparation and distribution, (3) low shipping costs, (4) space saving on the part of the library, and (5) availability of on-demand copies either in micro or paper form, without requiring the publisher to maintain a substantial inventory.

All these factors constitute a benefit to the user of the library; but while the user is aware of any disadvantages in consulting material in microform, such as reader and reader-printer shortcomings, he is not immediately conscious of the fact that the economic advantages resulting from less expensive acquisition and maintenance cost for the microform give him the benefit of a more complete collection and speedier and more reliable access to information. The most important future benefit of the microimage will be the attribute of information in microform which will allow the reader to command many items on a push button basis without his leaving his desk. There is little doubt that the eventual, total acceptance of microforms by users and librarians will be directly attributable to greater convenience of the medium as compared to the paper form, rather than to the indirect economic benefits. A natural acceptance of microforms generally calls for the technical improvement of reading, duplicating and enlarging devices, but this is so clearly within the capabilities of available technology that it will not constitute an obstacle for any length of time.

The major reference work for items available in microform is the *Guide to Microforms in Print* which is published annually by Microcard Editions, Inc., under the editorship of Albert J. Diaz.² The *Guide* contains an estimated 12,000 items, and an item may be a single book or all back issues of a newspaper, or even the entire collection of technical reports by a government agency including tens or hundreds of thousands of individual titles. Over 400 entries in the *Guide* refer to U.S. government documents, although the actual production of the microform publications is, in most cases, in the hands of commercial service companies. Producers of microform editions of U.S. govern-

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ment documents include Readex Microprint Corporation, Microcard Editions, Inc., Micro Photo Division—Bell & Howell Co., University Microfilms, Inc. (Subsidiary of Xerox Corp.), Matthew Bender and Co., Inc., J. S. Canner & Co., Inc., Godfrey Memorial Library, and the Institute of Paper Chemistry.

The most important microform publishing project of U.S. government documents, with the exception of technical reports, is the complete publication of all documents listed in the *Monthly Catalog of United States Government Publications*. The publisher is the Readex Microprint Corporation, which is the only company in the world providing an offset printed micro-opaque. Readex divides the documents into depository and non-depository publications. The depository publications, that is those which are automatically distributed to specific depository libraries throughout the country, are available in Microprint form at a cost of \$3,000 per annum. The file is complete from the year 1956 on, but the serial and periodical publications listed in the February 1956 issue of the *Monthly Catalog*, which covers the period July to December 1955, are not included.

Since the Readex Microprint publications are arranged according to the entry numbers which the documents bear in the *Monthly Catalog*, the latter serves as a convenient index to the Microprint edition. The government permits depository libraries to discard the depository publications if a microform copy is retained but the Superintendent of Documents has to be informed of the change. The non-depository documents have been published since 1953 and consist of about 12,000 items annually.

All of the publications of the following agencies are included in the Readex non-depository collection with the exception of items which, for one reason or another, are not received by the Superintendent of Documents:

Air Force
Atomic Energy Commission
Customs Bureau
Economic Cooperation
Administration
Entomology and Quarantine
Bureau
Federal Power Commission
Federal Reserve System
Board of Governors

Fish and Wildlife Service
Forest Service
General Accounting Office
Interstate Commerce Commission
JPRS (Joint Publications Research
Service)
Library of Congress
Mines Bureau
National Aeronautics and Space
Administration

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| Naval Research Bureau | Wage, Hour and Public Contracts |
| Reclamation Bureau | Division |
| Rural Electrification Bureau | Weather Bureau |
| Smithsonian Institution | |

Beginning with 1959, the non-depository Readex edition includes agency releases which frequently contain valuable statistics. All of the releases are included for the following agencies:

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| Agricultural Research Service | Defense and Civilian |
| Agricultural Marketing Service | Mobilization Office |
| Business and Defense Services | Engineer Corps Army |
| Administration | Federal Reserve System |
| Business Economics Office | Board of Governors |
| Census Bureau | Foreign Agricultural Service |
| Commodity Credit Corporation | Geological Survey |
| Commodity Exchange Authority | Housing and Home Finance |
| Commodity Stabilization Service | Agency |
| Congress. House of | Mines Bureau |
| Representatives | Public Assistance Bureau |
| Congress. Senate | |

On a selective basis, the releases from the following agencies are included:

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| Civil Aeronautics Board | National Labor Relations Board |
| Federal Power Commission | National Science Foundation |
| Labor Department | Weather Bureau |
| Labor Statistics Bureau | |

The price of the non-depository publications for the years 1953 to 1957 is \$1,500 per year, for 1958 to 1963 \$1,800 per year, and for 1964 to 1966 \$2,500 per year.

For the benefit of libraries interested only in the publication of specific agencies, the publications of the following agencies are available individually:

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| Aeronautics Bureau (Navy 1958 and 1959) | Business and Defense Services |
| Agricultural Department | Administration |
| Air Force Department | Census Bureau |
| Army Department | Children's Bureau, Health, |
| Atomic Energy Commission | Education, and Welfare |
| | Department |

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| Civil Aeronautics Administration | Health, Education and Welfare Department |
| Civil Aeronautics Board | Hydrographic Office, Navy |
| Civil Service Commission | Interior Department |
| Coast and Geodetic Survey | Internal Revenue Service, |
| Coast Guard | Treasury Department |
| Commerce Department | International Business Operations Bureau |
| Congress, House and Senate Bills | International Programs Bureau, Commerce Department |
| Congressional Hearings and Committee Points | International Commerce Bureau, Commerce Department |
| The Congressional Record, Daily Edition | International Cooperation Administration, State Department |
| Copyright Office, Library of Congress, Catalogue of Copyright Entries | International Development Agency, State Department |
| Court of Claims | Interstate Commerce Commission |
| Court of Customs and Patent Appeals | Joint Publications Research Service, (JPRF) Reports |
| Defense Department | Justice Department |
| Education Office, Health, Education and Welfare | Labor Department |
| Engineer Corps, Defense Department | Labor Standards Bureau, Labor Department |
| Federal Aviation Agency | Labor Statistics Bureau, Labor Department |
| Federal Communications Commission | Library of Congress |
| Federal Register | Marine Corps |
| Federal Register Office, General Services Administration | Medicine and Surgery Bureau of the Navy Department |
| Federal Reserve System Board of Governors | Mines Bureau |
| Federal Supply Service, GSA | NASA |
| Federal Trade Commission | National Archives and Records Service, GSA |
| Fish and Wildlife Service, Interior Department | National Bureau of Standards |
| Foreign Commerce Bureau, Commerce Department | National Institutes of Health. |
| Forest Service, Agriculture Department | Health, Education and Welfare |
| General Accounting Office | National Labor Relations Board |
| Geological Survey, Interior Department | National Library of Medicine |
| | National Science Foundation |
| | National Oceanographic Office |

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| Naval Weapons Bureau | Smithsonian Institution |
| Navy Department | Soil Conservation Service, |
| Patent Office (Other than Patent Office, Official Gazette) | Agriculture Department |
| Patent Office, Official Gazette | State Department |
| Public Health Service, Health, Education and Welfare | Supreme Court |
| Securities and Exchange Commission | Tariff Commission |
| | Tax Court |
| | Treasury Department |
| | Weather Bureau |

In most instances publications by an entire department such as the Treasury or Navy Department are complete excluding, however, departmental subdivisions which are separately listed above.

A very important project also is Readex's *United States Congressional Serial Set* (15th to the 47th Congress) and the *American State Papers* (1789 to 1838). The Patent Office's *Official Gazette* is available from different commercial sources in three different microforms, viz., the micro-opaque form (Readex Microprint), 35 mm. roll film, and microfiche. *The Congressional Record* is available in Microprint and roll microfilm. Other Congressional documents available are the *Annals of Congress* (1st to 18th Congresses), *Congressional Globe* (23rd to 42nd Congresses), and *Debates in Congress* (18th to 25th Congresses).

In addition to commercial publishers of U.S. documents, the National Archives and the Library of Congress have filmed substantial amounts of material, normally in the form of 35 mm. roll microfilm. Many of these publications deal with foreign relations. The National Archives has filmed the *Federal Register* for the last thirty years, and the *Guide to Microforms in Print* lists numerous U.S. government documents relating to administrative and legal matters published by the courts.

Technical reports have been microrecorded by the government, or on behalf of the government, for many years. The increase in bulk and importance of this type of material over the years has led to substantial administrative and technical innovations which are discussed below. Technical reports are disseminated by the Clearinghouse for Federal Scientific and Technical Information (previously the Office of Technical Services) in the form of microfiche.

This writer has had a predilection for the microfiche as applied to certain types of information, notably technical reports, for many years, as indicated in an article in the January 1960 issue of *Library Trends*: "The microsheet [this was a vain attempt to prevent the establishment of the term microfiche] 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.”³

Several years later, NASA and the AEC took the lead in publishing their non-classified technical reports in the form of microfiche. Rather typically, the NASA fiche was 5 × 8 inches in size, while the AEC fiche was 3 × 5 inches in size; and the image orientation, reduction ratios, and the materials used, were all different in the two types of fiche. Eventually, with the participation of industry, the government requested and obtained a National Microfilm Association standard for microfiche which led to control of fiche size, reduction ratios, and spacing of the images within the fiche. While the National Microfilm Association specifications permit of several different image and fiche sizes, the government, for its own purposes, adopted a single format subsequently backed by COSATI * *Microfiche Specifications* which establishes a microfiche, 105 × 148 mm. in size, holding up to 60 pages on the first fiche, and a caption which may be read without magnification. A trailer (continuation) fiche can accommodate 72 pages.

The Federal Government then established the Clearinghouse for Federal Scientific and Technical Information, thus initiating a technical report publishing and dissemination program for the distribution of technical reports by NASA, AEC and the Defense Documentation Center. Tens of thousands of technical reports then began to be sent to depository libraries and other users of the information, in microfiche form only. The actual number of fiches thus distributed has run to many millions and will undoubtedly increase from year to year. Prior to the government's acceptance of the fiche, this microform had been used occasionally by title companies and insurance companies, but the lack of a standard hampered its development.

The fiche revolution, and it can be called that, constitutes a complete break with the traditional development of microfilm systems intended for libraries. Frequently, in the past, libraries have adopted microforms and related equipment essentially designed for business application. Moreover, many of these were intended primarily for security filming of records, based on a low grade systems approach not suited

* Committee on Scientific and Technical Information.

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to extensive and detailed study of the information, and often lacking in quality of image and in convenience of the reading device.

The microfiche sets a precedent in that library application on a large scale precedes extensive business application of this microform, and this establishes a better basis for the design of equipment and systems geared to the requirements of the scholar and scientist. What is more, the government's fiche publication program has focussed a spotlight on micropublishing and the library as a potential market, and this, in turn, will certainly also lead to a reexamination of available equipment for use of microforms other than the microfiche. The fact that a standard, however elementary it may be at this time, did accompany the large scale introduction of the fiche, has helped to avoid some of the confusion and design complexities which have plagued 35 mm. roll film systems in the library.

The introduction of the microfiche associated with an important collection of material correctly establishes micropublication and the fiche as worthwhile tools, but the almost dramatic effect of the technical reports project has perhaps resulted in some misconceptions about the relative merits of the different microforms. Without departing from an earlier prediction that the fiche will be the primary microform in the library, this writer would be the first to argue against this form as the sole means of micropublishing. The current COSATI fiche is obviously well suited to report-length material, and other microfiches (3 × 5 inches and tab size) covered by the National Microfilm Association standard will also be useful; but for many types of information, aperture cards, roll film and other forms will be preferable. Aperture cards lend themselves particularly well to information whose basic unit is a few pages in length, and roll film has the best automatic retrieval features. There is, after all, no reason why roll film systems must remain associated with inadequate systems theory and a lack of standards. To recapitulate, the fiche is finally coming into its own, but with it the library will also use roll film, aperture cards, strip systems and possibly micro-opaques. Probably there will be some new hybrid systems also which will encompass several forms.

For the purpose of large editions, unequalled economy appears to be inherent in the Microprint process, but the question arises whether the Microprint process will not have to be subjected to a few innovations, if it is to remain a prominent microform for government documents. Such innovations might include a change from the 6 × 9 inch sheet as the sole format, and the introduction of additional readers and reader-printers for this form. The photographically produced micro-

opaque, which does not have the particular advantage in economy which the Microprint process can offer, will probably decline in use gradually and yield to the fiche.

It would be an error to assume that superior planning has remedied some of the traditional problems associated with microfilm systems. The standardization of the government fiche has given rise to a number of inexpensive microfiche readers marketed by the Microcard Corporation, Dietzgen, Documentation Inc., Altantic Microfilm Corporation, Kodak, 3M, Audio Visual Research, and others, and some of these companies have also marketed somewhat more expensive and superior equipment. Other companies have devices which are designed for roll film but are capable of adaptation to the microfiche. At the time of writing, other companies, IBM among them, are about to market new microfiche readers and reader-printers. Most of the reading devices which have been marketed, while improved in some respects, are still not as good as they might be for comfortable reading. Some have deficient optical systems with consequent poor definition, other have deficient screens, or lack facilities for image rotation, yet others blind the user with direct rays from the lamp. To be fair, many of the readers are improvements over former machines, but they still do not permit the degree of physical comfort which better engineering could provide.

In reader-printers, that is to say reading devices which will permit economic print-out of occasional articles or single pages, the fiche is, if anything, in a worse position than roll film. Reader-printers are provided by 3M and Documat and, by means of adapters, by Kodak. The long-standing complaints pertaining to reader-printers have been that the paper copy is either inadequate in contrast and definition, that it requires the maintenance of staining or caustic chemical solutions, or that the print emerges from the reader-printer moist or exhibits bad curl. It would seem that after many years of electrostatic enlarging a satisfactory fiche reader-printer should have been produced, but no such device is now available. The Microcard Corporation and the Xerox Corporation have automatic microfiche enlargers intended to be used for large volume conversion of the fiche to hard copy. The Xerox Corporation's enlargement print is naturally a xerographic copy, while the Microcard Corporation's print-out is a dry silver print, an inexpensive process which involves heat development of a thin silver emulsion. The cost of these production printers is upward of \$18,000.

With such heavy emphasis on the "new" microfiche, what has happened to the traditional microforms?

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As previously mentioned, Readex Microprint continues to publish a great volume of government documents. Only one reader is now available for the 6 × 9 inch Microprint cards, and that is the Readex Company's Model D reader. It is an inexpensive reader and responds to library or individual requests for an economical device, but nothing is offered to the user desiring a better reader or a reader-printer. Although an experimental reader-printer for micro-opaques, based on xerographic principles, was once exhibited in prototype form, no such device has been marketed. While numerous government documents are as yet available in microcard form, the current trend to the fiche is reflected in the Microcard Corporation's increasing emphasis on the new form.

Approximately 300 government documents or groups of documents, listed in the *Guide to Microforms*, are offered on 35mm. microfilm.² Generally, these are shipped in the form of a positive film made from a negative camera master film. But 35 mm. roll film has not been subjected to the discipline of a standard with respect to image definition, reduction ratio, or image orientation. With available cameras and photographic materials, reduction ratios between 10 × and 17 × (and slightly greater for newspapers) have been a logical choice for the microfilming of most textual materials, and in recognition of the great variety of non-standard films likely to be received by a library, film readers have had to be flexible. The most reliable of them, the Kodak Model C reader, accommodated virtually any 35 mm. or 16 mm. roll film, and was sturdy enough to resist the onslaught of most users. The Model C was built almost too well and many old-timers are still used effectively in libraries. But the cost of this reader became increasingly uneconomic until the unit was finally withdrawn from the market.

The lack of regard for the library as a market is no more clearly illustrated than in the disappearance of several 35 mm. roll film readers useful in the library field. A close study of the National Microfilm Association's *Guide to Microreproduction Equipment* reveals that few 35 mm. roll film readers suited to libraries are now available, and cameras recently designed show a definite tendency to ignore all requirements of library film in favor of microfilm for engineering drawing storage or microrecording of business records.⁴ These equipment limitations will be overcome in the next five years or less, since manufacturers are beginning to recognize the increasing volume of microfilming of scientific, technical and scholarly information.

Production equipment for microfiches prepared according to the

COSATI or the National Microfilm Association specifications is problematic. Step-and-repeat cameras, the most suitable production medium, require an investment upward of \$25,000, while methods based on stripping up of roll film in preparation for a microfiche master tend to be expensive in labor. Better low volume microfiche step-and-repeat cameras are needed.

While the future will bring micropublication on a large enough scale so that libraries will readily command their own systems with all associated special equipment, the present state still compels libraries to depend on equipment designed for business records, and the latest trend in progressive business systems suggests serious consideration of increased use of 16 mm. roll film in the library. The use of 16 mm. film in place of 35 mm. film requires higher reduction ratios, and its use for scholarly purposes therefore demands better materials, better optics, superior quality control at the production level, and additional standards, but all this is well within our present technological resources. There have been some notable improvements recently in camera and duplicating films, and even better films are being field tested. Since the reduction ratios required for the standard fiche are the same as those required for 16 mm. roll film, the use of these two forms will facilitate conversion from one to the other, a discipline likely to be useful in the future.

U.S. government documents will almost certainly be published in the next few years in fiche form, as well as in 16 mm. roll film form. 35 mm. roll film will continue to be used for large or difficult documents or in applications where the images are accompanied by substantial amounts of indexing information in coded, photographic form. The storage of roll film in cartridges facilitates automatic threading of the reader and is so clear an advantage, currently associated only with 16 mm. roll systems, that we may expect all library roll film to be in this form within a short time. The failure to develop an automatic cartridge for 35 mm. roll film was surely an oversight on the part of manufacturers which will be remedied. A cartridge intended for the storage of engineering drawings on 35 mm. film was designed some years ago, but never reached the market.

One more word about standards. The primary responsibility for writing standards lies with the American Standards Association, which over the years has written many standards relating to the permanence and storage of microfilm. There is also an ASA standard entitled *Specifications for 16 mm. and 35 mm. Microfilm on Reels or in Strips*. But these standards have not led to uniform practices in recording on

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35 mm. microfilm intended for libraries. The writing of a standard under the auspices of the American Standards Association is necessarily a thorough and painstaking procedure which takes time. Consequently industry-sponsored committees are sometimes created to set up interim standards, and this was the case with the National Microfilm Association's standard for microfiche.

In order to obtain specifications for library microfilm, an ALA Library Standards for Microfilm Committee was created and has written a set of specifications entitled *Microfilm Norms*, which should help to bring some order into the chaotic state of 35 mm. roll microfilm in libraries.⁵ Any standard drawn up after many years of arbitrary practices is bound to arouse some controversy. The authors of *Microfilm Norms* carefully considered every aspect of image orientation, reduction ratios, and film quality, and wrote a standard based on the best prevailing practice, and on the desire to curb costly, arbitrary variations. A standard is of value only to the extent to which it is observed. It is very much in the interest of libraries to observe a microfilm standard, to reduce equipment costs, and to improve the legibility of the images. Librarians will have to insist on a standard if it is to be turned from a document into a useful tool.

Past articles on the subject of microforms often deplored a lack of planning, but in some thoughtful comments on this subject Paul Berry wrote, in 1961, that while planning was a fine thing, excessive structuring of a process could turn into a bureaucratic exercise which might hinder rather than help the development of good microsystems.⁶ His point was well taken, since we need both planning and free competition. It will be valuable to experiment freely with a variety of different microforms in different applications, and the last thing one would wish to do would be to limit prematurely the number of possible microforms, but within each microform it will be essential to adopt some standard to avoid confusion and incompatibility. The adoption of a single microform for all materials in the library is impractical and undesirable. The time is ripe, however, to give consideration, in standards and in systems design, to the possibility of greater compatibility of the various forms. This will facilitate conversion of images from one form to another and will help to create systems which will store the material in one form and duplicate it, for take-away copies in another form. The more attributes in tonality, definition, size, image spacing, etc. which the different microforms have in common, the greater the hope for a successful application of all of them. Berry is right in saying that too much planning can be restrictive. But too

little standardization of the basic components has in fact been the roadblock in library microform systems.

It is of some interest in this connection to read the National Bureau of Standards' Technical Note 268,⁷ which outlines a plan for micro-recording a considerable portion of the National Library of Medicine's assets on 35 mm. microfilm. The report is technically quite detailed and contains some valuable data. Whether one agrees with specific points in the report or not, it is clear that the proposed system, which is intended to preserve materials in immediate danger of deterioration and to set the basis for possible distribution of the information to other libraries, does not consider a standard for libraries important enough to alter its recommendations even slightly. If the Library of Medicine's 12 × reduction ratio is actually used the resultant films may not be compatible with future equipment designed for the ALA microfilm standard. While the NBS technical report justifies the Library's decision on the basis of the photographic materials discussed in the report, alternative materials might well meet the requirements of the NLM and still permit compliance with the pending standard. Obviously, if librarians are not willing to compromise their individual preferences to some extent, reader and reader-printer design will continue to remain complex and costly.

Compatibility of different microforms is desirable. So is systems design which considers more fully the use of the microrecorded information after publication. It is no longer adequate simply to publish material in microform, it is necessary also to foresee the system of information flow which results, and to provide all of the necessary hardware. If this article occasionally strays from the more limited question of government documents in microform, this is due to the interrelationship of micropublishing in this area with the future employment of microform systems generally. It is certain that mechanization in the form of digitally stored information, microrecorded information and the use of computers will revolutionize information handling within ten to fifteen years. The library can depart from an essentially passive role as a user and engage in valuable experimentation backed by organizations like the Council on Library Resources whose activities constitute a milestone in library development. Recently the Massachusetts Institute of Technology created PROJECT INTREX whose aim is experimentation for improved information-handling systems. INTREX experiments are intended to utilize only the technology likely to be practical by 1970. While INTREX is a small project compared to the overall size of the problem, it may well provide a spark

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for a general increase in research and experimentation in new library methods. It is likely that during the next few years the U.S. government too will accelerate its search for better information retrieval and storage systems and experiment with new methods in the dissemination of its own publications. It would be foolhardy to attempt to envision the ultimate in such systems which may include vast digitalized stores.

The immediate future appears to hold great promise for combinations of computer search and microform storage. For some years, libraries and publishers will continue to search for slight improvements in otherwise traditional microform systems. This will include the microfiche with improved, automatic fiche-selection devices, roll film systems possibly with larger rolls than the 100 ft. unit and associated with automatic search information in digital form. Cartridges will also facilitate high speed, efficient page selection, and there will be improved facilities for economic take-away copies in hard copy or microform. There are likely to be developments in automatic abstracting and extracting, utilizing film as an intermediate step. The systems of the next few years can be substantially improved simply on the basis of greater utilization of technologies recently perfected or currently in a state of near-perfection. This will result in improved cameras yielding microimages instantaneously, by means of high-speed silver processing, utilization of dry processed Kalvar and diazo images for direct camera recording, and electrostatic micro-methods such as Microxerography. Certainly there will be better reader-printers, as a necessary adjunct to microform consultation.

Additional recording techniques, which are now experimental, will be introduced and this may begin to include the family of thermoplastic films produced by General Electric and Xerox. There will be further improvements in quality and economy in electrostatic print-out methods, better interface between computer and microform storage at the input and output ends of the computer, better mechanical devices to facilitate the selection and duplication of single microimages, and without a doubt we will begin to realize some benefits from high-reduction micro-images with $100\times$ or greater reduction ratios. It is probable that many of these technologies will be tried in the dissemination of government documents and if the programs are prepared as they should be, they will include more adequate provision for the use of the disseminated information in the library by means of an allocation of funds to cover available and experimental reading, duplication and enlarging devices.

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