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LIBRARY FICHE:

AN INTRODUCTION AND EXPLANATION

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9 October 1967

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Information Springfield Va. 22151

SP-2922/000/01

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LIBRARY FICHE:  
AN INTRODUCTION AND EXPLANATION

by

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9 October 1967

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ABSTRACT

This paper describes the need for a new microfiche reduction ratio to provide more satisfactory microforms of books and periodicals for libraries of the future and urges its consideration and adoption by the microfilm industry. It discusses the concept of having one microfiche for each book, and its advantages in use in a distribution library, or in an automated library, using time-sharing techniques. The general characteristics of library fiche, the reduction ratios, the number of pages, and preparation requirements are given. The economic costs of original and duplicate library fiche are specified. The size and shape of the potential market is specified, and future growth of the market delineated.

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The emerging pattern of use of microfilm in dynamic information systems is becoming clearer. The impact on every level of human activity is also becoming clearer as more total system studies are made, and as new systems are announced.

The conclusions reached in just one system study in the area of libraries-- public, school, university, special--as to some of the requirements affecting the use of microforms, should be of considerable interest to the microfilm equipment manufacturers.

It is of interest because, if the manufacturers can satisfy the requirements, the user base for microfilm can be broadened to include every student, and every adult in the United States, and perhaps throughout the world. But, if the requirements are not satisfied, it may very well be that one or more of the alternative methods for solving library and retrieval problems will be adopted, and the use of microfilm will not be as widespread as it can be.

A study was performed by System Development Corporation for the National Advisory Commission on Libraries, under a contract with Duke University. "The basic objectives of that report is to provide the Commission--and, through it, other interested audiences--with an overview of present applications of technology to libraries, possible library systems of the future, and problems of effecting a transition between the present and the future."<sup>1</sup>

My participation involved, among other things, the evaluation of trends in microfilm and microforms, and the probable usage of microfilm as a storage medium for books, and other library documents over the next 5 years, 10 years, and 20 years. In trying to read the crystal ball and to see which microform would be most promising and most apt to be widely used in libraries over the next 20 years, it seemed reasonable to look back at current microforms, their uses, and their advantages, disadvantages, handling characteristics, and

<sup>1</sup>Technology in Libraries, TM-3602, SDC, 15 Aug. 1967, p. 9.

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relative costs. Microforms considered in this phase included aperture cards, roll film with and without cartridges, the COSATI and NMA microfiche, and the ultra reduction microfiche. One characteristic seemed to me to be the most significant common denominator as to why one microform is dominant over the other forms for particular application.

Aperture cards, for example, are the dominant medium for engineering drawings. I submit that the most significant reason for this is because of the one-to-one relationship between the aperture card and the engineering drawing.

Generally, there is one engineering drawing on an aperture card. And, there is one aperture card for each engineering drawing.

Consequently, storage and retrieval of any one unit...an engineering drawing... is simple and straightforward. Files are established on a common engineering drawing number series. Storage is by sequential number, retrieval is by sequential number, duplication of aperture cards is on a one-to-one relationship.

The ease and simplicity of the system is because of the one-to-one relationship, one source document to one microform.

Likewise, NASA reports, for example, are contained on one microfiche...generally 1 report, 1 microfiche. The result of the one-to-one relationship is a straightforward storage and retrieval system.

Now, if we look at roll film and the ultra-reduction microfiche, we find that these microforms tend to be used more for collections of items, rather than for individual documents...parts catalogs for example, or all checks received today, that sort of thing. This does not make them less usable or less desirable, except when a relationship of one microform per document is more efficient.

If the unit size of the cartridge film is 2,000 images, and we store books on the film in units of 300 images, we must pack more than 1 book on the film to be cost effective with the microform. But, we normally will retrieve all of 1 book and only 1 book at a time.

Indexing a recoverable unit...a single image on a cartridge, or on an ultrafiche usually requires an external index. This may be computer-generated, or manual. Likewise retrieval of a single book from a shelf of books, or microfilm of a book from sets of microfilm usually requires an external index, such as a library catalog.

But, the end item is usually not a single frame, or a single page, but a collection of pages...in other words, the entire book, the entire report, the entire magazine.

So, one of the elements that affects the use of microfilm in a library is the requirement for retrieval of an entire book.

There is another concept that enters into library microfiles. The traditional library uses a circulation system. When you find a book that you want, you borrow the book. You must return it within a set time period, usually 2 weeks. No one else can use that particular copy of that particular book until you do return it. Libraries, therefore, often stock 2, 3 or many copies of the same book.

There is a general feeling, and a very positive movement, to substitute a distribution library for the circulation library. In the distribution library, a requestor receives his own permanent, non-returnable copy of the book. This is feasible, provided that the distributed copy is not the only one the library has, that it is less costly, all things considered, than the handling of a book in a circulation system, and that the copy is as usable as a conventional

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circulating copy. Again, it is less expensive to duplicate an aperture card, than it is to duplicate a microfiche, than it is to duplicate a cartridge.

Let me bring up one more point on the use of a microfilm in the "library of the future". It seems clear, now, that the browsing and reading that is characteristic of library use today will continue with us for a very long time. However, the browsing would be accomplished through electronic methods, as opposed to the present manual searching methods. The library user will probably use a terminal device of some kind, on a time-shared basis, on-line with a computer, and remote from the central files of literature being accessed by the computer. Without going into this sort of system to any extent, I do wish to call attention to the probability that more than one user will want to access a particular book at the same time. A reader in the north wing and a reader in the south wing of the library both want to read the "NMA Proceedings", or "Gone with the Wind", or whatever.

If the time-shared system cannot effectively locate the desired book, and give access to that book to more than one user at a time, then some of the advantages of a centralized file is lost.

The smaller the unit of storage, the less probable is the likelihood that two people will want the same item. If you have a unit of storage of all books on paleontology, the number of requests against that file at any one time will be large. But, if you have as the unit of storage a single book, the probability of simultaneous requests is substantially reduced...not eliminated but reduced. And, equally as important, you have simplified the hardware and software requirements for processing these requests.

This leads back to the main thesis...a microcopy of an entire book is the most effective unit size for a library. However, none of the existing microforms I have seen provide a satisfactory storage size to meet these requirements.



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I am therefore, proposing that a new size, and, we are talking of reduction ratio here, that a new size of microfiche is required for distributing libraries, for computerized libraries, for the library of the future.

This library fiche, as I call it, would have a reduction ratio of 50 or 60 to 1. As you know, we use reduction ratios for fiche of 19 to 1, 24 to 1, 150 to 1, 200 to 1...but there is a large gap between the 24 to 1 and 150 to 1...and the 50 to 1 size would fill the gap nicely.

The library-size fiche would have the following characteristics:

1. A 50X fiche would have about 390 pages, arranged in 13 rows of 30 pages each.
2. A 60X fiche would have about 475 pages, arranged in 15 rows of 35 images each.
3. The title block would contain appropriate normal-reading indexing material, such as either a Dewey Decimal or Library of Congress classification code, the title, the author, the publisher, the number of pages, the number of fiche, an accession number, if required, royalty or reproduction costs, and so on.
4. The master fiche could be prepared in a single-stage operation...direct filming of the original page to its image on the film. No intermediate master would be required, as is now the case with the ultrafiche. I understand that at least one manufacturer is experimenting with a single-step reduction at 45X.
5. Present fiche duplicating equipment should be usable to duplicate the library fiche. This would be particularly advantageous for those now having fiche duplication equipment.

6. Readers should be available at under \$200 each, and preferably, under \$100, and with good quality viewing...incidentally, there's a need for better reader design to lessen resistance to microfiche.
7. Blow-back printing equipment should be developed to provide for good, usable copy, and at competitive prices...say under 4 cents per print, the printer (or reader-printer) should not cost more than \$900.

How would the library fiche size fit the library needs? Some off-the-cuff figures, and while these have not been authenticated, they do come from reliable sources, indicate the following:

1. The average book-non-fiction is about 300-400 pages, and the average novel is 400 pages...not including Valley of the Dolls, of course. This means most of the books will fit on a single fiche.
2. Periodicals and technical manuals average about 70 pages. The conventional COSATI or NMA fiche may be satisfactory, but, it seems to me that library fiche is more desirable for a mixed collection of periodicals and books than the present fiche. For one thing, because of the high degree of automation in both storage and retrieval, because of the emphasis on browsing capabilities, and so on, the problem of handling the two different reduction ratios may cost more than the cost of using the higher-capacity library fiche at less than 100% of its efficiency. Again, for a distributing library instead of a circulating library, at least two blowback ratios would be required in the readers and reader-printers if the COSATI-NMA fiche and the library fiche are intermixed.

Let's assume that I've convinced you that the 50 or 60X microfiche is a desirable size. What are the relative costs of involved? How much does it cost for master library fiche? For a duplicate fiche? For a reader or reader-printer?

Obviously, we are venturing into the unknown. If we assume that a 60-image fiche costs, say \$1.80 to \$2.10, we have an average cost per image of 3 to 3-1/3 cents. If we assume 400 images on the library fiche, at 3 to 3-1/3 cents, we find a cost of from \$12 - \$14 per fiche. This is a reasonable cost for the first year or so. But, costs could be reduced, because of use of graphical display equipment as the source image, because of increased volume, competition, and so on, such that, eventually, costs could be on the order of \$7 to \$8 per fiche.

Costs of readers and reader-printers should be competitive with existing microfiche equipment costs, if for no other reason than that present equipment costs are trending downward.

So, we find library fiche costs at \$8 - \$12 per original, duplicate fiche at 15 cents. Right now, the average text book costs about \$10.00...and circulation costs range from an estimated 10 cents for public library, which is low, to an estimated high of \$1.50 for a special library.

It would seem from this casual examination that library microfiche are well within a competitive range with existing book and library processing costs, and may well prove to be cost effective even for public libraries.

These assumptions do not consider whether microfiche would be satisfactory from the user's viewpoint. While reader design is really a side issue, it seems worthy of some comments here. Frankly, I doubt very much if present readers are sufficiently effective to permit use of microfiche in place of conventional books. There is not now any reader that I know of, at least, that will permit shifting position while reading...as a teenager does, for example. If you cannot read sitting up, lying down, sideways, swiveling back and forth, or maybe, even, upside down, the changes are good that given the choice, conventional hard copy will be chosen.

Again, most readers, and there are exceptions, are very similar to television sets...you stare at a black box, Microfilm readers have the added disadvantage of requiring you to sit fairly close to them because of the type size, with consequent problems in prolonged use of the reader. It seems feasible to design some brand new kind of reader, say an over-the-shoulder projector, which would permit changing your position more than current readers. While I recognize why manufacturers have not made radical changes in reader design, as yet, I do not believe the full market potential can be realized until there is a better reader design.

The market potential for library microfiche in a closed system, that is, a circulating system, is very large. Library collections currently total 215 million books or more, based on the following table:

<u>Type of Library</u>	<u>Estimated No. (in thousands)</u>	<u>Book Holdings (in thousands)</u>
Special	7-10	3-5
College & Universities	5-7	7-5
High School	5-6	1-2
Public Libraries	5-6	30-40

Collections are expected to expand at an annualized rate of better than 10% over the next 10-20 years. Some segments of the market, such as college and university libraries are expected to double in the next 5 years. There should be about a 10% increase in numbers of libraries and, conservatively, the same increase in holdings.

When we consider potential users, and appropriate reading equipment, the figures are equally as impressive. By 1970, we can assume 125 million adults, and 59 million school-age children within the United States alone. There might well be a reader per household...60 million households, or a reader for each 2 people...70 million readers...just for home use. And, if we put a reader in every car...well, that's more than we can build, almost.

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As a microfilm user, and analyst, I can only tell you my impressions and thoughts regarding the concept and potential value of library fiche. It is up to the individual firm within the microfilm industry to determine its own responses to these ideas.

It becomes now the responsibility of NMA members, and other interested parties to evaluate this proposal for library fiche, to determine the technical complexities, and potential solutions, in the preparation and use of library fiche.

It becomes the individual manufacturer's responsibility whether to invest time, money, and resources, into development of library fiche or to pass up the market potential of widespread library use of microfiche.

It wouldn't surprise me at all to find out that you already have library fiche in your labs, and behind closed doors. I hope this discussion will encourage you to bring library fiche out of the labs, to open those closed doors, so that we may all benefit from library fiche.

The alternative solutions proposed in the SDC Library study are attractive, are technologically feasible, and may be only slightly more costly per installation than library fiche.

The feasibility of use of library fiche in home and office environments, as well as the library environment provides some positive values that may make library fiche the preferred choice and preferred system.

That decision is yours.

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) System Development Corporation Santa Monica, California		2a. REPORT SECURITY CLASSIFICATION Unclassified	
		2b. GROUP	
3. REPORT TITLE Library Fiche: An Introduction and Explanation			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates)			
5. AUTHOR(S) (First name, middle initial, last name) Arthur Teplitz			
6. REPORT DATE 9 October 1967		7a. TOTAL NO. OF PAGES 12	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO.		9a. ORIGINATOR'S REPORT NUMBER(S) SP-2922/000/01	
b. PROJECT NO.		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
c.			
d.			
10. DISTRIBUTION STATEMENT Distribution of this document is unlimited			
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY	
13. ABSTRACT This paper describes the need for a new microfiche reduction ratio to provide more satisfactory microforms of books and periodicals for libraries of the future and urges its consideration and adoption by the microfilm industry. It discusses the concept of having one microfiche for each book, and its advantages in use in a distribution library, or in an automated library, using time-sharing techniques. The general characteristics of library fiche, the reduction ratios, the number of pages, and preparation requirements are given. The economic costs of original and duplicate library fiche are specified. The size and shape of the potential market is specified, and future growth of the market delineated.			

DD FORM 1473  
1 NOV 66

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Library fiche Microfilm Microfiche Microforms Books Periodicals						

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Security Classification