
The Preservation of Knowledge

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ABSTRACT

IN LIGHT OF RAPID TECHNOLOGICAL advances in the creation, storage, and dissemination of information, preservation managers must reevaluate the broad principles which have guided the field. These principles have tended to be oriented toward the treatment of individual items, yet the field has shifted more toward such large-scale measures as reformatting and mass deacidification. With electronic formats of books on the increase, there is further impetus to reexamine preservation principles especially when one considers present electronic forms of communication.

INTRODUCTION

Midway life's journey I was made aware
That I had strayed into a dark forest,
And the right path appeared not anywhere
(Alighieri, 1983, p. 3)

Those midway through careers in preservation now find themselves in a forest that, if not dark, is dusky. As information is stored increasingly in electronic formats, as the very concept of the form and substance of the book is changing, it is time to reexamine the principles of preservation under which we were trained and under which we are still guided in decision making. These principles need to be compared to recent technological advances in the formation and storing of texts so that points of convergence or divergence can

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be evaluated. Only then can we either follow a new path or continue down the current one.

One can argue that preservation dates back to the origin of written records. In ancient times, one form of preservation consisted primarily of protecting items from all kinds of human and natural enemies by placing them in earthenware vessels and other types of containers. Once libraries were established, the three broad areas of librarianship were acquisitions, the organization of texts (for access), and guardianship, which implies preservation of the collection (the circulation of library collections is a relatively recent development in library history). Yet, although preservation has always been one of the primary aspects of librarianship, it has only become a recognized specialty within the library profession in recent times. In other words, storage, safekeeping, and repair of library collections have always been integral parts of librarianship, but these activities were not formally designated as preservation.

As the preservation of library materials became a specialization within librarianship, certain principles evolved which grew out of the guardianship mandate of librarianship, the discipline of bibliography, and the art conservation field.¹ The guardianship aspect of librarianship is the assumption that, generally speaking, once libraries acquire books, they are kept permanently. The second assumption is that the books will be stored in buildings that are structurally sound and secure; these buildings are usually owned, rented, or leased by the library or the organization to which the library belongs. Therefore, the books are usually "owned" by the library. This is an important concept to keep in mind, for in today's electronic environment, the ownership of texts by libraries can no longer be assumed or expected (the general historical concern for suitable library structures has been well described by Swartzburg and Bussey [1991] and the late nineteenth- and early twentieth-century debates have been documented by Higginbotham [1990]).

Regardless of how one defines bibliography, it goes back centuries. For the purposes of this discussion, it is adequate simply to state that the existence of rare book departments in libraries demonstrates that the value of particular books has been recognized for a long time. These books have been valued for such attributes as their artifactual, historical, or associational significance. Therefore, there is a long tradition of appreciating books as artifacts where the underlying assumption is that each book requires special care and handling.

The influence of art conservation dates from the twentieth century. It lies in the artifactual one-by-one approach to treating items and in the principle that, whenever possible, treatments should

be reversible.² This influence can be seen in the curriculum of the book conservation program which was offered at Columbia University from 1981 to 1992. The curriculum was partially based on the art conservation programs at the University of Delaware, New York University, and Cooperstown (now Buffalo State College). Everyone who took those courses at Columbia was exposed to the artifactual approach.

From these sources the following broad preservation principles have evolved:

- When materials are treated, the treatments should, when possible, be reversible.³
- Whenever possible or appropriate, the originals should be preserved. Only materials that are untreatable should be reformatted.
- Library materials should be preserved for as long as possible.

These principles have come increasingly into conflict with the enormity of the library preservation problem—i.e., millions of deteriorating books. The sheer size of the problem, as well as the high cost, has diverted us from the artifactual approach toward such measures as preservation microfilming and mass deacidification. These approaches have meant that many more texts could be preserved. However, the effects of deacidification are not necessarily reversible, and, in the case of microfilming programs, some institutions discard the books once they have been filmed. So, two of the three principles have already diminished in importance. The third is open to interpretation: should the objects be preserved for as long as possible, or should we preserve only the texts?

THE PRESERVATION PROBLEM

The use of mass deacidification and microfilming assumes that the items to be treated are paper based to begin with. The forest in which we now find ourselves is replete with new media such as audio- and videotapes or computer and optical disks, all of which are constantly changing form. In some instances—for example, e-mail—the electronic format is the first and only format unless the information is printed out. The trend is a shift from information in permanent formats to information conveyed in formats so transitory that it can disappear at the touch of a command key.

Kurzweil (1992a, 1992b, 1992c) presents a world in which the “book” is a personal computer, telephone, television, and cybernetic research assistant all in one. Though he says that the electronic book “falls short in some of the fundamental characteristics of paper and

ink in the areas of flicker, contrast, resolution, and color..., computer technology is anything but static, and already some of these limitations are being overcome" (Kurzweil, 1992b, p. 141).

More immediate than the Kurzweil "powerbooks" are the electronic formats already available in libraries—e.g., digital media such as CD-ROMs. These media have become an integral part of library collections and yet they are deteriorating at a rate that is much quicker than originally thought (DeWhitt, 1987a; "Special Report: ALA Back to Basics," 1990; Stielow, 1991; Zachary, 1991). However, Lesk (1992) reminds us that perhaps of more import than deterioration is the fact that from now on data will have to be frequently "refreshed" (reformatted) because of technological obsolescence—e.g., the equipment used to convey information will be obsolete or cease to be manufactured as vendors go bankrupt or as data are moved to more sophisticated storage media. "On the good side, the intervention of machinery between the actual object and the reader means that the users are unlikely to become emotionally attached to the particular physical media, and thus reformatting of advanced technology should not produce the objections that accompany reformatting of books" (Lesk, 1992, p. 3).

In an ideal world, where time, manpower, and money exist in equal shares, such regular reformatting could be expected. In the meantime, a lot of valuable information is disappearing, particularly in government archives. Sniffen (1991) has described information such as census data, which has been lost because it is stored only on old computer tape from discarded systems (p. 46). Anderson (1985) describes administrative records from the 1980s "created in machine-readable form and...stored on media which at best had only a few years of reliable life and at worst were subject to regular overwritings in the interests of economy of data storage" (p. 79).

How do our preservation principles hold up to these situations? We can evaluate the principles in the context of the life cycle of information which consists of three stages: creation, life (or use), and disposal (reformatting, replacement, or disposal with no form of replacement). Preservation administrators are concerned with all of these stages.

THE LIFE CYCLE OF INFORMATION

The deterioration of an item begins during creation. For books, deterioration is caused by many things, among which are poor methods of manufacture such as adding alum-rosin sizing to paper pulp, the use of sulphuric acids to accelerate the leather tanning process, and so on. In recent years, the preservation community has lobbied paper manufacturers to produce permanent/durable papers

and the publishing industry to use such papers and to designate that use with an infinity sign on the verso of title pages. Nevertheless, even though some manufacturers can guarantee 250 years of life for their papers, all organic materials will disintegrate eventually, so there is ultimately a limit to what can be done.⁴

The useful life of library materials can be extended not only through proper methods of manufacture but also by improving conditions of storage and use. Controlling the environment of buildings, proper shelving, and careful handling of materials will make them last longer. Preservation administrators have made great strides in extending the use of library materials and in educating manufacturers, librarians, and users.

Finally, disposal may take place when individual items deteriorate beyond the possibility or practicality of repair. Replacement with a like item such as a reprint or by reformatting are all solutions (this stage usually requires collaborative decision making with other librarians as well as with the vendors who can provide the necessary services).

How does the life cycle differ with new media? At the media creation point, the preservation community has less knowledge and expertise about the development and manufacture of new formats than it does about more familiar formats such as paper. Also, physical durability of new media is not the ultimate problem but rather obsolescence (Lesk, 1992, p. 2). Therefore, preservation administrators will have to plan for an ongoing process of media conversion beginning at the point of acquisition (Cloonan, 1991; Lesk, 1992).

The life of media is another consideration. Storage conditions can be controlled for some new media, but not all electronic information is replicable and, therefore, it is not necessarily in a physical form which can be stored or saved. Librarians will need to decide what will be stored, how and when it will be stored, and by whom—the library, the creator, the end-user, or the publisher (the issue of how information could be stored and transmitted is examined by Fiddes and Winterbottom, 1991).

Reformatting will also be an integral part of this stage. Four areas of concern in media conversion are: (1) fragility (the inherent strength or inherent weakness of each medium), (2) rapidity of obsolescence of the operating apparatus of each medium, (3) the ease of altering documents (the ability to manipulate, change, or reformat data easily), and (4) proprietary rights and preservation (who owns the information, and who will take responsibility for its preservation—an area potentially far more complex than copyright issues) (Cloonan, 1991, p. 3).

Disposal of media is a third concern. Content or format—which will we preserve? To a certain extent, these decisions will be market driven. No matter how much people resist, they will eventually give up their LP collections in favor of the predominant CDs, which they will then collect only as long as CDs are manufactured. So, ultimately, we have no control over formats and will have to focus on the content. Yet we must also realize that, in changing formats, something of the original is lost. The CD version of the Beethoven piano sonatas performed by Artur Schnabel may sound cleaner and crisper than the original LPs, but some of the original atmosphere is gone.

Given these new scenarios, let us examine the principles of longevity and the importance of the artifact. There is no doubt, given the current technological environment of the late twentieth century, that the notions of both are changing radically. New technologies last a shorter and shorter time than do the older ones—papyrus, paper, vellum, vinyl records, etc. So much for the artifact; under these circumstances, preservation administrators will have to be more concerned with the longevity of the information.

However, even as some new materials are being created only in electronic formats, what about the hundreds of millions of books currently housed in libraries? Most books will not disappear within our lifetimes. Preservation managers will need to continue to use established methods for the maintenance of these materials.

Yet the emergence of electronic information will result in a fundamentally different way of approaching the preservation field which has been object based (books, broadsides, maps, etc.) and time oriented (e.g., permanent/durable paper should last for at least 250 years). Thus the notion of saving object X for Y years may become obsolete. We will need to secure the longevity of information so that the information itself does not disappear. And it must be done in concert with librarians, publishers, manufacturers, and anyone else involved in the handling of the information. Malinconico (1992) makes an articulate plea for library educators to teach students how to cooperate with the whole community of individuals who are involved with the dissemination of information—computer and telecommunications specialists, vendors, community service agencies, and educational organizations—so that there is an understanding of the problems from all perspectives (pp. 233-34).

Lesk (1992, p. 16) also calls for cooperation but cites as his reason the technical aspects of the digital world. But such cooperation is already an integral part of the preservation field: deacidification, standards for microfilming, and other developments required collaboration among preservation managers, conservators, scientists,

and corporations. The only difference in the digital world is that we may need to look more toward industry in our collaborative efforts.

CURRENT INITIATIVES OR PATHS OUT OF THE FOREST

There are a number of interesting initiatives currently underway that suggest more than one path to be taken. Some projects are sponsored by the Commission on Preservation and Access and the British Library. A description of these will give the reader some idea of the directions in which librarians, researchers, and corporations are headed.

The Commission on Preservation and Access, since its formation in 1986 as the Committee on Preservation and Access of the Council on Library Resources (Byrne & Van Deventer, 1992, p. 313), has been charged with creating a structure to set the conditions for a national preservation program. In 1988, it became an independent nonprofit organization. Since then, it has sponsored research, organized task forces and symposia, and published numerous technical reports.

It has succeeded in accomplishing so much because it is an independent organization funded by universities, foundations, and granting organizations. It is an example of a network, a way of organizing activities that, according to Naisbitt (1982, pp. 192-94), is largely replacing the old hierarchies. In the case of preservation, it has, in a sense, replaced such hierarchies as the National Preservation Office at the Library of Congress. The National Preservation Office was dependent on staffing and support from the Library of Congress which, in recent years, has had fewer resources. Without the burden of a large hierarchy, the commission has had the freedom to pursue a number of initiatives. Patricia Battin, president of the commission, has often said in public speeches that the commission will last only as long as it takes to fulfill its mandate. No matter how long the commission lasts, its method of organizing a variety of activities through networks may well turn out to be a model that will be followed for some time to come.

Perhaps the most striking example of the commission's networking has been through the work of Hans Rütimann (1992), international project consultant to the commission. Through Rütimann's extensive travels, he has reported on a variety of preservation initiatives, including the Archivo General de Indias in Seville, Spain, which is seeking to make accessible the contents of 45 million documents and 7,000 maps and blueprints which chronicle Spain's 400 years of influence in the Americas. The project comprises three parts: (1) the creation of an image database, (2) a bibliographic database, and (3) implementation of an archive management system. The technical work is being carried out by IBM Spain at its Scientific

Center north of Madrid, and the cataloging and scanning are being done at the archive (Rütimann & Lynn, 1992, p. 1). Rütimann (1992) has also reported on the possibilities for cooperation with preservation initiatives in China.

The Technology Assessment Advisory Committee of the commission has conducted and authored several pieces of research (Brown, 1991; Lynn et al., 1990; Waters, 1991). One of the members of the committee, M. Stuart Lynn, vice president of information technologies at Cornell University, is also involved in a collaborative effort between Cornell and Xerox (with the support of the commission) to test a prototype system for recording the text of deteriorating books as digital images. High-quality and archivally sound paper facsimiles can be produced from the digital images on demand. The project is described in detail by Kenney and Personius (1991).

At Yale, a study is being conducted (under contract to the commission) to determine the means, costs, and benefits of converting library materials on microfilm to digital images. The idea for this study was based in part on Lesk's 1990 report to the commission which affirmed the current use of microfilm as a preservation medium but suggested that, in the future, digital imaging technologies would be realistic only after the costs become lower (Lesk, 1990).

Meanwhile, the British Library Research and Development Department is sponsoring its own research into the electronic storage and transmission of texts.⁵ One of these projects was to examine the feasibility of acquiring data for storage in an electronic archive directly from the printer after it was typeset into electronic form. The text could be acquired in ASCII code, which is compact. In this manner, the British Library could maintain an accessible record of the intellectual content of published works. The user would have access to the information online. In order to determine the feasibility of such a plan, two researchers undertook a survey of printers to ascertain current technology and practices in Britain. The study concluded that it should be possible to convert much of the text held into an electronic form (Fiddes & Winterbottom, 1991, pp. 1-2).

The purpose of the projects described here is to capture the information, store it centrally, and then make it available to users on demand. The emphasis is on the information itself rather than on the artifact, and, in the case of both the Yale and British Library projects, they will be carried out at some future date.

There is still another path to be taken, one in which the new formats are treated as objects, much as we have treated books, archives, maps, and so on. Some of the preservation literature describes storage, handling, and use of various formats; this literature is becoming more

voluminous every day. To cite a recent example, St-Laurent (1991) has written *The Care and Handling of Recorded Sound Materials* which discusses the physical characteristics of these formats, how they deteriorate, and how best to minimize their deterioration. As libraries acquire more of these new formats, they will depend increasingly on such literature.

OUT OF THE FOREST TO WHERE?

After spending considerable time in preservation, where will we find ourselves? Which principles will be practiced? Will books be treated much as museum objects are today, as rare items because so few are being manufactured? Will reversibility become a dead issue because we will no longer expect books to last for hundreds of years? Will our very concept of permanence change in the next generation as consumer goods become disposable at an even faster rate than today's average paperback book? The answer to most of these questions is likely to be "yes." Concepts will change as the work environment changes and as the materials change. But the commitment to preserving information for future generations will certainly remain.

THE LAW OF THE SITUATION

Naisbitt (1982, pp. 85-86) directly and Kurzweil (1992c, p. 63), indirectly refer to the Law of the Situation which asks "what business are you really in?" The law was formulated in 1904 by Mary Parker Follett (1942), the first management consultant in the United States (pp. 58-59). The question is usually asked when the business environment changes and a company or industry must reconceptualize its mission, though Follett saw it as being applicable to all organizations. Naisbitt uses the railroads as an example of an industry that did not understand the Law of the Situation. Instead of seeing themselves in the transportation business, they saw themselves only as railroads and almost became obsolete.

Kurzweil uses the blacksmith at the turn of the century as a metaphor for the position that libraries and other public institutions are in today. The blacksmith, who saw himself as a facilitator of transportation, traded in his forge for a gas pump. Kurzweil (1992c) contends that if libraries see their mission broadly as gathering information and making it universally available (not confined by library buildings or adversely influenced by current perceptions of librarianship), then they will become even more important in time (p. 63).

Applying the Law of the Situation to the field of preservation, we must consider the primary underpinnings of what we do. Are we ultimately concerned with the preservation of individual items or with the preservation of knowledge? If the former, then the field

will merely respond to changes brought about by each new technology. If the latter, then we must help to shape the sources that will create and distribute information. Both items and knowledge must be preserved. We must continue to save as much information as possible, regardless of the format or the means by which it is stored and disseminated.

NOTES

¹ For the past decade, librarians have used the term *preservation* to denote the aggregate care of collections, and *conservation* to refer to the treatment of individual items. In art, the term *conservation* denotes both.

² The principles of longevity and reversibility are part of the *Code of Ethics and Standards of Practice* which deal specifically with conservation treatment issues. Written by The American Institute for Conservation of Historic & Artistic Works (AIC) and currently under revision, the code applies to books, paintings, objects, and so on (American Institute for Conservation of Historic & Artistic Works). AIC principles have influenced not only book conservators but preservation administrators as well.

³ Actually, many conservators have argued that no treatment is truly reversible. So, reversibility means that, inasmuch as possible, conservators will use the least intrusive treatments available. For example, thirty years ago, lamination was a common method of strengthening documents. Today conservators are more likely to encapsulate an item.

⁴ For a cogent discussion of recent scientific findings about the behavior of different types of paper, see Sparks (1991).

⁵ Knowledge of these projects is based, in part, on this author's discussion with Terry Cannon at the Research and Development Department of the British Library on July 29, 1992.

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