



PRESERVATION OF RESEARCH LIBRARY MATERIALS COMMITTEE
ASSOCIATION OF RESEARCH LIBRARIES

LIBRARY PRINT PRESERVATION
AN ADMINISTRATIVE BRIEFING

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Library Print Preservation: An Administrative Briefing

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CONTENTS

Introduction	3
Setting Goals and Priorities	5
Cost	6
Preservation Treatments	
Environmental Management	9
Security	11
Controlled Storage	13
Commercial Library Binding	15
Routine Item Repair And Item Enclosure	17
Preservation Microfilming	19
Preservation Photocopying	21
Digitization	23
Deacidification	25
Selected Further Reading	27

INTRODUCTION

This publication responds to a need articulated by ARL library directors for a brief non-technical survey of preservation, preservation methods—their appropriate uses, advantages, and disadvantages—and preservation costs. It is intended to provide an overview and to help ARL library administrators in their local planning for preservation and in their communication with the preservation specialists who make up an increasing larger proportion of ARL library staffs. A list of readings and links to various Web sites provide resources for further study.

The focus of this document is chiefly on the preservation of paper resources, such as books, journals, newspapers, maps, archives, and photographs, as paper still constitutes the major area of preservation activity and expenditure in ARL libraries. While other formats are also collected by libraries, little has been done thus far to address their preservation needs. However, the preservation of digital and AV formats are the subject of significant current research and discussion and will be addressed when community standards have been established.

This document reviews the major preservation treatment options for print resources that ARL libraries engage in, either in-house or through contract services. These include preventive strategies such as security, controlled storage, environmental management, and commercial binding. Additional programmatic strategies may include de-acidification, conservation, reformatting (microfilming, photocopying, and digital imaging), item repair, and item enclosure.

The following general points should be made:

Preservation has a worthy mission. It is assumed that readers of this publication will agree that the aim of preservation—to assure that the historical and cultural record is maintained for both present and future generations—is crucially important and worth supporting.

Preservation is a significant investment. ARL libraries are currently spending more than \$92 million on preservation annually. In the ARL compilation of preservation statistics (2000-2001), 113 member libraries reported spending \$51.7 million dollars on preservation personnel alone. The median staff commitment to preservation was 11 FTE, at a median total staff cost approaching \$300,000 per library. Over \$39 million was spent on contract services, supplies, and equipment to carry out the preservation mission. While these impressive figures demonstrate institutional commitment to preservation, the financial outlay for support of preservation programs is offset by recognition of the capital value of irreplaceable library collections. The expenditures reported to ARL reflect an integrated strategy of fiscally responsible long-term management of cultural collections safeguarded by preservation efforts. Anne Kenney

and Deirdre Stam, reporting on the results of a recent survey published by the Council on Library and Information Resources (CLIR), note that as a percentage of the library's total budget, preservation expenditures often total less than 3 percent.

Preservation offers funding opportunities. As grants, annual giving campaigns, and endowment management become increasingly important to support the work of ARL libraries, preservation is proving to be an area of interest for funding sources and donors. Major grant funding programs, including NEH, IMLS, Save America's Treasures, and Mellon are awarding large grants for preservation projects. NEH funds the full range of preservation strategies from environmental controls to microfilming to conservation treatments. Some funding agencies encourage and support new collaborative approaches in which preservation departments, for example, partner with museums on digitization projects to insure long-term access to information. A number of ARL libraries have established endowment funds specifically to support preservation, and donors have responded generously. Educating development staff to the diverse, interesting, and special projects handled by preservation can help them pique a donor's interest in supporting the library.

Preservation encompasses both macro- and micro-strategies. Though the day-to-day focus in preservation discourse is often on higher cost treatments of individual items (remedial micro-strategies), there are preventive macro-strategies, such as well-managed storage and environmental controls that are, on a per-item basis, affordable by every ARL library.

Preservation is complex. While this publication seeks to simplify the subject for the nonspecialist, the front-line reality is that an effective preservation program is the product of many hands and extensive in-depth technical knowledge. To achieve its mission of preserving the significant records of our civilization, an effective program embraces activities from the initial selection to the appropriate housing of materials. Preservation librarians must be concerned with everything from the chemical properties of what they handle to building security and emergency preparedness. Preservation of library collections involves overarching principles for library management and can only be carried out effectively in collaboration with library administration and staff. For example, collection assessments or surveys carried out by preservation staff in collaboration with staff from public and technical services and collection management are used to identify volumes and collections in need of repair, commercial binding, deacidification, conservation or other treatments; physical plant staff involvement is invaluable for creating effective disaster preparedness, response and recovery plans and for ensuring stable environmental conditions; and partnership with collection managers and preservation librarians is needed to set policy, assess and evaluate vendors, and plan for moving collections.

Preservation requires intensive planning. Effective preservation programs are the result of setting goals and priorities, making policy, assuring fiscal support, and implementing plans through the hiring of staff and the acquisition of suitable supplies

and equipment. Some preservation treatments can be accomplished inside the library; others are more effectively handed over to contract services. At its most effective, preservation is fully integrated into the planning, strategy, and implementation of library-wide operations. Libraries should undertake a preservation planning process, setting goals and priorities that are achievable. Publications to assist with the preservation planning process are available through ARL.

SETTING GOALS AND PRIORITIES

Preservation goals should support the mission and strategic directions of the institution and should be implemented in ways that support current needs while incorporating a long-term perspective. One ARL library established the following priorities for its print preservation program for the 1990s, using as its criteria the broadest benefit, demand, and suitability for shelving. The priorities are offered here only as examples. This library's list of priorities focuses primarily on the micro-strategies. For most libraries, multiple priorities can exist and be worked on together, at both the micro- and macro-strategy levels.

First priority: collection security, disaster preparedness, and disaster response. (It was felt that this would have the most positive impact on the preservation of the collections).

Second priority: preservation of damaged materials currently in demand, including brittle materials.

Third priority: preservation of newly acquired materials not in suitable physical condition for the library's shelves.

Fourth priority: preservation of damaged materials not currently in demand, including brittle materials.

Fifth priority: preservation of newly acquired materials in suitable condition but inadequately protected for long-term preservation.

Sixth priority: preservation of brittle materials that are not damaged and not currently in demand.

As a first step, preservation priorities should focus at the macro-level—that is, on those strategies that are likely to produce the most gain for the cost. As overall preventive strategies, environmental management and effective security, for example, are likely to preserve many more items at a lower per item cost than more expensive remedial strategies such as item-level conservation or reformatting. Additional preventive strategies, such as staff training in the care and handling of library materials can reduce damage to collections and have a long-term impact on the usability of collections at very little cost to the library.

At the micro-level, the decision-making process for preservation is one of careful

discernment which involves analyzing all current options for maintaining long term access to the information at hand and deciding how, for how long, and in what format, it should be preserved. One leader in the preservation field suggested that a decision maker should always start with the question: “Why should we spend money to preserve this item? What about the possibility of simply discarding it?” Other questions that need to be asked include: Is a cooperative collection development policy in place that will help ensure the availability of the material elsewhere, or that encourages the holding library to take measures to preserve the volume in hand? Will the item receive low use or high use? Do you want to preserve it for another ten years, a hundred years, forever? The use of a decision path for materials can be very helpful.

COST

Administrators need to know how much things cost; it is their job. Without such information, they cannot make intelligent decisions about staffing, funding, or other needs. And yet, preservation costs can vary widely, some would say maddeningly. Preservation librarians often analogize preservation costs with medical costs. When you are injured or sick, will a band-aid or over-the-counter medication suffice? Do you need a trip to the emergency room? Must you see a specialist? How concerned are you about quality, timeliness? These are but a few of the factors that will influence the cost of the care that you receive. So it is with preservation treatments. Preservation is focused on prevention and on wellness as efficient and cost effective strategies for managing the life cycle of library collections. Macro-strategies, like environmental management and security, require high initial cost but provide long-term benefits.

Determining costs for preservation involves consideration of a number of variables that may vary greatly from institution to institution, depending on the size and condition of the facilities and on the size and condition of the collections. Consideration must be given to the cost/benefit ratio of preservation measures handled internally with in-house staffing and resources compared to measures handled through out-sourcing to vendors of preservation products and services. Nonetheless, some libraries are using a sort of rule of thumb to help with preservation planning. Regarding micro-level treatments—not including all-important follow-up issues such as storage and metadata—the following appears to be a reasonably accurate “cost ladder” used by one library as an estimate of costs of various treatments. These figures are not offered as a prescriptive formula for preservation expenditures, merely as an example of costs that can figure into internal planning and budgeting discussions. Figures are estimates of per volume costs.

Routine repair	\$5.00
Routine boxing	\$5.00
Re-binding	\$12.50
Deacidification	\$17.00

Digital imaging	\$80.00
Preservation photocopying	\$100.00
Preservation microfilming	\$120.00

The lower costs for some treatments largely reflect variations in labor costs. For most repairs and routine boxing (not custom-made boxes for, e.g., special collections materials), student workers are often used. Costs may increase significantly if student labor is unavailable. Maintaining an appropriately skilled and trained cadre of student workers requires investing in training and supervision of those students. Costs associated with the selection of materials designated for repair, with supervising and training student workers, and with ordering and maintaining appropriate supplies and equipment are not reflected in the above costs. Re-binding and mass deacidification costs can be quite reasonable because of high volume. Outsourcing of routine binding keeps costs down as well. The costs for digital imaging, preservation photocopying, and preservation microfilming are relatively high principally because these are skilled, labor-intensive processes.

Not included in this list are most of the macro-level preventive strategies: security, environmental control, and storage. Costs for these strategies are very difficult to compute for several reasons. First, the preservation “boundary” of these costs is difficult to ascertain; in the area of environmental control, for example, where do the costs for ordinary human comfort (heat in the winter, air conditioning in the summer) leave off and the costs for preservation of materials (keeping temperatures and humidity at levels that are collection-friendly) begin? Second, the costs for most libraries of macro-strategies may be pennies per volume; however, the real benefit of such systems is in their cost avoidance. How many volumes are not stolen or mutilated because of an effective security system? How many are not infected with mold because of adequate environmental controls? How many volumes do not become brittle because temperature and humidity remain stable, ensuring longevity of paper and binding materials? Such measures are difficult to apply.

The best way to track costs, of course, is to track them day-to-day in house. What are the overall costs for a treatment such as preservation microfilming and how many volumes were treated for this expenditure?

ENVIRONMENTAL MANAGEMENT

What Is It?

Environmental management is a fundamental strategy for protecting the capital investment represented by collections and buildings. Environmental controls are chiefly used to manage the four principal physical factors that can affect the preservation of library materials: temperature, relative humidity, light, and airborne pollutants. Lower temperatures (in unstaffed storage facilities at 50 degrees) have proven to delay significantly paper deterioration. Relative humidity kept between 40% and 60% prevents mold and insect infestations. If the humidity is too low, paper can lose vital moisture. Of even greater importance than the exact level of temperature or rH is the need to control fluctuations, which can cause significant damage to collections. Working closely with physical plant personnel to be sure temperature and rH are kept constant 24 hours a day, 365 days a year is critically important. The ultraviolet radiation given off by many lighting systems can seriously discolor and damage library materials. Airborne pollutants can both discolor and weaken paper. Environmental management also includes an effective pest management program as well as preparing and practicing an up-to-date disaster preparedness, response, and recovery plan.

When to Use this Strategy

Every library has some environmental controls in place, if only to provide reasonable levels of comfort for human inhabitants. Most libraries have taken at least a step or two beyond this by installing ultraviolet filters on lights, using special equipment to monitor temperature and relative humidity, and upgrading ventilation systems. The key question is: "Is your environmental management system adequate to provide the necessary protection for your collections?"

Important research and development into environmental monitoring is underway with the testing of PEM (Preservation Environment Monitoring) software. Nearly 200 libraries and archives are testing software and instrumentation produced at the Image Permanence Institute at the Rochester Institute of Technology. The software is designed to calculate both a PI (preservation index) and TWPI (time weighted preservation index). The PI is a result in years that projects useful life expectancy for given collections under specific conditions of temperature and relative humidity. The TWPI projects a useful life expectancy that also factors in variations recorded at a given storage location. Such tools can help libraries monitor current environmental conditions and develop data to support investment in improvements.

Advantages

- "Providing optimum environment is the only preservation strategy that can help prolong the life of entire collections." (Banks and Pilette, p.119)

- Per volume costs for prevention are minor.

Disadvantages

- Overall costs for initial installations and continuing maintenance of effective environmental control systems are high.
- Systems must be monitored continuously and maintained in effective working order.

Cost Range

Environmental management programs can be very expensive when considered overall. The costs avoided (such as replacement, repair, and time), however, are likely to make initial and continuing expenses for environmental management well worth the investment.

SECURITY

What Is It?

Security programs are designed to manage deliberate human misbehavior. For whatever reasons—revenge, pique, carelessness—library materials are stolen and mutilated at shocking rates, on occasion by library employees themselves. Sometimes the theft or mutilation goes undetected for months, even years, until someone tries to locate specific items or information.

A significant proportion of preservation mishaps occur because of ineffective security systems. An effective system encompasses many strategies, including effective overall management practices. It starts with a workable facility design that minimizes opportunities for misbehavior. Also at the technical level, it encompasses electronic security systems, property marking, and key control (the first two are usually focused on intensely, while the last often receives scarce attention) and such tangential but critically important areas such as maintaining photocopy machines in good working order so that users will not take out their frustrations through mutilation and theft. In the human arena, effective security should encompass preventive measures such as the thorough screening of employees before hiring and the maintenance of high employee morale (commitment to the work and the organization is a powerful preventive strategy).

Obviously, security for general circulating collections will be different in nature and scope than the security provided for special collections. Property marking, insertion of security strips, and photocopying privileges are inappropriate for many special collections materials. In such cases, however, careful attention to policy formulation and implementation can reduce loss or damage to collections while providing high levels of service to library users.

As in many areas of life, the technical issues involved in security programs are more easily solved (though typically more expensive) than the human issues. If one has the money, it is a relatively simple matter to find and install security systems. Maintaining high morale or convincing users of the value of intact collections are within the financial reach of most libraries but they are much more difficult to achieve.

When to Use this Strategy

All libraries have security programs but some are clearly more effective than others. The question is not so much “When should this strategy be used?” as “How appropriate is our current security program and where does it need improvement?” Such an assessment will probably best be conducted with the assistance of a security expert. Library-wide communication can help reduce the likelihood of internal theft

and mutilation. A regular, systematic inventory review, and adherence to security policies for all employees throughout the organization establish a climate in which internal problems are noticed and can be dealt with appropriately. The impact of Ebay, Antiques Roadshow, and other media that draw attention to the dollar value of library collections have made valuable collections visible to unscrupulous people who steal maps, prints, and first editions for easy resale to an unsuspecting public. Making library staff and security personnel aware of the kinds of thefts experienced by libraries nationwide and the methods employed by thieves can help protect your collection against this danger.

Advantages

- For most libraries, the cost avoidance realized through the reduction of theft and mutilation is substantial.
- Security programs do not necessarily involve touching the library materials, thus the damage that is always possible with some other treatments is avoided.

Disadvantages

- A truly effective security program can be, overall, very expensive, especially in start-up costs, but also in continuing costs.
- Libraries often focus much more on technical systems rather than human systems when they plan security systems. Both are important.
- Implementing some of the ancillary human programs, such as combating internal theft and vandalism through improvement of morale can be quite labor-intensive.
- Security staff is often among the lowest paid and least recognized tier of library employees. Including them in appropriate training for preservation can boost their morale and heighten their awareness of the importance of the work they do.

Cost Range

As suggested above, a security program can be very expensive when considered overall. However, the costs avoided (replacement, repair, time, etc.) are likely to make initial and continuing expenses for security well worth the cost.

CONTROLLED STORAGE

What Is It?

Due to growing collections and chronically overcrowded book stacks, many ARL libraries have one or more controlled storage facilities. These are often located separately from the library, typically in off-campus facilities. Most such facilities use compact shelving. One reason that controlled storage preserves materials is simply that the materials are subject to minimal handling by both users and library staff; materials can be kept in virtual darkness at temperatures and relative humidity readings that would be uncomfortable for many humans, and they can be better protected from airborne pollutants. At this writing, discussions are underway in the community to explore the feasibility of using controlled storage facilities as nodes in a national distributed print preservation repository system.

When to Use this Strategy

Controlled storage is most appropriate for low use materials. As mentioned above, it is a major strategy for alleviating crowded book stacks. It should not be a substitute for systematic review and de-selection of materials in a collection, since even storage space is limited and expensive to maintain.

Advantages

- Controlled storage keeps many of the most harmful environmental and human factors away from library materials.
- Overall storage facilities can be very expensive but per item costs are very low.
- Compact shelving takes up less room and thus is a less expensive storage medium.
- Materials can be shelved by size and retrieved by bar code number rather than in classification order, maximizing the use of available space.
- Collaborative use of shared storage facilities can help to defray expenses for the institutions involved.

Disadvantages

- Some facilities can be browsed but most require the user to request items.
- Service is compromised when users must request items and wait for delivery.
- Bibliographic control, retrieval, staffing, and delivery must all be considered for items stored in a storage facility.
- Significant effort must be made to educate the community of library users about the availability of materials sent to storage and to alleviate any misgivings about having materials withdrawn from browsable stack space.

Cost Range

Overall, controlled storage can be very expensive. However, the costs avoided (such as replacement, repair, and time) are likely to make initial and continuing expenses for storage well worth the cost. Development of shared facilities to house collections of multiple libraries demonstrates a collaborative approach that reduces costs and increases benefits to the institutions involved.

COMMERCIAL LIBRARY BINDING

What Is It?

Commercial library binding is a process carried out by certified library binders who use defined processes and strictly controlled supplies to transform gathered journal issues, newspapers, or other print publications into permanently bound volumes designed to enhance the longevity, facilitate user access, and simplify library management of these materials. Nearly all libraries use the services of a commercial binder for binding some or all of their journal volumes and monographs. Many ARL libraries have carefully negotiated library binding contracts; others operate with simple binding agreements. The preservation community and the library binders have worked together to define standards for commercial binding, and the standard (LBI Standard for Library Binding) and the group of binders who work under its aegis can be found at <http://www.lbibinders.org>. At present, American National Standard ANSI/NISO/LBI Z39.78-2000 Library Binding is the library binding standard of record. Copies of the standard can be purchased or downloaded free in PDF format from the Web site.

When to Use this Strategy

Commercial binding is appropriate for those materials designated for long-term retention in library collections. Only materials published on strong paper with adequate margins are suitable for library binding. Rare or fragile works, or works with artifactual value should not be commercially bound because of the rigors of the process and because the standard buckram binding into which materials are bound requires the loss of original and possibly valuable bindings. Many LBI binders can supply protective enclosures for these valuable or fragile items.

Advantages

- Adherence to standards insures a high-quality, durable product.
- Commercial library binding is inexpensive when it is done as a high volume enterprise.
- Shelving and retrieval of materials is greatly facilitated. Loss, theft, and mutilation are minimized by binding journal issues.
- Commercial binding is a regular part of the workflow process in most ARL libraries.

Disadvantages

- Negotiating contracts can be time consuming. Successful partnership with a library binder requires an investment in time and education for both parties, and it requires that the library works closely with the binder.
- Some libraries may have to contract with a binder who submits the lowest bid.

Changing binders is expensive, time consuming, and can be very frustrating if the quality of delivered product declines.

- Turn-around times can vary from binder to binder. Materials held at the bindery for excessive amounts of time can frustrate library users who are denied access to materials in the interim.

Cost Range

Depends on volume and leaf attachment method. Can begin at as little as \$7.00 per volume.

ROUTINE ITEM REPAIR AND ITEM ENCLOSURE

What Is It?

Virtually all libraries maintain a repair function, and repair is the most frequently performed remedial strategy. Repair includes tightening hinges, a particularly vulnerable part of the book, tipping in loose or replacement pages, repairing paper, and the more sophisticated structural repair of books, pamphlets, and other kinds of materials. There are right and wrong ways to repair books and other library materials. Even so, many repairs can be performed by well-trained students. The lower personnel costs, if student labor is available, are a major factor in repair costs being among the lowest of all remedial treatments.

Protective enclosures are sometimes more appropriate than repair. Enclosures can range from simple paper wrappings to custom-constructed boxes and special acid-free containers purchased from suppliers. Students or volunteers can perform most enclosure work, keeping costs down.

When to Use these Strategies

Routine repair is typically a strategy used to prolong the useful life of circulating materials that have little value as artifacts. Even when used to prolong the life cycle of general collections materials, treatments appropriate for the item should be selected and care should be taken that such treatments are reversible and documented if possible. More sophisticated repairs are often done on rare and irreplaceable materials, though they require expert skills and can be costly. It is important that staff recognize their limitations and understand that an amateur repair can cause more damage and loss of value than it may correct.

Protective enclosures are used for many reasons: for example, enclosure can prolong the useful life of materials that are likely to be little used and/or are largely irreparable and would be too costly to repair; enclosures are less intrusive than repairs; and the enclosure protects materials from the ordinary wear that can happen at library shelves. Enclosures can also be used to aggregate pamphlets and other materials. They are often used to protect rare materials and archives. In these cases, such enclosures are often custom made and can be costly. Enclosures are sometimes used as part of a phased approach to the preservation of fragile materials, providing a protected microenvironment until funding, staffing, space, or other considerations can be made available to pursue a more thorough treatment.

Advantages

- Most routine repairs and enclosures are relatively inexpensive, as students or other lower-paid staff can perform them.

- Both treatments can add years of life to materials that would otherwise fall apart.
- Repair staff can offer insights about the health of the circulating collections in general by identifying trends in the damage they repair. For example, missing pages and mutilation in an area of the art collections may signal the need for additional security or for housing such materials in special collections.
- Providing in-house repair options can keep items in high demand on the shelves and ready for use without lengthy delays caused by the need to reorder or rebind a title.

Disadvantages

- Unless repair personnel are carefully trained, repairs can do more harm than good to the materials they are supposed to preserve.
- Sometimes repairs are preferred to replacement, which should be the strategy of choice for materials that are likely to receive continuing heavy use.
- Investment in skilled staff time in selecting items for treatment, deciding the appropriate treatment, acquiring preservationally sound materials and supplies to use in repair, and fulfilling an ongoing training requirement when repairs are performed by an ever-changing cadre of student workers can be expensive and time consuming.

Cost Range

\$5.00 to \$10.00 per item for routine treatments; much more for custom repairs and enclosures done in-house; very expensive if outsourced to a professional conservator.

PRESERVATION MICROFILMING

What Is It?

Microfilming, one of the longest established and most widely accepted treatments in the preservation arsenal, is “the process of reproducing, in reduced size, the intellectual content of library and archival materials on film....” Through this process, a master negative (or camera negative) is produced; from the negative, a printing negative is generated from which service (or use) copies are created. The master negative is stored under stringent conditions of controlled temperature, relative humidity, and exposure to light and is used only to generate printing negatives. Silver gelatin film is the current standard for microfilm. Though some microfilming is done in-house, it is more typical that a library will purchase already produced commercial microfilm or outsource the filming process to a commercial company.

When to Use this Strategy

Microfilm is used extensively when low use of research materials is anticipated and when there is little or no loss of research value when the materials are reformatted in this way—in other words, when durable, readable content is the chief goal. The production of high quality microfilm also offers the library the opportunity to digitize content from the film, thereby making the content readily accessible without subjecting fragile originals to additional handling in order to produce digital files. This hybrid strategy is favored by a number of preservation librarians because of the multiple options it presents. Film can also be generated from digital originals.

Advantages

- A relatively cost-effective method for long-lasting preservation.
- Time-tested: microfilm has been around for decades. Kept in a controlled environment, microfilm can be expected to last at least 200 years.
- RLG Standards for microfilming have been widely adopted. Adherence to these standards, whether filming is done in-house or is outsourced, leads to creation of a reliable, useful, high quality surrogate for the original material.
- An unlimited numbers of service copies can be made relatively cheaply from printing negatives.
- Storage is high density; libraries can save significant amounts of space if they reformat in microform and discard the hard copy.
- Microforms are a potent tool in resource sharing. For example, when extremely low use is anticipated, one or two high quality service copies within a consortium might serve the research needs of a number of institutions.
- Funding sources such as NEH have typically been willing to support microfilming grant projects.

Disadvantages

- Can be expensive. The initial reformatting is very labor-intensive and for good quality work, the labor must be highly skilled and well compensated.
- Purchasing and maintaining high-quality equipment can add to the cost, as can the need to purchase appropriate microform cabinets in which to store film.
- The technology is somewhat inconvenient for users. While microforms are portable, they cannot be read without equipment, although it is possible to read microfilm with a magnifying glass and a light source. Portable readers provide some solutions to the problem.
- Though many researchers have accommodated to microform, most prefer hard copy; some simply do not like microforms.

Cost Range

\$50 to \$150 per volume.

PRESERVATION PHOTOCOPYING

What Is It?

Preservation photocopying involves making high-quality replacement copies of printed materials on permanent and durable paper. Ideally, the preservation photocopy should match the size and layout of the original in order to give scholars some sense of the original item. The photocopied pages are then bound, usually in sturdy, serviceable bindings. The standards for preservation photocopying are quite extensive. Obviously the paper used must meet rigorous standards but the photocopying equipment must also meet standards, particularly in the ability to provide tonal variation in images.

When to Use this Strategy

Preservation photocopying is used when an approximation of the original item is needed for research purposes. It is particularly useful in reformatting brittle, badly damaged, and otherwise fragile materials. Materials that have been filmed should never be considered for preservation photocopying. It is too time consuming and labor intensive to carry out this work if the title needed is already available on film or in another format. It is not an appropriate strategy for books with important value as artifacts, as in many cases the original must be permanently disbound. In many cases, the original does not survive the photocopy process and must be destroyed. Photocopying does not result in the potential for saving space that microfilming does.

Advantages

- The result of the preservation photocopy process is the creation of a facsimile that provides a closer approximation of the original item than does the microform copy, making the researcher's experience of the work more like the experience of the original.
- The reader does not require any special equipment.
- Photocopies are as portable as the original items.
- Many researchers prefer preservation photocopies to microform on aesthetic grounds.
- A number of vendors offer preservation photocopying as a commercial service, so the bulk of this work can be outsourced.

Disadvantages

- The preservation photocopy process frequently destroys the original work.
- Copyright provisions must be understood and complied with in selecting titles for preservation photocopying.
- Knowledgeable subject experts should be involved in selecting titles for preservation

- photocopying to reduce the possibility of a valuable edition being destroyed.
- When the process is carried out in-house it requires access to a high quality, dedicated photocopier/scanner.
- Special training is required to master the procedure of registering page images correctly when preservation photocopying is done using a standard photocopy machine operated by student workers.
- Preservation photocopying is labor intensive, time consuming, and requires careful quality control measures to insure a satisfactory product.
- Most libraries cannot adequately reproduce color illustrations or maps, so detail is lost.

Cost Range

\$50 to \$150 per volume, including binding.

DIGITIZATION

What Is It?

Digital images are “electronic photographs scanned from original documents. A digital image can accurately render the information, layout, and presentation of the original, including typefaces, annotations, and illustrations.” (Cornell University Library) Unlike some digital files (e.g., ASCII), the text in digital images cannot be searched or manipulated. However, through the application of optical character recognition (OCR) programs, digitally imaged text can be searched and manipulated, though the quality of these programs varies greatly.

When to Use this Strategy

Digitization has gained much popularity among library users as a delivery mechanism, since for those with access to computers, digital images can be of higher quality than microfilm, can handle color successfully, and can be manipulated and printed more easily. Emerging standards and best practices for metadata creation, for image capture, and migration and refreshing, are leading some in the community to consider digitization as a viable preservation reformatting technology, although many still question the long-term survival of digital files and the equipment required to access them. At the very least, digitization can provide a surrogate that may protect a fragile or valuable original from excessive handling.

Advantages

- Digital images are capable of great fidelity to the original.
- Quality varies little from one copy to the next.
- Images can be accessed remotely by simultaneous users.
- When appropriately programmed, images can be manipulated.
- Digital imagery has potential for saving space and costs.
- Electronic access is highly valued by students and scholars for its desktop availability 24 hours a day, 7 days a week.

Disadvantages

- Lack of nationally approved standards similar to those that exist for microfilming.
- The preservation of digital images will be a challenge as technologies change and as some become obsolete. Will vendors continue to support outdated technology?
- Copyright provisions must be understood and complied with in selecting titles for digitization.
- Costs of long-term maintenance including metadata creation, data migration and refreshing, and file storage are difficult to predict.
- Information made available solely in electronic format currently creates equity / access

- issues since not all of a library's users may have equal opportunity for access.
- Establishing a digital imaging capability in-house can be very expensive.

Cost Range

\$50 to \$80 per volume.

DEACIDIFICATION

What Is It?

The introduction of acids into the papermaking process during the middle of the 19th century has led to the “slow fires” that burn today in our research libraries. Because of acids, many materials have become so brittle that they crumble if handled too roughly. Others are well on the way to terminal embrittlement. Deacidification is a process that alters the chemical composition of treated materials so that embrittlement is retarded. The process does not strengthen paper or provide a permanent cure for acidity. It buffers the now neutral paper adding several hundred years of life to the material. If deacidified materials are returned to a highly acidic environment, however, deterioration will resume. Developed deacidification systems include Battelle, Bookkeeper, DEZ, FMC, and Wei T’o. Each system has advantages and disadvantages. The Bookkeeper process has been successfully used by the Library of Congress and a number of ARL libraries have begun to de-acidify materials using this process. Currently the most effective systems commercially available are Bookkeeper, operated by Preservation Technologies, and Battelle, operated by Zentrum fur Bucherhaltung (ZFB) of Germany. Both are solvent immersion systems in which books immersed in an inert liquid carrier absorb magnesium oxide particles.

When to Use this Strategy

Deacidification is an appropriate treatment for current materials that are printed on acidic paper and are at risk of becoming brittle. As it is less expensive than reformatting treatments, it is particularly used when materials are not already brittle and do not appear to merit the cost of preservation microfilming, photocopying, or digitization. Unfortunately, it will not reverse the process of embrittlement. It is a waste of time and money to try to deacidify hopelessly brittle materials.

Advantages

- One of the chief advantages is the lower cost per unit.
- Applied to a volume printed on acidic paper before the paper becomes embrittled, deacidification can significantly extend the useful life of the work.
- The original piece is retained, unlike reformatting options in which the provenance and detail provided by the original binding may be lost.
- Because it is a batch process, several pieces can be treated at the same time, and economies of scale can result.

Disadvantages

- It slows but does not stop the process of embrittlement.

- Requires pre-selection before treatment. May not be appropriate for all materials.
- Like commercial binding, de-acidification is done off site, so materials are out of the library and therefore not available for use for a period of weeks. This also requires significant staff involvement in selection, packing, shipping, and bibliographic control of the materials being treated.
- Deacidification is still a relatively new preservation strategy. Improvements to methods and longitudinal data about effectiveness will be forthcoming. Accelerated aging tests, however, seem to support the effectiveness of the process.

Cost Range

\$15 to \$20 per volume.

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