

Report of a General Preservation Survey

Maynard Historical Society
Maynard, MA
September 16, 2009

Submitted December 3, 2009 by:

Angelina Altobellis
Assessment Program Coordinator
Northeast Document Conservation Center
100 Brickstone Square
Andover, MA 01810
P: 978.470.1010
F: 978.475.6021
aaltobellis@nedcc.org

Executive Summary

Archival collections at the Maynard Historical Society (MHS) were surveyed for preservation planning purposes by Angelina Altobellis, Assessment Program Coordinator of the Northeast Document Conservation Center, on September 16, 2009. The survey evaluated the building and environment as they relate to the preservation needs of the materials; examined current policies, storage and handling procedures; and assessed the general condition of materials. Invaluable information was provided by Historical Society President David Griffin.

As the full report explains, the collections are presently stored in a temporary space donated to MHS in 2008 by Clock Tower Place. Though it is far from certain, it is possible that the collections will move to a more permanent location in the next year or two. **With that in mind, MHS should bear the following needs in mind when evaluating new spaces:**

- **Ultimately, the collections should be stored in a space with year-round, 24/7 climate control.** Sudden spikes or dips in temperature and relative humidity drive the deterioration of archival materials, so climate control equipment should operate in a way that reduces the extent of seasonal fluctuations in the storage environment. For example, a winter temperature of 65°F and a summer temperature of 75°F would be acceptable, as long as the shifts happen gradually (i.e., monthly shifts not exceeding $\pm 3^\circ\text{F}/3\%RH$). Relative humidity should never exceed 50%.
- **Ideally, collections storage spaces would be windowless.** Windows provide entry points for intruders, and they can break during a severe storm, exposing collections to the risk of water damage. Uncovered windows expose collections to damaging light levels.
- **The building should have a fire detection and suppression system installed throughout.** Wet-pipe systems are ideal for cultural heritage institutions because they are relatively inexpensive to maintain, and they have a low failure rate. For more information about the various options for fire suppression systems, see the Appendix to this report, as well as preservation leaflet 3.2, “An Introduction to Fire Detection, Alarm, and Automatic Fire Sprinklers,” in PLAM3 or online at www.nedcc.org.
- **Avoid basement storage.** Basements are prone to high humidity and flooding, and are not appropriate for storing collections of enduring value.
- **The collections storage room or rooms should have a minimum number of entry points.** Avoid spaces that serve as through-ways to other parts of the building. As they do in the current building, volunteers should carefully limit the number of keys in circulation.

- **MHS should avoid moving to a building without regular upkeep.** Because it serves as the collections' main line of protection from the elements, the building should be maintained according to a regular schedule, whether by MHS or by another entity (e.g., the Town or Clock Tower Place).

Numerous actions can be taken to improve care of the archival collections in the current space. Some of these activities, such as the preparation of a collection manual, cataloging, and rehousing, are already (or will soon be) underway. **Recommendations for short, medium, and long-term priorities are as follows:**

Short-term priorities (problems requiring immediate action and/or projects that can be undertaken with existing resources):

- **Create a preservation policy, and consider including it in the Collection Manual.** This policy should include security guidelines, including requirements for using the collection; procedures for environmental monitoring, and target levels for temperature and relative humidity; storage and handling practices; and maintaining records of conservation treatment. For more information about developing appropriate policies, see preservation leaflet 1.5, "Collections Policies and Preservation," in PLAM3 or online at www.nedcc.org.
- **It is excellent that the volunteers have developed steps for accessioning and cataloging the collections.** The procedures outlined in the Collection Manual are professional, and MHS should move forward with implementing them.
- **Use the recommendations in this report to prepare a long-range preservation plan for the archives.** The preservation plan should be a written document that is used for both short- and long-term planning. Preparation of a plan should begin as soon as possible, but expect its completion to take time.
- **Start the practice of conducting a walk-through of collections storage areas before leaving at the end of the day to spot any emerging problems.** This practice will also allow volunteers to become more familiar with the building envelope.
- **Monitor collections storage areas for mold during periods of high external humidity.** Without continuously-operating climate control equipment, a spike in relative humidity (above 50%) lasting more than 24 hours could activate mold spores. It should be noted that materials that have been exposed to mold growth in the past are more susceptible to repeat outbreaks.
- **Move materials out of direct sunlight.** Materials stored in the open should be transferred to protective enclosures.
- **Install smoke detectors in each of the collections storage rooms.** Ideally, the detectors would also be wired to the building-wide system, but even if they cannot be, a local alarm is preferable to no alarm at all.

- **Raise collection materials off the floor by at least four inches to prevent damage in the event of a water emergency.** For the collection of framed materials, volunteers might consider making padded blocks. See Canadian Conservation Institute, “Making Padded Blocks,” CCI Notes 10/2 (available at www.cci-icc.gc.ca/) for instructions. Try to avoid leaning framed items against shelves holding other materials as well as exterior walls (which are prone to moisture).
- **Assemble a disaster response kit for water-damaged materials.** A list of recommended supplies is included in the “Worksheet for Outlining a Disaster Plan,” leaflet 3.4 in PLAM3, and online at www.nedcc.org. Alternatively, the library might consider purchasing a React-Pak, available from ProText (www.protext.net) as well as other suppliers. Although purchasing a prepared kit is more expensive than buying the supplies separately would be, the convenience may outweigh the extra expense.
- **Start preparing a disaster plan for the collections.** See the “Worksheet for Outlining a Disaster Plan,” leaflet 3.4 in PLAM3 or online at www.nedcc.org. MHS might also consider using dPlan™, NEDCC’s free, online disaster planning tool, available at www.dplan.org.
- **Become familiar with disaster preparedness and response procedures for cultural collections.** The Massachusetts Board of Library Commissioners is one local organization that offers one-day workshops on these topics. For more information, see the online workshop calendar at <http://mblc.state.ma.us/advisory/workshops/calendar.php>. Another excellent resource is Heritage Preservation’s Field Guide to Emergency Response. This guide, which includes an instructional DVD, would provide valuable information on responding to a disaster, including techniques for stabilizing collections. For more information, see www.heritagepreservation.org/catalog/#DisasterBooks.
- **Use sticky traps to monitor the collections storage rooms for any signs of insect infestation.** This will help the volunteers determine the extent of any problem that does arise. Moreover, knowing which pests are entering the areas will help in choosing the most effective preventive strategies and avoid chemical extermination. See “Integrated Pest Management,” leaflet 3.11 in PLAM3 (or online at www.nedcc.org) for more information.
- **Any items believed to be contaminated with mold should be isolated from the rest of the collection, and cleaned.** For more information, see preservation leaflet 3.8, “Emergency Salvage of Moldy Books and Paper,” in PLAM3 or online at www.nedcc.org. It should be noted that mold seen during the site visit appeared to be inactive, and it was limited to only a handful of items.
- **Perform a daily check to ensure that all windows are locked.**
- **Volunteers should become familiar with proper collections handling techniques.** See the guidelines provided in NEDCC preservation leaflet 4.1,

“Storage Methods and Handling Practices,” in PLAM3 or online at www.nedcc.org. Other good resources include:

- **Harvard Libraries’ PowerPoint presentation “Care and Handling of Archives and Special Collections Materials,”** available at <http://preserve.harvard.edu/education/presentations.html>
- **The British Library’s “Using the Collections” videos,** available at www.bl.uk/aboutus/stratpolprog/ccare/collectioncarevideos/index.html
- **Purchase white cotton gloves to use when handling photographic prints, negatives and slides.** These are available from library, archives and conservation suppliers such as University Products, Talas, and Gaylord.
- **Avoid placing adhesive labels on materials of permanent value for any reason.** Adhesives can cause permanent damage, and as they deteriorate, the labels fall off, leaving residue that attracts dirt.
- **Avoid labeling folders in ink.** All labeling of folders should be done only in pencil. Folder contents that come into contact with ink can become stained, and any water-soluble inks that come into contact with water (as in the event of a water-related emergency) can bleed, causing staining of items and possible erasure of labeling information.
- **Prepare a list of handling guidelines, and incorporate them into the collection management policy to help ensure that they remain in place over time.** New volunteers should be asked to review the guidelines before they begin handling collection materials.
- **The work of re-folding items in Perma-Dur™ folders, or folders of a similar quality (i.e., acid-free, lignin-free, and buffered) should continue.**
- **The sample book (shown in Figure 13 of the full report) should be placed in a custom-fitted acid-free, lignin-free, buffered box, and stored flat.** Volunteers will need to decide whether this item’s value merits the cost of conservation treatment. If so, once collection-level preservation priorities have been addressed, treatment options should be discussed with a professional conservator.
- **Moldy recordings should be placed in boxes and segregated from the rest of the collection.** Boxes should be clearly marked to indicate that they contain moldy items, and to prevent contamination, they should not be opened. Contact Little Film (www.littlefilm.org) for recommendations on cleaning these items.
- **Ask Clock Tower Place facilities personnel for more information on its schedule for inspecting and maintaining the building and its systems (e.g., HVAC and drainage).** Developing a relationship with the personnel responsible for these activities will provide volunteers with an avenue for learning more about the

building and systems, and for reporting problems. It could also enhance cooperation and speed response time in the event of a collections emergency.

- **Start keeping a log of any building-related problems that may be discovered, and record when and how the problem was resolved.** A log will help volunteers to identify recurring problems, and it will preserve institutional knowledge long-term.
- **Work with Clock Tower Place facilities staff to ensure that the roof and drainage on the Paymaster Building are inspected and maintained at the end of fall and spring and after severe storms.** Drainage should be cleaned according to this schedule, or more frequently if needed to ensure that it works properly.
- **Determine whether routine chemical extermination is performed in the building.** If it is, see whether collections storage areas can be excluded. MHS should use integrated pest management (IPM) practices to prevent infestations, relying on chemical extermination only as a last choice.

Medium-term priorities (projects that will require planning and organization or additional resources and volunteer time):

- **Begin ongoing environmental monitoring.** Maintenance of proper storage conditions is one of the most effective ways of extending the longevity of archival materials. Volunteers can use environmental monitoring readings to take remedial climate control measures—such as using a dehumidifier and increasing air circulation when the relative humidity starts to exceed 50%. For more information about environmental monitoring, including an overview of the various environmental monitoring devices available and information about the proper placement of the devices, see preservation leaflet 2.2, “Monitoring Temperature and Relative Humidity,” in PLAM3, or online at www.nedcc.org.
- **Use portable dehumidifiers to lower the relative humidity when it exceeds 50%.** Note that dehumidifiers will need to be emptied regularly, especially before closing time each day to ensure that standing water does not recirculate into the environment, causing the humidity to rise overnight.
- **Install window coverings on all windows in rooms housing collections, and keep blinds closed on windows that already have them.** The coverings need not be expensive, and should simply serve the purpose of blocking as much light as possible out of the storage environment. Exposure to light causes premature embrittlement and fading.
- **Install at least one portable fire extinguisher on the second floor, and seek training in fire extinguisher use from the local Fire Department.** For more information on the number and placement of extinguishers, see NFPA 10: Standard for Portable Fire Extinguishers. This publication can be read online free of charge at www.nfpa.org.

- **Complete the disaster plan.**
- **In preparing to make the collections available to researchers, MHS should develop a security policy.** The policy should outline procedures for registration of researchers and guidelines for use (e.g., limiting the number of items used at one time). It should also outline standard operating procedures for addressing a theft. For more information, see preservation leaflet 3.11, “Collections Security: Planning and Prevention for Libraries and Archives,” in PLAM3 or online at www.nedcc.org. Also see the ACRL/RBMS “Guidelines Regarding Security and Theft in Special Collections,” available online at www.ala.org/ala/mgrps/divs/acrl/standards/security_theft.cfm. This document was approved in 2009 and contains the most current accepted best practices.
- **Develop a registration form for use of the collections.** The form should be dated and signed by the researcher, and it should be retained indefinitely. Researchers should also be required to present a photo ID at the time of registration, and every time they check in to use the materials. For a sample registration form, see preservation leaflet 3.11, “Collections Security: Planning and Prevention for Libraries and Archives,” at www.nedcc.org.
- **Acquire appropriate shelving for bound and unbound materials.** Shelving should be constructed of powder-coated steel or anodized aluminum, and it should be deep enough to fully support its contents (i.e., books and boxes should not hang past the shelf edge). Twelve- or fourteen-inch-deep shelves would be ideal. As space permits, it would also be a good idea to purchase some double-faced shelving, so that oversize items (e.g., large books or flat boxes) can be stored across the surfaces of two adjoining units. Canopy tops should be purchased and installed to protect items on the top shelf from water, dust and debris.
- **Consider purchasing a book cradle to use when viewing fragile books.** See, for example, the Norfolk Book Sofa, item number 805-3271 from University Products (www.archivalsuppliers.com), or Gaylord’s book mount system (available in three sizes), item number WW-52171 at www.gaylord.com. Other suppliers will have similar products.
- **In further developing its Collection Manual, MHS should create more specific policies for loans and exhibits.** See Section III.E of the report for details.
- **Inventory microfilms and check the inventory against the newspaper collection to determine which papers still need to be filmed.** MHS should plan to film any newspapers that have not been filmed.
- **Determine the location of the master microfilm negatives, and ensure that each one has a duplicate negative and a use copy.** Master negatives should not be used for access, and should be used only for duplication in the event that the duplicate negative were destroyed. They should be stored in a separate location from the duplicate negative and use copies, to ensure that the information they contain is preserved in the event of a localized disaster.

- **Volunteers will need to decide whether the clipboard’s value as an artifact (with receipts attached) is more important than the informational value of the individual receipts.** (This item is shown in Figure 12 of the report.) Because acids from the wood are leaching into the documents attached to it and contributing to their deterioration, it is recommended that the documents be removed from the clipboard. See Section IV.C of the full report for more detailed recommendations.
- **Continue the work of rehousing archival collections into chemically stable protective enclosures.** Format-specific recommendations are outlined in Sections III.C and D of the full report.
- **Photocopy newspaper clippings onto acid-free, lignin-free, buffered paper, then discard the clippings.** If the clippings are to be retained, they should be separated from the photocopy, either by being placed in a polyester folder or by placing a piece of alkaline-buffered paper between the clipping and the copy. Acid from the clipping will migrate to the acid-free copy if the two are not separated.
- **Improve storage practices (e.g., upright shelving of books) as the shelving to accommodate correct storage is acquired.** Detailed recommendations are outlined in Sections III.C and D of the full report.
- **Initiate a stacks cleaning program.** Volunteers should clean shelves, boxes, and books that are not boxed, on a regular schedule (once a year is generally recommended). For information on proper cleaning techniques, see “Cleaning Books and Shelves,” leaflet 4.3 in PLAM3, or online at www.nedcc.org. The online version of this leaflet contains links to additional resources on this topic.

Long-term priorities (steps to be taken once short- and medium-term goals have been accomplished; and/or larger general goals that will require major funding and/or significant reorganization of resources):

- **Once MHS makes its collections accessible to the public, volunteers should start keeping use statistics.** Documented use of the collections—whether in-person or through remote reference—will support MHS’s fundraising efforts.
- **If MHS ever acquires the Clock Tower Place architectural drawings, it should also acquire powder-coated steel flat file units to store them.** Units should be stacked no more than two-high on a steel base at least four inches high to provide adequate floor clearance. Keep in mind that drawings will need to be placed in folders (though not necessarily individually), which will add bulk to the collection. Storage solutions for these materials will be addressed in greater detail in Section III.D of the full report.
- **Framed items that are determined to be of high priority, and that are backed with acidic materials (such as wood and cardboard), should be reframed with archival-quality materials.**

- **Rolled photographs should be examined by a conservator.** The emulsion and support layers have likely weakened from bending, and could break when the photographs are unrolled.
- **To preserve the information they contain, consider microfilming collections of unique materials.** Microfilm could also be digitized for access. For more information, see the Research Libraries' Group's "RLG Guidelines for Microfilming to Support Digitization," available at www.oclc.org/research/activities/past/rlg/presmicrofilm/microsuppl.pdf.
- **Audiovisual recordings that will be retained permanently should be reformatted onto stable, widely-supported media.** Two vendors who provide reformatting services are ColorLab (www.colorlab.com), for film conversion, and Safe Sound Archive (www.safesoundarchive.com), for audio conversion.

I hope this report will help the Maynard Historical Society as it works to chart a course for future preservation efforts. If some of the initiatives recommended here seem overwhelming, it is essential to remember that this report is intended as a long-term planning tool. It will be possible to implement some actions soon, but others may require diplomacy, awareness-raising, and funding efforts over several years. It is important to break these initiatives down into manageable tasks.

It was obvious during the site visit that the collections are being maintained by an extremely careful and conscientious group of volunteers. With continued support from MHS members and from the Town, the materials under their care—which document not only the history of Maynard, but also aspects of New England history and national history—could be preserved and made available to a wide range of researchers for generations to come.

Respectfully submitted,

Angelina Altobellis
 Assessment Program Coordinator
 Northeast Document Conservation Center
 100 Brickstone Square
 Andover, MA 01810
 P: 978.470.1010
 F: 978.475.6021
aaltobellis@nedcc.org

December 3, 2009

Table of Contents

Introduction	1
I. Collection Management	3
A. MISSION STATEMENT & COLLECTION POLICIES.....	3
B. STAFFING & BUDGET.....	3
C. INTELLECTUAL CONTROL.....	3
D. PRESERVATION ACHIEVEMENTS & PLANNING.....	4
II. The Building & Environment	6
A. THE BUILDING.....	6
B. TEMPERATURE, RELATIVE HUMIDITY (RH) & AIR QUALITY.....	6
C. PROTECTION FROM LIGHT.....	8
D. PROTECTION FROM FIRE.....	8
E. PROTECTION FROM WATER.....	9
F. EMERGENCY PREPAREDNESS.....	10
G. PEST MANAGEMENT & HOUSEKEEPING.....	10
H. SECURITY.....	11
III. Collections Storage & Handling	13
A. STORAGE FURNITURE & SPACE.....	13
B. HANDLING PRACTICES.....	13
C. STORAGE OF BOUND MATERIALS.....	15
D. STORAGE OF UNBOUND MATERIALS.....	17
E. EXHIBITION.....	23
IV. Replacement & Treatment Strategies	25
A. REFORMATTING: PRESERVATION PHOTOCOPYING, MICROFILMING & DIGITIZATION.....	25
B. LIBRARY BINDING.....	25
C. IN-HOUSE REPAIR & PROFESSIONAL CONSERVATION TREATMENT.....	26
Conclusion	28
Appendix: Best Practices for Preservation	29

Introduction

Maynard Historical Society

The Maynard Historical Society (MHS) is headquartered at Clock Tower Place, a former mill complex on the Assabet River in downtown Maynard, Massachusetts. It was established shortly before the town's centennial in 1971. The collections comprise 35 rare books; 46 non-rare books; approximately 800 folders of archival materials (including documents, manuscripts, pamphlets, and ephemera); 60 ledgers; 2,800 photographs; 1,300 slides; 40 negatives, 36 microfilm reels; 50 maps; 11 posters; and 60 audiovisual items.

The Survey

Archival collections at the Maynard Historical Society were surveyed for preservation planning purposes by Angelina Altobellis, Assessment Program Coordinator of the Northeast Document Conservation Center, on September 16, 2009. The survey evaluated the building and environment as they relate to the preservation needs of the materials; examined current policies, storage and handling procedures; and assessed the general condition of materials. Invaluable information was provided by Historical Society President David Griffin.

Two concepts are necessary for evaluating the adequacy of preservation in any institution with historic records:

Responsible custody is defined by the Commission on Preservation and Access Task Forces on Archival Selection as the provision of "a level of environmental management, housing, care and maintenance that will retard further chemical deterioration and protect materials from physical damage."¹ These preventive measures include climate management, protective enclosures, fire detection and suppression, effective security, disaster planning, and training staff and users to handle and care for the collection appropriately.

Optimal Storage is defined as meeting or exceeding the guidelines proposed by professional organizations and national standards-setting organizations. Such guidelines and standards are authored by committees made up of professionals in the field, and they are informed by recent scientific research into the deterioration of collections. The challenge for standards-setting organizations (and for collections-holding institutions) is to translate scientific findings into practical and affordable recommendations for storage. In many cases, optimal storage may not be achievable, but institutions should be aware of the ideal as they work towards providing the best conditions possible.

Every institution should provide responsible custody for all its records. The provision of optimal storage conditions for records of long-term value to the institution should be a primary goal.

¹ Task Forces on Archival Selection. The Preservation of Archival Materials. Washington, DC: The Commission on Preservation and Access, April 1993, p. 3.

This report is intended for continuing reference. The first portion of the report contains observations and recommendations specific to the Assessor's records and the building housing them. Observations are in standard type, while recommendations are bulleted and in bold type. General background and best practice information are included as an appendix, which follows the observations and recommendations. For ease of reference, the report and appendix follow the same order. Additional information about a particular section of the report may be found in the corresponding section of the appendix.

For additional best practices information, reference will be made to preservation leaflets in *Preservation of Library and Archival Materials: A Manual*, 3rd edition, edited by Sherelyn Ogden (Andover, MA: Northeast Document Conservation Center, 1999), referred to hereafter as PLAM3. Many of these leaflets have been revised and updated, and are available in the "Preservation Leaflets" section of NEDCC's website at www.nedcc.org.

Archival and preservation supplies will be recommended throughout the report. Most of these supplies are available from multiple vendors, and staff should select the one that best meets the Historical Society's needs in terms of cost, shipment method, etc. An extensive list of suppliers is available on the NEDCC website, at www.nedcc.org/resources/suppliers.php. Examples of particular items given in the text are intended as illustrations, not recommendations of one supplier over another.

I. Collection Management

A. Mission Statement & Collection Policies

The mission of the Maynard Historical Society is “the collection, preservation, promotion and development of the historical heritage and artifacts of the Town of Maynard.” The collections are managed primarily by a group of three volunteers who have collaborated on a Collection Manual that is presently in draft form. The manual is already fairly well-developed, and it promises to be a valuable document for governing the collections. It assigns responsibility for collections stewardship to a Collections Committee, and it outlines and addresses acquisition (procedures and criteria for); accessioning and deaccessioning; receipts of gift and maintaining records of provenance; cataloging; digitization (including guidelines for selection); maintenance of “born digital” objects; loans; and ethics.

- **Create a preservation policy, and consider including it in the Collection Manual.** This policy should include security guidelines, including requirements for using the collection; procedures for environmental monitoring, and target levels for temperature and relative humidity; storage and handling practices; and maintaining records of conservation treatment. For more information about developing appropriate policies, see preservation leaflet 1.5, “Collections Policies and Preservation,” in PLAM3 or online at www.nedcc.org.

B. Staffing & Budget

MHS collections are maintained entirely by a group of eight dedicated volunteers. Peg Brown, Dave Griffin, and Paul Boothroyd are the primary persons responsible for preservation. Since the collections were moved to the Paymaster Building at Clock Tower Place in 2008, the volunteers’ main focus has been on organizing the collections as a first step toward making them available to the public.

There is no specific budget line for preservation, but the Society recently purchased shelving for the small artifact collection and archival enclosures. Funds came from membership dues and fundraising. In the spring of 2009, MHS successfully applied for funding for the present survey through the Town’s Community Preservation Act.

- **Once MHS makes its collections accessible to the public, volunteers should start keeping use statistics.** Documented use of the collections—whether in-person or through remote reference—will support MHS’s fundraising efforts.

C. Intellectual Control

The collections are well-organized in the aggregate: large and small artifacts are stored separately from the archives. The archives are partially organized by format

and/or subject (for example, volunteers have begun to separate photographs from other unbound materials). Various sub-collections are being identified. Guides to the collections have not yet been created, but the volunteers plan to begin cataloging after completing their overall organization. They will use the open-source Collective Access to maintain collection records. The Collection Manual states that redundant copies of collection records will be kept.

Until 2009, a formal accessioning process had not been used for approximately 15 years, though MHS has acquired many materials in that time. Previously, accession records were kept on index cards that included an accession number, a description of the item, and donor information. MHS still has these cards, which are organized by accession number in file drawers. Volunteers recognized the need to formally accession materials into the collection, and have established necessary procedures in the Collection Manual. They have also created an accession form. Accession records will be entered into the collection database.

- **It is excellent that the volunteers have developed steps for accessioning and cataloging the collections.** The procedures outlined in the Collection Manual are professional, and MHS should move forward with implementing them.
- **To ensure that professional standards are followed, at least one volunteer who will be responsible for the arrangement and description of archival collections might consider attending a workshop on best practices for archives.** Archival collections are different from library and museum collections in that materials tend to have value in groups rather than individually. Arrangement and description practices for archives focus on maintaining the context of a collection's creation. Continuing education workshops are offered by organizations such as the American Association for State and Local History (www.aaslh.org) and the New England Archivists (www.newenglandarchivists.org).

D. Preservation Achievements & Planning

Since moving the collections to Clock Tower Place in 2008, MHS volunteers have accomplished a great deal towards making the collections accessible and available to the public. These activities are mentioned throughout this report, but to summarize here, they include:

- Creation of a professional Collection Manual;
- Overall organization of the collections by separating artifacts and archives;
- Purchasing shelving for the small artifacts;
- Purchasing rehousing supplies (chemically stable boxes and folders), and beginning the rehousing of archival collections;
- Microfilming a portion of the newspaper collection;
- Applying for CPA funds to support preservation activities.

It was obvious during the site visit that the collections are being maintained by an extremely careful and conscientious group of volunteers. With continued support from

MHS members and from the Town, the materials under their care—which document not only the history of Maynard, but also aspects of New England history and national history—could be made available to a wide range of researchers and preserved for generations to come.

- **Use the recommendations in this report to prepare a long-range preservation plan for the archives.** The preservation plan should be a written document that is used for both short- and long-term planning. Preparation of a plan should begin as soon as possible, but expect its completion to take time. For more information, including worksheets that can be used in preparing the plan, see Sherelyn Ogden's *Preservation Planning: Guidelines for Writing a Long-Range Plan* (American Association of Museums and Northeast Document Conservation Center, 1997).
- **The preservation plan should be considered a living document, and revisited annually.** Periodic revision will be needed as circumstances change, preservation needs are addressed, and new ones are identified.

II. The Building & Environment

A. The Building

MHS has resided since 2008 in temporary headquarters donated by Clock Tower Place. Its space is located on the second floor of the two-story “Paymaster Building,” a small unit that is physically separate from the adjacent mill complex. Constructed in the early 20th century, the building originally housed the executive offices of the mill. It houses a doctor’s office on the first floor. The building was renovated in the 1980’s by Digital Equipment Corporation; another renovation began in the 2000’s but was left incomplete. Walls and ceilings are unfinished, and the space is illuminated with sunlight and construction lighting, but the building appears to be in good condition. Maintenance is performed by Clock Tower Place facilities personnel, but MHS volunteers do not know the frequency with which maintenance activities take place. It is not known whether a log is kept of building maintenance and problems.

Even though the present storage space is temporary, the volunteers do not know how temporary, and the potential exists for the collections to reside in the current building for some time. It is therefore essential that volunteers start to develop a knowledge of the building and its systems, and to initiate a system of reporting problems and keeping a log of building issues. Even if MHS found a permanent home in a year or two, starting these practices now will make them a matter of routine in a new facility. To protect MHS collections to the best of their ability, it is important that the volunteers take “ownership” of their space to this extent.

- **Ask Clock Tower Place facilities personnel for more information on its schedule for inspecting and maintaining the building and its systems (e.g., HVAC and drainage).** Developing a relationship with the personnel responsible for these activities will provide volunteers with an avenue for learning more about the building and systems, and for reporting problems. It could also enhance cooperation and speed response time in the event of a collections emergency.
- **Start keeping a log of any building-related problems that may be discovered, and record when and how the problem was resolved.** A log will help volunteers to identify recurring problems, and it will preserve institutional knowledge long-term.
- **Conduct a walk-through of collections storage areas before leaving at the end of the day to spot any emerging problems.** Starting this practice will also allow volunteers to become more familiar with the building envelope.

B. Temperature, Relative Humidity (RH) & Air Quality

The building has a central HVAC system that can provide year-round climate control. MHS spaces are zoned separately from the doctor’s office on the first floor. Very little information was otherwise available about the system. Its hours of operation and

inspection and maintenance schedule are unknown to MHS volunteers. It is also unknown whether the system was designed to maintain constant temperature or RH levels. While, as noted, the system can operate year-round, it is only “partially active.” Environmental monitoring is not performed, but temperatures reach uncomfortable levels in the summertime, believed to be as high as 90°F. The space is “livable” in the wintertime. Mold growth affected some materials in one of the two previous storage spaces (an abandoned high school locker room and the basement of the old town hall), but it has not developed in the current space.

- **Monitor collections storage areas for mold during periods of high external humidity.** Without continuously-operating climate control equipment, a spike in relative humidity (above 50%) lasting more than 24 hours could activate mold spores. It should be noted that materials that have been exposed to mold growth in the past are more susceptible to repeat outbreaks.
- **Begin ongoing environmental monitoring.** Maintenance of proper storage conditions is one of the most effective ways of extending the longevity of archival materials. Volunteers can use environmental monitoring readings to take remedial climate control measures—such as using a dehumidifier and increasing air circulation when the relative humidity starts to exceed 50%. For more information about environmental monitoring, including an overview of the various environmental monitoring devices available and information about the proper placement of the devices, see preservation leaflet 2.2, “Monitoring Temperature and Relative Humidity,” in PLAM3, or online at www.nedcc.org.
- **Use portable dehumidifiers to lower the relative humidity when it exceeds 50%.** Note that dehumidifiers will need to be emptied regularly, especially before closing time each day to ensure that standing water does not recirculate into the environment, causing the humidity to rise overnight.
- **Ultimately, the collections should be stored in a space with year-round, 24/7 climate control.** Sudden spikes or dips in temperature and relative humidity drive the deterioration of library and archival materials, so climate control equipment should operate in a way that reduces the extent of seasonal fluctuations in the storage environment. For example, a winter temperature of 65°F and a summer temperature of 75°F would be acceptable, as long as the shifts happen gradually (i.e., monthly shifts not exceeding $\pm 3^\circ\text{F}/3\%\text{RH}$). Environmental monitoring is a critical component of fulfilling this goal because the data it yields will be used to help volunteers and facilities personnel determine when adjustments to the HVAC system are needed.
 - **As with temperature, it is acceptable for RH to fluctuate seasonally (e.g., 35% in the winter and 50% in the summer).** However, to prevent mold outbreaks and insect infestations, it should always be kept below 50%.

C. Protection from Light

All collections storage rooms receive abundant natural light from tall windows. (Figure 1) Artificial illumination comes from compact fluorescent lamps installed as “construction lighting.” Windows facing east have mini blinds that are kept partially closed. Materials not stored in closed boxes or cabinets receive a great deal of sunlight. (Figure 2)



Figure 1.



Figure 2.

- **Install window coverings on all windows in rooms housing collections, and keep blinds closed on windows that already have them.** The coverings need not be expensive, and should simply serve the purpose of blocking as much light as possible out of the storage environment. Exposure to light causes premature embrittlement and fading.
- **Avoid storing materials in direct sunlight.** Materials stored in the open should be transferred to protective enclosures.

D. Protection from Fire

The entire building has a wet-pipe fire suppression system, which is excellent. Smoke detectors are located in the stairwell and second-floor hallway, but none are installed in the individual rooms occupied by MHS collections. Fire alarms are connected to the Clock Tower Place security station and to the Maynard Fire Department. Fire detection and suppression equipment are inspected annually by Clock Tower Place and the Maynard Fire Department. Portable fire extinguishers are not available. It is believed

that the building is inspected annually by the fire department. Annual fire drills are conducted by Clock Tower Place in concert with the fire department. Smoking is not permitted in any Clock Tower Place buildings.

- **Install smoke detectors in each of the collections storage rooms.** Ideally, the detectors would also be wired to the building-wide system, but even if they cannot be, a local alarm is preferable to no alarm at all.
- **The building housing MHS collections should be inspected annually by the local Fire Department.** Volunteers should confirm whether or not annual inspections take place in their current location.
- **Install at least one portable fire extinguisher on the second floor, and seek training in fire extinguisher use from the local Fire Department.** For more information on the number and placement of extinguishers, see NFPA 10: Standard for Portable Fire Extinguishers. This publication can be read online free of charge at www.nfpa.org.
- **If MHS relocates, it should seek another building with a fire suppression system installed throughout.** Wet-pipe systems are ideal for cultural heritage institutions because they are relatively inexpensive to maintain, and they have a low failure rate. For more information about the various options for fire suppression systems, see the Appendix to this report, as well as preservation leaflet 3.2, "An Introduction to Fire Detection, Alarm, and Automatic Fire Sprinklers," in PLAM3 or online at www.nedcc.org.

E. Protection from Water

The Paymaster Building has a flat roof. Information about its composition, and about the schedule for its inspection and maintenance, was unavailable. Drainage is effected by downspouts. Water detectors are not installed in collections storage areas, but there have been no problems with leaks or seepage. Numerous items are at risk of water damage because they are stored on the floor. These include architectural drawings, newspapers, framed items, and boxes of archival materials in the meeting room.

- **Raise collection materials off the floor by at least four inches to prevent damage in the event of a water emergency.**
- **Work with Clock Tower Place facilities staff to ensure that the roof and drainage on the Paymaster Building are inspected and maintained at the end of fall and spring and after severe storms.** Drainage should be cleaned according to this schedule, or more frequently if needed to ensure that it works properly.
- **Assemble a disaster response kit for water-damaged materials.** A list of recommended supplies is included in the "Worksheet for Outlining a Disaster Plan," leaflet 3.4 in PLAM3, and online at www.nedcc.org. Alternatively, the library might

consider purchasing a React-Pak, available from ProText (www.protext.net) as well as other suppliers. Although purchasing a prepared kit is more expensive than buying the supplies separately would be, the convenience may outweigh the extra expense.

- **As recommended in Section II.A, conduct a walk-through of collections storage areas before leaving at the end of the day to spot any emerging problems (e.g., water leaks).** Be especially vigilant during heavy rains and periods of extreme cold (when pipes can freeze).

F. Emergency Preparedness

MHS does not have a written disaster plan for the collections. Volunteers have not been trained in disaster response or recovery.

- **Prepare a disaster plan for the collections.** See the “Worksheet for Outlining a Disaster Plan,” leaflet 3.4 in PLAM3 or online at www.nedcc.org. MHS might also consider using dPlan™, NEDCC’s free, online disaster planning tool, available at www.dplan.org.
 - **Share the disaster plan with all MHS volunteers so that they will be prepared to assist in the event of an emergency.**
 - **Keep copies of the disaster plan off-site, in the event that the building is inaccessible in an emergency.**
 - **Review the disaster plan annually and update contact information as necessary.**
- **As recommended above, assemble a disaster response kit for water-damaged materials.**
- **At least one volunteer should receive training in disaster preparedness and recovery for cultural collections.** The Massachusetts Board of Library Commissioners is one local organization that offers one-day workshops on these topics. For more information, see the online workshop calendar at <http://mblc.state.ma.us/advisory/workshops/calendar.php>.
- **Another excellent resource is Heritage Preservation’s Field Guide to Emergency Response.** If volunteers cannot attend hands-on training, this guide, which includes an instructional DVD, would provide valuable information on responding to a disaster, including techniques for stabilizing collections. For more information, see www.heritagepreservation.org/catalog/#DisasterBooks.

G. Pest Management & Housekeeping

There have been no problems with pests anywhere in the building. A few items in the collection, including ledger books and tape reels, have mold on them. (See Figure 11, below) On the pre-survey questionnaire, Mr. Griffin noted that his biggest preservation concern is “mold or other contaminants moving from non-critical to critical items.” Food and drink are not permitted around collections. Aside from occasional vacuuming, no housekeeping is performed. It is unknown whether routine chemical extermination is performed inside the building.

- **Use sticky traps to monitor the collections storage rooms for any signs of insect infestation.** This will help the volunteers determine the extent of any problem that does arise. Moreover, knowing which pests are entering the areas will help in choosing the most effective preventive strategies and avoid chemical extermination. See “Integrated Pest Management,” leaflet 3.11 in PLAM3 (or online at www.nedcc.org) for more information.
- **Any items believed to be contaminated with mold should be isolated from the rest of the collection, and cleaned.** For more information, see preservation leaflet 3.8, “Emergency Salvage of Moldy Books and Paper,” in PLAM3 or online at www.nedcc.org. It should be noted that mold seen during the site visit appeared to be inactive, and it was limited to only a handful of items.
- **Initiate a stacks cleaning program.** Volunteers should clean shelves and boxes on a regular schedule (once a year is generally recommended). For information on proper cleaning techniques, see “Cleaning Books and Shelves,” leaflet 4.3 in PLAM3, or online at www.nedcc.org. The online version of this leaflet contains links to additional resources on this topic.
- **Determine whether routine chemical extermination is performed in the building.** If it is, see whether collections storage areas can be excluded. MHS should use integrated pest management (IPM) practices to prevent infestations, relying on chemical extermination only as a last choice.

H. Security

The building is accessible by a key held by the MHS, by staff from the doctor’s office on the first floor, and by Clock Tower Place security and facilities staff. There is no security alarm, but Clock Tower Place does have security guards that make rounds of the campus. There are also locks on the windows. The collections are stored in two main suites, each of which has its own door. The suites are kept locked when MHS volunteers are not present; only two people have keys. Unfortunately, each of the storage rooms has windows, which present a potential access point for intruders. While this risk may be lowered somewhat because the space is situated on the second floor, intrusion through one of the windows would not be impossible. Materials are not yet accessible to researchers.

- **Continue to limit the number of keys in circulation to collections storage areas.**

- **In preparing to make the collections available to researchers, MHS should develop a security policy.** The policy should outline procedures for registration of researchers and guidelines for use (e.g., limiting the number of items used at one time). It should also outline standard operating procedures for addressing a theft. For more information, see preservation leaflet 3.11, “Collections Security: Planning and Prevention for Libraries and Archives,” in PLAM3 or online at www.nedcc.org. Also see the ACRL/RBMS “Guidelines Regarding Security and Theft in Special Collections,” available online at www.ala.org/ala/mgrps/divs/acrl/standards/security_theft.cfm. This document was approved in 2009 and contains the most current accepted best practices.
- **Develop a registration form for use of the collections.** The form should be dated and signed by the researcher, and it should be retained indefinitely. Researchers should also be required to present a photo ID at the time of registration, and every time they check in to use the materials. For a sample registration form, see preservation leaflet 3.11, “Collections Security: Planning and Prevention for Libraries and Archives,” at www.nedcc.org.
- **Ideally, collections storage spaces would be windowless.** MHS should consider this if it moves to a new building. If it were to remain in the Paymaster Building, if possible, windows could be boarded up (which would also solve the problem of light penetration). In the meantime, volunteers should perform a daily check to ensure that all windows are locked.

III. Collections Storage & Handling

A. Storage Furniture & Space

The bulk of MHS's collections are stored in two office suites. The first suite consists of two rooms and a small foyer, and is dedicated primarily to housing large artifacts. One room serves as a staging area for incoming materials of all kinds (artifacts and archives) awaiting accession. The second suite consists of three rooms and a large foyer, and is dedicated to housing small artifacts and archival collections. Small artifacts have been segregated into one of the three rooms. A second, small room houses framed materials; the foyer and the third, large room house bound and unbound archival materials. MHS's newspaper collection is stored in a large room adjacent to both office suites.

Storage furniture includes wire rack shelving (for small artifacts); metal roller shelving (for the newspapers); wooden flat file units (which are not used); metal file cabinets; and one wooden file cabinet. MHS lacks adequate shelving for bound volumes and archival materials. For the most part, bound and unbound materials alike are stored in file cabinet drawers, which subjects them to movement as drawers are opened and closed. As explained in Section II, MHS could acquire a large collection of architectural drawings of the Clock Tower Place facility. It presently lacks storage furniture for these materials.

- **Acquire appropriate shelving for bound and unbound materials.** Shelving should be constructed of powder-coated steel or anodized aluminum, and it should be deep enough to fully support its contents (i.e., books and boxes should not hang past the shelf edge). Twelve- or fourteen-inch-deep shelves would be ideal. As space permits, it would also be a good idea to purchase some double-faced shelving, so that oversize items (e.g., large books or flat boxes) can be stored across the surfaces of two adjoining units. Canopy tops should be purchased and installed to protect items on the top shelf from water, dust and debris.
- **If MHS ever acquires the Clock Tower Place architectural drawings, it should also acquire powder-coated steel flat file units to store them.** Units should be stacked no more than two-high on a steel base at least four inches high to provide adequate floor clearance. Keep in mind that drawings will need to be placed in folders (though not necessarily individually), which will add bulk to the collection. Storage solutions for these materials will be addressed in greater detail in Section III.D below.

B. Handling Practices

Collections are managed entirely by a core group of careful, dedicated volunteers. They have not yet been trained in proper collections handling techniques. As noted,

the collections are not yet open for research, so they are not handled by the general public. Use of the collections until recently was characterized as “light and unintentionally abusive.” Materials are not photocopied because MHS does not have a photocopy machine. It was noted during the site visit that adhesive labels were used a number of years ago to affix accession numbers to items. (Figure 3) Many folders are labeled in ink. The volunteers have work surface that is large enough to allow oversize materials to be viewed safely, which is good.



Figure 3.

- **All volunteers should become familiar with proper collections handling techniques.** See the guidelines provided in NEDCC preservation leaflet 4.1, “Storage Methods and Handling Practices,” in PLAM3 or online at www.nedcc.org. Other good resources include:
 - **Harvard Libraries’ PowerPoint presentation “Care and Handling of Archives and Special Collections Materials,”** available at <http://preserve.harvard.edu/education/presentations.html>
 - **The British Library’s “Using the Collections” videos,** available at www.bl.uk/aboutus/stratpolprog/ccare/collectioncarevideos/index.html
- **Purchase white cotton gloves to use when handling photographic prints, negatives and slides.** These are available from library, archives and conservation suppliers such as University Products, Talas, and Gaylord.
- **Also consider purchasing a book cradle to use when viewing fragile books.** See, for example, the Norfolk Book Sofa, item number 805-3271 from University Products (www.archivalsuppliers.com), or Gaylord’s book mount system (available in three sizes), item number WW-52171 at www.gaylord.com. Other suppliers will have similar products.

- **Avoid placing adhesive labels on materials of permanent value for any reason.** Adhesives can cause permanent damage, and as they deteriorate, the labels fall off, leaving residue that attracts dirt.
- **Avoid labeling folders in ink.** All labeling of folders should be done only in pencil. Folder contents that come into contact with ink can become stained, and any water-soluble inks that come into contact with water (as in the event of a water-related emergency) can bleed, causing staining of items and possible erasure of labeling information.
- **Prepare a list of handling guidelines, and incorporate them into the collection management policy to help ensure that they remain in place over time.** New volunteers should be asked to review the guidelines before they begin handling collection materials.
 - **When the collections are made available to the public, make handling guidelines available to researchers.** Some repositories ask researchers to read and then sign a copy of the policy upon registration. Others place “table tents” with this information on work tables.

C. Storage of Bound Materials

Books

Books in the collection include numerous ledger volumes (e.g., account books, meeting minutes, payroll books), scrapbooks, valuation lists, handwritten personal diaries, bound newspapers, and a few published volumes with associational value. Most volumes are stored flat, either on top of a file cabinet, in file cabinet drawers, on top of a table, or in plastic bins. A few are stored on fore edge in a cardboard box. Some are in fair to poor condition, with loose covers, skewed bindings, or missing spines. (Figures 4, 5) Oversize volumes (e.g., the valuation lists) are stacked on top of lateral files, or on the floor (e.g., bound newspapers).

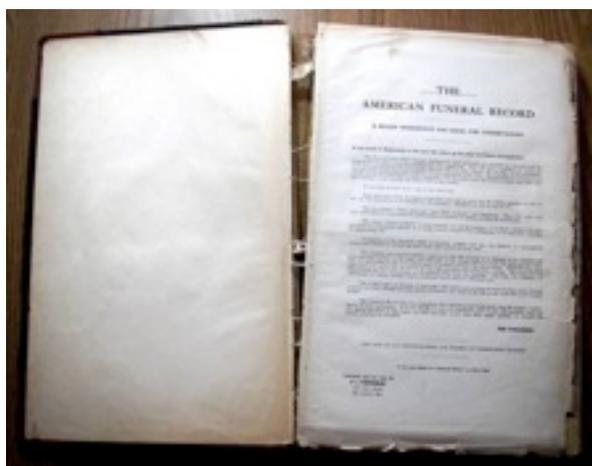


Figure 4.

Figure 5.

- **Place fragile or damaged volumes in custom phase boxes.** Phase boxes will provide structural support, and will protect volumes as they are moved on and off shelves. They will also provide protection against light, dust, and water. Custom-fitted CMI Micro-Climate™ boxes are highly recommended by NEDCC's book conservators. They are available from around \$8.00 each through Custom Manufacturing, Inc. (www.archivalboxes.com).
- **Non-oversize volumes in good condition should be shelved upright, and supported with non-knifing bookends.** Upright shelving will provide volumes with needed structural support. For an example of a "non-knifing" bookend, see item number WW-168-3-01 from Gaylord (www.gaylord.com).
- **Improve storage of oversize volumes by storing them in shallow stacks no more than two or three volumes high.** Oversize volumes can be difficult to keep upright, and for this reason, they are best stored flat. Needless to say, this is intended as a longer-term recommendation since it will require additional shelving, but it should be factored into planning.
- **Avoid storing volumes on fore edge.** This causes a volume's text block to pull away from the spine. Oversize volumes that cannot be stored flat, or non-oversize volumes that cannot be stored upright due to lack of space, should be turned onto their spines to prevent further structural damage.
- **Raise volumes off the floor by at least four inches to prevent them from being damaged in the event of a water leak.**

Pamphlets & Booklets

Pamphlets and booklets in the collection include town reports, taxpayer lists, paper-bound yearbooks, and programs from local events. These items are housed in the subject files (in file folders of unknown quality and file cabinet drawers), or are stacked in drawers, various boxes, or a plastic bin. Taxpayer lists are housed upright in archival flip-top document boxes. The collection of town reports has been divided into preservation copies and use copies, which is good.

- **Transfer booklets (such as town reports and yearbooks) to flip-top shelf files.** Enclosures will protect these items from light, water and dust, as well as provide them with greater stability on the shelf so that they remain upright. See, for example, item number WW-EFCROC1 from Gaylord (www.gaylord.com).
- **Individual pamphlets and booklets housed in folders with unbound materials should be transferred to a separate folder.** This will prevent damage to adjacent items such as documents and photographs, which are lighter and/or smaller and can slip under heavier items and become crushed or torn.

D. Storage of Unbound Materials

Documents & Manuscripts

Most document and manuscript materials reside in older file folders in file cabinet drawers. Many items are mixed in with newspaper clippings, a few photographs, booklets, pamphlets, and ephemera. (Figure 6) Some items are relatively small (e.g., small certificates or receipts), and could be stored more safely in polyester folders or sleeves within the paperboard folders. Hanging files are not generally used, which would improve physical support, but following blocks are generally used for this purpose at the backs of drawers, which is good. In some instances, documents are folded, and can be found in old manila envelopes or other conventional-quality enclosures. Paper clips can be found on materials throughout. Some subject file materials (e.g., Town Organizations, Private Organizations, Transportation) have been housed in acid-free Perma-Dur™ archival folders and hanging files.

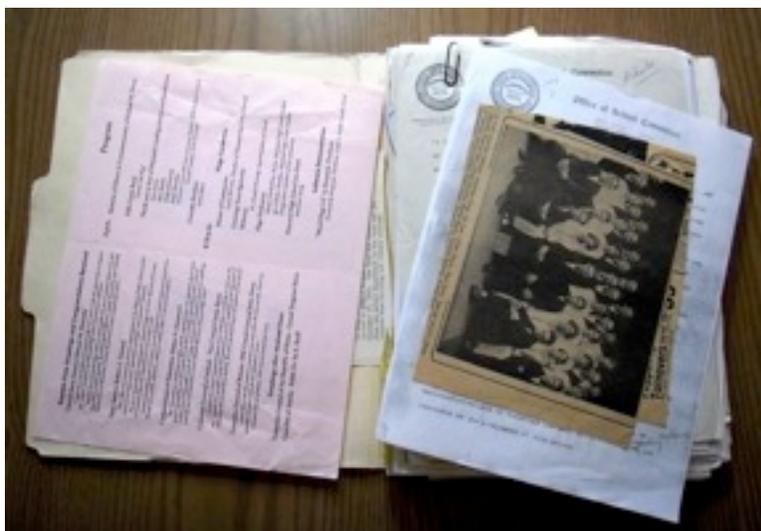


Figure 6.

- **Ultimately, all unbound materials should be transferred from file cabinet drawers to archival boxes.** Flip-top document boxes or half-size records storage cartons are recommended because they are relatively easy to handle. Boxes should be acid-free, lignin-free, and buffered.
- **The work of re-folding items in Perma-Dur™ folders, or folders of a similar quality (i.e., acid-free, lignin-free, and buffered) should continue.**
- **Smaller items, such as receipts and small certificates, that are stored with larger papers, should be placed in polyester L-sleeves to prevent them from slipping out of folders unnoticed.** See, for example, item number WW-ESM810L from Gaylord.

Oversize & Framed Materials

Oversize materials include maps, newspapers, and architectural drawings. A number of maps are stored horizontally in rolls in a blue-grey archival box. As explained above, MHS has not formally acquired the architectural drawings, of which there are several hundred, but it may acquire them at some point in the future. They are stored in stacks on tables and on the floor (Figure 7), and inside cardboard tubes. Other rolled oversize materials (possibly maps) are stored upright in a cardboard box on top of a file cabinet in the main reading/processing room.

The majority of framed materials—including photographs, documents, and broadsides—are stored on the floor, in boxes and leaning against walls in a small room with two windows. (Figure 8) Most, if not all, framed items are backed with acidic materials (e.g., wood and/or old cardboard). A few small framed items are stored flat in a file cabinet drawer.



Figure 7.



Figure 8.

- **Unbound oversize items should be transferred to heavy folders and oversize boxes.** Rolled items should be opened and stored flat. Folders will prevent individual items from sliding around inside the box and will allow them to be more carefully handled and more easily identified. They should be made of 10-point or 20-point folder stock and cut to fit the dimensions of the box. Item number KB-M3042 from Gaylord is one example; these folders are available in several sizes.
 - **In general, several items may be placed in the same folder, but they should be items of like size.** An exception should be made for items that are fragile, which should be housed individually.
- **As recommended in Section III.A above, if MHS ever acquires the Clock Tower Place architectural drawings, it should also acquire powder-coated steel flat file units to store them.** Flat files for a collection this large would provide the most efficient means of storage and access.

- **Ultimately, the architectural drawings in cardboard tubes should be removed from the tubes and transferred to folders and flat file drawers.**
- **Avoid using alkaline-buffered folders for blueprints.** The imaging chemicals used to produce blueprints can be damaged in an alkaline environment.
- **Framed items that will be retained permanently, and that can fit into standard-size boxes, should be placed in individual acid-free, lignin-free boxes lined with chemically stable polyethylene foam (e.g., Volara® or Ethafoam®).** Larger items can be stored upright in one of the following ways:
 - **By placing them on padded blocks at least 4” high.** Padded blocks can be made in-house; see Canadian Conservation Institute, “Making Padded Blocks,” CCI Notes 10/2 (available at www.cci-icc.gc.ca/) for instructions. Try to avoid leaning framed items against shelves holding other materials as well as exterior walls.
 - **In storage bins for framed materials.** See, for example, the “Art File,” item number 51224-0000 from Dick Blick (www.dickblick.com). The bottom of each bin should be padded with polyethylene foam, and bins should be placed on a base raising them at least four inches off the floor to protect materials from moisture.
- **If their value merits it, framed items backed with acidic materials (such as wood and cardboard) should be reframed with archival-quality materials.**

Photographic Materials

The collections include hundreds of photographs. Many of these were mounted a number of years ago on cardboard that is becoming brittle and has, in some cases, started to break apart. Mounted and unmounted photographs are generally stored in hanging files in file cabinet drawers. Most are stored in hanging files without protective, chemically stable folders. Some smaller photographic prints are stored in polyethylene bags; with several prints are stored in each bag, items can easily slip out. Slides are housed mostly in plastic cases stacked in a large cardboard box. One file cabinet drawer contains a number of rolled-up photographs, some of which are somewhat brittle or have already become torn. A small wooden box of glass lantern slides is stored in a narrow file cabinet drawer. Three vinyl binders contain photographic prints, mounted and unmounted, in plastic pages of unknown quality. Some prints and slides are stored in Perma-Saf™ polypropylene pages and Vue-All™ sleeves in an archival binder box. Larger mounted photographs are stored in stacks in file cabinet drawers.



Figure 9.

- **Ensure that all enclosures for photographs have passed the Photographic Activity Test (PAT).** The PAT (ISO Standard 14523) determines whether a product contains properties that will react with photographic images to cause deterioration. Product descriptions in library and archival supplier catalogs such as Gaylord, University Products and Light Impressions will indicate whether an item has passed the PAT.
- **Transfer photographs mounted on cardboard to folders and drop-edge archival storage boxes, and store them flat.** As noted, the cardboard mounts are already starting to disintegrate. Flat storage will provide better overall support.
- **Unmounted photographs in hanging files, or otherwise stored in file cabinet drawers, should be transferred to archival folders and boxes.** These materials can be stored flat or upright, but either way, a box would provide housing that is less prone to frequent motion.
 - **If photographs are stored upright, spacer boards should be used to keep folders upright in boxes that are only partially full.**
- **Rolled photographs should be examined by a conservator.** The emulsion and support layers have likely weakened from bending, and could break when the photographs are unrolled.
- **Transfer the lantern slides to four-flap enclosures and an acid-free, buffered storage box.** Look for four-flap enclosures and boxes manufactured specifically to fit standard-size (3 ¼" by 4 ¼") lantern slides. See, for example, item number 4F348-MC (MicroChamber four-flap enclosures) and 843MCS (MicroChamber

lantern slide box) from Conservation Resources, International (www.conservationresources.com). The four-flap enclosures will prevent the slides from scratching.

- **Because glass lantern slides are very susceptible to breakage if not stored properly, they are more safely stored on shelves rather than in drawers.**
- **Slides not already stored in them should be transferred to polyester, polyethylene, or polypropylene slide pages and stored in an archival binder box.** Alternatively, as appropriate, slides can be stored in slide pages placed in individual folders in an archival box.

Newsprint

The bulk of the Historical Society's newspapers are stored on metal roller shelves in the large room with the Clock Tower Place architectural drawings, where they are housed in conventional cardboard boxes as they were returned from microfilming. Several stacks of newspapers papers are folded and tied with string. Smaller stacks of newspapers and clippings are stored in file cabinet drawers in the foyer.



Figure 10.

- **Photocopy newspaper clippings onto acid-free, lignin-free, buffered paper, then discard the clippings.** If the clippings are to be retained, they should be separated from the photocopy, either by being placed in a polyester folder or by placing a piece of alkaline-buffered paper between the clipping and the copy. Acid from the clipping will migrate to the acid-free copy if the two are not separated.

- **Unbound newspapers should be transferred to oversize, flat archival boxes.** The boxes should be acid-free, lignin-free, and buffered. Folded newspapers should be unfolded for storage if the process of unfolding them will not cause damage.

Photo Albums & Ephemera

Several velvet-covered photo albums are stored in stacks in a drawer or stacked on a table in front of a window, and a small album of tintypes is stored in a file cabinet drawer. Ephemera include postcards, stereoscope cards, calendars, and paper and plastic shopping bags. Postcards are stored in plastic sleeves of unknown quality in a vinyl album, as well as stacked in a narrow file cabinet drawer. Stereoview cards are stored upright in a cardboard box as well as flat in a narrow file cabinet drawer. Calendars and shopping bags are stacked in file cabinet drawers.

- **Place photo albums in individual acid-free, lignin-free, buffered boxes that fit their dimensions as closely as possible.** CMI boxes, recommended in Section III.C above, would be ideal for this purpose. Boxes will provide protection from dust and water.
- **Postcards can continue to be stored in albums, but they should be transferred to stable polyester sleeves and archival binder boxes.** Alternatively, postcards can be rehoused in archival postcard boxes, such as item number 780-PC from University Products (www.archivalsuppliers.com). Postcards stacked in file cabinet drawers should be rehoused according to one of these options.
- **Stereoscope cards should be rehoused in a shallow-lid box, and individual cards should be placed in polyester sleeves to protect them during handling.** See, for example, item numbers WW-B4712T (stereo box) and WW-PN37A (stereo sleeves) from Gaylord (www.gaylord.com). Note that the sleeves come in two different sizes.
- **Paper and plastic shopping bags should be stored flat in individual archival folders and a drop-edge box.** Because the plastic bags are likely to off-gas chemicals that are harmful to paper, paper and plastic bags should be stored in separate boxes.

Audiovisual Materials

The collections hold several dozen audiovisual recordings, in formats including acetate reels, vinyl record albums, audio cassettes, 8-mm reels, and 5-inch reels. A few of the reel tapes are moldy. (Figure 11) Items are stored in stacks in file cabinet drawers. Reels are housed in steel canisters, manufacturer's boxes, or a manila envelope; a few were not in any type of enclosure. Vinyl record albums are housed in cardboard or paper sleeves. Cassettes are housed in plastic cases.



Figure 11.

- **Moldy recordings should be placed in boxes and segregated from the rest of the collection.** Boxes should be clearly marked to indicate that they contain moldy items, and to prevent contamination, they should not be opened (except by the reformatting vendor).
- **Recordings that will be retained permanently should be reformatted onto stable, widely-supported media.** Two vendors who provide reformatting services are ColorLab (www.colorlab.com), for film conversion, and Safe Sound Archive (www.safesoundarchive.com), for audio conversion.
 - **MHS should have a preservation master and at least one use copy of each recording created. The masters and copies should be stored in different locations to prevent total loss of information in the event of a disaster.**
 - **Masters and copies should be housed in chemically stable enclosures.** The library and archival vendors mentioned elsewhere in this report offer enclosures specific to particular formats.
- **Note that audiovisual materials are extremely sensitive to high temperatures and humidity.** They are best kept in a storage environment with year-round climate control, with temperatures kept between 40 and 60°F and with relative humidity at 40%.
- **When MHS acquires shelving, audiovisual materials should be moved out of file cabinet drawers and onto shelves.**

E. Exhibition

A few photographs are on permanent display in the Town Hall. The possibility has been discussed of having rotating exhibits at the public library, and Clock Tower Place has offered some space for display in one of its buildings. The space was not viewed during the site visit, but it was reported that a great deal of work would be needed to make it appropriate for exhibition. As MHS makes its collections accessible to the public, other area organizations may express an interest in borrowing materials for exhibit. A general loan policy is in place in the Collection Manual, but it does not cover requirements for security, environmental conditions, limiting exposure to light, or item-appropriate display techniques. An exhibition policy (for exhibitions created by MHS) has not yet been created.

- **Avoid placing rare or unique materials on permanent exhibit.** Light damage occurs even under low light levels, though it may be imperceptible initially. MHS should consider replacing the originals with copies.
- **As much as possible, display copies of materials in place of originals.** For documents and photographs, photographic reproductions or color copies should always be made for exhibition purposes.
- **In further developing its Collection Manual, MHS should create more specific policies for loans and exhibits.**
 - **The loan policy** should outline specifications for environmental conditions (including temperature, RH, and light levels); fire protection; security; transportation; and use of appropriate mounts.
 - **The exhibition policy** should include guidelines for exhibit duration; selection criteria, including the person or persons responsible; condition limitations; specifications for environmental conditions; security for exhibit cases and space; and use of appropriate mounts.
- **For more information on proper exhibit techniques, see NEDCC preservation leaflet 2.5, “Protecting Book and Paper Collections During Exhibition,” in PLAM3 or online at www.nedcc.org.**

IV. Replacement & Treatment Strategies

A. Reformatting: Preservation Photocopying, Microfilming & Digitization

The majority of MHS's newspaper collection was microfilmed by New England Micrographics approximately ten years ago. Volunteers are not certain where the master negatives are stored, and they have not yet reconciled the films with the original materials to determine which materials still need to be filmed. As explained in Section IV.D, the collections hold a number of audiovisual items that will need to be transferred to stable, widely-supported media to ensure that the recordings remain available. Newspaper clippings can be found interspersed throughout the archival collections.

- **Inventory microfilms and check the inventory against the newspaper collection to determine which papers still need to be filmed.** MHS should plan to film any newspapers that have not been filmed.
- **Determine the location of the master microfilm negatives, and ensure that each one has a duplicate negative and a use copy.** Master negatives should not be used for access, and should be used only for duplication in the event that the duplicate negative were destroyed. They should be stored in a separate location from the duplicate negative and use copies, to ensure that the information they contain is preserved in the event of a localized disaster.
- **To preserve the information they contain, consider microfilming collections of unique materials.** Microfilm could also be digitized for access. For more information, see the Research Libraries' Group's "RLG Guidelines for Microfilming to Support Digitization," available at www.oclc.org/research/activities/past/rlg/presmicrofilm/microsuppl.pdf.
- **As recommended in Section IV.D above:**
 - **Photocopy newspaper clippings onto acid-free, lignin-free, buffered paper, then discard the clippings.** If the clippings are to be retained, they should be separated from the photocopy, either by being placed in a polyester folder or by placing a piece of alkaline-buffered paper between the clipping and the copy. Acid from the clipping will migrate to the acid-free copy if the two are not separated.
 - **Identify audiovisual recordings that will be permanently retained, and have them transferred to stable, widely-supported media.** MHS should plan to refresh the recordings onto new media every 5 to 10 years.

B. Library Binding

Library binding is not performed on MHS collections. Because library binding is not appropriate for materials of special value, this practice should continue.

C. In-House Repair & Professional Conservation Treatment

MHS has not had materials treated by a professional conservator, nor are materials repaired in-house. Two items of special concern to the volunteers include a collection of receipts attached to a wooden clipboard (Figure 12) and a fabric sample book from a woolen mill (Figure 13). Many of the receipts are deteriorating, with torn or crushed edges; the paper is of poor quality, and has begun to break apart. Fabric samples are attached to weak support pages that break when handled.



Figure 12.



Figure 13.

- **Volunteers will need to decide whether the clipboard's value as an artifact (with receipts attached) is more important than the informational value of the individual receipts.** Because acids from the wood are leaching into the documents attached to it and are contributing to their deterioration, it is recommended that the documents be removed from the clipboard. Deborah Wender, Director of Book Conservation, and Walter Newman, Director of Paper Conservation at NEDCC, were consulted for this report, and recommended the following actions:
 - **Photograph the object before taking it apart to document its appearance.** The photographs can then be included in the box that will house the receipts.

- **Carefully remove the items from the clipboard.** A piece of stiff Melinex, text-weight paper, or a microspatula should be used to support each item as it is lifted. The clipboard's prongs should be cut along the way so that papers are not lifted over them more than necessary.
- **As they are removed, items should be numbered lightly in pencil, in a consistent location, to document their original order.**
- **Place items in acid-free, lignin-free, buffered folders, then store the folders in a flip-top document box.**
- **Photocopy especially fragile receipts onto permanent paper.** This will ensure that researchers have access to the information without having to handle the original items and possibly subject them to further damage.
- **The sample book should be placed in a custom-fitted acid-free, lignin-free, buffered box, and stored flat.** Volunteers will need to decide whether this item's value merits the cost of conservation treatment. Treatment options should be discussed with a professional conservator.
- **When conservation treatment is performed, ensure that MHS receives and retains a copy of the treatment report.** Information should be available on all adhesives and other materials used in treatment, in case problems arise in the future.

Conclusion

I hope this report will help the Maynard Historical Society as it works to chart a course for future preservation efforts. If some of the initiatives recommended here seem overwhelming, it is essential to remember that this report is intended as a long-term planning tool. It will be possible to implement some actions soon, but others may require diplomacy, awareness-raising, and funding efforts over several years. It is important to break these initiatives down into manageable tasks.

It was obvious during the site visit that the collections are being maintained by an extremely careful and conscientious group of volunteers. With continued support from MHS members and from the Town, the materials under their care—which document not only the history of Maynard, but also aspects of New England history and national history—could be preserved and made available to a wide range of researchers for generations to come.

Respectfully submitted,

Angelina Altobellis
Assessment Program Coordinator
Northeast Document Conservation Center
100 Brickstone Square
Andover, MA 01810
P: 978.470.1010
F: 978.475.6021
aaltobellis@nedcc.org

December 3, 2009

Appendix: Best Practices for Preservation

I. COLLECTION MANAGEMENT

A. Mission Statement & Collection Policies

A clear mission and a carefully thought out collecting policy are essential to effective preservation efforts. Preservation planning requires a manager to set priorities by looking at the resources available for preservation and weighing the condition, needs, and value of materials against them. This process is sometimes called “selection for preservation.” To do this, a repository must have a detailed understanding of its goals and objectives for the collection—exactly what it wishes to document, who it wishes to serve, and what types of material it will collect to accomplish those goals. It is also crucial for a repository to have a clear sense of what it will not collect. Collections must be limited to those that serve the real needs and mission of the repository.

The mission statement should enunciate a repository’s overall goals (whether for its entire collection or for a part of it, such as special collections or a local history collection), while the collecting policy provides specifics about the scope of the collection and indicates areas in which additional materials may be collected in future. A good collecting policy will take into consideration the holdings and collecting activities of other local (and national, if appropriate) repositories.

Collection management policies spell out the nuts and bolts of caring for historical records: cataloging and processing, procedures for access to and use of the collections, storage methods, target environmental conditions, access procedures, preparation of materials for use, microfilming procedures, environmental monitoring procedures, etc. These procedures are needed for both public and private records. Clear and well-considered policies that are universally enforced will make preventive preservation measures routine and lengthen the useful life of collections.

B. Staffing & Budget

Adequate staffing is crucial to maintaining and preserving library and archival collections. Some preservation projects such as weeding and shelf maintenance do not require an investment in equipment or supplies, but do require a commitment of time. In addition, someone on staff must be assigned the responsibility of being knowledgeable about preservation issues, and of making (or overseeing) preservation decisions. An investment in staff time to carry out collections care and preservation activities will result in a longer life for the records.

Another essential for effective preservation planning is the ability to “liberate” at least a small amount of money for supplies, training and equipment. Effective preservation requires a dependable budget with active administrative coordination, even if the budget is not large at the beginning. A budget line for preservation should be part of

the institution's annual budget, to ensure an ongoing commitment to preservation and allow better tracking of expenses.

C. Intellectual Control

Effective selection of collections for preservation requires good intellectual control, since relative values and priorities cannot be assigned unless staff is familiar with the content of collections.

Evaluation of Records

Evaluation and weeding of collections is an essential part of preservation management. Resources (financial and otherwise) are always scarce, and it is important not to waste valuable resources on records that do not have long-term historical value. It is also important to make a distinction between materials that are valuable only for the information they contain and those materials that have intrinsic value and must be retained in their original form.

For public records (e.g., those created by town officials and governed by state records retention/disposition schedules), evaluation is fairly straightforward. Certain types of records are designated as permanent, while others can be disposed of (usually only with the approval of the public records administrator) after a certain amount of time has passed. In some cases the retention/disposition schedules will indicate whether records need to be retained in their original form or whether a microfilm copy is sufficient.

Archival Processing & Descriptive Guides

Cataloging standards for library materials are familiar to most institutions with library collections, but many such institutions are less familiar with standards for the arrangement and description of archival materials. Archival materials (e.g., non-printed items, such as photographs, documents, handwritten ledger books, scrapbooks) are generally organized in groups, since the individual documents are often related. This means that instead of cataloging each individual item, materials that are related are cataloged together, as one unit. The basic purpose of archival description is to enable the researcher to find both the collection he/she needs and the information within the collection by using various types of written guides. This prevents rummaging through large numbers of boxes and documents, which can cause handling damage and general disorder. It also means that the researcher is not solely dependent on the personal knowledge of the archivist or other staff member(s) to access the materials.

Normally an archives will have more than one type of descriptive guide. There might be an overall repository guide that provides brief overviews of each collection, more detailed finding aids for each collection, and finally indexes to enable researchers to access the materials by subject (often collections contain information about other subjects unrelated to the primary subject). Summary catalog records are also prepared, so that they can be shared with other institutions via the standard bibliographic databases. Arranging and Describing Archives and Manuscripts, by Kathleen D. Roe (Chicago: Society of American Archivists, 2005; available from SAA at

www.archivists.org) provides an excellent overview of archival cataloging. For photographs, *Photographs: Archival Care and Management*, by Mary Lynn Ritzenthaler and Diane Vogt-O'Connor (Chicago: Society of American Archivists, 2006; available from SAA at www.archivists.org) provides helpful chapters on arranging and describing photographic collections.

D. Preservation Planning

The most basic requirement for successful preservation planning is local commitment: from the director, from the board of trustees or other administrative entity to whom the director is responsible, and from at least a few key staff members. An effective preservation program requires effort and involves expense—for space, staffing, environmental control, storage supplies and equipment, and/or other strategies. Administration and staff must be willing to find the time and at least some money to undertake preservation activities.

Certainly few repositories have sufficient resources to address all of the preservation needs of all of their collections, however. When resources are limited, choices must be made among preservation activities. Every institution with collections of enduring value should have a preservation plan that weighs the needs of the collections against institutional resources and provides a list of priority preservation actions. Institution-wide long range planning is also essential—to establish the relative priority of the special collections to the rest of the institution's activities.

While this survey should be the first step in putting together a preservation plan, **this report in itself should not be considered a plan**. This report describes preservation needs by category, and it provides an executive summary that assigns these preservation needs a high, medium, or low priority, but it cannot provide a complete analysis of the many factors other than physical condition of collections that must be considered when setting priorities for actual preservation action. Some factors—such as available funding for preservation, staff time and expertise, and user demand for collections—change as institutional circumstances change, and other factors that affect preservation priorities require an in-depth understanding of the institution and its collections that only staff members possess—such as the relative value of collections to the institution and political considerations.

There is general consensus regarding the factors to be considered when prioritizing potential preservation actions:²

Collection-specific

² These basic criteria for setting priorities are taken from Sherelyn Ogden, *Preservation Planning: Guidelines for Writing a Long-Range Plan* (Washington, DC: American Association of Museums and Northeast Document Conservation Center, 1997). This publication is geared toward museums but provides general planning information and worksheets for writing a plan that will also be helpful to libraries.

- 1) Use—materials that are used frequently, whether consulted by researchers or exhibited routinely, may be at higher risk than other collections.
- 2) Storage—collections that are stored under adverse conditions, whether environmental or in damaging enclosures, may require prompt preservation action.
- 3) Condition—items or collections in fragile condition may be at risk of loss unless they receive attention quickly.
- 4) Value—either absolute value (rarity, monetary worth, intrinsic or associational value, etc.) and/or relative value of collections to an institution may influence preservation priorities. Whether collections have long- or short-term value to an institution will also influence decision-making.
- 5) Format—whether or not materials need to be preserved in their original format will also influence priorities.

Overall

- 1) Impact—those actions that will result in dramatic improvement in current conditions or a slowing of deterioration, or that will affect the greatest number of items, will often be the highest priority.
- 2) Feasibility—this factor is essential; it includes staffing levels and expertise, financial considerations (outside funding, capital outlay, operating costs, expenses for materials and services), policy and procedural changes required, and political considerations. Even if the impact of a preservation action is high, it may be given a low priority if implementation is not feasible.
- 3) Urgency—there will always be some activities that require immediate action; collections may be damaged or lost, or an opportunity to act on a particular project may be lost, if action is not taken.

In general, preservation activities that will have high impact (e.g., improved climate control, rehousing of a collection, or microfilming) and are highly feasible (e.g., the staffing, time, and money is available to carry them out in the near future) will be the highest priority. Activities with high impact but low feasibility (e.g., replacing the HVAC system) may be given a lower priority until circumstances make them more feasible, while actions that are feasible but have only minimal impact (such as installing UV sleeves on fluorescent lights) may or may not be undertaken, depending on such factors as cost, visibility within the institution, and collection value. Even if it is only possible to begin with small projects, a written preservation plan will allow the institution to act when the opportunity arises to address more ambitious preservation projects.

II. THE BUILDING & ENVIRONMENT

A. The Building

The most effective way to preserve large quantities of library and archival material is to control temperature, relative humidity, air quality and light; to provide routine housekeeping; and to use good storage and handling techniques. Installation of fire

detection and suppression systems is also a high priority. In addition, protection from water damage, theft and vandalism is critical for collections as a whole.

The building is central to all these efforts and must remain in good condition to provide the maximum protection. Regular preventive maintenance should be provided on a fixed calendar basis, with inspection of roof, gutters, skylights, flashings, drains, HVAC equipment, security systems and fire safety equipment. Cleaning and repair should be performed as needed. A log of building maintenance and problems should be kept.

B. Temperature, Relative Humidity & Air Quality

Poor environments reduce the lifespan of paper and related materials. For library and archival collections, control of relative humidity is crucial. Moisture provides the catalyst for chemical reactions within paper that lead to acid formation. Paper is hygroscopic; that is, it readily absorbs and releases moisture from the surrounding atmosphere, expanding and contracting as it does so. This adds dimensional changes to chemical deterioration and can accelerate deterioration and cause visible damage such as cockling of pages. Excessive moisture also causes mold and foxing, and favors insects. At the other extreme, very low relative humidity (often found in winter in centrally-heated buildings) can desiccate and embrittle some materials. Control of temperature is also very important; heat accelerates deterioration by speeding up damaging chemical reactions. The deterioration rate of cellulose appears to double with every temperature increase of about 9°F, independent of other factors.

Stability of the climate is also critical to long-term preservation of collections with special value, such as rare books or local history collections. Research has shown that large and frequent fluctuations—such as those that occur if climate control systems are turned off or if settings are altered when the building is unoccupied—greatly accelerate paper deterioration. Close control of temperature and relative humidity is less critical for general collections in public libraries, since a great percentage of these materials are short-lived. It is more desirable for general circulating research collection, however, since many of these materials are retained over the long term. Every attempt should be made to avoid extremes and large fluctuations in relative humidity and temperature wherever library collections are housed.

There is no national standard for storage of paper collections. The scientific evidence is clear, however: lower temperatures and lower relative humidities greatly extend the usable life of paper collections. The National Information Standards Organization (NISO) has issued a technical report entitled *Environmental Guidelines for the Storage*

of Paper Records.³ This publication gives suggested values for temperature and relative humidity for storage of paper records in libraries and archives:

Situation	Temperature	Relative Humidity
Combined stack and user areas	70 °F maximum*	30–50% RH**
Stacks where people are excluded except for access and retrieval	65 °F maximum*	30–50% RH**
Optimum preservation stacks	35–65°F***	30–50% RH**
Maximum daily fluctuation	±2°F	±3% RH
Maximum monthly drift	3°F	3%

* These values assume that 70°F is about the minimum comfort temperature for reading and 65°F the minimum for light physical activity. Each institution can make its own choice.

** A specific value of relative humidity within this range should be maintained ±3%, depending on the climatic conditions in the local geographic area, or facility limitations.

*** A specific temperature within this range should be maintained ±2°F. The specific temperature chosen depends on how much an organization is willing to invest in order to achieve a given life expectancy for its records.

– from Environmental Guidelines for the Storage of Paper Records, p. 2.

In most buildings in the Northeast, mechanical systems for both humidification and dehumidification (in excess of the dehumidification provided by air conditioning) are required to maintain the specified RH control. Temperature and relative humidity should be systematically documented wherever collections of permanent value are stored. Recorded data will serve to establish existing environmental conditions, support the need for environmental controls (should the need exist), and indicate whether climate control equipment is operating optimally, if such equipment is already in place. Monitoring devices vary greatly in their complexity and effectiveness, so it is important to choose the instrument most appropriate to the situation.

Since temperature and relative humidity are related, correcting one factor may alter the balance of another. It is essential to have the advice of an experienced climate control engineer before making major changes, and monitoring must continue after changes are made. It is most important to provide good routine maintenance for mechanical equipment (including radiators and air registers) as well as regular servicing.

3 William K. Wilson, Environmental Guidelines for the Storage of Paper Records. NISO Technical Report (NISO–TR01–1995). Bethesda, MD: NISO Press, 1995. Available from NISO Press, P.O. Box 338, Oxon Hill, MD, 20750–0338; 1–800–282–NISO; <<http://www.niso.org>>. Another interesting publication is New Tools for Preservation: Assessing Long-Term Environmental Effects on Library and Archives Collections (Washington, DC: Commission on Preservation and Access, November 1995), which details the Image Permanence Institute’s research into paper preservation. It is available through the Council on Library and Information Resources web site at <http://www.clir.org/pubs/reports/reports.html>.

Air Pollution

Dirt and dust particles soil and abrade paper. Gaseous pollutants such as sulfur dioxide and nitrous oxides (SO₂ and NO_x, generated from automobiles and industry), peroxides, and ozone catalyze chemical reactions that lead to acid formation in paper. Exposure of collections to particulate and gaseous pollutants should be controlled to the extent possible.

Routine vacuuming and dusting are the first defense against particulate pollutants. Particulate filtration equipment varies in size and complexity from individual filters attached to vents, furnaces, or air conditioners, to building-wide systems. Particulate matter must be mechanically filtered if centralized HVAC equipment is in use. Filters should match the needs of the equipment and a regular schedule of cleaning or replacing filters should be followed. Exterior windows should be kept closed, and valuable materials should be enclosed in archival enclosures for protection. Control of gaseous pollutants in large areas is expensive and requires a significant investment in equipment and maintenance—here again, the advice of a professional climate control engineer should be sought before major changes are made.

C. Protection from Light

All light accelerates paper deterioration by providing energy to fuel damaging chemical reactions within paper. While the ultraviolet (UV) component of light (present in natural light and artificial fluorescent, mercury vapor, or metalhalide lamps) is the most damaging, it is important to understand that visible light can also be very damaging. Light causes paper to fade, yellow, or darken, and media to fade or change color. Damage is cumulative and irreversible. Its extent is determined by the intensity of the light and the length of exposure.

Collections of permanent value are best stored in areas with no natural light and low levels of incandescent light. A great deal can be done to control natural light through judicious and careful use of shades, drapes, blinds, or shutters. These also minimize heat loss and heat gain from sun during the day. Skylights should be covered to block the sun.

Levels of UV light must be no higher than 75 microwatts/lumen (this must be measured with a UV meter)—in practical terms this means that most light sources must be filtered to remove UV light. Fluorescent lamps emit significant UV light and require filtering in areas where collections of value are stored. Filters are available in the form of soft, thin plastic sleeves or hard plastic tubes—it is important to insure that these are properly sized so that unfiltered light does not slip by at uncovered ends. Incandescent light does not require UV filtering. UV-filtering film or Plexiglas can be applied to windows and exhibit cases, in order to control the amount of UV to which collections are exposed—but this does not reduce the damage caused by visible light.

See “Protection from Light Damage” in PLAM3 for additional background information on controlling exposure to light.

D. Protection from Fire

It is a very high priority to equip any repository that houses valuable collections with heat and smoke sensors throughout. To be effective, these must be monitored 24 hours a day through a direct connection to the local fire department or another service provider. Fixed-temperature heat sensors detect smoldering fires inefficiently. Rate-of-rise sensors are better, since they are activated by a sudden, small increase in temperature. Smoke sensors have a relatively high rate of mechanical failure. Both rate-of-rise heat and smoke detectors should be used. All detectors should be tested monthly and maintained regularly as recommended by the manufacturer.

All existing fire hazards should be eliminated and regular fire drills should be held. Repositories should be equipped throughout with portable fire extinguishers and these must be inspected annually. Staff must be trained in their use and they must be inspected annually. Most local fire departments will provide fire inspections and assist institutions in developing a fire safety program. This should include training staff in the use of portable fire extinguishers and in evacuation procedures. If the fire department has been familiarized with the building and collections in advance, there is a greater chance that firefighting strategies may be able to take collection priorities into account. The National Fire Protection Agency Publication No. 909: Standard for the Protection of Cultural Resource Properties—Museums, Libraries, and Places of Worship, 2005 Edition (available from NFPA at www.nfpa.org) is an extremely useful resource.

The preservation community's recommendations for fire suppression have undergone significant changes in the past 10–15 years. Modern wet-pipe sprinkler systems are now almost universally recommended for libraries, archives, and museums, due to their relative low cost, ease of maintenance, and dependability. The rate of accidental discharge has been estimated at 1:1,000,000 heads or better. Recent studies indicate that 70% of library fires are extinguished by three or fewer sprinkler heads. These statistics, combined with new, technologically sophisticated methods of drying water-damaged books and paper (i.e. vacuum freeze drying), make sprinklers in libraries and museums less ominous than they once seemed.

For a variety of reasons, the use of Halon gaseous fire suppression systems has been phased out. A number of substitutes are available, including FM-200, FE-13, and Inergen, but these share many of the risks of Halon systems. Such systems require above-average maintenance and are suitable only for protecting the contents of a tightly sealed room that can contain the gas once it is discharged. Any breach to the room will allow the gas to escape and the remaining volume of gas will not be able to extinguish the fire. In addition, there is a limited amount of the gaseous agent, so the fire might burn beyond the capacity of the system. The discharge velocity of the gas is also a concern, as some systems are capable of blowing objects about the room. And finally, many fire codes require the use of water (via fire hose) following a gas discharge, since the agent will not necessarily put out smoldering items. Given a choice, one would prefer the more gentle application of water from a sprinkler to the force and volume of water from a fire hose.

Water mist sprinklers are an excellent recent development in fire suppression technologies. They deliver water at exceptionally high pressures, producing a fine, high-efficiency water vapor. This maximizes water's cooling capacities, thereby extinguishing fires with minimal amounts of water. The sprinklers are controlled by an air-sampling smoke detection system.

See “An Introduction to Fire Detection, Alarm, and Automatic Fire Sprinklers” in PLAM3 for additional information.

E. Protection from Water

The best insurance against water damage is regular inspection of roof covering and flashings, with repair and/or replacement as needed. Gutters and drains must be cleaned frequently. Storage of collections underneath water or steam pipes, lavatories, mechanical airconditioning equipment, or other sources of water should be avoided. Collections should never be stored on the floor—they must be stored at least 4” above floor level on shelves or pallets. Storage in basements or other areas vulnerable to flooding should be avoided. If storage in such areas is necessary, water-sensing alarms should be installed so that quick detection of flooding is assured. These must be monitored 24 hours a day to be effective; such alarms can normally be connected into the existing fire detection system. Staff should familiarize themselves with the location and operation of water mains and shutoff valves in the event that it is necessary to shut off the water supply during an emergency.

F. Emergency Preparedness

Emergency preparedness—efforts to prevent damage from fire, water, and other hazards—has become routine preservation practice in libraries and archives in the past decade. It is understood that every institution with collections of enduring value should evaluate its risk of events that could damage holdings. Plausible risks should be addressed and reduced, and the institution should prepare a formal, written plan for responding to emergencies identified as being within the scope of its plan. Fire and security protection—particularly during construction and renovation projects—are essential to preservation, since all other activities to promote preservation of collections become moot if collections are destroyed by fire or lost to theft and vandalism.

Having an up-to-date written disaster plan before a disaster occurs is highly recommended. The plan should include the following:

- **Phone numbers and contact names** for providers of local freezing services, building dry out services and vacuum freeze drying services. For materials that become wet, quick freezing (within 24 hours) prevents mold growth and can keep damage to a minimum. A local supermarket or college food service may be able to provide freezer space, but it is a great advantage to have made arrangements ahead of time.

- **Sources for the purchase of disaster supplies**, such as fans, plastic milk crates, mops, blank newsprint, etc. Note that a source of emergency funds will be needed to purchase such items—how will money be accessed during the night or on a weekend? It is a good idea to keep a few basic supplies on hand, but be sure to note their location so they can be easily found.
- **Identification of staff and volunteers** who will assist in case of a disaster, including home phone numbers.
- **Identification of proper procedures for drying books, documents and photographs.** A training session should be held so that all staff are generally familiar with first response procedures and are not expected to sit down and read detailed instructions as the disaster is happening.
- **Information about insurance coverage.** This should include evening and weekend contact information and specify what procedures the insurance company requires if a disaster happens.
- **Identification of priority items to be rescued in a disaster.** Priority items (both historical records and current administrative records needed for continuing operation) should be identified and their locations marked on a map of the building. If certain areas are normally locked, the location of the keys should be indicated. For security reasons, this section of the plan would be distributed only to a few key staff members. Also note that backups of collection records (e.g., a complete inventory) and administrative records (e.g., backups of computer files, etc.) should be stored offsite in case of disaster. It is also a good idea to keep microfilm copies of land records and vital records in off-site storage.

The information in the “Emergency Management” section of PLAM3 will be helpful in writing a disaster plan. See especially “Disaster Planning,” “Worksheet for Outlining a Disaster Plan” and the leaflets on emergency salvage of various materials.

G. Pest Management & Housekeeping

Paper and associated materials are appetizing to insects and rodents. Clutter and food remains attract vermin, and food odor is one of the cues to pests that a space may be hospitable. Eating and drinking should be prohibited, especially in collections storage areas. Systematic housekeeping is very important, since dust and dirt also attract pests. Moist conditions may encourage both pests and mold growth, so the climate should be well controlled and water leaks should be avoided. Books and storage boxes should be cleaned at least once a year to prevent soiling and abrasion of paper. Feather dusters only rearrange dust; dust and dirt should be carefully vacuumed, preferably with a 3stage filter vacuum to prevent recirculation of dust through the exhaust.

Current preservation practice does not recommend extermination for pest problems except as a last resort, due to the toxic nature of pesticides. Instead, a strategy termed "integrated pest management" is suggested. This involves removing the

habitats and sources of food for pests and regularly monitoring the space for the presence of pests. In cases where problems do not respond to preventive techniques, direct treatment for insect infestation may be necessary. Non-chemical means of treatment are preferred. The most promising methods currently being explored are controlled freezing and the use of modified atmospheres.

Staff should perform a general cleaning of books and archival storage boxes at least once a year to prevent soiling and abrasion. Feather dusters should not be used since they just rearrange the dust. Instead, heavy dust and dirt should be carefully vacuumed, preferably with a three-stage-filter vacuum to prevent recirculation of dust through the exhaust.

Books and boxes are best cleaned with a magnetic wiping cloth, which attracts and holds dust with an electrostatic charge. This cloth is sold commercially under the names Dust Bunny and Dust Magnet.

Books should be held tightly closed during cleaning so that dirt will not migrate into the pages. When cleaning storage boxes and books, staff should work from the top to the bottom of each shelf range. Materials should be removed from each shelf in shelf order to a book cart. The shelf and its contents can then be cleaned and the contents returned to the shelves in shelf order.

Since cleaning has the potential of damaging collections, staff or volunteer assistants assigned this task must be taught careful handling techniques.

H. Protection from Theft & Vandalism

Security is essential to the preservation of collections. Access to collections must be controlled during working hours, and the building must be well-secured when it is closed to the public. It is best to install perimeter intrusion alarms and internal motion detectors wired directly to the local police department or to another outside monitoring agency. For the purpose of controlling access during working hours, as well as controlling loss of materials, it is best to limit open entrances, ideally to one used by patrons and staff alike. All other doors should be alarmed to detect unauthorized use. Local fire regulations may require crash bars on emergency exits.

Collectionsholding institutions should not use master key systems. Building keys and keys to areas where special collections are kept should be strictly limited. A list of key holders should be kept current, and staff members should be required to return keys when they leave the employ of the institution.

Use of valuable materials by researchers must be carefully controlled and strictly monitored. Theft and vandalism are unfortunately more common than many staff members believe, particularly in small institutions where supervision is limited and staff may give some researchers special privileges. Ideally, researchers should use special collections in a room adjacent to the locked storage area in which those materials are kept. Personal belongings should be left in a locker outside the research room. Researchers should sign a register and be required to fill out a "call slip" for the

materials they wish to use—this information should be retained to help identify the last date of use or the last user in case of loss. Ideally researchers should be supervised at all times when they are using collections, but this can be difficult when staffing is limited. One solution to this problem is to require the researcher to leave an identification card (e.g., a library card, if the person is local, or a driver's license if not) with the staff (obviously a secure storage drawer for these items needs to be provided). Staff members would then inspect materials visually before and after use to insure that no theft or vandalism has occurred. The identification card would be returned only when all items have been returned without damage.

Institutions must have some way of demonstrating ownership of unique, artifactual, or otherwise valuable objects. Difficult to remove cataloguing or ownership marks on an object itself are often undesirable. Detailed written descriptions and/or photographs of identifying details are essential to the institution's records for such objects.

“Collections Security: Planning and Prevention for Libraries and Archives” in PLAM3 provides additional information.

III. STORING & HANDLING LIBRARY & ARCHIVAL MATERIALS

A. Storage Furniture

The choice of shelving materials is important for the preservation of collections of longterm value. Storage furniture can produce byproducts that react to form acids and other damaging chemicals in the presence of moisture and oxygen. This may be a serious problem in closed furniture like map cases, file drawers, locked bookcases, or exhibit cases, where pollutants can build up. Archival materials stored in closed cabinets should always be protectively enclosed.

Wood has traditionally been used in the manufacture of furniture, but it emits numerous reactive chemicals that can damage collections. This can also be a problem with wood composites, sealants, and adhesives. Emissions are highest when the furniture is new, but some off gassing continues for the life of the furniture. If wooden shelving, map cases, or file cabinets must be used, the wood must be sealed—moisture-borne polyurethane or latex or acrylic paint are the best choices, although they will not completely prevent off-gassing of chemicals. Oil-based paints or polyurethanes should not be used since they can be damaging. It is important to line wood shelves and drawers in addition to sealing them. Melinex or 100% ragboard are no longer thought to be sufficient barriers by themselves. Inert metallic laminate (such as Marvelseal, available through conservation suppliers), box board containing zeolites that will absorb damaging chemicals (called MicroChamber, available from Conservation Resources, Inc.), glass, or Plexiglas are among the materials now recommended. Ragboard can be used in addition for cosmetic purposes. For the best protection, all exposed wood surfaces should be completely covered (e.g., sides, tops, and undersides of shelves and drawers).

Standard open metal library shelving with a baked enamel finish has generally been recommended for storing unenclosed books or boxed collections. It is possible, however, that baked enamel coatings may give off formaldehyde and other volatiles harmful to collections if the coating has not been baked long enough at high enough temperatures. This is primarily a concern when collections are stored on bookshelves in an area that is enclosed or has poor air circulation, or are stored in closed furniture such as map cases, file cabinet drawers, and book cases with solid doors. The only way to be sure that baked enamel furniture is not harmful is to have it tested.

Alternatives that appear to avoid the problems of baked enamel are powder-coated or anodized aluminum furniture, but be aware that these are somewhat more expensive. Open chrome-plated steel shelving, made of heavy-gauge, chrome-plated steel wire, can also be used, but only for boxed materials. The wires can leave permanent marks on items that are not protected with boxes.

See “Storage Furniture: A Brief Review of Current Options” in PLAM3 for more information.

B. Handling Practices

Damage to collections through carelessness is perhaps more common than theft or vandalism, but it often goes unrecognized. It is essential to educate staff and users in the proper ways to handle collections. Careless handling—whether during shelving, retrieval, photocopying or researcher use—can cause significant damage to collections over the long-term.

Handling procedures can also cause unnecessary damage to books. Books should not be pulled off the shelves by the headcap, a practice that can cause the headcap to fail and tear the spine. Instead, books on either side of the desired book should be pushed in and the desired book gripped gently on either side of the spine. Books should not be stacked too high when they are moved or carried, to minimize the chance of dropping them. Photocopying can damage book spines and should be done on an edge copier whenever possible.

Documents should be handled carefully to avoid tearing, folding or accidentally marking them. Researchers and staff must not be allowed to use pens, tape, glue or scissors near historical materials. They should not take notes on top of collection materials, as the pressure can emboss the paper. Staff should always photocopy fragile documents.

There has been considerable debate about the use of cotton gloves when handling paper. In most cases, the loss of dexterity is more damaging to paper than are oils from the skin, so gloves should not be used. However, staff and researchers should wash their hands immediately before handling collections. They should not apply moisturizing lotions before handling materials.

In contrast, dirt and oils from fingers are disastrous to the emulsions of photographic materials, so cotton gloves should always be worn. Wherever possible, Xerox copies or

copy prints should be used for general research purposes to reduce handling of originals.

Sufficient workspace is essential to proper handling. Aisles and work surfaces where oversize materials are used must be large enough to allow them to be handled without damage. A work surface large enough to support items should be close to the storage area.

All staff members who work with historical collections should learn proper handling procedures. For more information, see “Storage Methods and Handling Practices” in the “Storage and Handling” section of PLAM3.

Staff must explain proper handling techniques to researchers on their first visit and as needed throughout their research. Often, proper procedures are described in writing on the registration form, which all researchers must sign before using historic collections. This helps emphasize researchers’ individual responsibility for handling materials carefully.

C. Storing Bound Materials

1. Books

Shelving practices often cause unnecessary damage to books. For example, when oversize books are shelved with the spine up, the weight of the pages will pull the text block away from the cover. Such books should always be shelved spine down or stacked horizontally. Books should not be allowed to lean because this too causes unnecessary strain on covers and binding. They should instead be shelved upright, standing on their tails, supported by each other and by bookends. However, books should not be shelved so tightly that retrieval requires force. This causes abrasion of covers as the books are removed and reshelved.

Broad-edged (“non-knifing”) bookends are safer than the flat (“knifing”) variety, whose sharp edges may damage books. Staff can modify knifing bookends by slipping a piece of acid-free foam-core covered with bookcloth over the sharp metal edge. A brick covered with bookcloth fastened with PVA adhesive also makes a good book support.

Heavy, oversize volumes should not be shelved vertically. Instead, they should be stored flat on shelves, giving them the overall support they require. They should be stacked no more than two or three high in order to facilitate safe handling. This may necessitate inserting additional shelves at narrow intervals. Shelves must be wide enough to support oversize volumes completely and books must not be allowed to protrude into aisles where they will likely be bumped.

Care should be taken to remove all acidic inserts like bookmarks, scraps of paper, etc., from books so that the acid they contain does not migrate to the book pages and cause staining.

Books of enduring value should be shelved by size. Very small volumes will not support large bindings and can be crushed by the weight of larger books. Small hard-covered volumes may be shelved. Soft-covered volumes should be laid flat in piles or boxed together by size.

Identifying information should not be painted on books that have special value, nor should it be typed on labels that are taped to the volumes with pressure sensitive tape. Paint is unattractive and disfiguring; tape may discolor and stain the binding. Instead, information should be typed onto heavy, buffered paper flags placed inside the volume. The flags should be about two inches wide and two to three inches longer than the book is high. Commercially available "notched" flags have a tendency to break brittle paper.

Damaged bindings should not be held together with rubber bands, which will deteriorate and cause further damage. If detached covers must be tied onto books as temporary protection, ties should be made of undyed cotton or linen tape or undyed polyester ribbon. Any knots should be at the top or fore edge of the text block to prevent damage from pressure against other books.

Volumes with artifactual value, where the fragile binding is to be retained in its present condition, should be boxed. Fitted boxes support a volume and protect it from dirt, dust, light and mechanical damage. They may also slow a book's response to climate changes. Permanent or decorative boxes (clam-shell or drop-spine) can be custom-made for books of very special value by conservation facilities. A simpler, less expensive option is called a "phase box" (so-named because enclosure in these boxes is the first phase of treatment for volumes at the Library of Congress).

Volumes that have low value or are rarely used and do not warrant binding repair may also be candidates for boxing. "Easy rare book boxes" (which are really wrappers made of pre-scored, acid-free cardstock) are available from conservation suppliers. They are a good choice for such volumes.

2. Pamphlets & Booklets

Pamphlets and small booklets can be stored in specially made enclosures, in folders and boxes, or in hanging folders in file cabinets. Pamphlets of the same cover size can be stored in dropspine or phase boxes. Pamphlets that differ in size may be stored according to guidelines given for manuscripts and documents. Pamphlets more than about 1/4" thick should be stored spine down in individual folders. Pamphlets of very different size should not be stored in the same folder.

If individual pamphlets must be shelved between books, they should be individually boxed. Groups of pamphlets shelved between books can be boxed together if the guidelines above are followed. If pamphlet binders are used, they must be of preservation quality throughout. They should never be glued directly to pamphlets. Where stitching is used to join pamphlet and binder, it should be done through the fold or in original fastener holes where possible.

D. Storing Unbound Materials

Lowlignin buffered file folders, boxes, and other storage materials should be used for all collections of permanent value. Archivalquality storage materials are available from most conservation suppliers (see "Preservation Suppliers and Services," on NEDCC's Web site at www.nedcc.org).

When processing archival collections keep in mind that acid will migrate from poorquality paper to any other papers with which it comes in direct contact. It is very important to separate poorquality papers from those that have a high rag content. News clippings and other obviously inferior papers must be removed from direct contact with historical documents and manuscripts. Informational news clippings can be photocopied onto buffered paper.

Be careful to store objects of the same size and category together. Archivists habitually organize collections by subject group, but objects of differing bulk and weight can cause damage due to uneven pressures in a drawer or box. It is not advisable to store single sheets in the same box with books or pamphlets unless separate enclosures and supports are provided for each category of material. Generally speaking, heavy or bulky objects should be stored separately from lighter objects.

1. Documents & Manuscripts

Documents and manuscripts should be unfolded for storage if they can be unfolded without resistance, splitting or breaking. If unfolding threatens the integrity of the paper, a conservator should be contacted. All foreign objects such as staples, paper clips and pins should be carefully removed since fasteners produce physical damage.

Documents should be stored in low-lignin, buffered file folders, each containing no more than fifteen sheets. The folders should then be placed in document storage boxes, as close to the size of the folders as possible. All folders in a single box should be the same size. Boxes should be full enough to prevent slumping of the contents. Boxes should not be stuffed too full, since this can cause damage when folders are removed or refilled. Partially empty boxes can be filled with document spacers available from conservation suppliers. Crumpled acid-free tissue paper can also be used to fill excess space, although tissue is likely to compress over time and allow materials to sag.

An alternative to boxed storage is a baked enamel file cabinet equipped with hanging racks and hanging folders. Materials should always be placed inside an acid-free file folder, then into a hanging file. Several file folders may be placed into each hanging file, provided that they do not extend above the top of the drawer. Archival-quality hanging folders are available from some general conservation suppliers, but conventional "Pendaflex" folders are acceptable if materials are protected from direct contact by acid-free folders.

2. Oversize Materials

Report of a General Preservation Survey
Maynard Historical Society, Maynard, Massachusetts
Northeast Document Conservation Center
September 16, 2009

Prints, maps, broadsides, and other oversized objects are best stored flat in map drawers or in large covered boxes of preservation quality (available from conservation suppliers). It is acceptable to store documents legal-sized or smaller in upright archival boxes, but anything larger than 15" x 9" should be stored flat. Sheets smaller than 30" x 40" will fit into archival boxes, which come in various sizes and are cheaper than map cases. Objects should be protected in neutral or buffered folders cut to fit the size of the drawer or box—since smaller folders tend to shift position as the drawers open and close, and get jammed at the back of the drawers. Several objects may be placed in a folder. Items of special value should be interleaved with buffered or neutral tissue paper. Blueprints, cyanotypes, and handcolored objects should not be stored in alkaline buffered folders because some pigments may react and change color. Lignin-free, neutral folders should be used for these materials.

If map drawers or boxes are not available, or if objects are too large to fit in map drawers, oversized objects can be rolled on tubes or within a polyester folder. "Storage Solutions for Oversized Paper Artifacts" in PLAM3 provides detailed instructions for doing this safely. Always make sure the paper is not too brittle to withstand unrolling.

Any prints, drawings or other objects that have been matted or backed with acidic materials or wood should be removed from those mounts. They may be reframed in their original frames using museum-quality materials. These objects may also be safely stored unframed, matted or unmatted, in folders inside boxes or drawers, as described above. Frames should not use eye screws or other protruding hardware for hanging. They can cause damage to other frames or glazing. These should be replaced with D-rings on brackets, available from framers. See "Matting and Framing for Art and Artifacts on Paper" and "How to Do Your Own Matting and Hinging," both in PLAM3 for more information.

3. Photographic Materials

Photographic prints and negatives should be stored separately and in individual enclosures. Enclosures provide physical support and protection; they can be made of paper or plastic. Paper enclosures require photos to be removed for examination; plastic enclosures allow a researcher to view the image without handling, reducing the danger of scratching or abrasion. Polyester (e.g. Melinex), polypropylene, and polyethylene are currently the only plastics acceptable for photo storage. Uncoated transparent polyester is the material of choice, but it is also the most expensive. Where possible, items of similar size should be stored together; the mixing of different sizes can cause abrasion and breakage, and can increase the risk of misplacing smaller items. Horizontal storage of photographs is usually preferable to vertical storage, since it provides overall support and avoids mechanical damage such as bending. See "Storage Enclosures for Photographic Materials" in PLAM3 for additional information.

Nitrate and acetate film negatives can pose preservation problems. As it deteriorates, nitrate film generates oxidative gases that will damage photographic and paper collections in the surrounding area. Nitrate film also poses a serious fire hazard, although the hazard is less for sheet film than it is for roll film such as motion

pictures. "Safety" film (cellulose acetate) generates acetic acid as it deteriorates. This acid is not an oxidizing agent and therefore does not pose a threat to surrounding collections, but it will cause paper enclosures to become acidic and brittle over time.

Both nitrate and acetate negatives should be monitored on a regular basis and ultimately duplicated onto a stable polyester film base. Both nitrate and acetate negatives should be stored in buffered paper envelopes, and nitrate negatives should be stored separate from other collections in a well-ventilated area. Nitrate and acetate safety films deteriorate at about the same rate, so institutions should give the highest priority for duplication to that film which shows early signs of deterioration, since deterioration can proceed very quickly once it begins.

Glass plate negatives should be stored in boxes made for this purpose by conservation suppliers. Individual glass negatives should be enclosed in paper enclosures like those described above and placed inside boxes designed to stand upright on the shelf. Glass plate negatives should not be stacked flat on top of each other, since the weight of large glass negatives can damage those on the bottom.

Slides are generally considered unstable for archival and preservation purposes. In contrast to black and white photographic materials, the major factor in the deterioration of color slides is not the support, but the emulsions that carry the image. Fading, which affects virtually all color photographic materials even in the dark, is responsible for color shift and changes in contrast, the major problems for this medium. Most of the dyes used in color emulsions fade quickly when exhibited (in a few years or less), and most fade or discolor even when stored in the dark (in many cases this occurs in less than 35 years). The expected life span of color slides depends on the original film type and brand and storage conditions. Darkness, temperature of 70°F or lower and RH of 40% or lower are minimum requirements.

The use to which slides are put is also critical for preservation. Dirt and oils from fingers are disastrous to color emulsions. Slides in research use should be encapsulated for protection. Slides that have archival value should never be projected, since heat and light exposure are destructive. Duplicates of important slides should be made for copying, projection and extensive light box research.

4. Scrapbooks & Ephemera

Many historical collections include scrapbooks and ephemera (e.g., trade cards, valentines, patterns, paper dolls, etc.). These objects pose challenging preservation problems, because they often contain a variety of components and media. They may have raised surfaces or threedimensional decoration. They are frequently unique, fragile, damaged, or of significant associational value. They should never be interfiled with other categories of library and archives material, because significant chemical and mechanical damage can result from the different sizes, shapes, weights, adhesives, and media represented.

Most scrapbooks and ephemera can be handled according to general guidelines for other, parallel categories of artifact. Objects that have informational value alone (for

instance, some clippings scrapbooks) can be photocopied onto archival-quality paper and boxed, bound, or foldered. The originals can be retired from use, and copies made available to researchers. Scrapbooks that have enduring value in their original form should be individually boxed in custom-fitted boxes. Valuable scrapbooks may have a high priority for evaluation by a conservator.

Other artifacts should be grouped by size and composition (e.g., photographs, printed material, documents, etc.), enclosed to protect them from chemical migration and mechanical damage, and stored in a way that will support the structure of the artifact (encapsulated, boxed, stored flat or in hanging files, etc.). Some vendors of archival supplies offer customized storage boxes and sleeves for common ephemera such as postcards and stereo views. Others can produce customized boxes in quantity to meet special needs. For more information on preserving scrapbooks, see “Preservation of Scrapbooks and Albums” on the Library of Congress web site at <http://lcweb.loc.gov/preserv/care/scrapbk.html>.

5. Newsprint

Newsprint produced after 1840 usually contains ground wood and may be highly acidic. Long-term preservation of this paper is difficult at best. It is possible to treat newsprint by deacidification and reinforcement, but this is generally not considered practical for large quantities of material; in addition, deacidification will not make yellow, brittle paper white and flexible again.

Most news clippings are important because of the information they contain, not because they have artifactual value. For this reason, either preservation photocopying or microfilming are considered to be the most practical options for collections of news clippings. All photocopying should be done on low-lignin, buffered paper using an electrostatic copier with heat-fused images. Originals may be deaccessioned after photocopying at the discretion of the curator. News clippings with photographs that do not photocopy well may be retained. News clippings that are to be retained in their original form should be deacidified and stored separately in a folder or in a polyester enclosure.

6. Audiovisual Materials

Research collections frequently include recorded sound media, videos, computer records and other non-traditional materials. Unfortunately, none of these is “archival,” that is, capable of surviving with minimal deterioration for long periods of time.

Video- and audiotapes (along with computer tapes and some computer disks) are magnetic media and as such they have a considerably shorter life expectancy than do paper-based materials. The binders used to couple magnetic media to their film base break down quickly. Damage from playback equipment and the susceptibility of magnetic media to migration and abrasion add to the difficulty of preserving video and recorded sound. Stringent handling procedures are essential. The best predictions for the life expectancy of these materials extend only twenty to thirty years. The estimated life expectancy of magnetic media that are in active use is only about ten years.

There is little consensus on the ideal climate for preservation of magnetic media, but desirable conditions would be within the range given for paper-based materials. Cold storage can significantly increase the life expectancy of magnetic media, so long as temperatures remain above freezing. Videotapes should be stored in an area with the coolest possible temperatures and the most tightly controlled conditions. As with paper, fluctuations in climate should be avoided as much as possible.

An equally important preservation activity for magnetic media is regular copying. A master should be created of each recording, which will be stored in a stable environment (in cold storage if possible) and restricted from use. Only duplicate copies should be used for viewing. In addition, all tapes should be copied onto new tape about every ten years. All playback machinery should also be kept clean and in good condition to minimize damage to the tapes from playback. Even with the most careful use, some damage is inevitable.

It was hoped that optical media—that is, CDs and DVDs—would solve the life expectancy problems posed by magnetic media. Unfortunately, while CDs and DVDs are more stable than floppy disks, they are still far from stable, over the long-term. The window of opportunity to preserve the information these materials contain must be considered in years—not decades, as for paper-based materials.

Although some researchers estimate that CDs and DVDs will last for ten to fifteen years, custodians of these materials should be aware that estimates of media life expectancy vary greatly, and generalizations are difficult. Due to variations in the manufacturing process—both from one company to another, and from one disc to the next in the same production facility, the only way to know for sure whether a particular disc is suitable for long-term storage is to test it individually. These tests are highly specialized and cannot be performed without the proper equipment. Anecdotal evidence suggests that average, untested CDs and DVDs may begin to fail within three to five years. As for magnetic media, a regular program of copying is necessary. Alternatively, files may be stored on a server and backed up regularly, as are files in active use.

Further complicating preservation of all digital files—whether stored on magnetic or optical media—are the twin problems of hardware and software obsolescence. To combat the former, files must be migrated to new media—for example, moving files from floppy disks to CD or DVD—while equipment capable of reading older media is still available. Saving files on a server will also solve this problem. Addressing software obsolescence is more difficult, as simply resaving files in the newer format (before backwards compatibility is lost) will sometimes cause the loss of important metadata.

E. Exhibition

The need to exhibit books and paper artifacts complicates the goal of preservation. The display environment is often more difficult to control than the storage environment; the materials displayed have, almost by definition, special value; and

preservation is often secondary to an exhibit designer. At the very least, exhibited objects are exposed to higher light levels than they would normally experience in storage.

Valuable paper collections should never be exhibited permanently, since this can cause irreversible fading and accelerate acidic deterioration. Whenever possible, duplicates or facsimiles of photographs and other paper-based materials should be exhibited. If originals must be exhibited, light levels should be no higher than 50 lux and exhibit length should be limited to 2–3 months. Climate conditions inside exhibit cases should be monitored to insure that they are not damaging. A min/max thermohygrometer will give a general indication of conditions.

Duplicate photographs can usually be made, and extremely good facsimiles can now be produced at a reasonable cost. Canon is marketing a computermodulated fourcolor (plus black) photocopier that makes exceptional reproductions on alkaline paper. Other manufacturers have also entered this field. Such copiers are prohibitively expensive for most institutions, but the service is increasingly available commercially. We recommend exhibiting duplicates or facsimiles whenever possible, or perhaps alternating original and facsimile objects in longterm exhibits.

Exhibit cases should be built of stable, pollutantfree materials and coatings; mounts, supports, and other exhibit materials should be made from inert materials like Plexiglas and polyester, or from neutral paper. Exhibit cases should not contain lights, since these cause significant changes in temperature and relative humidity within the case. Fiber-optic lighting is acceptable, since it does not produce heat.

Documents should be completely supported by mats and museumquality framing and hinging techniques, or by polyester slings, bands, or coversheets. See "Matting and Framing for Art and Artifacts on Paper" and "How to Do Your Own Matting and Hinging" in PLAM3 for instructions for matting, hinging, and framing. Additional sources are Ann Clapp's *Curatorial Care of Works of Art on Paper* (New York: Nick Lyons, 1987), and Margaret Holben Ellis's *The Care of Prints and Drawings* (Nashville: American Association for State and Local History, 1987).

Books must be well supported to protect their bindings from strain. Supports can be made from neutral mat board or Plexiglas. A stand or mount should support the entire cover(s) of a book as well as the spine. Reasonably good Plexiglas supports are available from conservation suppliers. Most books, and all oversized books, should be exhibited at no more than a gentle angle. If the book will not remain open naturally, a polyester band closed with 3M doublesided tape no. 415 can be used to hold the book open. Books can be structurally damaged by longterm exhibition in an open position; exhibit periods must be limited.

A standard for exhibition of paper-based collections has recently been issued; ANSI/NISO Z39.79—2001 *Environmental Conditions for Exhibiting Library and Archival Materials* provides guidelines for light; temperature; relative humidity; pollutants; exhibit case materials, design, and construction; methods used to display items; and appendices that provide lists of materials that are recommended and not

recommended for use in constructing exhibit cases or supports for exhibiting particular items. A free PDF version of the standard can be downloaded from NISO's web site, at www.niso.org.

IV. REFORMATTING & CONSERVATION TREATMENT

A. Microfilming, Preservation Photocopying & Digitization

Reformatting strategies like photocopying or microfilming should be considered when the value and condition of collections materials make it necessary to limit their handling or when only intellectual content needs to be preserved. In the case of original photographs, unique or valuable materials or fragile items, a copy is preferable for researchers' use, at least for initial examination.

Microfilming

Despite increasing interest in new technologies, preservation microfilming remains an established and valued preservation strategy. Properly produced and properly stored preservation microfilm has a lifespan of about 500 years. Filming can provide a use copy for artifacts that are too fragile to be used and can provide a preservation copy for materials that are badly deteriorated and valuable only for their informational content. In most cases, preservation microfilming is contracted out. High-volume commercial operations usually lack equipment, time and expertise to process fragile materials without damage. A special service filmer should be employed.

See "Microfilm and Microfiche" in PLAM3 for an overview of film types, film production standards and storage requirements.

Preservation Photocopying

In-house photocopying onto permanent durable paper is an excellent way to preserve information from acidic paper materials such as news clippings. Electrostatic copiers that fix an image with heat ("Xerograph") produce long-lived copies when durable paper is used. Paper used for preservation photocopying should meet the ANSI Z39.48 1984 or 1992 standards for paper permanence. Such paper is available from preservation suppliers and some traditional office supply sources. The label will say "low-lignin" or "lignin-free" and "buffered." The Library of Congress has a handout available on the Web that gives more detail on preservation photocopying (see "Preservation Photocopying," Library of Congress Preservation Directorate, available at <http://www.loc.gov/preserv/care/photocopy.html>).

For used frequently local history books that are damaged, brittle and out-of-print, preservation photocopying—also called facsimile reproduction—can provide a use copy. It is not the best choice for a book that is valuable as an artifact, since the photocopying process can be damaging, but it is a good option for books that are only valuable for their content. A number of facilities specialize in facsimile reproduction of brittle books on buffered paper. Some of them are listed in "Resources for Facsimile Replacement of Out-of-Print and Brittle Books" in PLAM3.

Unfortunately, the photocopying process itself can seriously damage collections. Copiers with flat or curved platens may not readily copy text at the gutter of a tightly bound book. Materials of enduring value should never go through a roller feed. Careful handling during the photocopy process is essential. Historical materials and volumes with permanent research value should only be photocopied by staff members, not researchers and then only if it will not damage the objects themselves. Staff must not press down on the spine of a book or the cover of the copier to insure a good quality image. Sometimes positioning a book gutter perpendicular to the edge of the platen will reduce the shadow. Edge copiers protect the spine by allowing book to be copied without being entirely opened.

Digitization

Administrators and staff must be aware that the large segments of the preservation community do not yet consider digitization to be a means of preservation. Those conservation and preservation professionals who do accept digitization for preservation have begun to do so only recently, and have not yet agreed on the best strategy to preserve digital materials. More conservative members of the conservation and preservation communities still recommend that digitization be partnered with microfilming to ensure long-term preservation of the information.

Among those who do believe digitization may be used for of preservation, consensus is developing around several likely strategies. A good place to start—particularly for digital images—is Cornell University’s online tutorial, “Moving Theory Into Practice,” at <http://www.library.cornell.edu/preservation/tutorial/contents.html>. Any digital preservation strategies will require a significant on-going commitment of time and resources, which may be beyond the means of smaller institutions acting independently; it is likely that consortia and other cooperative efforts will be required.

Leaving aside the question of digitization as a direct means of preservation, digitization can definitely improve preservation indirectly, by reducing handling. It can also be an effective means of increasing access, particularly for off-site users.

B. Library Binding

In recent years numerous discussions of binding considerations for research materials have appeared in the library literature. Any institution that uses commercial library binding for preservation purposes should be familiar with the options that have replaced oversewing or “Class A” binding and should make decisions for its own collections based on those options. Contracts with library binders should specify standards, procedures and guidelines covering the range of materials in a library’s binding program. Books returned by the binder should be individually inspected for quality of work and adherence to these specifications. Volumes with value as artifacts should never be rebound using library binding techniques or materials. Paper must be strong enough to withstand library rebinding without additional treatment.

Oversewn or side-sewn volumes can be difficult to open and it can be difficult to photocopy or read information near the inner margin. Ideally, these guidelines would produce the most useful and long-lived bindings: 1) any sewn volumes that are

suitable for recasing should be recased; 2) volumes with intact signatures should be sewn through the fold; and 3) volumes without intact signatures and with a text block two inches thick or less should be double-fan adhesive bound.

Formal standards have been adopted by the binding industry for commercial high volume or library binding; these are detailed in ANSI/NISO/LBI Library Binding Standard Z39.78-2000. The guide to this standard is available as a free download online at www.lbibinders.org/0838984840_LBIguide.pdf.

C. In-House Repair & Professional Conservation Treatment

Circulating Collections

Some techniques can be safely carried out by people who are not conservation professionals. Techniques used without the supervision of a conservator should be limited to objects that do not have special value to the collections.

Basic book repair, proper shelving practices and correct handling procedures can significantly extend the useful life of circulating materials. Preventive activities such as avoiding fore edge shelving, limiting use of book drops, and handling books carefully during interlibrary loan can help prevent distortion, which often causes the text block to detach from its binding. Proper shelving and handling procedures have been discussed in the section on handling books (above).

It is important to remember that for most libraries, very basic repairs such as tightening the hinges of a hardback book, repairing dust jackets and repairing torn pages will be the most useful and cost-effective. These kinds of repairs combined with careful handling procedures will lessen the amount of major damage to bindings and text blocks. More extensive repairs such as rebacking a damaged spine or recasing a text block that has fallen out of its cover require more complex training and supplies and may not be appropriate. In many cases weeding or replacement of damaged volumes will be a better choice.

Staff should be trained in proper book repair procedures. Supplies and materials used should be relatively non-damaging, and the resulting repairs should be strong and should allow the book to function well and remain attractive to users. Written instructions are available for basic repairs, but hands-on training is essential to insure that repairs are performed correctly. Workshops in basic book repair are offered by NEDCC and other area organizations. A private consultant could also be engaged, perhaps as a cooperative effort among several libraries, to teach proper book repair techniques to library staff. NEDCC can provide references to such consultants. After initial training has been completed and a book repair program has been initiated, it is a good idea to have a periodic review of the program and procedures by a preservation professional experienced in repair of general collections.

The value of preventive care has been confirmed by the experience of the Wellesley Free Public Library in Wellesley, MA. An initial 1987 collection condition survey at Wellesley found a significant amount of collections damage. An aggressive program of preventive maintenance was initiated that included performing minor repairs, training

staff to identify damage early and eliminating shelving and circulation practices that cause distortion. A second survey was conducted in 1991 at Wellesley and at three other Massachusetts libraries; its goal was to update Wellesley's condition findings, evaluate the effectiveness of their preservation efforts and provide statistically valid results to help define the condition of books in Massachusetts public libraries of various sizes and types. The second survey found an obvious improvement in the condition of Wellesley's collections and provided condition surveys for the Framingham, Concord, and Medfield public libraries, whose findings can be extrapolated to other libraries in the state. The following article was published about these condition surveys. "Preservation: The Public Library Response," *Library Journal* (February 15, 1989), 128-132. Co-authors: Anne Reynolds, Nancy Schrock and Joanna Walsh.

Historical Collections

Book repair procedures for general collections should never be used on historical materials with artifactual or permanent research value. However, some appropriate techniques can be used safely by nonconservators with proper training.

In the context of historical collections, "safe" inhouse techniques include rehousing; simple cleaning of books and some paper; simple repairs of book pages or documents and polyester film encapsulation of documentary materials. Paper that has artifactual or permanent research value should only be mended using conservationapproved methods and materials. Pressuresensitive tapes and many other adhesives have proven unstable over the long-term and many will cause permanent damage.

Other treatments must be performed by professional conservators who have the experience and equipment to ensure that the treatments are performed safely and effectively. If you are unsure whether an object is appropriate for in-house treatment, consult a conservator before proceeding.