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*The Museums Association of Montana (MAM) promotes professionalism and cooperation among the Museums of Montana. MAM is an organization for all types of museums—art, history, science and general—and individuals who are interested in improving and strengthening Montana’s museums.*

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**THE DEADLINE  
FOR SUBMISSION OF ARTICLES  
FOR THE NEXT ISSUE IS  
March 10, 2007**

The MAM Newsletter is published quarterly by the Museums Association of Montana, a nonprofit organization of institutions and businesses, dedicated to promoting communication among all types of museums in Montana. MAM is an all volunteer organization whose support comes from its membership and from occasional public and private grants.

As a forum for exchange of information and ideas, the MAM Newsletter needs your contributions. Deadlines for submitting articles and announcements are: March 10, 2007. Please send information to:

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# Newsletter

## President’s Message—

*Paul Shea, President, Museums Association of Montana*

Happy new year to all. I hope all goes well this year with your organizations. I was never one to make resolutions, always too guilty about not keeping to them. But it is never wrong to want to do better.

It is easy after years of doing the same thing to get into a rut. So at the start of a new year let’s try to do something different this year. How about a new display, or just clean up an old one that has been out for sometime. Maybe that valuable donor or the volunteer that is always there when you need them needs to be told “Thank you” a few more times this year.

Also it is time to look back and say thank you to yourself. Another year of making your museum work. Thanks to the extra hours, and out of pocket expenses to make things work a little better. Helping that school group understand their heritage. Helping that board member get to know museum management better. Smiling to the visitor who asks the same question you get time after time, “Where is the bathroom?”

Maybe it is time to stretch out a little and try to pick up something new. When it is time to attend this years conference look at the sessions and attend one that has a topic that is brand new to you. Encourage a co-worker to do the same.

Museums everywhere are having to strive to do more with less, it seems. The Museum’s Association of Montana is partnering with a coalition of other state and local history organizations to try to set up a Federal Formula Grants Program. Whether this will come to fruition or not remains to be seen. Nothing will be know until after 2009, but it is an attempt to get federal funding to individual states to help with their museums.

In the mean time we struggle to get the job done. Our best resources to date are our fellow museum workers and organizations. Just being able to call someone else and talk about your problems is a big help. That is what MAM is striving to be. Board members are always willing to listen and help where they can. Sometimes a solution is as simple as asking someone else’s opinion. Don’t hesitate to pick up the phone, or email one of us for help if you need it. That is what this organization and its board members are here for.

For those of you who received a Integrated Pest Management museum Starter Kit from Montana State University, it is never to late to watch the DVD or video and send back the survey. Will Lanier from MSU will be presenting and answering questions at the conference in Missoula regarding this kit. He hopes that it will help museum personnel set up their own Pest Management Program. This kit is designed to show you how to get started and with little cost. That is one of the parameters the group strove to achieve, a simple cost effective way to get a grip on the pests in your museum. A special thanks to the National Park Service, Grant Kohrs Ranch (watch for Chris Ford, an MAM board member, in the presentation.) for their part in putting this together.





**2006-2007**

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## IMLS Responds to Federal Formula Grants for Museums

By now you should know about the Federal Formula Grant Coalition, and its work to secure state formula grants for museums through IMLS. You can find more information about the initiative on the AASLH web site at [www.aaslh.org](http://www.aaslh.org).

Last fall AASLH took the lead in asking members of Congress to write IMLS and ask that the agency explore the feasibility of formula grants for museums to parallel the federal formula grants IMLS currently provides to states for libraries. IMLS received letters from several members of Congress and in mid-December announced that the agency will undertake an effort to explore the feasibility of formula grants to the states to support museum services. Dr. Anne-Imelda M. Radice, director of IMLS, said, "For fifty years there has been a population-based formula grant to each state and the territories to support library services. In recent years the museum community has been engaged in discussions about the feasibility of a similar program for museum services, and the agency has received several requests from members of Congress to explore the issue. This is an issue which must be fully examined by bringing a variety of voices to the table." IMLS has employed an outstanding strategist and policy advisory, Celeste Colgan, to take on this important project that will include a review of relevant funding models and work with community leaders, museum professionals, and educators across the country to convene local hearings to investigate the public's need for museum services and the potential for meeting those needs through federal grants to states. A report will be published 12/07.

This is, indeed, good news for the Federal Formula Grant Coalition. However, with a yearlong study and a report due 12/07, the Coalition cannot and will not wait for the report before moving forward with this important effort. During the first half of 2007 the Coalition will begin making its case to members of Congress and implementing strategies for gaining support for the initiative with IMLS's reauthorization in 2009. The Coalition believes the feasibility study commissioned by IMLS will verify what we all know – museums need more money from the federal government and state governments in order to sustain themselves into the future.

AASLH is pleased to act as administrator for the Federal Formula Grant Coalition. Members of the Coalition can be found on the AASLH website at [www.aaslh.org](http://www.aaslh.org). If you live in a state or region whose museum association has not signed on as a member of the Coalition or if your museum is represented by a national organization that is not a Coalition member, let them know you support the initiative and ask that they support it by becoming a member of the Federal Formula Grant Coalition.

Working together we can secure a brighter financial future for America's museums. Please help by asking all associations to join in on the effort. And, when the time is right, we will ask for assistance from the museum community too!

## MAM MEETS MONTANA LEGISLATURE

The Museums Association of Montana participated in a Legislative Open House at the Montana Historical Society in Helena on January 17, 2007. Board members were on hand to talk with those Legislators who attended and provided an informational booth on MAM activities.

**The Montana Academy of Living History (MALH)** had a successful inaugural year in 2006. Based on this positive experience, the MALH is now seeking proposals for workshops and presentations in 2007.

MALH focuses its educational offerings around the draft horse era of 1866-1930. Its campus is in historical Deer Lodge Montana, home to 5 museums including the Montana Territorial Prison, and the 1860s Grant Kohrs Ranch operated by the National Park Service. One of the earliest towns in Montana, Deer Lodge is rich in Montana History.

Proposals for workshops and/or presentations are being sought for the 2007 Academy to be held in Deer Lodge September 10-14. These should be related to the draft horse era.

The weekend following the Academy is the 12th annual Big Sky Draft Horse Expo and Antique Quilt, Lap Robe and Carriage Show (September 15 & 16, 2007). This provides an opportunity to see draft animals in action and is a fitting partner to the Academy.

If you have any questions, please contact Nick Shrauger at the address below. Please forward this message to others that you know who are interested in this time period. Deer Lodge is Montana's September place to be.

Nick Shrauger  
7825 Gooch Hill Road  
Bozeman, MT 59718  
(406) 586-5113



## **Field Guide to Emergency Response**

### **Field Guide to Emergency Response**

**Published by Heritage Preservation, Washington, DC**

**\$29.95, with instructional DVD**

When disaster strikes, how will an organization respond? This new manual for cultural institutions outlines specific steps, designed to help managers cope with an emergency and avert outright disaster.

Readers will find:

- Step-by-step instructions tailored to the scope of the emergency: what to do first, whom to call, how to prevent further damage.
- Tips on how to form a response team to deal with multiple tasks: working with emergency responders, assessing and documenting damage, ensuring health and safety of staff and setting up a salvage operation.
- Suggestions on stabilizing collections, with advice from professionals on handling the most common types of damage from water, mold, corrosion, pests, and other threats. A companion DVD shows how.
- Ways to customize handy checklists for the institution and find vital conservation resources.

"This primer is an invaluable tool for emergency planners and responders, small collecting institutions, and the public. The Field Guide is a real life saver!" says Randy Silverman, preservation librarian at the University of Utah Marriott Library.

Order online from [www.heritagepreservation.org](http://www.heritagepreservation.org).

## Federal Tax Refund

**Independent Sector** ([www.independentsector.org](http://www.independentsector.org)), the umbrella organization representing nonprofits from across all sectors, has alerted its members that the IRS recently announced a procedure which businesses and nonprofits can use to file for a refund on federal long-distance telephone excises taxes that they paid from March 2003 through the end of July 2006, when the federal government stopped collecting the tax. The release of the procedure follows the IRS announcement last May that individuals, businesses, and tax-exempt groups could request a refund for the long-distance telephone excise tax on their 2006 federal income tax returns. Businesses and nonprofits can either total the actual amount they paid in the federal long distance excise tax or use the formula provided by the IRS to estimate the refund. For additional detail, see the IS website at [www.independentsector.org/programs/gr/telephone\\_refund.htm](http://www.independentsector.org/programs/gr/telephone_refund.htm).

The Internal Revenue Service ([www.irs.gov](http://www.irs.gov)) has posted information about the formula that will allow tax-exempt organizations to estimate their federal telephone excise tax refunds. To request a refund, you must file Form 990-T, even if it does not have taxable income to report, and attach Form 8913. See the formula at: [www.irs.gov/newsroom/article/0,,id=164305,00.html](http://www.irs.gov/newsroom/article/0,,id=164305,00.html)

## Save the Rialto

Stop by the American Grandma gift shop at 325 Main Street and pick up your Rialto Community Theater Mug for only \$10 each. Proceeds from the sale of this mug will be donated to the Rialto Theater restoration.

Pick yours up today and help rebuild our Rialto Theater. If you can't make into the store, the mugs are available at [www.deerlodgerialto.com](http://www.deerlodgerialto.com) or [www.americangrandma.com](http://www.americangrandma.com).

Shana Forsman, Forsman Graphic Design & American Grandma Gifts, 325 Main Street, Deer Lodge, MT 59722  
406- 846-1368

## MONTANA SHRAB SURVEY....

**What's a SHRAB?** The Montana State Historical Records Advisory Board serves as the central advisory body within Montana for the preservation and use of historic records. The Board consists of eight governor-appointed members who have expertise and interest in the collection, administration, preservation and use of records of historic value. In that role the SHRAB sponsors workshops, awards training scholarships, produces the *Montana Archivist* newsletter and serves as a clearing house for information relating to records care and access.

How will the survey be used? The Montana SHRAB is conducting a follow-up survey of repositories in the state caring for archival records. The short survey will gather information that will be used to create the Montana SHRAB Strategic Plan for 2007. Respondents will be asked to answer questions about their training priorities, collection management needs, emergency preparedness planning and goals for providing access to collections.

The survey will be available January 1 to 31 online at the following web address <http://www.surveymonkey.com/s.asp?u=602352991800>. For those who do not have access to the internet, a hard copy can also be provided. Please contact Jodie Foley at (406) 444-7482. The survey responses will be used to determine future workshop and scholarship offerings, so please help us help you!

## SOCIETY MAKES GRANTS FOR HISTORIC BARN RESTORATION

Three historic barns in Montana will be restored using \$15,000 in grants from the **Montana Historical Society's State Historic Preservation Office's Rural Property Brick and Mortar Grant program**, according to Society Director Richard Sims.

The three barns are the J.G. Myllymaki Barn near Belt, the Cue Livery Barn in Melrose, and the Nunberg Barn near Wibaux. All three projects will receive \$5,000 a piece as matching support. The funds derive from federal dollars the Historic Preservation Office receives annually from the **National Park Service**.

"Barns are a difficult property type to maintain," Society Historic Architecture Specialist Pete Brown said. "We receive requests for barn-related grants all the time, and there is a real interest out there for preserving barns and other agriculture-related buildings."

The Society received more than 125 letters of inquiry from barn owners across the state after it announced the program, which was a one-time demonstration project.

"These three barns represent only the top of the haystack," Brown said. "We wanted to include a variety of barn construction traditions and geographical locations, and we wanted to award funding to buildings that are used much as they were historically."

Any businesses, organizations or individuals interested in contributing funds as sponsors for the Society program to restore historic barns and other ag buildings can contact Brown at 406-444-7718.

"We do not have ongoing funds for this sort of thing, and this is a great opportunity for people and organizations to show their support for the history of Montana agriculture," Brown said.

Here are the three barns selected for grants:

**Myllymaki Barn** – Owned by J.G. Myllymaki and built in 1939 in the Finnish log building tradition, it is part of Korpivaara National Register Historic District, which is made up of Finnish barns along Little Belt Creek in Cascade County.

**Cue Livery Barn** – Owned by Linda Cue and built over the course of the 1880s and 1890s by the Hecla Mining Co. for mules used in their operation near Melrose. It is built using lap-jointed logs and wood frame with board and batten siding.

**Nunberg Barn** – Owned by the Nunberg family and built in 1911 in the classic red, wood frame barn tradition. It has been in the Nunberg family since 1928.

## ROCKY MOUNTAIN TEXTILE CONSERVATION

### Treatment of historic costumes and textiles

Services provided for museums, historical and cultural institutions, and private collectors by Teresa Knutson, Conservator, including:

- Local cleaning of stains
- Consolidation and stabilization of losses
- Textile mounts & mannequin construction
- Documentation of treatments, including photographs
- Condition surveys/On-site consultations
- Lectures and workshops on storage, preservation, and mounting of textiles and costumes

Kalispell, MT 59901

[rmtcons@yahoo.com](mailto:rmtcons@yahoo.com)

406-756-1388

[tknutson@aboutmontana.net](mailto:tknutson@aboutmontana.net)

## *Traveling Medicine Show*

### **Hockaday Museum and Blackfeet Tribe collaborate**

The Hockaday Museum of Art in Kalispell was recently awarded an Indian Education for All Montana Implementation Assistance Grant from the Montana Office of Public Instruction. The \$24,000 grant will finance the development of "Indian Art and Cultural Trunks with Resident Artists" – a collaborative project between the **Hockaday Museum** and artists of the Blackfeet Nation.

Excitement is running high among **Hockaday Museum** staff and Blackfeet artists, who will work together to design and produce three traveling trunks for Native American studies classes in Flathead, Lake and Lincoln County schools.

Christened the "Traveling Medicine Show" by its artists, the project will bring artifacts, display materials, hands-on activities and members of the Blackfeet Nation themselves directly to students. Participating classes will explore the history, culture and traditional practices of the Northern Plains Indians and discover how each has influenced the other across time and territory. Already, nine artists from Browning are collaborating closely with the Hockaday to develop the trunks.

Perspective, spirit, talent and vision characterize the membership of the project team. David Dragonfly, artist and director of the Museum of the Plains Indian, will consult in the creation of each trunk and assist in contracting with Indian artists to fashion replicas of historical Indian objects and art. Two notable artist-educators collaborating on the project are Richard Horn and Darnell Rides at the Door, both members of the Blackfeet Tribe.

Also from the Blackfeet Nation is resident project artist Holly Eaglespeaker. Her role will be integral to a host of educational activities at the schools; she will also serve as an ongoing consultant to the Hockaday Museum's education department and volunteer docents.

The first trunk, called the "Ancient Case," will focus on early art and artists of the Blackfeet and other Northern Plains tribes. It will include artifacts once considered contemporary, including Blackfeet language tapes and cultural games sure to ignite the enthusiasm of school children as they learn new vocabulary and play games from long ago.

Other treasures planned for the trunk are a parfleche case, bow and arrow, shield, hide scraper, bladder bag, horn spoon and club. Their significance in function, fashion and tradition will be the subjects of many school lessons.

Traditional clothing design and ornamentation—and the evolution and significance of native dance and drum—are central themes for the second trunk. Contents planned for the "Traditional Case" include moccasins of different materials, a horse stick and stand, dolls with and without a face, amulets for girls and boys, a cradle board, drum and pipe.

History will come alive for students as they learn the stories behind each article, and they will experience traditions of Blackfeet and Northern Plains cultures firsthand through modeling everyday and ceremonial dress, doing beadwork, and learning dance and drum techniques.

Artifacts and activities in the third trunk—the "Contemporary Case"—are intended to strike intriguing comparisons between perspectives of contemporary Indian artists and those of historic times. The old is reborn as new, the ancient reflected in the contemporary in this collection, which will include an antler comb, Blackfeet numbers book, jewelry, boy and girl puppets, a King Kuka print, a painting by David Dragonfly and a parfleche case.

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**The Hockaday Museum of Art** will host a ceremonial opening of the "Traveling Medicine Show" trunks, 5-8 p.m. Jan. 26. At that time contributing artists will take center-stage to tell the stories of items in the trunks: their significance in history, how they were made, and what they represent to the collection and the project. They'll share details of inspiration, effort, struggle and success—each affording a privileged glimpse into the spirit and culture of an artist and a nation.

The Traveling Medicine Show is at once authentic and very much alive—a remarkable way for the Hockaday Museum to bring the marvels of art history to greater numbers of young people in Montana schools, and to effectively coordinate the focus of the museum's Education Services with Native American studies curriculum requirements.

Perhaps most important of all, organizers perceive this project as a chance to build a sacred bridge across a chasm of misunderstanding. For surely, as school children meet and experience the proud history and profound culture of the Blackfeet Nation and other Northern Plains Indians, they will gain respect and reverence for their native, fellow Montanans—and in turn teach the rest of us to live as one, diverse and peaceful brotherhood.

## Montana tribes sort out economic future with state

HELENA, Mont. - The result of 2003 legislation that was introduced by Rep. Jonathan Windy Boy, Chippewa Cree from the Rocky Boys' Reservation, requires the state and tribes meet to review a mandatory annual report. The law requires that the tribes have a say in state policies that could affect the seven tribal nations in the state.

Economic development is, for the most part, stagnant on many of the reservations with unemployment in the 80 percent range during the winter months. In 2005 the state Legislature allocated \$1 million to be used over a two-year period for economic development in Indian country.

This year, the Chippewa Cree will receive a \$55,000 grant to assess the possibility of an ethanol plant; \$55,000 will be used by the Fort Belknap tribes for a meat-packing plant; and the Crow, or Apsaalooke, Nation will receive another \$55,000 for start-up loans for small businesses. The remainder of the \$500,000 annual funding will be awarded throughout 2007.

### **Advertise in the Museums Association of Montana Quarterly Newsletter**

*The Museums Association of Montana* has great opportunities for advertising in our Quarterly Newsletter, great rates and an expanding subscription base. Our newsletter goes out to all members and is over 100 at this time. With your support we can increase that to over 300 quarterly issues. Our advertising rates below can be received at a discount by joining MAM at the Benefactor and Corporate levels.

<b><u>Advertisement Size</u></b>	<b><u>Dimensions - H X W</u></b>	<b><u>Cost</u></b>
<b>½ page (horizontal)</b>	<b>4 ½" X 7 ½"</b>	<b>\$100.</b>
<b>¼ page (vertical)</b>	<b>4 ½" X 3 ½"</b>	<b>\$ 50.</b>
<b>1/8 page (horizontal)</b>	<b>2 ½" X 3 ½"</b>	<b>\$ 25.</b>

Contact the *MAM Coordinator*, Rocky Whipkey, for more information regarding membership and newsletter advertisement opportunities! Call 406-443-6563 or email: [coordinator@businessmt.com](mailto:coordinator@businessmt.com)

## **Missoula Awaits MAM 2007 Conference**

**The Historical Museum at Fort Missoula** and the entire museum community of Missoula are delighted to be hosting this year's MAM conference, March 8-10, at the Holiday Inn-Parkside. The hotel is located right downtown, close to everything—coffee shops, bookstores, antique stores, theater, shopping, restaurants and, of course, bars (lots and lots of bars, but more of that later).

The conference itself promises to be one of the best ones yet, with workshops on *PastPerfect* and boards & governance; and sessions on exhibit development, ethics, pest management, collection care, maintenance, inventorying, repatriation, the bed tax, museum stores, and more. But that's the boring stuff—Missoula is ready to party!

If you come early and don't want to go to one of the workshops, or if your significant other wants something to do on Thursday, March 8, at 1:00, "Preservationist of the Decade," noted lecturer, and award-winning author Allan Mathews will give a walking tour of the historic downtown. That evening we've got a progressive dinner for you that will take you from the "New" **Missoula Art Museum**, to the **Historical Museum at Fort Missoula**, to the **Rocky Mountain Museum of Military History**.

Friday evening's dinner banquet will be followed by an eerie look at Montana's ghostly history by Ellen Baumler. "Spirit Tailings and Story Tellings" looks at things that go bump in the Big Sky night with eerie experiences involving heritage places and historical events that are an integral part of our cultural fabric and, when grounded in fact, substantiate the notion that the past sometimes "haunts" the present. Ellen Baumler, research historian and writer from the **Montana Historical Society**, includes stories and tales from across the state, richly embroidered with Montana's unique historical legacy.

Following the silent and live auction with auctioneer Bill Holt that evening, some very professional and enthusiastic volunteers will lead you on an expedition to visit some of Missoula's finer drinking establishments.

During your stay you will also have the opportunity to see the new Abraham Lincoln exhibit at the Public Library and a new exhibit at the **Montana Museum of Art & Culture** featuring the works of internationally known, Native American artist George Longfish.

We would like to take this opportunity to also thank all of our co-sponsors: *the Historical Museum at Fort Missoula, A&E Architects, Missoula Art Museum, Friends of the Historical Museum at Fort Missoula, Rocky Mountain Museum of Military History, Mountain Press Publishing Company, Southgate Mall Associates, Montana Historical Society, Bill Holt, Missoula Downtown Association, Dollar Rent A Car, and the Montana Cultural Trust.*

Finally, please make your reservations at the Holiday Inn-Parkside soon, **before February 20**. We've got a great rate for you and we need to fill up our block of rooms to get a better rate for MAM's overall costs. Call 728-8550 and be sure to mention MAM.

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### **Sign Up for the *PastPerfect* Workshop**

9:30 a.m.—4:30 p.m. March 8, 2007 – Missoula

On Thursday, March 8, as part of this year's MAM Conference in Missoula, Brian L Gomez, Vice President of Operations for Pastime Software Company, will be presenting a workshop focusing on the collection management features in *PastPerfect* Version 4.0. Join us for a hands-on class designed to help all user levels become more efficient with *PastPerfect*. Bring your questions and bring your data, Brian will work with you to make sure you get what you need to be successful. Bring your laptop if you've got one, although it is not necessary to participate. Cost is \$40 per person.



## 2007 MAM Conference Registration Form

Please complete a separate form for each individual and send to:

Museums Association of Montana  
P.O. Box 1451  
Helena, MT 59624  
*Please Make Checks Payable to MAM*

NAME: \_\_\_\_\_

MUSEUM POSITION: \_\_\_\_\_

INSTITUTION: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

PHONE: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

Registration (Register by March 1 <sup>st</sup> ):	Fee	Paid
Individual: Includes Meals	\$110	
Additional Participants from same Institution: Includes meals	\$100	
<b>Thursday Workshops (Register by March 1<sup>st</sup>):</b>		
Collections management with Past Perfect	\$ 40	
Boards & Governance	\$ 20	
Local Tour	\$ 10	
Extra Meal Tickets for Non Conference Attendees:		
Friday Lunch:	\$ 15	
Friday Banquet:	\$ 30	
<b>TOTAL:</b>		\$

This is my first MAM Conference: \_\_\_\_ (Check if YES)

Please note any special dietary requirements:

\_\_\_\_\_  
\_\_\_\_\_

## 2007 Federal Grant Deadlines

### **National Endowment for the Humanities – NEH**

Preservation Assistance Grants for Smaller Institutions

Deadline: May 15, 2007

Questions? Contact: 800-NEH-1121 or 202-606-8400,  
[info@neh.gov](mailto:info@neh.gov), or [www.neh.gov](http://www.neh.gov)

### **Institute for Museum and Library Services – IMLS**

21st Century Museum Professionals Grant

Deadline: March 15, 2007

Questions? Contact: 202-653-IMLS, or [www.imls.gov/grants](http://www.imls.gov/grants)

### **National Park Service—NPS**

National Park Service Tribal Heritage Grants

Deadline: February 17, 2007

Questions? Contact:

<http://www.cr.nps.gov/hps/hpg/tribal/index.htm>; 202-354-2020

Save America's Treasures

Deadline: April 18, 2007

Questions? Contact: [www.cr.nps.gov/hps/treasures](http://www.cr.nps.gov/hps/treasures)

See [www.grants.gov](http://www.grants.gov) for more grant opportunities

All Federal Grant applicants are required to provide a Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number when applying for Federal grants or cooperative agreements.

## UPCOMING MUSEUM CONFERENCES

### **Museum Retail Conference & Expo**

April 13 – 16, 2007—Denver, CO  
Colorado Convention Center

### **Museums and The Web**

April 11 -14, 2007—San Francisco, CA

### **AAM Annual Meeting and MuseumExpo™ 2007**

May 13 -17, 2007—Chicago, IL

Lakeside Center, McCormick Place

### **20th Annual Visitor Studies Assoc. Conference**

July 19-21, 2007— Ottawa, Ontario Canada

Ottawa Marriott

### **Mountain-Plains Museums Association 2007 Conference**

September 10 -14, 2007—Fargo, North Dakota

### **American Association for State & Local History**

September 5 -8, 2007—Atlanta, GA

## **33rd Montana Governor's Conference on Tourism & Recreation**

**April 2-3, 2007**

Participate in a variety of educational, entertainment and networking sessions on tourism along with special events and field trips to Helena area attractions.

**LOCATION:** Red Lion Colonial Hotel, 2301 Colonial Drive, Helena, MT 59601 406-443-2100 or 6703, 800-RED LION (325-4329), [www.redlion.com](http://www.redlion.com)

**REGISTRATION:** \$120 prior to March 16; \$140 March 17-31; \$160 April 1-3; \$50 Student Registration; Visa and Mastercard accepted

RMS Management Services, 36 South Last Chance Gulch, Suite A, Helena, MT 59601, 406-443-1160, FAX 406-443-4614, E-mail: [skopec@rmsmanagement.com](mailto:skopec@rmsmanagement.com)

Conference Information and Registration Form available at website:  
[travelmontana.mt.gov/conference](http://travelmontana.mt.gov/conference)

### **EXHIBITOR/SPONSOR OPPORTUNITIES**

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MONTANA  
HISTORICAL SOCIETY

## ***JAMES H. BRADLEY FELLOWSHIPS***

### ***Montana Historical Society***

The Montana Historical Society offers up to two JAMES H. BRADLEY FELLOWSHIPS every summer to graduate students, faculty, and/or independent scholars pursuing research on Montana history. The Fellowship stipend is \$2,500.

The recipient of the award is expected to be in residence for four weeks between June 1 and October 31. Fellows are expected to make use of the MHS's collections and to submit a written report upon completion of the research. Bradley Fellows also agree to submit an article based on the research for possible publication in the Society's quarterly journal, *Montana The Magazine of Western History*, within one year of their residency.

#### *Award Criteria*

- 1) suitability of research to the Society's archival, library, or museum collections*
- 2) applicant's experience and training*
- 3) potential of the project to make a significant contribution to historical scholarship on Montana*
- 4) potential of the project to produce an article-length publication.*

Applications must include a cover letter, a project proposal **not to exceed three double-spaced pages**, a 2-3 page resume, and at least one letter of recommendation. The proposal should indicate what material in the MHS collections the applicant intends to consult. Historical Society employees and previous Bradley Fellows are not eligible to apply.

Applications must be postmarked no later than **March 1<sup>st</sup>, 2007** and sent to the Bradley Selection Committee, Montana Historical Society, PO Box 201201, Helena, MT 59620-1201. Email: [mhslibrary@mt.gov](mailto:mhslibrary@mt.gov) or call (406) 444-2681. Announcement of the award will be made in early April. For more information about the Montana Historical Society and its collections see: [www.montanahistoricalociety.org](http://www.montanahistoricalociety.org).

Lieutenant James H. Bradley's "prose and poetry at intervals for several years brightened the columns of the local press...Other and broader themes shared his attention as well, and manuscripts of solid worth, applying to the earlier voyageur occupation of the Northwest, are valuable mementoes left of his untiring, thorough and enthusiastic historic research."

*Helena Weekly Herald*  
August 16, 1877



# NORTHEAST DOCUMENT CONSERVATION CENTER

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## The environment

### 2.2 Monitoring Temperature and Relative Humidity

Beth Lindblom Patkus  
Preservation Consultant  
Walpole, MA

#### Introduction

Books, photographs, and other paper-based artifacts are vulnerable to damage from their environment. Heat, moisture, light, and pollutants produce destructive chemical reactions. Warmth and damp promote biological processes like mold and insect infestation. While some materials used to produce books, documents, and art on paper have proven quite durable, others (like ground wood pulp and acidic inks) deteriorate rapidly under adverse conditions. Museums, libraries, and historical societies are subject to the same phenomena as any other buildings, but have an extraordinary responsibility for preserving their collections for future generations.

While we cannot eliminate all of the causes for decay of our cultural records without forfeiting access to our collections, we can greatly slow deterioration by moderating the environment. Control of some factors, such as light, is relatively easy and inexpensive. Controlling the climate (temperature and relative humidity) is a much more difficult task. Monitoring of temperature and relative humidity is essential to the success of climate control. Monitoring can have several purposes: to provide data showing that current climate control is inadequate; to document current conditions in preparation for making changes in equipment; to evaluate the effect of equipment changes that have been made; and/or to guard against any environmental extremes that might occur.

#### Why Is Climate Control Important?

Climate control is important because inappropriate temperature and relative humidity (RH) can severely limit the lifespan of paper collections. Many people assume that temperature has the greatest effect on collections (as it does on people), but in fact RH is at least as important a contributor to paper deterioration. Most people are aware that high temperature and RH can encourage mold growth and insect infestation, but in reality the effect of the storage climate on collections is much more complex.

It is important to realize that temperature and RH are interrelated — a change in one will bring about a change in the other. Warmer air holds more moisture than cooler air, so if the absolute amount of moisture in a space remains constant, the relative humidity (which represents "the amount of moisture in the air relative to the amount the air is capable of holding, expressed as a percentage"<sup>1</sup>) will fall as the temperature rises, and it will rise as the temperature is lowered (these relationships between temperature and RH can be calculated using a psychrometric chart). For example, if a space is at 60° F and 70% RH, the RH will fall to about 40% if the temperature is raised to 75° F. On the other hand, if the temperature is lowered the RH will rise — and when it reaches 100% the air will become saturated and moisture will condense out (this is called the dewpoint). For example, if a space is at 70° F and 50% RH and the temperature suddenly drops to below 50° F, condensation will occur on collections.

Embrittlement of paper (along with many other forms of decay in such organic materials as leather, textiles, and magnetic tape) is an indication of chemical deterioration, and the chemical reactions that govern this process are greatly influenced by the climate. Temperature increases the speed of the chemical reactions that cause acidic deterioration. A familiar rule of thumb estimates that chemical reactions double with each 18°F (10°C) increase. In the special case of

cellulose, artificial aging tests indicate that each 9°F increase nearly doubles the rate of deterioration, even in the absence of light, pollutants, or other factors. Relative humidity provides moisture to fuel these reactions — the higher the humidity, the more quickly deterioration proceeds.

Research models have been developed in the last several years that quantify the effects of temperature and relative humidity on chemical deterioration. The Image Permanence Institute (IPI) at the Rochester Institute of Technology has developed the "Preservation Index", which builds on work done by Donald Sebera, formerly of the Library of Congress. This tool gives a general idea of the length of time it would take paper collections to become noticeably deteriorated at a particular temperature and RH. The model shows that short-lived organic materials stored at 72° F and 50% RH would have an approximate lifetime of 33 years, but if the temperature were lowered to 62° F and the humidity to 40%, such materials would have a lifetime of 88 years. The model also shows that if materials are subjected to high temperatures and humidities (such as 82° F and 75% RH) noticeable deterioration would occur in 9 years or less.<sup>2</sup>

Another interesting aspect of this research is that it demonstrates that the same projected lifespan can be achieved through different combinations of temperature and RH. For example, conditions of 57° F and 50% RH or 62° F and 35% RH would both result in a predicted lifetime of close to 100 years.<sup>3</sup> This has the potential to offer institutions some flexibility in how they control the climate, although extremely high humidities or temperatures must always be avoided due to the danger of mold and insect infestation.

The effects of fluctuations in temperature and RH on collections is another important concern for climate control. Fluctuations in temperature are serious — research done at the Library of Congress has shown that chemical deterioration of paper proceeds more quickly if paper is exposed to temperature fluctuations than if it is stored at a constant temperature. In addition, paper — like many other materials — is hygroscopic, meaning it absorbs and gives off moisture. This means that as the temperature rises and the RH decreases, moisture will migrate from a hygroscopic object to the air as the object tries to maintain equilibrium. As the temperature drops and the RH rises again, moisture will move back into the object. This process can cause physical stress as the changing moisture content causes the material to swell and shrink. It can result in serious damage to composite materials such as furniture and art works, and it can cause cockling and distortion in books and paper (although in some situations books and paper collections are protected from moderate RH fluctuations because RH changes are buffered by storage enclosures or by books being packed closely together<sup>4</sup>).

Finally, collections managers must be aware that while there is no danger associated with low temperature storage (in fact such storage greatly slows deterioration), very low RH can be damaging to some materials. Traditionally there has been concern about paper becoming too brittle to be handled at very low humidities. Research has shown that paper can be safely handled at around 20% RH — or 30% if it is to be folded — so there is no need to store it at 40–50% RH for the purposes of handling. For parchment and photographic materials, lower humidities are being recommended for chemical stability — but these materials should not be stored below 30% RH. Especially in the case of parchment, it is also important not to change the climate rapidly, since this might cause damage.<sup>5</sup>

It seems clear that a significant investment in the acquisition of information, aesthetic artifacts, and cultural records for research, exhibit, and education warrants active protection of the acquired materials. It should be equally clear that the climate of a storage environment will profoundly affect the condition of these objects.

### **Climate Control is Expensive — What is Good Enough?**

Although the preservation community has been unable to agree on specific standards for climate control in paper-based collections, authorities do agree on several general conclusions that emanate from research:

Temperatures above about 70°F and RH above about 55-60% encourage mold and insects.

Additional damage occurs at climatic extremes: high RH increases acid formation; RH below 30% can embrittle paper, parchment, adhesives, photographic emulsions, and other materials.

Within these limits, the lower the temperature and RH can be kept, the better — provided they do not fluctuate.<sup>6</sup>

As a first step towards limiting deterioration by good climate control, an institution should aim at maintaining stable conditions year round, no higher than 70°F and between 30–50% RH. These are the suggested values given in

Environmental Guidelines for the Storage of Paper Records, a technical report issued by the National Information Standards Organization. This report is not a standard, but it offers useful guidelines for climate control. The report specifies that one target value within the range of 30–50% should be chosen for relative humidity, depending on what the institution's climate control system can maintain consistently. The report notes that temperature should not vary more than  $\pm 2^{\circ}\text{F}$  and RH should not vary more than  $\pm 3\%$  in any 24-hour period. If fluctuations can be controlled, damage to collections will be significantly slower than it has been under the typical range of storage conditions in many areas of the United States and Canada.

Institutions committed to long-term preservation must be willing to budget for the best achievable climate. At least, where winter-long heating is necessary, temperatures should be kept as low as staff can be persuaded to tolerate (assuming the resulting RH is acceptable). Where summer temperature and RH are high, collections of lasting importance should be air conditioned.

In no case should climate-control equipment be turned off or thermostat settings altered over night, during weekends, or in other periods when the facility is unoccupied. The rapid, repeated changes that result when equipment attempts to bring a building from "closed" conditions to "working" conditions produce significant stress on collections. In some areas, severe weather or economics force institutions to close for the winter. In such situations, it is not cold that is a preservation hazard, but potentially unstable humidity in a building that is inadequately insulated or poorly sealed to prevent air migration. Procedures for winterizing collections have been developed. In addition, it appears that control of winter humidity by low levels of heat in conjunction with humidity sensors may be practical.

If winters are severe, central heating can dramatically lower the RH of a building. Where a humidification system is feasible, it should be steam-based, and the source of the steam should be clean and independent of other systems. Most steam and hot water heating systems use anti-corrosive chemicals to prevent damage to pipes. These chemicals can harm staff and collections if they are injected into the air.

Under prolonged high humidity, conventional air conditioning alone usually will not provide adequate dehumidification. Environments that are air conditioned should therefore be carefully monitored. Chemical desiccants can put damaging abrasives into the air and should be used only in emergencies. Additional refrigeration cooling is preferable.

Maintaining perfect conditions is difficult and expensive, particularly in northern climates subject to both hot, humid summers and cold, dry winters. The NISO guidelines include specifications for allowing the temperature and relative humidity to drift (change gradually in one direction)  $3^{\circ}\text{F}$  or 3% RH each month, following the changes of the seasons. The maximum allowable daily fluctuation would be  $\pm 2^{\circ}\text{F}$  and  $\pm 3\%$  RH. Careful monitoring is necessary to track such changes accurately.

### **How Can You Tell if the Climate is Okay?**

The only way to know what climate exists in your building is to measure and record temperature and RH with instruments designed for that purpose. This should be done systematically wherever collections of permanent value are stored. A concrete, accurate record can move climate control out of the hypothetical realm into a set of practical steps or goals for improving storage or exhibit conditions. It is often helpful in convincing senior decision-makers that concerns about a building's climate are not imaginary.

In addition to documenting existing conditions, a monitoring program can guide and record the effect of changes in the operation of available climate control equipment. Heating, ventilation, and air conditioning (HVAC) systems are seldom optimally used, even when all the components are in place. A building maintenance engineer or the contractor responsible for the HVAC system can often improve its performance, if concrete information is available to show the effect of altered thermostats, filter replacement, or even rearranging furniture to unblock vents.

If climate-control equipment was designed to produce the desired conditions, but problems cannot be solved by simple adjustments and routine maintenance, it may be necessary to have the system professionally rebalanced. Balancing is a process that measures air flow and other characteristics of HVAC systems; it requires the expertise of a professional climate-control engineer.

If conditions cannot be improved with existing equipment, a monitoring program can document the severity of the problem and support the need to add machinery. Under the best circumstances, it will indicate that available climate-control equipment is operating properly and handling the environmental load. It may also identify occasional transient problems.

## **How Do You Monitor Climate?**

There are various instruments available to measure temperature and RH. They fall into two categories: those that provide "snapshot" measurements (i.e., a record of conditions at a specific moment) and those that provide a continuous record of climate conditions. Each institution must analyze its own needs and resources to determine which monitoring instrument is most appropriate. The most common instruments are described below.<sup>7</sup>

### **"Snapshot" Monitoring Devices:**

Thermometers can provide accurate temperature information for about \$10.00. Calibrated thermometers for scientific use are available, but at this level of accuracy, a standard thermometer that measures the entire range of foreseeable conditions in your building is satisfactory. Most instruments that measure RH incorporate a temperature sensor of some sort, since RH is a function of air temperature and the amount of moisture available in the air.

Simple dial-type hygrometers available from most hardware stores for \$15.00 or less, are an inexpensive way to measure RH, but they are not recommended because they can be inaccurate and most cannot be recalibrated. The only exception are "animal membrane"; dial hygrometers, which are more accurate.

Humidity indicator strips or color cards are another inexpensive (from \$1.00–\$5.00 per strip) humidity-monitoring device. Some are reversible and thus can be reused, while others are for one-time use. Humidity indicator strips provide only approximate readings; they have been shown to be reliable for indicating extremely high or low conditions.

Sling psychrometers (about \$100) are the least expensive instrument capable of accurate RH measurements. Two thermometers are mounted side by side. The bulb of one is covered with a wick, which the user wets with distilled water. The instrument is swung, rotating about once per second for several minutes to get an accurate reading. The resulting flow of air over the wet wick cools the second thermometer, and the difference between the dry bulb and wet bulb temperatures is used to calculate the RH.

While conditions can be recorded using a sling psychrometer (preferably several times per day), accuracy depends on the design of the instrument and the skill of the user. The people responsible for monitoring need to practice until readings are reproducible. The major advantages of a sling psychrometer are cost and portability. One instrument can be used in many spaces each day. Disadvantages are inaccuracy in the hands of an inexperienced user, problems with reproducible measurements, and the fact that a monitoring program based on spot readings will not provide critical information such as the speed and frequency of variations in each 24-hour period.

These instruments provide only a rough picture of the environment, dependent on a human monitor who may not be around to record information at midnight, or over holidays and weekends, when conditions will often reach extremes. For useful comparison, measurements need to be made at the same times and the same locations each day.

Battery-operated (motor-blower) psychrometers work on the same principle as a sling psychrometer, but use a motor-driven fan to generate the air flow. These are moderately priced (about \$150 and up), are less prone to error, and can be conveniently moved to monitor a wide variety of spaces. They too are likely to fail to measure the most extreme conditions and rapid changes in the environment, since they depend on a human user. Replacement batteries should always be on hand.

An electronic temperature/humidity meter is another hand-held instrument that uses a calibrated sensor to measure RH at a known temperature. Many have liquid crystal displays that give both RH and room temperature. These range from about \$300 and up, and also depend on the time and frequency of measurements. While they are capable of great accuracy and are easy to use, some of the more inexpensive models may be accurate only to  $\pm 3-5\%$  and may take several minutes to react to changes in RH. These instruments need to be recalibrated periodically as recommended by the manufacturer.

Min/max digital thermohygrometers are battery-operated instruments that combine temperature and RH sensors with a computer chip that retains a memory of minimum and maximum values until it is manually reset. Like other spot measurement tools, these provide information about conditions at only one moment in time, but they do insure a record of highest and lowest conditions in each interval. A human monitor must record the measurements and reset the meter

once a day. Humidity measurements tend to be accurate only to about  $\pm 5\%$  (at mid-range temperatures — accuracy may be less at temperature extremes), but these instruments can provide an initial broad outline of climate conditions. These are available at below \$70.00 through several vendors.

### Continuous Monitoring Devices

A recording hygrothermograph has been the standard choice for monitoring temperature and RH. Features to look for include:

The hygrothermograph should use a human hair bundle to measure RH and a bimetallic device to measure temperature.

The sensors will be attached to pens that record changes continually on a simple graph—these pens should be an easily replaceable cartridge type.

The minimum acceptable variation in accuracy for temperature is  $\pm 2^\circ\text{F}$ ; minimum RH is  $\pm 5\%$  ( $\pm 3\%$  is preferred). Make sure the instrument will work in the most extreme conditions your building experiences.

Hygrothermographs are available with circular charts, but linear charts (also called drum charts) are preferred since they are easier to read.

The hygrothermograph should offer variable speed, so that 24-hour, 7-day, or 1- or 2-month charts can be used. While daily or weekly charts provide the most detailed information, monthly charts may be useful if staff cannot change the charts regularly.

For a recording hygrothermograph with the above features, cost ranges up from about \$700 per instrument. If more than one space needs to be monitored, hygrothermographs can be relocated as needed, but should be left in each area for at least a couple of weeks during each season.

Regular maintenance is essential for recording hygrothermographs. The cover must be used to protect the mechanism from dust, and the instrument should be cleaned periodically following the instructions in its manual. Periodic rehydration of the human hair bundle, perhaps as often as once per year, is necessary. Recording hygrothermographs must also be recalibrated regularly (usually at least once a month and whenever they are moved) using a battery-operated psychrometer or good quality electronic hygrometer. If an instrument is not recalibrated regularly, it can be off by as much as 10–20%. For both rehydration and recalibration it is best to follow the manufacturer's instructions. The human hair bundles also need to be replaced every three to five years — or as often as the manufacturer recommends.

Dataloggers are battery-powered instruments about the size of an audio cassette. They use electronic sensors and a computer chip to record temperature and RH at intervals determined by the user. Data is transferred between the datalogger and a personal computer by a cable. Once the data has been downloaded, software that comes with the datalogger allows the user to produce customized charts and graphs that illustrate conditions over time. This is an advantage over hygrothermographs, the data from which must be replotted by hand for analysis.

Some issues to consider when purchasing a logger include:

The frequency you wish to take measurements and how often you wish to download data. A datalogger does not provide continuous monitoring in the way that a recording hygrothermograph does — most loggers can take measurements at intervals ranging from a few seconds to a few hours. More frequent measurements will occupy more memory, require more frequent downloading of data, and add to the staff time required to maintain the logger.

Real-time display of climate conditions. An increasing number of loggers, but not all, provide this.

Accuracy of the electronic sensors. Some loggers use sensors that are temperature-compensated — meaning the logger can provide about 3% accuracy for RH over a wide range of temperature and humidity — while others do not. Also, some sensors may have a "time-lag" of 4 or 5 minutes if the humidity is falling — this would be a disadvantage if frequent sampling is required.

Prices vary, but units are available for about \$500 and up. The electronic sensors must be recalibrated periodically according to the manufacturer's instructions. Like the traditional recording hygrothermograph, a datalogger can be moved to monitor several locations, but you must keep a careful log of the time of the moves to correlate with the data.

### **How Do You Decide What Instrument to Buy?**

Cost may be the major consideration for a small institution. Look at catalogs from a number of suppliers and compare the features and prices of their equipment. If the catalogs do not provide all of the information you need, ask questions. Talk to colleagues who have developed climate-control programs.

The following questions are important to ask in making an informed decision:

What do you want the information for? If you are documenting the effect of operating changes for your climate-control equipment, you may need a recording hygrothermograph to continuously document small changes in temperature or RH. If climate control in your building is limited to steam heat during the winter, and you want to prove that conditions in your collection regularly fall outside acceptable limits, a sling psychrometer may be an adequate first step.

What range of conditions does the instrument need to measure? If you are monitoring an unheated building through a year on the coast of Maine, temperature may drop below 0°F and rise above 90°F. Relative humidity in a building with heat, but without air conditioning, may range from less than 10% to nearly 100% RH. Will your instrument record the entire predictable range? Does it need to?

How exact do your measurements need to be? If you do not have sophisticated climate-control equipment, or if your collections do not include valuable artifacts, less sensitive instruments may be adequate. On the other hand, if you are developing a case for changing equipment or procedures, and increasing expense, you may need to present an extremely accurate record.

Do you need to record information when the building is unoccupied? If you are measuring changes in climate due to altered climate-control settings at night and over weekends, an instrument capable of continuous monitoring is necessary.

How easy do calibration, operation, and maintenance need to be? Who will be responsible for these tasks, and what skills do they have? Can you afford both a recording instrument and a calibration instrument?

How durable does your equipment have to be? Will it be exposed to careless handling or untrained users?

What powers the instrument? Can your building provide dependable electricity, or do you need a battery-operated instrument?

Will this equipment give you the information you need your monitoring program to provide?

### **What Do You Need Besides Instruments?**

Monitoring should be the assigned responsibility of a specific person in the institution. A back-up person should be trained to cover during absences and vacations.

A good monitoring program includes a written plan for collecting information and maintaining instruments. This should identify spaces to be monitored, the procedures to be used, and forms for recording desired information.

If monitoring depends on a person rather than an automatic recording instrument, try to sample the widest variation in conditions: take measurements when they can be expected to be at the highest and lowest points. For practical purposes, in most libraries or museums this will be the first thing in the morning, and at noon or 5:00 p.m.

Except for special purposes, it is important to position automatic recording instruments to measure representative conditions. They should be located above floor level, away from air vents, heating/cooling/humidity equipment, and doors and windows.

Records of weather conditions and special events (exhibit openings, for example, where unusual numbers of visitors alter temperature and RH in a space, or a failure of the boiler or air-conditioning system) should be maintained so that changes recorded by the instruments can be interpreted usefully. Regional weather records are available from the National Oceanic and Atmospheric Administration (NOAA), Washington, DC. They may also be available from a local or college weather station or local airport.

If a limited number of recording hygrothermographs or dataloggers is available, a reasonably accurate profile of conditions in several spaces can be developed by leaving an instrument in each area for several weeks in each season. At the end of a year, these records will show typical conditions. The readings should be interpreted by a professional consultant. The most important information will be the extremes of temperature and humidity and the speed and extent of changes in the environment.

Each chart (or form in a manual monitoring program) should be labeled with the location and date of the measurements, the initials of the monitor, and recalibration information (date, time, alteration) if a change is made. Interpretation of the information provided by hygrothermograph charts will be easier if it is transcribed regularly onto a running graph that gives highs and lows, fluctuations, and frequency of fluctuations. This should be done each week (or month) as the chart is changed.

## What Do You Do Once You Know What You Have?

Remedial measures to improve environmental conditions for museum, library, and archival collections may include: (1) installation of central environmental controls; (2) use of portable air conditioners, humidifiers, and/or dehumidifiers; (3) removal of collections from attics, which tend to be hot, or basements, which can be damp; (4) creation of compartmentalized storage spaces; and/or (5) improvements in insulation and building seals. It is critical to remember that temperature and RH are intimately related and that the correction of one factor may alter the balance of other important factors (e.g., a dehumidifier may generate enough heat to require additional cooling). If remedial measures are taken without considering all contributors to the environment, conditions may worsen, not improve. It is essential to know (from recorded measurements) what conditions exist and to seek the advice of a climate-control engineer with experience in collections-holding institutions before making major changes. The importance of continued monitoring after the institution of a change cannot be over-emphasized.

In choosing a climate-control consultant, look for someone whose clients include libraries, archives, museums, or other institutions with collections of long-term value. If no one with this specific experience is available in your region, look for an engineer with experience in climate-control of computer facilities, which also have demanding requirements.

For preservation purposes, it is the collections that are important, not the comfort of people, who are much less sensitive. A design that works splendidly for a hotel or shopping mall will not work for 19th-century books, a historic building, or a museum. Ask for references from clients whose needs may have been similar to your own, and talk to those clients about the success or failure of the system designed for them. Make sure your consultant understands what your ideal conditions and minimum requirements will be.

It is important to recognize the limits of a building's tolerance when making climate-control decisions. Here again, the advice of a climate-control engineer or preservation architect who is knowledgeable about collections' needs is indispensable. Uninsulated, historic, and some masonry buildings can be damaged by major changes such as the installation of central heating or humidification systems. Such buildings may need major alterations to be compatible with the needs of their contents; in such a case, it may be necessary to relocate collections to provide conditions suitable for preservation.

A systematic monitoring program properly carried out is one of the best measures of an institution's success in providing conditions favorable to the long-term survival of its collections. It will not, in itself, solve the difficult problem of climate management, but it is the only dependable tool for decision-making.

### **Additional Reading and Resources**

Erhardt, David, Marion F. Mecklenburg, Charles S. Tumosa, and Mark McCormick-Goodhart. "The Determination of Allowable RH Fluctuations." Online at <http://palimpsest.stanford.edu/waac/wn/wn17/wn17-1/wn17-108.html>.

Lull, William P., "Further Comments on Climate Control Guidelines." Online at <http://palimpsest.stanford.edu/waac/wn/wn17/wn17-1/wn17-111.html>. Real, William A., "Some Thoughts on the Recent CAL Press Release on Climate Control for Cultural Collections." Online at <http://palimpsest.stanford.edu/waac/wn/wn17/wn17-1/wn17-110.html>. All in WAAC Newsletter 17(1) (January 1995).

The first article provides an overview of the Smithsonian Conservation Analytical Laboratory research on climate control, while the others question recommendations made by a Smithsonian press release describing the research. For further discussion of this controversy, see WAAC Newsletter 18.3 (September 1996). Online at <http://palimpsest.stanford.edu/waac/wn/wn18/wn18-3/>.

Kerschner, Richard L., and Jennifer Baker. Practical Climate Control: A Selected, Annotated Bibliography. Online at: <http://palimpsest.stanford.edu/byauth/kerschner/ccbiblio.html>.

A good bibliography of alternative strategies to standard heating, ventilation, and air conditioning (HVAC) systems that includes books, conference proceedings, and articles.

Lull, William P., with the assistance of Paul N. Banks. *Conservation Environment Guidelines for Libraries and Archives*. Ottawa, ON: Canadian Council of Archives, 1995. Available from Canadian Council of Archives, 344 Wellington St., Room 1009, Ottawa, ON, K1A 0N3, Canada.

A fundamental and highly recommended guide to criteria, assessment, monitoring, and goals for creating or improving environmental conditions for the preservation of collections. Important reading for library staff, architects, and systems designers prior to the design phase. Discusses building systems, cost trade-offs, responsible compromises, and steps in the planning, design, and construction process. Provides a glossary of common terms used in design and construction of the building systems.

National Information Standards Organization. *Environmental Guidelines for the Storage of Paper Records*. Technical Report NISO-TR01-1995. Bethesda, MD: NISO Press, 1995, p. 1.

Not a standard, but provides guidelines for storage conditions and gives a summary of research into the effect of temperature and RH on paper-based collections. Available for \$35 plus \$5 shipping from: NISO Press Fulfillment, PO Box 338, Oxon Hill, MD, 20750-0338; 800 282-NISO (6476). <http://www.niso.org>.

Padfield, Tim. *An Introduction to the Physics of the Museum Environment*. Online at: <http://www.natmus.dk/cons/tp/index.htm>.

An online book-in-progress, (as of 1999) with various chapters on controlling humidity in museums. Includes a chapter on data loggers and climate sensors.

Reilly, James. *IPI Storage Guide for Acetate Film*. Rochester, NY: Image Permanence Institute (IPI), 1993. 24 pp. Available from IPI, Frank E. Gannett Memorial Building, P.O. Box 9887, Rochester, NY 14623.

Discusses the effect of temperature and relative humidity on acetate film, provides tools to help project the life expectancy of film-based materials, and identifies film preservation strategies.

Reilly, James M., Douglas W. Nishimura, and Edward Zinn. *New Tools for Preservation: Assessing Long-Term Environmental Effects on Library and Archives Collections*. Washington, DC: Commission on Preservation and Access, November 1995. Available for \$10 from: CLIR Publication Orders, 1755 Massachusetts Avenue, NW, Suite 500, Washington DC, 20036-2124; (202) 939-4750 or fax (202) 939-4760 or e-mail: [info@clir.org](mailto:info@clir.org) or <http://www.clir.org>.

Describes and explains the Image Permanence Institute's "time-weighted preservation index," a tool that demonstrates the effect of temperature and humidity on the life-expectancy of paper.

Sebera, Donald K. *Isoperms: An Environmental Management Tool*. Washington, DC: Commission on Preservation and Access, June 1994. Online at: <http://www.clir.org/pubs/reports/isoperm/isoperm.html>.

Detailed explanation of the "isoperm" method for quantifying the effect of temperature and relative humidity on the lifespan of paper collections. The basis for IPI's "Storage Guide for Acetate Film" and "New Tools for Preservation," described above.

Smithsonian Institution Press Office. "Work of Smithsonian Scientists Revises Guidelines for Climate Control in Museums and Archives"; and Ellen McCrady, "Temperature & RH Guidelines Challenged by Smithsonian." Both in *Abbey Newsletter*, 18.4-5 (Aug-Sep 1994) (<http://palimpsest.stanford.edu/byorg/abbey/an/an18/an18-4/>).

This 1994 Smithsonian press release initiated a controversy over recommendations for temperature and humidity levels in museums, libraries, and archives.

#### Sources Of Equipment

This list is not exhaustive, nor does it constitute an endorsement of the suppliers listed. We suggest that you obtain information from a number of vendors so that you can make comparisons of cost and assess the full range of available products.

A more complete list of suppliers is available from NEDCC. Consult the Technical Leaflets section of NEDCC's website at [www.nedcc.org](http://www.nedcc.org) or contact NEDCC for the most up-to-date version in print.

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