

News

Archival Film Preservation at the Iowa State University Library

— *by Tyler Walters*

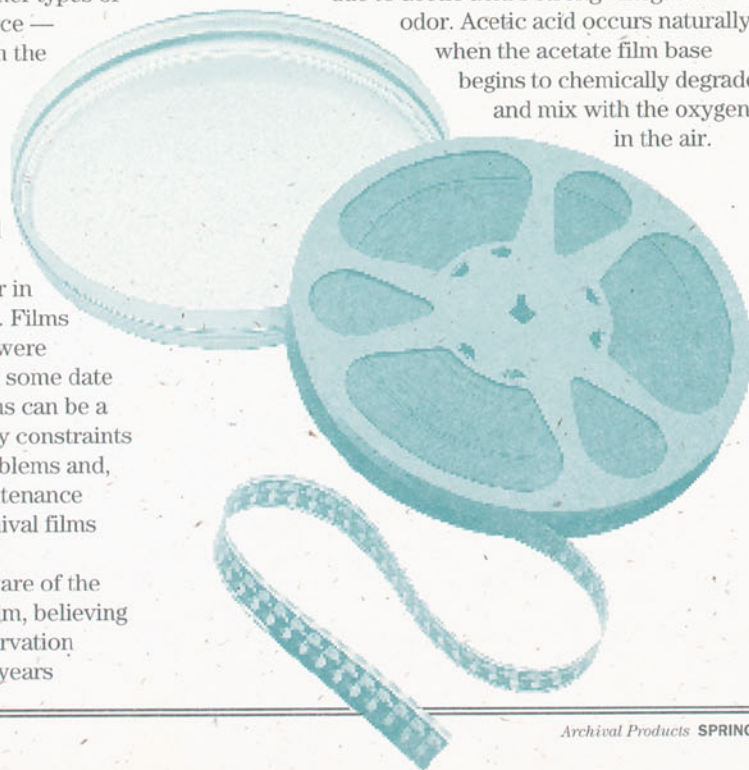
The Iowa State University [ISU] Library Special Collections Department has over twenty years of experience in managing collections of 16mm moving image film. The department's American Archives of the Factual Film [AAFF] was founded in 1974 as a center for preserving films and is comprised of 25,000 16mm films. The AAFF focuses on business, industrial, educational, technical, documentary, and other types of non-theatrical films. It is a unique resource — no other US film repository specializes in the collection and preservation of this genre of film, the factual film.

ISU Archives house 2,000 16mm kinescope films of original productions of WOI-TV, dating from the 1950s through the 1970s. WOI was the first and only educationally owned commercial television station in the US and a pioneer in the early days of television broadcasting. Films from WOI and the AAFF film collection were produced during the 1940s-60s, although some date as early as 1911. Preserving so many films can be a daunting task, especially when budgetary constraints are considered. We have studied the problems and, on a budget, have devised holdings maintenance procedures to extend the life of our archival films collections.

Many archivists and librarians are aware of the danger and instability of nitrate-based film, believing this type of film to be their biggest preservation challenge. However, within the past ten years

archivists and librarians have learned that 16mm cellulose triacetate, or "safety" film, is inherently unstable as well. Presumed to last nearly forever, film repositories around the world are now watching their acetate-based film collections deteriorate and the images they hold disappear.

Acetate films are afflicted with acetic acid degradation, or "vinegar syndrome," so nicknamed due to acetic acid's strong vinegar-like odor. Acetic acid occurs naturally when the acetate film base begins to chemically degrade and mix with the oxygen in the air.



Archival Film Preservation

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It is particularly insidious because once it is airborne acetic acid moves and latches onto other acetate-based films, destabilizing and accelerating their degradation.

With nearly 30,000 acetate films in the collections of the ISU Library, staff became greatly concerned about the possibility of widespread degradation of the collections. We initiated procedures to reduce the damaging effects and raise funds for the work.

Procedures for preserving and cataloging over 4,000 films were developed between 1993-96 through work supported by grants from the US Department of Education and the State Historical Society of Iowa. There are four principal methods to generally preserve 16mm films: 1) improve the environmental conditions of their storage area by lowering the temperature, relative humidity, and continually exchange the air to keep it clean of airborne acetic acid; 2) separate films suffering from acetic acid degradation from those that are not; 3) store films in chemically inert housings, clean them with a film cleaning solution and shelve them properly; and 4) reformat them.

The ISU Library Special Collections Department devised procedures to utilize the first three techniques to begin improving the condition of as many films as possible, while being fiscally conservative, given budgetary realities. The ISU Library began its efforts with a large, one-time investment of about \$100,000 to construct a new film vault with a proper environmental control system. Otherwise the cost of testing for vinegar syndrome, segregating, rehousing, and cleaning films is something that many repositories holding 16mm film can afford to undertake. James Reilly, Director of the Image Permanence Institute [IPI] at Rochester Institute of Technology, estimates that all these improvements, including the new film vault, will

expand the films' life expectancy from 50 to at least 125 years.

Environmental Control and Film Storage

Constructed in 1993, ISU Parks Library's Special Collections Department's film vault can hold over 30,000 16mm films and is a controlled storage environment capable of providing optimal temperature, relative humidity (RH), and air quality. Environmental ranges maintained are 60 degrees F \pm 5 and 40% RH, \pm 5%. Colder storage temperatures slow down the chemical reaction of acetic acid. The film vault also accommodates staff work areas to process films and seeks the lowest reasonable, comfortable temperature and relative humidity in this situation. The heating, ventilating, air conditioning [HVAC] system fully exchanges the air in the vault six times per hour to remove airborne chemicals such as acetic acid, dirt, and dust. The films are also stored horizontally. Setting the films on edge is recommended over vertical storage which puts undue pressure on the center of the film roll. The film can become warped from vertical storage.

Film Testing and Acetic Acid Management

The "vinegar syndrome" odor has been detected among the films maintained at the ISU Library. After the film vault was ready for occupancy, the next step was testing each film for acetic acid deterioration. Many films of the last 50 years were manufactured using acetate as the "plastic" film base. All 27,000 accessioned films were tested to find out which of them may be suffering from acetic acid, how far the deterioration has advanced, and which steps can be taken to stabilize their physical condition.

Through research conducted at the Image Permanence Institute [IPI], Rochester Institute of Technology, two steps were recommended to manage acetic acid deterioration. The first, using "A-D Strips," similar in some ways to pH measuring paper strips, allows measurement of the level of acetic acid. The strip, developed at IPI, is placed inside a film container with the film for 24 hours, and changes color if acetic acid is present. Staff simply look for the colored boxes — with 0 being low and 3 being high — and record the corresponding number.

If the level measured on the A-D Strip is between 0.5 and 2.0, IPI recommends placing a "molecular sieve" bag in the container with the effected film. A new and important tool in acetic acid management, the molecular sieve, a semi-permeable packet of Tyvek® containing 12.5 grams of desiccant, works to remove airborne acetic acid. Researched and developed by Eastman Kodak Corporation® and manufactured by FPC, a subsidiary of Eastman Kodak, it easily absorbs acidic vapors. Each film with an A-D

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Iowa State University's American Archives of the Factual Film department is a unique resource — no other US film repository specializes in the collection and preservation of this genre of film, the factual film.

We need your preservation articles.

Please submit to:



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e-mail: archival@ix.netcom.com

Preservation Awareness

Preservation of Memorabilia, Photographs and Documents

Many private collectors of memorabilia have good intentions of passing documents, photographs, letters and other significant remembrances to future generations. Hours are spent accumulating, organizing, labeling and placing the collection in albums, boxes and scrapbooks to maintain the precious keepsakes for future generations. The key elements that extend the longevity of materials are often overlooked, diminishing the goals of the collector.

Many albums, scrapbooks, and file boxes readily available are made with low quality materials which will embrittle and discolor items. Inappropriate tapes and adhesives can yellow and ooze, and paper clips and staples that can rust will harm the materials over time. Awareness to the dangers of these materials, knowledge, use of proper tools and quality materials is important to the life of your collection. Establishing safe preservation procedures, learning the material contents of products and using appropriate materials to house your memorabilia will produce safe storage of your treasures.

Environment

People are often unaware of the effects the place of storage will have on their precious memorabilia.

Environment will effect the longevity of stored materials. Materials should be kept in a stable environment of 68° or lower with a humidity level of 40-45%. Items should not be stored in an attic, basement or anywhere temperatures and humidity extremes occur. Heat accelerates deterioration and high humidity provides the moisture necessary to promote harmful chemical reactions in materials. Combining heat and moisture encourages mold growth and insect activity. Low humidity may lead to embrittlement of certain materials. Light accelerates deterioration and leads to weakening and embrittlement of materials. Pollutants can cause harmful chemical reactions that lead to formation of acid in materials causing discoloration, brittleness and disfiguration of some materials.

What to use:

Archival quality materials should be used to protect and guard your collection. The purpose of using archival quality materials is to reduce the damaging impact of poor environment or handling. Archival quality materials will not produce chemicals that damage, will resist deterioration and provide protection and support for the articles they hold. Archival quality has become loosely used by some manufacturers; therefore, learn the material content before using a product. A reliable source of archival quality materials will readily submit the information you need.

Paper Products that are:

Acid-free [having a pH of 7.0 or higher],

Lignin-free [made from cotton or linen or from other fibers that have had lignin removed] and

Buffered with a calcium carbonate reserve that acts as a neutralizer to counteract acids that may form in the future.

[Papers that contain acids will weaken the paper, board and cloth leading to discoloration, deterioration and embrittlement.]

Mylar, polyester, polypropylene, or polyethylene photo sleeves should be used (not vinyl or plastic). Fragile photos should be supported with acid-free board.

Acid-neutral polyvinyl acetate adhesives should be used for construction of albums, boxes, and storage enclosures as well as hinging paper items.

Deacidification of acidic papers should be per-



Preservation of Memorabilia, Photographs and Documents — continued from page 3

formed by a conservator or archivist prior to encapsulation. Placing the acidic papers in an enclosed environment will accelerate deterioration.

Safe Practices

- Use archival quality protective enclosures, boxes and storage materials.
- Provide a clean, cool, dark environment with stable temperature and relative humidity.
- Minimize handling — make photocopies on acid-free, lignin-free paper for items that will be handled often.
- When in doubt of how to handle embrittled documents or deteriorating photos, consult a conservator, archivist or photo specialist.
- Avoid direct touch of the materials. Use white cotton gloves or latex gloves when handling.
- Give attention to preserving the most deteriorated parts of your collection first.

Care Instructions

Allow future generations to benefit from the knowledge you have gained by leaving care instructions with the memorabilia. This will help them care for the items properly for generations to come.

Common Practices to AVOID

Do NOT Laminate

Lamination uses harmful adhesives and sometimes heat to permanently bond the document to the plastic. This process is irreversible and increases chemical deterioration of paper.

Use: Mylar encapsulations, polyester, polypropylene or polyethylene sleeves or other chemically stable film.

Do NOT use vinyls or plastics.

Vinyl, plastic, polyvinyl chloride (PVC), or "magnetic pages" will damage the image of your photos.

Use: Mylar, polyester, polypropylene, and polyethylene.

Do NOT store in conditions that extremely fluctuate.

Extreme temperatures and humidity, direct

sunlight will accelerate deterioration.

Use: Stable environment storage.

Do NOT use acidic papers.

Brown Kraft paper, glassine, or colored paper will discolor and deteriorate photographs.

Use: Acid-free archival quality storage envelopes

Do NOT use tape and glues.

Tapes, glues, and adhesives can damage and discolor photos and other items as well as migrate over time causing pages, photos and other items to stick together.

Use: Mylar or paper mounting corners.

Do NOT use rubber bands, paper clips, and staples which will get gummy, break, and rust or cause any damage.

Use: Cotton cord or stainless steel clips and staples if necessary.

Do NOT bulge your albums and enclosures.

Overfilling albums will eventually break the cover exposing the contents to a variety of elements and damage.

Use: Expandable archival albums, or limit the amount of items placed in each album so the cover does not bulge.



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Strip measurement of 0.5 - 2.0 was treated with a molecular sieve in an attempt to retard the acetic acid reaction taking place.

If the film measures higher than 2.0, an advanced state of deterioration, the molecular sieve bag will not effectively absorb all the acetic acid present. Those measuring at such a high level should be reformatted immediately or deaccessioned. Films measuring 1.5 and higher are shelved in a different room in the library basement, isolated from films measuring less than 1.5, reducing the potential of further contamination. Depending on the level of deterioration and the importance of the film, timetables for preservation attention are assigned by categories based on film condition. Categorization takes priority over any reformatting projects. Thus far, only a small amount of films have measured higher than 1.5. We will monitor the condition of the existing films in the years to come, measure our new film accessions for acetic acid using the A-D Strips; and continue to segregate films into separate storage areas until such time that the highly acidic films can be reformatted.

Film Cleaning and Housing

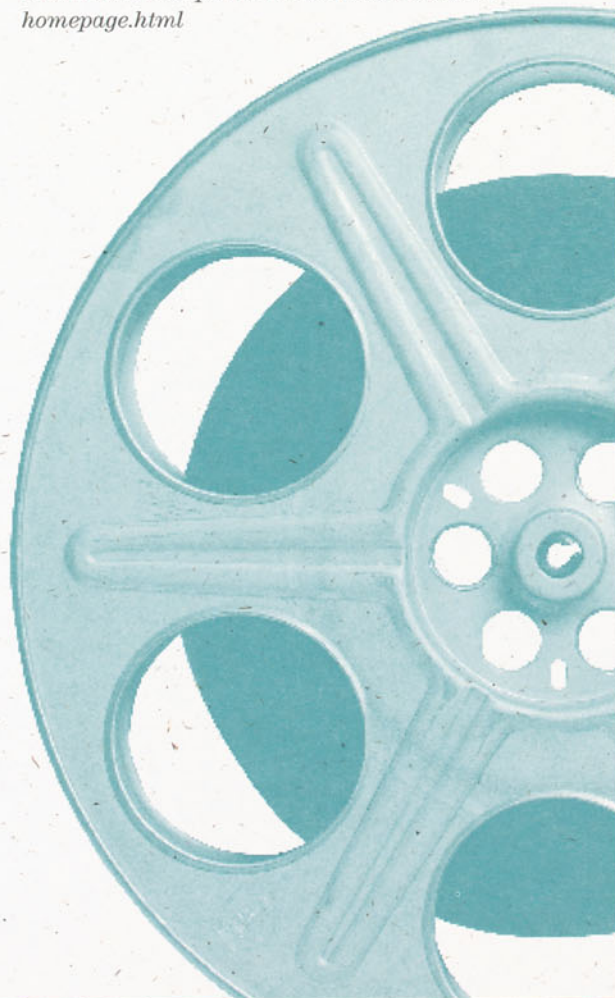
Other preservation actions can be taken to extend the life of 16mm films prior to their use by the public. Films can be cleaned so they are free of dust and dirt which can scratch the films as they are being viewed. Our methods have been very basic using either an isopropyl alcohol solution or film cleaning solutions manufactured by Eastman Kodak Corporation® to wipe the films with soft cotton cloths as they are rewound onto their new polypropylene core. Many variations on film cleaning, and certainly more sophisticated and better methods can be used. Our approach seems to work well on a small supplies budget and on an equally small budget for wages (we used student assistants in this activity).

Many films arrive at ISU in rusty metal cans, inside highly acidic paper bags, and on bent and rusty metal reels. All films stored on metal reels should be wound onto inert, polypropylene film cores. Metal reels are not recommended for film storage because they can rust and warp the films over time. The polypropylene film cores do not rust, and since they only sit in the middle of the wound film, they do not bind along the film's edge, creating pressure, which results in film warping. All films on reels are transferred to cores to reduce undesired pressure. The films also need to be removed from any acidic paper bag enclosures and metal cans and housed in polypropylene film containers. The use of polypropylene film containers are basic to film preservation and can be likened to the acid-free boxes and folders used by archivists to house paper-based archival collections. The film containers are relatively inexpensive. For instance,

to completely re-house the 2,000 WOI-TV films, the polypropylene film containers and film cores costs about \$5,000. They were purchased over a two-year period.

Simple holdings maintenance procedures, coupled with achieving proper environmental conditions, can greatly extend film life expectancy. Film-to-film reformatting is prohibitively expensive and copying to videotape, while improving the films' ease of access, is an impermanent medium for preservation purposes. Investing in sound, practical holdings maintenance programs makes sense. The difficult choices in film reformatting substantiates enacting basic holdings maintenance procedures similar to those we employ at the ISU Special Collections Department to extend the life of important archival films.

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ISUArchives: <http://www.lib.iastate.edu/arch/homepage.html>*



Choosing to Preserve

The European Commission on Preservation and Access (ECPA) announces its publication, the papers of the international conference *Choosing to Preserve: Towards a Cooperative Strategy for Long-Term Access to the Intellectual Heritage* which took place in Leipzig on March 29-30, 1996. The proceedings will automatically be sent to participants and sponsors of the Leipzig Conference, to the national archives and libraries of Europe and donors of the ECPA.

The papers in this volume were presented at an international conference organized jointly by ECPA and Die Deutsch Bibliothek Leipzig/Frankfurt am Main at the March conference. The title, *Choosing to Preserve*, is meant to reflect that in order to ensure long-term access to the printed and written materials in archives and libraries, institutions and government agencies will have to make a conscious decision to plan and take action. Many choices will have to be made as to priorities and most suitable methods of preservation.

In the volume, a group of experts from nine European countries and the US present their views on preservation and possibilities for cooperation in this area, outlining policies, problems and practices in preservation of paper materials in their countries

or their institutions. The discussion shows a variety of approaches and also brings out that in spite of the differences between countries and institutions there are many shared problems that should be addressed through concerted action.

The collection of articles underlines how massive the threats to collections are and how instrumental public support will be to keep them safe for the future. The importance of long-term access to older materials for academic research was brought out vividly at the conference's keynote speech by a representative from the scholarly world, Professor Bernhard Fabian. His contribution is printed as the first of the longer papers, providing a framework for discussion of preservation of access and use.

If you would like to receive a copy of the book mail, fax, or email your order to:

European Commission on Preservation and Access
PO Box 19121 NL-1000 GC
Amsterdam
The Netherlands
Phone ++ 31 20 5510 839
Fax ++ 31 20 620 4941
email ecpa@bureau.knaw.nl

Conservation and Preservation Articles Needed

Archival Products NEWS purpose is to give a medium to share preservation experiences and knowledge with others so that all may benefit from the methods, experiences, opportunities and challenges they have faced. Many have expressed the usefulness of the newsletter and the need for it to be hardcopy. The articles are often used for workshops that train newcomers as well as for intensive workshops for those already in the field.

Please let us know when you can share your experiences with the preservation community.

Deadlines:

Summer Issue: May 31, 1997

Fall Issue: August 31, 1997

Winter Issue: November 30, 1997

Spring Issue: February 28, 1998

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Archival Products Focus

Hinged Board Covers

Archival Products offers hinged board covers for side-binding methods such as Velo Bind®, Handi Bind® and Togie Bind®, or Post Binding. The hinged board covers are constructed of .058 acrylic-coated grey/white archival board. The board is grey on the exterior with white on the interior. A clear cover of .020 polyester is optional so that the original cover or title page can be viewed.

The acrylic coated .058 grey/white archival board is manufactured from cellulose fibers that are free of groundwood. The manufacturer removes any traces of lignin during manufacturing and adds a 2% calcium carbonate reserve. pH of the board is 8.5.

The dyes used to give the board its grey color will not mix, run or fade. No sizing is used in the milling process, but an inert acrylic coating is applied exclusively to our finished board to guard against delamination, moisture, abrasion and soiling. Independent tests for stiffness and abrasion resistance meet the standards set forth by museums and preservation libraries.

The hinged board covers are cut from 40 x 50 inch sheets on a precision cutter. The hinge is then applied using our custom-made gauges that adjust for various sizes. Since our hinged board covers are hand-crafted, they can be made to any size.

Hinged board covers offer alternatives to three-ring binders that do not provide a tightly constructed binding. Materials that are over 1/2 inches thick are too bulky to fit properly in other types of enclosures. Government documents, financial reports, hard copy data bases — anything that consists of numerous pages — would be well protected between hinged board covers. Side binding offers limited openability but is often a better solution for otherwise loose-leafed materials.

Definition of Terms:

Handi-Bind® is an automated one-step side binding method using individual grommets. It can accommodate materials up to 2 inches thick.

Togie Bind® is a side-binding process using individual grommets. A hole is drilled through the materials to be bound and a grommet is placed into the drilled hole and welded. It can accommodate materials 3-5 inches thick.



Velo Bind® is a three-step side-binding procedure that can accommodate materials up to 1/2 inch thick. Pages are first punched; then front and back covers placed; and materials side bound using a plastic strip.

Post Binding is a side-binding technique that holds materials in their original format. Pages are held together with solid or sectional screw posts. If materials are to be added, the posts can be extended by half inch or inch long sections.

For further information contact:
Millie Knee, Customer Service Representative
Janice Comer, Division Coordinator
Toll-free 1-800-526-5640 or 515-262-3191
FAX 800-262-4091 or 515-262-1535
e-mail: archival@ix.netcom.com
web site: <http://www.archival.com>

Archival Products Focus

Archival Boards

To meet quality demands of the preservation community for archival boards, Archival Products offers four types of board for preservation projects. When comparing similar boards, various characteristics should be considered: paper standards including pulp content, outer coating, density, caliper, size, abrasion resistance, and color fastness.

High Density Acrylic-Coated Pamphlet Board is made from cellulose fibers that are free of groundwood. The manufacturer removes any traces of lignin during manufacturing, and adds a 2% calcium carbonate reserve. No sizing is used in the milling process, but an inert, acrylic coating is applied to our board exclusively to guard against delamination, moisture, abrasion, and soiling. The board is milled to be extremely dense. No other board currently available can match this pamphlet board for stiffness, abrasion resistance, and warp resistance. The dyes used to give the board its color will not mix, run, or fade.

Various tests are conducted to designate pulp content for the board. The board meets ATM D 1030x5 spot stain tests. To demonstrate the adequacy of bleaching or lignin removal, the board gives a negative reading, and has a kappa number of 5 or less when tested according to the Technical Association of the Pulp and Paper [TAPPI] T-236. High Density Acrylic-Coated Pamphlet Board is manufactured to a pH of 8.0 to 9.0 according to TAPPI T-509, and no sizing of any kind is used in manufacturing.

Friction wheel tests show a total weight loss of less than 2%. Tests for stiffness show at least 1800 Tabor stiffness in the machine direction and 800 in the cross direction. The board is .050 in thickness and measures 27 x 40 inches, grain long.

Archival Products uses the High Density Pamphlet Board exclusively for Spine Wrap and Quick Bind Pamphlet and Music Binders. Other uses for the board are three-ring binders, protective enclosures, and bindings.

Manufacturing specifications of our **Grey/White Archival Board** are similar to the High Density Acrylic-Coated Pamphlet Board except that board is compressed to a lesser density. This board is .058 thick and measures 38 x 50. Archival Products uses Grey/White Archival Board for our archival folders and hinged board covers. Other uses are phase boxes or other book storage enclosures.

Our **Dark Tan Archival Board** is available in four thickness and measures 40 x 50 inches. The .010 [10 point caliper] tan board is single-ply and the .020 is a double thickness of the .010 board. The .040 tan board is a three-ply board made with a museum quality .020 alpha cellulose core laminated between two pieces of .010 stock. The four-ply .060 point board is constructed in the same manner, using two pieces of .020 alpha-cellulose core stock. The lamination process slightly decreases the stiffness and abrasion resistance of the tan board but independent tests show that these boards meet museum and library standards.

Archival Products uses the .060 Dark Tan Archival Board for music score enclosures, newspaper and map folders, four-flap and custom four-flap enclosures folders, and manuscript folders; .040 is used for academy folders; .020 for custom four-flap enclosure pockets; and .010 for four-flap enclosure pockets and acid-free file folders.

Davey Acid-pHree™ Binders Board is used to construct book blocks, cloth cover boxes, and temporary brittle book covers. Available in three thickness: .074 (74 point caliper), .082, and .098 the overall size measures 26 x 38 inches. Davey Acid-pHree™ Binders Board contains a 2% calcium carbonate reserve.

Archival Products will cut full sheets of any of our board in half or according to your specifications at a minimal charge. This is to accommodate shipping by UPS and avoid higher freight shipping charges.

We encourage you to compare our boards to others, invite you to share your comments and discuss your preservation projects with us. Contact us to request samples for your viewing, testing, and comparison.

For further information contact:
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Janice Comer, Division Coordinator
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