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Article: Some Recent Photographic Preservation Activities at the Library of Congress

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Some Recent Photographic Preservation Activities  
at the  
Library of Congress

Sarah S. Wagner

PART I Optical Disk Projects and Preservation Opportunities

Introduction

Numerous photographic preservation projects have been started since the Fall of 1989 at the Library of Congress. Most of these projects are associated with the Library of Congress American Memory Optical Disk Project, a new interactive optical disk research tool. The projects involve preservation and cataloging activities necessary for the preparation of items for optical disk production. Some of the Library's photographic collections which are being utilized in the American Memory Project include:

- The Brady-Handy Collection of Daguerreotypes (379)
- The Panorama Photograph Collection (5000)
- The Jackson Mammoth Glass Plate Negatives and Prints
  - Duplication and storage of 675 negatives
  - Treatment of 40 prints

Preservation activities associated with these three projects required research into conservation materials and treatment methods, and design of housing packages or cabinetry. These aspects will be discussed briefly later in order to share some of our findings. The first part of this paper will focus on broader issues pertaining to the management and incorporation of preservation activities into optical disk projects in general and the Library of Congress American Memory Project in particular.

Overview of American Memory Optical Disk Project

The American Memory Project is an optical disk project whose purpose is the dissemination of Library of Congress collections to the public.

"American Memory collections will be electronic copies of Library of Congress collections of photographs, manuscripts, music, motion picture, books, and sound recordings. Each collection will consist of primary documents presented as an archival unit, with little or no editing... Consulted together, the collections will provide multiple perspectives on the broad periods and

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themes of American History and culture...American Memory will run on a stand-alone microcomputer. A master catalog to all American Memory collections will allow users to search for items of interest... Reproductions of items will be placed on two types of disks: compact disks that contain digital information and television videodisks that contain analog video signals."(1)

Videodisks will allow for higher quality and efficient data storage for pictorial materials and for motion pictures. The audience for American Memory will "include scholars, researchers and students at research and university libraries, the general public at public and state government libraries" where one might "conduct personal research on local history, genealogy, or the history of various ethnic and cultural groups in America."(2)

#### Optical Disk--Use in Institutions

Similar optical disk projects have been created at numerous institutions in recent years, including: The George Eastman House/International Museum of Photography, The National Agricultural Library, The National Library of Medicine, and The National Geographic Society.

Optical disks are increasingly prevalent as research tools. They provide the sophisticated level of research access desired by libraries and their users. The making and use of optical disks may have a dramatic impact on preservation of collections and preservation activities. Video and digital optical disks are not considered archival media or archival preservation reformatting media, unlike microfilm. Yet a well designed optical disk program at an institution may have a strong preservation aspect.

Ideally, optical disks would limit handling of objects thereby reducing deterioration caused by wear and tear. Optical disks provide the ultimate descriptive cataloging tool: an image is provided along with the catalog data. A researcher can screen through hundreds of images before selecting the few that really need to be seen. Objects will be handled less if the institution has a policy which requires the use of available surrogates and restricts access to the original objects.

The Prints and Photograph Division at the Library has had a pilot videodisk available since 1986 which features the Detroit Publishing Company photographs, among others. They have found that most researchers are satisfied using the disk and that demand for the originals has decreased. Researchers no longer have to pore through numerous objects and as a consequence, handling is reduced. The Division's policy requires that microfilms, the videodisk, or reference copy prints must be consulted first. In the case of fragile or extremely valuable objects, access is limited or denied if reasons for viewing originals are not considered compelling.

### Optical Disk Projects and Preservation

At the Library of Congress, the American Memory Project selected uncatalogued collections or those already available on the pilot disk as the primary collections to be reformatted first (microfilms were re-used, also). In some cases, such as the three collections mentioned above, the selection of materials for the disk necessitated a large degree of cooperation between custodial division staff and the Conservation Office because cataloging and conservation activities had to occur concurrently and both had to be completed prior to filming for the videodisk production. This is analogous to mounting an exhibition of a newly donated collection while one is unpacking the shipping box! The advantage is that when the project is completed, the collection will be catalogued and therefore accessible to researchers, the items will be housed and conserved or at least stabilized, and a surrogate copy will be available to researchers thereby reducing wear and tear on the originals.

Extra supply budget allocations were incorporated into the American Memory Project budget in the expectation that preservation and proper housings would be required for many of the collections/objects chosen for the disk. Extra staff positions were added also, primarily in the custodial sections in order to sort through, select, process and catalog, and perform computer data entry for the interactive software aspects of the optical disk.

The work of the Conservation Section was supplemented by two newly hired cataloging technicians who were trained and supervised while undertaking basic and remedial mass treatments and housings. The coordination of these activities required cooperation especially with the cataloging component of Panorama Project. Rolled and folded panoramas needed humidification and flattening so that they could be safely handled and viewed for cataloging and sorting; duplicates were weeded out in order to minimize redundant conservation treatments and filming; mending was required on newly cataloged items found to have severe tears or breaks; housings were required that would provide stability for handling during filming, and for long term storage after filming.

As more and more institutions initiate or seek grants for optical disk projects, more and more of us in the preservation fields will become involved in the management of these projects. Optical disks may limit handling damage if researchers are satisfied with the disk surrogate and if the institution encourages the use of the disk as a surrogate in preference to automatic access to originals. However, some people have expressed concern that collections made available on disk will suddenly be placed in high demand for use due to increased awareness that the objects exist.

Regardless of whether handling is reduced or not, the video or digital disk is not considered to be a true

preservation surrogate because of the lack of standardization and rapid obsolescence of hardware and software. Further investigation is required in order to address the question of disk stability and deterioration characteristics. Disks may be copied or remastered before any possible deterioration causes unacceptable signal loss. In addition, any film copy from which the disk is mastered may serve as a preservation copy if properly stored, much as microfilm masters. Optical disks which utilize direct scanning and information storage do not require a film intermediate. In this case there will not be any archival intermediate that could act later as a preservation surrogate.

#### Incorporation of Preservation into Optical Disk Projects

A properly planned optical disk project may have numerous possibilities for preservation "spin-offs" if preservation is incorporated into the management of the project from the beginning. Here are some suggestions based on our experience with the early stages of the Library's new American Memory Optical Disk Project:

- 1) Rehousing--Add supply money into the project for the proper storage and housing of original objects used on the disk.
- 2) Remedial treatment--Budget for this type of preservation activity, especially if untreated objects are more susceptible to damage from handling during filming, or if the untreated object is less safe to serve to researchers, or if the untreated state greatly reduces the visual quality of the image on the disk. Poor image quality will decrease researcher satisfaction with the sole use of disks in lieu of seeing the original object.
- 3) Full treatment--Comprehensive treatment for severely deteriorated objects is less feasible since the preparation for a disk is on a much larger scale than an exhibition (thousands or tens of thousands vs. tens or hundreds). However, some objects may require full treatment in order to allow filming and long term preservation.
- 4) Extra staff--Allocate funds for extra staff to accomodate preservation activities, rehousing, etc. along with the cataloging and other production activities.
- 5) Planning--Preservation planning between preservation and custodial divisions may be increased and facilitated by the incentive to produce an optical disk and preserve the objects appearing on the disk--afterall it is because of the objects that the disk will be created in the first place!
- 6) Microfilming and duplication--These projects may be intermeshed with disk production--microfilm, duplicate negatives and other preservation surrogates may facilitate the production of the disk and, if available, reduce the production costs. The use of these surrogates

also will reduce the need for filming crews to handle fragile originals.

The narrowest assessment of the preservation aspects of optical disks suggest that the primary benefit is from reduced handling of originals. However the production of an optical disk presents other opportunities for preservation, particularly if the project incorporates these aspects from the earliest stages of planning. The preservation opportunities may include improved housing and storage, remedial or full treatment, or the production of preservation surrogates such as microfilm. Incorporating a high degree of preservation into the disk's production optimizes the benefit and potential of this new electronic research tool.

## PART II Photograph Preservation Activities

### Introduction

Numerous photographic collections have been chosen for inclusion on the American Memory Project. Three of these collections required improved housing and storage, remedial treatment, or full conservation treatment. These three collections included:

Panorama Photographs

The Brady-Handy Collection of Daguerreotypes

Jackson Mammoth Glass Plate Negatives and Prints

### Panorama Project Preservation

The Panorama Collection includes about 5000 objects. Most of these objects were copyright deposits and had never been catalogued. About 1500 panoramas had no housings. Approximately 500 were either rolled or folded, many with severe breaks and tears.

### Humidification and Flattening

Two humidification methods were considered for the mass flattening of the rolled/folded panoramas: 1) a chamber with stacked shelves utilizing moisture from an ultrasonic humidifier or 2) a traditional evaporative tray chamber. Our ultrasonic mist chamber had several disadvantages for the humidification of panoramas. First, its shallow shelf height and length impeded the full unrolling of objects as they relaxed upon humidification. Second, objects are saturated with moisture quickly causing gelatin binders to become very tacky.

In our situation, these two characteristics presented unnecessary complications and inconveniences. Most of the panoramas were very grimey. Extra damp conditions would create the potential for grime to transfer and adhere to the gelatin binder. Two cataloging technicians from the Prints and Photographs Division would be trained to perform the mass humidification and flattening. These people had no previous conservation experience and therefore no experience handling damp,

tacky photographs. The evaporative tray system would allow for the objects to be gently unrolled and weighted down as humidification progressed without undue gelatin tackiness to complicate the situation. (In other situations, the ultrasonic chamber works well and quickly with small flat objects, but may cause slight changes in surface appearance such as subtle matting of glossy photographs.)(3)

After deciding on the evaporative tray system, the chamber was created using the lab's oversized sink (50 in. x 62 in.) for the tray, PVC plumbing pipe for a tent frame, and plastic sheeting stapled together to create an enclosed tent. Door flaps were added for easy access to the interior while the plastic and tubing is in sections for easy assembly and disassembly. A similar system could be created even without a sink utilizing wooden two-by-fours and heavy plastic to create a shallow water tray on the floor.

Objects were humidified for 3 hours on average. Objects were dried between polyester webbing and blotters under 1/2 in. plexiglas for 3 to 5 days. We used blotters made by Archivart (4) which are heavyweight, oversized (38 in. x 52 in.), and 1/8 in. thick. The advantage of these blotters is that they are very large and are like thin felts--smooth, flat, and very absorbent. Because of their absorbent, felt-like characteristics, the blotters did not have to be exchanged during the drying period thereby eliminating some work. I highly recommend these blotters for large scale humidification projects.

Approximately 500 objects required flattening, but this activity had to be coordinated with cataloging and sorting. The slower, gentler evaporative humidification meant that the two cataloging technicians could do up to two humidification runs a day, checking the objects every half hour or so to unroll and weight down, while also continuing their other activities upstairs in the Prints and Photographs Division.

A mass treatment approach was used to maximize the efficiency: Objects were roughly sorted by width and estimated length (determined by multiplying the number of wrap-arounds on a roll times the diameter of the roll). This sorting allowed more objects to be humidified at any one time by grouping narrower and shorter panoramas together. Tubes of rolled polyester film (Mylar D) were used to support extra long panoramas which were folded back on themselves in order to fit inside the chamber. Blotters were placed end-to-end along with sheets of Plexiglas to dry super long panoramas which ranged in size up to 117 inches long.

If possible, objects were lightly dusted prior to humidification, or as the object was unrolled within the chamber if the surface was not too tacky. After flattening, loose dirt was brushed off and the image area was gently wiped down with cotton. Complete drycleaning with erasers was not performed.

As flattening commenced, the two cataloging staff began sorting out for duplicate objects in the categories used to organize the Panorama Collections, e.g. U. S. Geographical Location, and Specific Subjects (Groups, Pageants, Expositions, etc.). In many cases, good condition duplicates were found for objects with severe tears and breaks. This eliminated the need for redundant and/or extensive conservation treatment on numerous objects. All duplicates will be foldered and if possible, deaccessioned through the Library's Exchange and Gift Division.

#### Mending and Storage

The two cataloging technicians were trained to mend and consolidate along tears and breaks.(5) Drycleaning was performed only along the areas to be mended. Cloth linings were not removed. Mending followed a remedial approach consistent with our goal of stabilizing and housing these objects. Only breaks along previous fold lines and long tears affecting the structural stability of the panorama were mended. The final housing of polyester encapsulation should offer sufficient support for minor edge tears. A checklist form was used to document the treatments.

Brittle and previously broken panoramas will be encapsulated with a stiff board behind the object (40 or 60 point folder and box board). All others will be encapsulated with buffered paper behind the object. We are investigating the option of buying buffered paper on roll cut to commonly found panorama widths (10 in. and 20 in.). These materials will be tested for photo-reactivity prior to use. In addition, sleeved Mylar on a roll in 10 in. width was purchased from Taylor Made. This product consists of two sheets of Mylar sealed along one or two sides down the length of the roll. It is available in lengths of 200 ft.(6).

These rolled storage materials, pre-cut to widths commonly found in the Panorama Collection will greatly facilitate the housing of the 2000 Panoramas: The paper and Mylar sleeves can be cut off in the needed lengths, and the open sides will be heat sealed later. Labelling will be done utilizing computer generated pressure sensitive labels placed along a flange on the right side of the encapsulation. This will allow for easy retrieval without the need to flip through the stack of objects.

The panoramas will be stacked ten high in one to three rows per flat file drawer. We investigated several options for dividers to section off the rows in the flat file drawers. Plastic magnetized drawer dividers are available in 6 in. lengths. Sample dividers which we obtained had quite a strong odor and tested positive for chlorine with the burn test. Because of this they were considered inappropriate for use in the storage of photographs. Dividers made of paper board and magnetized tape were also considered. Although these could be made cheaply inhouse, they would not be as durable as plastic or metal dividers. We approached Delta Design Ltd. about



creating a metal magnetized drawer divider with a non-reactive "powder coating" finish. Their design for a 10 in. divider had a cost comparable to the plastic version. We will use these dividers since they will be sturdy and long lasting.

#### Daguerreotype Project Preservation

This project involved the improved housing of the Brady-Handy Collection of Daguerreotypes. These objects were without cases. They were acquired loose or sandwiched against glass. Others were placed directly against glass and sealed with a variety of pressure sensitive tapes by Library staff over the years.

Colleagues at several institutions were consulted and various package designs were considered which are currently used by other individuals or institutions, including: The National Museum of American History, George Eastman House/International Museum of Photography, Boston Museum of Fine Arts, and that of Daguerreotypist Ken Nelson. Various packages have been designed which best serve the particular projects and needs of the above institutions.(7)

#### Package Design and Testing of Materials

As conservators, we wanted a package for the Brady/Handy Collection that was simple, used as few materials as possible, and which used materials that would not be harmful to the daguerreotype. The curators in the Prints and Photographs Division had additional criteria. They preferred that the entire plate be visible so that any fabrication marks on the front or back could be seen easily. In addition, they wanted an aesthetically pleasing design since the collection is considered valuable. All of us wanted the design to be functional as a housing and for display with little or no alteration needed for exhibition.

There are several aspects of daguerreotype housing designs which conservators always seem to question. Issues which have caused concern include the use of paper overmats, the type of paper used for overmats, whether or not buffers in paper may cause deterioration (8), what binding tape to use, whether binding tapes should be porous or impermeable, etc. We tried to address these questions when designing our new package. Sample materials of matboards and plastic sheeting were tested for use as spacer material within the package. These materials, and various tapes, were tested using the ANSI IT9.2-1988 Photographic Activity Test and the TAPPI 444 Silver Tarnishing Test.(9,10)

#### Final Design Specifications

The final design is quite simple and utilizes four materials which tested the best: alumina-silicate plate glass on the front and back, a polypropylene sinkmat cut slightly larger than the daguerreotype, Mylar triangles which lay over the corners of the object and slip under the polypropylene sheet to hold the daguerreotype within the sinkmat well, and J-Lar tape to bind the edges of the

package. Matboard face mats and wrappers are taped on the outside of the glass package to create the desired aesthetic final housing, but ultimately these paper materials are decorative only.  
(Refer to diagram)

Both J-Lar and Filmoplast tape tested well with the ANSI Photographic Activity Test and have been used at other institutions for binding daguerreotypes and autochromes (11,12). In addition, we wanted a tape with good properties as a moisture vapor barrier. Actual size mock-ups were made with glass sheets and two layers of J-Lar tape sealing all sides and extending over the front and back of the sandwich. This sealing method maintained an interior relative humidity of 35% for 3 days against an exterior relative humidity of 100% (at ambient temperature). Eventually some sort of equilibrium between the exterior and interior might be achieved over long term exposure to constant conditions, but it appears that the tape will be effective as a barrier for short term shocks of high humidity that may occur during exhibition or during a water disaster. (13)

Polypropylene 60 point sheeting made by Allied Resinous from polypropylene resin manufactured by Himont was chosen for the sinkmat due to its superior results when tested using both ANSI and TAPPI tests.(14) In addition, the polypropylene sheeting cost one fifth as much as high quality ragboard. However, polypropylene sheeting is considerably harder and stiffer than paper matboard and therefore is more difficult to cut by hand with a blade. Routers or lasers must be used to efficiently cut out window mats from polypropylene sheeting. This entails an added milling cost. We planned to assemble the 379 packages in a mass housing project and therefore expected to have window mats cut or stamped by outside contractors regardless of whether paper or plastic was used. If one chose to use ragboard instead of polypropylene for this design the final cost would be less if the mats were cut by hand.

The final materials cost for this package, excluding the decorative outer wrappers is about \$12.00 per object. The decorative facemat and wrapper bring the cost to about \$13.50. It will take about 10 minutes to assemble the basic package, and about 30 minutes to assemble the entire package with the decorative wrappers.

Once the packages have been assembled, the front of the object will be photographed for a reference album in the Prints and Photographs Division. The fact that this design allows the entire object to be seen means that the photography of the objects can be divorced from the housing process. In addition, the backs can be photographed later as budgets allow or the need arises. Color transparencies and black and white photographs taken with ultraviolet light illumination will be made for 20 to 30 objects. This will serve as a reference for a long term

study of this package design and possible tarnishing.(15)

### Jackson Mammoth Glass Plate Negative and Print Project

The Jackson Project actually had three preservation components: 1) the duplication of the mammoth glass plate negatives (18 x 22 in.); 2) the improved storage of the glass plates; and 3) the conservation treatment of 40 photographic prints and panoramas made from mammoth glass plate negatives.

### Duplication of Mammoth Glass Plate Negatives

The duplication was contracted to Doug Munson of Chicago Albumen Works. The duplication will involve contact printing an interpositive and creating an 8x10 duplicate negative having a contrast that allows for printing on modern photographic paper. The interpositives will be filmed for the video disk so that the original glass plate negatives will not have to be handled again.

### Glass Plate Negative Storage Cabinets

The original plates were rehoused several years ago in custom four-flap enclosures made by Archivart. The negatives remained stored in wooden crates. Last Spring, Carol Johnson, Assistant Curator of Photography, and I began to investigate storage cabinets for the permanent storage of these oversize glass plate negatives. The large format and weight of these objects precluded the use of any standard cabinet which was readily available. In addition, we wanted a cabinet with non-reactive paint and waterproof gasketting.

Delta Design Ltd. utilizes a non-reactive powder coated finish. Powder coatings are made by electrostatically applying powdered epoxy resin which is then fused to an enamel finish by heat. No solvents or plasticizers are used in the process.(16) Our cabinet design was created with the help of the late Skip Dickinson of Delta Design following similar parameters used by Constance McCabe, Photograph Conservator at the National Archives, for the storage of the Archive's Brady Collection. The interior of the cabinets was tested for photo-reactivity using silver coupons to detect tarnishing and colloidal silver strips to detect fading (17). No changes were observed with either detector.

The plates will be stored vertically on their long edges supported by rigid vertical dividers welded 5 inches apart. The gasketed doors will prevent water from entering the closed cabinets. This is especially important since new sprinklers installed in the glass plate negative storage area are only a few inches above the cabinets due to the low ceiling in the room.

### Mending of Jackson Photographs

The third phase of the Jackson project involved the treatment of 40 mammoth prints and panoramas. Although there were numerous glossy POP gelatin prints, matte gelatin DOPs and a few albumen prints, most of the prints were

cyanotypes. Nora Kennedy was hired on contract to assist with the treatment of these objects. The two cataloging technicians also helped with drycleaning, minor treatments and the housing of the Jackson photographs.

#### Cyanotype Treatment Implications and Research

Most of the treatments involved mending of various degrees of difficulty. The most unusual aspect of the project was presented by the cyanotypes. Some of these objects were brittle, severely torn with numerous small edge losses, while others had backings of thin, acidic brown paper. Possible bathing, backing removal, and lining methods had been investigated in 1986 for the treatment of these objects by Sylvia Rodgers Albro in the Paper Conservation Section. Experiments by her on expendable, small Detroit Publishing Company cyanotypes (c. 1900) indicated that dramatic tone and value shifts might occur upon bathing and lining of these objects.

Further experiments were undertaken in the summer of 1990 using 3-year-old cyanotypes, 50-year-old blueprint paper of unknown origin, and untreated strips from the 1986 tests. Mock-ups were treated by bathing the samples in neutral pH tap water and pH 6 deionized water by float and immersion, with and without the presence of light. Other samples were humidified in a damp blotter/Gore-tex sandwich wetted with either pH 6 deionized water or water adjusted to pH 5 with dilute acetic acid. Samples were bathed for 1-1/2 hours while damp pack sandwich duration was for 1-1/2 to 3 hours. These long treatment times were chosen in order to evaluate results of maximum time possibly needed for complete backing removal.

Tests indicated that noticeable to slight changes might occur with all methods. Changes could not be accurately predicted--some samples had different changes with identical treatments. Change in object pH did not seem to correlate with change in hue or value in all cases. The amount of change was not always proportional to the pH change in the sample. (18)

Mock-ups performed on recently made cyanotypes were slightly more predictable than those run on the circa 1900 Detroit Publishing Company cyanotypes. On the 3-year-old cyanotypes dramatic lightening occurred by immersion in tap water while the least amount of change occurred with float bathing in tap water. There was slight lightening, but little difference between samples which were immersed or float bathed in deionized water. Little difference was found between bathing in the dark or light. A slight lightening was found with the damp pack treatment on the 3-year-old cyanotype and 50-year-old blueprint paper. Damp pack treatment of the Detroit Publishing Company cyanotypes was less predictable than with the recently made cyanotypes. Some samples lightened and shifted hue dramatically while others had barely perceptible changes. Acidifying the damp pack blotters with acetic acid (known to intensify cyanotypes) seemed to lessen the amount of change, but to

varying degrees only.

Other conservators have noticed color change phenomenon with the aqueous treatment of cyanotypes. Ian and Angela Moor attribute moisture induced lightening of cyanotypes to the formation of white iron salts from residual ferric ions in the paper.(19) The Moors found zero percent density loss of image by bathing for 15 minutes in either deionized (pH 6.8-6.9) water or purified water (pH 6.3-6.6, deionized and filtered). Given the constraints of an early filming deadline for the disk, and the unpredictability of the effect of moisture on the Jackson (c. 1900) cyanotypes, it was decided that the objects would not be bathed or lined at this time.

Local relaxation was performed using a directed mist stream from an ultrasonic humidifier, and the tears were aligned and reinforced with mends applied relatively dry. The brittle objects will be encapsulated with a stiff, paper board behind for support. Reference copy prints will be made and access to the originals will be restricted based on the fragility of these objects.

#### Summary

All-in-all, the preservation projects undertaken for the American Memory Optical Disk Project have provided numerous opportunities to investigate treatment methods, test storage materials and design new housings and storage cabinetry. More in depth information about any of the topics covered by this paper is available by contacting the Library of Congress Conservation Office.

#### Acknowledgements

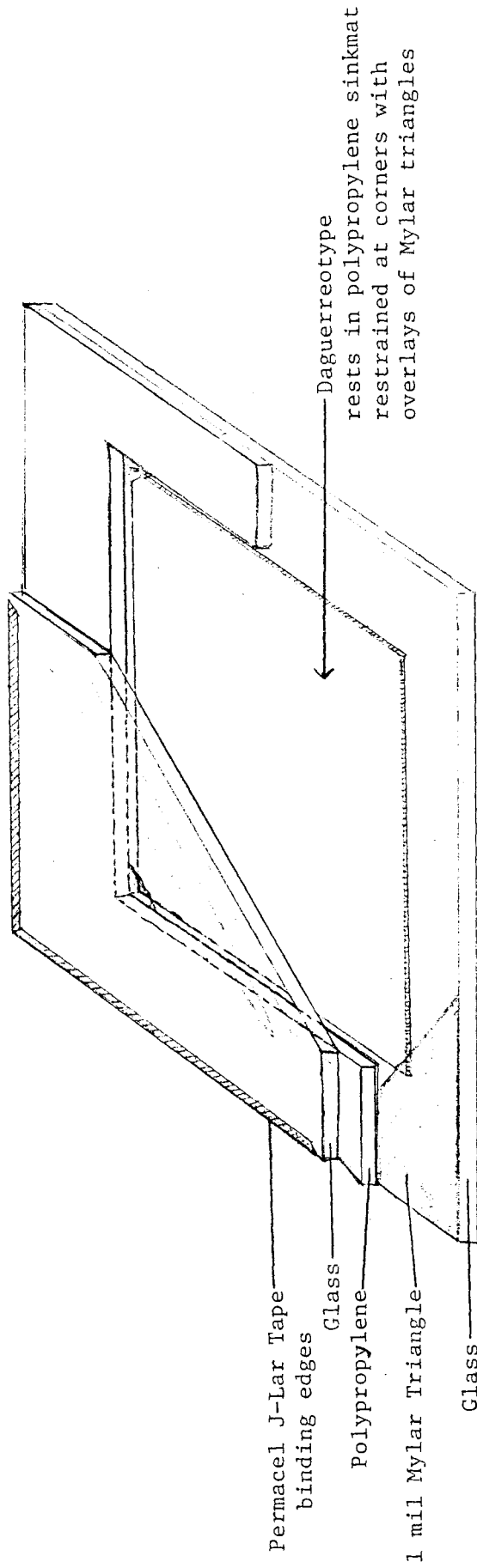
I would like to thank the many colleagues at numerous institutions who shared insights and information regarding daguerreotype storage packages. In addition, Doris Hamburg, Conservation Office, and Drs. Shahani and McComb, Research and Testing Office, provided helpful guidance. A very special thank you goes to Carol Johnson of the Prints and Photographs Division who helped with much of the storage supply ordering for the Panorama Project, wrote the final specifications for the storage cabinets and continues to oversee the negative duplication project. Cheryl Megerdigian and Philip Michel continue their excellent work on the Panorama Project and provided much needed assistance with the Jackson Negative and Print Projects. Lastly, Nora Kennedy worked on contract for the Jackson Print Project helping us all to meet the filming deadline.

## Endnotes

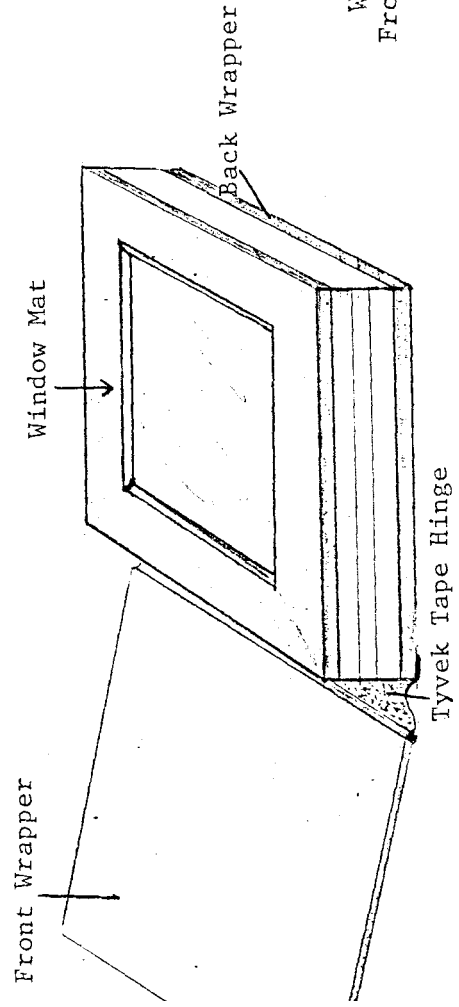
- (1) "The American Memory Project: Sharing Unique Collections Electronically", LC Information Bulletin, vol. 49,(2/6/1990), No.5.
- (2) Ibid.
- (3) This slight surface change was seen on one set of expendable glossy prints tested in the ultrasonic humidity chamber. Further testing would be required in order to verify results prior to drawing conclusions. It is mentioned only as an interesting observation that may warrant further consideration.
- (4) Archivart Extra Heavy Weight Blotting Paper, 100 pt. caliper, 38x52 inches. Archivart, 301 veterans Blvd., Rutherford, NJ 07070.
- (5) Mending done with Aytex-P (General Mills) wheat starch paste and Usuiusomino Tissue purchased from Hiromi Paper International 1317 Abbott Kinney Blvd., Venice, CA 90291. This is a 100% Kozo tissue made in Winter, naturally bleached to a light color without chemicals. It tests well with typical paper quality control tests and with the ANSI IT9.2-1988 Photo Activity Test run at the Library of Congress.
- (6) Sealed Mylar on a roll, Taylor Made Co., P.O.Box 406, Lima, PA 19037.
- (7) Grant Romer (Conservator, George Eastman House/International Museum of Photography) was particularly helpful and shared his insights gained from experience with the daguerreotype collection at GEH/IMP; Lynn Gilliland (Conservator, National Museum of American History); Roy Perkinson (Conservator, Boston MFA); Robin Siegel (Conservator, The National Geographic Society), Ken Nelson (Daguerreotypist and Information Center Representative, Kodak Information Center, Eastman Kodak); Andrew Lins (Metals/Objects Conservator and Corrosion Scientist, Philadelphia Museum of Art); M. Susan Barger PhD. (Dept. of Materials Science and Engineering, Johns Hopkins University Baltimore, MD.)
- (8) Personal communication Ken Nelson, Fall/Winter 1989-90 and M. Susan Barger, Summer 1990.
- (9) American National Standards Institute, Photographic Activity Test as described in Standard IT9.2-1988, "Photographic Processed Film, Plates, and Papers--Filing Enclosures and Storage Containers".
- (10) TAPPI 444-pm80 "Silver Tarnishing by Paper and Paper-board" scaled down to petrie dish size (1x3 in.) as described in Collings, T.J. and F.J. Young, "Improvements in Some Tests and Techniques in Photographic Conservation", Studies in Conservation 21,(1976), 79-84.
- (11) Personal communication with Lynn Gilliland of NMAH and Robin Siegel of NGS, Winter 1989.
- (12) Siegel, Robin "Testing Adhesive Tapes for Rebinding Autochrome Plates in the National Geographic Society Collection", AIC Newsletter vol. 12,(May 1987),No.3, 5-6.

- (13) P400 J-Lar Tape by Permace1 is available from Read Plastics (address below).The polypropylene carrier on Permace1 P400 J-Lar Tape is 2.4 mils thick, the acrylic adhesive contains an anti-oxidant. Barrier properties to moisture and oxygen for 1 mil polypropylene are: 8-10 WVTR (water vapor transmission gr./24 hr./1 sq.M at 100F-90%rH) and 1300-6400 gas transmission (cc/mil/1 sq.M/24 hr. at 1 atm.73F-0%rH). This compares with 15 WVTR and 52-130 gas transmission for 1 mil thick polyester film. Actual transmission rates at ambient conditions are much lower. Information from How To Identify Packaging Films, McGraw Hill, New York, 1965.
- (14) Stress Relieved 0.060 in. thick polypropylene sheeting available from Read Plastics, 1233 Wilkins Ave., Rockville, MD 20852. Polypropylene sheeting manufactured by Allied Resinous Products, Inc. Box 620, Clark St. and Whitney Rd., Conneaut, Ohio 44030 from Pro-Fax PF162 polypropylene resin manufactured by Himont Inc., Hercules Plaza, Wilmington, DE 19894. This materials is unpigmented, and does not contain anti-oxidants, flame retardants, or coatings. Himont tests its proprietary stabilizer with a silver wire tarnishing test and finds no tarnishing.
- (15) This long term study follows guidelines developed by Grant Romer for the GEH/IMP daguerreotypes. Ektachrome transparencies made under normal illumination and B/W photographs taken under normal and ultra-violet illumination will be used to evaluate degree of tarnishing as part of the long term evaluation of this package.
- (16) Delta Design Museum Storage Equipment, Delta Designs Ltd., P.O.Box 1733, Topeka, Kansas 66601.
- (17) Sterling silver coupons were placed on the shelf of the cabinet. Colloidal silver strips (Agfa) used as the fade detector in the ANSI IT9.2-1988 Photographic Activity Test were placed on a shelf and underneath the gasket. No tarnishing or fading was observed at one month. The test strips remain in place for long term evaluation.
- (18) Albro, Sylvia Rodgers, "William Henry Jackson Cyanotype Research Project" Unpublished Research 1986 and Sarah S. Wagner, Unpublished Research, 1990.
- (19) Moor, Ian and Angela, "The Conservation of Anna Atkins' 'British Algae' The World's First Photographically Illustrated Work" Paper presented by E.M.B. King at The European Society for the History of Photography Symposium, 1989 (In Press).

# BASIC DAGUERRETYPE GLASS PACKAGE



FRONT VIEW



BACK VIEW

