Article: A Case for Preservation: Revisiting the Agassiz Collection of Daguerreotypes from the Peabody Museum Archives at Harvard University
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A Case for Preservation: Revisiting the Agassiz Collection of Daguerreotypes from the Peabody Museum Archives at Harvard University

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Abstract

This paper is an overview of a case study of the documentation and preservation of 36 significant daguerreotypes from the Peabody Museum of Archaeology and Ethnology at Harvard University. The collection includes fifteen rare pre-Civil War portraits of African-American slaves commissioned by Harvard University professor Louis Agassiz in 1850. The daguerreotypes were stabilized at Harvard University Library's Weissman Preservation Center. This project is an example of exceptional professional collaboration among the spectrum of conservators, archivists and photographers.

Introduction

The daguerreotype collection at the Peabody Museum of Archaeology and Ethnology consists of 36 highly valuable and significant images.

Figure 1- "Jack Driver Guinea" before treatment (35-5-10/53043). Courtesy Peabody Museum of Archaeology & Ethnology (PMAE), Harvard University.

Of the daguerreotypes, fifteen were taken by photographer J.T. Zealy who was commissioned to take the images by Louis Agassiz of Harvard University. The Zealy daguerreotypes were probably intended as research tools for Agassiz' burgeoning theory on polygenesis, and feature African American slaves who Agassiz examined in 1850 while visiting plantations near Columbia, South Carolina. Thus these images represent the oldest known daguerreotypes of African American slaves and serve as an important documentary of the unique social issues of pre-Civil War America.

Along with the Zealy images, the remaining Agassiz daguerreotypes feature so called 'ethnic type' portraits taken by well-known 19th century photographers: L.G. Chase, T.M. Easterly, W.F. Langenheim and Southworth & Hawes. This paper will discuss the preservation and treatment of the Peabody Museum's daguerreotype collection undertaken by Harvard University Library's Weissman Preservation Center.

Figure 2- Unidentified Chinese women by L. Chase, before treatment (35-5-10/53057). Courtesy of PMAE, Harvard University.

The provenance of the Agassiz daguerreotypes indicates that the Peabody Museum accessioned the objects in 1935 (accession 35-5-10) upon their transfer from Harvard's Museum of Comparative Zoology. Notably, in 1977, the daguerreotypes were rediscovered by former Peabody Museum staff member, Eleanor Reichlin who found them in an unused storage cabinet in the museum's attic. At that time, Dan Jones, the Peabody Museum's photo archivist collaborated with Ms. Reichlin to document their story and have them published for Reichlin's article, "Faces of Slavery" (*American Heritage*, June 1977); Dan Jones later confirmed to us that before publishing the Zealy daguerreotypes they were treated with thiourea, a commonly used cleaning method at that time.

Unfortunately, during the 1970s there were no established protocols for object documentation before, during, or after treatment. The oral history of the conservation interventions performed at that time was thus documented through a series of oral interviews with Dan Jones.

Accordingly, documented treatments, conservation interventions, and surveys for the collection as a whole began in 1991. Subsequent interventions took place in 1994, 1997, and 1999. Occasional condition examinations were done for the purpose of loaning specific objects. All records from these interventions were systematically collected by conservators and archivists. Beyond that, however, there is indication of previous treatment on many daguerreotypes that was never documented, including the use of different types of binding tape. Many of the daguerreotypes had transparent self-adhered binding tape with no known conservation record.

Figure 3- Portrait of unidentified boy also identified as "a Hottentot Boy" before treatment (35-5-10/53069). Courtesy of PMAE, Harvard University.

After their rediscovery and removal from the Peabody Museum attic, the daguerreotypes were housed in a more controlled location within the photographic archives department and then for a short period in the three-dimensional organic materials storage vault. In 2002, the daguerreotypes were moved to cool storage (58°F and 35%RH) where the museum's black and white photographic materials are kept.

The conservation documentation and oral history based on the interviews of the former archivists and contractor-conservators dating from 1977 also reflect the history of both daguerreotype conservation efforts and the photograph conservation profession in general.

Project Goals

Begun in June 2007, the Peabody daguerreotype stabilization project at the Weissman Preservation Center (WPC) was originally intended to be part of a summer work study project for graduate student and conservation intern Jessica Keister (Winterthur/University of Delaware Program in Art Conservation). While Jessica performed conservation treatments on a few daguerreotypes that summer, the stabilization and imaging of the entire collection eventually grew into an eighteen month project.

As the earliest photographs, daguerreotypes are becoming increasingly important due to their rarity, fine art value, and uniqueness. The long-term preservation of these complicated objects poses a significant challenge for photograph conservators. Previous conservation experience within the field has demonstrated the extreme complexity of decision making for a daguerreotype treatment proposal. With this in mind, the stabilization of the Peabody Museum daguerreotypes was designed to serve as a pilot project and serve as a potential model for WPC conservators when considering preservation protocols for the many thousands of daguerreotypes located throughout Harvard.

The objectives that were established for this project include:

1. Collect the history of conservation intervention for each daguerreotype.
2. Produce detailed written and photographic documentation of the daguerreotype's condition before, during and after stabilization to provide a basis for future monitoring and to provide information to researchers that may limit the need to access the original daguerreotype.
3. Determine treatment priorities based on the daguerreotype's condition and conservation history.
4. Stabilize each daguerreotype using the best current practices and proper, archival materials.
5. Keep original elements of the daguerreotype package intact when possible. When existing elements (original and historical) are replaced, they must be stored with the object.
6. Analyze specific forms of daguerreotype deterioration at the Harvard Art Museum's Straus Center for Conservation & Technical Studies.
7. Properly house the collection in preparation for climate controlled storage at the Peabody Museum at a constant temperature and humidity (58°F, RH 36%).
8. Re-examine the daguerreotype collection on a regular basis.

General Condition

The daguerreotypes had many conservation issues such as glass deterioration, broken and tight cases, and binding tape problems. Additionally, there was severe brass preserver corrosion, as well as tarnishing and different types of accretions and stains on the plates. According to the existing documentation, more than half of the plates were previously cleaned, but most of the daguerreotypes still show very good image condition. It is interesting that those daguerreotypes that were used for exhibitions and publications were in noticeably worse condition overall.

Most of the daguerreotypes had modern binding tape and glass; only on eight daguerreotypes did the glass appear to be historic, if not original. Most of the wood cases had evidence of prior case repair.

In order to assess the condition of each daguerreotype it was critical to understand its treatment history. Therefore, all existing written and photographic documentation was requested by WPC conservators at the beginning of the project. Prior to the establishment of WPC's photograph preservation program in 2005, Harvard libraries and archives contracted directly with regional centers or conservators in private practice. The retention rate of conservation documentation varies, depending upon the Harvard repository; however, the Peabody Museum Archives and Conservation Departments have a strong record of photograph preservation efforts and maintained most of the relevant paperwork.

As part of the detailed condition report, all known or documented treatments were duly noted. In addition to the comprehensive paper files amassed during this project, we created a simple Microsoft Access database to compile dates and types of conservation interventions undertaken for each daguerreotype. The database was designed to be an easy tool, not only for looking at the treatment history of an object, but also for sorting by preservation projects such as the 1994 conservation intervention.

Cover glass

In 2007, we observed a thick white film or haze on the cover glass of almost every daguerreotype, making it very difficult to see the actual images. In fact, the film appeared on both historic glass and on the ten to fifteen year-old replacement glass. It was unclear if the haze was simply glass deterioration or if it was another type of accretion resulting from the storage environment.

Upon closer examination, it was evident that the white film had developed not only on the exterior of the glass, but on the interior as well. Therefore we decided to analyze the film's composition. Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM) analyses were undertaken at the Straus Center for Conservation & Technical Studies. The SEM showed that there were numerous tiny crystals of NaCl (sodium chloride) and an unidentified organic material. Since glass tends to deteriorate by loss of sodium and potassium ions (initially) as hydroxides, the presence of NaCl indicated that the daguerreotypes had severe glass deterioration issues, a surprising find considering that most of the glass was only ten to fifteen years old.

The deterioration of the original historic glass (as observed in the 1990s) was severe and appropriately warranted intervention at that time. Based on conservation documentation and oral history, we believe that most of the daguerreotypes had glass replacement during the 1990s. Two daguerreotypes had glass replacement in 1994 during a Harvard-wide daguerreotype survey and preservation project coordinated by the WPC and funded by a grant from the National Endowment for the Humanities. At that time, framers glass was used, which was, and continues to be, a common practice in conservation. Unused glass from 1994 was found in the WPC lab in

2007. This glass also showed signs of severe deterioration, revealing that the contemporary framers glass was less stable than we had hoped. (See figure 4.)

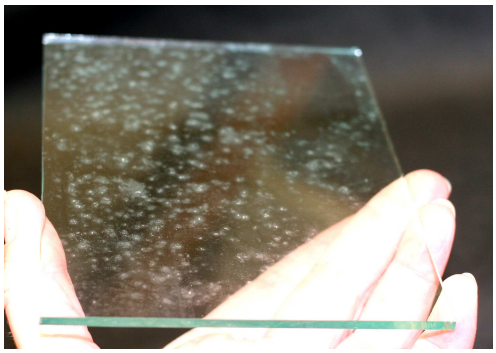

Figure 4- Glass from 1994.

With this information in mind, we decided to replace the glass on all 36 daguerreotypes with borosilicate glass, the same type of glass used in Pyrex® products because it is physically stable, chemically inert, and highly transparent. Additionally, it has been tested in the conservation field over the years, albeit inadvertently, as a component of accelerated aging packages, and has proven to be at least twice as stable as regular window glass. Borosilicate glass can be ordered in different thicknesses from 1.75mm to 15.00cm, but unlike window or framers glass, it is very difficult to cut precisely on your own. Two different vendors, Swift Company and Howard Glass provided our replacement glass and also custom cut each piece to specified sizes. It should be noted that this is the first project at Harvard where an entire daguerreotype collection experienced glass replacement with borosilicate glass so the condition of the glass will be closely monitored over time.

Plates

The Peabody daguerreotypes are generally in good condition. However, as previously mentioned, it was evident that the daguerreotypes used heavily for exhibition or publication were in worse condition as they were exposed to light and changes in the environment more frequently. These images were also cleaned several times using different methods: for example, thiourea (CSN_2H_4 or $(NH_2)_2CS$) was commonly used for daguerreotype cleaning prior to the 1980s when electrocleaning was developed as a safer alternative. Plates cleaned with thiourea and then electrocleaning appear much duller, with a flatter appearance and more surface scratching.

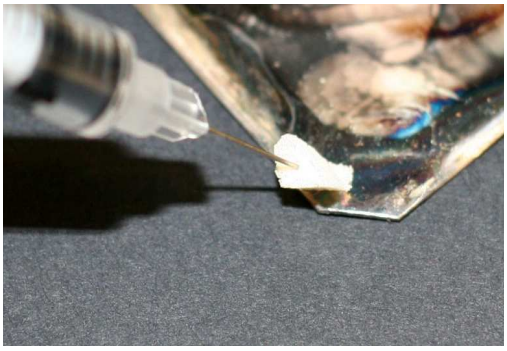

Figure 5- Removal of adhesive from pressure-sensitive tape on the plate using solvent-filled syringe with small sponge tip.

Four of the daguerreotypes had double-sided pressure-sensitive tape found on the front corners of the plates. In this project, the tape was removed mechanically and the residue was removed locally with toluene, using a method developed by Ralph Wiegandt at the George Eastman House. The applicator was an insulin syringe with a small wedge of cosmetic sponge affixed to the tip of the syringe. (See figure 5.) The sponge was filled with a drop of toluene from the syringe, and then introduced to the residue; the toluene dissolved the residue, which was then pulled back into the syringe through the sponge tip. This method worked well, with no detected changes to the surface after treatment.

All of the African-American slave daguerreotypes were photographically documented with long wave (UVA) and short wave (UVC) ultraviolet radiation visible fluorescence. This decision was made because the collection had undergone numerous treatments over the past 30 years and we wanted to document as much of the daguerreotypes' treatments as possible.

A yellowish green fluorescence under the UVC possibly indicated copper cyanide compound. (See figure 6.) This may be a product of a cyanide compound chemically reacting with the copper element of the plate. The cyanide compound could be the residue from the original plate manufacturing, electroplating process and/or a cleaning process to remove the tarnish, such as cleaning with cyanide solution.

A quick rinse in distilled water/ammonium hydroxide solution (10/1) helped to reduce accretions, oily substances and possible cyanide compounds; eight plates from the collection were washed in distilled water and four were rinsed in water/ammonium solution.

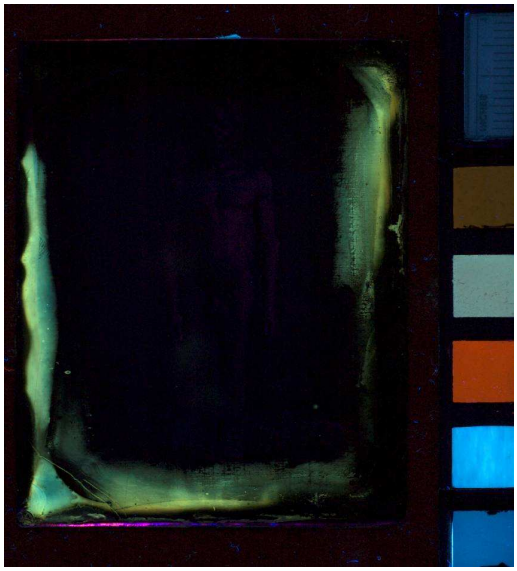

Figure 6- Plate image (front) under UVC

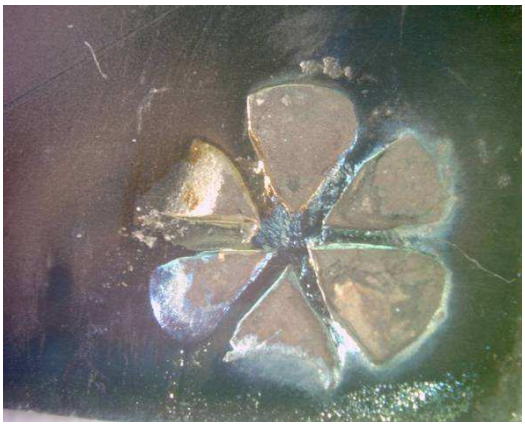

Figure 7- Hallmark, 50x (35-5-10/53053)

While the daguerreotypes' packages were open, many images were taken under magnification to document plate details. (See figure 7.) Eleven daguerreotypes have unique hallmarks, which are a rich source of information for researchers. Hallmarks can determine a plate manufacturer or percentage of silver within in a plate.

Brass Mats and Preservers

All of the ethnic type daguerreotypes taken by Chase had very strong corrosion on the brass preservers and on the copper backing of the plates. (See figs 8-11.)

The corrosion was prominent on the interior of the trays as well, exhibiting at least three different colors of corrosion: green, pink and transparent white. The texture of the corrosion

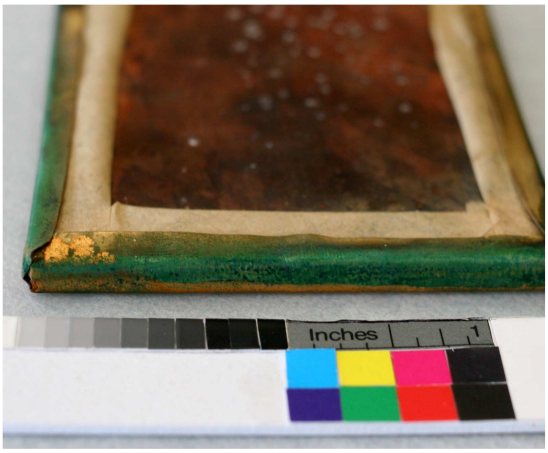

Figure 8- Copper corrosion

was sticky and soft and while it was possible to mechanically remove it using a cotton swab, the metal remained green in color.

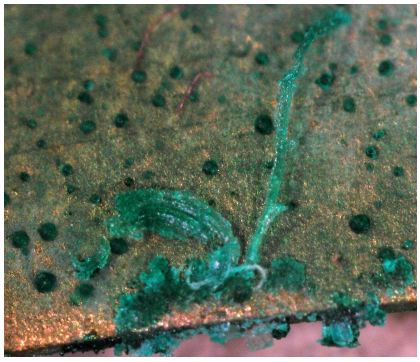

Figure 9- Copper corrosion, 80x on the back of the plate

Figure 10- Copper corrosion

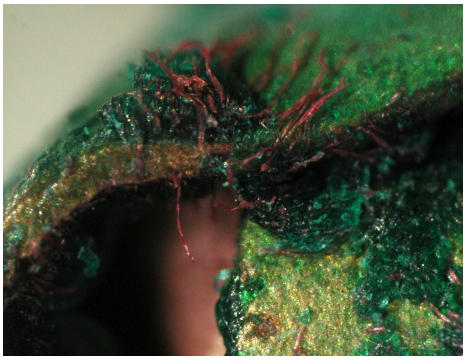

Figure 11- Copper corrosion, 50x

Instrumental analysis was carried out by Harvard's Straus Center for Conservation & Technical Studies. Fourier Transform Infrared Spectroscopy (FTIR) of a green corrosion sample showed that it contained copper palmitate and wax. We think this could be a reaction of the copper in the brass and beeswax which also contains fatty acids. Stoddard solvent was used to remove the corrosion from the preservers on four of the daguerreotypes.

Another phenomenon we noticed was the presence of amber colored drops and stains on the brass preservers and mats. We assumed this might be related in some way to the severe corrosion. The Straus also performed an FTIR analysis of a sample of brown material from the inner edge of a brass preserver that ultimately matched a library spectrum for amber. The amber spots appeared on several daguerreotypes from the Chase photography studio and was located on the interior side of the brass mats, between the daguerreotype and the brass mat. So far, our research has not determined an explanation for why amber oil would have been used inside this daguerreotype package. However, Canada balsam has similar visual characteristics to amber oil and was commonly used by nineteenth-century photographers so we plan to do further testing of Canada balsam with FTIR to compare its similarities in spectra to amber oil.

Binding tapes

The materials and techniques used for binding the daguerreotypes varied over the years and serve to illustrate ever changing methods. Regardless of the type of binding tape used, all of the daguerreotypes developed the same glass deterioration. Thirteen daguerreotypes had pressure-sensitive transparent tape adhered directly to the back of the plate. Gummed paper that was probably used in the nineteenth century was found on nine daguerreotypes. This paper was very loose and did not safely hold the plate packages. Most striking was a daguerreotype that was bound using a nineteenth-century Boston newspaper. (See figure 12.) Although

Figure 12- Late 19th century Boston newspaper used as binding tape

the unidentified adhesive had failed, the newspaper itself was very well preserved, not even yellowing over the years. Nine daguerreotypes had Filmoplast P-90 binding tape, some with paper backings and others with Mylar backings. Four daguerreotypes did not have cases at all and were inadequately mounted with poor quality board using black paper as a binding tape. Many of the daguerreotypes also had remnants of several layers of different binding tapes adhered to the back.

We used Filmoplast P-90 archival tape to re-bind the daguerreotypes. The group of daguerreotypes which originally did not have preservers were re-bound with Filmoplast P-90 and pre-coated (water/aquazol-15%) Tanbo Japanese paper, toned with acrylic/mica media. (See figure 13.) We included a backing of Mylar-D polyester. Pre-coated paper strips were slightly remoistened before use.

Figure 13- "Renty" with new binding tape (35-5-10/53037) Courtesy of the PMAE, Harvard University.

Mica pigments were chosen for two specific reasons: 1) since it is a metallic oxide on mica, it was used to imitate the brass mat finishing on the paper binding; and 2) it was hoped that the mica particles would diminish the air flow through the binding tape, thus further reducing possible deterioration.

We then wrapped the binding tape over the front of the cover glass, even though it would be visible without a preserver. Unpublished research by Hanako Murata (*Investigation into Traditional and Modern Daguerreotype Housing Systems from Conservation Point of View)* demonstrated that binding tape creates a tighter environment inside the plate package when the binding tape wraps over the front edges of the cover glass. Murata's research also confirmed that two layers of binding tape protect more than one layer, and that using a strip of continuous tape is better than four separate pieces.

Cases

Nineteen daguerreotypes had broken cases ranging from major to minor, particularly along the spines. The cases were repaired using thin Hollytex and Japanese paper in order to re-create any missing spines. A mixture of poly vinyl acetate (PVA) and wheat starch paste was used as adhesive. For a collection as heavily used as this one, the durability of the hinge is an important consideration when using the PVA/wheat starch paste mixture. Although PVA is not as easily reversible as pure wheat starch paste, it can be mechanically reduced.

According to previous and recent conservation documentation, the cases for eleven out of fifteen African American slave daguerreotypes were too small to hold the plate packages, and therefore all had broken corners in the tray. Since many daguerreotypes had several leftover layers of binding tapes on the back from previous conservation treatments, we deduced that this could be

why the cases were so tight. However, even after removing the tapes, we still encountered a problem of not having enough room in the case to properly fit the plates. Through the years, different conservators attempted to resolve this problem by using smaller glass for the plate package and then fixing the corners. However the brass mat was still slightly larger than the repaired interior of the tray, so each time a plate package was removed, the tray was sure to break from stress.

It was hard to determine the exact cause of the tight cases, since they were very high quality cases and original to the daguerreotypes. One explanation is that, being made of wood, the cases might have shrunk over the years. Another explanation might be that the plate packages may never have had binding tape, although this is reduced to speculation since prior to 1977 there was no photographic documentation or evidence to support these theories.

Even so, the cases needed to be repaired in such a way that they could accommodate the binding tape and not break each time a plate package was removed. After several discussions, case maker and daguerreotypist Alan Bekhuis suggested that we remove the cardstock from the velvet preserver. This technique solved the problem by providing a much needed additional 1.5 to 2 mm on each side of the tray allowing enough room inside of the case to hold the plate using the binding tape previously described.

Custom mounting system

Four daguerreotypes that did not have cases required a mounting system that allowed the image to be presented inside mat board holders with window cutouts, making it possible to view them from front and back. (See figures 14-15.)

Figures 14-15-“Man with bear claw necklace” re-mounted daguerreotype, front and back (41-72-10/53023C) Courtesy of the PMAE, Harvard University

In keeping with best practices, our goal was to eliminate the use of paper based materials inside the plate packages. Therefore, a sink mat made of 2mm thick borosilicate glass was used with Z-shaped Mylar trays to safely store the daguerreotype in the mount structure. The thickness of the sink mat was just enough to place the package inside of the cutout window without creating additional thickness in the package; Mylar D was used as a barrier from the mat board backing with the cutout window to see the back of the daguerreotype. (See figure 16.)

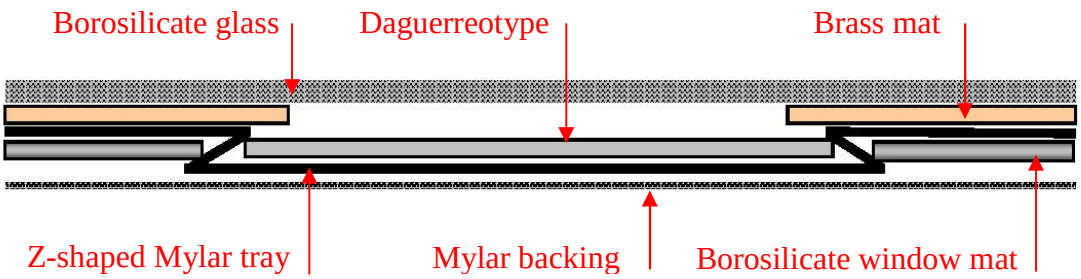

Figure 16- Schematic structure of the new mounting system

Imaging

After treatment was completed, all of the daguerreotypes were imaged at Harvard College Library Imaging Services. We decided to take several images of each plate. First, we shot the images 'bare plated' without the glass or cases, this included both front and back views. Once the final binding was applied, the bound plate package was imaged both in and out of the case. Each digital image was taken at 600dpi with a Sinar 54 H camera equipped with a 90mm HM APO lens and illuminated with electronic flash. The copy setup included a black piece of construction paper serving as the background for the daguerreotypes. To avoid reflection from the copy lights, the camera was also fully covered with black shields and anything white or metallic on the camera was covered with black tape. This setup was in a room with black painted walls and ceiling. The standard contrast curve in the Sinar Captureshop software was adjusted to obtain more gradation in the shadows of each daguerreotype. Each file was exported as a 16-bit per channel RGB TIFF file, then converted to 16-bit per channel grayscale using Adobe Photoshop. It was decided that color and tonal corrections would not be performed, so each image was saved and delivered both as a 16-bit per channel file without an imbedded color space, and as an 8-bit per channel file with Adobe RGB (1998) imbedded within each one. These digital images will be used both for publishing and preservation purposes as well as documentation in monitoring the daguerreotypes' condition over time.

Housing

After all 36 daguerreotypes were stabilized and photographed, they were placed in specially designed archival storage boxes and each daguerreotype was housed in an individual folderstock wrapper. This type of housing had been incorporated into the collection as part of the 1994 university-wide daguerreotype preservation project and the majority of the wrappers were in fine condition for re-use. Coroplast® strips

Figure 17- Housing for daguerreotypes

were used to create an individual nest for each daguerreotype within the box. A Mylar lining was also used to reduce direct interaction with paper-based materials inside of each box. The collection is now stored in a climate controlled environment at the Peabody Museum at a constant 58°F and 35%RH.

Figure 18- Two seated men in Chinese in Western dress, after stabilization (35-5-10/53068). Courtesy of the PMAE, Harvard University.

Conclusion

The Agassiz collection of daguerreotypes at the Peabody Museum of Archaeology and Ethnology has a long history of preservation interventions, mirroring the trends in daguerreotype conservation over the past thirty years. In the field of photograph conservation in general, conservators have become very conservative in their approach to treating these unique and fragile images after seeing the unfavorable consequences of thiourea cleaning, and in some cases of electrocleaning. So it is, too, with the collection of daguerreotypes from the Peabody Museum. After stabilizing all the case elements, we determined that no further cleaning method for the plates themselves seemed safe enough to justify the risk to such significant images at this time.

The archivist and conservators in this project determined that the priority for the daguerreotypes is for long-term monitoring to effectively document changes in their condition in the future. Since the introduction of the photograph preservation program at the Weissman Preservation Center, a mechanism now exists for sustained collaboration between photograph conservators and the Peabody Museum. This collaboration serves to enable photograph conservators to regularly monitor these complex three-dimensional objects and to re-evaluate the suitability of borosilicate glass and other materials over time while continuing to advocate for safe methods and materials in the future.

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T. Rose Holdcraft, Conservator and Administrative Head of Conservation Department, PMAE

Preservation Action During Project	# of Objects	Preservation Action During Project	# of Objects
New conservation form designed and utilized		Plates surface cleaned with manual air blower	36
All previous documentation collected		Plates washed in distilled water	8
Conservation history database designed and utilized		Plates washed in ammonium/water solution	4
Oral history of 1977 conservation intervention		Copper corrosion removed from brass preservers	4
In-house photographic documentation taken before, during and after treatment	36	Borosilicate glass sink mats for small daguerreotypes	4
In-house photomicrographs of hallmarks	11	Analysis of glass decomposition	
In-house photomicrographs of deterioration details	33	Analysis of copper corrosion	
In-house UV documentation of J. Zealy daguerreotypes	15	Analysis of brown accretions	
Cases repaired	19	Professional imaging of bare plates after treatment	36
Tray liners adjusted to fit plate package	11	Professional imaging of plate packages after treatment	36
Cover glasses replaced with borosilicate glass	36	Professional imaging of cased daguerreotypes after treatment	36
Binding tapes replaced	36	Daguerreotypes re-housed	36

Figure 19- Summary of project elements.

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