

POSTER SESSIONS

(01) The Application of Analytical Techniques in Art Conservation

Sarah Talcott, second year student at Trinity College majoring in Biochemistry; Henry DePhillips, Professor of Chemistry Emeritus, Trinity College

A number of analytical techniques have been developed for the determination of resins, binders and organic pigments in artifacts, in particular, easel paintings. Typically, those methods require that the sample be modified (solubilized, derivatized) and given that samples taken from easel paintings are very small, treatment usually means loss of the original sample. Hence, any technique that permits analysis of sample components with no prior treatment is preferable. Such a technology is Direct Analysis in Real Time, Time of Flight, Mass Spectrometry (DART-TOF-MS), especially for organic materials. This method requires such a small amount of sample that virtually no sample is “lost” and, because of the conditions required to obtain a Mass spectrum, the usual fragmentation of species is considerably reduced.

This poster shows the first steps in the development of a library of information on artificially heat aged resins, binders and organic pigments. In addition, results are shown for artists’ paints prepared and aged in our lab as well as commercial artists’ paints aged the same way. Finally, this method permitted us to determine both the resin and binder from a painting submitted by a private owner for materials analysis.

(02) Source Identification of Mesoamerican Obsidian using X-ray Fluorescence Spectrometry

Emily Hamilton, Associate Objects Conservator, San Francisco Museum of Modern Art; Dr. Jeffery Ferguson, Research Assistant Professor, University of Missouri

The Saint Louis Art Museum holds 99 objects identified as Mesoamerican obsidian in its collection, largely given to the museum in the 1980s. 58 of the pieces are reportedly from a single cache of objects in Teotihuacan (c. 250–600 AD). The cache includes 21 human effigies, 14 animal effigies, and 23 bifacial knives or projectile points. In addition to the cache, 39 other obsidian objects from a range of locations and time periods were analyzed including 2 blade fragments, 1 ear spool, 8 labrets, and 28 various bifacial knives/projectile points.

This group was analyzed using x-ray fluorescence spectrometry by Dr. Jeffrey Ferguson of the University of Missouri Research Reactor Archaeometry Laboratory. The goal of analysis was to identify source information through trace element identification. The Archaeometry Laboratory holds one of the most extensive reference collections for obsidian sources in the world. The elements measured include Rb, Sr, Y, Zr, and Nb, which are excellent indicators for discriminating sources in most geographic areas.

The analysis revealed that two of the specimens analyzed are not made of obsidian, and one additional specimen does not match any known source in Mesoamerica. The remaining 96 artifacts were all assigned to ten compositionally distinct

sources in Mesoamerica. The sources identified include Fuentezuelas, Pachuca, Paredon, Tulancingo, Ucareo, Zinapécuaro, Cerro Veral, Malpais, Otumba, and San Antonio Enchisi-2. The artifacts in the large cache are almost entirely from the major sources nearest Teotihuacan, suggesting that this cache is from that region and may represent a collection of objects made nearby. The artifacts other than the cache reveal greater source diversity, including more sources to the west of Teotihuacan.

(03) Cowboy Conservation: The Treatment of a Taxidermy Leatherback Turtle in Cordova, Alaska

Fran Ritchie, Conservation Fellow, National Museum of the American Indian

An emerging conservator on a grant from the Museums Alaska Collections Management Fund traveled to a small town in Alaska to treat “Prince Willy,” the Cordova Historical Museum’s taxidermy leatherback turtle. Since its mounting in 1963, this turtle has become a beloved town mascot, but after over 50 years on display was in need of serious rehabilitation. Conservation treatment of the largest species of sea turtle included the cleaning of rancid oil, removal of flaking and unnatural taxidermist paint, repair of splits and gaps in the dried skin, and stabilization of limbs. Although a standard course of treatment was proposed, the limits of the small town hardware store and the effects of a wet climate required constant rethinking of the original plan and called upon the invaluable help of museum staff and community members to meet a four week deadline. After ethical dilemmas were discussed with the museum curator and director, future display and treatment protocols were designed. For an emerging conservator on a first solo contract, the compromises and innovations with materials at hand created an atmosphere of wild conservation when compared to classroom theory, and thus “cowboy conservation” saved Prince Willy for generations to come.

(04) The Conservation of a Pair of Sandals from the King Tutankhamen Collection

Safwat Mohamed Sayed Ali, Conservator, The Grand Egyptian Museum, Cairo

This poster discusses a study case of one pair of sandals out of 32 pairs found as the property of King Tutankhamen, found in different sizes. Carter & Mace remark that sandals were leaning on the floor; they appeared to be in good condition, but in an attempt to pick one up, it crumbled at the touch. So they treated the sandals on the spot using a spirit stove and some paraffin wax, and left the sandals for an hour or two to harden; then the sandals could be removed safely intact.

Sandals were manufactured in ancient Egypt from different types of materials such as halfgrass, dom, palm leaf, papyrus, or straw, etc. Ancient Egyptian priests used sandals made of papyrus as unstained material for ritual purposes, so the sandals were not only a royal possession but used also by the commoners

and priests. The documentation of the sandal was made by using digital photography and AutoCAD 2D for the dimensions and deterioration aspects. Additional investigation and analysis were applied in order to: identify the type of fibers used in the sandals; assess the cell wall of the fibers (imaging with SEM); and recognize the previous conservation materials by FTIR. The condition of the sandal was poor. It suffered from fragmentation, previous conservation materials such as Paraffin Wax, deformation, missing parts, and stains. The conservation stages of the sandal included: Mechanical cleaning; removing previous conservation treatments; consolidation of fibers; and making a model replica to facilitate the reconstruction of the sandal. The results of conservation actions were convenient and appropriate, restoring the sandal to its original shape by reconstruction, and successfully removing the Paraffin Wax. We recommended performing more studies and analyses on previous conservation materials used in the last decade to facilitate further conservation actions.

(05) Testing Dry-Ice Cleaning on Archaeological Wrought Iron from the USS Monitor

William Hoffman, Senior Conservator for the USS Monitor Project, The Mariners' Museum

Between 1998 and 2002, National Oceanographic and Atmospheric Administration (NOAA) archaeologists and experts from the U.S. Navy retrieved approximately 200 tons of artifacts from the wreck site of the Civil War ironclad USS *Monitor*. The excavation culminated with the retrieval of the vessel's iconic 120-ton revolving gun turret. The turret is a massive cylindrical structure consisting of a layered 8-inch thick ring of wrought iron 21 feet in outside diameter and 9 feet tall, covered by a roof composed also of wrought iron members.

As conservation began on the ironclad's enormous turret, it soon became clear that alternative cleaning techniques would need to be explored. The turret's exterior surface had degraded badly during 140 years of exposure in a marine environment, resulting in significant areas of surface loss and deep pockets of embedded corrosion within the surviving metal structure. This type of corrosion product is traditionally removed by hand and mechanical tools or with the use of a standard media blasting system. However, these methods proved difficult to utilize. Hand cleaning was impractical because of the sheer size of the artifact, and possible abrasive residues posed a health risk to staff and had the potential to clog expensive plumbing equipment. Therefore, conservation staff began looking for a cleaning method that was effective in a relatively short period of time, safe for staff, and left behind minimal by-product. Dry-ice cleaning was a technique explored to fit the required criteria.

This paper provides a brief overview of research conducted at TMM to evaluate if dry-ice cleaning could be applied successfully to remove corrosion products from the surface of archaeological wrought iron. The paper includes a description of equipment setup, operation, and the development of cleaning working parameters by conservation staff. Results of cleaning test will also be shown.

(06) Testing the Sealing of Medium Density Fiberboard (MDF) to Prevent Corrosive Emissions

Rachel Greenberg, Objects Conservator, Monmouth County Archives

Wood products are known to emit volatile gasses that cause significant deterioration of museum artifacts when used as construction materials for display cases. This presentation will discuss the analytical testing conducted at the British Museum on barrier layer materials for Medium Density Fiberboard (MDF) to prevent corrosive emissions in such cases. The project is based on research conducted by David Thickett while a conservation scientist at the British Museum that determined the suitability of manufactured films and liquid coatings through accelerated corrosion testing. The original research determined that manufactured films performed best. However, liquid coatings are often preferred for their pragmatic qualities, and therefore further analysis is required to fully appreciate the sealing characteristics and the appropriate application to allow best performance. The best performing liquid coating is no longer available, which initiated the current project to test the second best liquid coating material: Dacrylate. The number of coats and drying time required for Dacrylate to effectively limit volatile emissions compared to the best performing manufactured film, Moistop, was under analysis through accelerated corrosion testing. The standardized accelerated corrosion testing method successfully tested the sealing materials and the MDF individually, but proved problematic for testing the sealing efficiency of the barrier materials once applied to the MDF substrate. The testing methodology had to be revised, and came under analysis alongside the material application, resulting in the goals of the project changing to include determining the most appropriate methodology for testing sealed MDF. This presentation will look at not only the effectiveness of different barrier materials, but also the effectiveness of the accelerated corrosion testing method in assessing these materials. Testing the sealed MDF with other analytical methods may enhance the comprehension of sealing properties, limiting the necessity to utilize accelerated corrosion testing on this type of material altogether. The research conducted for this dissertation will hopefully create the awareness needed to question the current preventive conservation practice for display cases, and perhaps make the complications of MDF usage in the museum environment better known, understood, and appreciated.

(07) Analysis of Rock Deterioration in Naqsh-e Rostam Relief by Geospatial Technology

Azadeh Ghobadi, PhD Candidate in Conservation of Cultural Heritage, Art University of Isfahan, Iran, Faculty of Conservation; Mohammad Amin Emam, Assistant Prof., Art University of Isfahan, Iran; Hesam Aslani; Jenoos Gashasy

Naqsh-e Rostam is known as an ancient periphery which is located in northwest of Persopolice in Fars Province, Iran. The oldest relief at Naqsh-e Rostam is severely damaged and dates to

1200 BC. There is a Rock relief thought to be Elimate, originally. Four tombs belonging to Achaemeind kings are carved out of the rock face and seven oversized rock reliefs at Naqsh-e Rostam depict the monarchs of the Sassanid period.

These works are located in orographic mountains which expose overall to interaction with their surrounded environment. Therefore existing deterioration as well as erosion process is mainly observed due to climatically conditions and geo-environmental factors that have influence of causes such challenges.

Transverse Cracks and micro cracking are most kinds of damages that will result erosion in whole of these works. The focal pressure sources, which cause cracks in rock surfaces, has been studied with Aerial Photography and Satellite Imagery and analyzed with respect to GIS system. Finally the gullies effect has been identified in the back of the rocks, Also determined that Existing natural factors like fault and earthquake in this area or any other faulted or seismic areas are not necessarily creation factors of cracks and subsidence phenomena is the main factor for creation of Ground cracks in Naqsh-e-Rostam site.

(08) New Light on the Surface of Art Objects in the Conservation Studio with a 3D Digital Hirox Microscope Mounted on an XYZ Stand

Jaap J. Boon, Art Researcher, JAAP Enterprise for Art Scientific Studies, Amsterdam, The Netherlands; Emilien Leonardt, Hirox Europe, Limonest, France

The low power stereo-microscope is a useful common tool in the conservation studio but new developments are bringing versatile high magnification 3D in-focus microscopy into the work place. Moving a digital microscope suitable for high resolution microscopy of small objects to a stand system that moves the microscope in the X and Y direction with high precision is a game changer. We have mounted the Hirox KH-8700 digital microscope on a MOPAS XY-stand to enable painting studies at high magnification. The stand is equipped with motorized precision bars, which allow micrometric movement that match the processing speed of the microscope system. This feature makes it possible to perform life stitching of microscopic images or video imaging over larger areas. A new visual world opens up for conservators.

Since the microscope is equipped with a revolving lens system using three separate zoom lenses a magnification span from x50 to 2500 is available at the touch of a finger. Led light at 5700 K, a 58-megapixel camera and a retina screen workstation provide highest quality images. The microscope can be moved in the Z-direction using 50 nanometer steps to focus stack 3D images. These digital images can be manipulated further for accurate measurement of surface corrugation, impasto features, cracks, efflorescence etc. A patented 360 degrees rotating side view system enables examination of impastos in video mode. Zoom lenses with a long focal distance (4-13 cm) are used for conservation treatments that require higher magnification viewing.

We have used this setup a.o. for painting studies of delamination and surface defects of paintings by Vermeer, impastos of Van Gogh and Riopelle, softening and dripping paints on Riopelle,

efflorescence on paintings by Munch, damage on a painting by Rothko, microscopic chemical changes in a painting by Breiter, and technical studies of paintings by Frans Hals. The presence of varnishes is a problem that can be overcome by manipulation of the light or viewing in polarized light. In fact, using different viewing modes the thickness of transparent coatings can be measured. The setup is now used routinely in a private conservation studio where the image information is integrated with further research and conservation practice. Images and measurements can be used for an exhibition trip of art works to record before and after condition. The horizontal stand-mode is used to minimize vibrations at the higher magnification allowing observation of flat art objects with sizes up to several meters. In vertical-stand mode wall paintings or larger sculptures are examined up to a height of 2.5 meter with a microscope cage setup on a movable low-vibration table. This mobile stand suitable for use in museums has been employed at the TEFAF art-show in Maastricht where it can be moved and setup in the different booths to assist the vetting committees. A portable smaller stand with Hirox microscope is shown in action during this AIC conference at the Hirox booth.

(09) No Plough? No Problem! A Method for Constructing a Low-Budget Bookbinding Plough for Conservators

Kathy Lechuga, Book Conservator, The Indiana Historical Society

A plough is typically used by fine binders to trim a textblock to produce smooth, even edges. A book is placed in the press of the plough with the edge to be cut facing up and a blade, perpendicular to the book, is drawn along the length of the textblock, cutting through it a few sheets at a time. For conservation purposes, a plough (or guillotine) is often used to trim off the damaged spine of adhesive-bound books in preparation for rebinding using the double fan adhesive method (DFA). The DFA method deposits tiny amounts of glue on either side of individual pages, essentially tipping them to each other, therefore a smoothly trimmed spine edge is crucial for this binding's success. DFA binding creates a very strong and flexible textblock that will remain more resilient than commercial adhesive bound books which are prone to failing, especially under heavy use.

Hybrid or general collections labs that rebind large quantities of books using the DFA method will typically invest in a guillotine or plough which can cost hundreds or thousands of dollars. Working in a primarily special collections lab, the only opportunity I have to perform this type of rebinding is when one of our reference books becomes damaged and/or the original binding has failed. When recently faced with damaged reference materials, I could not justify spending hundreds of dollars for a piece of equipment that may be used only a few times per year, regardless of how handy it would be. There are many book artists that have created their own makeshift ploughs using various materials and equipment combined with specialized blades, some of which may be purchased. After studying these binders' practices and techniques, I was eager to construct my own plough using equipment and materials already available in our conservation lab.

I constructed a plough using a tying-up press, several pieces of

binder's board, and a rounded hacksaw blade knife. The book was placed spine-up in the press and a board was positioned behind it, taller than the spine, followed by a set of boards placed in front of the book only as tall as necessary so the desired amount of material could be removed. The front boards were cut to produce a flush, flat surface even with the press edge, allowing the blade to glide along to produce a straight and evenly cut edge. The blade used was a rounded hacksaw blade knife, frequently used by book and paper conservators for lifting, with a modified edge to improve cutting.

This makeshift plow produced a spine edge as smooth and flush as that achieved using a conventional plough or guillotine and provided enough control to remove a minimal amount of material. As a result, the book was easily rebound using the DFA method to produce a strong and flexible textblock able to withstand further heavy use.

(10) Watermark Capture and Processing with the 'Light Wedge'

Meghan Wilson, Preservation Imaging Specialist, Library of Congress; Fenella France, Chief, Preservation Research and Testing Division, Library of Congress

New optical technologies to capture watermarks on single sheets and bound materials have been required since the beta radiograph technique was no longer allowed at many cultural heritage institutions. Spectral imaging with low heat low intensity light emitting diode (LED) illumination in a range of wavebands has been used successfully on single sheet materials to elicit accurate renderings of watermarks, in reflected, transmitted and raking illumination modes. However, bound materials pose a greater challenge, so staff at the Preservation Research and Testing Division at the Library of Congress commissioned a "light wedge" from Equipoise Imaging LLC that could be used to safely illuminate and capture watermarks from bound materials, especially to address the challenges with watermarks from the gutter of these materials.

The Multispectral Transilluminator Wedge is made from polymethylmethacrylate acrylic glass. It has a surface area of 16.8" x 16.8" x 8mm with illumination provided LEDs that diffuse across the surface of the wedge. These narrow wavebands range the entire visible spectrum through the near infrared. To minimize the impact of light on fragile items, the length of exposure of each individual wavelength is carefully controlled through a maximized image histogram. The LED wedge exposure is less than 5 lux across all wavebands, as compared to normal room lighting at 800-2000 lux (and 20,000 for many digital illumination processes). The wedge is used in conjunction with the Library's standard reflective imaging illumination (13 wavebands in the ultraviolet, visible, and near infrared) to create a registered cube of 21 images that are then utilized for advanced image processing. The wedge rests horizontally on an elevated platform allowing for a manuscript to sit supported on a book cradle underneath with a single page laid flat atop the wedge for imaging. Because of its thin bevel, the wedge can slide safely into the gutter of a book, allowing for image capture of difficult to read watermarks.

Watermarks are often heavily obscured by text and ink-intense diagrams. Various advanced image processing techniques are employed to enhance watermarks for ease of viewing and identification. The information captured in the 21 individual wavebands provides spectral variation between paper and text, which when applied to a Principal Component Analysis (PCA) algorithm results in a clear rendering of the specific watermark. Select PCA bands can then be further manipulated by applied pseudocolor rendering, brightness and contrast adjustments, as well as hue angle rotations to generate the best composite image.

One example of a challenging bound book where the watermarks present on the pages were heavily obscured with diagrams and text was the *Calendarium*, written by Johannes Regiomontanus ca. 1474. Part of the Rosenwald Collection, this block book is printed on 31 leaves of paper, some containing watermarks identifying the paper mill that produced the paper. The various watermarks are of interest to researchers interested in establishing the dates that various sections of the calendar were printed. The wedge has also been used to extract obscured information from other challenging collections, including music manuscripts.

(11) Microclimatic Monitoring for the Assessment of the Conservation Conditions of the Stucco Statues in the UNESCO Site of the Longobard Temple in Cividale del Friuli – Udine (Italy)

Adriana Bernardi, Senior researcher, Institute of Atmospheric Sciences and Climate, National Research Council, Padova, Italy; Francesca Becherini, Researcher, Institute of Atmospheric Sciences and Climate, National Research Council; Alessandra Quendolo, Associate Professor, Department of Civil, Environmental and Mechanical Engineering (DICAM); Maria Di Tuccio, Research fellow, Institute of Atmospheric Sciences and Climate, National Research Council; Arianna Vivarelli, Research fellow, Institute of Atmospheric Sciences and Climate, National Research Council

The Longobard Temple, built around the middle of the 8th century, is part of wider complex including the Saint Maria in Valley monastery edified in the following centuries, located in Cividale del Friuli - Udine (Italy). Both the temple and the monastery have been declared by UNESCO world heritage sites in 2011. The Temple constitute one of the few extraordinary testimonials preserved of the Longobard architecture, testify also by the six saints in high relief placed leaned to the west wall side by side in ternary groups, to the right and to the left of the blind lancet window. A microclimatic monitoring of the temple was performed between 2011 and 2012 by the Padova Unit of the Institute of Atmospheric Sciences and Climate, as part of the diagnostic project promoted by the City Council of Cividale del Friuli, in order to investigate the causes of the different damage features affecting the statues on the two sides of the west wall and to eventually identify suitable actions for the improvement of the current conservation conditions. In order to assess the microclimatic conditions, air temperature and relative humidity were recorded automatically for one year nearby the two central female figures.

In addition, seasonal thermographic measurements were carried out to evaluate the thermal variations of the material and then they were compared to the microclimatic measurements. Furthermore some anemometers were installed in strategic points of the Temple for the automatic monitoring of the movement of the air masses to evaluate the impact of the air masses on the statues.

The results of the microclimatic monitoring of the Longobard Temple showed that the different conservation conditions of the statues at the two sides of the west wall cannot be directly related to the actual microclimatic conditions. They could be more reasonably related to the history of the Temple (it seems that in the past they have been exposed to weather impact) and to past restoration works. In fact, according to the microclimatic results, the two sides of the west wall are subjected during the course of the year to similar daily thermal variations, even if in different seasons, due to the natural course of solar radiation during the whole year.

Moreover, the movement of air masses observed and also simulated by means of a fluid-dynamic model resulted to have a different impact on the two wall sides. Nevertheless, this phenomenon can be more properly related to the risk of airborne particle deposition processes. In conclusions, the actual microclimatic conditions cannot be considered responsible for the different conservation conditions of the statues of the two sides of the west wall, but, if not improved, they could have a different impact on the statues that have different state of conservation.

(12) Preventive Conservation and Flood Risk Management: The Microclimatic Monitoring of the New Outfitting in Santa Croce Museum in Florence, Italy

Francesca Becherini; Adriana Bernardi; Arianna Vivarelli; Maria Di Tuccio, all Institute of Atmospheric Sciences and Climate, National Research Council, Italy

The Santa Croce Museum houses extraordinary works of art, many of them victims of the 1966 flood of the Arno river. The masterpieces “Crucifix” by Cimabue, which lost 60% of the paint on the surface and became the symbol of the disaster, the “Deposition of Christ” by Francesco Salviati and the “Christ’s Descent into Limbo” by Agnolo Bronzino were brought back to the museum after many years of difficult restoration work. The microclimatic monitoring carried out in 2009–2011 by the Padova Unit of the Institute of Atmospheric Sciences and Climate had pointed out that the general microclimatic conditions inside of the museum (composed of 6 rooms) were not properly suitable for conservation purposes and a better management of the museum had been strongly recommended. In fact, important thermo-hygrometric variations had been measured during the opening time in all the rooms mainly due to the incorrect management of the heating system and of the openings. In addition, in room VI the paintings by Salviati and Bronzino were subjected to thermal gradients caused by the artificial (lights pointed directly on paintings) and natural (sun penetrating from the windows) lighting. Moreover, the presence of many people on the occasion of special events in room VI, such as conferences and concerts, led to short variations of the main thermo-hygrometric parameters, with consequent

risk of damage for the works of art preserved.

The results of this first microclimatic monitoring together with the increasingly necessity of flood preventive measures, led the Opera di Santa Croce to inaugurate a new museum outfitting. Between late 2013 and early 2014 almost all the most valuable movable works of art previously located in room VI were moved in safer locations within the Santa Croce complex: the sacristy, the entrance hall of the Novitiate, the ex bookshop and the Medici Chapel. In particular, the Crucifix was located in the former and the two paintings in the latter. Hence, a new microclimatic monitoring has started in spring 2014 in order to evaluate if the environmental conditions of the new rooms are suitable for the conservation purposes and it will last one year. In particular, short thermo-hygrometric variations are extremely dangerous for these frail works of art, resulting in dimensional variations that lead to irreversible damages, such as cracks and detachment of the paint layer. As in the 2009–2011 campaign, the on-going microclimatic monitoring is studying the main perturbing factors related to the management of the museum: the opening/ closing of the doors, the cleaning, the heating and lighting systems and the presence of visitors. The results obtained will be compared with the past ones in order to evaluate if the new environmental conditions are more suitable for the conservation purposes.

Moreover, the microclimatic study could help in the identification of future mitigation actions to be included in the conservation strategy of the Santa Croce complex.

(13) Conservation Treatment of Early Printed Books: Possibilities, Methodologies and Outcomes

Jennifer Hunt Johnson, Graduate Student, SUNY Buffalo State; Gary Frost, Adjunct Assistant Professor, Conservator Emeritus, Conservation Laboratory, University of Iowa Library; Laura Schell, Paper Conservator in private practice; Judith C. Walsh, Professor of paper conservation, Art Conservation Department, SUNY Buffalo State College

Development of treatment strategies for conservation is challenging when an object has undergone many campaigns of repair in its lifetime. Determining the appropriate level of intervention requires an understanding of the object’s history, coupled with achievable goals for preservation and improved function. *Historia Troiana*, an incunabule from 1486, and the Geneva Bible from 1597 are two books that offer an opportunity for contrasting approaches to treatment. Prior rebinding and cover to text detachment have been identified in the *Historia Troiana*, providing an opportunity for rebinding in full leather to restore functionality to the book and offer a more sympathetic style of binding that relates to the period of the text. In contrast, a study and minor treatment is offered to the Geneva Bible that suffers mainly from a loose gathering near the center of the text. The bible, as received, retained its initial binding. Though significantly worn, the structure was functional and provided a visual account of the history for the piece.

It is important to note the nature of the book as a commodity, as this underpins the context through which these objects have been treated throughout time. Changes in thinking in library and

archives settings place greater emphasis on the physical book as a valued artifact, while digital surrogates provide alternative means to access textual information. As modern-day book conservators shift their focus from commodity to artifact, implications for treatment require new examination as well.

This presentation describes two avenues for treatment and the reasoning behind each. Questions concerning value, aesthetics, function and preservation, efficiency and skill, and historical context clash, driving towards the bigger question: what is the impact of rebinding and treatment on the use and understanding of a book? This presentation seeks to reignite conversations surrounding this issue.

(14) Strategic Maneuvers: How the Preservation Lab Helped Move Special Collections Storage at the Public Library of Cincinnati

Ashleigh Schieszer, Library and Archives Conservator, Public Library of Cincinnati and Hamilton County; Holly Prochaska, Preservation Librarian, University of Cincinnati Libraries

The Preservation Lab on the west campus of the University of Cincinnati is a collaborative lab, jointly managed, funded and staffed by the Public Library of Cincinnati and Hamilton County and the University of Cincinnati Libraries. Since coming together in the winter of 2011 we continue to learn from one another's experiences, expertise, and ingenuity. A project conducted this spring, to move more than 1300 oversized rare books, flat items, and objects from one part of the Public Library to another, provides an excellent example of how differently our two institutions would have accomplished this task prior to the collaboration. It demonstrated how putting aside past practices and truly collaborating led to a more successful, cost effective project that fostered teamwork between the organization's members while establishing a greater awareness of preservation and conservation within the public library.

One of the fundamental missions of our two institutions is to be stewards of our collections for future researchers and scholars. Though the day-to-day operations of a public library and an academic library can be very different this overriding mission grounds us. That said, UC is a unionized environment and PLCH is not. UCL has highly specific job descriptions and PLCH's are more flexible. PLCH has had a history of pitching in to get a special project done – such as a major book move. UC has had a history of hiring outside assistance, such as professional book movers, with sensitivity to employee contracts. So, when the special collections move surfaced, the recommendations on how to proceed ran to the opposite ends of spectrum!

It quickly became clear that the economics, culture, and tight time frame at PLCH made moving forward with staff from within the library a certainty. The question to answer for us then became what assistance could the Preservation Lab provide to protect the collections and to make them easier to move, while taking into consideration how this large project would affect the balance of providing equal workload to both institutions. The Preservation Lab's role evolved into surveying the collection, conducting mold

remediation, housing the fragile collection items before moving, educating library staff on handling and storage, monitoring environmental conditions, and physically moving the most fragile, awkward items.

Our poster will discuss how under a tight time frame and without time to purchase supplies we were able to formulate a plan bringing together public library staff and preservation staff to successfully, economically, and safely move special collections. Our plan involved staff training and education, on-the-fly preservation, and cursory collection assessment. Our plan resulted in team building, positive internal PR, awareness of preservation and conservation as a professional field, and of course, a relocated collection.

(15) Optical Options and Challenges Opportunities

Fenella G. France, Chief, Preservation Research and Testing Division, Library of Congress; Meghan Wilson, Preservation Imaging Technician in PRTD, Library of Congress

Many factors can impact the ability to capture information with optical systems but the utilization of illumination as a non-invasive technique to assist preservation of cultural heritage collections has developed significantly in the past few decades. Spectral imaging has been one of these advances, allowing different illumination modalities (reflected, transmitted and raking) to characterize and identify materials, as well as capture hidden and obscured information on original source materials. Examples of research into various challenges are given in the following discussion. Imaging through glass allows us to assess the potential for change to documents while on long-term exhibition. Test imaging through ultra-violet (UV) protective laminate glass proved less challenging than originally considered, since even though the glass had the usual conservation UV illumination protection, preventing capture of non-visible data in the UV range, the incorporation of light emitting diodes (LEDs) in the low blue region gave very similar spectral information to 365nm UV illumination.

Utilization of spectral imaging with transmitted illumination and image processing allowed capture of heavily obscured information on an original music score. The *Concerto for Orchestra* was written by Béla Bartók in 1943, one of his best known, most popular, and most accessible works. The score, inscribed "15 August – 8 October 1943" premiered on December 1, 1944, in Boston, played by the Boston Symphony Orchestra conducted by Serge Koussevitzky. Bartók said that he called the piece a concerto rather than a symphony due to the way each section of instruments was treated in a soloistic and virtuosic manner. The work was written in response to a commission from the Koussevitzky Foundation, following Bartók's move to the United States from his native Hungary where he fled because of World War II.

Bartók revised the piece in February 1945, with the most change in the last movement where he extended the movement with a longer ending. Bartók added additional sections on a number of pages where he changed the score, and in some places the layers of additions leave up to four layers, all with staff lines on both sides of the papers, further obscuring the original music

score. These layers could not be removed due to the document having been laminated at a period in its history. Many historic documents have been heavily redacted either by the original author to expunge and remove the earlier text, or by latter readers, whether familial or people to whom the writing referred. Heavy redactions are also of interest to the forensic community to detect forgeries and capture changes and attempted erasure of information. There are a number of examples of founding father letters and documents where original text has been redacted and multiple illumination techniques, as well as image processing has allowed optical retrieval of this information. The utilization of customized illumination to recover information on original heritage materials is critical to better understanding the intent of the author, whether text, diagrams or music, and can further aid preservation by tracking changes of materials on exhibit to ensure their longevity for future generations.

(16) Cast Iron, Salt Air and 140 Years of Exposure: Cannon at Dry Tortugas

Ronald Harvey, Conservator / Principal, Tuckerbrook Conservation LLC; Nancy Russell, Museum Curator, South Florida Collection Management Center, Everglades National Park

Treatment of oversized artifacts in remote locations present particular challenges for developing sustainable and logical treatment protocols while ensuring professional standards and ethics are maintained. The treatment of the cannons is at times visible to the park visitors and the treatment offers a unique opportunity to connect with the public and provide information about conservation, interpretation and historical context of the cannons and their preservation. These issues will be examined using the multi-year cannon conservation project at Fort Jefferson, Dry Tortugas National Park as a case study. The challenge of treating large-scale 19th century cannons in a remote marine park located in “hurricane alley” required formulating systems that would reduce maintenance, ensure sustainability, and meet treatment goals, all within the reality of day-to-day operational limitations at the site. The cannons were surveyed and a treatment approach was outlined. The project utilizes a close partnership between conservators and curatorial staff to conduct historic research, develop protocols, adjust to field conditions, monitor microclimates, and ensure preventive maintenance. Field-tested techniques for five cannon treated between 2007 and 2013 will be presented. Specific information about the surface treatment using a zinc rich primer and engineered Siloxane paint system, micro-climate bore treatments and internal microclimate data will be presented.

(17) Artificial Aging of an Emulsified Acrylic Artists’ Material: Ultraviolet Light, Visible Light, and Heat

Michael Doutre, Queen’s University; Ashley Freeman, Queen’s University; Alison Murray, Associate Professor, Queen’s University

Traditional painting materials, such as those based upon natural oils, proteins and gums, have been used in a fairly consistent manner for

many centuries. Current understanding of the chemical, physical, and optical stability of these types of materials is supported by empirical observations of naturally aged artworks. Unlike their predecessors, emulsified acrylic artists’ materials have only existed in their current form for a few decades and thus lack examples of the changes that occur with long periods of natural aging. Current predictions on the longevity of artworks composed of acrylic materials must therefore be based upon an understanding of the chemical nature of these materials and the materials’ reactions to induced aging. Individual aging techniques raise the rate at which certain types of reactions occur within a material. Depending on what characteristic of a material is of interest, different forms of artificial aging may be more or less suited to inducing the types of changes necessary to examine the stability of a material.

In this work the effects of various methods used to simulate the changes that occur with aging were examined and compared for a modern acrylic emulsion artists’ material. Prepared films of an acrylic paint, Golden Acrylic Gesso, were exposed individually and sequentially to intense visible light, intense ultraviolet light and elevated temperatures. This allowed for the evaluation of the relative effects of each aging regime on the chemical, physical, and optical properties of the acrylic-based gesso. Bulk chemical changes and polyethylene glycol chain length degradation in the material were assessed. Uniaxial tensile testing and immersion were used to evaluate the physical properties of the material, while visual stability was assessed for color and gloss changes. Understanding what sort of changes are induced by each aging technique will allow researchers in the conservation field to develop aging regimes which produce the desired changes in a material, and avoid techniques which produce contrary changes.

(18) One Wall, Many Challenges: The Conservation of Late Roman Painted Wall Plaster at Sardis

Jessica Pace, Project Objects Conservator, Brooklyn Museum; Eve Mayberger, Student, NYU Conservation Center; Haral DeBauche, Student, NYU Conservation Center

This abstract concerns the conservation of painted wall plaster in a Roman-era house during the 2014 field season at the Archaeological Exploration of Sardis, in Sart, Turkey. This ongoing project posed many exciting, arduous, and oftentimes frustrating challenges. As often in conservation, the ideal situation was out of reach. In this case, grappling with the thorny reality meant selecting the most appropriate among a group of methodologies, all of which had their advantages and disadvantages. Several courses of treatment were devised to address the varying conditions and needs of the wall plaster at different stages of excavation. A crucial aspect of the project involves the close collaboration (and at times compromise) among conservators and archaeologists.

In 2014, a trench excavated in 2005 was reopened and expanded. In 2005, two walls of a Roman-era house containing significant amounts of painted wall plaster (fresco) were discovered and treated in situ. The trench was backfilled at the end of that season. When the trench was reopened, it was apparent that despite proper precautions taken during reburial, the wall plaster’s condition had severely deteriorated during the intervening years.

The trench's location in an olive grove resulted in extensive loss of plaster due to root action. Plaster of Paris edging used in 2005 also exacerbated erosion and detachment of plaster.

In addition to these issues, conservators also had to consider approaches to preserving newly excavated wall plaster. In 2014, it was discovered that painted wall plaster covered two other walls of the room, as well as the entirety of a second adjacent room. Because of the wall plaster's expanse and varying states of preservation, several courses of treatment were devised. First, trees adjacent to the trench were removed. Then a large section of the wall treated in 2005 was in lifted due to its very poor condition. After facing, it was detached in large sections and placed into storage. The pieces were numbered and mapped. Facing and support materials were carefully chosen to facilitate reassembly in the future.

The remaining plaster—both previously treated and newly excavated—was in better condition and was treated in situ. New treatment utilized a lime mortar mixture as edging material and lime slurry as gap filler. Acrylic-based adhesives and tissue were used as temporary mending materials. The lengthy treatment necessitated close collaboration with archaeologists and other specialists.

In spite of these efforts, last minute alterations had to be made to accommodate unexpected deviations from the plan. Three walls slated to be exposed in 2015 were fully excavated instead. These were partially reburied using a retaining wall and filling the gap with sifted sand. The entire trench was then roofed and sealed. The condition will be assessed as treatment continues.

(19) Is this a Library or a Museum? Preserving Mixed Collections at the National Library of Trinidad and Tobago

Danielle J. Fraser, Library Conservator, NALIS, Port of Spain, Trinidad

The National Library and Information System Authority of Trinidad and Tobago (NALIS) is the country's coordinator of all library and information services. One of its key responsibilities is to promote and preserve national heritage information. Though the National Library has a comprehensive collection of paper-based items and electronic and audiovisual media there is particular emphasis on materials with national and Caribbean origin, focus and authorship. The Heritage Library helps NALIS fulfill the goal of acquiring, promoting and preserving national heritage information. Special collections acquired by or donated to the Heritage Library, consists of mainly "traditional" library items written by or of interest to a significant person or organization of Trinidad and Tobago. Collections contain a wide array of materials including books, newspapers, pamphlets, photographs, letters, film and audio recordings. However, within several collections housed in the Rare Book Room of the National Library one can find an eclectic mix of items oft labelled "memorabilia" – which can comprise of coins, cricket stumps, typewriters, a large glass bottle filled with matchboxes, framed artwork, decorative bookends, award plaques, or even a top hat with a dinner jacket and ties. This paper explores how the Library Conservator, along with the staff of the Preservation and Conservation Laboratory and the Heritage Library, approach and accomplish the challenge of preserving, exhibiting and housing these mixed collections.

(20) A Study of the Light Sensitivity of Birch Bark Part 1: Exposure to Visible Light (no UV)

Carole Dignard, Senior Objects Conservator, Canadian Conservation Institute; Season Tse, Senior Conservation Scientist, Canadian Conservation Institute; Sonia Kata, Objects Conservator, Canadian Conservation Institute

Empirically, it is known that light will cause the cambium side of birchbark to change colour. Examples are found in museums where there are noticeable differences between covered and exposed areas of the same birchbark object. However, there is no precise data such as extent and rate of damage due to visible light only, or due to both visible light with some ultraviolet component (e.g. sunlight from a window). Risk assessment of damage due to light is difficult to carry out without quantified data. The goal of this project is to better understand the light sensitivities of birchbark and to quantify results.

The colour of birchbark on its cambium side can vary considerably, spanning the range of beige, yellow, orange and brown depending on factors such as the time of year that the bark is collected from the tree and how it is processed. Part of this research involves determining whether one tone or colour component of birchbark is more light sensitive than another, for example whether the yellow component of birchbark is as light sensitive as the reddish component.

In these experiments, 6 different tones of birchbark were tested: beige; yellow; pale orange; orange-brown; orange-red, brown. Samples were exposed to visible light from a LED light chamber, and to light from a window (containing both visible and some UV radiation). Light and UV doses were monitored. Microfade testing was also carried out to compare results. Preliminary results for samples exposed to natural light in a window (containing UV) show that birchbark of all tonalities tested fall in the high sensitivity range, comparable to ISO standard Blue Wool 2 and 3. All samples darken. The rate of change varies depending on the initial colour of the bark. Exposures to visible light only (LED) with no UV will also be presented at the time of the conference, comparing them with the ones containing UV.

(21) Bringing Science to Your Doorstep: Northwestern University/Art Institute of Chicago Center for Scientific Studies in the Arts

Francesca Casadio, Katherine Faber, Marc Walton, Monica Ganio, Johanna Salvant, NU-ACCESS, Northwestern University/Art Institute of Chicago

As a result of strong and multiple partnerships developed since 2004 between the Art Institute of Chicago and Northwestern University, the Center for Scientific Studies in the Arts is a new collaborative endeavor in conservation science. The Center is dedicated to conduct object-based and object-inspired research through interdisciplinary collaborations to investigate problems of interest for museums and cultural institutions that do not

currently have scientific support.

To initiate collaborative projects, cultural institutions or individuals are invited to submit short proposals twice a year (April 15 and October 15). Successful projects are selected through peer-reviewed process by an international team of experts. Although the Center does not award third-party grants, project-related costs and expertise are supported.

Since its creation in 2013, the Center has focused on a broad variety of projects on materials ranging from archaeological glass and paintings to modern bronzes and artwork pursuing objectives as diverse as collecting materials evidence for dating, advancing knowledge for technical art history, enhancing conservation and exhibitions and developing new technologies. Out of the thirty-three proposals submitted from all around the world, nine projects were funded to date, resulting in very successful collaborative research:

- Moholy-Nagy / Construction of Space and Light (Solomon R. Guggenheim Museum, NY)
- Technical Study of Bronze Sculptures (Smart Museum of Art, University of Chicago)
- Technical Study of Roman Egyptian Paintings (Phoebe A. Hearst Museum of Anthropology, University of California, Berkeley, CA)
- Origin and Production of a Glass Mosque Lamp (Brooklyn Museum, NY)
- Investigation of Art Nouveau Glass (Visiting Scientist: Cristina Fornacelli, Università degli Studi di Siena, Italy)
- Surface-Shape Studies of Gauguin's Monotypes, Prints and Drawings (Art Institute of Chicago)
- Compositional analysis of Rodin sculptures from the turn of the century to 1970's (Cantor Museum, Stanford University, Palo Alto, CA)
- Characterization of soaps and developing long term solution to monitor nodules (Georgia O'Keeffe Museum, Santa Fe, NM)
- A new strategy for plant gum identification in works of art using enzyme digestion and MALDI-MS (Visiting Scientist: Clara Granzotto)

(22) Conservation Through Conversation: Material and Meaning in the Work of Dario Robleto

Desirae Peters, 4th year graduate student, Conservation Center, Institute of Fine Arts, New York University, intern, Smithsonian American Art Museum

Contemporary Texan artist Dario Robleto (b.1972) challenges conservation ethics and practice because he often uses historic and sensitive material— including Civil War era letters, human remains and vinyl records—as media in his artworks. Often the historic materials are transformed into an unrecognizable form. They are thus divorced from any visible connection to their original context. Sensitive to this separation, Dario includes material lists that detail the origins of the artwork's components and that are, according to the artist, an integral part of the artwork. The final work is an amalgamation of transformed historic material that has both a new contemporary context represented visually and an original context represented in the material list.

The challenge of conserving Dario Robleto's work originates from the complex relationship between object and description, image and word. Should a loss of original material occur, compensation must consider how the type of restoration material affects the object's description. Conservation solutions gathered from a series of interviews conducted between the author and the artist since 2013 range from accessible and practical to nuanced and theoretical. The conservation issues posed by the historicity of Dario's materials and the exchange between practice and theory will be considered in detail through analysis of a single work, *A Defeated Soldier Wishes to Walk His Daughter Down the Wedding Aisle*, 2004.

(23) TRI-Funori™: A Fixative, Cleaning Agents and Light Adhesive for Objects and Architectural Conservation

Rod Stewart, President, Historic Plaster Conservation Services, Ontario; Neal Mednick, Communications Director, Historic Plaster Conservation Services; Masumi Suzuki, Conservator, Historic Plaster Conservation Services

One of the major barriers preventing *funori* from being adopted in architectural conservation (especially in large projects) is its relatively high cost. The only fully commercialized *funori* product on the market is prohibitively priced at about a US\$1000 per liter (when the *funori* powder is converted to liquid), and consequently has not gained much traction.

For the past three years, HPCS has conducted ongoing experimental research and development work to improve both the purity and production cost of TRI Funori, a conservation product introduced in liquid form in 2012. HPCS imports two untreated sun-dried species (*Gloiopeltis furcata* and *Gloiopeltis tenax*) of seaweed (“*funori*” in Japanese) harvested from the Sea of Japan and uses mechanical processes with no chemicals to extract the key conservation component—polysaccharide mucilage (starch) similar to carrageenan.

This R&D work has resulted in the recent introduction of a dehydrated form of TRI Funori. The dehydrated product maintains all the performance characteristics of the liquid product while dramatically reducing shipping cost, extending shelf life and improving affordability to conservators around the world.

For several centuries, *funori* has been a prominent restoration material in Japan, used primarily as a light adhesive for washi paper onto to sliding shōji screens and as a “dry” cleaning agent for silk kimonos. Every household kept a supply of the raw material and made it up as needed for a variety of common chores.

The conventional process of extracting the starchy polysaccharide from *funori* involves chemical bleaching and drying the seaweed in the sun, forming the bleached seaweed into a sheet, rinsing the sheet, heating it in water and then filtering the heated solution to concentrate the starch.

In the post WWII era, *funori* became known in the west, and its many uses have been explored by paper and objects conservators within the museum community. The important characteristics are three fold. It can be used with washi paper as a cleaning poultice for delicate gilded and painted surfaces. It can also be

used as an atomized spray to consolidate friable painted surfaces. In both these applications, the noteworthy characteristics of *funori* are that it dries matte, does not mobilize soluble salts, and thus does not create and leave tide lines on the surface. Finally, it can be used as a light duty adhesive, regulated in tensile strength by the addition of isinglass and reversed as needed with warm water. It is non-toxic and odorless.

In North America, new applications of *funori* have been successfully demonstrated in architectural conservation settings, and opportunities to “scale up” the use of *funori* in larger projects are beginning to emerge. For example, the magnificent 1930 art deco John A. Macdonald Building (a National Historic Site) in Ottawa, Canada features two large (totaling 15,000 square feet) coffered fibrous plaster ceilings with extremely delicate gilt and metallic painted surfaces that had not been cleaned since the building’s construction. After evaluating a number of cleaning methods, the project architect chose a poultice method using TRI Funori. One of the advantages of this method was that the wash paper could be inspected post removal to determine and confirm that only soil was removed with no evidence of any pigment or gilding on the wash. This is by far the largest *funori* cleaning application ever undertaken.

To consolidate friable powdery paint surfaces, *funori* can be applied as a mist spray with an airbrush or other suitable applicator. Although some saturation of the colors may be observed, the surface will be significantly more durable after treatment. This procedure was recently used with good success at the Glanmore National Historic Site house museum in Belleville, Ontario, Canada. A spray application of TRI Funori successfully consolidated powdery binderless tempera paint on a massive architectural cornice molding, which had been impossible to maintain in a museum setting even with feather dusters.

As a light adhesive, *funori* can be used on its own or made stronger as needed by mixing with up to 4% sturgeon glue. It is particularly efficacious at reattaching delicate wallpaper, paint flakes and curled foil and gilding metals. At the Lower East Side Tenement Museum in Manhattan, *funori* was used extensively to re-adhere curling flakes of very low quality early 20th C. ceiling papers, all of which had their own water stains and were in extremely delicate condition.

(24) Formation of a Long-Term Preservation Plan for a Computer Program by Siebren Versteeg

Alexandra Nichols, Graduate Fellow, Winterthur/University of Delaware Program in Art Conservation; Nicholas Kaplan, Collection Assistant, Hirshhorn Museum and Sculpture Garden; Andrew Doucette, Time Based Media Coordinator, Hirshhorn Museum and Sculpture Garden

Text: Artworks dependent upon specific hardware and software parameters pose significant preservation challenges. Digitally born artworks such as computer programs may be composed of a series of files working in tandem rather than a single executable file. This results in works that are dependent on the entirety of their playback environment rather than a single digital file or recording. Creating archival and secure duplicate copies of such

digital systems is an essential part of a long-term preservation plan for such artworks. In many cases, the conservation of this media often relies upon the creation of extensive documentation and collaboration with artists.

This poster will focus on the methodologies employed by members of the Hirshhorn’s interdepartmental Time-Based Media Group, working in tandem with the Museum’s Artist Interview Program, as they evaluate works of electronic media art. Using Siebren Versteeg’s computer-based artwork, *Neither There Nor There* (2005), displayed in the Fall 2014 exhibition, “Days of Endless Time,” as a case study, the team will explain how they approached the impending obsolescence of accessioned hardware and software provided by the artist. Initial steps included consultation with outside experts in the computer science field to troubleshoot the complexities of the software’s migration to a singular computer backup system. The challenges surrounding the team’s goal of securely archiving the piece on the Smithsonian’s Digital Asset Management System were also identified. Discussions with the artist, however, proved to be instrumental in the development of a far deeper understanding of the fabrication of this artwork and in the development of a long-term preservation plan for both the central computer program and the artwork as a whole. While much has been gained from these interactions with the artist, it is clear that he is still exploring the issues surrounding the prolonged preservation of his artwork and that the development of long-term solutions be a process that will involve continued collaboration.

(25) Fighting the Illicit Trade in Cultural Heritage: How Conservation Professionals are Helping

Harriet F. “Rae” Beaubien, Research Associate, Smithsonian - Museum Conservation Institute; Jessica S. Johnson, Head of Conservation, Museum Conservation Institute, Smithsonian Institution

Archaeological artifacts, fine arts, and other cultural heritage materials have become an increasingly important component of customs investigations carried out by law enforcement agents posted throughout the US and internationally. Whether crossing the border with questionable paperwork, offered for sale, or retained with problematic authorization in a collection, these materials are potentially part of the illicit trade of stolen, looted, or otherwise restricted goods. They also pose enormous challenges to agents with little background or training in this class of “merchandise,” whose identification, authentication and provenience—as well as qualification for detention and return, and civil or criminal prosecution of implicated individuals—must ultimately be ascertained.

Since 2009, the Smithsonian Institution has hosted specialized training workshops, in collaboration with the US Department of Homeland Security and US Department of State, for agents now numbering more than 200 from over 85 domestic and 25 international offices to date. To complement the legal and procedural course content, the museum setting provides exposure to collections from at-risk parts of the world, and to a wide variety of specialists. These include conservators and conservation

scientists, as well as art historians and archaeologists, who bring critical skills to the assessment of collection items, equivalent to what is needed by the agents for questionable materials detained for investigation. Case examples will illustrate ways that conservation professionals are directly contributing to these investigations: facilitating agents' familiarity with and access to our resource networks, providing expert advice or assisting with appropriate technological, stylistic, condition or analytical assessments, art packing advice and occasionally damage repair. More broadly, our efforts in support of cultural heritage inventories and documentation, as part of work with underserved, far-flung and at-risk museums, archaeological repositories, sites and collections, create information resources that become critical to law enforcement when stolen or looted cultural heritage materials surface in the market.

(26) How Big is a Big Map? Large Map Digitization for Preservation and Access

Deardra Fuzzell, Cartographic Technology Specialist, Stanford University

To those of us within the cultural heritage community, digitization is universally acknowledged as a means of increasing access to collections. Over the past several years, as technology has advanced and expertise within the cultural heritage imaging community has grown, Librarians and Archivists have also begun to use digitization as a preservation strategy for endangered and fragile paper-based material. Digitization brings a renewed attention to the preservation of paper-based collections and preserves the content of deteriorating visual materials.

Using an ongoing project at the Stanford Oversized Imaging Lab as an example, this presentation will focus on oversized still imaging and mosaicing workflows and techniques as well as some of the limitations and pitfalls associated with imaging oversized map content specifically. In addition, the added value of large, high resolution images for use in research and learning will also be highlighted as will Stanford's online viewing and image delivery environment. Replicating the work examples shown in this session will require an in-house oversized imaging program, however, for those without access to such resources, this presentation will provide interesting insight into potential benefits and challenges faced by institutions participating in the evolving area of oversized digitization for preservation and access of historic materials.

(27) Conservation in a Construction Environment

Kumiko Hisano, Architectural Conservator, EverGreene Architectural Arts

Conservation projects face a myriad of technical issues but the challenges seem to multiply when conservation occurs on-site and not in the studio. In a controlled studio environment issues such as ventilation, restricting access and even managing a schedule are easier to achieve. This poster will highlight the challenges (and

solutions) of executing conservation projects, in accordance with AIC Guidelines and Code of Ethics, in an architectural construction environment.

Thurgood Marshall Federal Courthouse, located in New York's Financial District, was designed by Cass Gilbert and completed in 1936. The restoration project, one of the largest undertaken by the US General Services Administration in Region 2, was complex. Total project value was about \$200M. There was a great deal of plaster and decorative paint restoration in the building from the main lobby to the upper floor courtrooms, but much of the detailed conservation occurred in the 25th Floor Law Library. In this space, conservation focused on the ceiling, which featured massive beams highly decorated with faux wood graining, gilding, and tromp l'oeil florets and plaques.

Conservation treatment included:

- Condition survey
- Plaster and paint consolidation
- Surface cleaning
- Isolation varnish
- In-filling and in-painting
- Final varnish
- Photography and digital printing

The challenges of working on a large construction site included:

- *Being one of many trades or specialties.* Conservators are only one of the trades or specialties that will be working on-site. It is very likely that the conservation work may be among the last work to be done on-site.

Not all spaces may require conservation or restoration so it is important to *be in conversation early in the project* with all the trades that will be involved in the spaces to be conserved. Be certain to understand the sequence of work. You certainly don't want to be varnishing or in-painting while extensive cutting or sanding is occurring.

- *Using the right materials for the best results.* Often, materials specified for use are not appropriate for the conditions encountered in the field. On projects with long lead times, there could be a change in product formulation from when the specs were written to the time the work is being performed or the product may work differently in different conditions. Since there are many unknowns in conservation/restoration work, it is important to have an agreed-to process for recommending and getting timely approvals to change specified products.

It is important to *run tests early* in the project and in several places (if the project encompasses multiple spaces) as it may work differently in different places.

- *Planning and timing.* There seems to be a direct relationship between the size of a project and the amount of planning that must occur and the amount of time it takes to accomplish a single task. For example, Thurgood Marshall, a federal building only blocks from the World Trade Center site, had stringent security protocols for staff and materials.

The first tenant of the AIC Code of Ethics maintains that "The conservation professional shall strive to attain the highest possible standards in all aspects of conservation." When working

in the field, the challenge is balancing limited resources, client requirements and staying true to the AIC Code of Ethics. At Thurgood Marshall Federal Courthouse, the “highest possible standard” meant working collaboratively with the client, design team, and construction team and respecting the integrity of the character-defining features while integrating contemporary alterations and enhancing the building for continued use.

(28) Dynamic Artwork Lighting and Conservation

Octavio Luis Perez, PhD Graduate Student, Smart Lighting Engineering Research Center; Anqing Liu, PhD Candidate, Smart Lighting Engineering Research Center; Michael Shur, Professor at RPI and PhD Advisor, Smart Lighting Engineering Research Center

We present here a LED lighting system that will put together three approaches for lighting paintings that have been seen traditionally as opponent. We propose a system that optimizes the LED lighting efficacy, in terms of energy, at the same time that it improves the observer’s experience and contributes to the preservation of the cultural heritage.

There is a relevant study about potential damage by the CIE “Control of Damage to Museum Objects by Optical Radiation (CIE 157; 2004)”. Due to the radiant heating and the photochemical damage caused by light into Paintings, Museums and Galleries have a limit on the illuminance at the painting level. This causes a perceptual problem preventing artwork to reveal its full potential to the beholder as the human visual perception and color discrimination have a known dependency on the illuminance levels.

Most of the time that a painting is exposed in a museum or gallery it is not being observed in detail. There are some solutions that implement presence systems for dimming or turning the light on/off. Our approach goes one step further optimizing the Spectral Power Distribution (SPD) of light. Besides illuminating the painting under low-level illuminance when not under direct sight, we also apply customized SPDs that minimize the relative damage potential (no UV and no IR).

When the presence system signals an observer, the system, taking into account the potential damage metrics, is able to improve and optimize the characteristics of the light to provide a much richer experience for the observer at the same time that the potential damage is minimized, even at high illuminance levels.

At a second stage, and for more professional exhibitions of the artwork, different SPDs can be chosen on demand to study the painting under different illumination conditions like simulating the SPD of the spatiotemporal moment when the painting was performed or even enhance the restoration appearance of the artwork. Using novel sensors under development, the target SPDs can be modified to take into account the aging and performance of the different LED sources (like “reds” shift to higher wavelengths as they warm up). Potential damage should be measured in terms of spectrum power, not in photometric magnitudes or units (like flux-lumen or illuminance-lux).

Our contribution will be beneficial for the conservation of the painting at the same time that improving the beholder’s experience giving a much richer “light”, and life, to the paintings. It

will also reduce the energy consumption and expand the lifecycle of the investment, helping to balance in the long term the higher upfront cost with a valuable ROI (energy, conservation and artistic experience).

To this end, we are exploring and developing new color rendition metrics, like the Statistical metrics, as an alternative to CRI and we are currently collaborating with CIE TC 1.90 “Color Fidelity” in this critical issue.

(29) The Smithsonian Interview Project: Questions on Technical Standards in the Care of Time-Based and Digital Art

Crystal Sanchez, Time-Based Media Art and Digital Art Working Group member and Video and Digital Preservation Specialist, Office of the Chief Information Officer, Smithsonian.

The Smithsonian’s Time Based Media Art and Digital Art Working Group, a pan-institutional group charged with caring for the Institution’s artworks with technology-based components, recently completed an interview project with various experts in the field focused on the discussion of technical standards in the care of media artworks. Over 27 artists, conservators, registrars, IT and AV staff members, and other specialists were asked guided questions targeted towards current and emerging preservation standards, best practices, and training opportunities surrounding the technical dependencies of artworks throughout the life of a work in an art museum. The Group’s project findings were published in July 2014, “The Smithsonian Interview Project: Questions on Technical Standards in the Care of Time-Based and Digital Art, Ten Insights from Artists and Experts in the Field” on the website, www.si.edu/tbma/projects#interviews. Additionally, full interview transcripts are available on the site. This poster will discuss the project’s findings.

The Smithsonian TBMA Working Group formed in 2010 to develop pan-institutional protocols, with input from and relevance for peer institutions and practitioners nationally and internationally, for the acquisition, installation, and long-term care of time-based and digital art. The Time Based Media and Digital Art (TBMA) Working Group includes staff from various Smithsonian museums, including the Smithsonian American Art Museum, Hirshhorn Museum and Sculpture Garden, and National Portrait Gallery. The group has hosted multiple symposia and roundtables, collaborated on Institution-wide projects, and developed a public website with case studies and external resources at www.si.edu/tbma.

(30) Worst Case Scenario: Preparing Alberta’s Archives for Future Disasters

Emily Turgeon-Brunet, Lead Conservator, Archives Society of Alberta; Amanda Oliver, Lead Archivist, Archives Society of Alberta

In June 2013, Alberta, Canada experienced severe overland flooding. This case study investigates the long-term planning involved in disaster preparation and recovery and how the Archives Society of Alberta (ASA) is providing flood assistance

for their institutional members across Alberta. The Minister of Alberta Culture & Tourism provided the ASA with funding to assist archival institutions affected by the flooding. Assistance includes conducting conservation treatment on their collections and supporting contextual recovery of damaged records.

Over the next two years, ASA's Lead Archivist and Lead Conservator are travelling throughout Alberta to their 45 institutional members, providing flood relief by way of collection survey, building profile, access to holdings, collection care, level of disaster preparedness, and conservation treatment. They are also purchasing disaster recovery supplies, and writing disaster plans for each institution. Priority is given to institutions that were significantly impacted by the floods, including the amount of flood water present, the duration in which floodwater was in the facility, the damage to the facility and the damage to the collection.

This project also includes preparing archival institutions for future disasters by providing resources and expertise on disaster preparedness and recovery. Resources include mobile apps, online articles, and electronic environmental monitoring tools. The Lead Team has also created how-to guides on basic preventative care and disaster recovery, such as packing wet records, mould removal, and freezing records. These resources, in combination with the custom work plans, provide ASA institutional members with expertise on disaster preparedness and recovery and ensures that Alberta's archival community is prepared for any future disasters. By embracing modern approaches to conservation and preventative care, the Lead Team is helping protect Alberta's heritage.

(31) Format Migrations at Harvard Library: General Framework and Plan Development

Joey Heinen, National Digital Stewardship Resident, Harvard Library; Andrea Goethals

While much theoretical discussion has taken place around how to provide long-term access to digital objects, few solutions have emerged to address the complexity of ongoing technological change which leads to format obsolescence. A digital object has many requirements to ensure authentic representation of the material and its significant properties—preservation of bitstream, wrapper, codec, and external dependencies such as Operating System, Application, and Hardware/Software for playback. In order to incorporate a migration workflow into a broader institutional digital preservation plan, the design must be flexible enough to interface with the chosen repository and delivery system while also considering how to monitor and take action based on the unique challenges found with each format. Harvard Library is currently undergoing a plan to design a format migration framework that will be tested against three actual use cases: Kodak PhotoCD images, RealAudio files and SMIL audio playlists. This framework will be used to plan and execute the migration of obsolete files held in the Library's long-term preservation repository, the Digital Repository Service (DRS). The resulting poster will diagram multiple facets of this process: 1) a look at proposed methodologies to this date and what conclusions have remained relevant across time; 2) the large-view migration

plan at Harvard as is used to benchmark all digital formats that enter the repository; 3) a look at the complexities of Kodak PhotoCD, RealAudio, and SMIL and how these formats applied to the model (or necessarily deviated from it).

(32) Reproduction Challenges in Federal Style

Rian Deurenberg-Wilkinson, Conservator, Fallon & Wilkinson, LLC; Randy S. Wilkinson, Principal, Fallon & Wilkinson, LLC

In 2010, Fallon & Wilkinson, LLC was awarded two contracts: one to build 28 pieces of Federal furniture, and the second to conserve five of the original Louis XVI chairs that would also be reproduced. Both contracts were for Hamilton Grange National Memorial, the one-time residence of Founding Father, Alexander Hamilton, located in New York City. The contracts were part of the much larger project of moving the mansion to a new location and reinterpreting the period rooms. Conservation of the five chairs has been treated in the 2011 WAG paper "Reproductions for Hamilton Grange: What Legs Do We Have To Stand On?" This poster aims to discuss some of the challenges in reproducing the other 23 pieces of furniture, including:

1. Upholstery: thorough examination of original (under) upholstery for minimally intrusive recovering of original Louis XVI Hains chairs and new upholstery of reproductions
2. Timing: limited time to examine and measure original pieces, and tight deadlines for actual reproductions
3. Cabinet making: complex Louis XVI armchairs with compound angles and many curves
4. Inlay: a set of 16 shield back chairs with a total of 1472 bell flowers
5. Mechanics: cylinder desk with metal mechanism for opening cylinder and pull-out writing surface
6. Design: melding of the design of two sofas to make the best new reproduction sofa as possible

(33) Conserving and Interpreting Two Bird Pendants from the mid-Chincha Valley, Peru

Colleen O'Shea, Graduate Intern in Objects and Textile Conservation, Asian Art Museum; Jacob Bongers, Graduate student, UCLA/Cotsen Institute of Archaeology; Henry Tantalean

This poster investigates the material composition and cultural significance of two bird pendants from the mid-Chincha Valley, Peru: one recovered from a platform mound dating to the Late Paracas Period (400–100 B.C.) and the other from a semi-subterranean, collective tomb, or chullpa, likely dating from the Late Intermediate Period (A.D. 1000–1476) to the Late Horizon (A.D. 1400–1532). Mortuary rituals and ceremonial activities are cross-cultural social processes that comprise a diversity of practices, varying across time, space, and social organization. One such practice is the modification of animal remains into adornments. These adornments reveal insights into the customs, ideology, and

symbolism relating to the treatment and decoration of the living and the dead. In South America, the transformation of animal remains, particularly birds, for decorating ceremonial attire is a central process. Feathered artifacts including clothing and head-dresses have been recovered in the north, central, and southern coasts of Peru and the Amazon. Spanish chroniclers even note that the Inca highly valued the colorful feathers of tropical birds. The existence of feathered artifacts suggests that the modification of bird remains was pervasive. Indeed, ongoing and past archaeological fieldwork performed in the Chincha Valley indicate that during Late Paracas, Late Intermediate Period, and Late Horizon times, groups deposited modified and unmodified bird remains in ceremonial and burial contexts. However, during the 2014 field season, two feathered artifacts were recovered that appear to be completely unique manifestations of cultural practices.

The two artifacts discovered are possible bird pendants, which were brought back to the conservation lab for treatment and examination. Both objects were feathered and attached to cords, and in excellent condition as a result of the arid burial conditions in the area. Close study of the artifact from the Late Paracas Period platform mound revealed that the object was not a dessicated bird as was originally thought, but instead was a bird head shaped out of unfired clay, with colorful green and orange feathers inserted into the clay while it was still wet. Black beans were used as eyes, while the back of the pendant was covered with unspun fiber and leaves. Fiber samples were taken from the cord and from the unspun fiber on the back. The artifact from the later chullpa is likely the body or part of a body of a bird that has been deboned. The then flexible skin and pale feathers were wrapped into an oval shape and then bound with a cord. Samples were taken of dark red granules found throughout the feathers and of the cord. All of the samples were later analyzed with optical microscopy and x-ray fluorescence. This poster will present a detailed look at the materials analysis of the bird pendants, discuss their conservation treatment, and offer preliminary interpretations of these artifacts in their respective cultural contexts. No other similar artifacts have been recovered in Peru, meaning a close study of these objects can provide new insight into local customs and practices.

(34) Sustainable Energy Reduction from Relaxed Environmental Criteria in Five Canadian Cities

William P. Lull, President, Garrison/Lull Inc.

Recent economics lead to challenges in meeting operating costs for collections-holding institutions. This has spurred interest in means to reduce annual operating costs by reducing energy use. This paper presents the potential energy savings from relaxed criteria for five Canadian cities: Montreal, Toronto, Vancouver, Winnipeg and Calgary. The savings are based on a block load analysis in a hypothetical building meeting ASHRAE Standard 90.1 for the building envelope, and ASHRAE Standard 62.1 for outside air. The variation between the five cities is due to climate, which is evaluated using a bin analysis of published weather data. The relaxed internal building criteria considered are: 15-26 degC @ 40-60%RH against 20-22 degC @45-55% RH for museum

collections; and 15-26 degC @ 30-60%RH against 15 degC @30-35% RH for archival paper collections.

Three types of collections space are analyzed for savings: a) museum gallery/collections use spaces; b) museum collections storage; and c) archival paper storage. For the archival paper storage, estimates are also made for the preservation impact from relaxed criteria, using the Image Permanence Institute's Preservation Index (PI).

Climate is the primary variable for the comparison, with a heating/cooling-humidification/dehumidification loads rationale presented to support this comparison. Hypothetical building occupancy/use is the same between the five locations. Energy rates are the same, and are presented in a form so that the reader can easily convert to actual rates at the institution, with an example provided. In making the comparison, in addition to energy use, each location is evaluated for its global carbon dioxide emissions for the energy used. [This paper is based on a presentation at the 2014 CAC Annual Meeting in Quebec City.]

(35) Finding the Point of No Return: The Irreversible Effect of Ultraviolet Radiation Exposure

Jiuan Jiuan Chen, Assistant Professor, Art Conservation Department, SUNY Buffalo State; Jennifer McGlinchey Sexton, Conservator of Photographs, Paul Messier LLC; Paul Messier, Founder, Paul Messier LLC; Rebecca Ploeger, Assistant Professor, Art Conservation Department, SUNY Buffalo State

Ultraviolet radiation (UV) examination and its accompanying photographic documentation has been a basic tool of modern conservation since the early part of the last century. UV lamps are generally inexpensive and simple to use. The examination result is immediate and often informative. Not only do conservators use UV examination frequently, but anyone with interest in examining artifacts or documents can use this tool simply by turning the lamps on.

Conservators are aware that UV is a more energetic radiation than visible light and can cause irreversible chemical change to some materials under prolonged exposure. Conservators are careful to keep the exposure of UV on objects to the minimum possible. The *AIC Guide to Digital Photography and Conservation Documentation* states that 85 $\mu\text{W}/\text{cm}^2$ is the typical minimum irradiation for satisfactory fluorescence photography. Thus, it is suggested that the UV intensity does not need to go beyond 85 $\mu\text{W}/\text{cm}^2$. Generally radiation damage is based on the reciprocal principle between intensity and exposure time. The total exposure is more accurate to quantify UV exposure. There is no clear guideline for what the safe total UV exposure is.

We have observed that some photographic paper samples can fluoresce differently after exposed to intense UVA (450 $\mu\text{W}/\text{cm}^2$) for as short a time as one minute. This difference is not discernable under visible light. The change in fluorescence may indicate permanent chemical change to the materials. Additional guidelines therefore are needed for responsible use of this tool. Ideally this guideline would take into consideration not only intensity and time but also the particular vulnerabilities of the object being evaluated.

This poster will present research based on our initial observations—to find the threshold when the change starts at a particular total UV exposure, and to determine whether it is reversible and when the change becomes permanent. We will present the first stage of this project by looking at the first 3 sets of samples: selected photographic papers, different photographic dyes, and various textile materials. The poster will illustrate and explain our UV induced visible fluorescence photography setup to capture the fluorescence consistently. The fluorescence change will be shown visually along with RGB values extract from these images. Also, the visual results will be accompanied by data collected with uv-vis fluorescence spectrophotometry and FTIR analysis, in an attempt to find an underlying relationship between the fluorescence change and chemical change.

(36) Creation of the Mecklenburg Materials Archive at the Museum Conservation Institute, Smithsonian Institution

Dr. Dawn V. Rogala, Paintings Conservator, Museum Conservation Institute, Smithsonian Institution; Dr. Gwénaëlle M.C. Kavich, Post-doctoral Fellow, Museum Conservation Institute, Smithsonian Institution

For nearly forty years, conservator, scientist, and engineer Marion Mecklenburg studied the mechanical behavior of art materials, with resulting discoveries that had—and continue to have—a direct impact on the preventive and treatment efforts of collections professionals around the globe. While conservators of fine art have traditionally focused on the chemical deterioration of art materials, Dr. Mecklenburg argued that the physical behavior of those artworks is further understood, predicted, and managed when approached as an engineering problem. Through his own studies—and through the studies of the countless researchers who worked or trained with him—Mecklenburg made mechanical engineering a formative aspect of conservation research.

Dr. Mecklenburg retired from the Smithsonian Institution in 2010 and the organization of decades of his materials, research, and equipment is underway at the Smithsonian's Museum Conservation Institute (MCI). The planned Mecklenburg Materials Archive will not only house the wood, fabric, and paint samples prepared and studied by Dr. Mecklenburg, but will also provide researchers with access to the raw materials (such as custom-made paints) from which those samples were created. The Archive will also include working and study samples of the equipment used over the course of Dr. Mecklenburg's career (and information to help researchers interested in building similar equipment); a library of notes, books, and publications related to the environmental, lighting, and material mechanics research of Dr. Mecklenburg and his colleagues; and correspondence related to the archived samples, the commercial production of art materials, and the application of engineering principles to the study of material behavior in artwork.

This multi-year project will combine conservation, materials science, and library science principles to create a usable archive of materials and reference data with a cataloguing system appropriate to mixed collections intended for historical study as well as for continued use and analysis.

This poster will outline the scope of the Archive's collections and the challenges inherent in designing a "living" research archive that allows scholars to access and sample materials while maintaining a flexible cataloguing system that can adapt and grow as new research is discovered—or is created—and enters the collection. Permissions and access considerations will be addressed, outreach efforts to gather information on national and international research associated with the collections will be discussed, and a project timeline will be presented, including ideas for an inaugural symposium highlighting past and present research related to the collection.

(37) Intersection of East and West – A Record of Rescuing the Historic Archives of Pe'h-ōe-jī in the Thai-peng-keng Maxwell Presbyterian Church

Jen-Jung Ku, Research Assistant and Conservator, National Museum of Taiwan Literature; Jia-fen Wu, Paper Conservator, Cheng Shiu University Conservation Center

Pe'h-ōe-jī (POJ) is an orthography used to express the Min Nan (Southern Fujian) dialect using Latin alphabets. Originally created and promoted by the Presbyterian Church in Fujian, Xiamen in the 19th century, POJ is also known as Church Romanization. As POJ developed, its users in Taiwan were not limited to Taiwanese speakers of the Min Nan dialect or those from Fujian. The orthography has also been used by the Taiwanese for transcribing the Hakka dialect and the vernaculars of Taiwan's indigenous people. Eventually, the application of POJ extended well beyond the Church and the Min Nan dialect. It became the oldest and the most widely used Romanization system in Taiwan at the time. Use of the orthography gradually declined after it was banned by the Kuomintang government in the 1970s. However, during the century-long period when POJ was actually in use, various folk customs, history and cultural materials, and even important historical records of Taiwan and the Asia region, were recorded in great detail using this orthography. This body of information written in POJ is thus extremely valuable.

Established in 1865, the Thai-peng-keng Church in Tainan was Taiwan's first Christian Presbyterian Church. The first missionary of the Church, Dr. James Laidlaw Maxwell established the first Western-style hospital and ran Sunday schools in Taiwan. He was a strong advocate of POJ, and many important historical documents written in POJ are kept in the archives of the Church. Unfortunately, many of these important historical documents have already suffered serious deterioration owing to their age. For example, writings in iron gall ink are seriously discoloured. Other books have exhibited extensive damages by insects, mildew or water.

This case study looks at how this batch of historical documents have been rescued in Taiwan by the use of current scientific methods. It details how rectification work was conducted at a local museum by involving the community in the primary inspection and documentation of the work. It also looks at the emergency treatment of cultural objects, such as controlling the infestation by insects and mildew, and records the deterioration of cultural relics as well as their conservation. Relevant conservation treatment, including structural consolidation such as rebinding

for Western publications and bibles, mounting and encapsulation of fragmented papers, are also discussed. The study also explores measures to preserve visual integrity, such as the dyeing of paper and inpainting of missing parts, etc. There is also an introduction to preventive conservation and protective measures. The study can be seen as a complete and representative case on the preservation and conservation of cultural relics in Taiwan, which also gives a picture of the current conservation practice in Taiwan.

(38) A Practical and Versatile Microscope Imaging System

Victoria Binder, Associate Paper Conservator, Fine Arts Museums of San Francisco

Setting up a microscope camera can be overwhelming. Purpose-made microscope systems are often costly, involve complicated software, and equipment can become quickly outdated. In updating the stereomicroscope camera at the Legion of Honor paper conservation laboratory, we wanted a system that would be user-friendly so that any staff member (even the technology phobic) could operate the camera and software with ease. We also wanted a screen for live view to encourage group viewing and discussion.

The system developed at the Legion of Honor consists of an existing Leica microscope outfitted with a 24 MP Nikon DSLR camera. The camera is tethered to CamRanger, a stand-alone WiFi unit, connecting the camera wirelessly to an iPad. The CamRanger unit comes with free software that is both easy to use and sophisticated, offering wireless photo and video capture, and numerous imaging controls. The iPad is attached to the microscope stand with an articulated arm that enables the device to be easily removed and even passed around in a group.

The system is multi-functional and interchangeable. It works with a number of Nikon and Canon DSLR cameras, and is compatible with iPad/iPhone, Android, and Mac and Windows computers. Since its setup, the new microscope system at the Legion of Honor has become very popular and seen frequent use by various staff members.

(39) Material Range and Treatment Compatibility: Board Edge Consolidation with the Use of Japanese Paper

Anahit Campbell, Student, University of Wisconsin - Milwaukee

Japanese paper is one of the East's most vital resources in paper and book conservation due to its dual properties of strength and flexibility. This poster presents a use of the paper in book board covering material consolidation. Oftentimes marbled and other decorative papers delaminate from the board due to wear and handling. This wear may also extend to the covering material on the face of the board itself which is not only aesthetically displeasing, but also exposes the board material to further wear and abrasion. While readdressing the paper with adhesive such as wheat starch paste may secure the lifted paper covering material temporarily, the location of the paper on the board edge poses the highly probable chance that the paper will once again lift and loss may occur.

This poster presents a treatment solution for this particular problem with the use of very light weight (3.5 gsm) Japanese kozo paper. After the paper covering material on the edges of the boards are readdressed using wheat starch paste, a strip of feathered edge Japanese paper (3.5 gsm) can be secured around the edge of the board, extending onto the verso and recto of the board—far enough onto the board that the Japanese tissue cannot easily delaminate from wear. In addition, it's fibrous feathered edge serves to transition from the covering material to the Japanese paper with minimal chance of lifting. Furthermore, as this Japanese paper is substantially thin and translucent, it can be secured to the surface of the covering material inconspicuously.

The noteworthy element to this simple treatment is that it is only with the dual characteristics of Japanese paper that this treatment can be executed. This poster will serve to offer options for repairs that are similar to that described and underscore the unique suitability of Japanese paper in such uses.

(40) Enlightening Approaches to Indo-Persian Carpets

Raquel Santos, Assistant researcher/PhD student, Department of Conservation and Scientific Research (DCSR), Freer|Sackler, Smithsonian Institution; Dr. Ana Claro, Instituto de Nanociencia de Aragón, Universidad de Zaragoza; Dr. Blythe McCarthy, Department of Conservation and Scientific Research (DCSR), Freer|Sackler, Smithsonian Institution; Dr. Jessica Hallett, Portuguese Centre for Global History (CHAM), Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa

The presence of silk in 16th century Iranian carpets facilitated the execution of very elaborate designs, making them more expensive and thus only accessible to the wealthiest European consumer. At the time the Turkish industry controlled the market by producing more economical wool carpets.

This situation changed at the end of the century with the succession of Shah Abbas I (r. 1587-1629). His efforts to exhibit the grandiosity and prosperity of the Safavid Empire resulted in a new vocabulary in which human and animal figures were replaced by large scale floral motifs. This new aesthetic was applied to a wide range of media, from architecture to small scale objects, as well as to textiles creating a homogeneous royal style. The Iranian textile industry was influenced by this development and changed their emphasis to manufacture textiles for export.

Carpet production was transformed and Iranian producers sought to create a new competitive carpet type referred to variously as "Herat," "Isfahan," and more recently "Indo-Persian." Workshops focused on minimizing production time and costs through developing new designs that involved less labour and cheaper materials, thus making them more accessible to a wider range of consumers, while also meeting international demand and taste for carpets of large dimensions. At the same time, travel accounts report that Persian weavers migrated to work for the Mughal court. This has led some authors to assert that these carpets were also being made in India. Thus, establishing how, when and where this transformation occurred and the geographic extent of production is fundamental for a better understanding of these carpets.

This study seeks to look at the question of their origin through an interdisciplinary approach, involving history, art history, and technical and chemical analysis. Fibres from both the foundation and pile were identified with optical microscopy, and dyes from red, yellow, orange and brown colours were analysed using Liquid Chromatography and Mass Spectrometry (LC-MS). Characterization of the natural dyes was then used to establish the regional use of various dyes, and hence the possible area of production for these carpets.

The material characterization results are essential for understanding problems such as extensive colour fading and material loss. Conservation professionals need this information to make decisions about exhibition, treatment and how to improve preventive conservation methods for these objects, particularly when they need to balance these requirements with institutional factors such as budget, space, staff, etc. Research project funded by Fundação para a Ciência e Tecnologia (FCT-MES), Portugal. (SFRH/BD/72882/2010)

(41) The Syrian Heritage Initiative: Planning for Safeguarding Heritage Sites in Syria

Kyra Kearcher, Leon Levy Foundation Research Assistant, Ur Digitization Project, Penn Museum; Kurt Prescott; LeeAnn Gordon, Project Manager for Conservation and Heritage Management, Syrian Heritage Initiative, ASOR

Syrian Heritage Initiative—Planning for Safeguarding Heritage Sites in Syria (SHI) is headed by The American Schools of Oriental Research (ASOR) and is funded by a cooperative agreement from the US Department of State, Bureau of Near Eastern Affairs.

Active conflict in Syria is contributing to the damage and destruction of cultural heritage. This research project aims to 1) raise awareness in Syria and among the international community about current threats to Syria's cultural heritage through ongoing monitoring and evaluation; 2) assist in mitigating adverse impacts; and 3) identify and plan cultural heritage preservation projects and assistance that can be carried out in Syria now or post-conflict.

The project will develop comprehensive documentation for the current condition and future preservation needs of cultural heritage in Syria and will generate practices that are relevant for conflict zones in neighboring regions. This poster will present the goals of this project, including assessing the impact of the conflict on cultural heritage, working with Syrians to monitor and mitigate threats to sites, assembling literature about Syrian heritage sites, developing a digital map and inventory of heritage resources, and developing proposals for future preservation projects.

(42) An Interior Conditions Assessment of Mission San Jose de Tumacácori

Rebecca A. Caroli, Graduate Student, Heritage Conservation, University of Arizona; Alex B. Lim, Architectural Conservator and Exhibit Specialist, National Park Service, Tumacacori National Historic Park

Mission San Jose de Tumacácori, an AD 1753 Franciscan mission church located in southern Arizona, was designated a National

Monument in AD 1908, just prior to the formation of the National Park Service (NPS) in AD 1916. Soon after its inception, the NPS assigned as custodian famed early preservationist Frank "Boss" Pinkley, who immediately took rehabilitative action to the historic ruin. Over the subsequent decades under NPS supervision, Mission San Jose de Tumacácori has undergone various phases of reconstruction and repair. As a consequence, the mission church represents a veritable laboratory for the evolution of NPS conservation theory and techniques. The interior in particular, featuring layers of plaster and painted surfaces over adobe brick construction, poses a unique set of maintenance challenges. As a formed-earth material, adobe is naturally inclined to degrade, requiring competent, cyclical maintenance to preserve its character and integrity. Consequently, the interior condition of the mission church is affected both by natural forces of deterioration and mechanical responses to incompatible or failing preservation techniques. A comprehensive assessment and documentation of these factors was thus essential for the future application of treatment and maintenance at Mission San Jose de Tumacácori.

Responding to this need, a joint project was formed between the Drachman Institute of the University of Arizona and the National Park Service at Tumacácori National Historic Park. By connecting a team of technically trained graduate students in heritage conservation with the park preservation specialists, this project was able to address the preservation needs of Tumacácori National Historic Park while also providing an opportunity for student experience and training often lacking in southern Arizona.

In advance of the condition assessment, the entire interior surface of Mission San Jose de Tumacácori was scanned using 3D laser technology, producing a complete orthophotographic rendering of the church. Using these orthophotographic images in combination with traditional documentation techniques, the project aimed to further the process of data preservation at Tumacácori National Historic Park through high-resolution digital documentation. The resulting interior conditions assessment generated a comprehensive report and conditions glossary from which the staff at Tumacácori National Historic Park will be able to monitor changes to the mission's interior structure and features, archive a record of conditions and treatments, evaluate the performance of past treatments and prepare appropriate treatment plans. This poster, submitted to the AIC Annual Conference Poster Session, documents the interior conditions assessment process performed at Mission San Jose de Tumacácori, summarizing the findings and resulting documentation products.

(43) Analyzing the Photostability of Artist Adhesives Using CIELAB Color Measurements

Ashleigh N. Ferguson-Schieszer, 2013 Graduate of the Art Conservation Department, Buffalo State College; Dr. Aaron N. Shugar, Andrew W. Mellon Professor and Conservation Scientist, Buffalo State College; Judith C. Walsh, Paper Conservation Professor, Buffalo State College

The purpose of the study was twofold, to document the vast range of adhesives currently being used by contemporary artists and to help printmakers in selecting adhesives based on visual aging characteristics that may impact their artwork overtime.

Printmakers use a variety of adhesives when creating collages or *chine-collé* prints. Often, pressure sensitive and spray adhesive are used to create collages, a term that refers to a general composite piece of art with adhered components. Traditional *chine-collé* prints are created when a thin sheet of tissue is adhered to a heavier paper support during the act of printing. Because the action of laminating occurs during the printing process, printmakers primarily choose *chine-collé* adhesives based on specific working properties. They prefer adhesives that contain little moisture, don't ooze, are strong, flexible, and have long-lasting tack, or are re-moistenable. In addition to all these traits, artists prefer an adhesive that is ready-made and obtainable at a low cost. Recently in the past few years, the use of commercial pressure sensitive acrylic mounting films, such as Artic DuraMount, has quickly risen in printmaking popularity to make untraditional *chine-collé* prints due to its affordability and ease of use.

To examine this popular mounting film's photo-degradation, eight other commonly used artist adhesives were chosen for comparative artificial light and thermal aging tests. These included traditional pastes known to age well and aerosol adhesives reputed to be fugitive.

In order to quantify the qualitative physical changes between aged and un-aged samples, CIELAB color measurements were taken before, during, and after artificial aging tests using two analytical techniques. In this investigation, the change in lightness (ΔL^*), the change in red to greenness (Δa^*), the change in blue to yellowness (Δb^*), and the overall change in color (ΔE^*) are reported using an average of three readings taken from a GretagMacbeth ColorEye spectrophotometer. As a comparative, alternative secondary method for color measurement, $L^*a^*b^*$ measurement readings were recorded for all of the specimens from digital photograph documentation in Adobe Photoshop.

This poster explores the adhesive color change within the samples and the differences between spectrophotometer vs. Photoshop Color Picker measurements.

(44) Egyptian Glass at the Freer Gallery of Art

Ellen Nigro, National Endowment for the Humanities Conservation Fellow, Chrysler Museum of Art; Blythe McCarthy, Andrew W. Mellon Senior Scientist, Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution; Ellen Chase, Objects Conservator, Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution

Charles Lang Freer acquired a collection of 1,388 glass objects in Cairo in 1909 that has been studied very little and required rehousing. The Department of Conservation and Scientific Research at the Freer Gallery of Art and Arthur M. Sackler Gallery is working to characterize the ancient glass technologies in the collection, as well as to rehouse the objects. This project has included both scientific and historical research in order to learn more about the collection.

The technical study began with x-ray fluorescence spectroscopy on a large number of objects in the collection. Since the objects are suspected to be from a range of times and places, the purpose of the technical study is to characterize the materials and techniques, to help sort the objects by time and place. A part of the project

employed qualitative x-ray fluorescence spectroscopy (XRF) to analyze lead content and colorants of a few hundred of the objects. The XRF data helped group similar objects and determine which should be analyzed further using inductively coupled plasma mass spectrometry (ICP-MS) in the next project phase.

Before rehousing, the collection was stored in a way that provided few advantages for the preservation, study, and safe handling of the collection. The primary goals of the rehousing campaign were to avoid dissociation, replace non-archival materials with archival ones, prevent excessive and unsafe handling, limit vibration and the potential for mechanical damage, as well as to make the objects accessible for study and technical analysis. There was also a concern that the older storage materials were of historical significance to the collection, and research was conducted in the Freer Gallery of Art Archives to learn more about the purchase of the collection and its history at the Smithsonian. An attempt was made to design and execute a housing scenario that achieved all of the objectives while respecting the historical significance of the old storage materials.

(45) Conservation on a Rare Botanical Specimen Decorated Book: A Case Study on Du Pan Fang-ge's diary

Jen Jung Ku, Research Assistant and Conservator, National Museum of Literature, Taiwan; Wan-Jen Lin, Paper Conservator, Cheng Shiu University Conservation Center

The discussion on the case of book conservation treatment aims at paper-based collection with herbarium specimens. It takes the diary of the famous female Taiwanese writer in the 1930s, Du Pan Fang-ge, as example. This object is collected in National Museum of Taiwan Literature. It records the writer's history of life, so it is extremely important in the literary world. As time goes by, however, the herbarium specimens, adhesive, or pressure sensitive tapes above the specimens began causing impact upon each other and led to complex degradation. It takes intervening treatment to suspend the degradation.

This essay discusses the case of treatment for books with such herbarium specimens. It introduces issues such as considerations and methods of treatment, how to ensure the safekeeping, and how to reach the balance between the conservation and the authenticity of objects. It takes complex procedures to treatment this object. Besides the complicated operation of book disbanding, it needs the treatment of insect remains, removal of tapes, mending, compensation, rebinding, and inpainting. Conservators discuss with scholars about the conservation for 39 specimens of four-leaved clover stuck with tapes on the back cover and title page. After cautious discussion, they decide to conserve the original specimens at another place. They apply the scientific technique of object copying and ICC profile for the optimization of the object in all color spaces of hardware. The original specimens are conserved after the print-out of original paper. Besides the original status of the object, the style and integrity remain the same with the original book. In addition, hazardous elements that might cause damage to the paper material are prevented. The techniques lessen the interruption of turning over pages and ensure the safekeeping of the collected object.

Four-leaved clover is considered as the lucky symbol in Asia, so lots of clover is stuck in pages for symbolizing the collection of happiness. It was once a popular trend to do so. For lots of such objects, this essay implements aging test by considering the climate in Taiwan, the solvent used to remove the clover, and the herbarium specimens. In addition, it also inspects whether the pigment of herbarium specimens causes impact upon paper. Conclusively, it estimates the frequent methods and conditions of conservation for such objects.

(46) Smartphone Colorimeter Technology: Practical Applications for the Conservator

Kimberly Frost, Conservation Technician, Caryatid Conservation Services, Inc.; Sarah Towers, Conservation Technician, Caryatid Conservation Services, Inc.

Colorimetry can be a valuable tool for quantitatively measuring color, and has been used to aid the conservator in objective, accurate color matching. With the advent of smartphones and application technology, colorimetry is now available to the general public on a massive scale, and is no longer relegated to only the most well-endowed institutional laboratories. Several colorimeters are available on popular operating systems, including iPhone and Android. These colorimeters use the built-in camera lens of the smartphone to take RGB values of any surface towards which the camera lens is pointed. Can these hand-held colorimeters give accurate, reliable readings of painted surfaces, and, by extension, are they a potentially valuable tool for the conservator? Color matching and in-painting can present a treatment challenge to the conservator. Pigments must exactly replicate the original surface, or risk losing the aesthetic integration of the treated surface. Typically, visual matching is done with the naked eye. However, the eye sometimes fails to give an accurate color match, especially in a variety of lighting conditions. In particular, the appearance of the colored surface of three-dimensional objects can vary considerably in light and shadow. Furthermore, in-painting is applied directly to the surface of the object, yet another reason why quantitatively precise color matching should be determined early, with as little experimentation on the actual surface of the object as possible. This project explores how inexpensive smartphone colorimetry apps might aid the conservator to resolve these issues as they arise during treatment.

Our research was inspired by the treatment of a posthumous cast of Yves Klein's *Venus of Alexandria (Blue Venus)*, 1982, undertaken at Caryatid Conservation Services' Miami-based studio in spring 2014. Several swatches of varying blue pigments were prepared that, to the eye, closely matched Klein's emblematic IKB. To achieve a powdery matt surface, Gamblin dry pigments were prepared in dilute solutions of PVA-AYAA at 10% and 25% and painted on Canson watercolor paper. Pigments used were Ultramarine, Cobalt, Prussian Blue, and Cadmium Red and Yellow for controls. These swatches were measured using two different colorimeter apps. The readings from the test swatches were then compared to readings from the same colorimeter apps on the surface of the original object, taken from several vantage points. Colorimeter readings from another original Klein monochromatic blue painting were taken at the Menil Collection in

Houston by painting conservator Erica James using a Minolta colorimeter as well as the smartphone app to determine if those readings correlated.

This project aims to determine whether or not colorimeter apps can be a valuable, practical tool for conservators in the field – an easy method to supplement information taken in by the human eye. While our preliminary tests of the smartphone colorimeter apps yielded variable and inconsistent results, this project will also explore possible ways in which, with simple tweaks, a colorimeter app could be employed to help conservators accurately color match and solve practical problems in the field.

(47) Collaborative Solutions for Preserving and Displaying Works by Self-Taught Artists James Castle and Minging Mike

Catherine I. Maynor, Paper Conservator, Smithsonian American Art Museum

The Smithsonian American Art Museum is noted for its long history of collecting art by self-taught artists. Artwork by self-taught artists can present unique preservation and display challenges:

- non-traditional, often impermanent materials are used (e.g. found or re-purposed papers and homemade or inexpensive paints)
- it can be difficult to distinguish the “original” condition from later deterioration and/or damage
- such artwork is sometimes poorly cared-for during its lifetime, leading to deterioration and/or damage
- display methods must reconcile several, sometimes competing concerns, e.g. the artwork's condition and physical needs and the curator and exhibition designer's aesthetic goals, while considering available institutional resources, including staff time

Recent American Art exhibitions featured work by self-taught artists of both national (James Castle) and local (Minging Mike) import. The poster will address the collaborative work undertaken by staff from several museum departments to represent each artist, with due consideration given to:

- the nature of artworks themselves, showing examples of materials and condition
- display intent
- treatment and mounting solutions devised for individual and groups of artworks

(48) In-situ X-radiography of a Monumental Oil Painting: Deconstructing a Giant

Keara Teeter, Conservation Intern, Villanova University; Allison Rabent, Conservation Intern, Villanova University; Kristin deGhetaldi, Painting Conservator, Independent Contractor; Anthony Lagalante, Professor of Chemistry, Villanova University; Brad P. Thorstensen, Chemistry Machinist/Instrument Technician, Villanova University

In September 2014, the 12' x 20' *Triumph of David* oil on canvas attributed to the Baroque master Pietro da Cortona, underwent x-radiographic examination at Villanova University's Falvey

Memorial Library. The analysis is part of a two-year campaign to restore the painting, headed by painting conservator Kristin deGhetaldi. Technicians from General Electric's Inspection Services Department were contracted to work alongside an interdisciplinary team of conservators, interns/volunteers, and members of the Villanova University Chemistry and Art History departments. The resultant x-radiographic image has now provided scholars with crucial information that may help answer questions about the painting's provenance. This project was possible thanks to the generous support of the Samuel H. Kress Foundation.

The team was faced with numerous obstacles including the scale of the painting, time restrictions, and the publicly accessible workspace. A novel method of securing the x-ray film was devised. This involved two steps; first, the location of each exposure was marked on the verso of the stretcher bars and second, a specialized film holder was designed to facilitate the process over a two-day time span. A 22¾" x 24½" x-ray film holder, designed by Brad P. Thorstensen and Anthony Lagalante, was created using sheets of polycarbonate with rare-earth magnets mounted in each corner. The magnets were padded with a soft synthetic rubber to protect the surface of the painting and an insert was created using 3MVHB tape. Tests indicated that the magnets were strong enough to suspend the 5 lb film cartridge during x-ray exposure. While this system worked well for *The Triumph of David* it should be noted the painting is without impasto or cupping which afforded safe contact between the film holder and the painted surface. The General Electric technicians used a Spellman LORAD LPX160 tube in conjunction with high resolution 14" x 17" Flex XL Blue film sheets. A GE Pegasus CR 50P digital scanner was moved into the space. This allowed for immediate scanning meaning that multiple sheets could be used simultaneously. A grid template was implemented to ensure the individual plates overlapped 1¼" on each exposure.

The public nature of the workspace necessitated that the Falvey Memorial Library Reading Room be closed for the two days of x-radiography analysis. Appropriate signage was placed around the periphery of the site and doors were secured. ND-2000 dosimeters were used to measure radiation levels, and individuals associated with the project vacated the exposure area while the LORAD LPX160 was active. Members of the public were able to observe the entire process through the live web-cam feed that is currently hosted on the project's blog site.

Over 120 x-radiographic captures were collected and compiled to form the final image. The x-radiograph revealed major artistic changes that will be important to the interpretation of the painting. The creation of the film holding system facilitated quick and accurate exposures allowing for global imaging of the painting within a short time frame.

(50) Using an Integrated Approach to Achieve Exhibit Goals for the Glittering World: Navajo Jewelry of the Yazzie Family

Kelly McHugh, Objects Conservator, National Museum of the American Indian; Janelle Batkin-Hall, Student, Buffalo State University; Reka Sarfy, student; Sasha Rivers, Student/Enrolled member of the Winnebago Tribe of Nebraska, Salish Kootenai College

Tribal Historic Preservation Program

Typically the care of silver objects is fairly straightforward—remove tarnish to restore the object to its original appearance. After all, things made of silver are supposed to look shiny, right?

Things were more complicated with the treatment of objects for The National Museum of the American Indian's exhibit, "Glittering World: Navajo Jewelry of the Yazzie Family." The exhibition shows the family's strong connection to Navajo culture and land. Historic pieces from the NMAI collection were chosen to provide the historical context in which these contemporary pieces reside. As conservators, we were asked to retain the "historic" patina on the NMAI objects, while ensuring the bracelets, necklaces and rings appear well taken care of. Achieving this middle ground in silver polishing proved to be an interesting endeavor. Conversely, the contemporary Yazzie pieces loaned to the exhibit were intended to appear highly polished. The needs of the exhibit brought up issues related to the understanding cultural context and the art market. These factors played into the decisions made to execute appropriate treatment action. This poster will illustrate how NMAI staff conservators, interns, and fellows utilized an integrated approach, including workshops, consultations, and silver cleaning mock-ups to find treatment solutions and balance all of the cultural and display needs in the exhibit.

(51) The Materiality of Painted Documents: Between History and Preservation

Márcia Almada, Professor, Universidade Federal de Minas Gerais – Escola de Belas Artes, Belo Horizonte, Brazil

This paper aims to discuss contemporary criteria about conservation of textual documents from two perspectives: one referring to the preservation of the objects and another concerning to the use of objects materiality in historical researches. The question that guides this discussion is: how can a conservator work towards the preservation need of an object when, at the same time, it is necessary to maintain the material vestiges that record different uses of the object through time?

Although there is a lack of theoretical systematization, some case studies have demanded that conservators think about objects from countless knowledge field's possibilities. For example: conservation science, concerning to the materials stability; humanistic studies and its text and encoding analysis aspects; art history and its images production techniques evaluation; writing culture history and the analyses about the use and circulation of manuscripts and printed texts; the archive studies and the concerns about old and new documents accessibility and care practices.

Nowadays one of the most important deontological matters in conservation training is the awareness of the responsibility of caring for historical and cultural properties in all its dimensions. One aspect of great interest is the manner that professionals have approached archive and historical documentation. These professionals must recognize the historical marks and modifications imprinted to the objects during its life and respect them during conservation intervention; unfortunately such respect is sometimes neglected for many reasons. The already well-known practice in archeological objects conservation process, in which

the minimal material records can be used as source of investigation about former societies, should be extended to others objects and their supports.

However, one dialectical fundament exists: the historical marks of an object are frequently dangerous to its preservation. Therefore, the limits between the object's physical and chemical stability and the needs to maintain historical marks must be debated. The resolution of this conflict is not always properly achieved; therefore more in-depth discussions are necessary, though often impossible during the daily professional practice.

This paper is the result of a post-doctoral research carried out in 2014 with the primary goal to reflect on a theoretical and methodological discussion about conservation of very valuable historical and artistic documents, taking into consideration the material analysis possibilities as a source for research in Social History. This debate will contribute to guide conservation interventions in the next four years of six 18th century Brazilian illuminated manuscripts. This work will be funded by resources earned with a National Award – my research received a prize in 2012 for best doctoral thesis in the Humanities and Social Sciences areas. All dialog process between theory and practice will be used as teaching subject at the Conservation-Restoration of Cultural Properties Course at the Federal University of Minas Gerais State (EBA-UFGM), where I teach, as well as in conferences and scientific articles. Keywords: deontology; conservation-restoration of graphic documents; history; illuminated manuscripts.

(52) Conservation, Lifting the Veil: To Teach in Order to Conserve

Alicia Barreto, Anthropologist and Conservator / Paper Restorer, Figari Museum—Uruguay Department of Education and Culture, Montevideo, Uruguay

“Collections are knowledge which is guarded and communicated.” Fernando Almarza Ríquez (ILAM 2014)

Conservation, the practice and the public's contributions in the tasks of conservation, constitutes one of the most interesting and pivotal debates in current museology. It is, this debate that is the foundation of our presentation. The importance of having appropriate education in caring for patrimony is established as crucial in the fourth principle of the ICOM's code of ethics for several decades. We are proposing that conservation, as a concept and practice, has to be the foundation on which political management of the cultural patrimony of any social group must be built. As a consequence, conservation must be included in its educational system, and to its institutions guarding the patrimony; it must be more global than just the actual museum.

Conservation must integrate the body of knowledge it brings a museum, to the visitors of the collections. The material's properties and conservation requirements are a fact of the item. The factors of deterioration are the knowledge we bring. The dissemination of the measures of conservation, and the knowledge of the conditions in which the cultural goods must remain while in storage, or in the art gallery, are part of the features of a museum, and of the cultural institutions that hold patrimonial or cultural goods in general. The knowledge we have to contribute to taking care of a cultural item, is part of the assurance of lengthening the

life of the materials that are part of the tangible and intangible legacy, and are a promise that they will last for generations to come. Museums are the appropriate place to put to practice the education of conservation.

We start convinced that people take care of what they feel is theirs, with what we identify with, and for that, patrimonial goods have to be valued, tangible or otherwise, to feel it our own. We want what we know, understand, and feel what is ours. It is necessary to learn how to take care of the goods, conserving them and enjoying them, and also transmitting them to future generations. Knowing how to take care of cultural goods requires knowledge, education and study.

In the “Museo Figari” we are educating about conservation through various activities. We highlight talks in which the works of conservation and restoration are shown in the setting up of an exhibition. Through these presentations, visually supported by Power Point, conservation issues are addressed to help the public, in a positive and clear way, see all those things that contribute to preserving the works (i.e. not taking pictures with flash, not touching, limiting the quantity of visitors, etc). In other words, we are turning the various negative imperatives that are usually present in a museum, into conscious actions with a positive value.

(53) Documentation Systems as Tools for Contemporary Art Conservation: A Conceptual Model Study Case for Performance Art

Gabriel Bevilacqua, Professor, Information Science Department, Universidade Federal Fluminense, Rio de Janeiro, Brazil

During the last century some art movements developed different and innovative ways of conceiving and producing works of art. Those new art forms and techniques questioned our traditional understanding about art definition and materiality, placing difficult challenges for the conservation of our recent cultural heritage. Known by the specialized art historiography as conceptual art and considered as a core component of the more generally recognized phenomenon of contemporary art this specific art form could be defined by several interconnected changes of paradigms in the way artists and society produce and signify art. From a material object centered production to the idea and process of artistic creation. From a more static and well delimited work of art in time, space and context related action. From a material support and technique based preservation to an integrated documentation approach. However, the dynamic, ephemeral, interdisciplinary and the so called immaterial features of some specific forms of conceptual art such as performance art could place even more complex conundrums for the preservation of contemporary cultural heritage.

One of the main objectives of this paper is to present and discuss some of those specific challenges addressing not only technical aspects of the problem, but also possible conceptual, cultural and management issues that could explain some of the difficulties faced in the implementation of documentation and conservation procedures for performance art in museums. Among the issues discussed are the object/material tradition in museum

collection management and the implications of acquisition and preservation policies toward performance art collecting initiatives. Other central questions will be raised from the presentation of specific study cases involving performance art conservation and museum collection management and documentation systems. As a possible conclusion this paper will propose a conceptual model of documentation-conservation strategies and procedures. As a second and more general implication this presentation will argue that an adequate performance art conservation procedure demands a change from a “passive documentation/preservation” (material object oriented) to an “active documentation/preservation” (phenomenon and event oriented) perspective.

(54) The Practical and Real Effects of Theory in Conservation

Ximena Paola Bernal Castillo, Coordinator of Research and Publications on cultural heritage/Coordinator of Family Album collection, Instituto Distrital de Patrimonio Cultural, Bogota, Colombia

The philosophical principles that lead our practice are the critical expression of our work as conservators. These philosophical principles can be successfully translated into workable if and only if, we deeply understand them as a solid base in which arguments and practical decisions can rest.

If we recognize that different theoretical positions can change our way of studying, doing research and applying certain conservation techniques, we will be able to understand how important it is to achieve a balance between philosophy and making conservation work. For example, let's think about different kinds of theories and conservation perspectives and evaluate how can they affect our technical procedures. We can begin with a Viollet Le Duc conception. In this case, the conservator will be thinking that the value of the object is mainly related to the shape and the style. There is no space to think about other kind of values, but to recover a formal unity. Even if that means to complete or make our object “perfect” without respecting the original authors' intentions.

If we act under John Ruskin directions, we will respect so much the object and the effects of time over it, that we won't be able to apply any direct restoring action. In that sense, we will be thinking that it would have been better to create preventive care methods for the object, before touching it.

Under Alöis Riegl perspective we will understand that objects are historically gifted and that our conservation decisions will depend of the age, historic and contemporary values that these objects may have. Without this study, we will never guide our practice. Camilo Boitto will tell us that we must consider our object as an historical document that deserves our respect. This means that we must never create historical fakes when working as conservators.

Finally, if we were acting under Cesare Brandi guidance, we will understand conservation practice as a critical act, more than a technical one. We should study the object understanding its documental and historical values, but knowing also, that there is an aesthetic aspect that should be reestablished by the conservator.

If we analyze these different theoretical positions we can see that philosophical issues are decisive to take decisions, but also to

explain and give solid arguments in our workable practice. My intention through this work is not to say that conservators still apply 19th century theory, but to make evident that theory—new or old—can create different effects in our daily work. It can also create questions related to our own limits in front of an object: do we touch it or not? Do we create preventive care plans for it? Do we reconstruct it or just take minimal conservation actions? The balance between philosophy and practice depends in how much we understand the practical and real effects of theory and the way in which we establish our own criteria. All this in order to preserve objects—in a physical, historical, functional, symbolic and aesthetic way. Also, in order to conserve the memory of cultural and aesthetic conditions in which they were produced.

(55) Rest in Peace? Challenges in the Storage of Mummified Human Remains, Regional Museum of Antofagasta, Chile

Daniela Bracchitta, Conservator-Restorer of Cultural Heritage, National Center of Conservation and Restoration (Centro Nacional de Conservación y Restauración), Santiago, Chile

At the beginning of 2013, the archaeological laboratory of the National Center of conservation and restoration (CNCR), was invited to participate in the co-execution of the project “Improvement of the conditions of conservation of mummified bioanthropological materials in Antofagasta's Museum.” This project emerged because of the biodeterioration problems presented in storage mummified remains. However, the scale of the problem meant to contemplate in its developing, multiple edges that are combined and culminate in the presence of pests. This ranged from the implementation of a plan of monitoring climate and pest, the enhancement of the remains through research and conservation actions, until discussions on the ethical obligations in relation to the possession of human bodies as part of the collections in our museums.

That, among other things, considered an important research about treatment alternatives, so as not to disturb the potential what biochemical markers have to investigate bioanthropological mummified remains. But, harmless methods for both biochemical markers and persons could not be materializing due to their high costs, or by not having the technology recommended for these cases. Yet, taking the precautions in the matter, we opted for a method by controlled gaseous emanation of magnesium phosphide (toxic substance), which was free of the compounds that usually interfere with biochemical analyses.

On the other hand, one of the major challenges was solving the packing and storage of mummies, since some of them had evidence of active decomposition. It was a fact that the Museum did not have a storage designed for bioanthropological collections, and neither was even a sustainable idea to think about packaging with controlled atmospheres. Nevertheless, thanks to the climate study, at least we could choose another room for storage purposes, which environment conditions were more stable. At the same time, theoretical considerations were taken and adapted in order to build packages with the required needs for helps in the preservation of mummified bodies. Bottom of the containers were adapted

with a tray with a cross-ventilation system, to allow constant circulation of air, and with the same aim, caps were perforated but isolated from the pollution as well. At the same time, bodies rested on layers of filter paper, which would allow the absorption of any kind of exudation and its subsequent replacement. All this work was accompanied by training for the staff of the Museum, in order to give continuity and maintenance at the measures taken, especially considering that the mummified bodies, of one way or another, will always be exposed to its decomposition.

The present paper aims to share the experience of working with mummified bodies in Chile, and the ethical and practical implications at the time of making decisions for its interventions.

(56) The Candelaria Cave Textiles: A Conservation Project

Leslie Julieta Cabriada Martínez, Conservator, Instituto Nacional De Antropología E Historia, Atizapan De Zaragoza, Mexico; Carla Silai Silva García, Intern of Archaeology

In 1952 the Prehistoric Department of the National Institute of Anthropology and History, or Instituto Nacional de Antropología e Historia (INAH), was created; a year later, it was in charge of extracting the materials deposited in the Candelaria Cave, located in the state of Coahuila in northern Mexico. At that time it was possible to recover a wide collection of organic objects such as wood, shells and large samples of basketry, cordage, textiles and funeral bundles produced by groups of hunter-gatherers known as “Laguneros.” By the time the materials were extracted from the cave they were divided into two parts: one of them was moved to the National Anthropology Museum or Museo Nacional de Antropología (MNA), and the other to the Regional Museum of La Laguna or Museo Regional de La Laguna (Murel). In the last ten years, several textile fragments have been provided to the Northern Museum or Museo del Noreste (MUNE) in the city of Monterrey and the H. R. Pape Library Museum or Museo Biblioteca H.R. Pape (PAPE) in Monclova, Coahuila.

In 2012 the archaeologist Juan Martin Rojas Chavez created a project that allowed the study of stored material at cellars of the MNA. The first part of the project provided a catalog for further research. It is important to stress that apart from the technical studies undertaken by the anthropologist Irmgard Weitlaner Johnson in the year of 1977 there has not been a deep study of the textile collection, this project being the starting point of work.

In mid-2014, at the conservation section of the lithic laboratory of the National Museum of Anthropology, the second phase of the project began. This phase focuses on the conservation of each textile, providing a support for storage and study that also works for future exhibitions.

In this second phase, the dating through ¹⁴C of 6 pieces from the Candelaria Cave is planned, in order to clarify its temporary. The paper presents the background around the conservation project as well as the progress and the expected results, which will generate new questions about the collection, which fills us with great expectations. The joint commitment between archeology and restoration will give us a comprehensive understanding of the “Lagunera” culture, its development as a society, and how they are the base of the current cultural customs of northern Mexico.

This is the first project focused on the preservation of the only plant based material textile collection that exists in Mexico, the biggest one that has been found inside the national territory, belonging to the permanent collection of the National Museum of Anthropology.

(57) A 16th-Century Spanish ‘Nao’ Shipwreck Found on the Quebrado de Fuxa (Pinar del Rio, Cuba): Wood Identification and Analysis

Raquel Carreras, Graduate in Biology Science, PhD. Forestry Science, National Union of Cuban’s Writers and Artist

The majority of the ships that made the Carrera de Indias (the crossing of the Atlantic) sailed the waters of the Cuban archipelago and sought shelter in its bays. Some of them sank due to inclement weather, encounters with pirates and ignorance of geographical features. The shipwreck of the Quebrado de Fuxa (16th to 17th centuries) was rescued by the defunct company CARISUB. It is probably the most important in the entire Caribbean and Latin America, and was supported by the National Geographic (1998). It required hard and meticulous work. The wooden material rescued was documented and scientifically identified before being consolidated. It was found to be in an odd and intriguing good state of conservation. The lack of money and coordination led to a fatal end the initial proposals for this shipwreck.

The present study describes the results of the analysis carried out to the wood of this shipwreck from its identification to the causes of its degradation. This study played an important role in the dating of the shipwreck. It was also important to the study of the evolution of wood use in Cuban ship construction. There are 22 out of 1500 shipwrecks so far localized that have been documented between the 16th and 19th centuries.

(58) ‘We are Well in the Shelter, the 33 of Us’: Preserving a Message of Hope

María Soledad Correa, Paper Conservator, Centro Nacional de Conservación y Restauración, Santiago, Chile

A note on a sheet of paper written by a miner trapped captured underground, became a life proof that got an unexpected prominence. The materials used were the ones within reach; a piece of notebook paper and a red marker. The aim of the message was telling that he and his coworkers were alive and safe in the security area.

On August 5, 2010; a significant cave-in affected San José mine located in Atacama Region in Chile, burying 33 miners under 2,360 ft depth. After the collapse the rescue works began immediately catching the whole nation’s attention. As days passed, everybody observed with despair how new caves-in followed making the rescue work even harder, until forcing the rescue team to leave the mine for safety reasons. Afterwards exploratory boreholes were made seeking to reach the security area where the miners might have been. After seventeen days of unsuccessful

hard work, it was almost impossible to imagine the survival of at least some of the miners, nevertheless the works continued. While pulling to the surface a drill bit, it was found an attached plastic bag with a folded paper inside that said: “We are well in the shelter, the 33 of us”. This had a great impact in the whole nation and the news spread around the world. Since that moment a heritage value was granted to this simple paper. The note was donated to Atacama Regional Museum by the author of the note Mr. José Ojeda, who was moved by the desire of preserving this valuable testimony.

The museum planned a long-term commemorative exhibition where the document was considered as an essential piece. The unstable nature of the document and the material alterations due to traces of its history, besides the symbolic and testimonial value were posed as key aspects in the decision making process. The exhibition of a facsimile and the storage of the original document mounted in a conservation quality folder were considered to be a successful response solution to the preservation and exhibition intentions of the message that recovered the hope of 33 men and a whole nation, becoming a symbol of an historical unprecedented event.

(59) New Trends at the National Museum of Fine Arts in Buenos Aires

Mercedes Isabel de las Carreras, Chief of the Collection Management Department, National Museum of Fine Art in Buenos Aires

The new trend in Buenos Aires is the opening of art meetings, where curators, investigators, and art historians discuss current perspective of museums and delineate trends with their original proposals. These meetings definitely open different frontiers of points of view, full of reflection and emotional thoughts and demonstrate that museums can be places for celebrations. Looking for new and radically different public, the National Museum of Fine Arts (MNBA) proposes night parties where inside-installations created by contemporary artists, writers, and disk jockeys are mixed with masterpieces and ancient art. The proposed exhibitions are far away from any conservation theory and the main objective is to transmit emotions and experiences. This new point of view of emotive museums leave aside all academic rules creating a festive and amusing climate, guiding the exhibition towards a personal level.

The dilemma between theoretical and practical practices begins when young curators propose the inclusion of ephemeral art exhibitions. Obviously, the proposed new trend is far away from the conservation theory developed by restorers for years; organic materials and frisky mountings are preferred. Nevertheless, conservators have to arrive to an agreement in some point, because it is a reality that this new trend develops quicker than theory responses to conservation questions. We must adapt conservation processes updating them and finding a good relationship with modernity. We conservators have to work on the diabolic debate appearing within institutions such as: shall we exhibit or conserve?, exhibit or investigate?, how can we conserve with these new styles and materials? Which is the limit between conservation theory and mixture of materials? What treatments can conservators propose to include “forbidden materials” in

museums? The challenge is continuous and knowledge must be permanently updated and directed towards theoretical concepts applied on the resolution of conservation problems. At the moment, we are trying to follow this renewal of the MNBA in each exhibition putting together theory and practice in conservation treatments.

(60) Research and Conservation of the Ruins of the First Mining Camp Built by the Spanish in Santo Domingo, Dominican Republic

Santiago Duval, Manager of the Department of Archaeology, Dirección Nacional de Patrimonio Monumental, Santo Domingo, Dominican Republic

The study we discuss below was conducted over three stages or seasons of work (2010–2013), in which the processes of investigation, move and reconstruction of the remains of the first mining camp built by the Spaniards in the town of “La Mejorada” Cotuí (currently located in the province of Sanchez Ramirez Dominican Republic) took place.

The remains obtained, came from the mining camp, the church, the cemetery and the area of initial preparation of metals. Both the church and the camp, correspond to a constructive typology characterized by the use of stones and clay as a binder, applying lime plaster on the walls as finish, except on the church, where mortar elements were found. The building of the mining camp has three stages or phases of construction, the initial stage dating back to the early 16th century, with addition from the 17th and 18th centuries in the final phase. The church had a polygonal apse and side entrance as a porch. These structures, possibly had a straw roof due to the absence in the excavated context of tile shards. New construction was going to affect the spaces where these objects were found. We proposed to take apart the objects and reconstruct them in an area close to where these components were originally found. To that end, we carried out several graphic records, in which the system of laser scanning, marking or coding of each stone or brick and the tracing of the walls was included by using plastic sheets. This process was the main tool for the faithful reconstruction of structures, based on a philosophy of research and restoration, which resulted in a faithful reconstruction of the mine site made in the early sixteenth century.

(61) Collaboration with Artists as a Strategy for Conserving Contemporary Art

Ingrid Frederick, Preventive Conservator, Banco De La Republica, Bogota, Colombia

Collaboration with artists in aims to better preserve the contemporary art collection of the Museo de Arte del Banco de la República (Bogota, Colombia) has been a relatively new practice that has encouraged conservators to involve the artists’ perspective as a guideline in decision-making related to preservation planning. The collaboration of artists through interviews or consultations,

initially begun as an informal practice related to specific case studies, rather than a formalized program involving the entire collection. However, recently there has been a shift in interest by implementing a more detailed and systematic documentation during acquisition procedures of new artworks.

The involvement of artists in problematic conservation matters, implies a significant shift in the values of authenticity and materiality related to traditional conservation theory, and has had practical implications in our views about how to preserve, store, and exhibit certain works such as installation and digital artworks. Furthermore, it makes us question ourselves about the theoretical considerations of implicating the artists' views in the decisions regarding conservation issues. What is the limit of the artist's involvement in these decisions? That is something that we have to discuss in each particular case study, and regularly practice may disagree from traditional theoretical principles. The collaboration with artists to discuss certain artworks of the collection, has affected mainly our exhibit and conservation criteria. In addition, in other cases, it has put into discussion the confrontation of public access vs. conservation in terms of the artist's and the conservator's point of view. The purpose of this presentation is to discuss some case studies, involving works of living Colombian artists, such as Oscar Muñoz, Alberto Baraya, Fernando Arias, and Liliana Angulo, where their participation has helped conservators to better understand and document the works of the collection, and how this has an effect on preservation and exhibition criteria in the practice of a present-day art museum.

(62) Conservation and Restoration of Special Books of the General Archive of the Council

Sonia Merizalde Aguirre, Licenciada En Restauracion Y Museologia, Universidad Tecnologica Equinoccial, Quito, Ecuador

The project is about the conservation and preservation of documents produced by the Government of Ecuador Legislative Branch since 1830, along with other historical documents with information on the New Republic and related social-political events of the war of independence. These include documents about the Battle of Chimborazo, Battle of Mocha, the order of celebration of President Joaquín Molina, the king, the triumph of the armies over the liberators of Quito, and others.

The Archive Section of the Archive-Library of the Legislative Branch is responsible for the Republican and Contemporary Legislative Document Collection, as well as historical archives previous to the Republic of Ecuador. It includes the files of the Royal Audience of Quito—war files, records against citizens, memorandums, royal orders (prints), and copied notebooks.

These serial collections are originally written documents about the legislative actions through laws, resolutions, agreements, and records that represent the unique memory of the Legislative Branch that show the creation of the Law.

Most of these collections are severely deteriorated, which demands an immediate intervention for preservation. The damages that internal and external factors have caused documents of the Legislature of 19th Century and the Royal Audience of Quito require a priority intervention. The chemical composition of the paper (internal factors) combined with the environment and

the human actions (external factors), have increased the degradation of the support (paper). The technical interventions that are needed to preserve these historical materials so they can be made available to the citizens are the following: • Inventory • Registration • Disinfection Treatment • Cleaning: physical, mechanical, chemical or wet • Removal of stains • Removal of adhesives • Consolidation of inks • Stabilization of inks • Tear repair • Inserts • Correction of planar distortions • Correction of deformations • Reintegration of missing areas • Recovery and study of water-marks • Rehousing in new containers with appropriate labels

(63) Conservation of the Enos Nuttall Papers

David Mohammed, Supervisor, National Library of Jamaica, Kingston, Jamaica

The main objective of this poster is to demonstrate how staff has been making conservation work, with outside the box thinking and the ability to be innovative in spite of the institution's limited resources. The aspects explored are: the care and handling of materials, and the treatment & restoration of badly damaged manuscripts—namely the Institute of Jamaica Letter Books and the Enos Nuttall Collections, as well as maps, general books, prints, and photographs.

The deterioration of these documents is as a result of: • Natural aging • Poor storage • Fluctuating temperatures and relative humidity • Pest infestation (e.g. silver fish) • Poor handling by users

The materials we use to treat and repair documents include: • Calcium hydroxide • Methyl-cellulose • Wheat and rice starch paste • Variety of Japanese tissues • De-ionised water • Klucel-G tissue • Alcohol

The techniques applied are washing and de-acidification, bounding of books with binding cloth, usage of book sleeves, sewing, and the making of Klucel-G tissue by the mixing of alcohol & Klucel-G powder. This tissue is currently being used on two of the Library's most prominent collections which are the Institute of Jamaica Letter Books and the Enos Nuttall Collections. These contain a number of letters written on onion skin tissue with what is known as "iron gall ink" resulting in the writing literally falling out creating quite a challenge for restorative work. Another method is by designing makeshift drying racks (made of wood and fishing lines) and makeshift dehumidifiers which is a tray with damp blotting paper, four plastic bottle covers and mesh and then covered with Perspex. The latter being used to relax folded documents enabling better restoration. Conservation can be a tedious task, however, our overall approach is always to restore every document to, or as close as possible to its original form. The skills and various techniques used to achieve this objective are evident in our collection as documents that have been treated and restored over two decades ago are still in very good condition. This proves that principles once carefully applied can achieve success. The Preservation and Conservation Department has always been confident in the knowledge that we have fulfilled our goal and mandate to preserve materials acquired for posterity.

(64) APOYOnline Association for Heritage Preservation of the Americas: 25 Years Building Communication Bridges in the Americas

Amparo Rueda Arciniegas, International Consultant and Trainer on Preventative Conservation, Chía, Cundinamarca, Colombia, Beatriz Haspo, Collections Officer, CALM Division, Library of Congress, Escarlet Silva, Member Director, APOYOnline

In 1989 during an AIC Meeting, a group of Latin American and North American conservation professionals met to discuss how to assist colleagues in Latin America in their professional activities. They effectively began to construct an interactive bridge between their Latin American and North American colleagues. The goal of this association of volunteers is to disseminate the conservation philosophy, and to share the challenges, practices, and experiences of people dedicated to preserve and conserve their common cultural heritage.

APOYOnline has grown into a non-profit organization that promotes communication, exchange and professional development in the field of heritage preservation in Portuguese and Spanish speaking countries throughout the Americas. Numerous institutions have promoted and fostered the activities to fulfill our mission to its current strength:

- A Website, <http://www.APOYOnline.org> disseminates current information on events, publications and pertinent links. First developed in 1999 and hosted by Imaginario, sponsored by the Instituto Provincial de la Cultura in Mendoza, Argentina, APOYOnline webpage is now expanding online and into social media to improve outreach and dissemination of information world wide.

- Scholarships for Latin American and Caribbean professionals. Thanks to funding from the Getty Grant Program and the Foundation of the AIC, over 250 professionals have attended the AIC Annual Meetings since 1997.

- A Network of conservation and preservation professionals. Currently includes over 4,500 individuals and institutions. It continues to strengthen the professional links between the two hemispheres. This project began in 1989. In 1994 ICCROM offered the support of its Database Management Office allowing its database to merge with that of APOYO.

- Publications keep APOYOnline members informed of current best practices. Printed newsletters consisting of one or two issues per year supported by the Smithsonian's SCMRE, was published from 1990 to 2003. Today, the newsletters archive is available online at the APOYOnline web page.

Three Directories of Individuals and Institutions working for the conservation and preservation of the cultural patrimony of the Americas were published in 1996, 1998 and 2001. These directories were published as a cooperative project between ICCROM, the Smithsonian Institution and APOYO. In 1999, the CCI's chart "Framework for the Preservation of Museum Collections" was translated by APOYO volunteers into Spanish and distributed to more than 4,500 Latin-American professionals. The CCI and the Smithsonian (SCMRE) supported the publication and distribution of this chart. In 2001, APOYO Volunteers translated into Spanish the CD-ROM Exhibition Conservation Guidelines by

Toby Raphael, NPS. In 2011, The Risk Management Manual by Robert Waller, Protect Heritage Corp., was translated into Spanish and Portuguese by APOYO volunteers and has been used in workshops throughout Latin America.

Awards: from 2000 to 2003, APOYO obtained funding to establish awards for Latin American institution from four manufacturers and distributors of conservation products: Gaylord, Metal Edge, Museum Services Corporation, and University Products. After 25 years of hard work of countless dedicated individuals, who continue to believe in its mission, APOYOnline has succeeded in creating and strengthening a communication and information bridge among conservation professionals of the American Hemisphere.

(65) The Preventive Conservation as a Tool: Experiences in the Cooperative Interinstitutional Project for Institutions in Rio de Janeiro

Milagros Vaillant Callol, Responsible of the Group of Conservation and Restoration from de National Union and Cuban Writers (UNEAC)/ Independent Adviser in Conservation of Cultural Heritage, National Union of Artists and Cuban Writers (UNEAC), La Habana, Cuba

The conservation of the cultural heritage is a problem of world wide repercussion, influencing a wide range of physical, chemical, biological, climatic, social-cultural and economic factors. For this reason, it should be approached with a multidisciplinary focus.

The libraries and the archives face a massive problem of deterioration and loss of their collections, many of which are every day more fragile, even many of them are in risk of disappearing due to their high acidity. The majority of collection present problems that cannot be solved with the traditional restoration procedures. Due their great volume, the best alternative is preventive conservation. There are specific problems in institutions where collections of historic documentary heritage in Rio de Janeiro are kept. Brazil is a country with a tropical climate where the RH and T normally are high and fluctuating, conditions that help the development of the deterioration processes of the documentary heritage.

An Inter-institutional Cooperative Project for institutions in Rio de Janeiro was created to preserve with appropriate methods this important part of the Brazilian cultural patrimony. It has the following objectives: to develop training programs in preventive conservation, to carry out research that would allow to elaborate a concrete group of preventive conservation recommendations and to introduce these concepts in the daily practice of each institution.

Some of the results worthy of highlighting are the creation of a Working Group in Rio de Janeiro, the Carioca Group, in which there are participants representing all institutions in the group. The work carried out in the different institutions fostered open channels of collaboration and exchange among several Brazilian institutions that preserve important documentary patrimony. Educational and scientific activities contributed to increase the training level and understanding of the members of the working group and to introduce these concepts and a new work style with a more preventive focus.

Other important results were several publications, which were presented, in various national and international congresses for the dissemination of the results. A book was published in Spanish and Portuguese, offering current information on the Bio deterioration processes of the documentary patrimony and some alternatives for the risk elimination and control. These publications are online and are accessible to conservators and scientists. The working methodology used was applied in a Cuban institution, some institutions in Valencia, Spain and Carioca institutions. We were able to demonstrate that this methodology is applicable to institutions located in different geographical latitudes.

(66) Proposal for Intervention in the Historic Monuments: Safeguarding, Preservation and Caretaking in Historical Greenhouse at Instituto Florestal of São Paulo, Brazil

Cristina Lara Corrêa, Conservator And Research Associate, GT Zeladoria do Patrimônio Histórico Edificado Paulista (SAMAS-SP), São Paulo, Brazil

This poster aims to contribute to the increasing demand for parameters in the planning, management and implementation of practices for preventive conservation, safeguarding and valuing tangible and intangible assets of São Paulo's public interest.

Formed by multidisciplinary professionals working in São Paulo, Brazil, a working group was created during the course "Zeladoria do Patrimônio Histórico Edificado Paulista" (Guarding Cultural Historic Built Heritage of São Paulo), which was given by the São Paulo Sacred Museum Friends Association (SAMAS-SP) with the goal to empower citizens (students, technicians and professionals) to take actions aimed towards protecting cultural heritage through transfer of theoretical, technical and methodological knowledge, by retrieving the memory and knowledge of construction techniques, their conditions and their urban trajectories in order to restore their integrity, their social inclusion and sustainability.

Designed as a "forum," the course promotes lectures and technical visits with experts, teachers from public and private universities, technical experts from local, state and national preservation institutions, public and private administrators and managers, and researchers from various fields to address topics related to diverse heritage assets in private and public spaces, inside and outside the city. This curriculum is supported by a virtual learning environment (Moodle system) and is designed to provide pedagogical support for teachers and students.

The applicability of this research method points out challenges and important issues with catalytic function and multiplying effect in contrast to processes and discussions of national and international groups alike. This democratic and inclusive approach, generated three action working groups to address the following themes: Burle Marx Square in Ibirapuera Park; the Greenhouse of the Woods Lab at Forest Institute of São Paulo; and the house of administration in Vila Maria Zelia, a working-class quarter built by an industrial in the early 20th century, generating a study based on a historical and physical survey, a preliminary diagnostic study and the presentation of relevant actions from the

conservation team.

Known as "Guardians of the Cultural Historic Built Heritage of Sao Paulo," this working group is committed to preserving the cultural and historical heritage and has been designing a comprehensive action plan in order to expand and establish partnerships and relationships with other peers in order to reverebrate the concept and philosophy of "Preservation/Preventive Conservation/Cultural Heritage Conservation," which is very much related to the theme of AIC's annual meeting, "Practical Philosophy, or Making Conservation Work."

(67) Confronting and Linking Restoration Theory to Reality: Field Practices at the National Restoration School

Lilian Garcia-Alonso Alba, Professor, Escuela Nacional De Conservación, Restauración Y Museografía Del Instituto Nacional De Antropología E Historia (INAH), Mexico City, Mexico

The National School of Conservation and Restoration ENCRyM began its functions in Mexico City in the year 1968 with the recognition of UNESCO. Globally, it was the first university to offer a degree in restoration. The school has the potential to form professionals in the research, restoration and diffusion of the cultural heritage of the nation.

From their first year in school the students learn the theory and principles of restoration while taking a direct approach to real heritage objects. They make their first intervention proposals supported by theoretical and material knowledge of the different objects and materials that are an important part of our heritage. They count with the advice of qualified teachers and the support of experts in chemistry, biology, history and other disciplines, as well as having access to laboratories and workshops equipped with the tools and materials needed for research and intervention. They learn and research about the theoretical ideals of the restoration practices and about storage and exposure parameters in order to confront theory with reality in museums, archaeological sites, temples and rural communities that possess our cultural heritage. Twice or more times a year, the students have to go to a practice field in which they live and learn in the transition between what is taught in theory with what they find in the field so they have to come with a solution that not only involves knowledge, but understanding of the situation and context they face with both commitment and creativity.

The future conservator takes experience from the field practice and understanding of the social and human reality that the theoretical framework alone cannot give. Fieldwork allows the student to achieve a theoretical and practical link in order to confront the problems posed by institutional and community constraints and the lack of materials and resources, in its real dimension. In field practice, students take the first step in recognizing how the theory is put into practice in a context outside the comfort of the school.

This paper presents how the student applies the theoretical and methodological tools learned along the career options in specific areas of reality. Cases such as the Textiles seminar and workshop field practice in which the students have their first contact with a real work situation at the Textile Museum of Oaxaca where they

are confronted with the multiple tasks and collective work that allow the operation of a museum. In addition, cases are presented of field practices in churches and rural communities, situations in which the students demonstrate their willingness and ability to make decisions and put a test to their ability to work together and/or with other experts. By showing their knowledge and creativity to solve problems they demonstrate that, indeed, better solutions can evolve from necessity.

(68) Expression Imposed or Superposed: Reintegration of Paper-based Artifacts According to the Custodian's Needs

Magdalena Grenda, paper conservator, Warsaw Uprising Museum, Warsaw, Poland

Conservation as a process has been described by the contemporary theory of conservation as a kind of expression that serves to enhance the meaning and secure the values of the artifacts' custodians. On the other hand, conservation is defined as an interpretation, as every treatment is a result of the decision-making process, and every decision is a next step of intervention that might affect the object's appearance and structure. It can be described as the expression of the conservator. Therefore, when it comes to cooperation between the conservator and the custodian, conservators experience the clash of two (or even more) different articulations, one of which inevitably prevails, because otherwise it would be impossible to complete the treatment.

The crucial point in the process of decision-making is communication. It enables to set the goal, define the principles and discuss the plan of treatment. It is also important, that conservators should not presuppose the needs of the custodians and have to be prepared to meet surprising approaches and unexpected needs of the owners. Unlike the stereotypes, the owners of public collections are not always advocates of archival attitude to reintegration of losses, and similarly, the custodians of the private collections may prove to be more stringent about historical values that institutional curators.

The paper presents different approaches to the issue of image reintegration and infilling the losses in paper-based objects, according to the context of their usage, the custodians' expectations and the self-reinterpretation by the artist. The diversity of examples shows the complexity of the problem of image reintegration and demonstrates there are no simple schemes for the decision workflow.

The presentation also provides a few examples of the application of *tratteggio* retouch in paper-based artifacts, both in large-scale objects like posters, and "handy" items as an album or a fan. *Tratteggio* is described here as a tool to compromise "the expression of the loss" and a solution for those reluctant to reconstruction. It may be actually defined as another way of expression introduced to the object. The use of *tratteggio* is discussed as a legacy of the classical theory of conservation.

Different case studies of image reintegration solutions are discussed in relation to the issues of appropriateness, negotiatory and adaptive character of conservation, and valuing in value-led conservation treatment.

(69) The Conservation of a Roman-Egyptian Mummy Mask, Case Study

Mahmud Hassan El behairy, Objects Conservator, Fatma Zaid, paper/papyrus conservator, at The Grand Egyptian Museum, Conservation Center, Egypt

The paper impetus is to describe an unusual cartonnage mummy mask excavated at Elminya area of Upper Egypt. It is a fine example of early Roman-Egyptian Funerary art. In 2010, the Grand Egyptian Museum has received this mask to prepare it for storage; it was kept in nonstandard transport box, which caused severe damage to the object; the mummy mask was broken, and the face was crushed. Before re-forming the crushed areas, the pigments were consolidated using a mixture of Methylcellulose and Ethyl methacrylate "Klucel G and Paraloid B-72" dissolved in ethanol. Small fragments were added and the cracks laminated inside with strips of Japanese paper "medium Wight KOZO fibers" fixed with acrylate resin plectol D-360. For physical stabilization, an inner form was made from papier maché covered with Japanese paper; Gaps were filled with bits of dry cellulose fixed with methylcellulose adhesive and slightly colored. Customized box was made for storage.

(70) 'Ideal' Versus 'Possible' in Field of Scientific Investigation Nowadays

Marcia Rizzo, Professor of Superior Conservation Course / conservator, PUC- SP Pontifical Catholic University of São Paulo, Brazil

The aim of this paper is to discuss the relationship between the "ideal" and the "possible" in the field of scientific research applied to conservation of cultural heritage. The scientific research on works of art must be done very carefully. The non-destructive analysis methods are preferred to the destructive. First of all the question and the reason of this question must be clear. Then it's necessary to know that methods of analysis can give the expected response, which of these methods are available and which are possible to be applied to works of art. It's necessary to think also about whether the analysis will be done in situ or if the work must be carried. If with withdrawal of samples or not. In other words it is necessary to create a strategy and approach procedure. However, as is known, it's not always possible to use the ideal procedure with all equipment and analysis desired. Sometimes the restriction is imposed by the artwork itself, because of the size, location, condition, etc.; other, by the project, deadlines, budgets, resources, availability of equipment, materials, etc. It takes a very broad knowledge in the scientific area to make the most appropriate decisions.

To illustrate this, two examples will be discussed here: the research done in the paintings on the ceiling of the Carmelite church in SP, which used destructive methods, and the research done in the oil painting *Annunciation*, which used non-destructive methods. The paintings of Carmo Church in Sao Paulo, carried in the eighteenth century and attributed to the great Baroque artist Frei Jesuino of Mount Carmel, had refinish on funds and central figures. Original paints, as well as the subsequent interventions were investigated scientifically through diverse methods based on

the use of complementary techniques and cross link of results, for the purpose of timing layers and propose treatment of restoration. The original materials and those added later were physico-chemical and analytically characterized. For this purpose samples of repainting and micro-samples from the original painting were taken. The following techniques were employed: cross-section of the pictorial layer; microscopic observation by binocular microscope and scanning electron microscopy with energy dispersive analyzer of X-ray the *Annunciation* painting made by Swedish artist Fredrik Westin (1782-1862), presented refinishing in several areas. It was possible to identify these areas through observation with UV radiation. The original pigments and the paints added later were characterized with a portable fluorescence X-rays Tracer III-SD da Bruker. In this case it was not necessary to remove samples. Whenever possible, the ideal is to make the scientific investigation of works of art with non-destructive methods in situ analysis, analyzing the front of pictorial layer; however sometimes it is necessary to observe directly the overlapping strata. And in these cases the withdrawal of samples could be required. It is important to assess whether the response I intend to get justified the use of a destructive method of analysis. The investigation made at Carmo's Church contributed to reveal a very important painting and also part of Brazilian history.

(71) Two Treatments: Too Much Versus Too Little? Brancusi and Man Ray Contrasted

Alison Norton, Paper Conservator, Moderna Museet, Stockholm, Sweden

The practical and philosophical aspects of the handling of two works of modern art, by Brancusi and Man Ray, will be contrasted. Discussion surrounding their vastly different treatments touches on aesthetic and ethical issues, the limitations of time and research, and on curatorial demands.

Portrait of James Joyce, circa 1928, by Constantin Brancusi is a curved cardboard wall sculpture hung on a metal spiral. Man Ray's *Transmutation (Theatr)* from 1916 is an early collage, with cut-outs and media applied to newspaper adhered to a wooden layerboard. Both works to some extent were considered unreadable in their untreated state yet their conservation was diametrically opposed - interventive, invasive stain reduction versus the bare minimum and an imagined digital reconstruction. The Brancusi had a wide, dark band of tideline staining across the entire lower section and treatment involved over a hundred hours of painstaking stain reduction. Discussions concluded that the stain was so prominent it was impossible to contemplate the artwork as intended. It drew the eye, distracting from the simplicity and form. The treatment was slow, and complicated by the sheer thinness of the facing paper and the discoloured degradation of the inner core. The stain was considerably reduced, remaining visible but without its deforming immediacy.

The Man Ray newspaper remains powerfully discoloured with dramatically faded components. In effect it is also a radically different work than when first executed. Collaged letters were probably originally red, based on earlier testimony of pinkish tones and tiny faint traces of colour visible under magnification, but this red colour has now diminished almost completely to white. A digital

reconstruction attempted to establish an earlier artistic legibility. The produced and published image altered the colour, balance and filled in losses. This recreation of how the work may have looked a century ago is striking in comparison to the largely untouched artwork, with its power more easily appreciated. The paper discusses the considerations and contradictions involved in treating modern degraded works by different artists. How does the idea and story influence proposals? It touches on the role of instinct in initial decision making and how this is cemented, or not, by more rigorous thought and the practical limitations of what can be done. Both artworks require more research - on the Man Ray materials and background to the Brancusi - but would more knowledge have led to changing aspects of their treatment? Neither of the results is wholly ideal, but are they satisfactory or a case of too much / too little? In a time of restraint, prevention and facsimiles coexisting with emphasis on exhibition and current use the paper attempts to find a philosophical basis for such different approaches and outcomes.

(72) Modular Mount for pre-Columbian Tunics

Robin Hanson, Associate Conservator of Textiles, Cleveland Museum of Art; Philip Brutz, Mountmaker, Cleveland Museum of Art; Carlo Maggiora, Principle, Carlo Maggiora LLC, Museum Mountmakers

Wari: Lords of the Ancient Andes, an exhibition organized by the Cleveland Museum of Art (CMA), opened in Cleveland in October 2013 and then traveled to two additional US venues. Before the Inca - between 600 and 1000 AD - the Wari forged a complex society widely regarded today as ancient Peru's first empire. The first exhibition of this culture in North America, Wari included more than 100 artworks from more than 45 lenders in all major Wari media, including ceramics, ornaments made of inlays of gold and silver, and sculpture, in addition to tunics and other garments from one of the world's most distinguished textile traditions.

Because the exhibition included so many similar textiles - tunics - that Cleveland was responsible for mounting for display, a flexible, easy to install mounting system that also satisfied the requirements of the museum's design department had to be created. An added complication was that not all of the tunics were displayed at all venues. The result was the mounting system described in this poster, developed by CMA's textile conservator working with the museum's mountmaker and a contract mountmaker. The basic mount, designed for tunics displayed in wall mounted cases, was adapted for use with tunics displayed in the center of the gallery and seen in the round, as well as for use in a compression fit scenario in a large plexi vitrine.

(73) Study of the Effect of the Enzyme Protease that Used in Textile Conservation on Cotton Fibers Dyed Natural Dyes

Dr. Harby E. Ahmed, Conservation Department, Faculty of Archaeology, Cairo University, Egypt

Enzymes have become widely accepted as some of the most useful reagents available to conservators. The application of the enzyme

protease on textiles is an efficient conservation method to remove animal glue adhesive and protein stains such as blood. The main advantage of using this enzyme is its specificity and efficiency to catalyze the hydrolytic cleavage of peptide bonds in proteins. In this experimental work, the fibers that were used in this study were cotton dyed with Turmeric dye, madder dye mordanted with CuSO₄ or Ferric Citrate, as well as without mordant. The effect of protease from *Aspergillus oryzae* as a function of enzyme concentration and time of treatment on the color parameters (the CIE-Lab values) was extensively studied. Furthermore, the effect of protease on the morphology of the surface of the untreated and enzymatically treated cotton dyed fabric was investigated using SEM and Stereoscope. Also the effect of the enzyme on the mechanical parameters of cotton fibers (Tensile strength, Elongation, Crystallinity index) was studied by FTIR, XRD and ASTM method. The results show the effective role of protease in the conservation of textiles and no significant change was observed on the fiber due to the protease enzyme treatment.

(74) Wynning Wynwood: Preserving Iconic Street Art

Viviana Dominguez, Art Conservator, Art Conservators Lab LLC, Francesca de Onis-Tomlinson, Television and Documentary Producer, Tomlinson de Onis Productions

The transformation of the once rundown and deserted district of Wynwood, close to downtown Miami, into the internationally renowned “Wynwood Walls” was thanks to the determination of a group of local artists known as Primary Flight. Today the concrete industrial warehouses are occupied by galleries and their walls are “dressed” with murals painted by street artists. Flocks of visitors stream through the streets and cheer the artists like rock stars while they paint. The artists were certainly successful in bringing art to the people and people to the art.

The urban landscape illustrated by temporary street art has turned the neighborhood into an important Miami landmark. The booming area attracted developers from New York City, who purchased warehouses. A curator, Jessica Goldman, selected famous perpetrators of this vandalistic art to paint murals on the firm’s Wynwood properties creating a unique open air museum. Taking to the streets, recognized artists such as Shephard Fairey, Kenny Scharf, Retna, Johnny Robles, and Kobra (São Paulo, Brazil), to mention just a few of the 45 artists involved, added their signature to the walls with their murals.

Another interesting factor that adds to the trend is that many murals are painted over and over every year, keeping the physiognomy of the area alive. The terms of their preservation depends on the property owners. Some are well kept, others are abandoned and tagged. However the revival of the area also brought a wave of developers eager to tear down and rebuild on the now valuable property. Because of this, many of these great works of art are disappearing very fast.

Given this scenario, the question is when does the conservator step in? A few years ago the Museum of HistoryMiami tried to rescue *Wingspan*, a mural painting by Etna and El MAC from the threat of demolition. The institution contacted Viviana Dominguez and Rosa Lowinger to remove the mural in order to

preserve some of the city’s history, but no funds were available and the project did not materialize. This is an all too common example of the perishability of street art. There appears to be a lack of government policy concerning this issue. To date no one has raised the question of preserving these city icons. Are these murals going to be removed from their context and sold in the art market as was done with the iconic Banksy wall stencils? Do the Wynwood murals need to be protected?

The authors of this paper will present the evolution of Miami’s Wynwood district with the data collected through interviews with artists. The authors will discuss how the engagement of different sectors brought attention to this area and the need for a preservation program. In this presentation, they will debate the role of the conservator at present and the future possibilities as a conservator/agent/facilitator to raise consciousness and to help the community keep the street art spirit and this Wynwood trend alive. Street Art saved the neighborhood; now it is our duty to save Street Art.

(75) SEM vs. Micro-Reflectance Transformation Imaging (RTI) for Examining Tool Marks on Jade

Julie Lauffenburger, Assistant Director of Conservation and Technical Research, The Walters Art Museum, Keats Webb, The Museum Conservation Institute, Paul Messier, Paul Messier LLC

Historically, since the publication of L. Gorelick and A. J. Gwinnett *Ancient Seals and Modern Science*, in 1978, scanning Electron Microscopy or SEM imaging has been a method used by conservators for the examination of tool marks on stone for the purposes of studying the materials and methods of fabrication. Additionally, the study of tool marks has been one of the few techniques at the conservator’s disposal when working with stone, which can help to identify the presence of a modern hand and therefore a potential forgery. SEM is a powerful tool for imaging micro-features on surfaces and has a wide range of magnification is possible from 20 times up to 150,000 times. Traditionally though, when studying tool marks, magnifications that are the most informative are on the order of only 28–35 x, an area at the lowest end of the SEM capabilities. In addition, few institutions have SEM on the premises or ready access to an SEM. With the incorporation of RTI, or Reflectance Transformation Imaging as an examination and documentation tool for conservators, the question posed was: can the features seen with SEM also be seen with RTI or more specifically micro-RTI.

A study was designed using a small group of Costa Rican jade artifacts in the Walters collection. Silicone impressions were taken from representative tool marks on the surface of the jades and the impressions were examined with the following comparative techniques: SEM in collaboration with Scott Whittaker at the Smithsonian Institution, macro-RTI by Keats Webb at the Museum Conservation Institute and micro-RTI conducted at the Walters on a custom-designed unit, which automates the process of RTI sequential lighting and exposure on the micro level. This system, designated as “The Monkey Brain” was developed and created by Paul and Andrew Messier and was generously lent to

the Walters for the purposes of this study. Additionally, comparisons were made between images taken from silicone impressions of tool marks and direct imaging of the tool marks on the jade artifacts. The results of this comparative study will be presented.

(76) Observations on the Use of OCT to Examine the Varnish Layer of Paintings

Derek Nankivil, Fitzpatrick Scholar, Department of Biomedical Engineering, Duke University, Adele DeCruz, Departments of Chemistry and Biology, Duke University, Joseph A. Izatt, Department of Biomedical Engineering, Duke University

To restore the original intent of the artist, art conservation is moving towards an increased use of laser ablation to remove varnish layers, which have become encrusted with contaminants or have been otherwise altered over the years. It should be possible to guide the restoration process with imaging modalities that provide information about the varnish layer. In paintings where the encrustation has not rendered the varnish completely opaque, Optical Coherence Tomography (OCT) has the potential to provide details about the structure and thickness of the varnish layer in a non-invasive manner.

In this study, OCT was used to visualize and quantify the varnish layer of paintings and to verify the success of efforts by conservators to remove the varnish layer using laser ablation. A free-running Er:YAG (MonaLaser, Orlando, Florida) laser with a central wavelength of 2.94 μm , a repetition rate of 15 kHz and an optical power of 1 mW was used to remove the varnish. A spectral domain OCT system with a Michelson topology was constructed using a broadband superluminescent diode (SLD-371, Superlum, Carrigtwohill, Ireland) with a central wavelength of 840 nm and a 50 nm bandwidth and a line scan CMOS sensor (AViiVA, e2v Inc., Milpitas CA) with a 20 kHz line rate. The sample arm design utilized a 4f relay between the first and second galvanometer and a telecentric beam delivery system to minimize optical distortions. The OCT system provided an 8.5 μm axial and 7.5 μm lateral resolution, a sensitivity of 105 dB, an imaging range of 0.8 mm (6dB fall off) and a field of view of 5 x 5 mm.

Samples, including pigment, varnish and substrate, approximately 1 mm² in size, were removed from an oil painting on panel (San Giorgio Maggiore) by Martin Rico (1833-1908) and imaged using Environmental Scanning Electron Microscopy (ESEM). Varnish thickness obtained from OCT was validated by similar measurements obtained from ESEM. In addition, other paintings, including a late 18th century landscape, signed Thomas Gainsborough, were imaged with OCT to compare neighboring regions before and after laser treatment and to examine the layering of the artist's signature in an effort to determine its authenticity.

Varnish layer thickness was $10.8 \pm 3.8 \mu\text{m}$ and $12.7 \pm 0.7 \mu\text{m}$ measured by OCT and ESEM respectively. Complete varnish layer removal was observed in several regions of paintings after laser treatment with occasional residual varnish in regions of significant surface topological variation. Additionally, the presence of over-paint and differences in penetration depth were observed in the OCT cross-sections.

We believe that this is the first demonstration of the application

of OCT to show that the varnish is removed by Er:YAG laser treatment. In conclusion, we demonstrate that OCT may provide a non-invasive technique that provides measures of the varnish layer and verification of its removal after laser ablation-based conservation efforts.

(77) Comparison of Klucel G Pre-made Mending Tissue Using Isopropanol and Ethanol and Three Methods of Reactivation

Erin Kraus, Conservator, Missouri State Archives,

Two solutions of Klucel G adhesive were made, one with isopropanol and one with ethanol. The mending tissue was made by applying the adhesive to Kizukishi Japanese tissue. The adhesives were reactivated using one of three methods of reactivation; brush application of the solvent, solvent vapor, and heat. The tissue sample with the reactivated adhesive was adhered to another tissue sample. Bond strength was determined with the T-Peel Test and the Lap Joint Shear Strength (LJSS) Test according to the American Society for Testing Materials standards (ASTM). The force needed to break the sample or pull it apart (depending on the test) was recorded. Klucel G was dyed with a Procion MX dye and the samples were prepared as previously described. The samples were then examined to see how far the adhesive penetrated into the tissue. There was no correlation between the solvent used to make the adhesive and the strength of the bond. Using isopropanol to reactivate that adhesive produced the strongest bond. The direct application of the solvent with a brush also made the strongest bond. The microscopy results support the tensile testing data because the isopropanol reactivation and the direct application of the solvent caused a deeper penetration of the adhesive which corresponds to the stronger bond produced.

(78) Cyclododecane as Temporary Consolidant for Asbestos-Containing Fill Material in Historic Osteology Specimens

Rebecca Kaczkowski, Kress Conservation Fellow, National Museum of History, Smithsonian Institution, Michael Hunt, Industrial Hygienist, Office of Safety, Health & Environmental Management, Smithsonian Institution, Catharine Hawks, Museum Conservator, National Museum of Natural History, Smithsonian Institution, Charles Potter, Collection Manager of Marine Mammals, Division of Mammals, National Museum of Natural History, Smithsonian Institution, Kathryn Makos, Industrial Hygienist/Research Collaborator, National Museum of Natural History, Smithsonian Institution

Museum collections can contain historically prepared and treated material; some of these materials pose an increased risk to specimen safety and human health. Specifically, the historic Steller sea cow (*Hydrodamalis gigas*) on exhibit at the National Museum of Natural History (NMNH) Osteology Hall represents an early 20th century installation. The armature, brackets, and modeled areas reflect techniques that are now known to pose physical and chemical risks to the specimen. Asbestos-containing

plaster fill material, if disturbed during handling and rendered air-borne, poses potential health risks to collection care personnel as well as possible environmental contamination. The primary goal of the project is to develop a mechanism for conservation treatment of the sea cow, exploring the use of cyclododecane for stabilization and temporary encapsulation of asbestos prior to the specimen's safe deinstallation.

The applied iron-alloy armature and unidentified metal brackets necessitated drilling through bone upon installation. Cracks have developed at stress points, exacerbated by unstable environmental conditions in the gallery. Adhesives on the specimen are promoting exfoliation related to their deterioration. Further, the plaster used to compensate for missing bones and to reinforce losses contains asbestos fiber. The specimen also has significant surface grime that promotes chemical degradation of the specimen and obstructs examination of the bone. The result is an extinct, scientifically valuable specimen with physical and chemical instabilities that complicate de-installation, transit, and subsequent conservation treatment. The exhibit format—suspended 20 feet above the gallery floor and recessed into the wall—does not allow for full-scale treatment to be carried out in situ. Therefore, successful asbestos encapsulation must be performed before the specimen can be safely moved to a conservation treatment locale.

Asbestos, a naturally occurring silicate mineral in several fibrous polymorphs, was widely used throughout the 19th and 20th centuries as an insulator, fire-retardant, plaster reinforcement, and filter material. Its role in causing a variety of diseases, including cancer, primarily through inhalation exposure led to bans in the 1970s on production and use of most forms in the U.S. Since the 1990s, cyclododecane, a saturated cyclic alkane in the form of a waxy solid, has increasingly been used by conservators as a temporary consolidation material based on its penchant to sublime at room temperature and pressure.

Several asbestos-containing plaster elements from other specimens serve as mock-ups for cleaning and consolidation testing in a controlled lab environment. Working with industrial hygienists, baseline samples taken by microvacuum are analyzed using transmission electron microscopy (TEM). To consolidate the affected plaster, cyclododecane will be applied with a variety of techniques and evaluated for efficacy via additional microvacuum sampling and TEM analysis. Application methods include direct application (controlling viscosity via heat or nonpolar solvents) or reactivation of consolidant-impregnated tissue facing material. The impact of temperature on the efficacy of consolidation is another evaluation factor. Based on results of the initial study, the experimentally determined effective protocol will be carried out in situ on three elements of the actual exhibited sea cow specimen and complete phase one of this large-scale conservation treatment.

(79) Combining Indigenous Practices and Modern Technology in the Conservation of Archival Material in Stella Maris College, Chennai: A Case Study

Gita Balachandran, Archivist, Stella Maris College, Chennai, Tamil Nadu, India

Today, conservation has become a serious call and challenge to both scientists and researchers. In 2011 the urgent need to preserve the history of Stella Maris College, Chennai, for the benefit of posterity led to the birth of Stellarchives – a pioneering, though modest venture to record the growth, experiences and achievements of the college through books, photographs, magazines, journals and ephemerals dating back to the foundation of the college in 1947. The collection, which spans a period of sixty-seven years, also includes Doctoral theses, artifacts, and artistic souvenirs of dedicated faculty and scholars, and sheds light on a rich past on which we look back with pride.

In this endeavour, our emphasis has always been on integrating preservation and archival management, with a focus on safe handling and storage of material in a protected eco-media. While taking into consideration environmental and climatic conditions, all our efforts are directed at effective preservation through traditional, eco-friendly practices using natural Indian herbal preservatives, combined with modern technology.

From its inception, Stellarchives has opted to use indigenous methods of conservation which offer significant eco-friendly advantages because – these methods are not hazardous to human health – these methods do not damage or destroy archival material – these methods are inexpensive and do not require much expertise – these methods do not necessitate the use of sophisticated high-cost equipment and material. This paper highlights the unique approach of Stellarchives, which combines the use of traditional methods with modern technology. The paper will also summarize the effectiveness of various traditional practices, Indian herbal pesticides and insect repellents in the preservation of valuable archival material.

(80) Conservation of Historical Documents with Silver Supported Chitosan Nanofibers

Güncem Özgün Eren, Graduate Student, Yıldız Technical University, Istanbul, Turkey, Cansu Noberi, Cengiz Kaya, Figen Kaya

History is a very significant matter of fact which contains the past, the present and the future of the societies, also has a very important place in improving the social consciousness. One of the most important duty of the mankind is to protect such a worthy history heritage. Paper can be deteriorated due to physical, chemical and biological based factors such as acidity, metal ions, lightning, heat, humidity, UV light, pollutants, fungi or bacteria as biodeteriogens. Within microorganisms, fungi are the major paper deteriogen. Since ancient times there has been a great concern about the inhibition of biodeterioration of paper items. The great majority of antifungal methods used to prevent and/or stop biodeterioration caused by fungi in paper conservation have been adapted from other scientific fields (Nittérus, 2000a).

The main aim of this study to establish conservation method for historical documents from different centuries by using silver doped chitosan nanofibers. Chitosan based nanofibres will be fabricated with electrospinning method. It is well known that Ag nanoparticles possess antibacterial properties. Electrospinning is a promising technique for producing continuous polymeric fibers with diameters down to nanometer scale. In electrospinning by using the action of an external electric field imposed on a polymer

solution or melt, polymeric based nanofibres such as polyvinyl alcohol (PVA) and polyvinylidene fluoride (PVDF) could be manufactured (Li Q, Xi S, Zhang X, 2013, 'Conservation of paper relics by electrospun PVDF fiber membranes' *Journal of Cultural Heritage*). Chitosan, a polysaccharide biopolymer derived from naturally occurring chitin, displays unique polycationic, chelating and film forming properties due to the presence of active amine and hydroxyl functional groups, is a natural polymer that is both non-toxic and biodegradable. In this work, hydrothermally synthesized Ag nanoparticles will be dispersed in chitosan solution. Obtained solution will be coated on paper samples as chitosan nanofiber containing Ag nanoparticles. Recently, many types of AgNPs have been loaded into a variety of nanofibrous scaffolds for antimicrobial applications. In terms of blending of chitosan with silver nanocomposites or films, these have previously been reported to possess excellent antimicrobial activity due to their high surface area (López-Carballo, Higuera, Gavara, & Hernández-Muñoz, 2013; Twu et al., 2008). Finally, coated paper samples will be tested for their antibacterial and antifungal resistance by using serial dilution and MMT techniques.

(81) Doing the Most in a Triage Situation

Steven Pickman, Contract Conservator, National Air and Space Museum, Smithsonian Institution, Sharon Norquest, Contract Conservator, National Air and Space Museum, Smithsonian Institution

Fundamental to treatment strategies within a triage context is the notion of trying to do as much as we can for as many objects as possible. Practically, this requires a rationalized balance between competing constraints, which can include methodological approaches, ethical considerations, available resources, and the supporting logistics. Identifying what can reasonably be done within those limitations allows for the efficient and effective application of conservation actions without sacrificing overall principles. Sometimes that means that preventive care is the only reasonable action that can be undertaken. Other times, invasive treatment is necessary to meet the needs of an object. Addressing these needs often necessitates creative solutions to deal with the complex issues that arise within a triage situation.

An effective example of these compromises is illustrated in the first stage of a triage project performed under the auspices of the Smithsonian National Air and Space Museum. Utilizing a Collections Care Preservation Fund (CCPF) grant, conservators were able to address treatment needs for over 200 small objects and artifacts that had been previously identified in collection surveys as requiring immediate action. The challenge here is treating many diverse objects from differing contexts. These objects can include traditional materials that conservators will be familiar with as well as modern alloys, coatings, and substances that were designed for the unique challenges of space travel. In addition to being composed of complex materials, many of these instruments have fabrication concerns as they were designed for a single use mission and not meant to survive or were intended to exist in the vacuum of space. These objects exhibit a variety of triage-necessary issues, including active corrosion, mold contamination, pest management, hazardous materials, and structural and surface insecurities. Solutions to the multifaceted problems were

built upon existing approaches for historic objects, adapting and applying materials and techniques to address their unique needs. Through select examples, problems and solutions will be illustrated to show how treatment protocols were developed to solve or mitigate existing issues within the demands and constraints of a triage setting.

(82) Analyzing and Retreating Copper Alloy Artifacts from the USS Monitor

Kathleen M. Sullivan, Conservator, The Mariners' Museum

The USS *Monitor* was an American Civil War ironclad ship that sank in 1862, roughly sixteen miles off the coast of Cape Hatteras, NC. Expeditions to the site from the late 1990s to the early 2000s resulted in approximately 210 tons of archaeological material being recovered from the wreck, all of which is being conserved at The Mariners' Museum (TMM) in Newport News, VA.

During rehousing of the conserved portion of the collection, it was discovered that circular areas of white powdery bloom had appeared on the surface of some of the previously treated copper alloy artifacts. These artifacts were isolated to await documentation, analysis, and retreatment. There were several hypotheses as to the cause of the white bloom. Conservators were concerned that potentially not all of the chlorides were extracted during desalination. If there were any residual chlorides, they could have reacted with the corrosion inhibitor BTA with which the objects were previously treated. Another hypothesis was that the white bloom was caused by dezincification. Therefore, samples of the white bloom from thirteen artifacts were analyzed using a scanning electron microscope (SEM) with an energy-dispersive spectrometer (EDS). Results of the analysis have shown that deposits on eleven out of thirteen artifacts were sodium based. All samples showed oxygen and carbon. Additional chemical testing determined that the white bloom was most likely sodium carbonate. This was not an overly surprising result as the initial treatment for these objects had included undergoing electrolytic reduction in a sodium sesquicarbonate solution. It is possible that the rinsing phase of the treatment was not quite as thorough as necessary. However, there were no chlorides found in the deposits on these eleven artifacts indicating that the desalination process was successful. Research and testing are currently underway to determine the best method to retreat these objects.

(83) Orange is the New Red – The Repainting of Robert Murray's Duet (Homage to David Smith)

Julia Langenbacher, Research Lab Assistant, The Getty Conservation Institute, Rachel Rivenc, Associate Scientist, The Getty Conservation Institute, Rosa Lowinger, Principal and Senior Conservator, Rosa Lowinger & Associates – Conservation of Art and Architecture, Christina Varvi, Associate Conservator, Rosa Lowinger & Associates – Conservation of Art and Architecture, Brian Trimble, Interim Director, University Art Museum, California State University, Long Beach

2015 marks the 50th anniversary of a pioneering event, the Sculpture Symposium held in 1965 at the California State University Long Beach (CSULB). The first International Sculpture Symposium in the United States and the first to occur on a college campus, the symposium partnered an international cadre of artists with local companies to create innovative sculpture using industrial materials and new technologies. These works form the core of the monumental sculpture collection located throughout the CSULB campus.

As the 50th anniversary approaches, and as part of a broad partnership between the Getty Conservation Institute (GCI), CSULB, and Rosa Lowinger and Associates, the corpus of sculpture was surveyed, its conditions assessed, and treatment needs prioritized. Robert Murray's *Duet (Homage to David Smith)* was selected to be the first sculpture treated. The paint layers, faded and pitted with numerous losses and abrasion, were a pitiful sight for visitors. In addition they did not protect efficiently the metal substrate any longer, putting it at risk of corrosion. The treatment was therefore urgent, and the sculpture also embodied many of the conservation issues typical of outdoor painted sculptures and the associated ethical considerations.

Duet was fabricated at the Bethlehem Steel shipyard in San Pedro. It consists of three steel plates assembled and painted with a custom-mixed epoxy paint which was at the time very new. Recent examination of the sculpture revealed that the sculpture has already been repainted several times. By looking at the stratigraphy of the 14 different paint layers, a color modification during the course of years became apparent. It ranges from the original pale orange to more intense red top layers. Archival evidence and consultation with the artist suggest that the color shift was partially intentional, and meant to offset the rapid discoloration of the original dull orange color. The initial study included a sampling and analyses by means of optical microscopy, Raman and Fourier transform infrared spectroscopy (FTIR) spectroscopy, Pyrolysis-gas chromatography-mass spectrometry (Py-GCMS) and Environmental scanning electron microscope with Energy-dispersive spectroscopy (ESEM-EDS). In addition, excavation windows were uncovered at different locations on the sculpture in order to visualize the color sequence and perform color measurements. Finally paint swatches were prepared in various shades and gloss levels so that their appearance could be discussed with the artist, Robert Murray. The paper presents the analytical results and outlines the methodological challenges of color matching based on the comparison to early photographs and examination of the faded layers, and discusses the ethical considerations involved the final color choice. It will also detail the onsite repainting treatment of *Duet*, scheduled to take place in October 2015.

(84) Active, Supportive, and Flexible: The Evolving Role of Book Conservation in Digitisation Projects

Flavio Marzo, Conservation Studio Manager, British Library, Qatar Foundation Partnership

Digitisation projects are increasingly becoming priorities in our cultural institutions. The importance of Conservation and Preservation within them is now widely recognised and treatment

approaches matching their special requirements have been broadly discussed. In this presentation, the author will highlight how the practical and broader skills of the book conservator has evolved to play a fundamental part in the success of a digitisation project – not only supporting it but actually enabling it from the scoping stage to the delivery of the digitised content.

This will be demonstrated using the recent experience gained within a collaborative project between the British Library and the Qatar Foundation. The current first stage of the Partnership will produce 500,000 images from a variety of library material such as Arabic manuscripts, files, photographic albums, maps and audio and visual content. The digitised content will be accessed through a new website for the National Library of Qatar.

The discussion will focus on three themes: 1. The physical location of the conservation studio. Located within the same space as all other project strands. Conservation is placed physically close to colleagues and this has benefited the project as a whole. Equality is promoted between all project staff and cross-team communication is optimised making daily issues related to the condition of collection items, their handling and the application of best practices, readily overcome.

2. The involvement of Conservation/Preservation in all stages of the workflow has identified and resolved problems effectively and aided a life cycle analysis of objects and their needs. A customised new policies and procedures document was created at the beginning of the project based on the BL Conservation 'fit for purpose' approach. The document addresses treatment approaches and the extent of treatment in the context of the project and set a common expectation for conservators, curators and imaging technicians alike. The knowledge of expert conservators was imperative in developing customised approaches and practices to achieve the best results without lowering quality of treatments or compromising professional ethical frameworks.

3. Conservation expertise has developed to become an independent and additional content strand within the project. Articles about the codicological features of items, explanatory videos of techniques and support for book binding terminology has added indisputable value to the content of the website and so to the items themselves. Such information is increasingly relevant today within the developing context of Islamic codicology and academic research.

As the needs of institutions change Conservation work must evolve and develop to meet new demands. Moreover, conservators are highly skilled, hands-on, practically focused, and efficient; they are used to project-based working and creative thinking. We therefore have much to offer but we need to be proactive and ready to adapt within always changing contexts.

The British Library/Qatar Foundation project has proved that Conservation remains a fundamental purpose of the institution and using Conservation expertise creatively can actually increase visibility of skills and knowledge that may otherwise be overlooked. A well-planned project can see productivity and innovation go along side with implementation of good practices and even increase the "value" of the processed objects by adding understanding of their physicality and improving their long term preservation.

(85) Illuminating the Martyred Saint: Conservation and Analysis of a Stained Glass Panel from Canterbury

Mary Clerkin Higgins, Owner, Conservator, Clerkin Higgins Stained Glass, Inc., Angela Chang, Assistant Director and Objects Conservator, Straus Center for Conservation and Technical Studies, Harvard Art Museums, Katherine Eremin, Stephan Wolohojian, Georgina Raynor

In 1924 the Fogg Museum at Harvard University was gifted an extraordinary artwork – a stained glass panel which had been installed in Canterbury Cathedral around 1205 depicting Thomas Becket, Archbishop of Canterbury, who had been murdered in the cathedral just 35 years earlier. One of only two panels extant from a much larger window (a decorative, border section is in the V&A Museum), it shows Becket sitting on a faldstool greeting a figure kneeling, with five other figures standing behind them, one of whom is William Grimm, his standard bearer.

With the recent renovation of the Harvard Art Museums, the opportunity arose for an in-depth, collaborative study and treatment of the Canterbury panel to better understand its manufacture and history. This three-year project involved conservators, a conservation scientist, and a curator, working closely to study, interpret, and present this significant object for display.

The panel contained substantial amounts of original glass, as well as numerous replacements. Many pieces of glass were broken and some had been repaired using lead. The panel had been releaded, but the original relationships between the pieces of glass had not been maintained. While connoisseurship helped guide the treatment at the start to distinguish original glass, there were numerous pieces where further investigation was needed. A complete disassembly of the panel's 260+ pieces for treatment provided a unique opportunity for access to and analysis of the glass to help define the panel's restoration history and to support treatment decisions. The glass was analyzed to determine the composition of the various pieces and assess their likely dates and relationships. Initial analysis involved non-destructive x-ray fluorescence (XRF) of every piece. To quantify compositions and detect light elements not seen by non-destructive air path analysis, small samples were taken from the edges of selected pieces and analyzed by scanning electron microscopy with energy dispersive microanalysis (SEM-EDS) and laser ablation with inductively coupled mass spectrometry (LA-ICPMS). This showed that the majority of the replacement glass was of similar medieval date, with a smaller amount of glass attributable to around the 15th, 17th and 19th centuries. Distinct compositional groupings allowed original glazing patterns and strategies to be surmised. Reassembly and loss compensation were guided by connoisseurship, analytical results, and practical considerations. While the overriding goal was to reestablish the original glass relationships as accurately as possible by studying the extant glass, the complexity of the panel and the numerous insertions meant that there could not be one guiding principle for including and excluding stopgaps. The approach to decision making was practical and shaped by curatorial interpretation. The documentation and analysis were, therefore, critical to the outcome of the conservation treatment. Stained glass is dependent on transmitted light, and much thought was put into its illumination in the gallery. The decision was made to hang the work backed by variable color temperature and dimmable LED

light sheet within a frame. This very recent technology allowed experimentation and adjustments to show the stained glass at its best in its gallery space.

(86) Parchment Mystery, Assessment and Comparison the Ratio of Degradation between the Interior Parts of Parchment and the Edges, Case Study

Moamen Othman; Fatma Zaid; and Mahmud Hassan El behairy, Objects Conservators, The Grand Egyptian Museum, Conservation Center, Egypt

The collection of Greek and Coptic papyri associated with Dioscorus of Aphrodito dated from sixth century BC (including a legal archive, personal papers, and original poetry) is one of the most important finds in the history of papyrology and has shed considerable light on the law and society of Byzantine Egypt.

The Grand Egyptian Museum holds a substantial portion of the Dioscorus archive, which was acquired in 2011 from the collections of the Egyptian Museum. This collection has evidence of previous restoration being performed: cardboard backing made of poor quality paper had been used as a method of preservation in the 19th century, and is very dangerous for the papyrus and can cause degradation. We evaluated the mechanical and physical effects of this old method of preservation from the point of inherent physical characteristics of paper support, chemical stability, sensitivity of paper to its environment, and potential alteration of support during handling.

The main purpose of this study is to stabilize and preserve one papyrus of Dioscorian poetry and remove sources of strain or stress by using a new method to remove the backing, the GORE-TEX technique. It uses moisture permeable material called expanded polytetrafluoroethylene (PTFE), sold under the trade name GORE-TEX. These GORE-TEX laminates consist of two layers, a polyester support and the membrane itself. The expanded PTFE membrane is produced with pores of approximately 0.2 µm in diameter and are suitable for conservation treatments. Due to its porous structure and the hydrophobic character of the GORE-TEX membrane, it prevents water and mixtures of water with polar solvents in liquid form from penetrating, but its permeable for gases like water vapor and solvent vapor.

(87) Hand in Hand: Conservation of Latex. Working with Contemporary Artist Susie MacMurray on Flock-lined Latex Gloves for *A Mixture of Frailties* Part I

Martha Singer, Principal, Atelier de Conservation, LLC

Can conservators play a role in conservation of an artwork by being involved with artists prior to manufacture? Should we influence their materials and working methods or is it preferable to be hands-off? Susie MacMurray, a contemporary artist, created a dress mainly composed of inside-out yellow latex rubber gloves called *A Mixture of Frailties* (73" h x 128" d). Thin cotton "flocking" on the inside of the glove is the side seen by the viewer.

Over time, this dress will change. If no treatment is done and this dress is exhibited in a gallery, the flocking will get dirty, collect dust, and become greyer. The latex will start to degrade, become stiff and possibly crack and darken. What are the artist's options? Should the preservation be in the form of a coating on the latex or would the artist prefer to use the gloves as-is and accept the aging process? Is there a value added (cost of pre-treatment vs. cost of creating anoxic environments and keeping it in the dark)? A cost analysis is included in the poster. Colorimetric readings and artificial aging tests on treated and untreated gloves were carried out with Jason Church, NCPTT (and presented in a companion poster). The results of these analyses form the basis for the recommendations. This poster presents the working method of the artist Susie MacMurray and how we worked to try to solve the problem of the potential aging issues of latex gloves. Latex and its aging properties will be discussed. Also, we will present the materials proposed for the solution (consolidant and anti-oxidant) and the artist's views on various solutions to this problem.

(88) Hand in Hand: Conservation of Latex. Working with Contemporary Artist Susie MacMurray on Flock-lined Latex Gloves for *A Mixture of Frailties* Part II

Jason Church, Materials Conservator, National Center for Preservation Technology and Training; Martha Singer, Conservator, Atelier de Conservation, LLC

Susie MacMurray is a British artist who works in a variety of materials. Some of her best-known works are large intricate garment sculptures. This testing was in conjunction with conservation treatments for MacMurray's sculpture *A Mixture of Frailties* (2004). This garment sculpture is made from 1400 latex gloves turned inside out. The goal of this project was to expose treated samples of natural latex to UV light; the exposure to UV is for accelerated aging. The samples of latex have been previously treated by conservator Martha Singer. All samples were treated with the same chemical but applied in a variety of methods. The goal of the accelerated aging is to chart the changes in the latex and how those changes relate to the treatment method. The samples were cut from Click 2000 Household medium weight gloves, product code HHMW size medium; gloves are flock lined natural rubber latex. These gloves are the same as those used by artist Susie MacMurray for her sculptural dresses.

In the experiment there are a total of eighteen samples. Ten of the samples were treated with the same chemical treatment and applied in three different methods. Four of the samples were treated using a nebulizer (NW), four samples had the treatment brushed onto them (PW), and the last two samples were sprayed (SW). An additional eight samples were untreated controls (UW); four of these controls were not weathered (UU). All samples were exposed in a Q-Lab QUV Weatherometer for 200 hours as per ASTM standard D 4329. This standard has a light cycle of 8 hours followed by 4 dark hours repeated for 200 hours. All samples were photographed and color measurements taken before weathering and at 100 and 200 hours of weathering.

This poster presentation looks at each of the treatment

methods and how they withstood the accelerated light exposure and how that relates to the longevity of the garment sculpture on display.

(89) Varsho in Dezful: An Ethnographic Report of the Transition of Cultural Material into Cultural Heritage

Sharareh Samangani, Dean Sully, Lecturer, UCL Institute of Archaeology, London

This project investigates the role of conservation practice in the transition a specific type of metalwork, varsho, commonly known as German or Nickel Silver, from things at hand into material culture and heritage. Some research suggests the technique of working with the material, varsho-sazi, developed in Dezful, Khuzestan Province and later spread to other parts of the country in the Qajar period. During this time, it grew in numbers significantly with utilitarian objects such as samovar and tea-drinking utensils. This boom ended after the importation of varsho sheets was stopped permanently in the 1970's.

In this work, a historical narrative is constructed through literature research and ethnographic fieldwork, to observe a transition in the relationships between things and people in the particular time and place of this study. As a response, it considers the role of heritage practice in this evolving system, and the potential consequences for conservation intervention. This story is told through interviews with Dezfuli people, from the production and use of varsho as a utilitarian product, to its gradual redundancy and its transformation into heritage. This reveals that the inability of manufacturers to access the raw materials to produce the objects results in a transformation in the way the objects themselves are valued and cared for. Changes in demand for varsho, as a socially strategic commodity, as dowry, can be seen to adapt to changes in social relationships. Changes in supply, with the introduction of cheaper imported mass produced products, have resulted in hereditary manufacturing practice being abandoned by younger generations. The identification of varsho as something of the past and not something, which is a vital viable practice, appears consistent between the manufacturers, users, and owners interviewed. Current owners reported how varsho, once valued for its functional utility, are now retained, and acquired as ways of connecting to a sense of identity, to families past lives, nostalgia for the past, and a sense of locality and pride of place. From the conservator's gaze, the physical condition of the objects, and the way that these collections are presented, can be seen to relate directly to the ideas of identity and value. The contrast between highly polished surfaces to those dusty and tarnished is dramatic.

By attending to the object in this ethnographic study, many aspects of varsho have been revealed. The processes of manufacturing and mending are described, and a different set of cleaning and maintaining processes have been locally identified that reflect a heritage perspective. As understanding the conservation object is an essential foundation for the conservation decision-making process, the heritage professional is required to catalyse these stories, and make them visible. We should accept however, that it may not have relevance outside of the created heritage world. Seeking to categorise varsho as heritage will have implications

for how the trajectories of identity, control, redundancy, and vibrancy are viewed and valued. Therefore, the creative process of the heritage professional is implicated in way that people are physically collecting things as heritage, in this case varsho.

(90) Magnets as an Alternative to Velcro

Gwen Spicer, Textile, Upholstery, and Objects Conservator, Spicer Art Conservation, LLC, Mike Dunphy, Project Manager, SmallCorp

Conservators have long sought an alternative to the use of Velcro. Over the years, disadvantages of Velcro have come to light. Specifically, concern with the use of Velcro began in the 1990's when discoloration of the product was being noticed. Several conservators became concerned and were suspicious of product modifications/alterations, which were resulting in color change.

The use of rare earth magnets attached to an aluminum slat may be the perfect alternative solution. The solution uses an extruded bar in an "L"-shaped cross-section, with grade N42, disc-shaped magnets pre-formed with counter-sunk holes. A 22-gauge steel piece is placed inside a twill-tape sleeve and needs to be created by the conservator or practitioner. The poster will focus on specific techniques of attaching the webbing sleeve to the reverse side of the artifact; how the webbing attachment is the same and different. The benefits of using a magnetic system behind the artifact will also be described. Incorporated into the poster will be an actual example.

(91) Preservation of the Sacred Cross of Chalpon, Motupe, Peru

Cesar Maguiña Gómez, Conservator, Instituto Americano de Investigacion y Conservacion, Chiclayo, Peru

The Sacred Cross of Motupe is located in the department of Lambayeque, Peru. It has been worshiped since 1868, when it was found inside a natural cave, in the Chalpon Mountain, Motupe. It was venerated by thousands of believers every day and every year, coming from different parts of the country. The cross measures: horizontally 1.50 m., vertically 2.26 and diameter 0.26 cm. A century ago, it was totally covered with silver and gold rings, donated by its worshippers.

Unfortunately, the Cross was stolen on July 5th, 2011. The population tried to find it around the mountains and everywhere, and after two days, it was found on the ground and its gold and silver ornaments had disappeared. What is worst, it had been cut with a hand saw in five sections, damaging its most critical parts and stability.

The cross is made from trunks of guayacán wood, in its natural state and its branches are like those of a common tree, with a simple structure. History tells that it was found in the 19th century by a hermit who put together both branches to make the Cross. From that date its structure had been maintained untouched, until the date it disappeared and was found cut in five pieces. These cuts gave us the opportunity to observe the internal structure. The wood is preserved and in good conditions. We think the perfumes spilled over the cross by its believers, due to the alcohol contents

might have avoided the presence of xylophages.

A multidisciplinary team was in charge of its restoration. Its purpose was to join the sectioned parts and recover its original shape. Its original dimensions were maintained, as well as its asymmetric shape and patina acquired with time. Only guayacán wood was used, similar to the original cross in color, dryness and consistency.

During the restoration no metal, such as nails or screws, was used to assemble it; only pieces of guayacán wood adhered with Milano glue, were introduced to fill gaps. Polyvinyl acetate was used to fix the parts and recover its capacity, structure and strength. For the reintegration pigments were used and its surface was protected with a layer of Paraloid B72 to 3%.

All the nation and the community were on the alert waiting for the treatment results. The cross has spiritual strength all over the Nation. On August 5th, 2011, the Cross was exhibited completely restored, during a ceremony lead by the highest hierarchy of the Catholic Church in Peru and with the attendance of about 20,000 people. Apart from the spiritual aspect of the Cross of Motupe, its restoration has returned to the region the economical life connected to the tourist trade: hotels, transportation, restaurants, artisans.

(92) Using XRF for the Identification of Chrome Tanning in Leather

Bruno P. Pouliot, Senior Objects Conservator and Affiliate Professor in Art Conservation, Winterthur Museum, Dr. Jennifer Mass, Senior Scientist, Scientific Research and Analysis Laboratory, Winterthur Museum, Lara Kaplan, Objects Conservator in Private Practice, Lara Kaplan Objects Conservation, LLC

Commercial production of chrome-tanned leather began in Philadelphia the 1890s. The process, using chromium sulfate, produces leathers with a high collagen shrinkage temperature and superior resistance to mold, water, chemicals and heat. Since the process required days instead of weeks, as it did with vegetable-tanned leathers, chrome tanning was soon adopted and widely used across Europe and North America. By 1925, it had become the main form of tanning in the shoe leather industry, and today it is used in the manufacture of over 80% of leathers worldwide. The standard micro-chemical spot test used to identify chrome tanning tends to be unreliable, given the difficulties encountered in separating chromium ions from the collagen matrix. This poster will present the results of a comparative study using X-ray fluorescence spectroscopy (XRF) to identify the presence of chromium in different types of leathers, including those prepared with the most common tanning and semi-tanning processes used on historical artifacts. The study shows how XRF is a powerful and completely non-invasive method to identify the presence of chromium in objects made of tanned skins and hides. XRF also proves to be a promising analytical tool for these kinds of objects in other regards. For instance it can pinpoint the presence of chromium in leathers that have received a combination tannage. In this process, which is common today, chrome tanning is used in conjunction with another tanning process, imparting the durability of chrome tanning with different visual and tactile qualities. It can also identify traces from other steps in leather

manufacturing process, such as residual chlorides from the salting of skins as a preservation method prior to tanning. Both portable and laboratory-based XRF methods are examined and discussed.

(93) An Extreme Case of Byne's Efflorescence: A Novel, Two-Pronged Approach to Consolidation

Bruno Pouliot, Senior Objects Conservator and Affiliate Professor in Art Conservation, Winterthur Museum, Claire Curran, Graduate Fellow in the Winterthur/University of Delaware Program in Art Conservation, Class of 2015

Greek Beach V, by artist Ilse Getz, was gifted to the Winterthur/University of Delaware Program in Art Conservation as a student treatment project. The piece is composed of found materials: a plywood support, woven rattan caning, cuttlefish bones, an animal phalange, and a whole egg. The sculpture, displayed in a Plexiglas case, was in poor condition; the cuttlefish bone had developed extensive Byne's efflorescence and was actively delaminating, while only a third of the egg remained intact and attached to the wicker substrate. Examination with the Plexiglas cover removed showed the presence of mold and corrosion of metal wire components, indicating sustained high relative humidity. It became apparent that this along with the plywood support and limited ventilation within the case had accelerated degradation and the development of Byne's efflorescence on the shell components. The extremely unstable condition of the cuttlefish bones meant that they could not take the slightest touch. As such, consolidation of the cuttlefish bone, the focus of this poster, was an essential component of this treatment.

Typical application of a consolidant with a brush was not appropriate as it caused the fragile surface to disintegrate further, requiring the development of a two-pronged approach. Consolidation was carried out by fixing the outer layers in place via mist consolidation, thereby allowing, as a second step, a more complete and in-depth consolidation of the interior layers with micro-pipette consolidation. This combination of consolidation methods provided minimal aesthetic change to the outer surface, yet an adequate consolidation of the cuttlefish bones.

NOTES