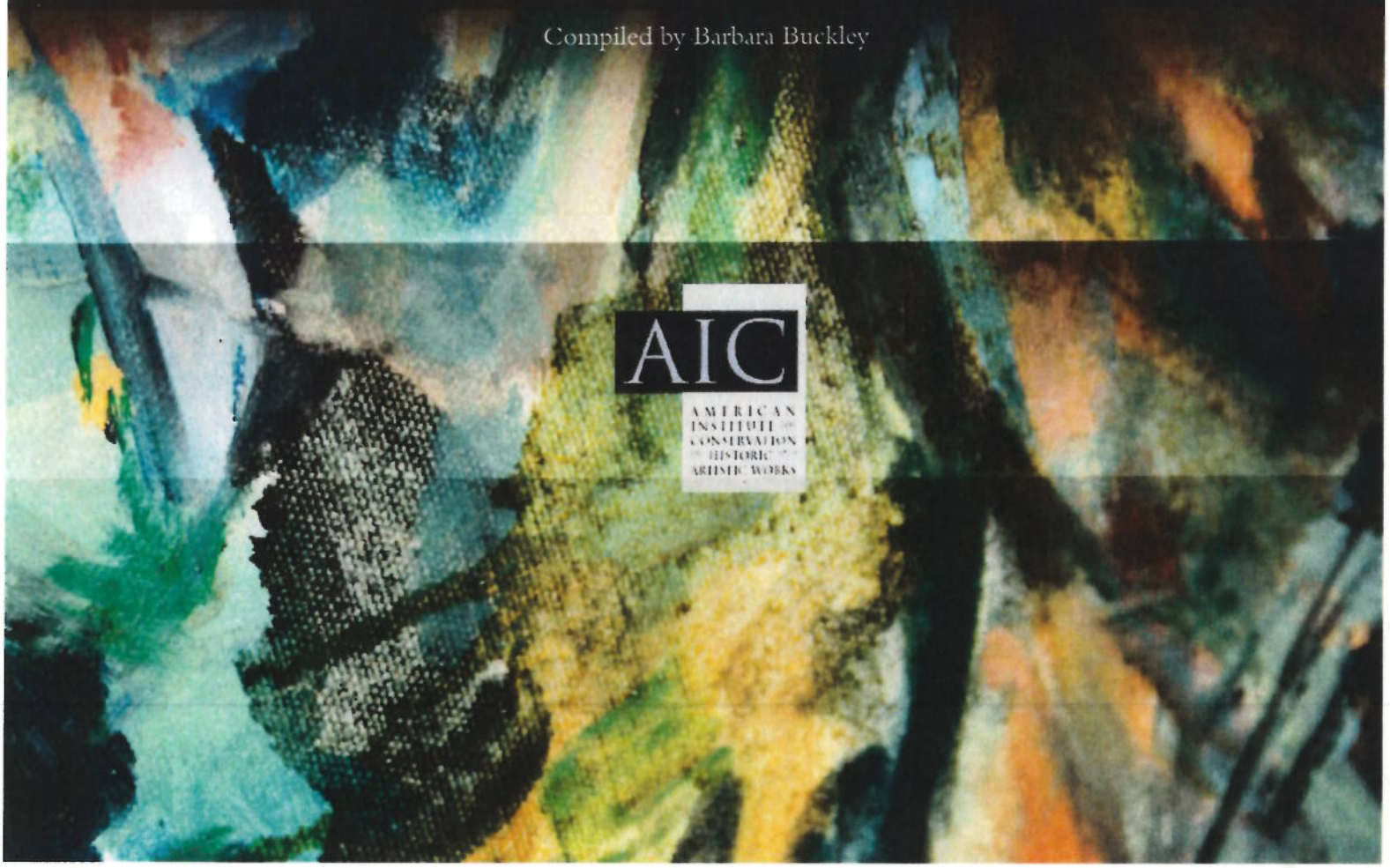
The AIC Paintings Specialty Group

POSTPRINTS

VOLUME TWENTY-EIGHT 2015

Papers Presented at the 43rd Annual Meeting of the
American Institute for Conservation of Historic and Artistic Works
Miami, Florida, May 13–16, 2015

Compiled by Barbara Buckley



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of the
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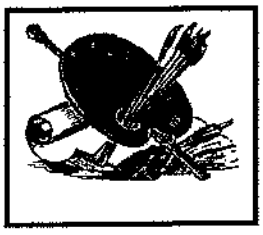

Publication of this serial began in 1988. Except for Volume 3 (1990) all issues until Volume 16 are unnumbered. Beginning with Volume 22, the title year will be the meeting year and not the publication year.

The papers presented in this publication entitled *AIC Paintings Specialty Group Postprints, Volume Twenty-eight, 2015* have not undergone a formal process of peer review. The publication is intended primarily for the members of the Paintings Specialty Group of the American Institute for Conservation of Historic and Artistic Works. The Paintings Specialty Group is an approved division of the American Institute for Conservation of Historic and Artistic Works, but does not necessarily represent AIC policies or opinions. Opinions expressed in this publication are those of the contributors and not official statements of either the Paintings Specialty Group or the American Institute for Conservation of Historic and Artistic Works. Responsibility for the materials and methods described herein rests solely with the contributors.

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AIC PAINTINGS SPECIALTY GROUP

POSTPRINTS

VOLUME 28 2015 ANNUAL MEETING

Papers Presented at the 43rd Annual Meeting of the American Institute for Conservation of Historic and Artistic Works
Miami, Florida May 13–16, 2015

Paintings Specialty Group Sessions

Friday, May 15, 2015

Saturday, May 16, 2015

JIA-SUN TSANG and INÊS MADRUGA

Conserving Paintings by American Artists of African Descent in the National Museum of African American History and Culture, Smithsonian Institution

ABSTRACT

The conservation and preservation of paintings in the Visual Arts Gallery at the National Museum of African American History and Culture, the newest Smithsonian museum on the National Mall, are on track for the grand opening scheduled for September 24, 2016. The Visual Arts Gallery will be the only permanent art exhibition on the Smithsonian Mall to illustrate the critical role of American artists of African descent in shaping the history of American art. It will raise these artists' profiles from the periphery of the American art canon to its center. Jia-sun Tsang, senior paintings conservator, leads the team of conservators, which includes Inês Madruga from the Smithsonian's Museum Conservation Institute who are charged with the conservation and safe display of paintings at the NMAAHC. This article highlights the team's long-term plans for preventive conservation and the technical studies designed to support their treatment.

1. INTRODUCTION

Some of the paintings in the VAG were purchased, but most have been donated by the artists, the artists' descendants, or private collectors since 2007. The collection includes artists from the 18th (Joshua Johnson), 19th (Robert Scott Duncanson), and 20th centuries (Charles Alston, Aaron Douglas, Lois Mailou Jones, Augusta Savage, and Hughie Lee-Smith), along with some of the most critically acclaimed artists working today (Radcliffe Bailey, David Driskell, Rashid Johnson, Whitfield Lovell, Jefferson Pinder, Joyce Scott, and Renee Stout). The artworks themselves represent a wide range of materials and techniques, including multiple types of paint (oil, oil pastel, acrylic, alkyd, poster paint, gouache, household paint, and mixed media); three-dimensional "found" objects (rhinestones, nails, and feathers) layered into paint; and primary supports ranging from canvas to paper, engineered (composite) wood, metal, and glass. This evolutionary spectrum of properties poses immense challenges and rewards for the professionals charged with the treatment and preventive conservation of these paintings.

Many pieces in the collection had been previously stored in less than ideal condition and thus required substantial treatment. To streamline the process, a system was established to prioritize emergency treatment according to the severity of damage. The first step involved a comprehensive condition survey that included paint and pigment identification, nondestructive instrumental analysis, and image-based condition reporting. The survey[1] also included treatment recommendations and guidelines for preservation, such as environmental conditions in storage and exhibition, and the display and safe handling of artworks. The survey report served as a platform for communication and planning for a team that included a digital imaging archivist, conservators, curators, designers, registrars, collection managers, and art handlers.

Physical and chemical changes are greatest in young contemporary paintings. This fact underscores the need to use scientific principles and techniques to better understand the composition and aging behavior of the immense array of new materials and techniques used by contemporary artists. An essential element of the team's treatment strategy was establishing guidelines for a technical analysis that combined nondestructive instrumental analysis, minimal sampling of paint binders for imaging analysis, FTIR instrumental analysis, and microchemical tests using optical microscopy. This comprehensive analysis of the paints' chemical behavior directly informed the team's treatment options.

The focus of this article is preventive conservation and treatment, categorized by four essential elements of our conservation strategy: iPad Survey, Travel Box, Hanging Devices, and Technical Analyses: Case Studies.

1.1 Condition Survey

The first step in systematically evaluating the need for preventive conservation and treatment of the paintings in the

Table 1. IPad Features and Applications in the NMAAHC Paintings Condition Survey

Touchscreen technology	Use of applications and digital image marking with the touch of a finger or stylus.
Mobile and lightweight	Survey can be done in front of the work of art being examined.
Apps: Notability and ArtStudio	Enable easy data input and organization, report, and photo documentation. Conversion of files to PDF format.
Wi-Fi	Easy electronic data transfer via e-mail, Dropbox, etc.

VAG collection was to conduct a comprehensive condition survey. Because this survey was often conducted in storage or off-site facilities, we chose a portable iPad as the most efficient way to deliver consistently formatted reports. We developed a template for the iPad that combined a traditional condition-ranking system with additional columns for notes, space for a short summary of treatment recommendations, and an image/diagram for visually documenting each painting's condition. This iPad survey was developed as a convenient tool for any museum staff involved in the care of collections, including registrars, collection managers, fabricators, art handlers, curators, and conservators, and is clear enough to be used by a nonspecialist as well. Particular features of the iPad that made it ideal for use in our condition survey are listed in table 1.

The goals of the condition survey were to identify and document the following:

1. The current condition of the front and back of each painting
2. Preventive conservation needs, including proper hanging and mounting
3. Treatment needs, including structure and paint surface
4. Optimal environmental conditions for exhibition
5. Safe handling guidelines

The survey template is attached as an Appendix to this article. See figure 1 for an example of the visual documentation of a painting's condition using the iPad.

1.2 Safe Art Transport

The Smithsonian's Museum Conservation Institute (MCI) facility is located in Suitland, Maryland, about 15 miles from the NMAAHC storage facility in Hyattsville, Maryland. The new NMAAHC on the Smithsonian Mall in Washington, D. C., is located 15 miles from the NMAAHC storage facility in Hyattsville. For the project to run smoothly and efficiently between these three locations, a safe, local van for transporting artworks was essential. Thus, developing guidelines for the packing, transport, exhibition, and care of these modern and contemporary paintings was the second major step in our plan for preventive conservation. After careful research, MCI conservators adapted a small-footprint, reusable, cross functional, modular, and environmentally responsible travel box for shipping NMAAHC paintings between locations.

Standard museum crates are expensive and often overbuilt for local transport of paintings by van. The travel box we developed (fig. 2) for packing and handling paintings on canvas grew out of the need to incorporate sustainable

Figure 1. Diagram used to mark up the condition of the painting *Self Portait* by Earle Wilton Richardson, est. 1930–1935, NMAAHC collection. The Bank of America Art Conservation Project funded the conservation of this painting

Figure 2. The travel box is made of wood. Ethafoam and Volara inserted in the bottom of the box absorb shock and vibration, and Coroplast covers the front and back of the box

practices into preventive conservation. The back of the painting is attached to the travel box. The free space between the edge of the travel box and the face and sides of the painting makes it possible to pack and unpack with very little handling or direct contact. Conservation-grade materials, such as Ethafoam and Volara, are added to the bottom of the box to absorb shock and vibration, and Coroplast covers the front and back of the travel box.

Figure 3 illustrates the construction of the travel box and the clips used to secure the painting to the box. Unscrewing the wing nuts releases the painting from the box. The Oz Clip remains attached to the back of the painting and can be folded out of sight when the painting is on display. Placing the Oz Clip with a D-ring allows it to secure the painting to the travel box while also functioning as the hanging hardware for the painting, streamlining transport and hanging into one step. If necessary, the travel box can be placed inside a crate for air transport, making it a simple, multifunctional device for temporary storage and shipping, and safe handling.

We also designed a travel box that could hold two paintings (fig. 4) to extend the box's housing capacity and reduce the footprint required for two separate boxes. Each painting is secured with an Oz Clip on either side of the travel box. There is ample gap between the two paintings, preventing any surface contact between them and eliminating the need to cover the surface of the paintings. (The fragile matte surface of a painting can often sustain damage from improper wrapping.) A locking system ensures proper closure of the travel box, and sturdy handles enable lifting and handling.

Figure 3. The painting is secured to the travel box by D-rings and Oz Clips

This travel box system was tested and used effectively as a temporary storage and transport system in another SI exhibition. A variety of conservation and exhibition-related functions were conducted while the paintings were in the travel box. Designers conducted photo documentation and color and dimension surveys, and fabricators carried out surface cleaning, in-painting, and dimension and material confirmation. The only time the paintings were taken out of the box was when they were ready to be hung for display. In our view, the travel box is an essential tool for preventive conservation as well as an excellent investment.

Altogether, the travel box we designed reduces costs, minimizes the risks of mishandling, protects painting surfaces, and ensures the safety of the painting during transit. In collaboration with SI collection care staff, use of the travel box has become standard procedure for packing and shipping paintings.

1.3 Safe Display

The third major step in the preventive conservation of the VAG's modern and contemporary paintings was devising a hanging system that would ensure safe, long-term display. As a rule, the dimension and weight of an artwork and the existing strainer, stretcher, and frame determine the appropriate hanging hardware. Other considerations in the hanging and mounting of artworks include the structural makeup of the wall, any special security requirements, indoor environmental conditions, and safety. In general, hanging hardware should support 25%–50% more weight than the maximum weight of the artwork. Determining the weight of a work ensures that the hardware for both the frame type and the wall structure are appropriate. Some artworks, especially contemporary art, are constructed with material that can be challenging to maintain over time. If inadequate construction materials or methods were used initially, additional support structures could be added to strengthen and stabilize the work.

Figure 4. A two-painting travel box. Each painting is secured with Oz Clips attached to each face of the travel box. There is ample gap between the paintings, which ensures that there is no surface contact between them

The existing hanging hardware doesn't necessarily need to be replaced, but if new hardware is added, considerable care must be taken not to drill over the old supports. Whenever possible, hanging hardware should be placed on the frame.

Our goal is to narrow the options for appropriate hanging hardware and to standardize methods of installation wherever possible. For medium- and large-sized paintings on canvas, we use the Oz Clip with D-ring (fig. 5). The clip is made of heavy-gauge brass with a steel pivot pin and ring (stainless steel loop). When placed in the open position (L-shape), the device has the double function of securing the artwork into a transport/storage system as well as hanging for exhibition or storage using the ring. It is designed to be a permanent attachment to the frame or stretcher and eliminates fitting each time the artwork is transported, as the Oz Clips can be pivoted to a closed position during exhibition.

Figure 5. Sample board illustrating various types of hanging hardware. Top row from left to right on the display board are two sizes of Oz-clips with D-ring and one without D ring

For large and heavy paintings not on canvas, we use a cleat system. The cleat is built in at the back of the support panel during treatment, and the hanging hardware is usually installed when conservation is complete. The painting can be secured in a travel box with the Oz Clip in the open position, and can be hung with the Oz Clip in the closed position.

At the beginning of the NMAAHC project, we carried out research to document the various types of hardware currently available for hanging paintings on different types of wall surfaces. We produced a booklet for use in SI facilities that lists all the hanging hardware available in the United States, the United Kingdom, and Japan, as well as specifications, prices, and supplier information. The booklet is divided into five

sections: Wall-Mounted Hangers, Artwork-Mounted Hangers, Hanging Systems, Mending Plates, and Security Straps. A resource section has information on where to buy these items. The booklet also includes a mechanical analysis of shear-loading condition, tension, and anchoring systems.

We then created a wooden example board that demonstrates the various types of hanging hardware listed in the booklet. The example board is currently on display at the MCI painting studio, where it serves as a teaching and communication tool for fabricators and exhibition staff. Working with conservators, the example board helps museum staff, and even staff who are not well-versed in paintings conservation, to select the appropriate hanging hardware for each piece of art on display.

1.4 Technical Analyses

There is limited technical information available on conservation of the kinds of modern and contemporary paintings included in the VAG collection. Thus, despite the pressures of a heavy workload and tight deadlines, we set out to establish a database of the materials and techniques employed by the artists in the collection. It is vital that the MCI develop and evaluate new materials and approaches to specific conservation treatments through scientific testing and critical assessment. It is also imperative that we share this scientific and empirical information with other conservators and the wider art community. Our technical studies of the VAG paintings informed our approach to treating these works. By detecting problematic grounds, over-painting, losses, and light-sensitive pigments, we were able to tailor treatment to the unique challenges presented by each painting. Our technical examination of these paintings required the use of portable and macro XRF for pigment characterization, FTIR spectroscopy for binder identification, and imaging techniques including UV-induced visible fluorescence, IR and IR reflectography, and x-ray radiography. Since many pigments, and thus paint colors, can be identified by their inherent elements, we can usually learn something about the quality of the paints, whether the colors used were appropriate to a particular period, and, sometimes, which areas of a painting are original and which have been retouched.

1.5 Reflectance Transformation Imaging: A Case Study

The MCI digital imaging laboratory employs reflectance transformation imaging (RTI), reflected IR and UV imaging, and digital radiography. The painting *Self Portrait* by Earle Wilton Richardson, est. 1930–1935, was stored unstretched and rolled for long time under poor storage conditions, which resulted in severe planar distortions and horizontal folding lines

Figure 6. Reflectance transformation imaging (RTI) and raking light of *Self Portrait* by Earle Wilton Richardson, est. 1930-1935, NMAAHC. The Bank of America Art Conservation Project funded the conservation of this painting. RTI image (*left*). Courtesy of Keats Webb, MCI. Raking light image (*right*) Courtesy of Don Hurlbert, NMNH

Figure 7. *Self Portrait* by Earle Wilton Richardson after treatment under normal light. Courtesy of Don Hurlbert, NMNH

(creases), cracking, cupping, and flaking. A surface study is critical to understanding the degree of deformation and is helpful in planning flatting techniques and selecting appropriate lining adhesives and methods. RTI is a computational photographic method that captures a painting's surface shape and color and enables interactive relighting of the subject from any direction.[2] In this case, RTI served as a useful diagnostic tool, providing data about the painting that was not apparent under normal light or a single angle of raking light (fig. 6). Figure 7 shows the conserved painting under normal light (fig. 7).

2. HIROX 7700 3D DIGITAL MICROSCOPE: A CASE STUDY

We used a Hirox 3D digital microscope to examine the small paint sample from Ed Clark's *Big Egg*, 1968, at higher magnification (up to 7000x). We observed and digitally recorded small pigment particles on the surface of the painting to make detailed measurements and profiles. Five cross-sections (A–E) were collected from the painting using a scalpel (see fig. 8a for sampling locations). When capturing images with the HIROX digital microscope, one advantage, when compared to standard microscopy, is that rather than focusing on a single point, the instrument allows you to set a depth of field, or plane of focus.

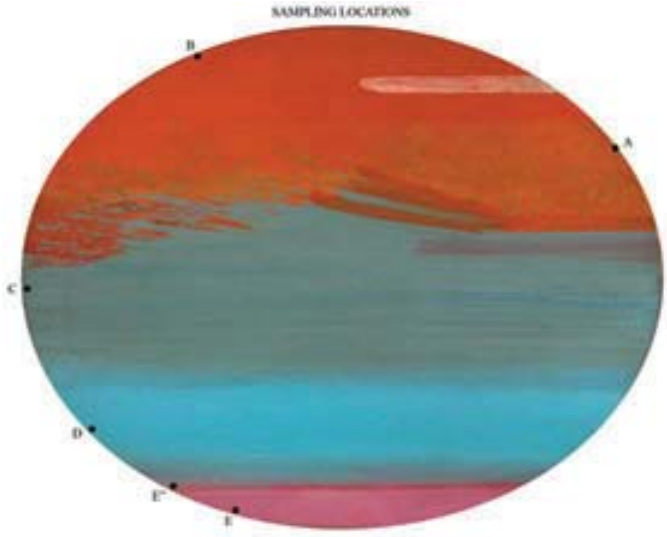

Figure 8a. A sample location of painting *Big Egg* by Edward Clark, 1968. NMAAHC collection

This means that a larger portion of the sample can be in focus at one time. The user can set those limits to be, by setting the "top" and "bottom" of the sample. Everything between those two set points will be in focus. The instrument achieves this by scanning through a range of depths, and compiling the

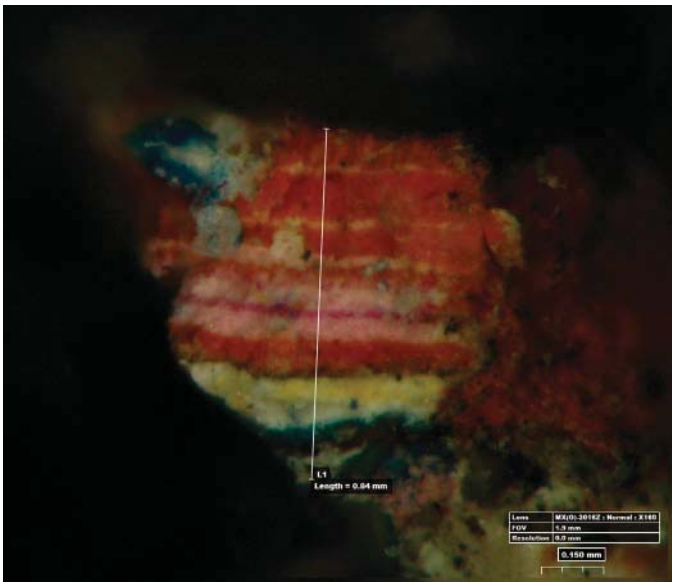

Figure 8b. 3D Hirox microscope image of a cross section of paint from sample D. The sample was not embedded in resin and was examined directly under the Hirox microscope using 3D autofocus features by stacking images to create a 3D image, A drop of water placed on this layer of paint, and paint was breaking apart immediately. This observation was captured via Hirox video features. The Bank of American Art Conservation Project funded the conservation project of *Big Egg*

information into a single image (fig. 8b). Alternatively, this information can be used to create a 3D representation of the surface. This feature eliminates the laborious work of mounting the cross-sections and the samples are not contaminated with embedding resin and can be saved and reused for future chemical analysis. Additional solubility tests with water and isopropanol directly on the cross-section were carried out under Hirox 3D digital microscope and ATR-FTIR analysis was carried out from the top layer sample of the cross-sections. The results indicated that the paint layers are sensitive to water and isopropanol and is most likely acrylic paint.

3. ATTENUATED TOTAL REFLECTANCE (ATR)-FTIR: A CASE STUDY

All fellows and interns working on this project were trained in using the FTIR instrument (located next to the MCI paintings conservation studio) for binder analysis, under the supervision of MCI conservation scientists. The painting *View of Lake Okanagan, British Columbia* by Grafton Tyler Brown, 1882, had a varnish coating that we found was soluble in Stoddard's solvent. We decided to remove a sample for analysis mechanically by ATR-FTIR spectroscopy. On the basis of its FTIR spectrum and solubility, we determined that the varnish was Regalrez 1094, a low molecular-weight hydrocarbon resin that is listed in the MCI FTIR database. Regalrez was developed at the National Gallery of Art around 1990, in large part by Rene de la Rie, for use in conservation. It is soluble in nonpolar solvents, which makes its removal easy with relatively nontoxic solvents such as mineral spirits. Underneath the Regalrez, we discovered a layer of overpaint. Using cotton swabs dipped in solvent, we extracted a sample of the combined residues of Regalrez and overpaint, concentrated the sample via centrifugation and solvent evaporation, and analyzed it by ATR-FTIR. We identified the overpaint as a PVA. C–H stretching registered at 2920 and 2850 in the sample and in the Regalrez, and the C=double bond=O stretch at around 1725. Peaks in the fingerprint region also matched PVA standards (Fig. 9. It is sometimes difficult to identify individual paint binders within mixed media by FTIR analysis. The low-tech analysis developed by Jia-sun Tsang and Maja Rink (2015) was first published in *WAAC Newsletter*, January 2015, can be used to characterize the mixed media paint binders' chemical and thermal behaviors, and results can be used to design proper cleaning and flatting techniques. The low-tech solubility test and melting-points analysis on hot stage (figs. 10 and 11) was routine used in the MCI painting Studio as diagnostic tests.

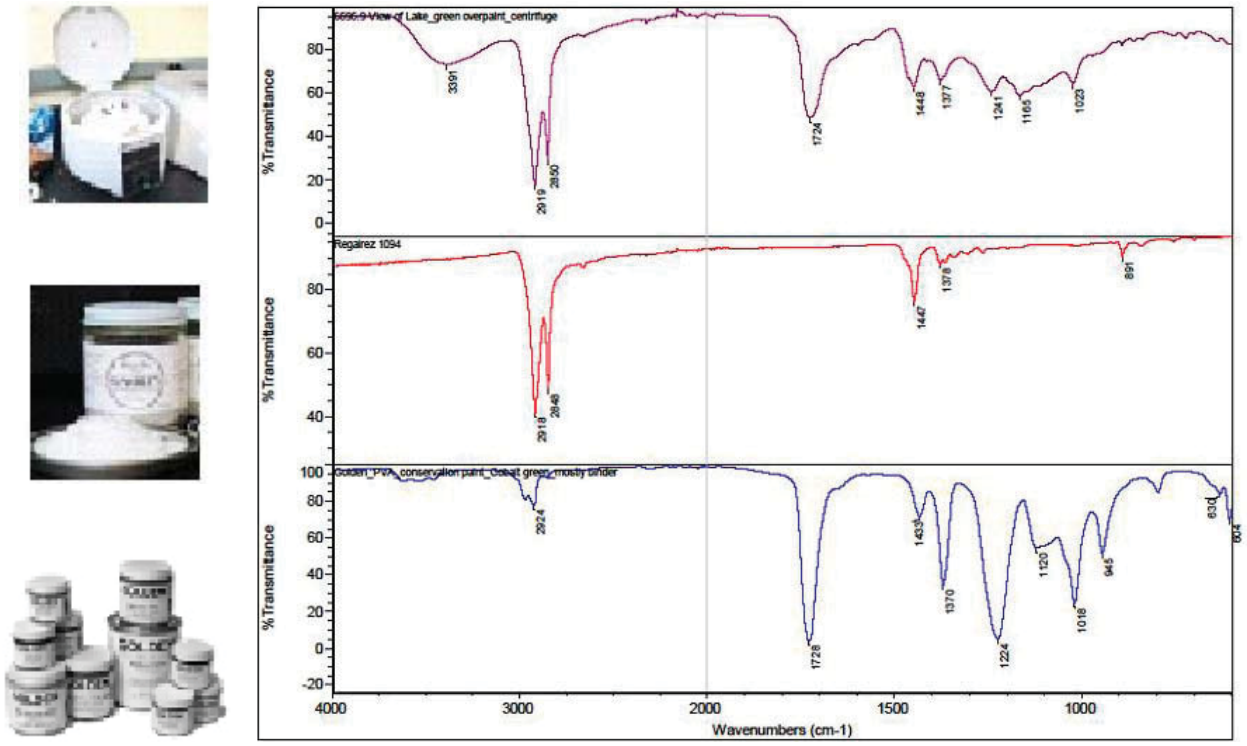

Figure 9. ATR-FTIR analysis of a sample of surface coating recovered from the cotton swab taken during varnish removal from the painting *View of Lake Okanagan, British Columbia* by Grafton Tyler Brown, 1882. A top layer of coating Regalrez and second layer of PVA were found. Courtesy of Christine Romano, 2014 MCI Intern, Buffalo State University Art Conservation Program

	30°C	110°C	130°C	210°C
Acrylic	Soft and elastic	Soft and elastic	Soft and elastic	Soft and elastic
Alkyd	Remains non-elastic	Hardens; does not darken	Hardens; does not darken	Hardens; does not darken
Oil	Remains hard	Softens	Melts, darkens, then hardens	Hardens, darkens, then chars

Figure 10. Melting point analysis of paint binders[1]

	Acetic acid 10%	NaOH 30%	Xylene	Isopropanol
Acrylic	Becomes soft and elastic then swells	No reaction	Becomes soft and elastic, then swells	Becomes soft and elastic, then swells
Alkyd	No reaction	Becomes partially soluble, then completely soluble	Becomes soft, non-elastic	Becomes soft, non-elastic
Oil	Becomes soft, non-elastic	Becomes soluble, darkens	Aged samples, No reaction; Fresh samples: becomes soft, Non-elastic	No reaction

Figure 11. Solubility analysis of paint binders[1]

4. SUMMARY

Since the initial report of our work in conserving paintings from the NMAAHC, presented in May 2015, we have gathered more technical information and our work has intensified. The early preparatory groundwork represented by careful condition survey, development of the safe art transport, and the streamline of safe display have led to positive results, and our initial investment of time, supplies, and research has had significant payoffs.

AUTHORS

JIA-SUN TSANG
Senior paintings conservator
Smithsonian Institution's Museum Conservation Institute (MCI)
E-mail: tsangj@si.edu

INÊS MADRUGA CARVALHO CALDEIRA
Paintings conservation fellow
MCI
E-mail: ines.madruga@gmail.com

NOTES

1. Tsang, J. folder holder. MCI# 6562. Survey storage and exhibition for NMAAHC VAG collections. MCI internal report.
2. http://si.edu/MCIImagingStudio/RTI, reflectance transformation imaging at MCI, accessed March 13, 2016.
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Tsang, J., and Rinck, M. 2015. Detecting individual paint in mixed media painting. *WAAC Newsletter*, pp. 20–24.