1998
AIC PAINTINGS SPECIALTY GROUP POSTPRINTS

Arlington, Virginia June 1 - 7, 1998

The American Instiute for Conservation of Historic and Artisti Works

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Papers Presented at the Twenty-Sixth Annual Meeting
of The American Institute for Conservation of Historic and Artistic Works
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Compiled by Catherine G. Rogers

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RECOVERY AND TREATMENT OF THE ST. JOHN'S MURAL

David Goist, Conservator

Introduction

In 1804, St. John's Lodge No. 1, the oldest Masonic Lodge in the State of North Carolina being founded in 1754, erected a building on Orange Street in Wilmington. The port town, on the banks of the Cape Fear River, was chartered in 1739. Wilmington dominated the state's overseas trade and maintained close ties with the West Indies, Philadelphia, New York, and Boston.

In 1808, the Masons hired one F. J. Belanger, reportedly from Martinique, to decorate the interior of the large meeting room on the second floor of the Lodge building. Little is known of the painter, but he did appear a few years later in New Bern, a town up the coast, advertising in a newspaper as the " Wilmington Lodge decorator." He is also known to have drawn an 1810 map of Wilmington.

A jeweler, Thomas Brown, purchased the building from the Masons in 1825 for conversion to a residence. Presumably the Masonic decorations were covered over with wall paper during the change over. It is reported that the Lodge decorations were "discovered" twice in the building's history during removal of wallpaper. The building remained in the Brown family until 1943 when it was purchased by James H. McCoy who renovated the building to be used as a restaurant.

During the 1940's renovation, the wall painting over the fireplace mantel at the west end of the original meeting room was found under old wall paper. The top edge and upper corners of the wall painting display swags of drapery. It is reported that during the 1940's renovation, that the painted drapery was found to be on the other walls. McCoy hired a young Wilmington artist, Claude Howell, to restore the painting over the mantel. Before the restaurant closed in 1955, the wall painting over the fireplace mantel, in which wood was burned nightly during cold weather, served as a focal point for the establishment.

In 1962, the building was converted to the St. John's Art Gallery. During a renovation in September, 1984, while the roof was off the structure, Hurricane Diane struck Wilmington with 115 mile per hour winds. The interior and the wall painting were saturated with rain. The renovation was completed, but there were no funds to treat the wall painting. The author was asked to examine the painting in 1985. Water run lines in the soot from the fireplace had washed streaks on the surface and left tidelines of black soot. Mold growth had developed and then died after a climate-control system was activated in the building. Active flaking and loss of paint existed throughout the composition.

In 1993, the St. John's Museum of Art received a grant from the North Carolina Arts Council to treat the wall painting based on the author's evaluation and estimates made in 1985. Although the grant did not include any funds for technical examination, cross-sections, or pigment analysis, the author agreed to take on treatment of what is reported to be the oldest surviving landscape painting in North Carolina and, perhaps, in the southeast.

Support

The support consists of a plaster layer approximately one inch thick. In a loss of the plaster in the upper left corner, another white plaster-like surface can be seen behind the top layer. It is presumed that firebrick exists behind the plaster layers.

Although the wall painting was commonly referred to as the "fresco," it is the author's opinion that the plaster supporting the paint is a traditional wall plaster and not the several lime and sand layers (the intonaco and arriccio) of a true fresco wall. The bottom edge of the plaster panel is 58 ½ inches above the floor over a fireplace mantel. The plaster measures 55 5/8 x 70 3/4 inches. The panel is divided into 6 sections by painted wooden moldings. The moldings were recreated in 1943 for James H. McCoy when he converted the Lodge building. The outlines of the moldings were clearly visible after removal of the wall paper. The wall was not painted under the molding pattern, so it was easy to reestablish the contours for the wood. A copy of an 8 page letter written in 1957 by Mr. McCoy to Ben F. Williams, former curator of the North Carolina Museum of Art, discussing the 1943 research and repair of the wall painting was made available to the author.

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The plaster is in relatively good condition in view of its many past coverings and more recent water damage. The only major loss of plaster in the upper left corner has already been noted. Some smaller concave losses were noted in several locations, probably due to nails having been driven into the plaster then pulled away. There is a crack pattern at the bottom center which extends 11 inches up into the panel.

Before treatment, the chimney cavity behind the wall painting was open to the outside air. Insulation had been placed below at the fireplace damper as an energy conservation measure. The Director intended to cap-off the chimney and insulate the cavity above the level of the wall painting. The author believed it is important to have climate-controlled interior air behind the painted wall to reduce moisture penetration, cold air condensation, and create a temperature-relative humidity equilibrium on both sides of the plaster. No other treatment of the plaster support was judged to be necessary.

Paint

The painting, as with many early American wall decorations, has been described as fresco technique. True or buon fresco requires the application of wet pigments without binder onto a special wet plaster. While fresco technique was used in early American, it is more likely that the medium of the St. John's Lodge mural is oil or glue. The glue or distemper paint can also be coated with skimmed milk to make it less water sensitive for cleaning purposes. Nina Fletcher Little in American Decorative Wall Painting, 1700-1850 discusses the above wall painting media. The author owns a copy of Valuable Secrets in the Elegant and Useful Arts published in Philadelphia in 1795 which discusses various wall painting techniques and coatings including those mentioned above.

The artist Claude Howell, who had "restored" the wall painting in 1943, had remained in Wilmington throughout his career. At the age of 78, he offered remarkable recollections of the condition of the painting and his treatment. He remembered the original paint had not been varnished. He thought the painting had darkened since 1943. He insisted that he only filled in the losses with oil paint thinned in turpentine. The author did take several cross-sections before treatment and found some passages very simple in construction while others clearly showed fragments of what was judged to be original paint mixed in a layer of later paint. During treatment, several small lines of paint near the vertical edge moldings were observed to be light in tone and more visually characteristic of gouache or distemper paint.

In a letter written in 1957 by James H. McCoy certain condition factors were noted:
The "All-Seeing Eye" was almost complete--very little damaged. Parts of the drapery were intact that is next to the ceiling and little was needed to complete the missing lines and folds of it. About 1/3 to 1/2 of each Coat of Arms was visible though almost three of the figures in the Arms to the right were ruined. "The Sun" was about half left but we could not understand why it appeared to have never been completed at the bottom. There were distinct lines visible below "The Sun" but we could not make out their meaning. The motto in the arch was a great question. All we could make out on the left side were the "O", "N", and the two "S". On the right side we could see the capital "T", the peculiar formed "h" to its left and the "r".

Mr. McCoy's letter went on to report that he and Claude Howell used masonic books belonging to his father, William Berry McCoy, Grand Mason of North Carolina, as source material for understanding the lost parts of the wall painting. Among the books was General History, Cyclopedia, and Dictionary of Freemasonry published in 1873. Claude Howell acknowledged the importance of masonic books in determining the missing images although he said they belonged to his father. He also remembered the 1943 condition somewhat differently than indicated in McCoy's 1957 letter.

Examination with ultraviolet light and infrared photography before treatment did little to distinguish between 1808 and 1943 paint. Much additional paint had been lost since the 1943 treatment. Flaking and loss of paint was so active that chips had to be periodically wiped off the mantel below the painting. Even if possible to do so, removal of Claude Howell's paint was never considered. Long before his death in 1997, he had become one of North Carolina's most beloved artists. The project was defined as a) removing the grime, soot, and mold, b) consolidation of the surviving paint, and c) in-painting the losses.

Treatment

On-site examination of the mural, testing, research, and preparation of examination report and treatment proposal for the Museum and the North Carolina Arts Council was undertaken during October, 1993. The author conferred with colleagues such as the late Morgan Phillips who had been researching plaster treatments. He encouraged the use of known materials.

Treatment began on February 12 and 13, 1994, testing with 5% polyvinyl acetate resin AYAA ® in denatured alcohol applied by brush and spray (compressor and aerosol power pack). The resin had been used by the author as one option for paint consolidation since interning with Bernard Rabin, 1974-75. Brush application proved to cause additional paint loss even in very small areas. Compressor-powered spray also caused paint loss because it was too strong as well as a problem in a gallery which remained open to the public during treatment. The Preval ® aerosol sprayer gave the best results in terms of applying adhesive to the paint without causing flakes to come off. After several passes with the aerosol sprayer, solvent was allowed to evaporate and then cleaning began.

Alcohol, water, and ammonia were tested in various ratios. The best results in terms of removal of the PVA along with soot and mold was ethanol and household ammonia highly diluted in distilled water. Cleaning was performed by rolling cotton swabs dampened with the mixture on the paint surface. Adhesive, soot, and mold were extracted to the state in which the paint surface was matte. The first areas cleaned were the eye in the keystone and the upper portions of the central landscape. After some cleaning of the original surface, the conservator's opinion was that Belanger used an aqueous-based paint such as a glue distemper. A blue grey tone was observed under the original paint of the eye.

Continuing on February 17, a 5% PVA spray was applied to all sections except the landscape. Later a 10 % spray was applied. Then BEVA 371 ethylene vinyl acetate adhesive diluted with V. M. & P. Naphtha was applied with a small brush to major losses and tented cleavage starting with the shield in the lower right. A hot air tool made by Steven Prinz was used to drive off the solvent and help relax the paint. A microspatula wrapped with Teflon tape was used to reposition the tented paint. Further cleaning was then accomplished in the manner noted above. Then finally a 5% PVA spray was applied. On March 5, 6, and 7 a Sealector ® tacking iron isolated with silicone-coated polyester film was used to set down cleavage in the shields at lower left and right also in the landscape section. Consolidation of other sections of the wall painting continued through March repeating the same procedures.

It became apparent during consolidation and cleaning that it was not possible to leave an even matte surface of paint that was well attached to the plaster wall. The Director of the St. John's Museum, agreed to tests of matte acrylic resin varnishes. It was decided to use acrylic emulsion paints with matte medium rather than pigments ground in acrylic or polyvinyl acetate resins to achieve sufficient hiding power and texture in the large losses. After a treatment session over March 12, 13, and 14 a test application of Soluvar ® Matte, 20%, and in-painting with Liquitex ® acrylic emulsion paints was made to show Director. The results were judged to be acceptable.

On March 31, April 1 and 2 the white painted wooden moldings were cleaned in same manner as the paint. Round polyethylene foam stripping was inserted into a gap between the plaster and wood molding across the upper edge to reduce the cold air drafts coming down over the paint surface. A block of polyethylene foam was carved to fit the plaster loss in the upper left corner. Once painted, the foam approximated the texture of the plaster, yet could be removed, if necessary. At the end of the first day, a brush-coating of Soluvar Matte, 30-35%, in naphtha, was applied. The next day, the larger holes and plaster losses were filled with Polyfilla ® water-soluble white cellulose putty. On the third day, in-painting began with the Liquitex paints. They were chosen because the paint could produce a relatively opaque layer after one or two applications. Matte medium was added to adjust gloss and reduce brush texture. The paint will remain soluble and reversible in xylene solvent.

In-painting continued on April 9, 10, 11, 23, 24, 25, 30, May 1 and 2. Final adjustments of in-painting and a spray application of Soluvar matte varnish were made during May 7 and 8, 1994. In-painting was approached with the intent of average tones between various color irregularities in the surviving paint. The conservator and Director agreed not to attempt to hide the condition history of the wall painting. The results were intended to make the wall painting legible from the floor under gallery lighting conditions and yet not have the old damages noticeable. The total time of treatment was 316 hours. As recently as January, 1999, the treatment has proven to be effective with no further paint loss.

Figure 1. The Masonic Lodge wall painting, St. John's Museum of Art, Wilmington, NC, before treatment.

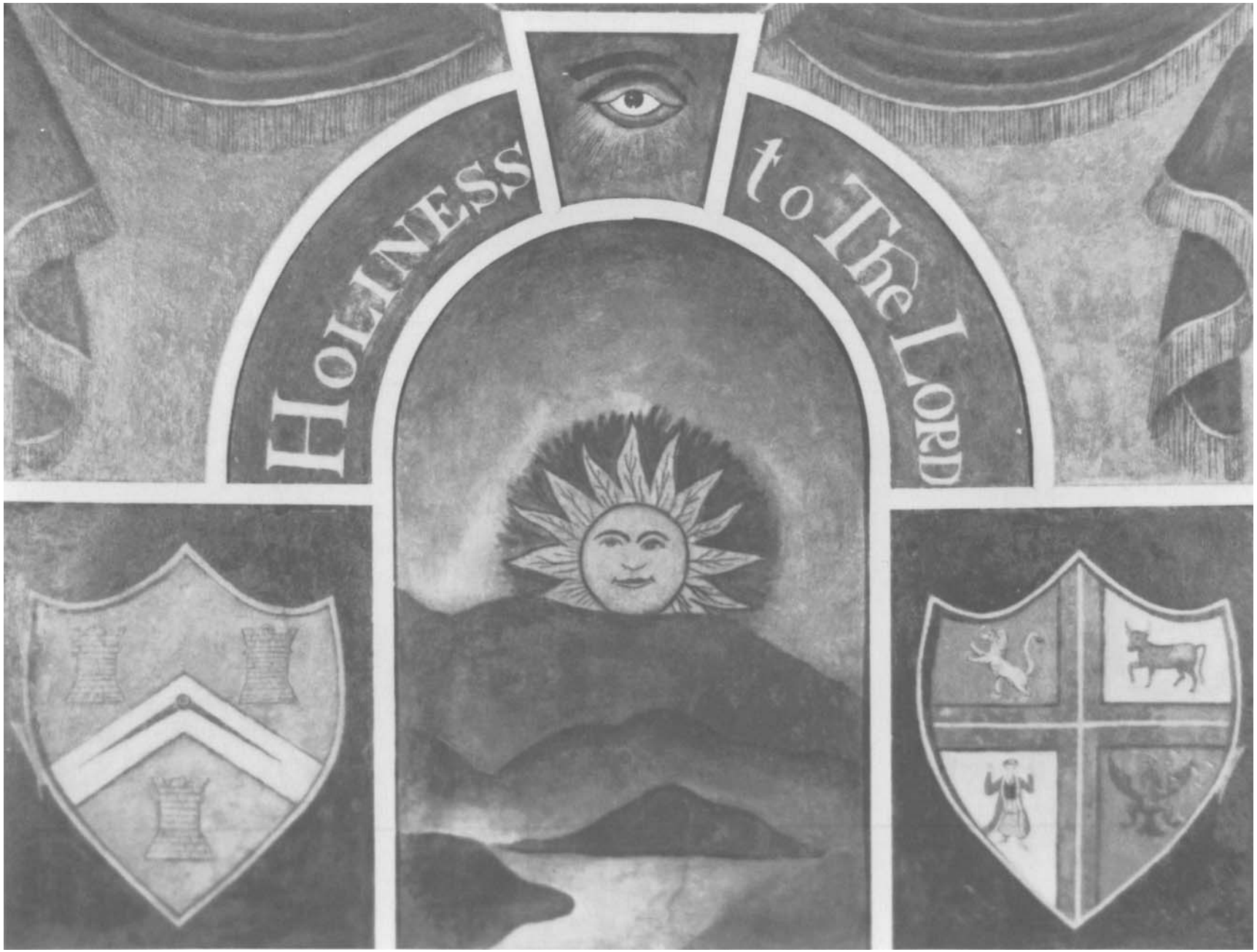

Figure 2. The St. John's Masonic Lodge wall painting, after treatment, May, 1994.

ATOMIC OXYGEN TREATMENT AS A METHOD OF RECOVERING SMOKE DAMAGED PAINTINGS

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Smoke damage, as a result of a fire, can be difficult to remove from some types of painting media without causing swelling, leaching, or pigment movement or removal. a non-contact technique has been developed which can remove soot from the surface by use of a gently flowing gas containing atomic oxygen. The atomic oxygen chemically reacts with the soot on the surface creating gases such as carbon monoxide and carbon dioxide which can be removed through use of an exhaust system. The reaction is limited to the surface so that the process can be timed to stop when the paint layer is reached. Atomic oxygen is a primary component of the low Earth orbital environment, but can be generated on Earth through various methods. This paper will discuss the results of atomic oxygen treatment of soot exposed canvas, acrylic gesso, acrylic paint, and other media through examination of surfaces pre and post treatment by optical microscopy and reflectance spectroscopy. Large scale methods of treatment by optical microscopy and reflectance spectroscopy. Large scale methods of treatment in vacuum, and an experimental hand held unit which operates at atmospheric pressure will also be introduced and discussed.

Complier's Note: This paper is under review for future publication in the *Journal of the American Institute for Conservation.*

THE HISTORY AND CONSERVATION OF MURALS AND OTHER DECORATIVE SURFACES IN THE PRESIDENTIAL PALACE IN THE REPUBLIC OF PANAMA

Anton Rajer[1], Ramses Alvarez, Valeria Lara

Introduction

The Presidential Palace of Panama, called the Palace of the Herons, is a source of great national pride. Many historical events have taken place in the palace, including visits of several American presidents and Queen Elizabeth II of England, as well as other dignitaries. The building is imbued with the history of this Central American republic.

Over the years, because of changing priorities, parts of the palace fell into neglect; mold grew on painted murals, water infiltration harmed interior decorations, and civil disturbances caused damage. Starting in 1994, Panamanian President Dr. Ernesto Perez Balladares and his administration undertook an extensive project to restore and upgrade the palace. A small component of that project was the conservation of its cultural property.

Students from Panama's Catholic University and other allied professionals were invited to participate in this project by conducting research, analyses, and conservation over a two year period. The Roberto Lewis murals in the Yellow Salon and Presidential Dining Room were conserved, as were the decorative surfaces in the Moorish Salon. It was an exciting, wonderful opportunity to integrate students into a high profile national heritage preservation project.

Diplomatic Aspects

As part of an ongoing comprehensive plan to restore the Panamanian Presidential Palace, the Presidency of Dr. Ernesto Perez Balladares has sought international technical assistance. Between 1996-97, conservation efforts concentrated on murals and recreating original decorative finishes. An agreement paved the way for conservation students from Panama's Catholic University, Universidad Santa Maria Antigua (USMA) to participate in the project, as the President is a major supporter of education. Art conservator Anton Rajer was teaching a course on art conservation at the university and was invited to the Palace as a consultant. Because of the location of the project, the President and First Lady visited the work site frequently. This provided a unique opportunity for students and conservators to discuss conservation with high level officials. Strict protocol and elaborate security procedures at the palace were followed at all times. The results were positive; as a team we conserved the murals and spoke to palace staff about the restoration field. Potentially troublesome situations were handled by remaining calm, opening bridges of friendship with the palace staff and working hard with colleagues, students and friends. Overcoming numerous local problems, such as obtaining materials, was also a challenge but a commitment to professionalism and an open heart helped in conserving an important part of Panama's national heritage.

Historical Background

The palace, located in the heart of the *casco viejo* district in the older part of Panama City, had earlier served as the Spanish custom house. Construction of the stone structure began in the 17th century and continued on and off for centuries. The structure, located on the Pacific Ocean, was the principal strong house for gold and silver that passed from Peru through Panama on its way to Spain. It has been estimated that over seven tons of gold passed through the palace over a period of nearly four hundred years. The building became the presidential palace in 1903 when Panama separated from Colombia and became an independent nation. Starting in 1922 the palace was extensively remodeled and enlarged under the auspices of President Belisario Porras. Architect Leonardo Villanueva Meyer

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[1] Anton Rajer was the project conservator for the Presidential Palace conservation project. Ramses Alvarez and Valeria Lara were students at the Catholic University of Panama (USMA) and assisted in the technical study and conservation of the Palace's Moorish Salon. Anton Rajer, art conservator, P.O. Box 567, Madison, Wis. USA, 53701

rebuilt the palace in the popular Spanish Colonial style with touches of Moorish decoration. It was at this time that the palace got its current name, when friends of President Porras gave him a pair of white herons for the courtyard. To this day that tradition continues and the palace is officially known as Palacio de Las Garzas, or Palace of the Herons. Four herons are kept in the central courtyard.

The architect introduced modern plumbing and improved electrical services as well as proper living quarters for the first family and other amenities. Several new grand rooms were added including the Yellow Salon, (Salon Amarillo) a place for formal state ceremonies, and the presidential dining room (Salon Tamarindo). The architect probably had local artist Roberto Lewis in mind when he designed these spaces, as they are well suited for mural decoration. Starting in 1924 Lewis was commissioned to decorate the state rooms with scenes from national and world history.

Roberto Lewis (1874-1949) was born in Panama and educated at the Ecole des Beaux Arts in Paris, France. Beginning in 1898 he received a classical European academic art education. He studied mural and easel painting with the academic French artist Leon Bonnat. Lewis learned traditional materials and techniques of painting including the use of canvas as a support for paintings and murals, linseed oil as medium as well as glazing, and varnishing with natural resins. In 1912, Lewis permanently returned to Panama City to direct the new National School of Fine Arts. After returning to Panama he found that the hot and humid climate yellowed natural resin varnishes quickly. Also mold grew on dark colors and attacked the reverse of his primed canvases. From an aesthetic and practical viewpoint, his palette also grew lighter, in response to the intense tropical light. Lewis began using colors that better resisted the damaging affects of the environment, such as zinc white. During his artistic career, which spanned the first five decades of the 20th century, he produced three large mural cycles in government buildings in Panama. They are the National Theatre murals, the Normal School decorations in Santiago, and most important: the Presidential Palace murals.

The Yellow Salon

This room takes its name from the yellow faux marble walls. **Fig. 1** Starting here in 1924, Lewis, painted *Balboa Discovering the South Sea*. **Fig. 2** The mural has a bold angular composition showing the explorer Balboa marching into the sea with flag and sword, claiming it for Spain. His mural commissions continued and Lewis painted two circular murals for the ceiling: The *Nations of the World Greeting the Newly Independent Panama* (1926) and *The Glory of the Republic* (1927). All eleven murals in the Yellow Salon are oil-on-canvas, glued to the wall or ceiling with hide glue and other adhesives. Lewis preferred to paint in his studio rather than on site and favored the texture of canvas as well as its ease in installation. Lewis relied upon classical motifs and standard representations in allegorical form for these murals, much as he had done 20 years earlier with the Panama National Theater murals. He employed standard European painting techniques utilizing oil-on-canvas glued to plaster surfaces. Many of the murals feature a rising perspective, a foreshortening of space, and pastel colors that convey a sense of movement and open sky. The compositions pay tribute to what Lewis had learned in Paris at the Ecole des Beaux Arts; a classical approach to art, spiced with an Impressionist palette that grew brighter over the years as he attempted to capture the intense light of his native land. In addition Lewis began a series of Presidntial portraits of Panama's leaders from colonial times to the present. These were placed in decorative moldings below the historical murals. Before Lewis' death he completed some 54 of these historical portraits.

Lewis continued painting murals for the Yellow Salon until 1936. Themes include an iron foundry, *Forging of Panama's Future* (1936), *The Arrival of the Spanish,* (1935) and *The Conquest,* (1935) which is a dramatic, intense, and violent scene, followed by *Fusion of the Race* and *War of a Thousand Days.*(1936) The last group of murals he painted for the salon are the sun-goddess Aurora in a golden chariot, drawn by four white horses and *Nations of the World Paying Homage to Panama* (1936). The man with white hair in the *Homage* mural is a self-portrait of artist Roberto Lewis. He shows himself carrying oars to a boat, alluding to his favorite hobby of boating.

Presidential Dining Room, Called the Salon Tamarindo

In 1937 President Arosemena, a personal friend of Lewis, commissioned him to decorate the Presidential Dining Room in the palace. **Fig.3** The project was a challenge to Lewis because the architecture of the room dictated--as it had in the Yellow Salon-- the shapes of the murals. The dining room is rectangular and has four large circular windows on the street side and four identical circular windows on the patio side. Below each window on both sides are sets of French doors. In addition, the wall that adjoins the Yellow Salon has a small music balcony that projects its curved balustrade into the dining room. On the wall that adjoins the kitchen, a large painted arch with mirror

divides the space. Lastly on all four sides of the room are additional decorative features, including small plaster arches. A high dark wood wainscoting divides the vertical planes of the wall from murals and woodwork.

Lewis met the challenge of decorating this complicated space with one continuous theme subdivided into several vignettes. The tamarind trees of his beloved island of Taboga twist and turn under afternoon light on all four walls. All the figurative vignettes in the murals are found in the bottom portion of the composition. They include *Picking Tamarind Fruit, Allegorical Figures of Tamarind Fruit,* **Fig. 4** *Hunting Deer and Pheasant, Women Gathering Mango Fruit at Mal Paso, The President's Wife and Her Family on Taboga beach at Play, Village of Taboga with Fishing Boats and Sail,* and *The Bishops' House on Taboga Island with Fishermen Repairing Nets.* The murals constitute in allegorical form a veritable document of life on the Pacific island in the 1930s. In addition, it is interesting to note that Lewis painted the scenes under the affects of afternoon light which by design, is the time of the day when the room receives the most sunlight because of its location on the west side of the palace. The murals come alive in the late afternoon on a sunny day, causing the surfaces to glow.

The dining room mural is composed of 22 large sheets of canvas, most of them hung vertically, except on the kitchen wall where two large canvases were placed horizontally. Lewis painted the murals in a temporary studio in the National Institute Preparatory School. It was the only space available to him that could accommodate the heights required for the murals After completing the canvases they were rolled and brought to the palace and glued to the walls. He signed and dated the work "Roberto Lewis, 1938" on the right side below the music balcony. The murals are painted in thin broad washes in oil. The initial drawings were done in charcoal, with zinc white highlights. Although the murals have fared quite well over the years, repeated outbreaks of mold growth have been noted on the murals closest to the kitchen.

Mural Conservation and Technical Studies

The murals suffered over the years with mold and mildew problems, but Lewis left instructions that the murals never be varnished, as he feared the yellowing effects of oxidized varnish on his work. He also feared that untrained hands might damage the thin coloredwashes with harsh cleaner. During the 1951 civil disturbances that toppled the Arias government, the Presidential Palace was seriously damaged. Artillery shells struck the palace and marred many state rooms including the President's suite, the Moorish Salon, Yellow Salon, and Dining Room. The Lewis murals suffered minor damage which was repaired by Lewis' student, artist Manual Cedeno (1915 -1997). Around 1965, air conditioning was installed in some areas of the palace. This helped to reduce mold growth, but still it persisted. In 1996 mold samples were taken and cultured at the University of Panama, Biology Department. The mold spore *Aspergillus Albus* was identified. In 1996-97 the murals were again cleaned, this time with dilute Vulpex soap. Old areas of Cedeno's oil retouch, which has discolored proved difficult to remove. These were modified with acrylic paints and left in place. The inpainting was kept to a minimum. Numerous small bullet holes from past civil disturbances were also filled and inpainted.

Recent interdisciplinary research efforts including on-site conservation, interviews with the Lewis family and his students--including Manuel Cedeno before his death-- and technical analyses have shed light on Lewis' materials and practices. Lewis' legacy is not only his art but the techniques he taught his students for adapting traditional painting methods to the tropics. The following colors have been found in the Lewis family archives: Yellow Ochre, Ultramarine Blue, Zinc White, Permanent Green, Terre Verte, Chrome Deep Green, Burnt Sienna, Ivory Black, Raw Umber, Emerald Green, Cadmium Red, Venetian Red, Cadmium Orange, Chrome Yellow, Cobalt Blue, Prussian Blue, and Winsor and Newton Flesh Tone. He used many of these colors on the Presidential Palace murals. Research is continuing on this topic.

The Moorish Salon

Our greatest challenge was the conservation of the Moorish Salon. It was built in 1922 to be nearly identical to a room in the Aranjuez Palace in Spain built for the Spanish King Alfonso XII around 1915. That room was in turn inspired by an earlier Moorish Salon in the famed Alhambra Palace, built for Caliph Mohammed V (1354-1359) in Granada, Spain. Panama's presidential palace architect, Villaneuva Meyer, admired these rooms and wanted to create the same affect in Panama in the newly expanded palace. He situated the Moorish room in a small tower on the third floor overlooking the Bay of Panama and Pacific Ocean, opposite the President's new bedroom and connected by a large open terrace.

In the Moorish Salon he closely imitated the decorative finishes found in the Aranjuez Palace with painted and gilded wood, ceramic inlays and colored glass. The original effect must have been stunning and certainly evoked Arab splendor. The room is square in plan with four elaborate niches--one in each corner --and three doorways, two with balconies. The room culminates in an elaborate eight-part decorative Moorish dome, made of plaster with deep relief highlighted in gold leaf. The floor pattern is also Moorish with blue, red, and white tiles set in mortar.

This salon had been much altered over the years. The water fountain was removed and the elaborate inlaid stencil patterns painted out. The French doors with colored glass were also lost. We started our research by examining period photographs, probing the walls and preparing cross-sections. This phase of the work was tied to a research course being given at the Catholic University. Much to our surprise, beautiful ceramic tiles were found on the lower sections of the walls. These had been painted our decades before because of wall and electrical renovations. Many were damaged. In addition painted decorative schemes were found in the niches and dome. Water infiltration had damaged some surfaces, but a new roof solved that problem. Tests indicated that the gilded surfaces could be cleaned with dilute Triton-X. We prepared a detailed proposal outlining our findings and presented it to the First Lady. The intent of the project was to return the room to its original appearance as much as possible by conserving some areas and restoring others. Once the project started, there were some limitations related to access and security. We had to work around the President's schedule and could only work when the first family was not present. One conservator and five students undertook the project which lasted approximately one month. **Fig. 5** As in the other restoration projects in the palace, this one stimulated much interest on the part of the entire staff including the Presidential Guard.

We consolidated the painted gesso with dilute acrylic adhesives, and cleaned the gold leaf with Triton-X cleaner. The other original surfaces were cleaned with a general cleaner. We reproduced the stencil designs in latex wall paint and recreated, as best as possible, the original decorative scheme. Areas of damaged gold leaf were regilded. Lastly, a clear acrylic resin was applied to the lower walls to facilitate future cleaning. **Fig. 6** The entire project was documented with standard written and photographic material that was presented in a ceremony to the First Lady upon completion of the project. We are continuing our resarch into the life and art of Roberto Lewis.

Conclusions

Between 1996-97, working with university students and the Presidential Palace staff, significant historic areas of the palace, including many murals and decorative finishes, were conserved as part of a larger project to restore and upgrade the Presidential Palace of Panama. With the personal support of the President and First Lady, students and other allied professionals were allowed to help restore this important national treasure. In our own way, through a humanistic approach, we contributed to international goodwill and understanding. An important component of the project was benevolent interest and concern.

Acknowledgements

Special thanks to Dr. Ernesto Perez Balladares, President of the Republic of Panama and Dora Boyd de Perez Balladares, First Lady of the Republic of Panama and the entire Presidential Palace staff for their assistance in making this project a success. Thanks to the family of Roberto Lewis, Catholic University of Panama (USMA), University of Panama Department of Biology, the National Institute of Art and Culture of Panama (INAC). the Embassy of the United States in Panama- Fulbright Office and many others.

Bibliography

Anton Rajer, Joaquin Horna: *A Preliminary Technical Study of Roberto Lewis' Murals in the Republic of Panama.* American Institute of Conservation (AIC), Norfolk conference, 1996, preprints. Washington, D.C. p. 112

Anton Rajer, Joaquin Horna: *19th century French Painting Practices and Materials in the Tropics: A Case Study of the Oeuvre of Roberto Lewis in Panama,* IIC-Dublin Conference, International Conservation Institute- London, England, abstract # 27, September, 1998.

This paper is dedicated to the memory of Don Manuel Cedeno, artist of Panama.

Illustrations to Presidential Palace Project in Panama

Figure 1. Presidential Palace of Panama, Yellow Salon, view of Roberto Lewis murals.

Figure 2. *Balboa Discovering the South Sea,* Yellow Salon, Roberto Lewis, painted in 1926, oil-on-canvas.

Figure 3. Salon Tamarindo, presidential palace dining room with Roberto Lewis murals, painted in 1938.

Figure 4. Detail of Lewis murals in presidential dining room. *Gathering of Tamarind Fruit.*

Figure 5. Moorish Salon during the1997 conservation project with universtiy students.

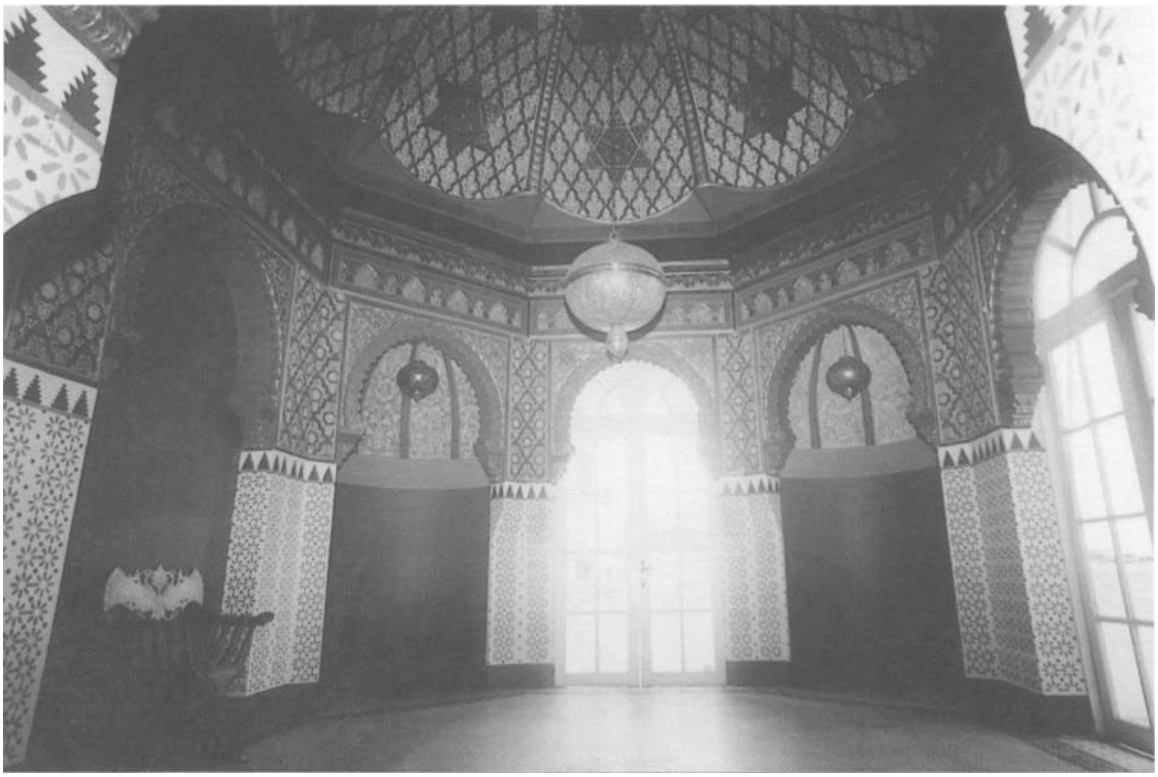

Figure 6. The Moorish Salon after conservation in 1997 with decorative dome, wall stencils and ceramic floor inlay.

Water damaged paintings : Treatment, and creation of prevention training programs

Chile is a country that has been victim to extreme natural disasters such as earthquakes, tsunami and severe storms often resulting in floods and landslides. The reasons for this are the meteorological, topographical and geological characteristics present in the region.

The National Museum of Fines Arts in Santiago, the capital of Chile, has suffered the consequences of these natural phenomena. These have caused irreparable damage to the building, a national monument, and to the works of arts it houses.

The National Museum of Fines Arts was inaugurated on the 21st of December, 1910 on the First Centenary Celebration of Chile's Independence.

It has been almost 90 years since the museum was inaugurated without the finishing touches and details from the original design. Unfortunately, shortly after the inauguration serious structural problems became evident. This was due to the urgency to finish the construction and the miscalculations of the initial budget. The final cost turned out to be five times higher which greatly reduced quality of materials used and manpower.

Poor resources and the general condition of the building, the lack of funds for maintenance and improvements of the initial inefficiency are fundamental factors which have caused the on going deterioration of the building.

On the 5th. of March 1985, a strong earthquake seriously damaged the building and all the remodelling work which had started only a few years before. After this natural disaster the museum was closed for three years while work was being carried out to reinforce the structure. The museum was then re-inaugurated in 1988 with only the glass dome left to be finished. This work was completed in 1991.

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Today, the museum plays an important role in national cultural life.

The galleries which house the permanent collections have important European painting exhibitions and the most promiment and representative works in Chilean painting history. Among these "La lección de geografía" ("The geography lesson") by Alfredo Valenzuela Puelma. One of the great masters in Chilean painting. He painted "La lección de geografía" in Paris in 1881. The painting was sent to Chile to prove that he had been worthy of the scholarship and also to be evaluated by professors of the Chilean Painting Academy. The most outstanding features of this painting are the precision of the drawing, the contrast of the light and shade and the subtle harmony of the colors.

After spending a long time in the restoration lab of the National Conservation and Restoration Centre within the National Museum of Fines Arts, "La Lección de geografía" was put on display once again.

On the 25 th. of December 1991, a heavy rainstorm caused serious drainage problems which resulted in water pouring down through three main interior walls in one of the rooms of the second floor. This was presumably due to the drainpipes and guttering overflowing and leaks on the roof. Many important paintings, from both national and foreign collections, were seriously damaged.

Of all these paintings, "La lección de geografía" was most gravely damaged.

The following factors must be taken into consideration when analysing this incident :

- In Chile, December marks the beginning of summer. This is usually a very dry and hot season, without any rains between October and April.
- The 25 th of December was a holiday and therefore the museum was closed.
- There was no previous record of water leaks or trips in this particular room in the Museum.
- There was only two guards on duty responsible for the whole building.
- Lack of preparation for risk situation and poor preventative security measures.

The unusual electrical rain and hail storm was caused by the well known El Niño phenomenon. A storm of this magnitude had not been seen in the last 60 years. After the preliminary assessment, the guards noticed that many paintings had got wet so they took them down and laid them on the floor face up well away from the three affected walls. The paintings remained in this position until the following day when they were taken to the restoration lab.

There was a total of 13 seriously damaged painting.

"The Geography Lesson", as did the other damaged painting showed :

- Blistering of the ground and paint film which spread over the canvas.
- Flaking, detachment and loss of the ground and paint film.
- Changes in the shine of the protective layer and blanching.

A possible factor which worsened the detachment of the ground and paint film was the drastic change in temperature. In December average temperature often reach 28 °c and relative humidity 25 to 30 % at peak temperatures. However, on this particular day the temperature was only 19 °c and humidity levels reached 85 to 90 %. These extreme exterior climatic conditions obviously affected room temperature.

"La lección de geografía" was exposed to high humidity levels because water has poured down the walls wetting the back of the painting. Later the next day, due to the normal high temperatures in December the canvas and the other layers dried out very quickly. When the painting was examined the following day, the ground and the paint film could not simply be placed back onto the canvas which has contracted with the increased temperatures and especially because of the humidity level which was reduced by 50%.

Another factor which was directly affected by the situation, was when the ground and paint film dried out they cracked and fragmented into tiny little pieces which had become unstuck from the canvas. These fragments were very difficult to treat and in some cases impossible due to their size.

The treatment that was carried out on "La lección de geografía" was basically to consolidate the paint film, filling in the paint loss an then retouching.

The replacement of the ground and the paint film was carried out using rabbit skin glue, heat and wet tissue paper. The diluted rabbit glue was sprinkled on because the affected areas were cracked and powdery. The objective of the facing was use the humidity of the tissue paper to slacken the canvas so that when it expanded it would produce the necessary space for the ground and paint film to return to its original position of the plane and also make the paper act as an insulator and protector of the affected areas when dried.

Moreover, the reverse side of the canvass was locally moistened allowing a further expansion, and to a certain extent reproducing the decaying process.

Even though the result of this process were positive as far as stopping the increasing loss of the pictorial layers, it was insufficient to ensure the future conservation of the painting. For this reason, and taking into account the weak state of the canvas, a decision was taken to line using resin wax on the hot table, strengthening and securing all of the layers of the painting. This not only results in a contact adhesion but brings together all the layers including the canvas.

The results were positive, the material unit of the painting was recovered and then stretched back onto the stretcher.

Subsequently, a solvent test was carried out to determine the mix necessary to remove the varnish which was initially affected by the water and then by the application of heat and then the lining.

Furthermore, there were signs of yellowing which altered the original pictorial features such as the colors and the subtle effects of the light and shade. It is important to mention that the painting was in perfect conservation conditions before the above mentioned event and if the extent of yellowing had been the same, the decision to remove this layer would not have been taken.

When the varnish was removed, the blistering was eliminated and lost its chromatic warmth given by the yellow shade of the varnish. The colors and original pictorial effects were recovered reflecting the original cold shades which stress the solemnity of the scene of a teacher and his pupil.

Once the new layer of varnish was applied, the paint losses were filled. For this process the same resin wax was used with colored pigments. Once all the losses had been filled, the trateggio technique was used to retouch the paint losses. The most affected areas was the lower left hand corner, specifically in the area of the inkwell and fountain pen. Here, there were many paint losses therefore it was necessary to use previous prints of the painting to compare and identify shape and volume.

Once this stage had been completed, the painting was put back on display in the museum. A poster was added to compliment the results achieved on this important piece of our heritage and to explain the general principles of restoration.

Considering the described events, It is important to bare in mind that although severe weather conditions are always unexpected and coincidental, accidents, disasters and catastrophes do not happen totally by chance. They occur because of known causes.

If we analyse all the described events, we can conclude that the incident which caused irreparable damage to "La lección de geografía" was avoidable :

The quality of the materials of the original structure of the building, the unexpected storm and the lack of maintenance work on the roof of the building were foreseeable situation.

After many years, the glass dome on the roof was finally repaired but shortly after there were leaks which had never formed before in other areas of the roof. This leads us to believe that the repair work carried out on the roof possibly caused the water to flow into the museum.

This situation could have been avoided if the extent of the roof problem had been correctly assessed and evaluated including the consequences of any alterations to the existing drainage systems.

In the last few years, the National Conservation and Restoration Centre designed a training program which included a special training for the personnel of the National Museum of Fines Arts. This training consist of offering technical advice for specifics tasks, theory on heritage value and basic preventative measures.

If we analyse the results achieved, they are in effect very positive because many important steps have been taken to incorporate new criteria and methods in disaster prevention. After the incident , the necessary measures were taken. The drains were changed and today the roof and the glass dome are checked regularly. Many training programs have been carried out for risk prevention within the museum as well as external programs offered by the National Emergency Agency and Fire Brigades. This had led to the personnel of the museum making frequent evaluation of risk factors and implementing preventative measures. Furthermore, the implementation of this process is being accelerated because international requirements demand this to exhibit foreign works of arts.

Although optimum results have been achieved from restoration and conservation techniques and deteriorated paintings have been recovered and restored, it is important to stress that they are not a solution but should be implemented as a last resort. It is fundamental that the necessary preventative measures be implemented beforehand so as not to risk mistaking the true purpose of the conservation and restoration unit.

Professionals in conservation and restoration must be present in every museum to ensure that expertise be present and carried out on a daily basis. Assessment and evaluation of all possible risk factors is the key to avoiding deterioration and in some cases the loss of irreplaceable works of art.

Training programs for the people who work in the museums are important for maintaining permanent communication among the staff. Otherwise, the conservation and restoration area will become isolated unit with little or no contact with other areas making it very difficult to bring together information and skills to achieve our common goal which is to conserve our heritage.

AN ILL WIND: HOW PERIPHERAL ISSUES AFFECTED CONSERVATION DECISIONS DURING AND FOLLOWING HURRICANE ANDREW

James Swope

The first named storm of the 1992 hurricane season hit just south of Miami in the predawn hours of August 24. As the eye of the storm passed over Florida Power and Light's Turkey Point nuclear power plant, the anonemeter blew away registering a 211 mile per hour gust. The destruction was vast: the insurance industry ranks Hurricane Andrew as the most expensive natural catastrophe on record, costing 15.5 billion dollars in claims. Some of those claims were for artworks damaged by the storm. This paper is written from the perspective of a paintings conservator in private practice, and examines how the conservator's role in response to the damage changed over time.

Within one week, over three hundred damaged items came into my studio: not just paintings, but works of art on paper, books and photographs, sculptures, furniture, textiles, object d'art, all things valuable and vulnerable, dripping with ocean water or soaked by rain, ripped, broken, growing mold, shrinking, buckling, blooming, delaminating, melting, or otherwise just plain falling apart. In the chaotic aftermath of the storm, the niceties of specialization, to say nothing of condition reports, treatment proposals, cost estimates, photographs, even contracts or authorizations were lost in the face of the sheer overwhelming number of objects, virtually all of which needed immediate attention.

My experiences with this storm, particularly in the hectic days which immediately followed, did not and in fact could not relate just to paintings, or, for that matter, to conservation itself as I might like to think about it and would normally practice it. The overall situation, for me as a conservator but also for both the owners and the artworks themselves, was extraordinary. In retrospect, the disaster divides into two parts: the emergency phase and the subsequent recovery. During the emergency phase, the best one could hope to do was bring a little order to chaos. Later, during the recovery, when there was time to deal more systematically with individual objects, practical realities and hidden agendas began to affect what would otherwise have been standard treatment decisions. During the emergency, one needed to make snap decisions, often with little information, knowledge, or time, but where the very survival of the object was entirely dependent upon immediate action. As the initial crisis passed, though, competing and often conflicting interests came to the fore, pitting collectors against insurance companies; where such fundamental issues as who was responsible for or even owned an object had to be determined before one could know what, if any, the goal of a treatment was to be or who had the authority to authorize it; where art dealers, appraisers, artists and museums all played subtle parts; where the role of the conservator was at once both overly broad and overly narrow; and where the needs of the object all too frequently seemed the least important concern of all.

Response During the Emergency Phase Immediately Following the Storm

The day after the storm I got a call from a long term client, a collector of blue chip late nineteenth and early twentieth century American artists. The core of the collection was over eighty paintings, supplemented by important works on paper, sculptures, even several Tiffany windows. During the storm, the owners had huddled in an upstairs room of their ocean front home as the hurricane's storm surge pushed the ocean itself through the house. The house, which would later be condemned, was inundated, leaving everything in splinters and shambles, dripping with ocean water, covered with sand, salt, and debris. Many objets d'art simply disappeared, as did quite a few of the paintings, although a Prendergast oil on panel did later turn up out in the yard, apparently none the worse for wear.

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House containing an art collection, gutted by the hurricane's storm surge

I arrived with a large rented moving truck to find husband and wife dazed and exhausted, carrying guns to guard against looters. The house was uninhabitable and impossible to secure, even though the art had been moved into a hastily organized store room. If for no reason other than security, we loaded the truck with seventy six paintings, boxes upon boxes of works of art on paper, objects of glass, bronze, and ivory, soggy masses of oriental carpets, even shattered pieces of furniture. Things were loaded onto the truck so quickly the best I could do was keep a crude and incomplete inventory of what I was taking. I had the owners sign it not so much for record keeping but in case I was stopped by the military police leaving Miami in a rental truck filled with millions of dollars of art and antiques.

While I was responding to this call, the Norton Museum of Art in West Palm Beach, where I am adjunct conservator, was busy salvaging an equally important collection of pre-eminent contemporary American artists. Already overwhelmed for space in my studio, the Norton allowed me to convert their auditorium into an emergency conservation studio. Fans were placed around the room and the paintings were unbacked and placed face up on blocks to dry. When possible, works on paper were removed from boxes, frames, and mats to be placed between blotters impregnated with ortho phenyl phenol to dry and stop mold. I worked late into the night over the next days trying just to stabilize whatever was in most dire need of immediate attention, but where to start when so many things are in such need?

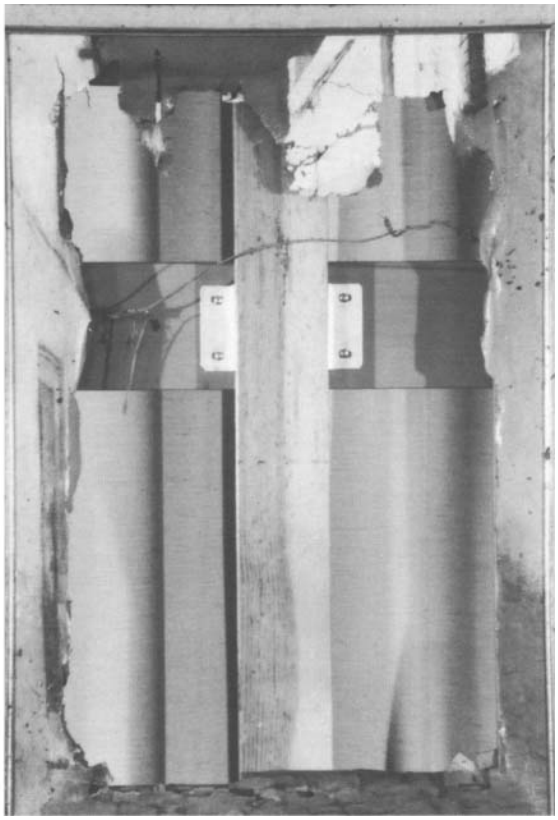
As a paintings conservator, I recognize my limits, but standing in the midst of literally hundreds of wet and disintegrating objects made it impossible to think in such terms. I knew I was out of my depth with many pieces, but also knew something had to be done fast. Dyes on soggy oriental carpets were bleeding and mold was already growing. The drawers of an 18th century French desk were so wet and swollen that they were impossible to open, yet inside those drawers was part of a valuable stamp collection, the condition of which was unknown. Perhaps most poignant were family photograph albums of weddings and Christmases and children growing up. The snapshots were wet in their plastic sleeves so

Snapshots from photo-albums stacked like a house of cards on the author's dining table to dry

The auditorium of the Norton Art Museum, temporarily turned into an emergency conservation laboratory

that the emulsions were dissolving. Here there was absolutely no financial but incalculable emotional value to people who's homes and lives had just been destroyed. The normal ethic and prudent business practice of staying within one's area of expertise was turned upside down: it could almost be unethical not to do what one could to at least try to stop the deterioration, even, perhaps, if ultimately misguided. I called friends and colleagues from other specialties for succinct, straight forward advice about specific problems. I called a sculpture conservator to ask if it was better to dry a drenched George Segal plaster quickly or slowly, and got a lengthy technical speculation about the potential long term problems which might result from such a water bath, about which I could do nothing at the moment in any event. While watching mold bloom across a soggy Cassatt pastel which I could not get unstuck from its frame, a paper conservator spoke about the subtle differences between thymol and ortho phenyl phenol. If I seemed testy, impatient, or rudely indifferent to the people whose advice I myself was soliciting, I offer my sincere apologies. But the simple truth was I didn't have the time for the detail. Perhaps I would have been better off calling colleagues in private practice rather than those from institutions: they may have been more likely to have had experience responding to emergencies such as house fires where everything is damaged, you are unfamiliar with the collection and so can formulate no plan of action based on considered priorities, and you are forced to work with limited space, resources, and, above all, time. What I needed was a clear "do this" or "don't do that," with maybe a hurried "good luck."

A Guy Wiggins torn from its stretcher, crumpled, and covered with debris



A Willard Metcalf reduced to just its edges protected by the stretcher

Art continued to come in so quickly over the next two weeks that most could only be given a cursory examination as it arrived to determine whether immediate steps were needed to prevent further damage. Often this meant no more than laying a painting face up until time allowed for more involved treatment. Many paintings were too badly damaged even to face, with detached paint chips lodged under uplifted paint flakes with sand beneath everything. An initial triage system was devised over the first days to help differentiate between those works completely beyond salvage, those paintings which were stable enough that treatment could be deferred, and those paintings where prompt attention might halt deterioration and so stabilize the work for more complete attention later. A paper conservator was brought in early on to help in the emergency phase, and three dimensional objects were referred elsewhere as time allowed. Over the following months additional colleagues were hired as necessary to assist with the recovery of the most critically damaged items.

The devastation was frightful. Paintings had been literally submerged in and tumbled about by hurricane driven waves. Paintings had been ripped from their stretchers, crumpled, submerged in ocean water, covered with seaweed and snails while rivulets of sand and debris ran down both their fronts and backs. Sand was trapped beneath paint flakes, mold grew on the reverse of canvases as well as beneath flakes of paint.

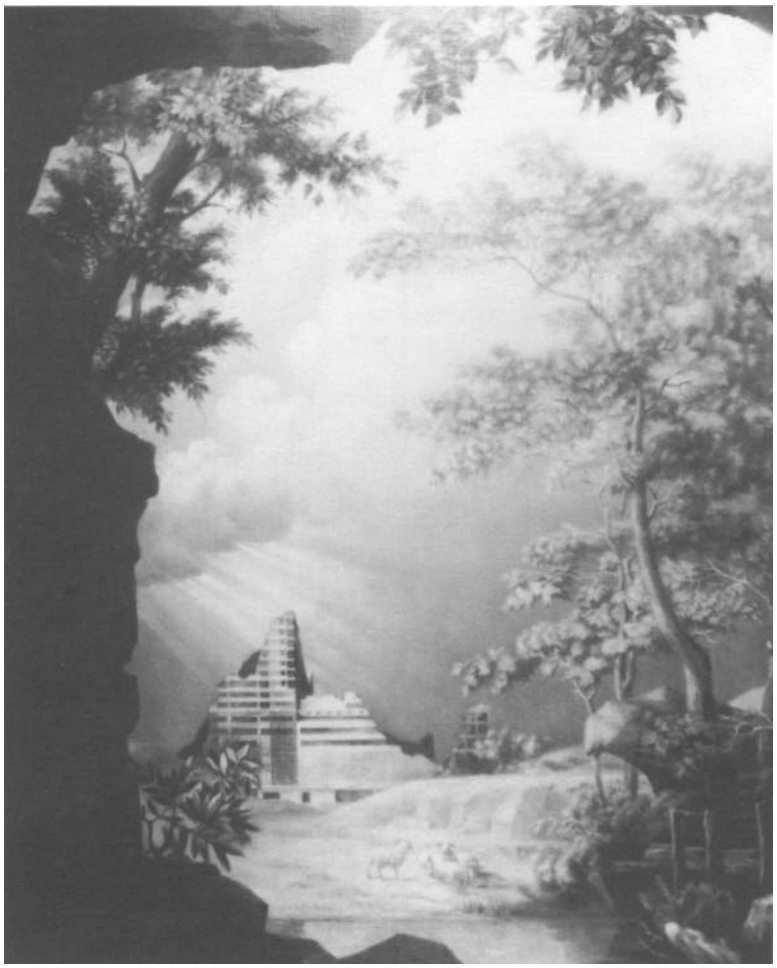
For what it is worth, paintings which had been lined generally fared better than those which had not, and among those which had been lined, wax, not surprisingly, fared the best. Aqueous linings were a mixed bag, in some instances seeming to exacerbate a bad situation both because of the adhesive responsiveness to water and its propensity to grow mold. A painting had been nap lined with BEVA to polyacrylic sailcloth held up beautifully, although this painting didn't seem to have been under water.

It took nearly a month just to get the first flood of pieces fully inventoried and photographed, while more paintings continued to come in for months. Gradually, abbreviated condition notes were added to the inventory, and work began on superficial cleanings and stabilization, and, little by little, on real treatments.

A Conservation Decisions Made in Complicated Circumstances: a Rare Experience

A museum client referred me to a couple they hoped to cultivate as patrons. The owners had a small but choice collection of contemporary art, the jewel of which was a painting entitled Scenes from the Future: the Museum of Modern Art by the Russian emigre artists Komar and Melamid. The painting had hung by the entrance to MOMA when it reopened following major renovations in the early eighties. The monochromatic painting shows this contemporary building as it might appear in the distant future, but depicted as a ruin in a style reminiscent of the 18th century Rococo artists Hubert Robert or Joseph Wright of Derby. The canvas had gotten wet and shrunk, resulting in both localized flaking paint and amorphous passages of opacity caused by delaminations between the varnish and the paint. My first impression was that the treatment would be straight forward: consolidate the paint, remove the varnish and revarnish overall.

Further examination, though, showed that the varnish was, in fact, a heavily tinted glaze over a grissaille underpainting. Realizing that I could not reglaze the painting myself, my next thought was that I could remove the tinted varnish if the artists would do the reglazing themselves. I called their studio and spoke with Vitale Komar. I told him the painting had been damaged by the hurricane, and described the problem with the varnish. At first, he was forthcoming with information, but he suddenly became audibly agitated. "This painting, this painting! It is about time and nature, how nature wears everything down! The hurricane has ruined this painting. This is nature following art! You must not touch the painting! You must leave the painting as it is!"



Scenes from the Future, the Museum of Modern Art, by Komar and Melamide

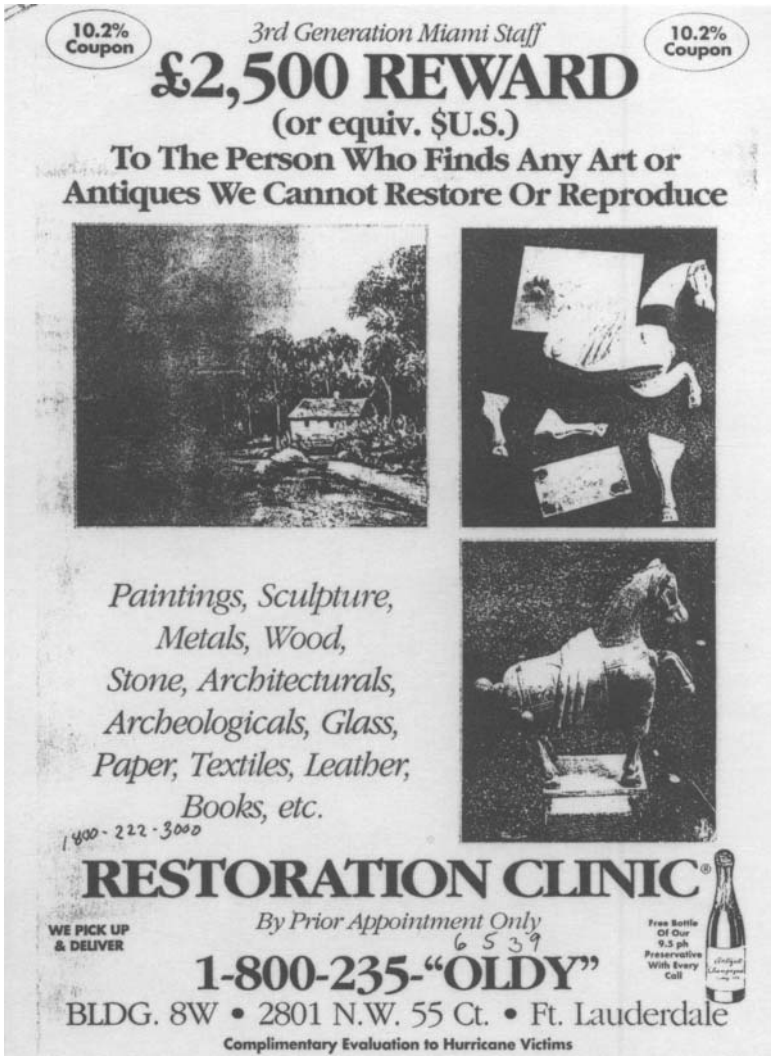
after treatment

Perhaps this should not have come as a surprise. In 1981, their Portrait of Hitler was slashed while on exhibit by an offended museum visitor. The artists refused to allow the painting to be taken out of the exhibition and asked that it not be restored, believing that the vandalism made the painting a stronger work, showing the power art and imagery holds over individual human acts. The painting remains unrestored to this day, the slash now accepted as an intrinsic part of the work.

The situation was reminiscent of the famous utterance "Ah, finished!" by Marcel Duchamp when he first saw his piece The Bride Stripped Bare by Her Bachelors, Even after the glass had shattered in transit to its new home at the Philadelphia Museum of Art. I conveyed the artists' desire that the work be left as it was to the owners. They found the concept intriguing and gave it serious consideration, but noted that the painting had an exhibition history, had been written about and had been reproduced in publications. They acknowledged both the responsibility which comes with the ownership of a work of art as well as the legitimacy of the artists' continuing interest in it. They expressed concern about the unpredictable effect even a deliberately preserved damage might have on the work's considerable value. I offered a compromise treatment: unlike the paint, which was actually flaking, the varnish generally remained in an unbroken film now visually interrupted by the pockets of delamination and consequent opacity. These pockets, while numerous, were each relatively small and so reasonably stable. I told the owners that, from a strict conservation point of view, I could consolidate the flaking paint, thereby addressing the painting's most urgent treatment needs, but leave the varnish as it was. Ultimately,

though, they couldn't get around the fact that to them, the opacities in the varnish aesthetically marred the painting they had chosen to purchase, had lived with, and loved. Not incidentally, they also felt that to keep it unrestored would mean that the painting would be a constant reminder of the horror of the storm and the difficult days of rebuilding which followed.

In 1991, one year earlier, Congress had passed the Visual Artist's Rights Act. The intent of this law is to allow artists to disclaim authorship of a work if it becomes mutilated. In this instance, though, the artists embraced the mutilation, claiming it as nature's extension of their artistic intent and so now to be considered an intrinsic part of their work. But can artists declare unanticipated damage to be part of the work's integrity protected by the law? Technically, the law exempts "the modification of a work of visual art which is the result of conservation." Since the flaking paint mandated that the painting be conserved, I was on solid legal ground in undertaking treatment, but felt that undertaking a full treatment when there was a viable partial treatment simply dodged the meat of the ethical question. And what of the rights of the owners? They had paid a substantial sum for the painting, and they were quite clear about wanting the painting returned to its pre-hurricane appearance, the appearance they reasonably believed represented the artists' original intent. They suggested that if I was uncomfortable treating the work, perhaps I could suggest someone else to do it.



Newspaper advertisement offering rewards, discounts, complimentary evaluations, and a "free bottle of Our 9.5 pH Preservative," labeled "Antique Champagne"

But if it was either unethical or illegal for me to treat the painting, how could I ethically refer the treatment to someone else to undertake? The owners had made it clear that they wanted the painting treated. If I did not make the referral, I had every reason to suppose they would seek out someone else on their own. An unavoidable reality of every major disaster is how they attract opportunists, fly-by-night businesses, and flimflam artists of every stripe. Conservation is a profession without licensing or certification, and so is particularly susceptible to the involvement of individuals with uncertain credentials. The newspapers were full of advertisements for hurricane recovery of all sorts. I did not want to see this painting go to a someone who might strip the varnish to reglaze the painting or damage it in some other way. One such ad was posted by an associate member of the AIC. Two years later, following numerous complaints from the public, he would be enjoined by the courts from ever again "being employed in any capacity at any antique or collectible repair or restoration service in the state of Florida," and who by May of 1995 would land in jail, essentially for irresponsible business practices.

So this was the situation. There were the artists who had an interesting point of view which was also consistent with their own history. There was the new Visual Artist's Rights Act which had an unclear applicability to this case. And of course there were the owners, my clients, who, after careful personal consideration which included input from both their dealer and an appraiser, had decided they wanted the painting treated and were apt to take it elsewhere, perhaps to the irrevocable harm of the painting, if I didn't treat it myself. Among all things a conservator is paid to do, ultimately one of them is to make informed decisions. I am sure there will be those who will disagree with the decision I made in this case, but I decided to fully treat the painting. I decided my fundamental responsibility was not to the artists, not to the client, but to the work of art itself. I had unequivocal evidence of the artists' original intent even if that intent had somewhat changed in the face of changed circumstances. Although I valued their input and saw their point, unlike the Portrait of Hitler, this was an act of God rather than a deliberate human act. I relaxed and consolidated the paint prior to injecting BEVA into the varnish delaminations with a hypodermic needle, and then lined it on the vacuum hot table. The treatment was a complete success: no evidence of the delamination remains apart from minute punctures in the varnish.

Some time later, Vitale Komar found out the painting had been treated. He said "Oh, well!"

Insurance claims, financial considerations, and competing interests

Hurricane clients ran the gamut from corporations to private individuals. Perhaps it is more obvious in private practice than it is in a museum, but the fundamental issue which almost invariably determines whether or not an object gets treated is money. What will the treatment cost? Is the painting worth it? The corporate clients were business like: they wanted a cost estimate, and then either approved or disapproved the treatment. Private owners with objects of only sentimental value had to convert that essentially intangible value into dollars to see if they were willing to have an object conserved if they could not collect for it under their homeowner's insurance. Clients with pricey decorative paintings, often in the $10 - 15,000 range, might be unsure whether the "decorator" was going to "reuse" the piece, and were candid about needing something which documented damage for an insurance claim. Fair enough. I see damage, I write it up; value is not my concern. But things were not always so straightforward.

The storm which hit Florida came in the wake of another storm which had recently ravaged the international art markets. During the last years of the 1980s, prices paid for individual artworks rose to astronomical heights, culminating in an auction in May, 1989, which brought in $469,000,000 in one evening. That autumn, just weeks after the had stock market crashed, Van Gogh's Irises sold for a record $49,000,000, giving credence to the notion that the art market was more stable than the stock market.

The art market boom was driven in part by the Japanese government's effort in the late 1980s to contain skyrocketing prices of Tokyo real estate by capping them at fixed values. This arbitrary price freeze lead Japanese corporations to an equally arbitrary artifice: they assigned inflated collateralized worth to art collections as a means of transferring value from one asset to another. But by the fall of 1990, Tokyo's real estate troubles had begun to let up. This was reflected in that fall's auctions as many objects failed to meet expectations or were bought in. Over the next two years, the art market suffered broad and dramatic declines in value. By the time Hurricane Andrew hit South Florida in 1992, some sectors of the art market had fallen by as much as 60%. Many who had bought at the peak of the market now had such poor investments that they simply could not afford to sell even if they wanted to. Paintings which had been insured at the height of the market, though, might carry an insured value far greater than the current market value. This set up a situation in which an owner might be able to unload an otherwise bad investment by making an insurance claim based on damage from the storm.

Dealers had had a good run while the market was hot, but many got caught with large and over-priced inventories when the market collapsed and no one was buying art anymore, especially not the former clients who were the unhappy owners of paintings which were now worth only a fraction of what they had paid for them only a few years earlier. A kind of a situation I still view with suspicion and distaste might start with a call not from an owner but, significantly, from a dealer. I was to go to a collector's home to examine a painting which generally had been purchased within the last five years, more often than not from the same dealer who was now asking me to make the examination. All I was supposed to do was write a brief condition report on the painting, with no need for a treatment proposal or cost estimate. I was to bill the dealer, not the owner, sending the dealer a copy of the report. A memorable example involved a painting by a leading color field artist, a sector of the market which had fallen in value especially hard. The painting looked fine. There were no tide marks, no stains or drips, no flaking, no unusual variegations in the paint's color, in short no evidence of any damage at all. But the owner kept mentioning the painting's "loss of vibrancy." There were no photographs available of the painting from before the storm, either from the owner or the dealer. First the husband, then the wife, the teenaged son, and finally even the maid all came out in succession to repeat the sad story. My initial report stated that I could find no damage to the painting, but the dealer pressed the point that high humidity has been known to blanch paint, and was insistent that the report include something about the alleged loss of intensity. My amended report read "Although my examination found no sign of damage, the owners tell of a marked loss of tonal intensity as a result of the storm." I have no idea what happened with this painting, but the owner mentioned he had paid $80,000 for it a few years earlier. A realistic auction market value for this particular painting in the fall of 1992 was closer to $30,000.

Serious collectors tend to be knowledgeable, possessive, proud, and passionate about their collections, and during the emergency phase immediately after the storm every one of them were focused on the preservation of their art. But as time passed, a composite attitude began to emerge as their concerns began to shift from the preservation of the art to the preservation of the art's value. Works which were lost or destroyed went straight into an insurance claim, but those that were salvageable gave the collectors their greatest worries. What was the actual damage to the object? Could the damages be fully treated? What would happen to resale value? Underlying all these concerns was the argument which had first been raised by the objects conservator regarding the Segal sculpture that very first night: were the seeds of unforeseeable future problems now buried deep within the individual pieces?

Even if all the abrasive sand and organic debris could be removed from both sides of a painting, what long term effect will sea salt, with its corrosive, reactive, and moisture-attracting nature have on canvases, pigments, and paint? What about the microscopic organic material deposited in these works? Unfortunately, most of the worst damaged paintings have been dispersed, so the opportunity to monitor them over the years has been lost. But even works not so blatantly affected raised serious concerns. A collector with many works on paper worried that even if no mold was visible, mold spores might have so

multiplied within the piece that if conditions recur to promote its growth, the superabundance of dormant spores will blossom forth with virulent vigor. Lengthy discussions over the pros and cons of treating objects without immediate or obvious necessity were had with the various owners, some opting to leave well enough alone, others deciding to take every precaution and treat insofar as possible against the fear of a broad range of future potential problems.

Detail of the front of a painting where water rivulets can be seen through the sand and debris

Detail of the back of a painting coated with sand, seaweed, and debris

Much time was spent with insurance companies and appraisers to determine loss of value. One kind of collector in particular would have an extensive and valuable collection of contemporary art purchased directly from either the artist or from the artist's dealer. He would be the first and only owner of virtually every piece in his collection. He would have built his home to display and house his collection, equipped with a sophisticated environmental control system which maintained a positive air pressure inside to help keep the temperature and humidity levels extremely stable. Every piece would be either matted and framed to strict conservation standards or would be equally carefully stored in good quality print cabinets, etc. The storm would have penetrated the house, blowing in the windows and knocking out the electricity so the art had stewed in a steam bath for two or three days before the pieces could be salvaged from the home. Some items would have gotten soaked by the rain water, some totally ruined. In general, however, the collection would have escaped with remarkably little apparent damage.

The owner, however, would be extremely insistent that every piece be subjected to the most intense examination. Every surface of every object would be scrutinized by himself, an appraiser he himself had hired, an adjuster from his insurance company, and usually two conservators, myself and a paper conservator. The conservators would also hired by the collector, although our bills would ultimately be part of the total claim. It would be taken by the collector as an absolute given that every piece had been in perfectly flawless condition before the storm, that no sculpture had the faintest hint of tarnish, that there was not the smallest speck on the verso of any print, that no Plexiglas glazing had any scratch. The job was simply to note the presence of any blemish, however minute, without elaboration. At the time, I was uncomfortable with what I felt was excessive zeal in these examinations, and could only wonder about the motives of those appraisers who dealt on the side and eagerly gave remarkably generous losses of value to the most imperceptible of alleged damages. I say alleged because I was certain that many of these marks were normal imperfections in the materials which had nothing to do with the storm and were so insignificant that they would never affect resale value even if they did.

When I compared these collections with their minimal damage to those which had indeed been badly harmed, I felt the owners were taking advantage of a situation. In retrospect, though, I think the collectors were justified at least to some degree by the underlying logic of hidden damage, possibly real but impossible to quantify and so be compensated for. They were the first and only owners of these pieces, and they had been meticulous with their care. They were enthusiastic about their collections, and through them had often forged close relationships with leading artists, prominent museum professionals, dealers, and other top collectors. None spoke of wanting to sell, but there was a fear that the notoriety of the collection's association with the hurricane would put a stigma on its value if they ever did. Particularly with multiples, it is not unreasonable to think that a print, for instance, which appeared to be in pristine condition but is known to have been through a hurricane might be a less attractive buy than another of the same edition without that infamous association.

Similarly, the collector of a more damaged collection did not want to sell. He had bought carefully over many years, but had insured the collection essentially as he acquired it at the purchase price of each piece, unfortunately now well below market value. He had believed his total coverage was ample to cover any individual claim, never imagining his entire collection would be so massively damaged. The artworks became hostages in a financial battle between the owner and the insurance company, the owner claiming a loss of value equal to his full coverage while his insurance company argued that it would take possession of the paintings if it had to pay the full value of the policy. This put the ownership of the paintings into question, and along with that the authorizations on the treatments. Work stopped until the dispute could be resolved. Ultimately, the insurance company won, paying off the entire policy but taking ownership of most of the artwork. With the insurance company now the owner of many of the pieces, I was given extremely restrictive authorizations to advance specific treatments only to limited extents. Paintings which had had extensive flaking, tears, or holes were lined but not stretched, much less filled or inpainted. Many paintings left the studio still obscured by facings, others still with sand embedded in the

canvas. A large shard of thick paint from the lower left corner of a J. Alden Weir had detached from the painting and was returned with but not reattached to the painting. Perhaps it was subsequently returned to its proper position or perhaps it was lost. Hours had been spent teasing sand from beneath lifted flakes on a Robert Henri and then easing those flakes back into position, but the treatment had to stop with only preliminary consolidation completed.

Conclusion

These were individual artworks and entire collections of substantial value, owned by individuals who were completely frank regarding their concerns not only about preserving their art but also about preserving its value. I had, and have, good relations with these clients, but they are generally self-made individuals who did not amass the fortunes necessary to collect on this scale without energetic defense on their own behalf. When I first considered writing this paper, a paper intended exclusively for a professional audience for purely educational purposes, I realized that even now, nearly six years after the event, there is at least one residual issue which still affects my actions as a conservator. I worried that, by speaking of these collections, I would be spreading the infamy of these artworks' histories and so perhaps opening myself to a lawsuit based on some kind of disparagement of the artworks. I sought legal advice and was told that to prove disparagement three criteria needed to be met: the statements made must be false, they must be uttered maliciously, and they must be proven to have caused specific pecuniary damage. By being factual, by acting in good faith, and by either obtaining the owner's consent to speak of specific pieces or by speaking either vaguely or in hypotheticals, I am told I have nothing to fear. Still, this affected not only my choice of which experiences to tell and how to tell them, but also which ones not to. Now, I can only hope the lawyer's advice is good.

This disaster, like all disasters, was good for business, but it was bad for the art and frequently the did not make for good conservation. At first there was simply too much damage; later there were too many compromises forced by personalities, money, and circumstance.

Each June, at the beginning of hurricane season, begins again, I remember the catastrophe of that storm. Everyone who was involved with it will remember it for their entire lives. Each year, I know that the chances are good no storm will hit. But just as surely, though, I know it is an absolute certainty that sooner or later a giant storm will again take direct aim at the luxury condominiums, the palatial ocean front estates, and the gated communities which cover so much of South Florida, to say nothing of the homes of the millions who live here more modestly. One cannot know when disaster will strike, or how. Two weeks after Hurricane Andrew hit, I got a call from an art museum across the state near Tampa. On an otherwise quiet day, a thunderstorm had blown in from the Gulf of Mexico, unleashing a tornado which took the roof off the museum's storage, and so yet another collection was badly damaged. More recently, a hot water heater two stories above my studio burst in the night, so that I came to work to find water cascading into the store room of my studio. Miraculously, nothing was damaged but the lessons are the same. Deal with individual situations with diligence and integrity, but don't let your insurance lapse. It is about all one can do.

THE GREAT FLOOD IN FLORENCE AND AN UPDATE ON THE EARTHQUAKE IN ASSISI

Andrea Rothe

The Arno River flooded the city of Florence and the surrounding countryside on November 4, 1966, after days of torrential rains. To compound the situation, the old Levane dam upstream on the Arno had reached dangerously high levels. To avoid a collapse of the dam, the sluices had to be raised to release some of the water. The many uprooted trees and other debris carried by the water blocked the sluices that could not be closed again. The rains and the spilling dam brought the flooding to the highest levels ever recorded, with some parts of Florence under more than twelve feet of water. In the area of Santa Croce where the street level is below that of the Arno, the waters rose to more than fifteen feet. The damage caused was far worse than the two World Wars combined.

The natural riverbed has been severely altered over the centuries, and the Arno tends to flood every one hundred years or so. Unfortunately, the lessons that these occurrences teach are all too soon forgotten, and each time the damages that the high waters wreak on works of art is horrendous. In the last flood, many great works were destroyed or so damaged that they could never be brought back to their former glory. One of these is the Crucifix by Cimabue in Santa Croce. All of the paintings in the Accademia Museum, which was undergoing renovation, were stored on the ground floor of the old Post Office opposite the Uffizi building. Many of them were partially immersed in the flood waters which were mixed with sewage and heating oil deposits that had oozed out of underground storage tanks. All of this severe damage could have been avoided if the works of art had been stored in the second floor storage area.

The Ponte Vecchio has always caused the greatest concern because it does not allow enough water through its low arches. To compound the calamity, the arches were blocked by detritus, forcing the water over the bridge. The contents, including some of the safes from the goldsmith shops, were swept out into the river. A large wine keg was found stuck in one of the hollowed out shops. The greatest fear was that the pressure against the structure would make it collapse and transform into a dam, causing even greater flooding. Fortunately, this did not happen.

After the flood, the riverbed was dredged out to accommodate a larger volume of water. Thirty four years have gone by, and the Arno riverbed is again filling up with deposits. Original plans to bypass the city with a canal have been dropped, and dealing with the

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ancient and extremely complex infrastructures of a historic city like Florence add to the problem. Although some maintenance is done, neglect and the human tendency to forget have again placed Florence at high risk should there be a repeat of the torrential rains of 1966.

More recently, on September 25, 1997, a strong earthquake hit the region of Umbria and the Marches. This and the following series of earthquakes caused serious damage to many of the monuments of the region, particularly to the Basilica of St. Francis in Assisi. Amongst others, a bay of a large ceiling fresco in the upper church, perhaps by the young Giotto, was lost.

A large quantity of rubble on top of the vaults from the original construction liquefied during the earthquake, sloshing back and forth like water. This motion accelerated the collapse of the vaults. Contrary to what has been said, the rubble was not left there to cut corners, but more likely as a means to weigh down the vaults. This material was immediately removed after the earthquake to avoid further damage.

As was the choice of leaving the rubble in place instead of removing it, former restoration campaigns were criticized. Questions were raised as to why the original wood beams holding up the roof of the Basilica had been replaced with cement beams. These are much heavier and may have rendered the building much stiffer than it originally was intended to be. On the other hand, the wooden beams needed to be replaced because they were subject to woodworm damage and rotting, and above all were a severe fire hazard. Decisions like these are difficult to make, and it is impossible to foresee the devastating effects of such earthquakes. One can only commend the Italian authorities for the timeliness with which the building has been shored up. Many technicians risked their lives, which has prevented further damage to the construction and has temporarily eliminated the threat of a collapse.

A NEW DEVICE FOR MAKING MICRO-SCALE LIGHTFASTNESS DETERMINATIONS ON ART OBJECTS

PAUL WHITMORE AND XUN PAN
RESEARCH CENTER ON THE MATERIALS OF THE ARTIST AND CONSERVATOR
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The prevention of light-induced fading damage requires the identification of light-sensitive materials. However, the actual lightfastness of a material is a property that is very difficult to predict. With the large number of chemically similar synthetic organic colorants available for use, identification of colorants on an artifact to the precision needed to distinguish light-sensitive materials is extremely difficult. Furthermore, lightfastness will also depend on other attributes of a specific application, so that even successful colorant identification is often insufficient to predict stability to light exposure. Similarly, efforts to identify light-sensitive materials through precise color monitoring are expensive, difficult, and may only detect fading after some amount of damage has occurred.

We have pursued a new approach, one in which the lightfastness of colored materials on an artifact is measured directly, but without compromising the appearance of the object. We have designed and built a prototype instrument that can measure the lightfastness of small areas of an object rapidly and with minimal risk to the object. Using silica fiber optic light guides, filtered light from a stabilized xenon arc lamp (400nm - 700nm, ca. 590,000 footcandles at the illuminated spot) is focused on a spot 0.4mm in diameter. A second fiber gathers a portion of the relected light and directs it into a photodiode array spectrophotometer interfaced to a computer. Reflectance spectra are measured every few seconds and periodically stored on the computer, and current color differences are calculated during the test to assess the progress of fading. At these intensities, a one-hour mico-fading test delivers an exposure dose equivalent to 40 hours in a table-top xenon exposure cabinet, or about 40 years in a 5 footcandle (filtered) museum gallery. Reflectance spectra measured with this instrument compare reasonably well with those taken with a Color-Eye reflectance spectrophotometer, and the stability of the spectra is very good (about 1% drift per hour). This stability is key to making sensitive measurements of color changes during the fading tests, which in turn allow the lightfastness to be determined with only very slight alterations of the tested area.

Micro-fading tests have been performed on a number of art materials, such as commercial artists' paints, pencils, inks, and crayons; homemade watercolors made from dry pigments; and dyed textiles (including Blue Wool fading standards). For an application containing very fugitive colorants, such as the Winsor & Newton Bengal Rose gouache, the extreme light sensitivity of the paint was established when a significant fading change ($\Delta E = 7$) was produced after one minute of exposure in a micro-fading test. A Blue Wool #1 cloth faded approximately 4 times more slowly in a similar test. Separate fading tests of several such fugitive materials were performed in a conventional table-top xenon arc exposure cabinet, with color measurements made in a Color-Eye spectrophotometer, with the conventional test duration adjusted so as to produce an equivalent exposure dose. The micro-fading tests produced results that were in general agreement with those of the conventional fading determinations. This agreement also suggests that reciprocity hold as well for the micro-fading test as for conventional tests.

We have examined the risk of damaging an artifact in a micro-fading test, and conclude the risk to be small. Because color measurements are made continuously during the test, and because very small color differences can be detected, fading tests can be terminated after producing color changes that are measurable but virtually imperceptible. The heating of the area illuminated with the high intensity light has been measured using a miniature thermocouple, and the illuminated area reached temperatures of 35-40°C, depending on the color and type of material.

Complier's Note: A paper on this abstract will be published in a future *Journal of the AIC*.

ASPECTS OF THE TECHNIQUES AND CONSERVATION OF A LARGE FIFTEENTH CENTURY ALTARPIECE BY NERI DI BICCI

Serena Urry, Associate Conservator of Paintings*

I. Introduction

Treatment of *Tobias and Three Archangels* (figure 1) was undertaken at the Detroit Institute of Arts from 1994 to 1997 and included: removal of varnish, overpaint and overgilding; excavation of previous structural repairs; cradle removal; panel separation; repair of cracks and joins; rejoining of panels; attachment of new traverses; filling, gilding, underpainting, inpainting and varnishing. Some further intervention was required as the panel adjusted to the environment.

Apart from the structural treatment, which was performed by Gianni Marussich, the more unusual and therefore more interesting parts of the conservation treatment concerned the wide variety of painting and gilding techniques found in the altarpiece, and the methods by which they were conserved. In the interests of brevity, this paper will discuss only these aspects of the treatment, after a brief overview of the painting's history, condition and initial treatment.

II. Commission

On Tuesday May 7th 1471, in the business diary of Florentine artist Neri di Bicci, the following entry is found:

> I record that I, Neri di Bicci, am to paint for Mariotto di Marcho...of the Porta Rossa della Palla, an altar panel that he wants for his chapel in the Church of Santo Spirito...in which will be made the Angel Raphael and Tobias, and on the right hand Saint Michael; on the left hand the Angel Gabriel, at the feet of the Angel Raphael a counterfeit tablet of the Crucifixion, the Virgin Mary and St. John, and flanked by two small angels and at the foot the predella of the miracles of Raphael and put everywhere it occurs fine gold and fine ultramarine blue and all the best and finest colors ...[1]

A few months later, on Monday, July 8th 1471, a purchase of pigments for the panel is recorded. Two grades of ultramarine pigment, a green blue pigment, a lake pigment, and an orange pigment are purchased from the Gesuati, one of the best suppliers of pigments in Florence at the time. It is paid for directly by Mariotto della Palla.[2]

On October 2nd 1471, Neri makes note of payment for the finished altarpiece.[3]

III. Condition

Tobias and Three Archangels disappeared from the Church of Santo Spirito by the late seventeenth century. The altarpiece surfaced in England in the nineteenth century and, without its predella, made its way into the DIA collection in 1926.

The altarpiece had probably been freshly cradled and restored before its acquisition. In a black and white photograph of 1926, the joins are intact; the silver leaf on Michael's armor is bright and untarnished. By 1994, the panel had developed over 75 linear feet of stress cracks because of the massive walnut cradle. The varnish had darkened and flattened the composition. The regilded upper background presented an inappropriately blotchy and lusterless appearance. Previous repairs along the joins were flaking. Discolored overpaint in these areas disfigured many elements in the composition.

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IV. Cleaning and Filling

Tobias and Three Archangels was cleaned in stages, both before and after the structural treatment undertaken by Mr. Marussich, using solvent and mechanical means. The joins in particular required extensive excavation. Some sections contained wood or putty inserts, which were removed during the structural treatment. In some areas of the upper background, four and five layers of regilding were found. In fact, a significant amount of original paint (which had been buried under layers of repair) was recovered in the lily.

Following the structural work and cleaning, the repaired cracks and losses were filled with polyvinyl-based commercial gesso (Modostuc). Because of the variety of the original techniques in the painting, a number of tools were needed to match both the level and texture of each part of the original. These included brushes, scalpels, X-acto and micro-knives, spatulas, swab sticks, clay sculpting tools, nails, needles, pins, chamois, micro-grit sandpaper, bone and agate burnishers.

V. Removable Overpaint

Tobias and Three Archangels had two areas of removable overpaint which presented problems with respect to the restoration aspect of the treatment.

The first concerned the boats and tree in the left background, between Michael and Raphael (figure 1). These were found to be overpaint, with no evidence of original painted elements beneath. It is probable that they were painted in order to disguise damage; the distant landscape under the overpaint foliage had suffered many losses and there was a deep scratch under the boat. The boats and tree were removed (figure 2).

The second major area of removable overpaint was Tobias's robe. It was immediately apparent upon beginning to clean that virtually no original blue remained. Traces were found only in a narrow border around the fish and under the mordant-gilded embroidery at the edges of the garment. The blue, undoubtedly the "fine ultramarine blue" pigment mentioned in the *Ricordanze,* had been abraded away to the white gesso ground, probably in order to re-use it elsewhere. The gesso was covered by a water-based overpaint which was not removed during cleaning (figure 3).

Fortunately, incisions in the gesso, readily visible under the watercolor, provided adequate information regarding the form of the robe. Because the garments of the other three major figures in the altarpiece were in comparatively excellent condition, and because the original incised design remained, it was decided that Tobias's robe be repainted. The robe was first broadly underpainted with watercolor. After the isolating varnish, the robe was painted with PVA and dry pigments following as closely as possible the incised design. The final blue is slightly less bright than the remnants of original (figure 4).

VI. Irremovable Non-original Glazes

Upon cleaning it was discovered that a previous restoration had involved the extensive use of an oily green glaze, broadly applied to most of the landscape. The glaze had seeped into the porous original paint and could not be removed.

While the glaze significantly altered the rocky arid terrain which is characteristic of Neri's work, of more concern were the areas next to the landscape which had also been impregnated, through the angelotti's wings, for example, or Tobias's fur hem (figure 5). The dragon under Michael's feet had been completely covered and visually attached to the landscape with the green overglaze (see figure 1).

In the end the decision was taken to overpaint, on top of the isolating varnish, the disfiguring areas of overlapping restoration glaze. And while Neri's landscape could not be completely recovered, an attempt was made to break up the larger clumps of overpainted foliage in the foreground (fig 6). Though the original hue of the

dragon could not be determined because of saturation by the glaze, painting out the two small triangular areas of along its back served to reduce the glaze's flattening effect (see figure 2).

VII. Water-gilded Gold

Traditional water-gilded gold leaf was found throughout *Tobias and Three Archangels*. The original gilding on the upper background, while thin and abraded, nevertheless reflected the light in a manner that only burnished gold leaf could achieve. The repaired joins and cracks interrupted the reflection. The more intact gilding at the edges of the figures, and under Raphael's wings suggested that the upper background had been sanded before regilding.

The decision was taken to attempt to duplicate the abraded appearance of the original burnished gold leaf. Though water-gilding requires the use of traditional materials, the polyvinyl fill material will help to differentiate between the original and restoration gilding at a later date.

First a bole of rabbitskin glue and clay pigments was mixed to match the color of the original bole. It was applied over the fills and allowed to dry.

Small areas of bole were wet with water and covered with irregularly shaped strips of gold leaf. After the leaf was dry, it was scratched with a needle file and lightly sanded with micro-grit sandpaper, before being burnished with agate.

In an area such as around the lily, and above the townscape, there was an attempt to duplicate the fadeout effect of the gold leaf found around the figures.

The join through Raphael had sprung, which meant it could not be aligned along its whole length. Mr. Marussich had matched the two sides of the face, which had left the halo misaligned. The halo had also been re-incised during a previous treatment, when it was mismatched in yet another configuration (figure 7). After burnishing, the design in the water-gilded fill was incised and punched in an attempt to minimize the misalignment (figure 8).

VIII. Silver Water-gilding

A limited amount of water-gilded silver leaf was used in *Tobias and Three Archangels*. While most of it was simply cleaned, filled and covered with bole, then burnished, Tobias's fish presented an additional problem. Here the burnished silver leaf had originally been thinly painted over to suggest the shimmering effect of scales. Unfortunately, the fish was so badly tarnished and abraded that its original appearance could not be judged (see figure 3). The fish was underpainted with bole, which was then burnished. It was minimally inpainted just to the point of increasing its legibility (see figure 4).

IX. Glaze on Gesso

Gabriel's robe was found to be a clear red glaze painted on white gesso. All shadows in the drapery are the result of increasing the pigment content of the glaze. The dots are also formed with the glaze, which is believed to be oil-based.

Losses in Gabriel's robe were filled and textured with dots (figure 9). (The dots could also have been made by the PVA during inpainting.) The fills were underpainted in watercolor to the creamy white color of the ground and inpainted with a PVA glaze of organic pigments, primarily rose madder. As with the original technique, gradations in the color were made by varying the amount of pigment (figure 10).

X. Glazes on Gold Leaf

Raphael's robe was painted with the same red glaze as Gabriel's. Gold leaf was applied directly to the ground, probably with a glue layer. The design was then incised in black on the unburnished gold leaf, and picked out in a thick red glaze that contributed a noticeable texture to the rich fabric. Further shading of the drapery was accomplished with a dark brown glaze.

Michael's waistband has a similar technique, using a golden brown glaze on unburnished gold leaf. Brown glaze is also used on many of the water-gilded and punched hems of the costumes to describe folds.

The damage through Raphael's robe included the original surface having been planed during a previous restoration and the design re-incised in areas to correct a misalignment. These were compensated by filling and texturing (figure 11).

The fills were underpainted with shell gold, 23.5 karat gold in a gum arabic medium. The shell gold needed to be applied in a fairly thick and uniform layer in order to mimic the original unburnished gold leaf. Inpainting was undertaken with PVA glazes, roughly the same mixture used for Gabriel's robe (figure 12).

XI. Paint and Glaze on Gold Leaf

The peacock feather design in Raphael's wings and Michael's sleeve is created with a similar technique. Glazes of various shades of brown are used on unburnished gold leaf to give a shimmering effect to the feathers. The eye design, however, is created with opaque paint, which breaks up the reflection of light on the gold.

Raphael's wings had suffered damage by overpaint, structural repairs, abrasion and poor adhesion between the glazes and gold. Fortunately, the original design was incised in the gesso, and was readily visible.

The losses were filled to an appropriate level, flush with the gilding for the glazed areas, and raised for the areas of opaque paint (figure 13). The fills were underpainted with either shell gold or watercolor. Inpainting was done with PVA resin and dry pigments mixed as either transparent glazes or opaque paint (figure 14).

After treatment the wings are probably less three-dimensional and dynamic than they were originally. Unfortunately, those altarpieces of Neri which also contain this technique are at least as damaged as *Tobias and Three Archangels*, and provided little useful information.

XII. Mordant Gilding

The final technique in *Tobias and Three Archangels* which was a challenge to treat was the mordant gilding. A design is picked out with a mordant which dries to a tacky state and covered with gold leaf. After the mordant is fully dry, the excess leaf is brushed away. Mordant gilding cannot be burnished but is an excellent technique for fine detail. In the altarpiece much of it is further embellished with glaze and paint highlights to render a three-dimensional effect.

Mordant gilding is found throughout the composition on sashes, bootlaces, cords and embroidered edgings (see figures 4, 6, 10 and 12). It even appears on top of water-gilding, as the clasps of Raphael's and Tobias's robes. It is used to great effect to create the lattice design of Michael's costume, where it plays against the water-gilded gold cuffs, hem and shield and the silver water-gilded sword and leg armor (figs. 15 and 16).

Though most of the mordant gilding had been overpainted with gold metal paint, it had suffered mainly only isolated losses. It possessed a characteristic fine crackle pattern which was duplicated by dotting textured fills

with shell gold, both as underpaint and inpaint. PVA resin and dry pigments were used to patinate and to match the original paint and glaze highlights on the mordant gilding.

XIII. Conclusions

In conclusion, *Tobias and Three Archangels* possessed a number of problems relating to its previous treatments which included both removable and irremovable overpaint, abraded gilding, re-incised designs, sprung joins and cracks. Treating these problems involved a certain number of compromise, as is often the case in paintings conservation.

The altarpiece also contained a number of disparate original techniques which involved sequential applications of paints, glazes, gold and silver in and on a variety of media. The original techniques were duplicated using a combination of traditional materials, in the case of the water-gilding, and modern conservation materials.

In the end, *Tobias and Three Archangels* after treatment presents a far more legible composition than before treatment, though much overpaint and irreparable damage is still visible. Most importantly, the intricate and exceptionally opulent techniques paid for by Mariotto della Palla in the summer of 1471 now clearly show where his money went; the altarpiece fairly shimmers with gold, silver and deep rich color.

Acknowledgments

I am grateful to Mr. Gianni Marussich, the National Endowments for the Arts and the Rockefeller Foundation. And I thank all my colleagues at the Detroit Institute of Arts and, in particular, Alfred Ackerman, Paul Cooney, Tom Dickinson, Barbara Heller, George Keyes, Julie Moreno and Leon Stodulski for their help and support during this long and complicated treatment.

[1] Santi , Bruno. *Le Ricordanze di Neri di Bicci*, Pisa, 1976. p 372, no. 698. Author's translation.
[2] Santi, op cit. p 366, no. 689.
[3] Santi, op cit. p 373, no. 699.

Figure 1. *Tobias and Three Archangels* by Neri di Bicci and Workshop, 1471
Tempera, oil(?), gold, silver on linden wood, 1.73m x 1.70m.
The Detroit Institute of Arts 26.114, City of Detroit Purchase.
Before treatment.

Figure 2. *Tobias and Three Archangels* by Neri di Bicci and Workshop, 1471.
Tempera, oil(?), gold, silver on linden wood, 1.73m x 1.70m.
The Detroit Institute of Arts 26.114, City of Detroit Purchase.
After Treatment

(Figures 2-16 photographed by Paul Cooney)

Figure 3. Tobias's robe, cleaned and filled

Figure 4. Tobias's robe, after treatment

Figure 5. Tobias's boot, cleaned and filled
(Arrows indicate irremovable glaze.)

Figure 6. Tobias's boot, after treatment.

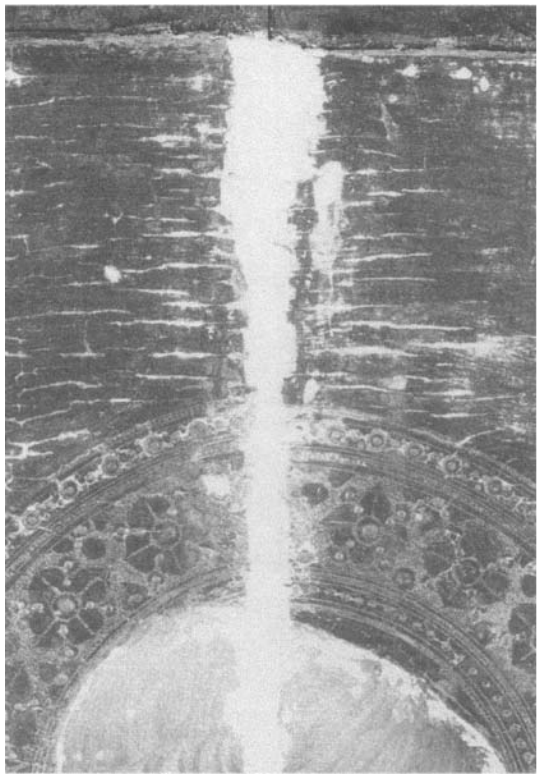

Figure 7. Detail above Raphael, cleaned and filled

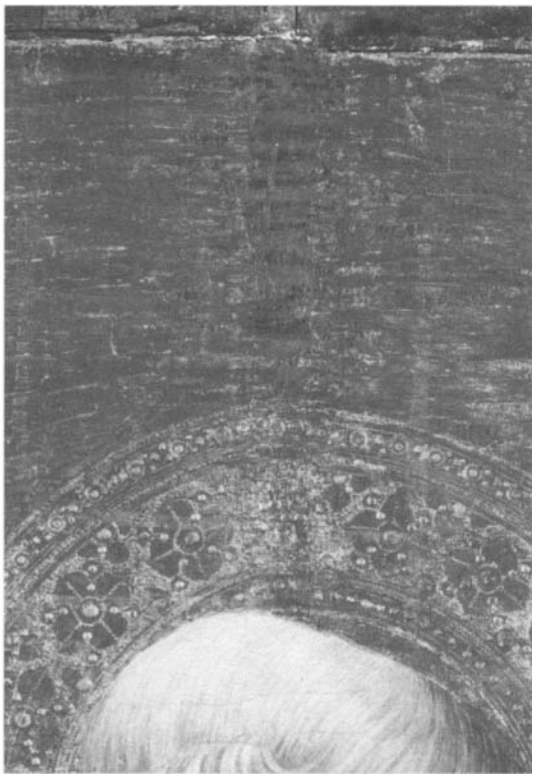

Figure 8. Detail above Raphael, after treatment

Figure 9. Detail Gabriel, cleaned and filled

Figure 10. Detail Gabriel, after treatment

Figure 11. Detail Raphael's robe, cleaned and filled

Figure 12. Detail Raphael's robe, after treatment

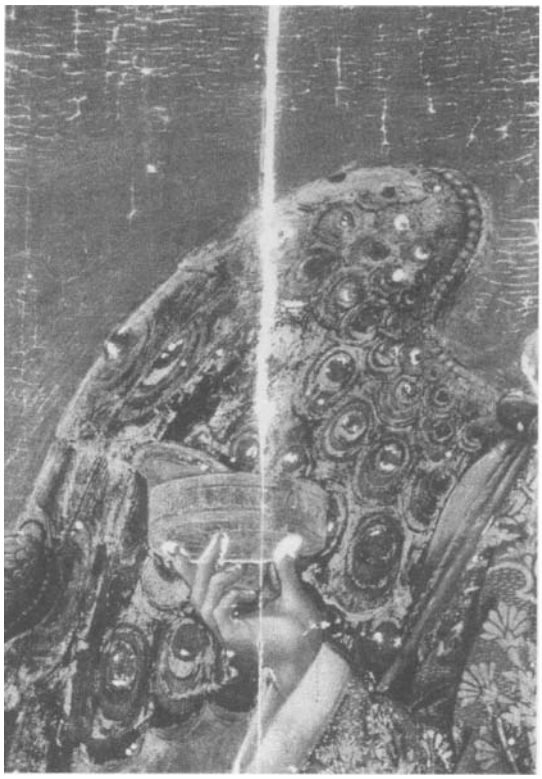

Figure 13. Detail Raphael's wing, cleaned and filled

Figure 14. Detail Raphael's wing, after treatment

Figure 15 Detail Michael's costume, cleaned and filled

Figure 16 Detail Michael's costume, after treatment

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