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An Introduction to Painting Conservation

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An Introduction to Painting Conservation

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelors of Arts in Art History from The College of William and Mary

by

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Accepted for

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A Brief Note

All of the treatments that follow have been performed under supervision of conservator Shelley Svoboda between May 2008 and February 2009. These treatments include preparing paintings for exhibition and loan travel. Simultaneously, these experiences are a necessary prerequisite preparing for graduate level studies in art conservation. The treatments presented here are only a brief introduction to the field of art conservation; they are by no means an exhaustive list of conservation methods and techniques. The paintings outlined in this thesis and their information are property of the Colonial Williamsburg Foundation. Any information not otherwise cited belongs to Colonial Williamsburg. All the photographs of the art works were taken by me. Photographs of me working were taken by conservators Shelley Svoboda and Amelia Bagnall.

The order in which these treatments are discussed deserves explanation. The first four treatments are twentieth-century American portraits that hang in the boardroom of the Goodwin Building in the Merchant’s Square area of Williamsburg. The next three are Colonial Era paintings. Following those are three treatments for Folk Art: two nineteenth-century American outdoor sign boards and a campaign banner for James K. Polk. Finally, a nineteenth-century American painted room, also Folk Art, and the various possibilities for examining paint composition are considered. These objects represent diverse materials and kinds of art from different eras and artistic cultures. The common ground they share is paint.
Introduction

Art restoration began with artists themselves. As early as Greek and Roman civilizations, trained artists, who best understood the complex nature of paintings at that time, oversaw their treatment.¹ Long since, though, conservation has shifted to the hands of specialists. For example, Sir Charles Eastlake, once keeper of the National Gallery in London, is known for “preventive conservation” and keeping full records of treatments as two of his more important innovations.² Thorough documentation of treatment is especially valuable to future conservation efforts and is an essential component of modern conservation. In 1846 Eastlake removed the mastic and oil varnish from five paintings. Viewers of the “cleaned” paintings found the bright colors once hidden behind yellowed varnish to be distasteful. Eastlake thus spawned one of many cleaning controversies in the history of conservation.

Controversy has not disappeared from conservation. In 1980, The Vatican launched its first effort to clean the ceiling of the Sistine Chapel. Some viewers protested that Michelangelo’s frescoes have been permanently changed by the twelve year treatment. And while what a conservator takes away from a painting during cleaning cannot be returned, extensive pre-treatment examination and appropriate documentation of the treatment diffuses this concern. The new understanding of Michelangelo’s work as seen from the cleaning is now embraced. Though interpreting an artist’s intentions will always include difficult choices, it is the conservator’s responsibility to carefully and

appropriately research the art and its condition prior to treatment to best inform his or her decisions.

Another part of a conservator’s job is to stop any agents that can harm art. According to Julie Heath who works in the Lunder Conservation Center at the Smithsonian, ignoring art is like eating too much fast food,

“You can eat that cheeseburger and fries, and it won’t kill you today, it won’t kill you tomorrow. It might get you in a decade or two. The same goes with conservation. Art won’t fall apart in one day, but if you neglect to take care of it one day it will. Then you’ve destroyed your cultural heritage.”

While this is often the case, benign neglect can be better for an artwork than the wrong treatment. At one extreme, leaving art in dark, climate-controlled storage rooms can protect it and preserve it for decades, even centuries. On the other hand, Paul R. Tetrault, the producing director at Ford’s Theater asks, “What value does it have if in fact people… never get to see it?” Leaving art overexposed can destroy the object and all of its value as an historical document and an aesthetic object. Both an improper conservation treatment and total neglect can damage art, negating its rich history and heritage. The conservator is thus charged with finding the mean, an appropriate treatment path.

Art displayed for the public in our nation’s museums and galleries should ideally be both stable and presentable. What value does an object have if people never get to see

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it? What, too, is the value of an object that the viewer can’t understand? Not all art can be on view at all times. Limited space and the effects of light damage play an important role in what can be displayed and what remains in storage. Conservators often discuss treatment decisions with the collection’s curators in order to account for an object’s long-term preservation and its historical integrity, as well as its educational value to the public. Each piece is unique, and should be treated as such. The artwork dictates what it needs to survive.\(^5\) A conservator begins by gathering as much information about an object as possible.\(^6\) Only then she can begin to make appropriate, informed treatment decisions.

**Preventive Conservation**

Degradation begins as soon as a piece is finished. The process of decay can never be reversed, or even halted. The conservator can only do her best to delay the process.\(^7\) Controlling the environment can be difficult in some collections, but is one of the best measures to protect art. As relative humidity and temperature change, materials expand and contract at different rates. Canvases and panels expand and contract more than paint layers do. This can result in cracking, cupping, and in the worst cases, paint loss. Thus, maintaining a stable environment is the best way to care for and preserve paintings.\(^8\)

Sometimes, however, it is necessary for art to travel, leaving the climate-controlled environment of the museum or gallery. A conservator must make the assessment as to whether a painting is secure enough travel. If treatment is necessary to make it travel-safe and appropriate given the time allotted before it must travel, treatment is undertaken.

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The next step is to decide on packing design and material. This involves considering temperature and humidity, as well as shock and vibration. The packing materials should be such that they do not release chemicals harmful to the work. All of these issues should be carefully considered by conservators and handlers before art is allowed to travel.⁹

Dusting, too, is an important and relatively safe practice to maintain a collection. Today, most modern museums have sophisticated HVAC systems to filter particulate out of the air. This greatly reduces the amount of dust on an object’s surface. Unfortunately, historic houses and private dwellings are not always equipped with such filter systems. Dust can cause abrasion, create static charge, and contribute to deterioration. Moreover, dust can carry microorganisms which attack organic material. It can also become hygroscopic, attracting water to the canvas or panel, which can, in turn, cause these fibrous supports to swell or attract mold and fungi.¹⁰ A soft bristle brush and occasionally the appropriate use of a vacuum are a simple way to prolong the stability and presentation of a collection.

The following case studies offer further examples of conservation techniques. They introduce some of the philosophies involved in decision making. The most important of these philosophies is that all art should be respected. Thorough documentation is one of the most respectful practices, as it allows future conservators to make well-informed decisions. The methods presented here are designed to preserve the art so that major treatments are few and far between. All materials change though, and

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treatment will become appropriate again. It is the (current) conservator’s job to make informed treatment decisions and to inform others in the future.
Ivan G. Olinsky, the artist (1878 – 1962)

Born in the Ukraine, Ivan G. Olinsky exhibited his talents from an early age. He studied at the university in Elizabethgrad at nine years old with students twice his age. He immigrated to New York with his family at age 12 and continued his studies at home in New York and in Europe. After returning from a trip to Italy in 1910, Olinsky began producing portraits, both on his own and for commission. In 1922 he took up residency in Old Lyme, Connecticut where several twentieth century American painters studied. He participated in several gallery exhibitions, though he never exhibited his work alone, which is perhaps why his name doesn’t appear in art history text books.

Despite his present obscurity, Olinsky won several prizes for his work, including full membership at the National Academy of Design. His paintings of women engaged quiet activities such as reading, sewing, or day dreaming bear influence of his impressionist predecessors. These portraits hung in galleries and won the attention of buyers and critics. The public enjoyed his art so much that he often could not participate in shows because he had already sold everything in his studio. His portraits of men were more often for institutions and board rooms, such as those of Arthur Woods and Dr. W.A.R. Goodwin.

Dr. William Arthur Rutherfoord Goodwin

The decorative plaque on Goodwin’s portrait reads, “Dr. W.A.R. Goodwin Who Conceived the Restoration.” Though Dr. Goodwin was said to modestly admit that the idea wasn’t his, he did collaborate with John D. Rockefeller on the enormous project of restoring an entire town – the first time such a project was undertaken in the U.S. Goodwin was fully devoted to his community. His life’s work was restoring Williamsburg to the living museum it is today. He also served as a professor of religion at the College of William and Mary, and the pastor of Bruton Parish church.¹³

Colonel Arthur Woods

Colonel Arthur Woods was the chief of Williamsburg Police before serving as the Colonial Williamsburg Foundation’s first president. He was also in charge of the policies of the Williamsburg Restoration, working closely with Goodwin and Rockefeller.\textsuperscript{14}

![Figure 2: Arthur Woods](image)

Technical Information

The portraits of these men hang in the board room of the Goodwin Building in Colonial Williamsburg. Examination in the lab revealed that they both survive in excellent condition. Neither portrait had been treated previously. This “untouched”

\textsuperscript{14} Montgomery, 135, 194.
condition served as a document for the artist’s intentions. Olinsky’s light-weight stretches and pre-gessoed canvases may have been purchased commercially; the white ground extended to the cut edges of the canvas. He worked in a time when such art supplies were readily available. Three small tears were in the tacking edges in Woods’ portrait: two along the top and one on the bottom. Thick deposits of a dark material covered the canvases and stretchers on the reverse. This was likely furnace soot from the building’s heating system. Additionally, white, fibrous insect material adhered to the canvases and frame rabbets. Fortunately, no evidence of damage from the insect activity was evident.

A thin, red imprimatura is visible along the tacking edges and in some areas of thinner paint, such as in the figures’ eyes and ears. This layer adds warmth to the figures’ skin tones. Working confidently in thick, opaque paint, Olinsky’s left behind brush hairs in his green, impressionistic backgrounds. He employed thick strokes of wet-on-wet blending in the background and the figures’ clothing. By leaving the red imprimatura exposed, notably in the figures’ eyes and ears, Olinsky created a rich variation of texture. The matte-gloss quality of the paint surface can be seen when viewing the paintings in specular light. This texture quality is evidence that Olinsky, like many of the earlier impressionist painters, did not apply overall varnish either of these paintings. A yellow film characteristic of nicotine coated the surfaces of the paintings. This film reduced the paintings’ contrast and depth. Likewise, the sitters’
skin tones became yellowed by this film, an effect which kept the viewer’s eye on the surface of the painting. Formal portraits, such as these, should impart depth and volume. Surface cleaning was therefore appropriate.

As both of these paintings experienced soot deposition and an environment with poor temperature and humidity controls, they also shared some condition problems. The thick deposits of black material were carefully vacuumed from the canvases with a soft brush. The nicotine-like substance was removed from the paint surfaces using saliva on cotton swabs. This restored the intended bright colors and depth to the paintings. It also returned the figures’ skin tones to a warmer, more natural color, the hue intended by the artist. The photographs show the state of the paintings while they were being cleaned. On Dr. Goodwin’s portrait, the right side of the canvas is clean, while the left half still retains the yellow grime film.

Figure 4: Dusting the canvas reverse

Figure 5 Dr. Goodwin during cleaning
On Woods’ portrait, a rectangular cleaning window is visible from the bottom of the figure’s nose to just below the shoulder, extending into the background space. The specular light photograph also shows the cleaning window and the contrasting matte and gloss surfaces that Olinsky created in the paint. Specular light involves glancing light off of the surface of the painting at such an angle as to detect any variation in the saturation. Because Olinsky did not use an overall varnish and so left the rich variation of texture on the canvas surface, no overall varnish was applied during this treatment.
After small tests were undertaken to ensure that the surface cleaning would leave a healthy paint film, saliva was chosen as the appropriate cleaning system for these paintings. Saliva can be excellent cleaning system because it is largely composed of water. Water, which is a polar compound, aids in removal of grime that has developed a polarity over time. Though this would not make saliva a good choice for paintings that would be soluble in water, such as gauche or water colors, it works very well with oil-bound paints. Moreover, saliva contains amounts of ions, enzymes, and proteins that aid in grime removal without acting as an especially strong solvent. Finally, too, the pH of saliva is found to be nearly always buffered close to 7.\textsuperscript{15} These factors, as well as its availability, make saliva one of the first options for testing a cleaning system on oil paintings.

Woods’ portrait suffered minor abrasions in the figure’s proper left arm. Because reforming these abrasions with solvents were not adequate, they were invarnished with Galdehyde Acrylic Resin and then inpainted, where necessary, with Gamblin Conservation Colors.

The canvas tears in the tacking edges of Woods’ portrait were mended with small patches of Pellon – a material commonly found in fabric stores – and sheet BEVA. The photograph shows the tear on the left side that has been repaired with Pellon, while the tear on the right remains untreated. Although these tears didn’t disrupt the visual presentation of the painting, they would benefit from securing while the painting was undergoing treatment.
The most substantial preventive measure taken in treating these paintings was the application of backing boards. No planar deformations were present when the paintings were in lab in the summer of 2008. However, Ms. Svoboda noted pronounced rippling when she examined the paintings in the environment of the board room during the winter. Because it is not currently possible to improve the board room’s environment, backing boards provide additional protection from environmental fluctuations. In addition to buffering environmental changes, they also prevent mechanical impact, reduce canvas vibrations, and protect the canvas from grime.16

Figure 11 Dr. Goodwin’s backing board

Figure 12 Mylar covering

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In addition to providing protection from the environment, Dr. Goodwin’s backing board’s design includes a clear, mylar sheet that allows viewers to read the archival tag’s information. A small notch left for the maker’s label on the frame’s reverse shows the label that advertises Julius Lowey’s antiques and frames.

Frames

The modern frames for both portraits resemble eighteenth-century style molded frames. They, like their paintings, are in excellent condition and have not previously been treated. They are constructed with mitered, wooden profiles. Gilded profiles form the interior edge. The surrounding black moldings are painted with a black finish. Examination indicated minor abrasions and localized losses in the gilding and the black paint that exposed the red bole and white gesso beneath. These losses distracted the eye from the painting. Some of these losses, notably in the gilding, were also unstable.

The unstable areas were consolidated with Aquazol 500. The losses were then inpainted with Gamblin Colors. Based on examination of the frame’s finishes, Aquazol was chosen as a consolidating adhesive and the Gamblin Colors for inpainting. The red bole and the overlapping pattern of the gold finish on the frame are suggestive of water gilding. Overlapping occurs as the gold leaf is laid in place on the frame’s surface to ensure that there are no gaps. Overlapping does not occur in oil gilding, as the oil adhesive is too viscous to penetrate a second layer of gold leaf. The conservation
materials and the original materials are both somewhat polar; however, the inpainting material did not adversely affect the original surfaces.

Caring for a painting’s frame is nearly as important as caring for the picture. The frame not only supports and protects the painting, but draws attention to it. In representational art, the frame creates a window sill between the viewer’s world and the painting. Frames also cross the boundary between furniture and paintings. Sometimes they are treated separately from the painting to which they belong. Conserving the frame along with its painting ensures that it supports the painting as it hangs on the wall, and doesn’t detract in any way from its overall presentation.

**On-Site Treatments: Portraits of C.H. Humelsine and Charles R. Longworth**

These two portraits of past Colonial Williamsburg Foundation presidents hang in the board room of the Goodwin building as well. They were both painted in the late twentieth century by Peter Egeli, an American-born portrait artist. Moving art to another site brings additional risks. For more minimal treatments, such as these, on-site treatment is both appropriate and sufficient.

Although these paintings do not share the decades of grime build up as Olinsky’s portraits, they exist in the same environment. The temperature and relative humidity change seasonally. The Goodwin Building is not a museum or gallery; the climate is not kept constant year-round. Instead, like most buildings, its climate is regulated for human comfort relative to the external environment. Backing boards were a necessary measure in buffering these artworks from the environment.

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Minor treatment was also appropriate for the frames. They are constructed of gilded, carved profiles. With these modern frames, it appears that the wood may have been poorly prepared. As temperature fluctuates, the wood support expands and contracts to a greater degree than the gesso and gilding. The gesso therefore is insecure and flakes off of the decorative carvings revealing the wood beneath. Inpainting the scattered losses with Gamblin Conservation Colors was sufficient for this treatment.
Colonial Era Paintings

The following treatments were in preparation for the Reading Room Exhibition in the Abby Aldrich Rockefeller Folk Art Museum in Colonial Williamsburg. Completed by either British artists or American artists studying in Britain, these paintings are examples of eighteenth century portraiture.

Portrait of Queen Anne

Attr: Kneller School

Sir Godfrey Kneller, the artist (1646-1723)

Sir Godfrey Kneller was the court painter to the British monarchs William III and his wife Mary in the late seventeenth and early eighteenth centuries. Kneller was elected unanimously to be the Governor of the English Academy for Drawing and Painting for the first seven years of its existence. Despite his popularity among his peers and public, his relationship with Queen Anne left something to be desired. The queen awarded Kneller’s rivals with several commissions that should have been his and even partially suspended his salary.¹⁸ Current research at Colonial Williamsburg attributes this portrait to the Kneller school.

Kneller’s portraits of women are characteristic of the Van Dyck and Lely schools that dominated English portraiture in his day. His soft flesh tones, though, are notable for their French influence. Details and texture are articulated clearly. This portrait contains

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a serious palette and mysterious backlighting. Even more striking than the light are the two faintly-painted, winged figures who flank Queen Anne.

**Queen Anne (6 February 1665 – 1 August 1714)**

Queen Anne of Great Britain is the sister of the same Mary for whom the college is named. She assumed the throne on March 8, 1702, after the death of her brother-in-law William III died. Unlike her sister, she did not share the monarchy of England with her husband, George of Denmark. She alone assumed the role as king.\(^{19}\) Queen Anne ruled over England, Scotland, and Ireland until August 1, 1714, when upon her death her husband George I took power.

![Figure 14 Queen Anne of Great Britain](image)

**Technical Information**

The painting survives in fair condition. It had been lined in a previous treatment. The paper tape that runs along the perimeter of the stretcher is characteristic of a glue-paste lining. This tape obscures examination of the tacking edges. Strong cusping along all edges of the composition, where the canvas weave is visible, indicates that the original, or very near original perimeters of the original canvas survive.

The artist applied oil-like paint in varying thicknesses. Although the impasto has been somewhat flattened in past lining treatments, brush strokes are still visible in the figure’s face, hands, and robes. The white lace retains an especially strong three-dimensional quality. Mechanical cracking that runs throughout the paint surface has caused the small, scattered losses through which a gray ground is visible. These losses are currently stable. The crackle pattern contributed to an overall darkening effect of the image, however, as many of the slightly opened cracks accumulated past varnish and grime. Microscopic examination revealed coarse, hand-ground pigments in contrast with the modern, machine-ground pigments in the inpainted areas. The hand-ground pigments may have become more visible as a result of chemical abrasion from an early, broad cleaning.

Microscopic examination also revealed small amounts of discolored varnish on the paint surface. These areas, possibly left behind from an early cleaning, contribute to a slight overall yellowing of the image. Records indicate that contract conservator Russell Quandt applied the last varnish layer in 1959. Quandt brush-coated the painting with polybutyl methacrylate containing an unspecified UV absorber. This is a polymer that has been found to cross-link, which can make it especially difficult to remove. In this case the typically tough varnish layer began to break away from the paint surface during
cleaning tests using saliva. As saliva was found to be a good cleaning system for grime removal, care was taken to ensure the varnish stability. Some areas of varnish began to delaminate from the paint surface, making the paint look lightened and splotchy. These areas were later invarnished with Regalrez in D-38, a shell petroleum solvent. This treatment re-saturated the varnish layer, reducing the effect of the scattered light. The photographs of the crown show one area of delamination before and after treatment.

![Figure 15 Delamination detail before treatment](image1)

![Figure 16 Delamination detail after treatment](image2)

The surface of the painting had a layer of grime that greatly reduced any sense of depth in the painting. The effect was similar to the nicotine-like film that covered the two board room portraits of Arthur Woods and Dr. W.A.R. Goodwin. The specular light photograph reveals the contrast between the hazy layer of surface grime and the richer, more saturated colors beneath. The right half

![Figure 15 Facial detail during cleaning](image3)
of the painting has been cleaned with saliva, while the left is covered with the hazy grime layer.

This portrait’s frame, a highly decorative, carved replica of a period frame, was particularly distracting as a result of scattered losses. It consists of a gilded surface toned with alternating regions of dark green and maroon paint. The expanding and shrinking of the wood caused numerous scattered losses in the surface paint, revealing the white gesso and light-colored wood beneath. These areas were also unstable. To consolidate the flaking paint, Acryloid B-72 in xylene was applied locally with a small brush. Loose pieces of paint were then held in place while the adhesive dried. The losses were finally inpainted with Gamblin Conservation Colors.

*Europa and the Bull*

**By: Matthew Pratt**

**Matthew Pratt, the artist (1734-1805)**

Matthew Pratt was a Philadelphia-born artist who traveled to England around 1764, where he studied under Benjamin West. Several portraits from England and America by his hand have survived, though they “turn up” slowly in comparison to the number of known Charles Wilson Peale or Gilbert Stuart portraits.²⁰

*Europa and the Bull* was painted between 1764 and 1770 during Pratt’s first visit to Europe. This painting is a likely a copy of Guido Reni’s same. It was advertised in the *Virginia Gazette* in Williamsburg on March 4, 1773 as part of a small exhibition of Pratt’s work. It is an example of Pratt’s handling of the figure and stylistic choices.

Using a light, airy palette, Pratt paints a classicizing drapery on a robust, elongated

figure.\textsuperscript{21} Europa’s head seems too small in relation to her body. Perhaps this is an overly harsh criticism for an early American artist still studying his trade. This painting represents an effort to bring European taste to colonial America.\textsuperscript{22}

**Europa and the Bull**

The story of the seduction of Europa begins with Zeus, who having fallen in love (or lust) with Europa, transformed himself into a white bull. In this guise Zeus is able to approach Europa as she picked flowers with her attendants. Europa noticed the bull and caresses his flanks. She eventually even climbed onto his back. At that point Zeus fled with Europa and swam across the sea to Crete, where he revealed his identity. The constellation Taurus was Zeus’s gift to Europa, who became the first queen of Crete.

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\textsuperscript{21} Sawitzky, 8-10, 54  
\textsuperscript{22} J. Thomas Savage Jr., “‘I See London, I see France’: Discerning Origins” (lecture, Colonial Williamsburg Antiques Forum, VA 5 February 2009).
Technical Information

The painting is in good condition. This canvas, too, was lined in a previous treatment. The adhesive found on the lining canvas is characteristic of a wax-resin. Conservators may perform wax-linings to correct deformations and insecurities in the canvas and paint layers. Sometimes canvases are even adhered to rigid supports, such as aluminum panels. Without a treatment record available, it is impossible to know exactly why this painting was lined with wax-resin. In addition to overall lining treatments, some alternative treatments include mending canvas tears locally with tiny pieces of Japanese tissue or Pellon, as seen in the treatment of Arthur Woods’ portrait.\textsuperscript{23}

Examination also revealed small areas of previous inpainting in the sky that had become discolored with time. These areas detracted from the overall aesthetic of the painting and fixed the eye on the surface of the paint. All materials change with time. As conservator George Stout has pointed out, a painting begins to deteriorate as soon as it is finished. The newer materials that a conservator applies will change with age, too, though at different rates than the original materials. To prepare this painting for exhibition, these areas of previous inpainting were inpainted with Gamblin Conservation Colors.

Figure 17 Discolored inpainting before treatment

Figure 18 Discolored inpainting after treatment

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Portrait of David Meade, Jr.

By: Thomas Hudson

Thomas Hudson, the artist (1701–1779)

Thomas Hudson became one of the most popular portrait artists in England following the death of Sir Godfrey Kneller in 1723. He trained under Baroque artist Jonathan Richardson and married his daughter before 1725. He also studied the works of Sir Anthony Van Dyck and Sir Peter Lely, continuing the tradition of the English portrait style previously established by Sir Godfrey Kneller. The Van Dyck tradition of British painting is modeled on Rubens and the warm flesh tones of the Italianates. If the European Enlightenment promoted the independence of children, Hudson certainly capture that quality in David Meade’s confident smile and mature pose.

David Meade, Jr. (1774-1830)

David Meade, Jr. was born in Nansemond County, Virginia, not far from Williamsburg. His parents sent him to England for his education. During this time Thomas Hudson painted the portrait of the young boy. Meade returned to Virginia in 1761. He was elected a burgess from Nansemond County, but because of poor health retired early from his political career. He moved to Prince George County in 1774, then to Kentucky in 1796.

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Technical Information

In an earlier treatment Meade’s portrait had been double-lined onto a light-weight plain-weave canvas and a heavier twill-weave canvas. The adhesive found on the lining canvases is characteristic of glue-paste. Illegible newspaper clippings remain in the taking edges of the lining canvases. Also visible from one of the previous treatments were broad amounts of overpaint and retouching. This obscured the assessment of the original paint layers. It is possible to see cupping in the original paint layers through the overpaint in many areas. Interruptions in the crackle pattern indicate past paint damages or even loss. Minor paint losses are present, too; most are visible in the dark areas, such as the shadows or background. Although minor paint loss is often the result of mechanical cracking due to aged paint, some of these losses are the result of an abrasive, early cleaning. These areas have all been stabilized in previous treatments.
The most significant problem caused by these losses was in the portrait’s presentation. The image was broken up by the crackle pattern and abrasions. The figure’s proper left shoulder, hair, facial features, hat, and clothing all had lost their sense of volume. The lightened shadows flattened the image, making it difficult to read. Also, the past lining treatments had damaged the paint in the pupils, creating a small matte area surrounded by healthier, glossier paint. This disfiguration was noticeable in specular light.

As in Pratt’s *Europa and the Bull*, some of the past retouched areas in the clothing, face, background, and drapery had begun to discolor. In some cases, when it is necessary to view the original material of a painting, removal of overpaint is the prescribed treatment. In this case, no varnish discoloration was present, and local inpainting with Gamblin Conservation Colors was an appropriate treatment choice.

Inpainting Meade’s portrait did not simply involve matching a uniform background color. Discussion with curator Barbara Luck and vice president Ron Hurst
helped to make decisions concerning the portrait’s [original] aesthetic. In addition, studying Hudson’s other portraits provided a more informed understanding of his stylistic qualities. For the most part, Hudson’s portraits show consistent features: the reflection of light on the sitter’s chin creates a stripe of shadow on the unlit side of the face. Noses are rounded, even almost identical sometimes. The shadow under David Meade’s nose contains a touch of red paint, adding warmth to cause the shadow to recede against the cool white light highlight on the top of the nose. Shadows and highlights are soft. Each brush stroke follows the direction of the feature. The strokes are blended, creating a solid, firm volume out of the figure. The drapery was probably handled by Hudson’s studio assistants. This information played a key role in making inpainting decisions.

The materials and technique chosen for inpainting should coincide with the artist’s choices. Reversible materials are chosen so that when removal is necessary at a later date the original paint will not be endangered. This is not to say that conservation inpainting materials should be generously applied to areas of damage, either. For David

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27 Thomas Hudson, 3-4.
Meade’s portrait, tiny dots of inpainting were used in minimal, discrete locations throughout cracked and abraded areas merely to make the image appear to be appropriately complete. Not every crack and loss was filled in with new paint. The gloss of the inpainting should also match that of the original surrounding paint. An area of inpainting that is of a different level gloss than the surrounding paint can absorb or scatter the light differently, making it appear different than its surrounding paint, and therefore defeating the purpose of inpainting. In general, it should be as invisible as possible to the viewer at a distance, but recognizable to the trained eye under careful examination.

Frame Repair

The period frame for David Meade’s portrait also required treatment. The top right corner joint was found to be unstable when the picture was unframed for treatment. In this case, the frame was treated under the supervision of conservator Chris Swan in the CW furniture conservation laboratory.

The eighteenth-century molded-style frame was constructed with a soft-wood back plate joined with lap joints. Two mitered, hard-wood moldings are joined to the back plate: a bolection-style molding with a black finish and a gilded, leaf-and-dart carved molding on the interior. It appears that the frame has been cut at a later point in its life following the miter joints, compromising the lap joints. This results in small, triangular blocks in the back plate. It also appears that an amount of material has been removed from the bottom of the proper right member. The bottom of the frame is approximately one quarter inch shorter in length than the top, which makes the frame as a whole slightly out of plane. The original joints and triangle blocks were previously glued
in place then secured with modern wire nails through the top molding’s miter joints. The glue at the top corners of the frame had failed. This resulted in the instability of the top member.

The top member was therefore carefully removed from its adjoining members. The modern wire nails were carefully pulled through their original holes. Backing the nails out, rather than pulling them through, could have possibly further damaged the original wood. The old glue was cleaned with Laponite RD, a gel system that can be gently wiped away without damaging the wood. The joints and triangle blocks were then re-glued with fish glue. A wax coating protected the frame’s finishes from the glue treatment. A two-part epoxy was used to fill the miter gap in the upper left joint, using fish glue as a barrier between the epoxy and the wood. After the glue dried, the wax was removed with Shell Solvent D-38. Where the epoxy was left exposed on the front of the frame, Liquitex Acrylic Artists’ Colors were used for inpainting.
A Note on Portraiture

Portraiture is unlike other genres of art in that it is concerned with the direct likeness of the subject, the sitter. Although distortion is a part of every portrait, the primary function of portraiture is to record the likeness of a specific individual. Portraits also allow for artist creativity – often, too, portraits were copies of other portraits.\textsuperscript{28} This is especially the case with royal portraits used for mass distribution, in which the artist was not in the court’s circle and could not gain access to the monarchs.\textsuperscript{29} Portraits are also objects, biographies of the sitters, and documents of specific moments in time. They can both instill power and destroy it.\textsuperscript{30} Portraits serve an especially important role in a culture’s heritage.

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Folk Art

Rural and untrained artists use a wide variety of materials according to what is available to them. Often these artists use their materials sparingly. Folk art can therefore be more fragile than more traditionally prepared art works. Highly individual styles and material choices make treatment decisions very different for the unique pieces in the folk art collection. The conservator should respect all art equally when making treatment decisions. This next set of treatments progress to the nineteenth century and into the American folk art tradition.

Campaign Banner for James K. Polk

This campaign banner for James K. Polk and George M. Dallas was documented and treated in preparation for loan travel. It closely resembles a lithograph published by Nathaniel Currier in 1844 when Polk was elected. The attention paid to the decorative
elements of this painting – the red drapery and the yellow elements below the portraits – suggest the artist was more comfortable painting furniture schemes than portraits. This is entirely possible, since often folk artists made a living painting a variety of things, from coaches, furniture, and painted signs to portraits and miniatures. So, it is not so unusual for this banner to cross the bridge between folk art and portraiture.

The CW records show that contract conservator Russell Quandt treated this painting in 1959. In keeping with most treatments of this period, his treatment included a wax-resin lining. The texture of the wax on the canvas reverse shows that the wax was melted with an iron, as opposed to a hot table which would have left a more uniform surface. A previously repaired damage at the top of the canvas disrupts the smooth texture of the paint surface. Small, pinhole-like loses are visible in the paint surface. Quite likely these are the pin holes applied to extract excess lining adhesive from the 1959 treatment. This list of past damages was well documented before the painting traveled to its loan destination as a record of its condition upon leaving.

A thick layer of varnish creates a glossy surface. Although the treatment record does not mention exactly what Quandt’s 1959 treatment entailed, he often applied Lucite 44 to his painting treatments at this time. Small cleaning tests were undertaken to determine the degree of reversibility of the varnish layer. The first attempt, saliva on cotton swabs only created a tacky surface, but did not remove any varnish. Eventually, a one-to-one mixture of xylene and D-38 was found to successfully remove the varnish layer, leaving a matte area that contrasted with the surrounding varnish. These tests are a part of a larger, ongoing study of Lucite 44 in the Colonial Williamsburg collections. Lucite 44 is a varnish that is believed to cross-link, a chemical process which makes
removal at a later especially difficult. The data collected from these tests will be entered
into a database that will help inform decisions in future treatments.

    Documentation, in writing and photography, is an integral part of conservation, as
mentioned earlier. It allows future conservators to make better decisions about the art
when treatment becomes necessary. Complete records are extremely helpful to current
and future conservation efforts. Conservators can make more appropriate decisions for
treatment only when they know what materials and techniques were used in previous
treatments.

    Sidewalks to Rooftops Exhibition
    Abbey Aldrich Folk Art Museum

    Horace Rockwell

    Horace Rockwell was born in New York and trained in Connecticut. He moved
to Indiana where he painted several biblical scenes and portraits. His ambition (and
varied talent) is, perhaps, most evident in his invention of a flying machine.
This nineteenth-century painting is another example of the crossover between portraiture and sign-painting. Rockwell used a pre-existing portrait of Reverend George Berkeley (who lived from 1685 to 1753) to advertise his own portrait painting skills. The panel is structurally sound with only minor convex bowing present and no visible
splitting. The bowing is accommodated by the carved rabbet of the light-weight modern frame. Evidence of the planning tools used to prepare the tulip poplar panel is present on the reverse.

To the original eighteenth-century portrait the artist added the lettering “Portraits & Miniatur’s painted by H. Rockwell,” as well as the yellow spandrels around the portrait and red quarter-rounds around the lettering. Examination with a microscope reveals that these elements are not part of the original portrait. Additionally, the drying cracks in the black glaze over the architectural elements reveals that these two paint layers are of the same generation. Drying cracks open up as the top layer of paint dries faster than the lower layers. The photograph shows the mechanical cracking in the original black background paint. Examination with both UV light and a microscope revealed that much of the yellow letter “H” is actually more recent retouching.

Linear abrasions ran along the outer perimeter of the paint surface on all four sides, possibly created by the panel’s previous frame rabbet. These abrasions distracted the viewer from the advertisement. Therefore they were inpainted with Gamblin Conservation Colors to reduce their visibility in preparation for exhibition. Fly specks that were equally as distracting were noticeable on the figure’s face. These were inpainted with the same so that the viewer can fully appreciate this nineteenth-century sign board.
Figure 30 Abrasion before treatment

Figure 31 Abrasion after treatment

Figure 32 Horace Rockwell after treatment
This sign, an advertisement found in Exeter Maine, survives in very good condition with no evidence of previous intervention. It consists of a single panel of wood with framing elements of a simple, rectangular profile that are original to the panel. These are nailed into butt joints at the corners, and are placed around the outer perimeter of the main support panel. A thick, vertical batten runs through the center of the reverse of the panel. Although slight shrinking has caused gaps between the horizontal edges of the main panel and the framing elements, the nails hold the construction together adequately.
A large field of dark paint surrounds the white and gilded lettering on this sign board. This field has been given a rough texture with coarse pigments, possibly strewn as the paint was drying. The framing elements are painted to match the sign panel, with gilding around the inner perimeter of the front edge. Lettering on the reverse that mimics the design on the front suggests a practice attempt or an initial sketch that was abandoned for the other surface. The rough texture of the dark paint in the background and on the framing elements is not present under the lettering, which is further evidence that the artist planned his design before painting. Small specks of gilding are found above the dark paint in some areas of the framing elements. This suggests that the gilding was applied as leaf after the dark paint was applied. The artist who carefully planned his design before laying down paint could likely be the name whom the sign is advertising. The CW record on this piece mentions that it would not be unusual for a writing instructor or “chirographer” to be able to enlarge his own penmanship.

The reverse of the panel shows evidence of tide lining from past water exposure. As a result, the paint on the upper edge of the lower framing element was found to be fragile. Dust was first carefully removed from this area with a small brush. The paint was consolidated locally with 7.5% Acryloid B-72 in xylene. Areas in the gilding and paint of these letters seen here were also found to be unstable and were locally consolidated with the same.
The curator found an accretion near the large, script “M” to be distracting. Cleaning tests with saliva on cotton swabs reduced the accretion partially. However, the strewn pigments in the dark paint were slightly sensitive and complete removal was inappropriate. Further improvement included local inpainting with dry black ivory and yellow ocher pigments in D-38 (a Shell Petroleum solvent). This “binderless” system contributed to the overall aesthetic of the sign board by allowing the treatment to be as invisible as possible.
These aesthetic decisions were the result of a joint discussion with curator Barbara Luck and vice president Ron Hurst to find an appropriate level of treatment. As these are outdoor signs, a certain patina of age is appropriate for the artwork. Folk art can look different – is different – than the “high-style” portraits of the board room or the Reading Room Exhibition. At the same time because these works are exhibited the viewer should be able to understand and appreciate their intended aesthetic value. Therefore it is important that treatment decisions are balanced between respecting the object as a historical artifact and allowing the viewer to appreciate it visually and understand its historical significance.
In addition to these considerations, each object being treated is unique, and should be handled as such. This point deserves reiteration here: no magic formula exists for treating objects. Even though so-called “high art” can be viewed as more homogenous than folk art objects, each artwork should each be approached without presupposition. The conservator is charged with gathering as much information as possible before making treatment decisions. This holds true for the more academic portraits seen earlier as well as folk and decorative arts.
The Carolina Room

Figure 26 East Wall and Mantle

The Carolina Room is a rare, surviving painted interior currently on view in the Abby Aldrich Rockefeller Folk Art Museum as a conservation exhibition while it is undergoing treatment. It is a beautiful example of the American Fancy period, expressing a celebration of life and the vibrancy of imagination. Painted in the Shaw House in North Carolina in 1836, the room passed through dealers’ hands until it landed in remarkably intact condition in Colonial Williamsburg in the 1950s.

The room consists of an upper register of approximately 140 unique vertical boards. These are painted blue with hand-painted swags at the top that mimics wall paper patterns. Wainscoting completes the lower perimeter of the room with chair moldings and dado panels painted in faux birdseye maple and rosewood finishes. A “Vue of New York” is
depicted over the brightly-colored mantle, and mirroring this on the opposite wall above the door is the artists’ signature and date. Even the window moldings, door moldings, and doors are painted. No inch of the room’s walls was left uncovered.

Figure 41 Vue of New York

Figure 42 Artist’s signature

Figure 43 Dado panel from the north wall in the laboratory
The photographs reveal the amount of paint loss that the room has incurred with time while in the environment of south central North Carolina, before it came to the collection in Williamsburg. The wood expanded and contracted with changing temperature and humidity; as a result the ground and paint layers clung more readily to the some areas of the wood grain than others. This contributes to the “striped” look of many of the paint surfaces.

When Williamsburg acquired the room in the 1950s, the collection caretakers, in keeping with the philosophy of the period, decided that the best course of action was to restore the room with nearly total repainting. Current conservation of the room includes removing this 1950s overpaint and the grime the previous caretakers left behind in order to reveal the original surviving paint. Removal of overpaint is challenging, as the treatment in the 1950s used oil paint to cover the original oil paint. Moreover, the characteristics of the original paint are different in many areas of the room, also making cleaning choices different across the room. Conservator Shelley Svoboda has developed a number of cleaning systems that safely remove the 1950s overpaint without harming the beautiful original paint below. Organic solvents, such as dimethyl formamide, n-pyrrolidinone, and benzyl alcohol, have been found to successfully remove overpaint on most parts of the room, including the door and window moldings, the Birdseye Maple finish of the dado panels, and the swags at the tops of the long boards.
Figure 44 Window molding during cleaning

Figure 45 Dado panel Birdseye Maple finish during cleaning

Figure 46 Vertical boards and swags during cleaning

The yellow areas of the swags are especially sensitive, as the artist applied extremely thin paint in these areas. For the blue fields of the long boards, a gel of ethanol and xylene is
used in a timed system to efficiently remove the overpaint and reveal the artists’ intended colors.

Cleaning time is as variable as the changing paint surfaces. The swags at the top of the long boards can take three days, or as long as three weeks. A blue field on a long board can be completed by two people in one day by leaving the gel system in place in nine to eleven minute increments. Several areas of the room can even take months to complete, such as the faux rosewood finish of the dado panel seen in the photograph below.

Figure 47 Dado panel Rosewood finish during cleaning
As this project continues in the future, once the overpaint is completely removed from the original surfaces, the paint losses will be inpainted with a conservation material that is of a different composition and solubility than the original paint. This will allow future conservators to easily remove the inpainting in the future.

**Methods of Examining Paint**

Finding the right cleaning system is aided by various methods of material investigation. Examining cross-sections is one method of characterizing components within paint layers. Cross-sections are tiny samples of the paint film, normally taken at a discrete location. When viewed sideways under a microscope, cross-sections reveal the paint generations and varnish layers as they were applied to the object. Both cleaning tests that use solubility parameters and cross-section examination have characterized
most of the paint media in the Carolina Room as oil-containing. The yellow paint of the swags is especially interesting, as it is possible that the media in this area contains a protein component in addition to oil. This area is still undergoing investigation. These photographs are of a cross-section from the faux rosewood finish on one of the dado panels. The bottom photograph shows the cross-section in UV light. The topmost, original autofluorescing layer is likely a natural resin varnish. Everything above that layer is not original.

Figure 49 Cross section of Rosewood finish from a dado panel

Figure 50 UV fluorescence of the same cross section
In UV light, materials that fluoresce differently than their surrounding materials can allow the viewer to make assumptions about the paint surface without taking a sample. Individual pigments can fluoresce. Newer, synthetic paints, such as the Gamblin Conservation Colors used in several treatments, appear to be very dark under UV light. Natural waxes and resins fluoresce as a milky, blue-white light; natural resin varnishes, such as dammar or mastic, fluoresce yellow-green. UV light is higher in energy than “violet” light on the visible light spectrum. The wavelengths of these light particles are therefore shorter than visible light. When the light energy is sent from the source to the object, some of that energy is absorbed and then re-emitted as light with a longer wavelength. The electrons become excited and are “bumped up” to a higher energy level. As the electrons move back to a lower configuration, they emit energy. The viewer can see the lower energy light that is re-emitted from the materials within the object.

Another method of investigation helpful to conservators is Fourier Transform Infrared Spectroscopy, or FTIR. Colonial Williamsburg does not currently have an FTIR in house. During the course of my internship with Ms. Svoboda I hope to work in tangent with the college and the Jefferson labs to possibly solve this question of media analysis on the Carolina Room. FTIR involves shooting infrared energy at a sample of the paint and recording the change in the energy that bounces off of the paint surface. Unfortunately this means that a small but destructive sample of paint has to be taken from the object.

In FTIR, the infrared energy that is emitted from a source bears a specific frequency, an equation for a sine wave. This is below the visible light spectrum, and the
wave lengths are therefore longer than that of “red” light. The beam of infrared light is split into two beams, one that hits a fixed mirror, and one that hits a mirror that moves back and forth at a constant speed. These two beams are then sent back to one another, at which point they recombine, are sent to the sample, and then to a detector. This apparatus allows a broad spectrum of infrared frequencies to be examined simultaneously. Molecules can bend, twist, and stretch in a variety of ways. If the frequency of the vibration matches the frequency of infrared light from the source, the molecule will absorb the light, resulting in a loss of light intensity, which can be measured at the detector. Each type of movement has a frequency associated with it – So, a carbon atom bonded to two hydrogen atoms and doubly bonded to an oxygen atom will have a different type of movement, and therefore a different frequency, than a carbon singly bonded to four hydrogen atoms. In general, FTIR is only sensitive to organic material in a paint complex. This includes the binding media, such as natural oils or proteins.

If a conservator were curious about the inorganic components of paint, she could possibly turn to XRF, X-ray fluorescence. XRF can be performed by a handheld device, which can be carried directly to the object. This also does not involve taking a sample of the art. Instead, high energy X-rays (higher energy than UV light, and therefore much shorter wave lengths) are sent to the surface the object. The waves of energy that are re-emitted at a lower frequency are recorded. Each element emits a different frequency of energy. This is possible because each element has a different number of electrons, and therefore a different electron configuration. The energy that the XRF device emits interacts with the electrons of the atoms, exciting the electrons and sending them to a
higher energy configuration as in UV fluorescence. XRF is especially helpful in pigment analysis.

Though not every lab has its own analytical equipment, the knowledge one can possibly gain from a successful analysis can beneficial in making appropriate treatment decisions. For example, copper in a green paint can blacken with age. The XRF can confirm that this blackened pigment is indeed copper. The copper cannot return to its previous, green coloration, though this information can help conservators make informed treatment decisions. Another example is the UV light examination as an aid to overpaint removal. As more recent conservation materials can appear dark under the UV lamp, conservators can use this fluorescence as a guide when removing overpaint. Analysis can be a very enriching element in making treatment decisions.
Conclusion

The objects I encountered through treatment in this last year span centuries and cultures; each is a document of its culture at a specific time period. Although they may share some features, such as a provenance or a certain condition, each object is complex and unique. Each artwork exists within its own history and its own style. Time treats each piece differently – they age in separate environments, are handled by different people, and consist of unique material combinations. Each object has its own aesthetic, and each piece has something unique to tell the viewer. Consequently, each conservation treatment is unique.

The conservator’s job is to respect the integrity of each object, while ensuring that each story is legible. What unifies each of these objects as much as paint is that their histories make them an important part of the Colonial Williamsburg collection. They are part of our cultural heritage as both art and document. These objects should be respected with the utmost care not only because they belong to Williamsburg, or because they belong to our culture, because they belong to the future, as well.

In addition to these treatments meeting the needs of Colonial Williamsburg’s collections, they have all been a necessary prerequisite for graduate studies in art conservation. Here I’ve shared a brief discussion of conservation materials and techniques from my experience in the CW conservation laboratories, from general care and handling to loan travel, to exhibition preparation. These conservation experiences have introduced me to some of the complex philosophies surrounding the field and how these philosophies are part of making decisions.
This thesis has enabled an additional academic focus on my required prerequisite conservation experience. I have not only been fortunate to work in a collection with specialists that have helped further my understanding of the history, context, and treatments associated with the objects, but also fortunate to have specialists in art history and science who have guided me down this path. The ideal path of conservation will always be a blend of art historical context, scientific understanding and application, and hands-on treatment. This opportunity, combining all of these specialties, has been a strong foundational introduction to the field of art conservation.
Appendix A

Glossary of Materials and Techniques

Aquazol – an adhesive polymer with the chemical name poly (2-ethyl-2-oxazoline)

Benzyl alcohol – a solvent used in overpaint removal; consists of a benzene ring (a six-carbon ring with double bonds around the ring) and an attached methyl alcohol group; C7H8O

BEVA, Berger’s ethylene vinyl acetate – a polymer that can be heated to a liquid state and applied as an adhesive

Cross-linking – a process by which one polymer can bond to another, making larger, less soluble systems

Cross-section – a small sample of paint that, when viewed from the side, reveals the layers of paint as they were applied

Cupping – the process by which paint begins to pull away from its support and form cup-like islands of paint

Cusping – the cusp-like quality of a canvas weave, in which the weave is distorted by unevenly focused tension

D-38 – a Shell Petroleum solvent produced from hydrocarbons

DMF, dimethylformamide – a solvent used in overpaint removal; (CH₃)₂NCOH

Hydrocarbon – a class of organic compounds consisting of carbon and hydrogen atoms

Galdehyde Acrylic Resin – the same synthetic resin solution from which Gamblin Conservation Colors are made (see below)

Gamblin Conservation Colors – synthetic resin paints consisting of Laropal A-81, which is a condensation product of urea and aliphatic aldehydes, and pigments
Gel – a water-based formulation thickened with a polymer or other high molecular weight material

Glue – an adhesive that can be prepared from animal protein, traditionally fish or hide; synthetic glues can include emulsions, elastomers, and thermoplastics

Ground – a paint layer that prepares a support for holding additional paint layers

Epoxy – a class of resin polymers that set when combined with hardening agents

Ethanol – a two-carbon chain with a hydroxyl or alcohol group on one end; CH₃CH₂OH

FTIR, Fourier Transform Infrared Spectroscopy – a method of investigating materials using infrared radiation

Gilding – gold surfacing; this can be applied with foil or as a paint with a brush

Inorganic – refers to those substances which typically do not contain carbon

Inpainting – a technique that involves applying a small amount of paint locally with a small brush only to an area of lost paint

Lap joint – a joint in which both adjoining pieces of material overlap one another

Laponite RD – a synthetic clay which swells in water to produce a clear gel

Leaf-and-dart – a decorative style of carving that consists of alternating foliage and “darts” or points

Lining – a process that involves adhering a new canvas to the reverse of the original canvas

Miter joint – a joint at a corner created by cutting both adjoining pieces at a 45 degree angle

Mortise and tenon – a joint in which one piece of wood is notched with a hole (mortise), and the other adjoining piece contains a projecting tenon that fits into the mortise
Molding – a decorative strip of material, such as wood, with various projecting or receding profiles

Organic – refers to those substances which are carbon-containing

Overpaint – paint of a later generation that is not original that has been laid on top of the original paint layer

Paste – an adhesive that can be prepared from vegetable matter, such as starch

pH – a measure of acidity of a substance; the lower the pH number, the more acidic; pH of 7 is neutral

Polarity – the quality of a molecule containing two poles, a negative charge end and a positive charge

Polymer – a large molecule composed of repeating structural units

Regalrez – a low-molecular weight, synthetic hydrocarbon resin that can be used as a varnish

Natural Resin – a hydrocarbon product of many plants; can also be produced synthetically

Specular light – the reflection of light in which light from a single incoming direction is reflected into a single outgoing direction, where the direction of both rays create the same angle with respect to the surface of the material on which the light is being reflected

Strainer – a rigid support system for a canvas that cannot be expanded

Stretcher – a support system for a canvas that can be expanded to tighten the canvas

Support – a surface such as a canvas or wood panel that holds paint
UV, Ultra-violet fluorescence – the emission of light rays from a material that has been excited by higher energy ultra-violet rays; wavelength of UV light is 10 nm to 400 nm

Varnish – a transparent film with no pigment that creates a glossy surface; traditionally created from natural oils and resins with solvents

X-ray – a form of electromagnetic radiation consisting of waves of energy with frequencies higher than that of UV rays; wavelength of x-rays are 0.01 nm to 10 nm

XRF, X-ray fluorescence – the emission of X-rays from a material that has been excited by bombardment with higher energy X-rays or gamma rays

Xylene – six-member carbon ring with double bonds around the ring and two attached methyl (CH₃) groups; C₈H₁₀
Appendix B

Treatment Reports

In order:

1. Colonel Arthur Woods
2. Dr. W.A.R. Goodwin
3. C.H. Humelsine
4. Charles R. Longswoth
5. Portrait of Queen Anne
6. Europa and the Bull
7. Portrait of David Meade, Jr.
9. Carolina Room In-Progress Examination and Treatment
   9a. Window Molding, North Wall
   9b. Vertical Board 50 Swag
   9c. Vertical Board Blue Field 49
   9d. Dado Panel, North Wall, west side
Works Cited


