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PAINT INVESTIGATION

Middleton Chair



Object: Middleton Chair
painted wood, c. 1800
2019.002.001

Prepared for: J. Grahame Long
Director of Museums
Historic Charleston Foundation
Charleston, SC

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Date: November 30, 2023

Description: The English Regency armchair descended through the Middleton line of the Nathaniel Russell family until it was acquired by HCF in 2019.

Project Objective: as proposed 9/28/23

The paint investigation will expand upon the analysis performed by the conservator as part of the initial assessment of the chair. At this time, chair has been undergone a standard visual examination and examination in ultraviolet light, and three paint samples have been analyzed. To determine a better understanding of the original finish and to develop a treatment proposal, further investigation is needed. This approach includes further paint analysis and overpaint removal tests.

Results:*Summary of Paint Condition*

The paint investigation has determined that the current black-and-gold paint scheme does not reflect the original appearance of the chair. Instead, the original paint was a light tan (and/or perhaps also white in areas) with gilded decoration. However, this paint seems to be in quite poor condition.

From the analysis and testing, it appears that the original paint is still there for the most part from the seat level down. But on the upper half of the chair, one would expect to find it heavily worn, abraded, or lost entirely. This may be in part from natural wear but also due to the repair work performed on the arms.

Original Paint Scheme

Microscopy has revealed that the original paint scheme was light in color with gilding that was more delicate and decorative.

The chair was prepared with three layers of white primer. Because no other presentation finish survives on many surfaces of the chair, it is uncertain whether at times these layers served as the presentation finish or whether the original finish has been lost to abrasion—through both natural wear and sanding during repairs.

Gilding (estimated to be genuine gold leaf) is present on the fluted legs, front and side seat apron, and corner blocks. It has been applied over a yellow-tan layer that has the appearance of bole (many particles are arranged in a flattened horizontal alignment typical of a burnished clay layer).

In the overpaint removal test on the side seat apron, this yellow-tan layer is well observed and decorated with a linear stroke of gilding. The appearance suggest that the yellow-tan color may part of the overall presentation finish.

There is also evidence that suggests white paint was used in the original paint scheme, as seen in the cross-section sample from the corner block.

Cross-Section Microscopy Results

The history of the decorative finishes is summarized in the table below. The best representative cross-section photomicrographs for each area is presented in the appendix. Each photomicrograph is annotated with numbers/letters to mark generations/layers. A generation may be comprised of several layers that together make up one presentation finish. Layers within a generation are given the same number but distinguished with letters (for example, 1a, 1b, 1c, etc.).

Generation	Leg fluting (2019.002.001-1)	Rosette block (2019.002.001-4)	Arm Block (2019.002.001-3)	Stile (2019.002.001-2)	Ringed Slat (2019.002.001-5)	
5	Metallic paint over natural resin varnish and black paint	Metallic paint over natural resin varnish and black paint	Black paint w/ varnish	Black paint w/ varnish	Black paint w/ varnish	
4	Metallic paint over black paint	Metallic paint over black paint	Black paint w/ varnish	-	Black paint w/ varnish	
3	Dark brown paint w/ metallic flakes	-	-	-	-	
2	Red-brown paint (could be a primer used in areas of previous paint loss?)	-	-	-	minor trace of red-brown paint	
1	Gold leaf, yellow-tan bole over 3 white primer layers	White paint over 3 white primer layers	Yellow-tan bole (no gilding) over 3 white primer layers	Only some white primer layers survive	Only some white primer layers survive	
	Wood	Wood	Wood	Wood	Wood	

Paint Condition Assessment and Overpaint Removal Tests

Below, the photograph of the chair has been digitally colored to illustrate the estimated condition of the original paint.

Green: The original paint scheme appears to be present under several layers of overpaint, though some loss and wear is expected.

Yellow: Some original paint layers may survive, but because of use, wear, and abrasion from repairs, the presentation surface may be missing.

Red: Examination and testing suggest that there is little to no original paint surviving under the current black paint scheme.

Overpaint removal test:

(Back of lower ringed slat)
Traces of white primer layers survive close to stiles (where they were missed by sanding?) but original paint is now mostly gone here. The front of the slats do not appear to retain any early paint. Microscopy of the inner ring (2019.002.001-5) suggests the protected areas of the inner rings retain some original paint.



abraded white primer

bare wood



line of gilded decoration

Overpaint removal test:

(Back of PR stile) Traces of original paint appear at the start of the leg, but above the seat, early paint layers appear missing on the back of stile. Condition: heavily abraded, black overpaint retained in wood pores.



bare wood

abraded white primer

Overpaint removal test:

(PR seat apron) Original paint scheme is present under black and brown overpaint. There is surviving gilding that suggests linear decoration over a yellow-tan paint (this may be the bole serving as the base color). Condition: area is generally intact, cracked paint, abraded gilding, scratches on surface (from mechanical abrasion such as sanding)



Discussion:

From the combination of condition assessment techniques—visual examination, cross-section microscopy, and overpaint removal tests, two things can be concluded: 1) that the original appearance was different than the current black-and-gold paint scheme and 2) the condition of the original paint is poor.

Feasibility

From initial testing, the black overpaint layers can be removed, but it is uncertain how much of (and in what condition) the original paint survives. The metallic paint overpaints will be more difficult to remove. Several layers of overpaint cover the entire surface of the chair, including the cane seat. Conservation treatment to remove all non-original layers will be very time-consuming.

Unknown further steps

If overpaint removal were performed to reveal what remains of the original paint, it is at this time uncertain what further treatment steps would be required. Would the poor condition of the original paint be presented “as is,” or would some loss compensation (filling/inpainting) be desired to make the paint scheme more legible? Much of this depends on how the chair would be interpreted by HCF.

Dates of Interpretation

One conflict that may arise is a disharmony between the original paint (in any condition) and the structural repairs that have been done to the chair arms. In other words, presenting the original paint scheme would interpret the chair to an earlier period than that of when the arm repairs were done. The repairs are visually-displeasing. So, would the arm repairs need to be addressed, so that the chair could be broadly interpreted in an original but damaged state? But then again, isn’t part of the paint damage due to the arm repairs? It becomes complicated.

In summary, the conservation of the chair would be a very involved treatment, and one with, in the opinion of the conservator, no guarantee of an excellent result.

APPENDIX

Procedures:

Microscopy

Cross-section Preparation: Samples were collected by Amelia Jensen using a #15 surgical scalpel. The areas of interest were closely examined, and samples were taken from protected surfaces and/or surfaces that showed an accumulation of layers. Each sample was given a unique number corresponding to its recorded sample location. The sample locations were photographed.

The samples were initially examined with a stereomicroscope under low power magnification (5 to 50 times magnification). A portion of each sample was kept in reserve for future analysis and a portion cast in a labeled cube of a commercial two-part polyester resin manufactured by Excel Technologies, INC. (Enfield, CT) that cured over a twenty-four hour period under a heat lamp. The cross-sections of the embedded samples were exposed by polishing the resin cubes using a belt sander with 400 grit sandpaper and then polished with 1,500-12,000 grit abrasive cloths from Micro-Mesh, Inc.

Cross-section Examination: The cast and polished samples were examined under visible and ultraviolet light using a Nikon Eclipse 80i epi-fluorescence microscope equipped with an EXFO X-Cite 120 Fluorescence Illumination System fiberoptic halogen light source and a polarizing light base using SPOT Advanced software (v. 4.6) for digital image capture and Adobe Photoshop Elements 5.0 for digital image management. Note: Interpretation of color by the camera, software, and/or printer may have resulted in some deviation from true color in the photographs.

Cross-section samples can be viewed under visible light to gather information about layer structure, composition, and paint color. The surfaces of paint layers can also be examined for signs of aging and weathering: oxidation, fading, accumulation of dirt, and cracks. Illumination with ultraviolet light provides further information about the layers in a sample because organic, and some inorganic, materials characteristically autofluoresce (or give off a glow). For example, when shellac is exposed to ultraviolet light, the material fluoresces orange. Plant resin varnishes (mastic, dammar, and copal, for example) fluoresce a bright greenish-white.

Cleaning Tests

After solvent testing, it was found that the black paint could be removed with a quickly-timed application of acetone gel (acetone, Ethameen C25, Carbopal 934), which was then gently removed by the rolling motion of a cotton swab. Residues were cleared with acetone on a cotton swab, also in a gentle rolling motion, because it seems that the gold may be sensitive to any harsher mechanical action. The black paint also responds to isopropanol. The metallic paint was not successfully removed by the same technique; further testing is required.

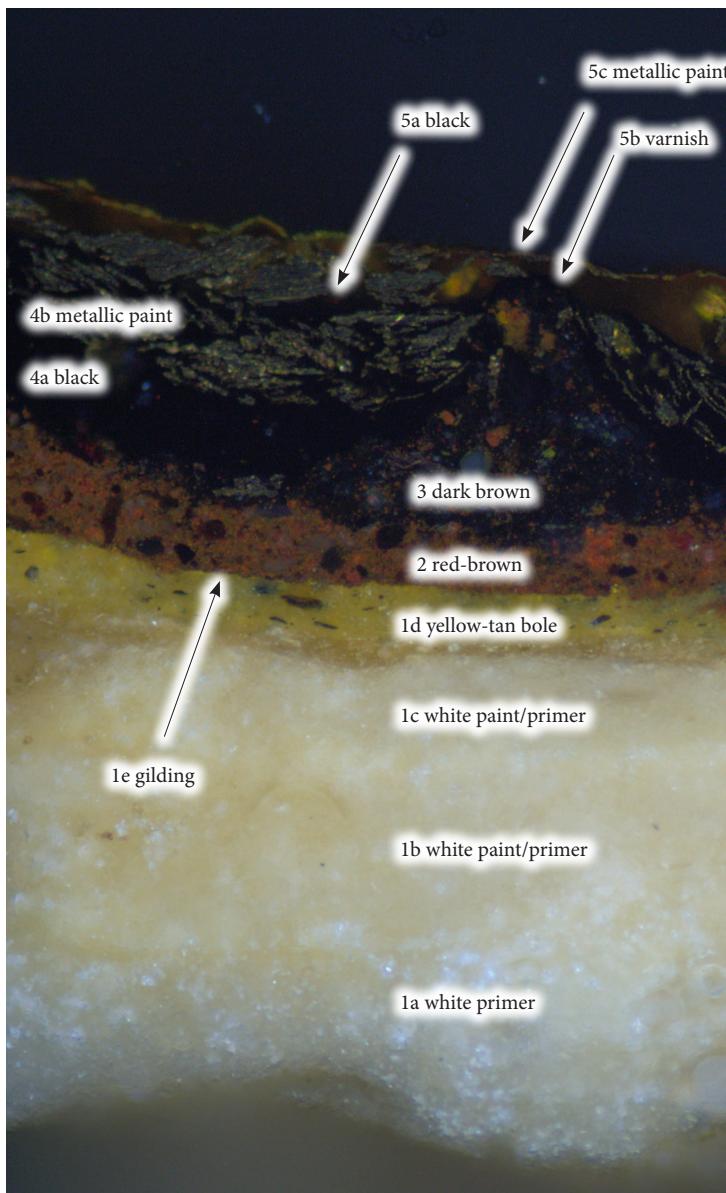
Sample # 2019.002.001-1

Location: Front proper right leg, fluted carving. Taken from area adjacent to previous loss that shows wood, gesso, and reddish paint that may be a filler only applied only to older losses.

Notable Observations: This sample is a good representation of how the current scheme differs from the original scheme. Originally, the chair was prepared with three layers of white primer, followed by a yellow-tan colored bole/paint and gold leaf decoration.

Generation 2 red-brown paint has a matte appearance almost like a filler when examined at the macro level. It also appears to be present in areas of previous paint loss. It may have not been intended as a presentation finish. Also, sometimes the sequence of brown paints can indicate a graining scheme but this is not the case here (see photomicrographs on next page).

2019.002.01-1, visible light, 200x

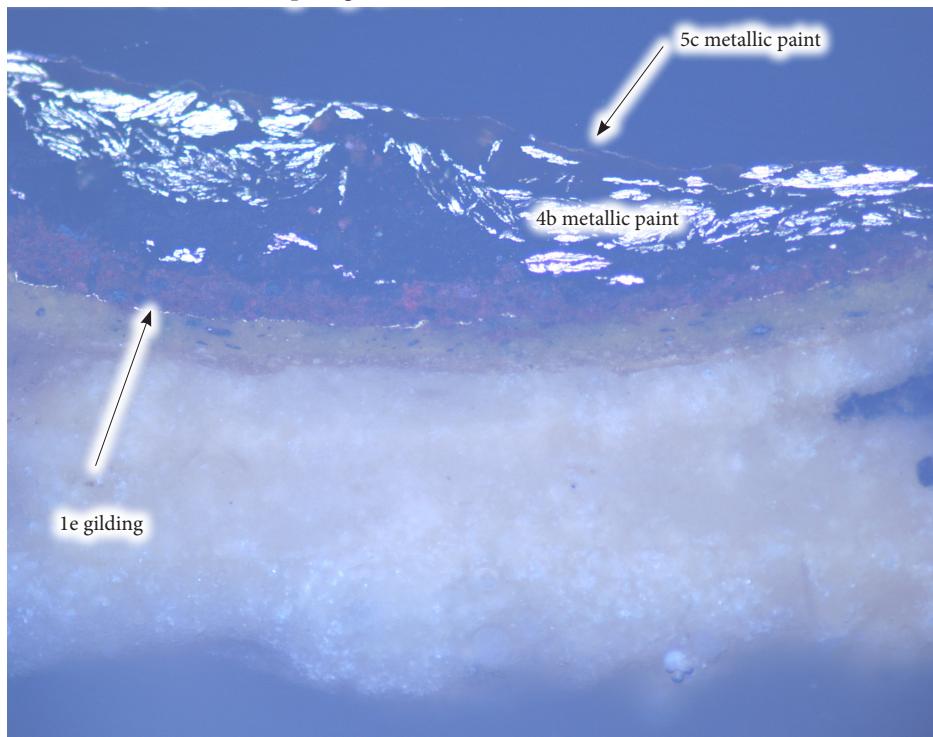


2019.002.01-1, ultraviolet light, 200x



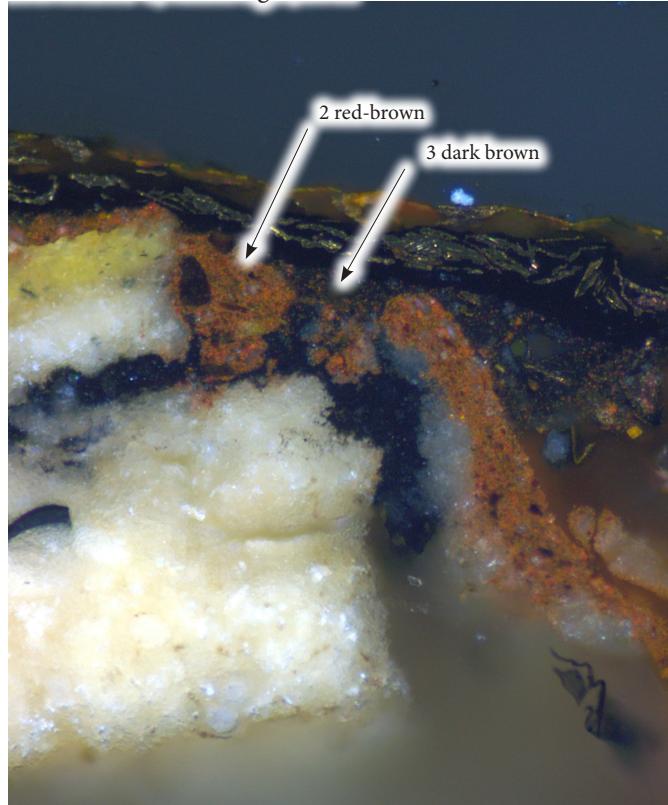
Sample # 2019.002.001-1 (continued)

2019.002.01-1, visible oblique light, 200x

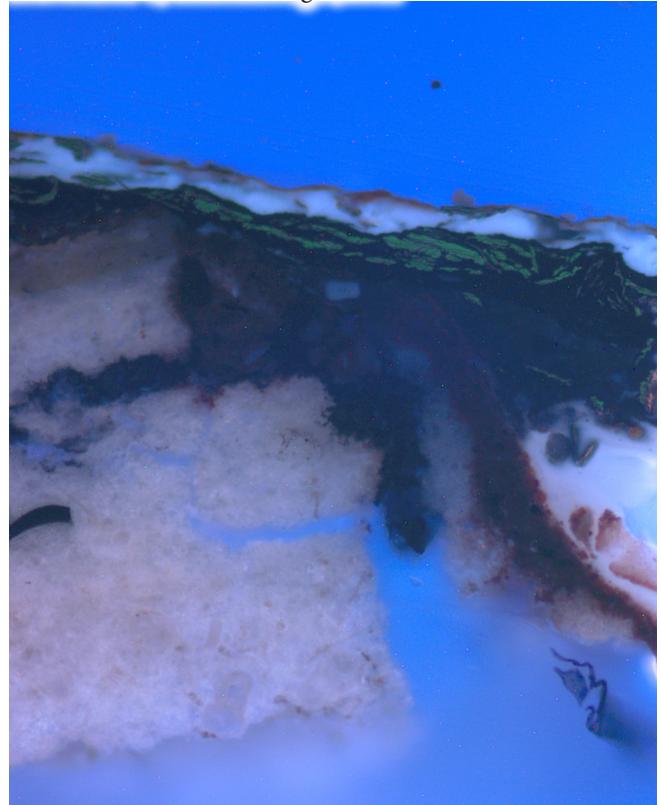


[Oblique light helps to identify gilding]

2019.002.01-1, visible light, 200x



2019.002.01-1, ultraviolet light, 200x



In this section of the sample, the red-brown paint can be seen flowing in and around cracks in the original paint generation. Next, the dark-brown paint can be seen flowing into cracks in the the red-brown paint, which confirms that these two layers were not applied at the same time.

Sample # 2019.002.001-2

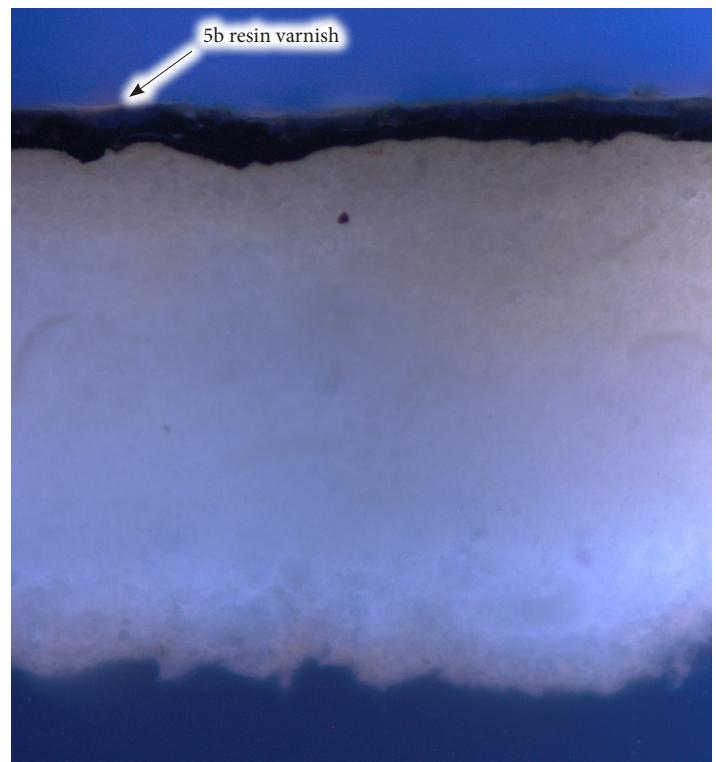
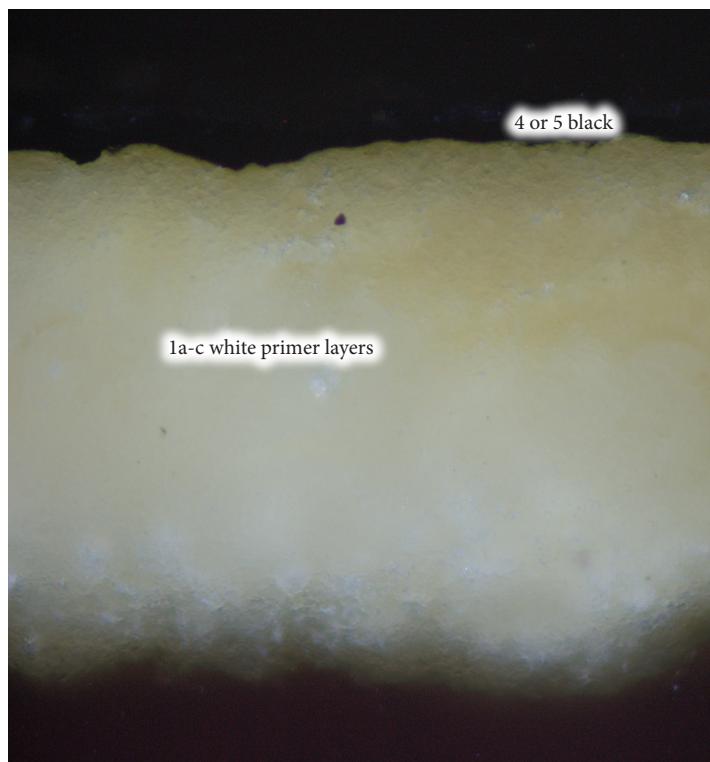
Location: Proper right stile, inner side below lowest back splat. Taken from area of existing paint loss that exposes wood substrate with non-original black paint covering nearby losses.

Notable Observations: The early white primer layers are present here, in part. The top surface of the white layer looks uneven, suggesting that it has been abraded. The black paint appears to be two thin layers of Generation 4 and 5.



2019.002.01-2, visible light, 200x

2019.002.01-2, ultraviolet light, 200x



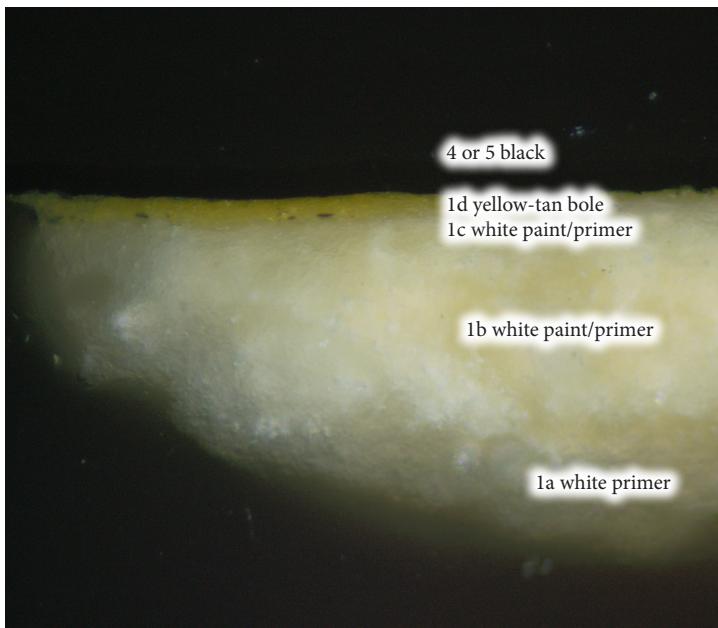
Sample # 2019.002.001-3

Location: Proper right arm, outer face of the block, plain black-painted surface with numerous linear paint losses.

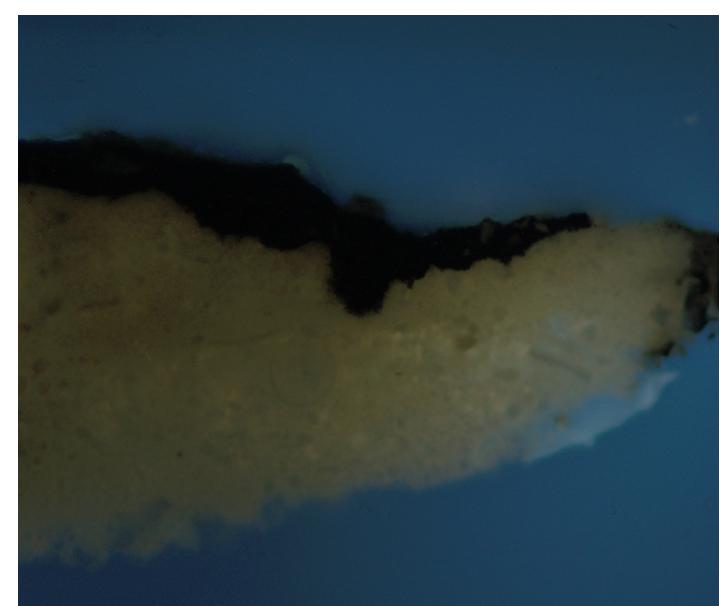
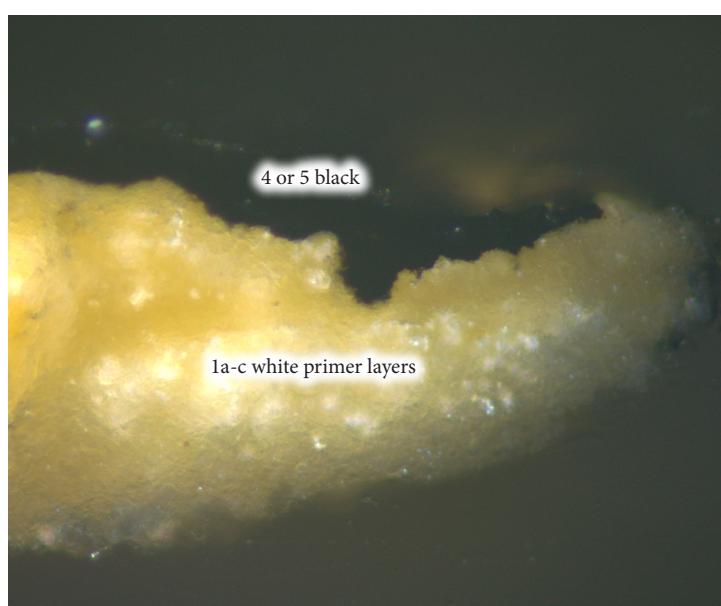
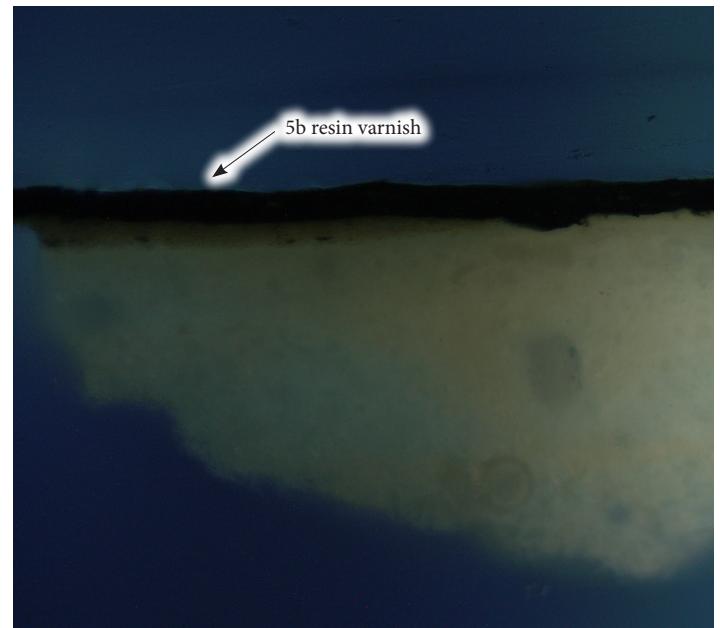
Notable Observations: This area of the arm showed some paint build-up so it was thought that the original scheme may be intact. The early layers are present but compromised. In one part of the sample, the yellow-tan bole survives (no gilding), and in another part of the sample, Generation 1 is abraded and incomplete.



2019.002.01-3, visible light, 200x



2019.002.01-3, ultraviolet light, 200x



Sample # 2019.002.001-4

Location: Front proper left leg, front-facing rosette. Taken from existing loss in the gold-painted field (background).

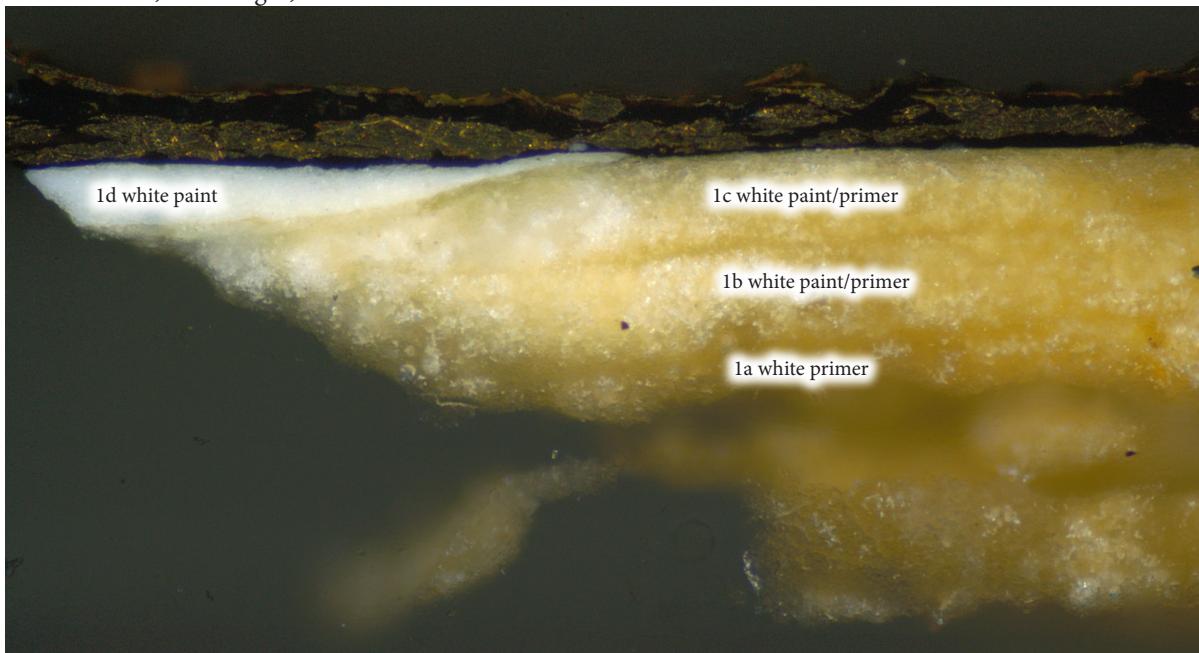
Notable Observations:

The white paint in this sample is not fully understood. It is likely that the white paint is part of the original paint scheme, such as white-painted background or highlights. The paint evidence does point in this direction: there is no dirt accumulation or signs of age between the white primer and the white paint. Or, it could be part of a repainting campaign (Generation 2). Further sampling or reveals could inform on this.

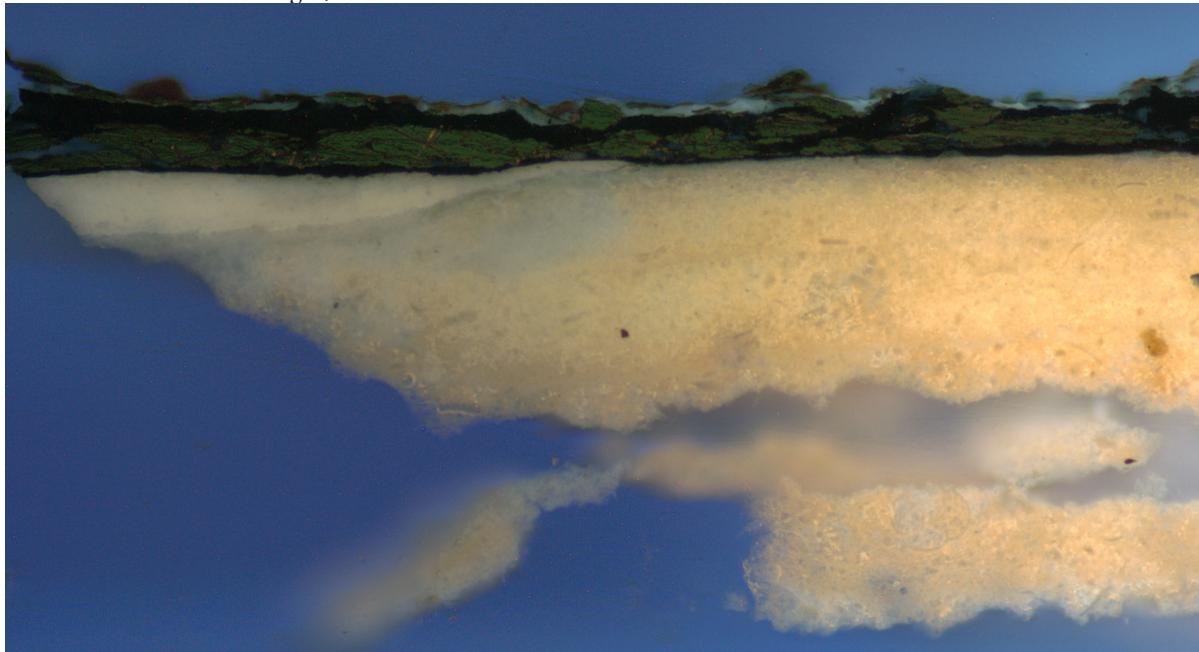
(The applied flower was probably gilded, but this was not analyzed.)



2019.002.01-4, visible light, 200x

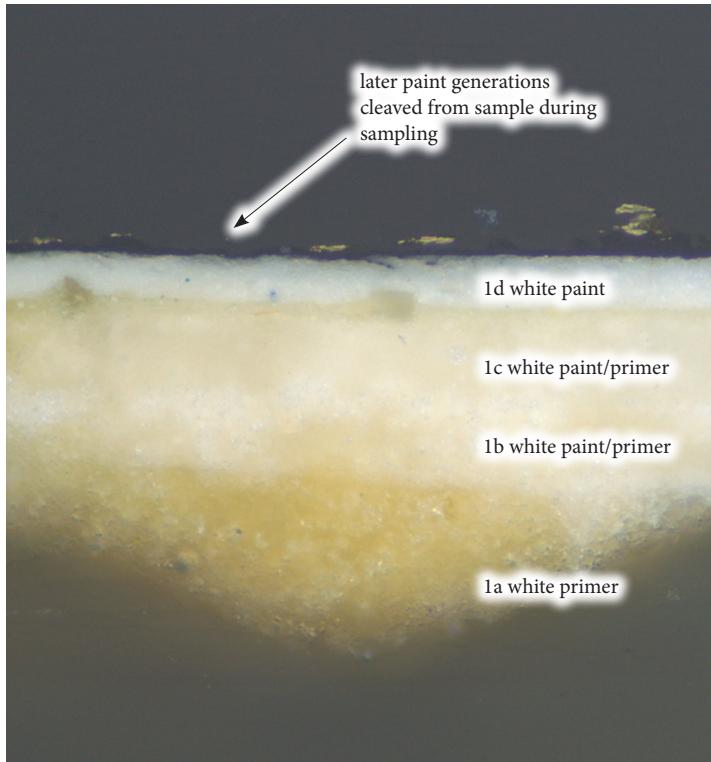


2019.002.01-4 ultraviolet light, 200x



Sample # 2019.002.001-4 (continued)

2019.002.01-4, visible light, 200x



2019.002.01-4, ultraviolet light, 200x



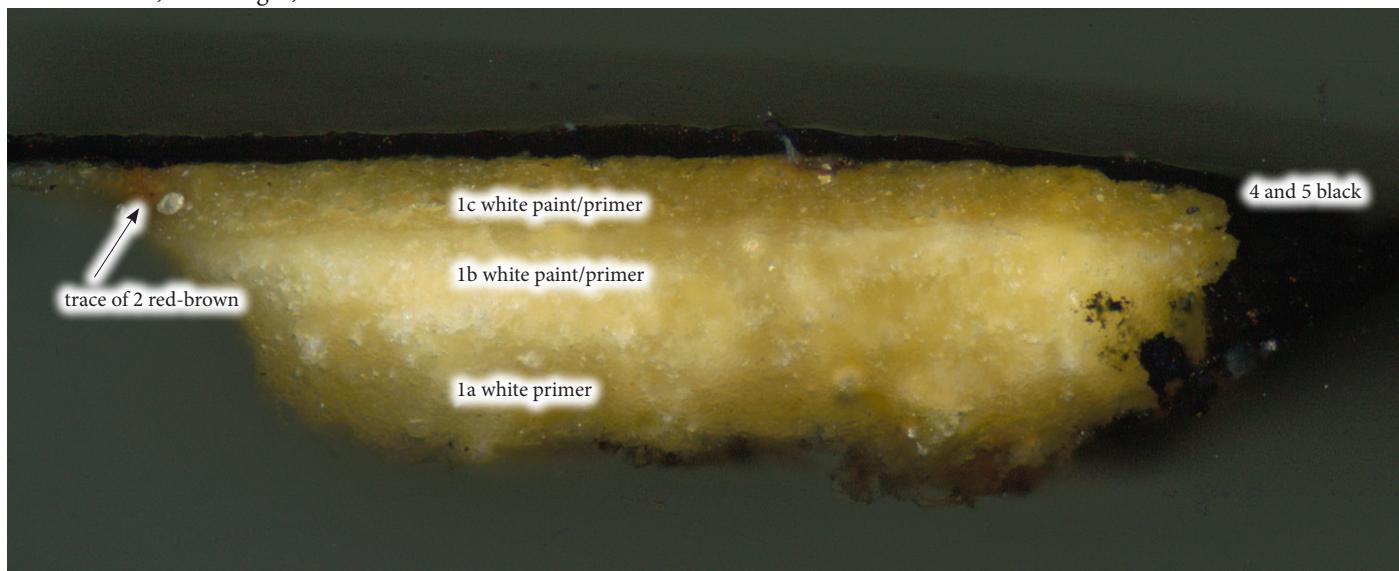
Sample # 2019.002.001-5

Location: Lower back slat, top surface of lowest rail (in the triangular-shaped space between the 1st and 2nd ring from the proper right)

Notable Observations: The early white primer layers are present here, though the original scheme does not survive on the front of the ringed slat. The black paint appears to be two thin layers of Generation 3 and 4. This sample also contains a thin layer of shellac, as indicated by its orangish autofluorescence in UV light.



2019.002.01-5, visible light, 200x



2019.002.01-5, ultraviolet light, 200x

