CROSS-SECTION MICROSCOPY ANALYSIS RESULTS

Client: Glenn Keyes Architects
12 Vanderhorst Street, Charleston, SC 29403

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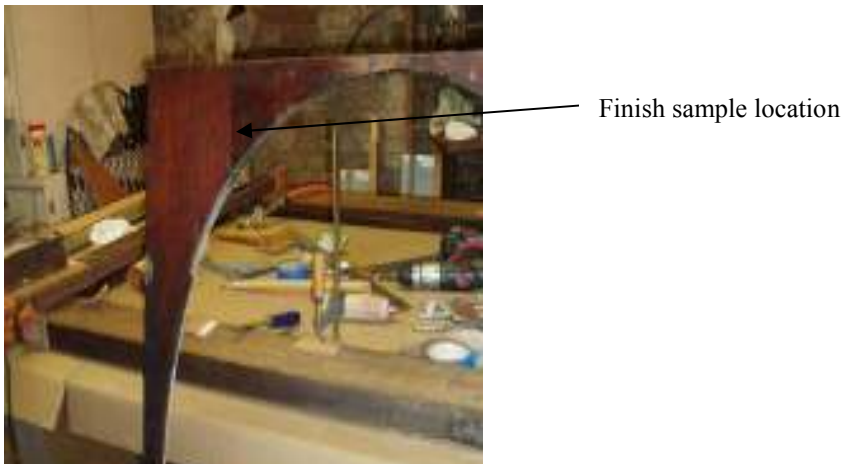
Object: Interior Surface of Front Door
Aiken-Rhett House, Charleston, South Carolina

Equipment: Nikon Eclipse 80i with EXFO X-Cite 120 Fluorescence Illumination System fiberoptic halogen light source and polarizing light base using SPOT Advanced software (v. 4.6) for digital image capture and Adobe Photoshop CS for digital image management.
UV Filter: UV-2A excitation 330-380 nm, dichroic mirror 400nm, barrier filter 420 nm.
Magnifications: 200X, 400X
Biological Stains:

Fluorescein isothiocyanate (FITC) 0.2% in anhydrous acetone for proteins. Positive reaction color is bright yellow-green
Triphenyl tetrazolium chloride (TTC) 4.0% in ethanol for carbohydrates. Positive reaction color is dark red to dark brown.
2, 7 Dichlorofluorescein (DCF) 0.2% in ethanol for saturated (pink reaction) and unsaturated (yellow reaction) lipids.
Rhodamine B (RHOB) 0.02% in ethanol for oils (bright orange reaction color).

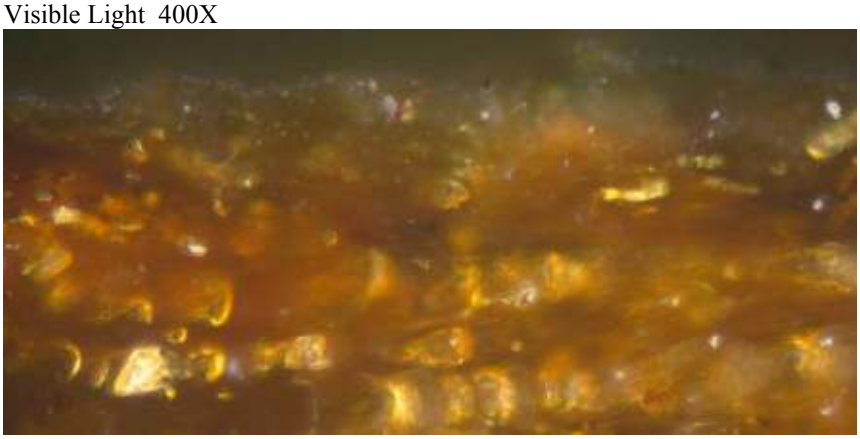
Staining Reactions:

DCF: Positive for the presence of oils in the wood and in the first and third pigmented oil-resin varnish coatings.



Comments: The cross-section analysis results show that the finish history in this sample begins with a pigmented plant resin varnish with an oil component. There are brown and red pigments widely distributed and suspended in this layer, which confirms that the surface was not originally stained, rather the mahogany color was enhanced by using a pigmented varnish. The second generation is a clear plant resin varnish and the uppermost layer appears to be a degraded, grimy layer of pigmented plant resin varnish. The first layer has penetrated into the wood fibers and also remains as a legible layer on top of the wood. This suggests that this may be the first layer of varnish applied to the door and that the interior surfaces were not stripped. It is likely that the exterior surface of the door was originally finished in the same manner, although this type of natural resin coating would not have been a durable exterior coating. No evidence of any early coatings was found on the exterior of the door during earlier investigations.

Interior Surface of Aiken-Rhett House Front Door
Visible Light 400X



Ultraviolet Light 400X

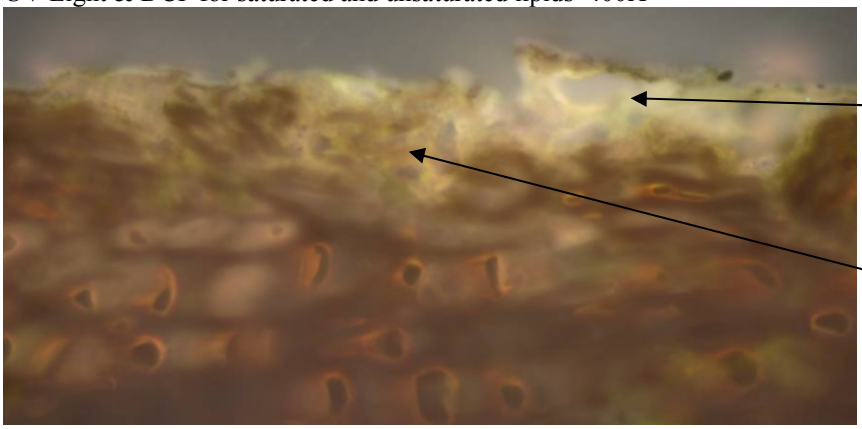
3. Thin pigmented oil-resin varnish on surface

2. Plant resin varnish

1. Pigmented oil-resin varnish

Wood substrate

UV Light & DCF for saturated and unsaturated lipids 400X



2. Clear plant resin varnish partially dissolved on exposure to the ethanol carrier for DCF

Positive reaction for unsaturated lipids in the first pigmented varnish

Detail of cross-section photographed at 400x under reflected ultraviolet light