Pawlet Town Hall

Ceiling Restoration Assessment

9/13/16

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History

The Pawlet Town Hall has been used continuously as the Town Administrative Offices since it was erected in 1881. In 2003 the community of Pawlet voted to restore and update the existing Town Hall rather than build new Town Offices.

In 2009 restoration of the second floor auditorium commenced with the removal of the tin walls and ceiling revealing the decoratively painted plaster ceiling and stenciled walls. MaryLou Davis was brought in to assess the ceiling and provide a preservation/restoration plan. See Addendum A.

Ceiling Preservation

The first step was stabilizing the ceiling. In 2010 Mike Smith was hired to re-adhere the loose plaster, remove the furring strips that the tin ceiling had been attached to and fill in the missing areas of plaster. Mike reattached the plaster to the lath using acrylic adhesives injected between the lath and plaster from above (injecting through the lath). In order to do this the existing insulation was removed and new cellulose insulation installed after the work was completed.

After re-attaching the plaster to the lath and removing the furring strips Mike applied a scratch coat of plaster in all areas of missing plaster. It appears that he also filled some of the nail holes where there was damage but not tight nail holes. The estimate that Mike submitted indicates that the scratch coat is a lime based plaster. The coat looked sufficiently “scratched” to create a good mechanical bond with subsequent layers of plaster. Prior to starting work the type of plaster used for the scratch coat should be confirmed in order to guide the choice for the remaining plaster composition.

In the process of re-adhering plaster to lath it can either be pushed tight to the lath while the adhesive cures or be left as is and the space between the plaster and lath filled with adhesives. It appears that in this instance the plaster was left as is and the space filled with adhesives. This impacts filling the voids (areas where there was plaster loss) in that the depth of the voids are inconsistent with some areas requiring a brown coat and finish coat while others only have enough depth for a finish coat.

The decorative painting on the ceiling was created with distemper paints. Distemper paint is water soluble and easily damaged when wet. In addition some of the paints used for this particular ceiling are considered quite fragile. See Addendum B, paint analysis reports.

Given that the patching plaster is wet when applied great care will need to be taken when filling the plaster voids in order to limit damage to the decorative painted finishes. The finish plaster surface in the voids will need to be kept just below the finish ceiling level in order to conserve the painted finishes. The patching plaster will have to be applied carefully within the edges of the voids. Any water and plaster that gets onto the distemper paint will wash it away. The slightly recessed patched areas will provide a clear demarcation between original plaster and restored plaster.

There are two areas where roof leaks damaged the ceiling after Mike completed his work. Some of the scratch coat plaster over a window on the front elevation failed as a result of the water damage. There appears to be some hard board insulation that was installed above the lathe where the plaster failed. This is not consistent with the ceiling re-insulation work as the insulation was blown-in cellulose. It is suspected that a piece of foil-faced hard board insulation was installed during the repair of the roof leak. It may impact the replacement of the scratch coat if it is laid tight to the back of the lathe. It will minimize the ability to push the plaster through the gaps in the lathe which is necessary to create the keys.

The scratch coat in the affected area over the emergency exit door is still in place but will have to be inspected for structural stability before applying plaster over it. If it is found to be unstable it will need to be removed and a new scratch coat applied. The surrounding plaster at both leak sites will need to be assessed for structural stability and removed or re-attached if found failing. The roof has been repaired so that it no longer leaks.

There is a gap along the edges of the ceiling where the blue board on the walls meets the ceiling. That gap varies from ¼" to up to 1" or more. While finishing the plaster repairs to the ceiling this gap at the juncture of the walls to ceiling should be filled flush with the blue board. When the blue board is skim coated the skim coat can run right to the ceiling. For smaller gaps plaster may be all that is required to fill the space but in the largest gaps either a backer material or metal lathe may be required to bridge the space and limit the amount of plaster required to fill the void.

Once the voids have been filled with the appropriate plaster matching the existing plaster the ceiling will be ready for the preservation and restoration of the decorative finishes. If the patching plaster is lime-base the plaster will need to cure for 60 days at a minimum of 50 degrees Fahrenheit prior to painting.

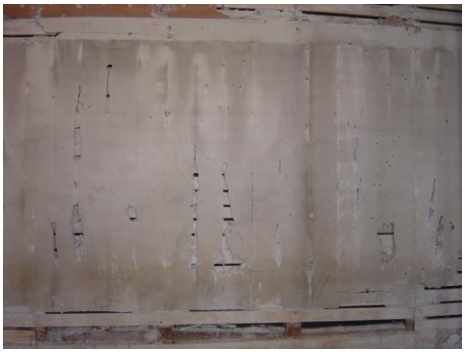
The existing painted finishes can be cleaned by carefully rolling "Absorene" across the surfaces without damaging the painted finish. The cleaning could be completed as part of the plaster restoration or as part of the paint restoration. Care should be taken when starting to clean in each new section of the ceiling design to judge how much pressure and rolling of the "Absorene" the paint can take in the cleaning process without removing the paint.

When Marylou Davis assessed the ceiling in 2009 she proposed a restoration plan for the ceiling that recreates the missing finishes in a free hand manner that blends with the existing design but is not a tight replication. In her report she notes, "Methods and types of in-painting were discussed with the decision to tone in areas of in-fill rather than to in-paint or in-stencil including free hand painting that would match the original."

Walls

The Auditorium walls were originally lath and plaster with a three foot high wood wainscoting or dado. The walls had stenciled boarders along the ceiling and above the dado. There are two windows in the sheetrock that display the original stencils.

The plaster and lath on the walls was removed due to the fact that “the plaster was crumbling”. Removing the failing plaster facilitated updating the electrical wiring, adding fire protection, and insulating the walls.



The walls were sheathed with blueboard with the expectation that they would be finished with skim coat (or veneer) plaster. The seams were quickly taped and mudded. It is believed that the seams were sealed with paper tape but unknown whether light weight joint compound or a Durabond setting type joint compound was used. The specifications for blueboard include sealing the joints with paper tape and Durabond setting type joint compound. The paper tape has a much higher sheer strength and generally will not stretch when the building is stressed where fiberglass mesh tape will creating cracks at the seams. Durabond setting type joint compound, once set, will not soften up in the presence of water where light weight joint compound will making Durabond a better match for skim coat work. The seams were simply taped and mudded but they were not leveled out with multiple layers of joint compound for a flush finish.

In either case the walls were primed with a dark orange primer when it was realized that the skim coat work was not in the budget. Blueboard is manufactured specifically to receive skim coat plaster. The paper on the board is several layers thick to withstand the water present in the plaster when applied and the paper has chemicals in it that create a mechanical bond with the gypsum based skim coat plasters. The paint on the board has effectively sealed the face of the blue board prohibiting a mechanical bond between the plaster and the face of the board.

Blue board with skim coat plaster was specified in the restoration to recreate as close as possible the hard, smooth finish of a traditionally plastered wall. In order to skim coat over the painted surface a plaster bonding adhesive (PBA) will have to be applied to the wall surface creating a bond between the paint and the plaster. The strength of the plaster to wall bond will be completely dependent upon the strength of the paint to the blue board. Before any skim coat is applied two tests should be completed. The first will be to test the bond between the paint and the blueboard. A series of lines should be cut into the paint creating a small ¼” grid. Apply a piece of Gorilla tape to the paint and remove it. If there is failure it needs to be between the paper and core of the blueboard rather than between the paint and the paper face of the board. If the paint peels off leaving the paper surface intact the painted surface will not be suitable for plastering over.

It might be prudent to then conduct a small plaster test area and repeat the above test with the plaster/paint/board combination. Again if there is failure and it occurs between the paper surface and plaster core of the blueboard skim coating the walls using a PBA is a viable option.

If skim coat plastering the walls is not a viable option they could be skimmed over with light weight joint compound creating a smoother surface than the paper finish of the board but not the hard polished surface of skim coat plaster.

Once the walls are finished the plan is to paint them to match the existing finishes before restoration, recreating the base color and the stencils.

The Preservation Trust of Vermont holds an easement on the building and auditorium ceiling. Any proposed work will need to be reviewed by the Preservation Trust Easement Review Committee.

Cost Estimates

Ceiling restoration: assessment/repairs at water damaged areas, finish filling voids, fill nail holes, fill gap between ceiling and wall board: $13,500.00 - $15,500.00

To repair areas of water damage:

Clean ceiling with Absorene: $1,000.00 - $1,500.00

Skim Coat walls: $5,300.00 - $7,000.00

Decorative Finish restoration: Two restoration painting firms that do decorative finish work were contacted in an effort to obtain pricing for the restoration of the decorative finishes. Neither had time to take a look at the building and provide estimates. The companies contacted are:

Charlie Gillie, (802) 457-3709, cbgpainting@gmail.com located in Woodstock, VT – I did talk with Charlie and sent him MaryLou's estimate. He is interested in the job but unable at this time to take time out of his work schedule to make the drive to Pawlet to look at the Auditorium.

David Rickio at John Canning Studios, (203)272-9868. x.303, david@johncanningco.com, located in Cheshire, CT. David is also interested in the job but did not have time to assemble an estimate.

The only numbers to work with at this time are MaryLou Davis's numbers which are outdated and lumped into one bid for ceiling and wall work. The estimate is included at the end of this report for the information included but is completely irrelevant in regards to pricing. MaryLou

was not willing to update her estimate given that she is no longer considering work that requires staging but she would be happy to consultant on the best treatment and write new specifications. Her fee is $125/hr. plus $.55/mile.

Addendum A

Marylou Davis report on ceiling preservation/restoration

Marylou Davis Inc.
Historic Interior Design
Conservation of Historic Paint and Gilded Surfaces
517 Route 169
Woodstock, CT 06281 860.963.7227 maryloudavis@charter.net

April 10, 2009

Karen Folger — Historic Preservation Consultant
Porch Hill Inc.
PO Box 117
W. Pawlet, VT 05775

Condition:

On April 9, 2009, the second floor auditorium space, stage area and historic decorative finishes were examined and discussed by Ms. Folger and me. A decorative tin ceiling was removed prior to my visit, under this, a paint-decorated ceiling was revealed. Folger plans to have the plaster ceiling consolidated and stabilized. Later additions of furring strips will be removed and all losses will be filled with in-kind plaster and primed for paint prior to surface, cosmetic conservation work.

Areas of decorative paints were tested with de-ionized water on q-tips. Paints on the center medallion section of sky and surrounding stencil pattern dissolved rapidly with the introduction of water. Areas of stencil design around perimeter of the room dissolved more slowly but still quickly enough to presume that all decorative ceiling paints are distempers or glue bound paints. Distemper paints always remain hygroscopic and watersoluble. See John Vaughn's report submitted April 3, 2009, which confirm the media present.

I believe the stenciled lattice pattern that decorates the area nearest the walls and wraps around the outside edge of the ceiling was done in the 1880's while the peach color of the ceiling field, the oval area of painted sky and all the floral motif stencil patterns were done later as additional decoration to the older stenciled lattice pattern. Additional decoration may have been done at this same time. To date, this possibility has not been investigated. I believe that the small border stencil pattern on the inside edge of the lattice pattern and done in yellow ocher and blue was added in the second generation of decoration as a means to integrate as well as terminate the lattice design with and to the newer decoration and adjacent peach color of the field area.

Near the lattice pattern and underneath the peach color field paint, a yellow ocher of a medium value is seen when water dissolved the peach. Presumed is that the yellow color is the first paint color on top of the finish plaster with the addition of the peach added later.

Stratigraphy of paints beginning with first coatings:

1. Plaster ceiling
2. Field of ceiling painted yellow ocher with lattice design as part of ceiling decoration — c. 1880's. Unknown is any other pattern(s) that may have been done in conjunction with lattice pattern.
3. Ceiling painted in field area with currently seen peach color distemper paint — c. 1910 - 1920s. Added on top of peach color field paint is: floral stencil pattern in drab greens and shaded, faux sky in blue and cream, two smaller stencil patterns in reds and cream as border to center medallion composition.

In routine paint practice, architectural distemper paints were washed clean prior to repainting. The yellow ocher color does not appear under the lattice pattern. The presence of another finish coat underneath the present top coat of peach color argues for the later addition of decoration to an already decorated ceiling rather than the complete scheme presently viewed as one executed wholly in the 1880's.

1880's stencil pattern with later terminating border pattern with blue color of border over top (in part) of peach color

Also, the presumed later stenciling is sloppily done as compared to the lattice stencil and displays media that dissolves at a more rapid rate than the lattice pattern suggesting that it is more loosely bound. In general, the profession of decorative painting and skill of painters declined in the period of 1880— 1920 with work done at the end of that period far less attractive in coloration, finesse and layout than the work done at the beginning of the period. I believe this ceiling reflects this trend. In addition, later stencil patterns (1900 — 1930 show more openwork patterns with tabbing areas displayed as voids. See support material included with this proposal as illustrations from, "Authentic Stencil Patterns 1890 — 1930," compiled and edited by Rebecca Witsell and Susanne Kittrell.

Later work — 1910 - 1920

Ms. Folger pointed out extant stenciling that was placed on the sidewalls above the dado and in the crown area. The field color of the wall is a burnt orange color with cream colored stenciling. The paints are distempers and dissolve with water at the slower rate.

I'm not certain at this time if this stenciling is earlier thus concurrent with the lattice stencil or if it was done at the later date of added decoration or sometime in between those dates. Stylistically, the work has more relationship to the later decoration but the media is more tightly bound as in the older work. Sheet rocked "windows" presently passively preserve two areas of this extant work. Ms. Folger can supply photographs that the whole design can be reconstructed faithfully for purposes of archiving and replication.

Crown Stencil — cream on burnt orange color

Waist stencil or stencil above dado

The whole of the ceiling exhibits dust and accumulated grime expected for type of paint and date applied. The paints all exhibit less fragility than expected given the ephemeral nature of distemper paints. Areas were tested for cleaning by rolling "Absorene" across the surface. The Absorene removed significant amounts of grime and dust without disturbing paints.

Methods and types of in-painting were discussed with the decision to tone in areas of infill rather than in-paint or in-stencil including free hand painting that would match the original. Discussed is project scope to include the documentation and development of stencils and subsequent re-stenciling of the dado and crown design on the walls so that the final room will display the wall stenciling along with the extant, conserved ceiling decoration.

Some time was spent in matching wall color and choosing entry hall and stage wall color to blend with a period palette present in the burnt orange wall color and deep red of the lattice pattern.

Chosen colors are:

Entry Hall area — California Paints color titled, "Knightly Straw" Scrubable flat sheen

Stage area — Walls — CA Paints color titled, "Harvest Tan" Scrubable flat sheen

Walls in Auditorium — Ben Moore's color # 105, "Terre Mauve" Scrubable flat

The treatment proposal and cost estimate is dependent upon recruitment of preservation/conservation student interns to assist in the execution of ceiling cleaning and in-painting and to document and replicate the extant stenciling wall over dado and around crown. Marylou Davis will act as conservator/contractor with oversight on the whole of the project scope including training of interns in all aspects of work listed within this proposal.

Treatment proposal:

1. Clean all areas of ceiling decoration with Absorene (Book and paper dry cleaner).
2. Document original wall stenciling by tracing designs, drawing in missing elements based on photographs and scale.
3. Develop master drawings of wall stencils for dado and crown design that show full repeat, to actual size in scale and including color notations.
4. In-paint all ceiling in-fills with latex tinted primer followed by latex paints that are toned to blend with extant ceiling decoration.
5. Cut stencils from master drawings of wall stencil designs. Layout and stencil patterns in same placement as extant examples. Match colors of wall and stencil with acrylic based paints to match extant examples.
6. Photography and Treatment Report of all phases of work submitted.

Cost Estimate:

Hours –

5 student interns for three weeks = 600 hours @ $10.00 —- 36000.00

Food stipend per student, per day = $2625.00

Travel costs for students -

ML Davis - 150 hours @ $75.00 = 1,250.00

Expenses of food and travel - $1200.00

Materials — $1800.00

Total - $23,400.00

Cost estimate does NOT include:

Cost or set up of staging and ladders necessary to accommodate six workers in executing the treatments described in this proposal.

Liability insurance carried student interns

Lodging expense (interns may be lodged with host families)

Cost estimate is subject to revision after December 31, 2009 and/or new findings during the course of the project work cause alteration or additions to treatment proposal.

Invoices will include a journal of time, materials and activates.

Terms — Upon acceptance the amount of $11,500.00 to be remitted to Marylou Davis, Inc., for the purpose of securing scheduling.

Balance of payments to be remitted within 30 days following receipt of invoices including project log.

Submitted,

April 14, 2009

Marylou Davis, Inc.

Addendum B

Pawlet Town Hall Auditorium Initial Paint Analysis

Samples were received Friday, April3, 2009. Both samples were discolored. Had dust & particulate matter on surface with sample PTH-200-2 from faux sky also having staining.

Based on visual characteristics, water-solubility, and tide marks, it is indicated that all the decorative coatings are distempers.

Sample PTH-200-1 Wide border stencil. Plaster substrate

Red ground – No reaction to Sodium sulfide (Na2S) indicating there was no lead present. Water-soluble. Has even, thin application but appears to have very high pigment to vehicle ratio. Very fragile with poor adhesion and matte finish. Coating came off even with gently rolling of cleaning sponge, cotton swap, or gently brushing with a bristle, chip brush

Off-white stenciled pattern – Appears to have slight pinkish coloration. There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. Water-soluble. Thicker than red coating and uneven thickness with evidence of bubbles. Less fragile then red coating but in places gently brushing pulled underlying red coating away along with the off-white coating

Sample PTH-200-2 Central medallion with faux sky & stencil border. Plaster substrate

Suspect a possible sealer coat on plaster with slight reddish tan coloration. Not water-soluble and no reaction to Sodium sulfide (Na2S). Appears alcohol-soluble (AI) suggesting spirit based and yellowish auto-fluorescence under 325-375nm UV light *suggests* shellac but could not confirm.

Off-white - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. Less porous appearance & with less of a matte appearance then blue and red coatings but still slightly water–soluble. Severe staining.

Blue - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. Water-soluble. Thin with matte finish. Appears to have been applied free hand. Fragile with coating removed with gently rolling with cleaning sponge, and brushing with bristle, chip brush which also left brush marks.

Red stenciled border pattern - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. Water-soluble. Thick application consistent with stenciled application but even gentle brushing removed material and left brush marks.

Architectural Conservation Services May 2009

Pawlet Auditorium Ceiling Final Paint Analysis

This report serves to provide finish investigation of the stenciled ceiling from the Pawlet Town Hall Auditorium. On March 19, 2009, Karen Folger, Project Manager, contacted John B. Vaughan of Architectural Conservation Services (ACS) by telephone to discuss the scope of work. The purpose of the investigation was to provide guidance in order to facilitate restoration/replication of finishes, specifically to investigate conditions and finish types of provided samples.

Karen Folger sent two samples, labeled PTH-200-1 and PTH-200-2, along with overall location photographs, which were received by ACS on Friday, April 3, 2009. On April 16, 2009 a third sample with location description was sent by Marylou Davis and labeled PTH-200-3.

Samples were examined and analyzed at the ACS laboratory by John B. Vaughan microscopically to:

1. document the chronological sequence of layers of decorative finishes, and paints applied to the substrate;
2. identify, where possible, paint type and condition.
3.

Both samples PTH-200-1 and PTH-200-2 were discolored with dust and particulate matter on the surface. Sample PTH-200-2, taken from an area of faux sky decoration, also had staining.

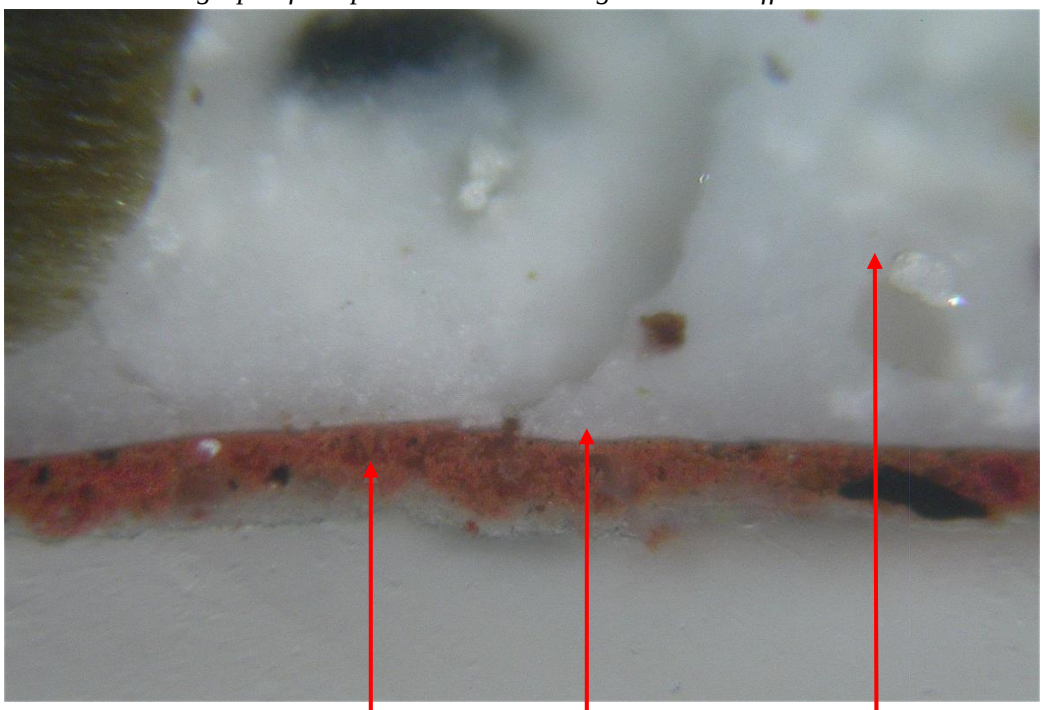
Based on visual characteristics, solubility & darkening with the application of water, and "tide marks" left after drying, it was indicated that the decorative coatings of all coatings applied to the three samples were distempers.

Sample PTH-200-1 Wide border stencil – red ground with lattice pattern. Plaster substrate

Red ground – There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. It was a water-soluble finish that had an even, thin application but appeared to have a very high pigment to vehicle ratio. The coating was very fragile with poor adhesion, demonstrated by easy removal with gently rolling a cleaning sponge, cotton swap, or gently brushing with a bristle, chip brush. The coating had a matte finish.

Off-white stenciled pattern – The stencil appeared to have a slight pinkish coloration. There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. It was a water-soluble finish, thicker than the red ground coating with uneven thickness and evidence of bubbles. This coating was less fragile than the red coating, although gently brushing in certain areas resulted in pulling the underlying red coating away along with the off-white stencil coating.

Photomicrograph of sample PTH-200-1. Red ground with off-white lattice stencil



Background - 18% gray scale

Sample PTH-200-2 Central medallion with faux sky & stencil border. Plaster substrate

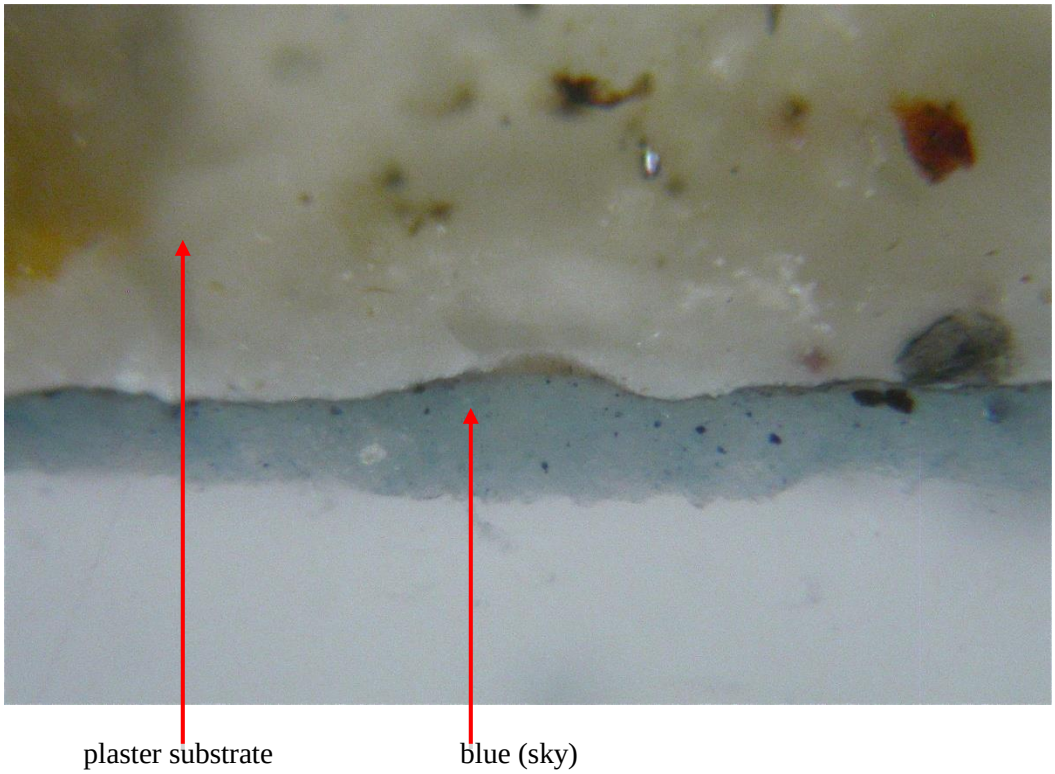
It was suspected there was a sealer coat applied to the plaster that had a slight reddish tan coloration. This suspected sealer was not water-soluble and had no reaction to Sodium sulfide (Na2S). The coating appeared to be alcohol-soluble (AI) indicating a likely spirit-based coating. A yellowish auto-fluorescence under 325-375nm UV light *suggested* shellac although that could not be confirmed.

Off-white - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. Compared with the following blue and red coatings, the appearance of this off-white finish was less porous and matte, but it was still slightly water–soluble. Severe staining was observed.

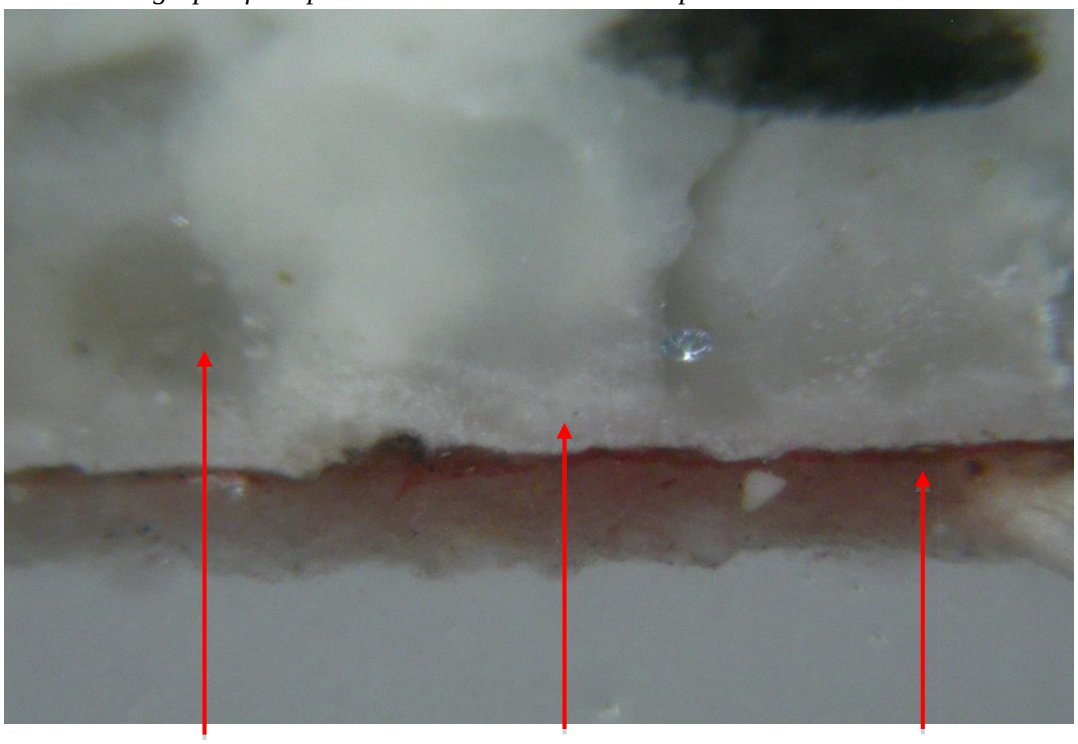
Blue - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. It was a water-soluble finish that appeared to have been applied free hand. The coating was fragile and easily removed by gently rolling a cleaning sponge. Brushing with a bristle, chip brush also left brush marks. The coating was thin and had a matte finish.

Red stenciled border pattern - There was no reaction to Sodium sulfide (Na2S) indicating there was no lead present. It was a water-soluble finish with a thick application consistent with stenciled application, although the coating was fragile, with even gentle brushing removing material and leaving brush marks.

Photomicrograph of sample PTH-200-2 with blue sky



Photomicrograph of sample PTH-200-2 with red stencil pattern



plaster substrate red (stencil) off-white (sky?)

Background - 18% gray scale *Sample PTH-200-3* *Lattice pattern border from edge closest to wall with adjacent peach colored field. Brown red ground for tan stenciled lattice pattern & ocher & blue stencil patterning. Plaster substrate*

Adjacent to the plaster substrate appeared to be a very thin, gray coating suspected to be a sizing or sealer. A total of five colored coatings were readily visible on this sample. This sample was comprised of a stenciled border pattern with a brown red ground and stenciled patterns in ocher, blue, and tan (comprising the lattice pattern). Adjacent to this stenciled border, a peach field color was also present.

Specific information was sought by Maylou Davis regarding this sample as follows;

1. Was there was a finish color under the peach colored field that wasn't under the lattice stencil design, and

2. Was there any difference in paint mix or quality between that of the brown red base color of the stenciled border and the ocher & blue colors in the edge design?

All five coatings darkened noticeably with the application of water and quickly dissolved, indicating distempers.

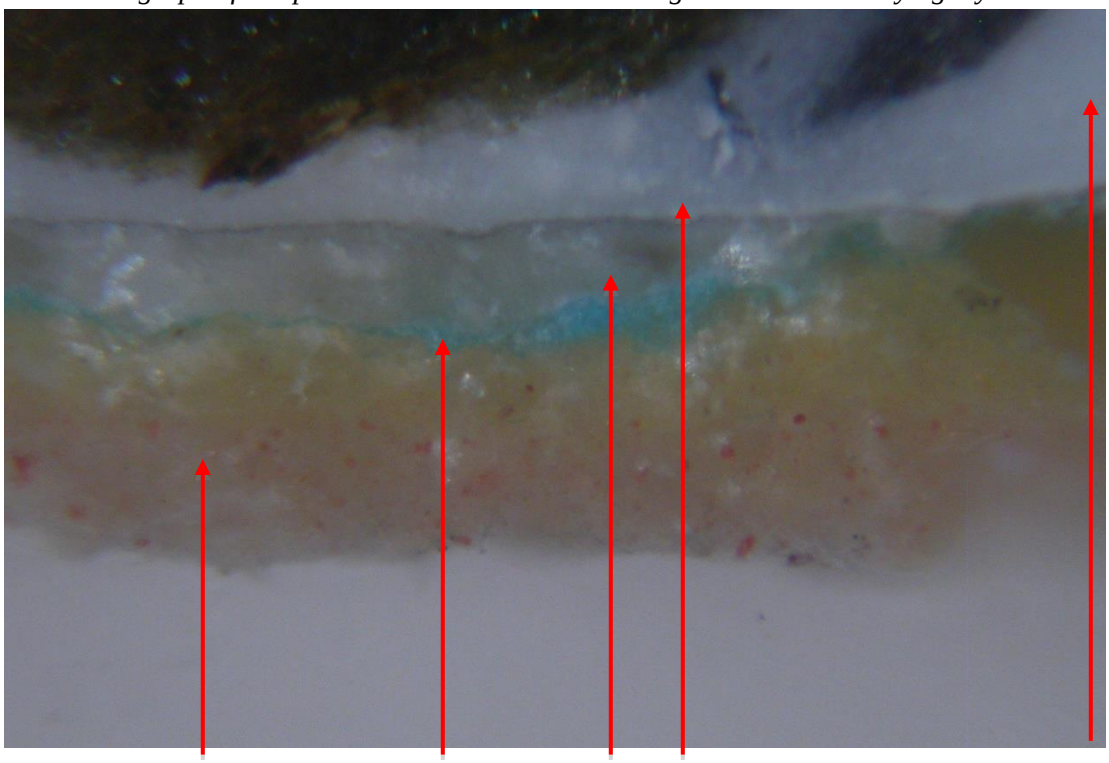
There was no discernable difference in pigment to vehicle ratio between the four (4) coatings that comprised the brown red stencil border. The only difference observed was in the slight variation in visual appearance and thickness indicating differences in the application process.

The ocher, blue, and tan coatings were thicker than the brown red coating, with irregular buildup, and evidence of bubbling. The brown red field had a more consistent thickness with visible brushmarks. This brown red field overlapped the adjacent peach colored ground by about 3/8". The peach colored coating was also highly soluble in water but appeared to be more loosely bound than the brown red, ocher, or blue coatings. Brushing with a bristle, chip brush left brush marks.

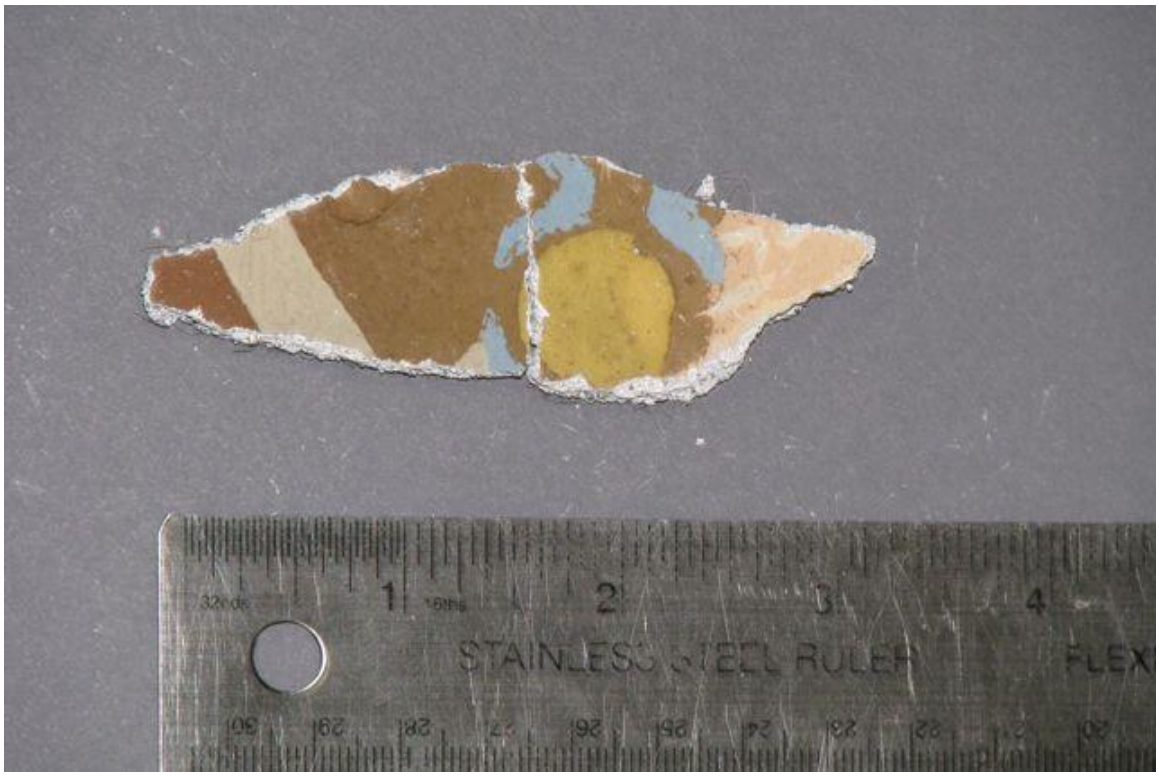
Microscopic examination of the sample revealed additional coatings or remnants of coatings under the peach ground (see photomicrograph below) suggesting a possible earlier finish campaign. A yellow ocher ground coating (with more yellow and less red than the peach ground) was directly under the peach coating but stopped just short of the brown red ground of the border stencil. Under this yellow ocher were remnants of blue and white.

Adjacent to the plaster appeared to be a very thin, gray coating suspected to be a sizing or sealer.

Photomicrograph of sample PTH-200-3. Peach colored ground with underlying layers.



peach ground yellow ocher blue white plaster substrate



Background - 18% gray scale

ANALYTICAL TOOLS AND TECHNIQUES

Laboratory investigation & analysis was undertaken employing microscopic equipment to determine the chromochronology of architectural elements.

Microscopes. The microscopes employed in laboratory analysis were a SMZ-1B zoom stereoscopic microscope with 10x/21 and 20x/12 eyepieces as manufactured by Nikon Instrument Group, Inc., Garden City, New York (516.222.0200) and a Zeiss Standard RA UV epi-fluorescence compound microscope with a magnification of 63x, 100x, 160x, 250x, and 400x as originally manufactured by Carl Zeiss AG, West Germany.

Lighting. To reduce the effects of metamerism, lighting for color matching approximated the natural daylight conditions under which the structure is to be viewed. Light with a consistent intensity and spectral composition was provided by a halogen fiber optic illuminator as manufactured by Techni-Quip Corporation, Hollywood, California (213.464.0490). This lighting source was color-corrected to approximate daylight by employing an 80A filter. Lighting for cross section UV analysis was provided by a HBO 50w mercury arc lamp illuminator and filter cube with 325-375 nm exciter filter, FT395 dichroic mirror, and 420 nm longpass emitter filter.

Sample embedding. Paint samples were encapsulated in Extec polyester clear resin as manufactured by Extec Corporation, 99 Phoenix Avenue, Enfield, Connecticut (860.741.3435) and cut to expose a representative cross section of the paint layers. The cut surface was sanded with progressively finer grit (220 to 12,000) wet/dry sandpaper to achieve a polished surface. Micro-mesh Cushioned Abrasives with 1,500 to 12,000 grit was supplied by Conservation Support Systems, 924 West Pedregosa Street, Santa Barbara, CA 93101 (805.682.9843). 220 and 600 grit wet/dry sandpaper was manufactured by 3M Do-It Yourself Division, Box 33053, St. Paul, MN 55133-3053.

Photomicrographs. Photomicrographs were produced digitally with a Nikon Coolpix 4500 fitted to the microscopes using a Martin Microscope MMCool S/N: 0485 adapter as manufactured by Martin Microscope Company, 207 South Pendleton Street, Easley, South Carolina, 29640 (864.242.3424). Prior to photographing, a thin, wetting solution of mineral oil was applied to the cross sectioned surface of the embedded samples to achieve a consistent surface and to reduce glare from scattered light reflection.