FINISHES ANALYSIS
THE WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

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I. INTRODUCTION

This report reflects conclusions based on a culmination of several different finish analyses, with samples collected at the site (William Robert Johnson House) in March of 1993, and analyzed in the laboratories of the North Atlantic Region's Cultural Resources Center in Lowell, Massachusetts, during the summer of the same year. Analyses included paint, mortar and stucco, wallpaper, molding profiles, and limited nail examination.

An Historic Structure Report was written in 1979 by Building Conservation Technology, Inc. (hereafter referred to as BCT), which included paint analysis. The Southeast Regional Office requested the services of the Building Conservation Branch of the Cultural Resources Center to confirm earlier conclusions and conduct a more in-depth study of certain aspects of the structure. Prior to this request, an historian for the HABS team that measured the building, Dena Sanford, researched the Johnson papers and wrote an excellent report in 1992 documenting its architectural and social history based on primary source material.[1] While the abutting building is included and the kitchen dependency is referenced in Sanford's report, only the Johnson dwelling house on State Street will be studied in this report. Due to the high quality of Sanford's report, it was determined by both the Southeast Regional Office and the Building Conservation Branch that no additional archival research would be required. The majority of historical information was drawn from Sanford's work and applied to the individual analyses.

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[1]Sanford, Dena, Draft HABS Report, William Johnson House Complex, 1992.

II. HISTORICAL CONTEXT

The most important archival information relative to the William Robert Johnson House not only includes the date of construction, but also the individual notes William Robert Johnson recorded in his personal diary.[2] While the photographs included in Sanford's report are probably valuable (Gurney photo ca. 1864; Norman photo, ca. 1880), the photocopies of the same are less so, due to their poor quality. Conversely, the Sanford report's photocopies of Sanborn Fire Insurance Maps are very helpful in providing a size and scale to the structure for the years 1886 through 1925, and put outbuildings and surrounding structures in their own context.

But the greatest documentary importance lies in Johnson's or his family's recordings of circumstances related to original construction and later alterations. His or their notes are listed below chronologically, filtered from Sanford's report (page number followed in parenthesis). Comments by the author may follow each entry in **[boldface]** type. It should be noted that the extant house is the second one Johnson built on the site, and that Johnson owned several properties in Natchez. Therefore, some references may be ambiguous.

May 21, 1840: "Mr Parker is selling of[f] his Brick very fast - number of Carts are hauling from thare" (p. 44) **[Johnson begins to take brick from Mr. Parker's burned hotel.]**

June 8, 1840: "you can take them [bricks] tho you must not pull dow(n) the Houses that the people are living in I told him I would not and so the Bargain was confirmed" (p. 45) **[The bargain was with Johnson's lawyer.]**

June 15, 1840: Three doors purchased from Parker (p. 46) **[first floor front doors?]**

August 3 & 4, 1840: Brown measured off the ground (p. 45)

August 17, 1840: Weldon began laying joists (p. 45) **[first floor?]**

August 25, 1840: Two sash frame windows purchased from Mr. Elam were installed (p. 46)

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[2]Sanford, from William Johnson Diary, 1835-1851, William Ransom Hogan and Edwin Adams Davis, eds., William Johnson's Natchez: The Antebellum Diary of a Free Negro (Baton Rouge: Louisiana State University Press, 1951). [Footnote #12, p. 5.]

September 7, 1840: "New Doors" had been hung (p. 46) **[first floor front doors?]**

September 14, 1840: Second floor joists partially constructed (p. 45)

September 15, 1840: Second floor joists finished (p. 45)

September 17, 1840: "the Brick layers commenced to work on the Building" (p. 46) **[If this refers to this building, then it may suggest that the masonry work was delayed, because the joists could not be finished if the construction of the building's masonry shell had not progressed.]**

The carpenters set two additional windows and another door frame (p. 46) **[second floor, S. elevation?]**

October 8 & 9, 1840: "Sheeting" and attic rafters installed (p. 46)

October 15, 1840: Johnson bought a keg of nails for $8.00 (p. 46)

October 17, 1840: Mason Fox's bill included laying 83,936 bricks, 17,000 provided by Fox; also installed (p.51):
Two trimmer arches @ $2.00 ea. **[chimneys]**
56 feet of cornice @ $1.00/ft. **[north and south facades]**
Three Double arches @ $3.00 ea. **[first floor front doorways]**
Twelve single arches @ $1.50 ea. **[eleven windows (3 on S. facade, first floor; 2 on S. facade, second floor; 2 on W. facade, second floor; 3 on N. facade, second floor; 1 on W. facade, third floor) and one doorway (S. facade, second floor)]**
Setting of three window frames @ $.50 ea.

October 20, 1840: Weldon nearly finished shingling (p. 46)

November, 1840: Shell of building completed (p. 47)

December 8, 1840: Purchase of 1000 feet of one-inch lumber (p. 48)

ca. Dec. 22, 1840: Bought additional $27.00 worth of lumber and partitioning of rooms begun (p. 48)

Jan. 6 & 7?, 1841: Spent $52.50 for 15,000 laths from Brown's sawmill (p. 48) **[The majority of 3rd floor lath is sawn, the remainder of split and mixed lath suggests alterations during construction, i.e. dormers.]**

January 11, 1841: 30 barrels of lime purchased for $37.50 (p. 48) **[for plastering?]**

Jan. 11 & 15?,1841: Hired two plasterers, Barbee and Evans, at $80.00/mo. and $3.00/day, respectively (p. 48)

January 15, 1841: Plastering had progressed to the second floor, "Left Hand Conner [sic] Room" (p. 48) **[parlor?]**

January 22, 1841: Plastering resumed after a week of damp weather; carpenters laying gallery and dormer floors (p. 48)

January 28, 1841: Third "whitening" plaster coat applied to unnamed portions of interior (p. 48)

February 18, 1841: One coat of plaster applied to third floor (p. 48)

February 19, 1841: Johnson hired another plasterer (p. 48)

February 24, 1841: Johnson and Winston painted third floor walls (p. 48) **[Contrary to Sanford's suggestion that the third floor only received one coat of plaster prior to painting, it is this author's contention that Johnson merely did not record any finish coats of plaster to the third floor. This also suggests that the third floor walls were originally painted.]**

February 25, 1841: Workers "Finished of[f] the Large Front Room to day in the second story and Commenced on the other Back Room" (p. 48)

March 11 & 12, 1841: Paper hanger arrived to hang wallpaper in "the front room" (p. 49) **[parlor?]**

March 15, 1841: Family completed moving (p. 49)

March 20, 1841: Saturday "To day Mr. George Weldon brought me His acct for work done on my Building in State Street, the acct reads this way --

March 11, 1841"

William Johnson D[n]

To G Weldon - for first floor and

3 Door frames and 3 Window frames as per contract	117.00
To framing second floor 12 sqr 4	48.00
To 1 Door door (sic) frame & transom sash Light	20.00
To Seting (sic) 3 window frames	1.50
framing Raising Floor 12 sqr	48.00

	framing 15 sqr of Rafters	60.00
	To 15 sqr Sheeting and Shinglings	90.00
	100ft reveal Board	5.00
	2 Dormer Windows	75.00
	12 po nails	1.50
	150 ft 2 inch pine [6 ed] per	7.50
	60 ft wall strip for second floor	1.80
	60 ft raizing (sic) plate	1.80
		$506.90
Deduction of $3 for weather Boarding that he kept		-3.00
		503.90
[???] $15 for over charge on shingling per square		-15.00
		488.90
[additional entries that are unreadable on the photocopy, but include] an addition of:		40.00
(for something on Main Street), and		528.90
a substraction of:		150.00
		378.90
and a subtraction of:		15.00
(for something relative to 20th March 1841)	Total	363.90

[from photocopy in "Images" appendix to report]

March 24, 1841: Wednesday — "Here is the Bill of work done by Mr. Tucker for me the full amount of which I paid Him for this Day 24th March 1841"

To repairing Front Doors	3.00
do window sashes	2.50
To Lumber Pine Lumber	4.00
Caseing 3 Windows at 4 $ per	12.00
Making 4 window Frames at 4 $	16.00
do 2 Door Frames [clothespress?]	10.00
Caseing 2 Doors under stairway	9.00
Bridging Joist & puting up Pillar	5.50
2 pine Doors at $7 per	14.00
Puting up furrowing to Lath on	3.00
Geting out & puting Down Base in Closepress under stairway	2.00
Making 18 Lights of Sash 25 [cts?]	4.50
Puting up Studing & Finishing around Dormer Windows	8.00
Puting in framing timbers in 2 wind ows& Making 2 Window Frames	8.00
Strate(d)ges & Darbys for Plasterer	1.50
Framing Roof to Kitchen	8.00
do Joists for 2 floors	10.00

[from photocopy of "Images" appendix in report]

March 24, 1841: Repair of front doors by carpenter Tucker (p. 49)

March 26, 1841: Johnson hired a man to dig a cellar under the

	house (p. 49)
April 1, 1841:	Tucker replaced "the old [window]" with a new one (p. 49)
May 13, 1841:	Awning installed on building (p. 49)
June 9, 1841:	Awning blew off building (p. 49)
July 22, 1841:	Plastering porch for dining area (p. 37) **[Sanford believes that this entry may have referred to the kitchen dependency.]**
July 29, 1841:	Underside of gallery lathed "to make a Dining or Eating Room" (p. 49) **[main house or dependency?]**
October 26, 1841:	Mr. Brick installed two grates Johnson purchased at auction (p. 49)
November 13, 1841:	Purchased 30 yards of carpeting and painted building with slaves (p. 49) **[for N.W. room?]**
April 22, 1842:	Purchased two doors at auction (pp. 49-50)
April 29, 1842:	"Door cut in the Back of the Lower Room in the dwelling House in State Street" for $20.00 (p. 50) **[replaced window opening with a doorway]**
May 16, 1843:	Carpenters St. Clair and Shaw installed a "cover" for gallery for $25.00 (p. 50; *p. 14 notes that this occurred in 1944, same date*) **[gallery roof of main house?]**
July 13, 1843:	Blinds installed on front windows (p. 50) **[shutters]**
March 12, 1844:	Mr. Dillon loses $6 horseracing bet to Johnson and pays back by graining three interior paneled doors; also noted in Dec. 1, 1843 diary entry (pp. 13-14)
November 28, 1844:	Had "Glass Frames" moved from Main Street store to residence on State Street (pp. 14 & 50) **[2 additional windows installed on W. facade, first floor?]**
May 8, 1845:	"the Boys Papering Some Little to day & Painting also" (p. 50)
ca. 1865 - 1880	Rear gallery roof framing changed (p.14)

ca. 1870 - 1900	First partitioned subdivision of first floor (p. 14)
ca. 1924 - 1925	Metal roof replaces shingles; bridge connecting main house and dependency constructed (p. 15)
ca. 1924 - 1930	Two front (north) doorways changed to window openings and center doorway changed to doorway with sidelights; center window opening, second floor, north facade changed to doorway to access new second floor gallery; facade stuccoed and scored to resemble ashlar; cornice covered with flashing and stucco (p. 15)
ca. 1930	Second partitioning of first floor into six rooms, ceiling finished in tongue-in-groove beaded board; lattice work added to south side of gallery; electricity and plumbing installed (p. 15)
ca. 1950 - 1960:	Bathroom installed in rear gallery; gallery probably also reconfigured (p. 15)
1978:	Removal of concrete stucco and restoration of north brick facade; restoration of rear gallery (*also listed as occurring in 1980 on p. 17*); installation of raised-seam metal roof and gutters (p. 16)
1980:	Board-and-batten ceiling discovered during gallery restoration, which is reproduced; first floor partitions are removed (p. 17)
1981:	First floor flooring removed (p. 18)
1982:	North facade, first floor doorways and second floor center window opening restored (p. 18)

The above notes have been used to interpret every aspect of the physical evidence. While the Historic Structure Report written by Building Conservation Technology, Inc. (referred to as BCT henceforth), was originally considered a reference, it became apparent that the findings did not agree with the current study. Rather than spending time to make a point-by-point comparison, general comparisons will be made at the conclusion of this report.

Since methodologies differ for each type of analysis, they will be provided with each respective written section.

III. PAINT ANALYSIS

Methodology

One-hundred-and-twenty-seven paint samples were removed from the William Robert Johnson House in Natchez, Mississippi, during a site visit the week of March 8, 1993. The samples were extracted using an X-acto knife and deposited in individual coin envelopes, which were then sealed and labelled with the samples' locations. Once returned to the microscopy laboratory in Lowell, Massachusetts, each sample was assigned a code number ranging from NATC WJ P001 through NATC WJ P127 and mounted in a wax-filled petri dish labelled with its corresponding number.

The samples were observed under a Nikon stereozoom microscope illuminated with fiber-optic lighting. Their chromochronologies were listed on individual, respective sample cards. Chemical testing was employed to identify lead-based or lime-based paint layers in selected samples. Sodium sulfide (Na_2S) and dilute hydrochloric acid (HCl) were used to identify lead and lime, respectively.

Stratigraphies were then compared to one another in order to establish an integrated understanding of the painted history of each room and the structure as a whole. Historic colors were selected from samples that represented the period of 1841-1851, the decade when William Robert Johnson occupied the house. The designated colors were color-matched to the Munsell Color Notation System in order to provide a permanent color record. These color matches are provided in the report.

Analysis

(NOTE: While room numbers were assigned to rooms in BCT's historic structure report, a plan with corresponding room numbers was not included in the documentation packet sent to this researcher. Therefore, rooms will be referred to by their directional location on each floor.)

Exterior

The exterior elements of the building that have not been replaced in the last two decades are in very poor condition, as are their painted coatings. Poor substrate and coating conditions made analysis of exterior paint samples difficult. Access to some fabric was also impaired because window openings were boarded closed, with boards often covering the trim.

Fifteen paint samples were removed from exterior surfaces

around the three exposed facades of the Johnson house. The original finish color was white, matching Munsell 10R 9/1. The oldest fabric is represented by samples from the first floor, south doorway jamb (P002); the first floor, south wall, east window architrave (P001); the second floor, south wall, east window architrave (P031); and the second floor, south wall, doorway jamb (P032). The physical evidence suggests that all of the above elements are original to the structure; the documentation concurs, except for the first floor doorway on the south facade. Johnson converted this doorway from a window opening one year after the building was completed, in April of 1842. At that time, he most likely repainted only the wood associated with the doorway, in the same color that was already on the remainder of the house's trim, rather than all of the exterior wood fabric. Therefore the samples related to the doorway would reflect similar, if not the same, stratigraphies as the remainder of the exterior samples; and they do.

Other first floor, south doorway samples included one from the architrave (P005). It reflects heavy deterioration, but appears to contain the same stratigraphy that all the earliest fabric samples do. Another sample was removed from the exterior surface of the door (P003). It suggests that the surface had been stripped, with its earliest white layers jumbled from the stripping process. Since the sample appears to retain early white paint layers, one could guess that it too may represent an early finish.

Two samples were removed from the two window frames at the first floor level on the west facade. Documentation suggests that these openings were added in 1844. Both of these installations are boarded over and whatever fabric is exposed is in poor condition. The sample from the northern window frame (P006) reflects a very poor paint condition. Based on barely readable paint layers, and when compared to samples from fabric in better condition, it could be interpreted to date to the earliest time period, but the evidence is inconclusive. The sample from the southern window (P007) is in even worse condition, and it only reflects the last five or most modern paint layers. Either this section of trim around the window was replaced, maybe around the turn of the century, or the piece was installed in 1844 and its earliest paint layers weathered off the substrate. Both scenarios are viable.

Five of the remaining seven samples provide less distinctive clues to the history of the house. One was removed from the north facade, second floor level, east window trim (P037). The sample suggests that its corresponding element was stripped of paint because its first visible paint layer (off-white) is intermittent, followed by the last three layers from the standard sequence. If this is true, the stripping most likely occurred during the front facade restoration in the 1980s. Likewise, a sample from the third floor, west window trim (P122) was removed. It did not reflect any paint, but appeared to have a charred substrate. Whether this

charring was from fire or from weathering is unknown.

Three samples were removed from the doorway on the second floor, on the south elevation. While documentation suggests that this opening was original to the construction of the building, in fact it would have been the only means of accessing the second floor, its paint samples suggest it was installed at a later date. The sample from the door's lower panel (P035) suggests that its painted history began during the second or third finish of the building. The sample from one of the door's stiles (P036) suggests that it was first painted during the third or fourth finish of the building. Since the two samples, removed from the same element, differ, one could conclude that the earliest paint layers weathered off the door. A sample from the door jamb (P033) is similar to the one from the door's stile. The combined information drawn from the archival documentation and the molding profile study seem to refute the paint evidence. Therefore the only logical explanation reverts to the erosion of the earliest paint layers, and that this opening dates to the original construction. (See corresponding interior study.)

The remaining two exterior samples (P004 and P034) were removed from the rear or south porch elements. Both of these samples reflect only a few modern paint layers, which is characteristic of the restoration details that were installed in the 1980s.

Interior

First Floor

The present condition of the interior first floor reflects the removal of all partitions, the removal of the western half of the floor's boards, varying conditions of cracked or removed plaster, one unsheathed, nonstructural arch in the center of the floor that is framed by two posts which help to support the floor above, and exposed ceiling framing with no lath or plaster remaining. Some of these conditions resulted from a need to access the cellar for archeology; others because several phases of restoration had occurred throughout the 1980s, including the removal of all first floor partitions, presumably to return the configuration of the first floor to its original one-room shape. These conditions were not conducive to conducting a complete paint analysis, so only twenty three paint samples were removed from this area. The majority of plaster, directly above what had been the first floor level, no longer adheres to the masonry and no baseboards are present. Therefore none were sampled.

The earliest sampled wood finish is a cream color matching Munsell 10YR 9/2. The second finish appears to be white. What may have been part of the room's third finish was a first coat of

rose/brown and a second coat of brown, found on both a panel and stile of the south door. This was the only evidence to suggest that any wood fabric within the first floor room was painted in a contrasting color during an early color scheme, exclusive of the mantel. A light blue/gray color followed, possibly as a finish, and then a dark blue/gray, definitely as a finish.

The subsequent finish was a gold/yellow, often followed by a resin layer, probably varnish. The varnish was not a consistent layer in the wood samples. For instance, it was found in only two of the six sash samples (one of these samples suggested that its respective sash came from another building and did not reflect the gold/yellow color at all). Likewise, the varnish layer was found in only a few of the similar trim samples. This evidence might suggest that the varnish was applied to all wood elements after the gold/yellow paint, but had worn off in many locations. The remaining three of four finishes are within the white to cream color range, while the last one varies from cream to pink to bright blue, depending on the element and its location.

The mantel and plaster wall samples are the only ones that display different stratigraphies of finishes. The mantel appears to have been painted black (matching Munsell N 0.5/) originally. But only two of the four samples removed from the mantel, from one of its corner molding blocks (P016) and from its shelf (P013), show significant black paint to account for a coating. The other two samples only have traces of black paint that appear to be embedded in their respective substrates, suggesting that much of the paint had worn off prior to a repainting. One sample is from the center molding block (P018) and one is from one of the columnettes (P017). Sample P016's wood substrate appears slightly charred, and the appearance of the black paint layer in sample P013 suggests that it may have reached a molten state from heat. Could a small fire outside the fireplace or repetitive hot fires within the firebox have deteriorated the original black paint finish on the mantel? Most likely, yes. Nonetheless, the subsequent paint finishes of the mantel all fall into the white to cream color range. The vertical section of mantel that is immediately adjacent to the tiled firebox surround seems to have been replaced or added, since it only reflects the last three painted finishes.

Only three plaster wall samples (P023 through P025) were removed from the first floor space, one from each of the north, south and east walls. None appear to represent a complete finished history of the room (or rooms as they later became), because the walls were probably originally covered with wallpaper, long removed. Each sample reflects about five to six painted finishes, the last of which is contemporary. The original wood fabric in the room reflects an additional two to three painted finishes (the earliest finishes) more than the plaster. Therefore, either the plaster was left unfinished through the first few painted finishes of the woodwork, or the plaster walls were papered during the

earliest periods of the room. The latter deduction is more likely because no dirt layer was found between the substrate and the first paint layer.

The paint analysis confirms that the south doorway trim, door, two south window openings, and respective sampled sash retain the same stratigraphies, and therefore appear to be original (samples P021, P026 through P030). Documentation suggests that the doorway was converted from a window opening ca. 1842, but it alone was probably painted when it was installed (to match the existing finish). The two window openings on the west wall were added shortly thereafter. The window architraves from these two openings do not reflect the first painted finish from the room, but begin with the second finish (white) found in other samples. Paint stratigraphies show that the lower window sash in the northern west wall opening was installed in another structure, until maybe the last two painted finishes in the room, since none of its earlier paint layers correspond to any other paint found in the house. The lower sash from the southern west wall window reflects a complete stratigraphy, but its molding profile is different than the typical original sash profile. The evidence suggests that when the west window openings were installed ca. 1844, either the trim related to these openings was left unpainted, or all of the first floor trim was repainted a white color, matching Munsell N 9.0/.

Second Floor

The general condition of the second floor interior is poor. Paint is crazed, cracked, and peeling. Plaster cracks exist in every room. Where wallpaper remains, it does not remain intact in all places. Except for their painted finishes, the only elements that are in good condition are those constructed of wood. Loose window sash rest on the floor in several places. In some cases, the sash are removed from openings because the windows are boarded up on the exterior side. However, extra sash originally from other buildings may also be present on this site.

Hall

Thirteen paint samples were removed from the second floor hall, ten from wood fabric and three from plaster surfaces. All of the wood-substrate samples, removed from doorways, doors, and baseboards, appear to represent original fabric. The original painted finish on the wood in this room was a cream, matching Munsell 10YR 9/2. The door (not the trim) to the Northwest Room was grained in 1843 or 1844, along with two other doors in the Northwest Room. Paint analysis shows that the paint layer that represents the original finish of the woodwork was also used as the base coat for the varnished graining layer(s), instead of a new base coat being applied (P038 and P039). Therefore, the grainer

worked with the existing finish under the newly applied varnish layers in order to simulate wood graining. Unlike other early finishes in the house, the graining was not painted over until modern paints were applied, that is until the last two or three finishes (of light cream paint).

The interior paint samples from the south door to the porch, (which appears to have been replaced based on exterior paint samples), show that this door (P041 and P042), its trim (P040), and transom (P043) were part of the original construction, reflecting the earliest interior paint finish. The deduction that the earliest exterior paint finishes probably eroded off the door before later finishes were applied is therefore accurate.

All of the wood elements in the room appear to be original, except probably the picture rail. Excluding the door to the Northwest Room, most elements were painted white for their second finish while the baseboards were painted black. The third finish may have been white, although this color does not appear in all samples. This white also may have been a primer for what appears to be a trichromatic woodwork color scheme in salmon, cream, and light brown. The subsequent woodwork scheme was bichromatic, using brick red and gold/brown colors, probably similar to what remains on the interior sides of the doors in the clothespress. This finish retains a consistent, protective resin layer, possibly varnish, over it. The remainder of finishes are the same two to three finishes of the modern light creams that appear subsequent to the graining layers on the door to the Northwest Room.

Both the plaster walls and ceiling currently have wallpaper attached to them in varying conditions. The plaster samples, extracted after the extant wallpaper was removed, reflect few if any paint layers, suggesting that wallpaper or unpainted plaster was the most often used plaster surface treatment in the hall throughout the occupancy of the house. A layer of pink, lime-based paint (matching Munsell 2.5R 7/8), probably calcimine, was found on the walls below picture rail height (P046); no paint was found in the sample taken from the wall above rail height (P049); and two layers of white calcimine were found on the ceiling sample (P050). These three samples suggest that the walls were originally papered and the ceiling was calcimined, or that a picture rail existed in this room originally, and the walls were painted up to it. Either scenario is a viable one, and in either case, the walls were probably coated in the tinted calcimine by 1850 (based on the wallpaper fragments found under the extant paper.

Southwest Room

Except for the mantel and the picture rail, all wooden elements reflect an initial painted finish of cream (matching Munsell 10YR 9/2) in their paint samples. The door to the

Northwest Room was grained in 1844, using the original finish as the base coat (P070 and P072). Like the door in the Hall to the Northwest Room, it retained its grained finish until modern paints were applied. Of all the room's fabric that was sampled, only the plaster firebox surround and the wooden picture rail were post-original.

The Sanford study refers to the mantel as Colonial Revival style (late 19th or early 20th century), which would indicate that the extant mantel replaced an earlier one. The mantel appears to be more of a simple Greek Revival style than Colonial Revival, which is more fitting to the original construction period and is therefore probably original. The paint samples (P056 and P057) seem to confirm this assumption, except that the mantel was originally painted black (Munsell N 0.5/), in contrast to the cream found on the majority of the room's elements. The mantle was painted black two additional times before its last three finishes of gray, light cream, and off-white.

Sanford also notes that Johnson recorded the installation of two grates in October of 1841. The BCT study refers to the coal grate that is set into the mantel as having Italianate detailing (ca. 1850 motifs), to the fact that the fireplace is too narrow for wood burning and therefore always burned coal, and to the number of paint layers on the plaster fireplace surround indicating that the grate installation was early. They also report that the mantel was originally painted black. This researcher agrees with the BCT study in that the mantel was originally painted black, but disagrees in that the plaster firebox surround is not contemporary to the mantel, because its paint layers only represent the latter half of the painted history of the room (P055). The firebox surround, however, could have been easily replastered during its lifetime. Therefore, its paint evidence is not very important in determining original fabric. The other evidence seems to support that the extant coal grate could easily have been one of the ones purchased and installed in 1841.

The picture rail appears to be of a late 19th century style, finished in a gold leaf with a resin coating protecting it (P062). It is post-original.

The baseboard (P053) was painted black during the second finish of the room, most likely to match the fireplace, while the remainder of the trim (exclusive of mantel and grained door) was painted a white color. The third finish, again appears to have been polychromatic (exclusive of mantel and grained door), with salmon, cream, and brown colors used. The fourth finish only reflects a red layer, not the bichromatic combination of red and brown that is found in the Hall. Other sampling may prove that the bichromatic scheme existed, as the BCT study surmised, but the current samples do not reflect that proof.

The fifth finish in the room, including the mantel and the door, was a gray, gray/blue, or blue. Sample P051, removed from the east door panel, shows that this layer contained fugitive pigments (as blues often are), in that part of the layer had discolored, while some of the truer blue had remained. All of the corresponding layers in the other wood samples appear as a gray color, while the plaster from the firebox surround clearly reflects a light blue color. (Pigment analysis would confirm the assumption about fugitive pigments, but that is beyond the scope of this project.) The sixth finish was probably cream and yellow, with the yellow found on the panel of the east door and the firebox surround. It is difficult to tell if the seventh finish is really one or two finishes, but either it or they are within the same color range of off-white to cream.

The plaster walls and ceiling are original.' Two of the three wall and ceiling samples from this room reflect a dirt layer after the original plaster skim coat, suggesting the surfaces may have been initially unpainted or unpapered. The wall samples (P059 and P061) reflect one or two initial coatings of white calcimine paint, while the ceiling reflects a total of four or five (P060) . All samples show wallpaper as the current covering. Interpretation of this evidence suggests that bare plaster may have been the original finish, then all plaster surfaces were calcimined, perhaps once or twice. Wallpaper was then applied to the walls but not the ceiling, which was still calcimined. The ceiling continued to be calcimined at least once, possibly twice. Whether the wallpaper was changed at this or these times is unknown. However, considering the economic situation of the family through the late 19th century, probably not. Ceiling paper was then applied, most likely at the same time that the picture rail was installed, down the wall plane to the picture rail, where different paper was applied below the picture rail.

Northwest Room

Similarly to the majority of other woodwork found on the second floor of the Johnson House, the original woodwork in the Northwest Room was painted a cream color matching Munsell 10YR 9/2. This color is also represented as the original finish in the mantel samples removed from this room (P076 and P077). Unlike the other two mantels found in the house, which appear to have been originally painted black, this mantel was not painted black until its second finish, which also was repeated during the third finish. This third finish of black remained on all of the mantel's wooden elements until the last two modern painted finishes.

Likewise, the baseboard samples from this room (P065, P066, and P074) show that the baseboard's second painted finish was black. They also show that the wall that separates the Northwest Room from the Northeast Room was original, even though the east

baseboard is not mitered into the north baseboard, as is the typical detail at all other baseboard joints. This may suggest that the front (north) half of the second floor was originally intended to be one room, but was subsequently divided into two during the construction process.

The three doors that connect this room to others all reflect evidence of graining (visually as well as microscopically), which was most likely applied in 1844. As described in previous rooms, the original wood finish coat on the second floor was used as the base coat for the graining. The doors remained grained until the last two finishes of this room, both of which were a light cream color. The corresponding architraves were not grained, but remained painted in the cream color when the doors were grained. The fact that every one of this room's doors were painted in a faux finish implies the importance of this room. It probably was the parlor or "best" room. Conversely, this room was repainted the least often compared to other rooms on the second floor.

The door and window architraves are all original to the room. After their initial finish of cream, they were painted white, as were the window sash. (The sash in the eastern window opening on the north wall is a reproduction sash dating to the 1980s restoration.) By the room's third finish, the wood appears to have been polychromed, with the baseboard painted in brown hues, the mantel black, and the door and window architraves in creams or off-whites, as well as the sash. The fourth painted wood finish in the room was a brick red color, exclusive of the doors and mantel. The last two finishes were light creams, when all of the woodwork, including the doors, was painted.

The two wood elements in the room which do not reflect all of the painted finishes are the picture molding and the curtain rod holders. Both of the representative samples suggest that they were installed one finish prior to the two modern painted finishes, when they were coated with a resin finish, most likely varnish. Since a resin-coated element could have retained its finish through several painted finishes of other elements in the room, it would be difficult to say when each of these specific elements were installed. Since wallpaper was found under the picture molding, the molding was not original to the room. Stylistically, the drapery/curtain rod holder appears to date to much later than ca. 1840. In addition, no varnished (non-grained) elements are found in the house dating to the earliest time period. If a curtain rod holder was removed from the wall, perhaps an examination of its securing nails would confirm that it is post-original.

Three plaster samples were removed from the northwest room, one from the wall below the picture rail (P080), one from above the picture rail (P082), and one from the ceiling (P081). None of these samples displayed any paint layers, suggesting that the walls and ceiling were always unpainted and/or papered. Although more

prevalent in higher style houses, ceiling papers were used more frequently as papers became less expensive.[3] Certainly by 1841 a ceiling paper may have been the perfect choice for Johnson's parlor, and became the preferred treatment as the century progressed.

Northeast Room

The original paint color of the woodwork in this room was cream, matching Munsell 10YR 9/2, as was the same color used throughout the second floor woodwork. Sample P092 from the window architrave shows that the original cream finish was very worn before any subsequent finishes were applied. Samples from the upper sash (P093) and south door architrave (P087) reflect a first finish of white. Either they represent two later additions, which seems unlikely, or their original coatings were so worn, little paint remained prior to repainting, as was the case of the window architrave. The grained door to the Northwest Room was initially painted in the original cream color, and then graining layers were applied over it, using the original finish as the base coat for the graining. The northeast room side of the door was not painted until the last one or two modern painted finishes of the room (samples P089 and P090).

Like the baseboards in the other second floor rooms, the northeast room's baseboards had a second painted finish of black. The remainder of the woodwork was painted light cream, except for the doors. While the west door remained grained, the south door either uniformly lost its second and third finish layers, or it was not painted until the room's fourth finish. The third woodwork finish was probably an off-white with a salmon color used on the baseboards. The subsequent finish was either a white, or if the white was the primer coat, a brick red color. In this case it is difficult to differentiate the primer from the finish coat. Intermittent layers of a turquoise color are found on the baseboard fascia sample (P083), the window architrave trim (P091), the south doorway architrave fascia (P087), and the recessed panel of the south door (P086). The turquoise could have been an accent color to the other brick red details, but since their layers were generally incomplete, this is difficult to ascertain. The remaining layers consisted of salmons, light browns, and browns, associated with one or two finishes, and finally the most modern (probably two) finishes of off-white and light cream.

Only two plaster samples were removed from the room, one from the north wall (P095) and one from the ceiling (P096). The wall

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[3]Catherine Lynn, Wallpaper in America From the Seventeenth Century to World War I, The Barra Foundation, W.W. Northon & Company, Inc. (New York: 1980), pp. 232-234.

sample reflected no paint, suggesting that it had always been unpainted and/or papered. The ceiling sample reflected three layers of a lime-based paint and one layer of a light green-colored oil paint. Currently, remnants of ceiling paper are installed on the ceiling over the light green paint and down the wall to the height of the picture rail. It is difficult to say how often the ceiling had been papered if not all of its layers remain, or to correlate the ceiling paint layers to the rooms woodwork samples. However, the three original white lime-based coatings, which are calcimine, may represent the earliest ceiling finishes.

Closet or Clothespress

The ubiquitous cream original paint color (Munsell 10YR 9/2) is present on the four woodwork samples (P097 through P098) removed from the interior of the clothespress. The woodwork was probably painted off-white as a second finish, light cream as a third finish, and definitely brick red as the fourth and final finish. This finish was also a polychromatic scheme, as evidenced by the extant doors with their brown-colored inset panels.

Although currently only remnants of wallpaper remain, the north wall's plaster sample (P100) reflects a white layer, and a tan/cream color as the second or third painted finish. The extant wallpaper was applied over the painted plaster. Its print has bled, caused by a thin coat of white paint applied over it. This plaster was originally unpainted or papered, the former being the most likely treatment.

Southeast Room

The wood elements in this room reflect the same original cream (Munsell 10YR 9/2) color found in other rooms on this floor. Several paint samples suggest that paint has fallen off their respective elements because sections of stratigraphies are missing. (In fact, this room is currently a den of peeling paint.) These elements include the architrave to the closet door (P111), the closet door's stile (P107) and recessed panel (P105), and the closet door's panel molding (P104). Therefore the door samples do not reveal all of their paint finishes. The window architrave (P110), upper sash (P106), and north baseboard (P103) samples appear to retain full stratigraphies, representing the entire painted history of the room's woodwork. In this room, the second finish shows that the baseboard was painted black (like all other of the second floor baseboards), while the remainder of the woodwork was painted white or off-white. The third finish in the room was light cream and the baseboards were painted a light brown. All of the woodwork where samples were complete were subsequently painted brick red. The baseboard was then painted brown. The last two wood finishes in the room were painted light cream.

No remnants of wallpaper were found in the three paint samples removed from the plaster surfaces. This discovery does not prove that wallpaper was never applied to these walls or ceiling. Since the ceiling (sample P018) received more paint coatings than the walls, a total of six, it never may have been papered. The sample reflects four initial lime-based white layers, probably calcimine, a finish of light cream-colored oil-based paint, and a final finish of a cream/tan oil paint. The wall sample taken from below the picture rail (P102) reflects only three layers of white lime-based paint and the same final coat of the cream/tan oil paint as the ceiling. The wall sample removed from above the picture rail (P109) appears to reflect only two layers of white lime-based paint, followed by the same cream/tan oil. While the picture rail was probably added to the room, based on evidence found in other rooms relating to their respective picture rails, the difference in the two wall samples' earliest layers is most likely a fluke. The walls were probably calcimined at the same time that the first three coats of calcimine were applied to the ceiling. The walls were probably then papered in their entirety, either when the fourth coat of calcimine was applied to the ceiling or when the ceiling was painted light cream, or at both times. The similar last paint layer in all three samples suggests that if paper had been added to the walls, it was removed at this time, and the walls and ceilings were painted in the same color.

Stairway to Third Floor

Paint samples show that this enclosed stairway to the third floor was painted less frequently than the second floor living space. The three wood samples taken from a stair tread (P113), a stair riser (P115), and the baseboard stringer (P114) only reflect two finishes. The first is the same cream color (Munsell 10YR 9/2) that is found as the earliest painted finish on the second floor, but in this case, it was protected with a varnish layer. The second is the brick red color that is found two-thirds the distance into complete paint stratigraphies taken from the second floor. These coating also may have been glazed, probably with varnish.

One plaster sample was removed from the wall of the stairway, from under two layers of wallpaper. It reflects only one painted finish, the same pink lime-based paint that was used in the second floor hall. The color matches Munsell 2.5R 7/8.

Third Floor Attic

The third floor was painted less frequently than the second floor and is in very poor condition. The physical evidence suggests that it was never subdivided, and most likely served as a sleeping loft. All of the paint samples from the fixed wooden elements show that they were probably only painted a maximum of

three times. The stair rail and balustrade were protected in a fashion similar to the stair to the third floor, as evidenced by a resin coat that follows a base coat of cream (Munsell 10YR 9/2) in their samples (P116 and P117). The varnish has darkened greatly, and the elements appear to be painted brown, but actually have never been refinished.

Samples removed from the aprons of the east dormer (P119) and west dormer (P127) windows display at least two painted finishes, the first in a cream color (Munsell 10YR 9/2), and the second in a white color. Both samples are so dirty on the surface, that one cannot determine if an additional last layer is only dirt or a third painted finish of white. The sample from the trim around the western dormer window (P126) only reflects one painted finish, the original one of cream, and either a glaze or dirt layer after it. Considering the amount of dirt found in the room and in other samples, the latter is most likely the case, unless it is a degraded paint layer. Other post-original paint layers, if they existed, may have fallen off. The sample from the west window architrave (P121) reflects two finishes, the first of cream and the second of a very dirty white. The sample removed from the west wall baseboard (P125) suggests that the first finish of cream was superceded by a dark gray/green-colored paint. Johnson's notes suggest that the third floor room was originally painted as opposed to unfinished, but it is impossible to determine when the second finish was applied.

Since the gray/green color of the baseboard was not used as a finish on the second floor, there are no clues to chronologically tie it into other painted finishes. It is interesting to note that the baseboard was treated in a different color than the rest of the trim during the room's second painting, just as the baseboards on the second floor were finished in black, and the rest of the floor's trim in white during its second painting.

A sample taken from the west window's lower sash (P123) reflects five or six painted finishes, including a brick red color found in the middle of the stratigraphy. This color is found only in second floor paint samples, indicating that this sash was moved from the second to the third floor, and probably from either the southeast or northwest rooms, based on similar stratigraphies found in those rooms. The upper sash from the same window is currently setting on the floor of the room under the opening. A sample (P124) removed from it displayed only dirt and no visible paint.

Two additional sash samples were examined, both from sash with a different profile than the typical one found in the house (see Molding Profile Analysis). The sample from the eastern dormer's upper sash (P118) reflects only a layer of light green/gray, while the sample from the western dormer's lower sash reflects only a layer of white. In either case, there is insufficient evidence available to correlate their stratigraphies with others in order

to determine an installation or replacement date of the respective sash.

IV. MORTAR, PLASTER, AND STUCCO ANALYSIS

Methodology

Twenty-one mortar, plaster, and stucco samples were removed from the Johnson House and assigned identification numbers ranging from NATC WJ M01 through NATC WJ M21. All of the exterior samples (mortar and stucco) were removed from the west wall. The initial two samples, one from the exterior west wall's stucco (P01) and one representing mortar from the same wall (P02) were removed by the Southeast Region's preservation masonry crew. Both of these samples were forwarded to the Building Conservation Branch's laboratory for analysis. The remaining samples were removed by the author after representative sites were selected, using small masonry chisels and a hammer, and collected in zip-loc specimen bags. Each sample location was noted on the respective sample bag with indelible ink and the samples were returned to the laboratory for number assignation and analysis.

In the laboratory, each sample was visually examined for similar characteristics and then ground to a powder using a mortar and pestle, with care not to crush any aggregate. Individual samples were placed in beakers that had had their weights recorded (and were labeled with corresponding sample numbers) and were weighed again. Small quantities of dilute hydrochloric acid (HCl) were added to a crushed sample. (Hydrochloric acid [HCl] reacts with the lime in lime mortars, plasters, and cements.) Once this reaction ceased, the liquid in the beaker was poured into a labeled filter paper that had had its weight recorded and was folded into and was supported by a glass funnel. The funnel had been fitted into a rubber stopper and help upright by the stopper, fitted into an Erlenmeyer flask. The poured liquid or filtrate was collected in the flask and its color noted. The remaining sand in each beaker was gently rinsed with fresh water and swirled to levigate the finer particles. Again the liquid was poured into the filter paper which collected the fines, leaving only sand or aggregate in the beaker. The beaker and drained filter paper were set under heat lamps to dry. Both the beaker containing the dried aggregate and the filter paper holding the dried fines were weighed. The fines were color matched to the Munsell Color Notation System. The aggregate and fines were then collected in separate test tubes that were labeled with the corresponding sample number. A lid capped each test tube, and the samples were set aside for future examination.

All of the calculations pertaining to sample, aggregate, and fines' weights were made from the initial records. The weight of the soluble material was determined by adding the weight of the aggregate and fines and subtracting the total from the sample weight. Percentages by weight of aggregate, fines, and soluble material were then calculated. These figures, notes from the initial visual examination, the filtrate colors, the fines' colors,

and test tubes of resultant fines and sand were all used to make comparisons among samples. These comparisons helped to establish like groups based on similarities, and when incorporated with the documentary research, provided the basis for deductive conclusions.

Analysis

Mortar

NATC WJ M02 - West wall, brick mortar.
(8% fines by wt., 86% sand by wt., 6% sol. mat. by wt.)

Of the twenty one samples removed from the Johnson House, only one represented mortar (M02). While it was the only mortar sample taken, its resultant sand and fines had combined characteristics similar to one plaster sample (M03) and three stucco samples (M16 through M19).

Exterior Stucco

NATC WJ M01 - West wall, near second floor level, south chimney area.
(5% fines by wt., 89% sand by wt., 5% sol. mat. by wt.)

NATC WJ M12 - West wall, believed original stucco, bottom layer of two different installations (may be composed of two layers, not separated), dirt layer between it and top layer. (Separated from sample M13.)
(8% fines by wt., 70% sand by wt., 22% sol. mat. by wt.)

NATC WJ M13 - West wall, apparent single top layer of two installation layers, dirt between the two layers, as well as on top. (Separated from sample M12.)
(9% fines by wt., 70% sand by wt., 21% sol. mat. by wt.)

NATC WJ M14 - West wall, believed original stucco, bottom layer of possible two-part system. (Separated from sample M15.)
(8% fines by wt., 81% sand by wt., 11% sol. mat. by wt.)

NATC WJ M15 - West wall, believed original stucco, top layer of possible two-part system. (Separated from sample M14.)
(13% fines by wt., 66% sand by wt., 21% sol. mat. by wt.)

NATC WJ M16 - West wall, believed second stucco finish, bottom layer of two-part system. (Separated from sample M17.)
(7% fines by wt., 71% sand by wt., 23% sol. mat. by wt.)

NATC WJ M17 - West wall, believed second stucco finish, top layer of two-part system. (Separated from sample M16.)
(9% fines by wt., 63% sand by wt., 28% sol. mat. by wt.)

NATC WJ M18 - West wall at south roof, coping stucco, top layer.
(9% fines by wt., 61% sand by wt., 30% sol. mat. by wt.)

NATC WJ M19 - West wall at south roof, coping filler, under top layer of stucco, probably installed at same time as sample M18.
(10% fines by wt., 71% sand by wt., 19% sol. mat. by wt.)

NATC WJ M20 - West wall at south roof, coping stucco, bottom layer.
(7% fines by wt., 69% sand by wt., 23% sol. mat. by wt.)

NATC WJ M21 - West wall, believed first layer.
(10% fines by wt., 65% sand by wt., 26% sol. mat. by wt.)

One problem that was prevalent with the stucco samples was determining how many layers were included with each sample. After reviewing all of the samples, it was determined that at least two different stucco installations took place on the west side of the building, and each of those was probably a two-part system. The difficulty lay in identifying all of the layers and then separating them prior to analysis. The division between the two installations was fairly easy to identify because a dirt layer was evident on what had been the exposed surface of the original stucco (as seen in samples M12 and M13). Had the wall surface been in better condition, perhaps the number of stucco installations would have been easier to assess. However, much of the stucco had fallen off the building unevenly and distinctive layers were not easy to identify.

The layers within each installation were more difficult to identify in some samples because their thicknesses varied greatly. If the demarcation between the two applications within the same installation was prominent, then the sample was split immediately prior to analysis. However, this demarcation was not always obvious. The documentary and physical evidence suggests that the west wall was built with reused brick and probably had an uneven surface. If it is assumed that the structure was originally stuccoed, the thickness of especially the first layer of the two-part installation would vary greatly. The thickness of the finish coat or second layer would probably depend on the capability of the mason who was applying it. Due to these variables, this author believes that the most reliable stucco samples would be M14 and M15 which may represent the first stucco installation, and samples M16 and M17, which clearly represent a later installation. The samples from the coping stucco may also accurately represent individual installations, but each of the two installations that cover the coping appear to have only a single layer. Comparative analysis

should clarify which coping layer was installed when, at least relative to the west wall stucco.

Two clear groups of stucco samples emerge when sands and fines are compared among the eleven above-named samples. Samples M01, M12 through M15, and M20 and M21 comprise the first grouping and display very similar sand and fines characteristics. The sands are generally fine to very fine in size and are somewhat silty, with an occasional large piece of aggregate. This sand appears to be river sand. It has an overall color of tan, with interspersed fine black particles. The fines for all of these samples are tan, matching 10YR 7/3 on the Munsell Soil Chart.

The second grouping, composed of samples M16 through M19, reflects sands that are lighter in color, more diverse in size, but whose aggregate is generally larger than those of the first group. This sand appears to be beach sand. The fines from the four samples in this group are also much lighter in color, approximating 10YR 7/1 on the Munsell Soil Chart.

Dividing the samples into groups by weight percentages of component parts poses a problem. If it was uncertain if samples were fully and accurately separated by application layers prior to analysis, then the weight percentages might be skewed. Assuming the same sand source was used for an installation even if it was a two-part process, the same stucco mix may not have been used. Inadvertently leaving two layers together during analysis would result in accurate sand samples but inaccurate weight percentages (if two layers of the same installation were not recognized and separated).

It is clear that samples M14 and M15 represent two parts of one installation. The same is true for samples M16 and M17. The weight percentages for these four samples illustrate that two different stucco mixes were used for the base stucco and the finish stucco for both respective installations.

If weight percentages are considered, clearly sample M01 stands alone. Samples M12, M13, possibly M15, M16, M19, and M20 form a second group. Samples M17, M18, and possibly M21 appear to comprise a third group. Sample M14 also may stand alone.

The culmination of this information suggests that three possible stucco installations occurred. The first two utilized the same sand source, and the second of the two may have been applied only to patch areas that had deteriorated, but this is an hypothesis. The dirt layer between samples M12 and M13 suggests separate applications (of similar stuccos in this case), the second of which was not applied until a dirt layer formed on the surface of the first. Samples M14 and M15 represent a two-part system of one of these applications: which one is unknown. Both of these stucco installations appear to represent a lime mix, without

cement. This assumption is based on the relative softness of the layers and the date of the original construction relative to the availability of cements. If the original stucco is to be reproduced, the color and texture of the earliest stucco layers should be matched, using the sands and fines derived from analysis.

Samples M16 and M17 represent the two parts of the last or third stucco installation. The evidence shows that the coping sample, M20, relates to one of the first two stucco installations, therefore it may have been original. Clearly it also shows that the coping filler sample, M19, relates to the base coat of the final stucco installation (sample M17); and the outermost coping layer sample, M18, relates to the finish coat of the final stucco installation (sample M16). Perhaps this last stucco finish was applied between ca. 1924 and 1930 when the metal roof replaced shingles and the door and window fenestration on the front or north facade was altered. This last installation of stucco has the characteristics of a portland cement mix.

Interior Plaster

NATC WJ M03 - First floor, S. wall under W. window.
(11% fines by wt., 84% sand by wt., 6% sol. mat. by wt.)

NATC WJ M04 - First floor, W. wall to N. of N. window.
(7% fines by wt., 75% sand by wt., 19% sol. mat. by wt.)

NATC WJ M05 - First floor, W. wall between window openings.
(6% fines by wt., 73% sand by wt., 22% sol. mat. by wt.)

NATC WJ M06 - Second floor, SW room, E. wall to S. of doorway.
(5% fines by wt., 80% sand by wt., 16% sol. mat. by wt.)

NATC WJ M07 - Second floor, NW room, N. wall between window openings.
(7% fines by wt., 82% sand by wt., 13% sol. mat. by wt.)

NATC WJ M08 - Third floor, W. wall to N. of window opening.
(7% fines by wt., 80% sand by wt., 14% sol. mat. by wt.)

NATC WJ M09 - Third floor, E. wall.
(8% fines by wt., 81% sand by wt., 12% sol. mat. by wt.)

NATC WJ M10 - Third floor, N. wall, E. dormer, W. dormer wall.
(7% fines by wt., 77% sand by wt., 17% sol. mat. by wt.)

NATC WJ M11 - Third floor, ceiling in NW quadrant, near center.
(6% fines by wt., 86% sand by wt., 8% sol. mat. by wt.)

By separating the plaster samples by like sands, three groups emerge. All of the samples except M03 and M06 have the same sands.

These like sands are generally all composed of fine-sized granules. Their overall color is tan, with black and orange particles interspersed. Although an effort was made to remove all paint prior to analysis, fragments of paint litter the sand in samples M04, M05, and M08. Sample M03's sands retain similar coloration to the majority group, but its particles appear to be very fine. Sample M06's sands are very different, with a wider range of particle size and overall darker coloration, including the majority of larger aggregate in a brown/orange color with a few large pieces in a black/brown color.

The resultant fines in all of the samples are the same color, except in samples M03 and M04. Considering the amount of light blue paint that could not be removed from sample M04 prior to analysis, its residue may have altered the color of the fines in this sample. All of the plaster samples contained hair except M03.

The weight percentages of samples' component parts add another dimension for grouping like samples: sample M03's weight percentages are different from all the other samples, confirming its uniqueness; the remaining two first floor samples' weight percentages (M04 and M05), and possibly those from sample M10, form a second group; samples M06 through M09, and again possibly M10 (it can be interpreted two ways), form a third group; and sample M11 constitutes the fourth group as a single example.

Based on these observations, plaster was applied to the interior walls and ceilings of the Johnson house at least three different times. The majority of like samples probably represent the initial construction phase. These include samples M04, M05, and M07 through M11. The weight percentages of components from samples M04 and M05 suggest that a slightly different plaster mix was used for the first floor, although the same sand was used for all of the original plaster installations; or, that since these two samples retained lime-based paint from the surface of the sample, that their percentage weight of soluble material (lime) would naturally be higher. The difference in weight percentages of components from sample M11 might be explained by the poor condition of the ceiling plaster due to moisture infiltration from the leaking roof. Prolonged exposure to moisture will leach lime from a sample, which is demonstrated by the lower percentage of weight of soluble material (lime) in this sample. All other indications suggest that this sample represents original fabric.

Sample M03 clearly represents a separate installation. While no known alterations occurred under the west window of the first floor, south wall (the location from which this sample was removed), it is known that the center doorway in this wall replaced a window opening in 1842. Whether this plaster was related to that change is unknown.

Sample M06 also clearly represents a separate installation based solely on its different sands. Removed from the second floor's southwest room, east wall, this plaster may represent only a repair patch, since no known alteration occurred to this wall and it is believed to be original. The similarity in weight percentages of this sample's components to other original samples appears to be a coincidence.

Comparison of Mortar, Stucco, and Plaster Analysis

The sands and fines from stucco and plaster samples that are believed to represent original installations are very similar, thereby supporting the supposition of originality based on like characteristics. The one mortar sample provides a very small data base from which to draw conclusions. It contains large lime deposits or clumps, which probably lighten its color. The fines color from the mortar sample is also much lighter than the color of fines from other supposed original samples. It is more similar to the color of fines in samples M03, M04, and M16 through M19. Since the mortar sample was sent to the laboratory, its exact location could not be ascertained, and more importantly, its freedom from contamination of repointing or patching mortar can not be verified. However, it does not appear to represent original mortar, based on comparisons to stucco and plaster samples.

V. WALLPAPER ANALYSIS

Methodology

Wallpapers have survived in the William Johnson House on the walls and ceilings of the second floor rooms and staircase hall to the third floor. Areas where the most layers existed in a sandwich within a room were identified, and in one case the picture molding was removed, prior to removal of paper. The paper sandwich or single layer, depending on the condition, was methodically separated from the wall with a metal spatula. When possible, without causing damage, paper was removed by merely inserting the spatula between the oldest paper and wall surface. The more tenacious papers were removed by moistening and therefore softening their old glues with water from a spray bottle. A spatula was again employed for the separation process between the oldest paper and wall surface. Steam was not used to remove any paper since electrical power needed to boil water was not available on the site. The paper sandwiches were placed in acid-free folders and labelled. The folders were separated with acid-free tissue paper, placed in a box suitable for mailing, and sent to the CRC laboratory in Lowell, Massachusetts.

Once returned to the laboratory, each wallpaper sandwich was separated using the dry method, steam method, or immersed in a water bath. The method used was dependent upon how well the glue in the sandwich responded to it, while attempting to limit damage to the printed surfaces at the same time. Once the layers were all separated, each one was tested using the Barrow's Groundwood Paper Test in order to determine if the paper was produced using the mechanical wood pulp method. Then the Type "C" Stain Test was employed to solidify additional information about paper type. A microscopic examination of fibers provided confirmation of paper type and helped to identify the method of manufacture. The microscope was also employed to identify printing techniques. Paint exposure to dilute hydrochloric acid (HCl) identified the use of distemper paints in printing. Each wallpaper layer was then photographed using a 35mm camera mounted on a photo stand. (Due to severe problems with the film developer, the photographs are of very poor quality.) The layers were individually encapsulated using mylar film and double-face tape, and then labelled with the necessary data.

General Observations

The majority of wallpapers that were removed from the walls of the Johnson House were machine-made, chemical wood pulp papers that were machine printed in distemper paints. One definite exception was the earliest paper and border found in the stairway to the attic: it was rag paper with block printing. Fragments of what appears to be this same paper were found on the backside of

the earliest intact paper found in the second floor hall. Both of these papers were installed over a bright pink lime-based paint. Richard Nylander of the Society for the Preservation of New England Antiquities, an expert on historic wallpaper, was consulted about the pattern style of this paper. Based on the border, he feels that the paper and border date to no earlier than between ca. 1850-1860. It is believed that this paper is the earliest surviving wallpaper found in the structure, but it is post-original.

Second Floor Wallpapers

Hall

Two complete papers were found in the hall of the Johnson House. Fragments of paper (WP01) were found on the backside of the earliest paper. Originally the small pieces were thought to be part of a liner for the first extant paper. However, similarities of pattern impressions found on the remnants suggest that they may represent the same paper that was found on the walls of the stairway to the third floor, under the existing paper. If this is true, the paper dates to between ca. 1850-1860.

The first fully recognizable paper (over the fragments) is a Middle East pattern (WP02), colored in yellow, red, orange, olive, and bronzing powder. It has two borders, the first being a plain brown band, and the second being a textured paper, also in a Middle East pattern, in browns and greens. This paper dates to ca. 1880.

The third and top paper (WP03) has been over-painted. It is a very heavy, plain oatmeal-type paper with a simple border. The border is composed of simple lines that connect equally simple floral medallions. The only color originally on this paper or border was in the border, that of the green lines. The green may have been highlighted with bronzing powder, as traces of shimmery powder can be seen under the microscope. This is also the same paper that had been installed in the Northwest Room, under the existing wallpaper. The hall paper was painted off-white at some point in time, and the green printed border print has bled through the paint coat. This is a twentieth century paper.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP01
LOCATION: 2nd Fl., Hall, W. wall, Fragments found under first full layer (bottom layer).

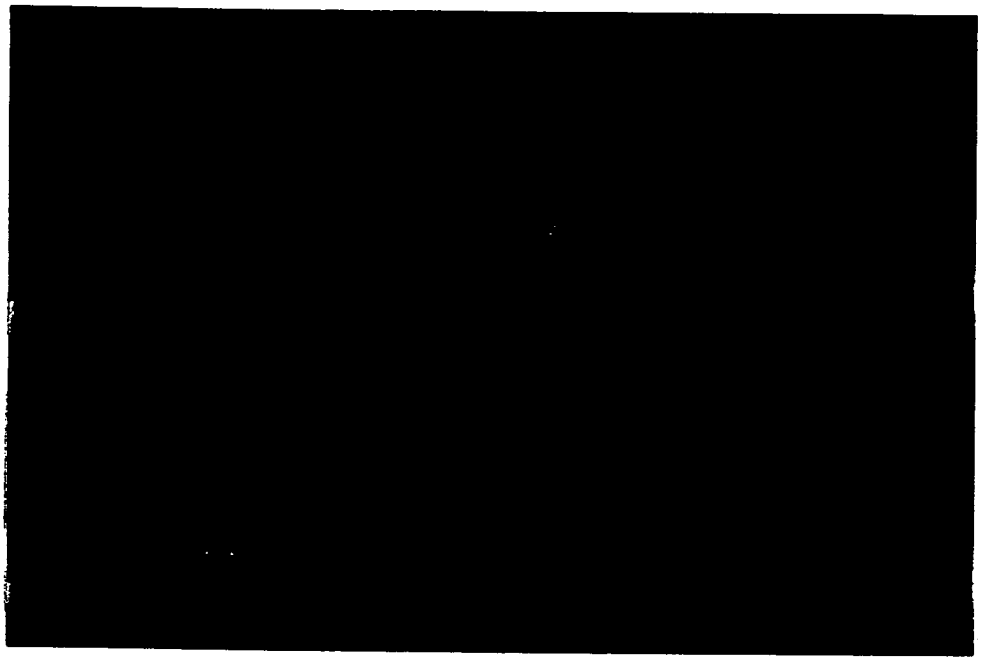
NO PHOTO

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Fragments; ca. 1850-1860	
PRINCIPAL COLORS:	White on off-white?	
PAINT TYPE:	Distemper	
PRINTING TECHNIQUE:	Block printed	
PAPER TYPE:	Rag	
PAPER MANUFACTURING METHOD:	Machine?	
PAPER TEXTURE:	Smooth	

Comments: Similarities of pattern impressions found on remnants of the fragments suggest that they may represent the same paper (WP17) that was found on the walls of the stairway to the third floor, under the existing paper.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP02
LOCATION: 2nd Fl., Hall, W. wall, second layer of three.

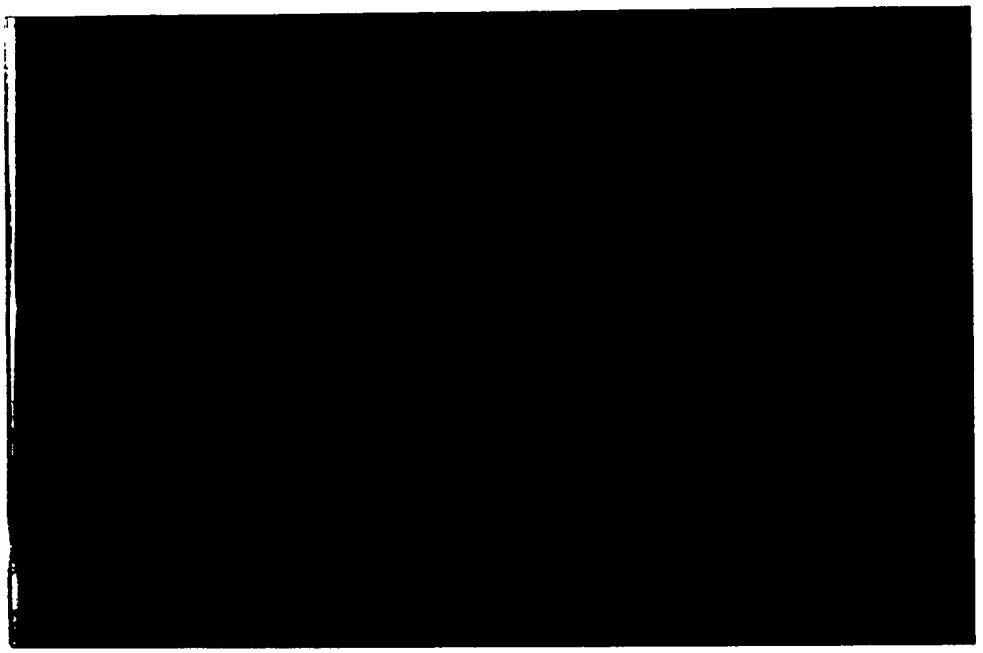


TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Middle Eastern ca. 1880-1890	1. Plain 2. Middle Eastern ca. 1880-1890
PRINCIPAL COLORS:	Yellow ground with red, olive, orange, bronzing powder	1. Brown 2. Olive, Brown
PAINT TYPE:	Distemper	1. Oil 2. Distemper
PRINTING TECHNIQUE:	Machine	1. Hand or machine? 2. Machine
PAPER TYPE:	Chem. Wood Pulp	Chem. Wood Pulp (both)
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made (both)
PAPER TEXTURE:	Smooth	1. Smooth 2. Textured Geom.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP03
LOCATION: 2nd Fl., Hall, W. Wall, top layer of three.



TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Plain; 20th C.	Arts & Crafts 20th C.
PRINCIPAL COLORS:	None	Green (bronze powder?) on plain ground
PAINT TYPE:	None originally	bronzing turned green?
PRINTING TECHNIQUE:	None	Machine
PAPER TYPE:	Chem. Wood Pulp	Chem. Wood Pulp
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made
PAPER TEXTURE:	Oatmeal	Oatmeal

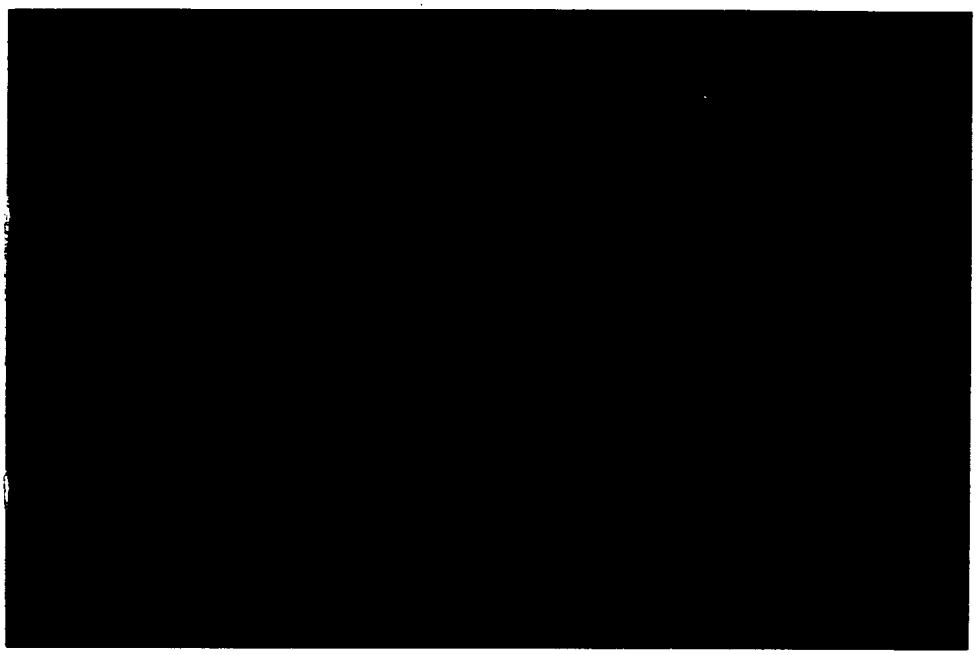
Comments: Paper has been painted over, green (bronzing powder?) bleeds through at border. Same as WP07 found in Northwest Room.

Southwest Room

Only one layer of wallpaper was found on the north wall of the southwest room. A twentieth century ivy print (P04) was found below the extant picture rail. The ivy is printed in light and dark greens, over an off-white ground. This paper dates to the twentieth century. A plain painted (P05) paper was found above the picture rail. It appears to be a handpainted ground, and printing is not obvious through the paint. This paper can be dated post-ca. 1880 based solely on its paper type, i.e. chemical wood pulp. However, since its color is very similar to the ground of the paper below it, it most likely is contemporary to the ivy-patterned paper.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP04
LOCATION: 2nd Fl., SW Room, N. wall, below picture rail, single layer.

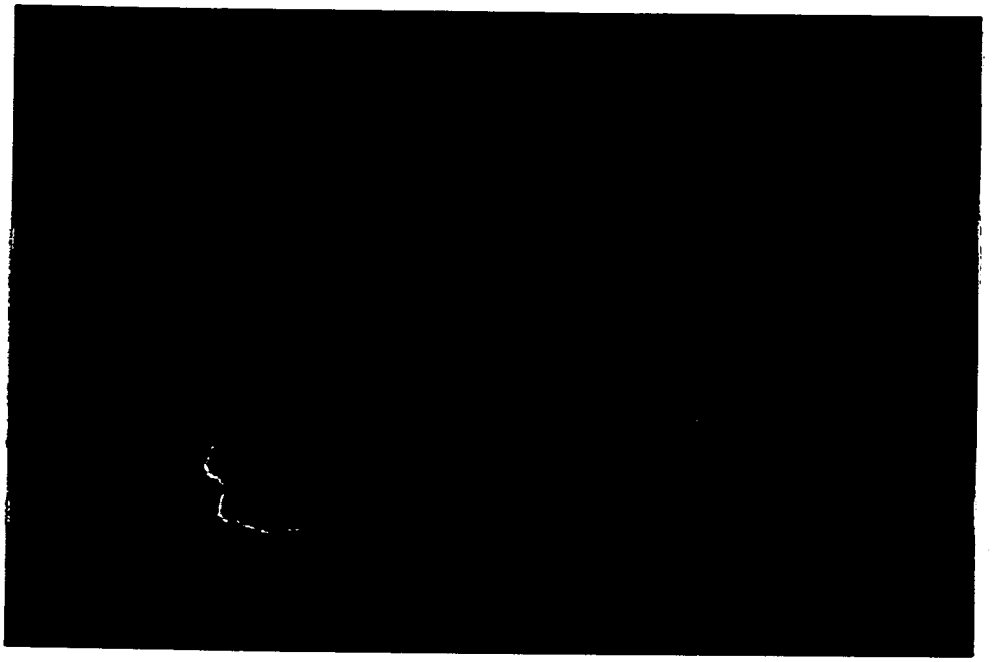


TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Ivy; 20th C.	None
PRINCIPAL COLORS:	Off-white ground, lt. and dk. green pattern	
PAINT TYPE:	Oil	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chem. Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP05
LOCATION: 2nd Fl., NW Room, N. wall, above picture rail, single layer.



PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Plain; 20th C.?	None
PRINCIPAL COLORS:	Off-white	
PAINT TYPE:	Distemper?	
PRINTING TECHNIQUE:	Hand-painted ground or machined printed?	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Northwest Room

Three papers were found adhered to the walls of the northwest room. The earliest layer (WP06) was found when the east wall picture rail was removed. This layer predated the other two layers removed from the west wall. Such a small piece does not reveal much of the pattern, but the paper tested slightly positive for mechanical wood pulp, which was a type of paper made after 1860. Since the chemical reaction was slight and not as aggressive as it normally is when mechanical wood pulp is present, a definitive paper type was not deduced. A second test for a more succinct answer was not conducted because the paper is either mechanical or chemical wood pulp, the latter of which is a later paper type. Since this study hopes to find evidence of fabric dating from 1841 to 1851, it was decided that further testing of this paper was not necessary.

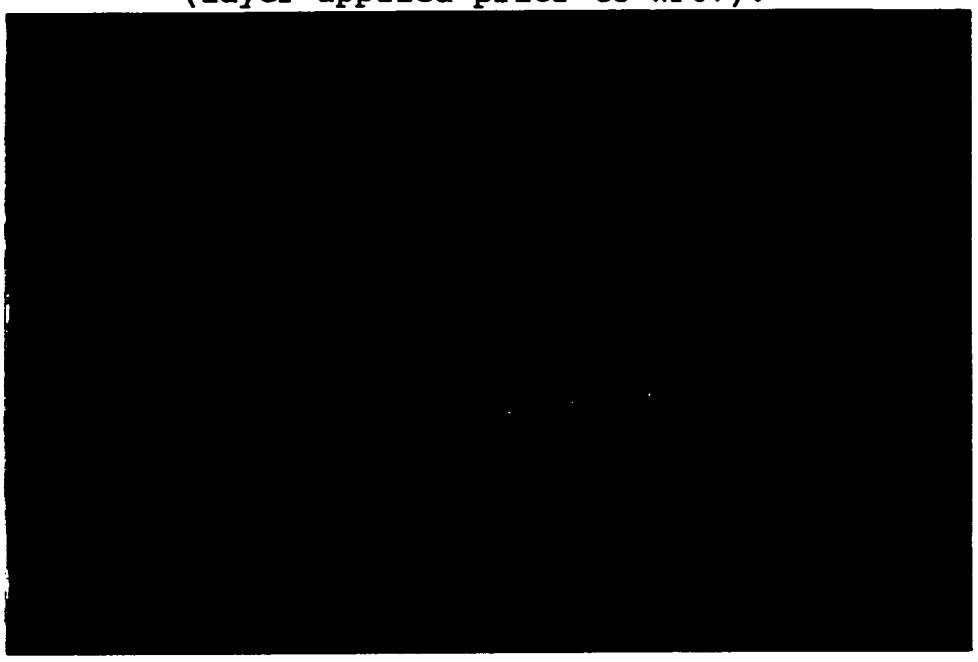
The bottom layer of paper removed from the west wall (WP07) is the same paper that was found as the top layer (WP03) in the hall, except this paper has not been over-painted. It is a plain oatmeal paper with a similar border, only the border has a simple Arts and Crafts style design at its lower edge. The design was printed in one color (green) and bronzing powder. The paper dates to the early part of the twentieth century.

The top layer from the west wall sample (WP08) represents an inexpensive paper. Its pattern is one of many similar foliated patterns that were produced during the 1930s, 1940s, and 1950s.

Samples WP09 through WP12 represent typical ceiling papers. While samples WP09 and WP10 are the same, and samples WP11 and WP12 are the same, they may represent either two or four installations. Based on other conditions found in the house, the former hypothesis seems more feasible.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP06
LOCATION: 2nd Fl., NW Room, E. Wall, found under picture rail (layer applied prior to WP07).



PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Foliated and curvilinear; post 1860	None found
PRINCIPAL COLORS:	White ground, off-white, light blue, light green, and bronzing powder	
PAINT TYPE:	Distemper	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Mechanical or Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Comments: Pattern is very similar to that of paper (WP16) found in closet or clothespress.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

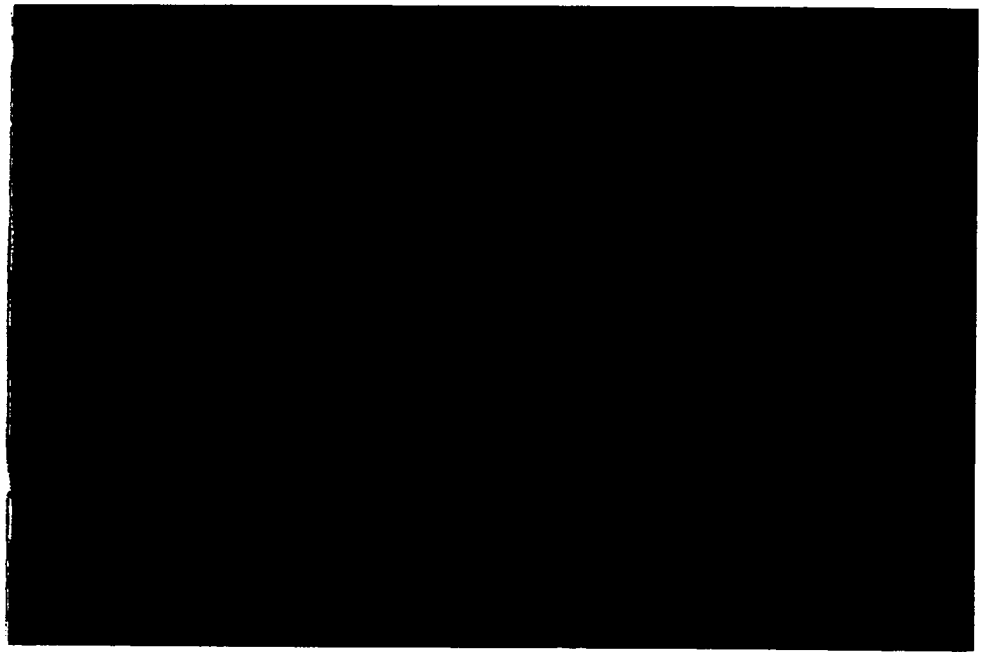
SAMPLE NUMBER: NATC WJ WP07
LOCATION: 2nd Fl., NW Room, W. wall, above fireplace, below picture rail, bottom layer of two.

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Plain; 20th C.	Arts & Crafts 20th C.
PRINCIPAL COLORS:	None	Green (bronze powder?) on plain ground
PAINT TYPE:	None	Bronzing powder turned green?
PRINTING TECHNIQUE:	None	Machine
PAPER TYPE:	Chem. Wood Pulp	Chem. Wood Pulp
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made
PAPER TEXTURE:	Oatmeal	Oatmeal

Comments: Same as painted-over paper (WP03) found in hall.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP08
LOCATION: 2nd Fl., NW Room, W. Wall, above fireplace, below picture rail, top layer of two.

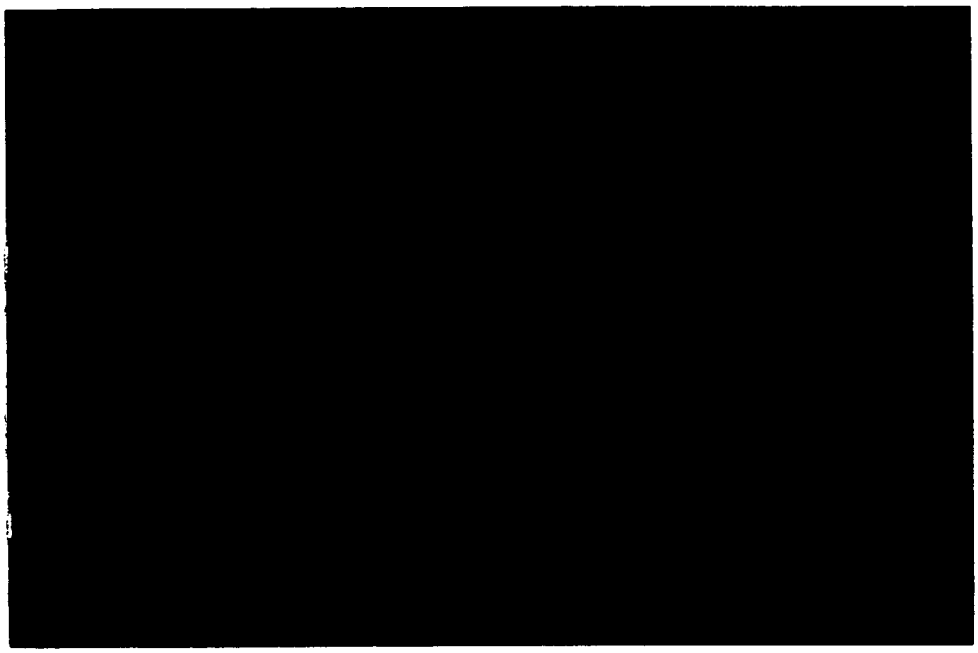


TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Foliated; 20th C.	None found
PRINCIPAL COLORS:	Ground: uncolored w/ white stripes & lt. gold/green squiggles printed in background.	- Foliation: Orange, red, brown, grn., lt. yel., black
PAINT TYPE:	Distemper	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chemical Wood pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP09 and WP10
LOCATION: 2nd Fl., NW Room, W. wall, above picture rail and ceiling, first and second layers respectively.

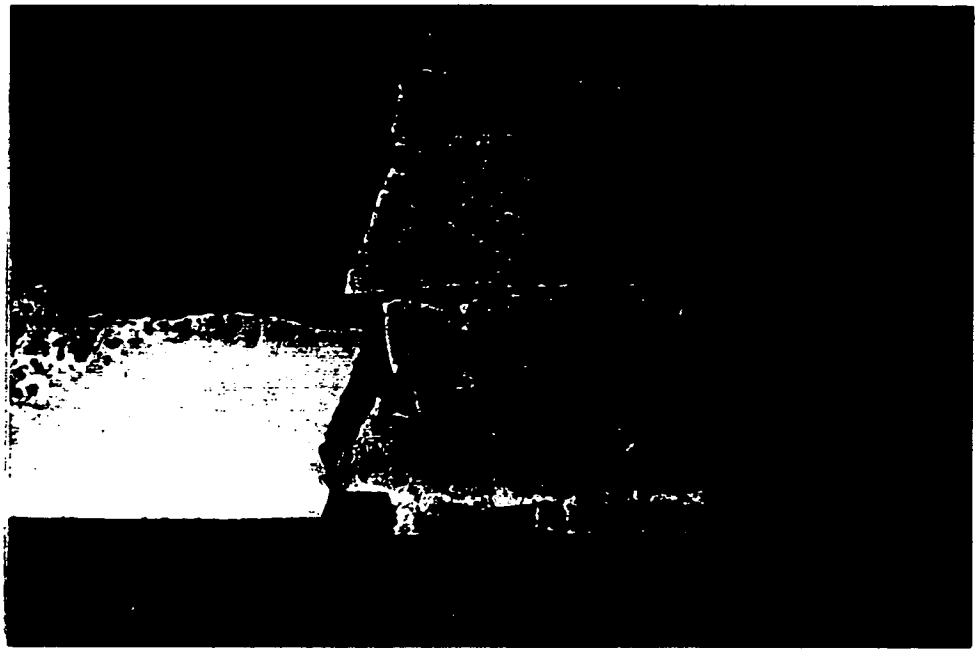


PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Freeform striations; post-1880	None
PRINCIPAL COLORS:	White on white ground	
PAINT TYPE:	Oil	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Comments: Papers WP09 and WP10 are the same paper, but represent two separate layers. (WP09 is adjacent to the ruler in the photo.)

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP11 and WP12
LOCATION: 2nd Fl., NW Room, W. wall, above picture rail and ceiling, third and fourth layers respectively.



PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Freeform curvilinear; post-1880	None
PRINCIPAL COLORS:	White on white	
PAINT TYPE:	Oil	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Comments: Papers WP11 and WP12 are the same paper but represent two separate layers. (WP12 is adjacent to the ruler in the photo.)

Northeast Room

The main body of wallpaper (WP13) found in this room is very faded, with little of a discernible pattern or recognizable colors remaining. The border and ceiling paper (WP14 and WP15) are in better condition. The border is printed in a stylized foliated pattern, while the ceiling paper is a typical white on white print. Although difficult to ascertain based on pattern, these papers probably date to the twentieth century.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP13
LOCATION: 2nd Fl., NE Room, W. wall, upper half, single layer.

TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Foliated; post-1880	Foliated; post-1880
PRINCIPAL COLORS:	Off-white? ground w/ green, gold, bronzing powder	White ground, w/ green, gold/tan, lt. blue, yellow, white
PAINT TYPE:	Oil?	Oil
PRINTING TECHNIQUE:	Machine	Machine
PAPER TYPE:	Chem. Wood Pulp	Chem. Wood Pulp
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made
PAPER TEXTURE:	Smooth	Smooth

Comments: This wallpaper is very faded and its image is difficult to identify.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

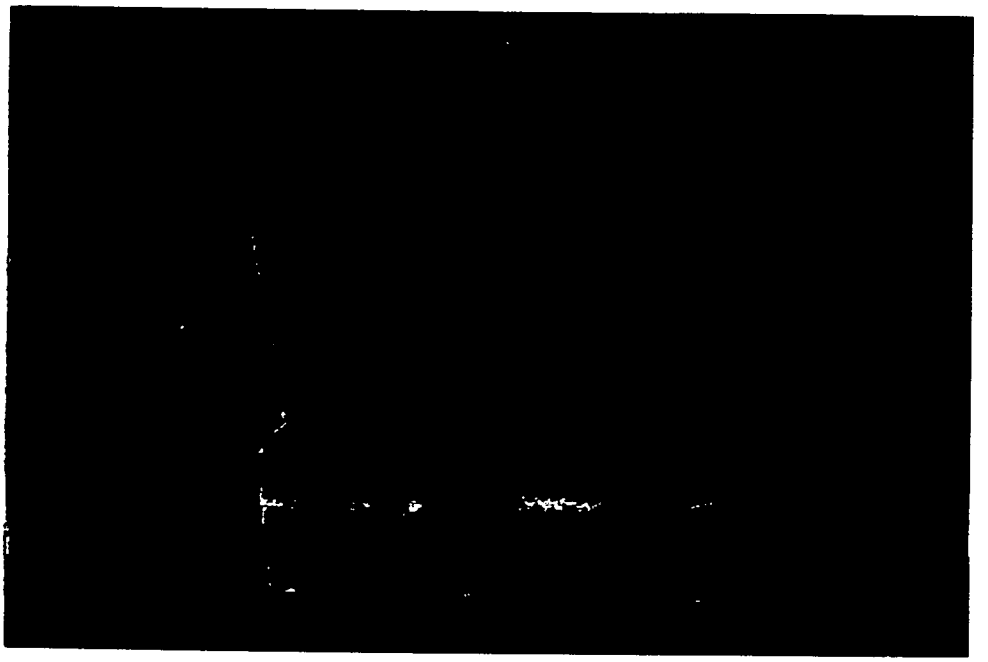
SAMPLE NUMBER: NATC WJ WP14
LOCATION: 2nd Fl., NE Room, W. wall, paper above border at picture rail height (no picture rail). Layer one of two.

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Freeform curvilinear; post-1880	None
PRINCIPAL COLORS:	White on white ground	
PAINT TYPE:	Oil	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Comments: This appears to be the same paper as WP15.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP15
LOCATION: 2nd Fl., NE Room, W. wall, above border at picture rail height (no picture rail). Second layer of two.



PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Freeform curvilinear; post-1880	None
PRINCIPAL COLORS:	White on white ground	
PAINT TYPE:	Oil	
PRINTING TECHNIQUE:	Machine	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

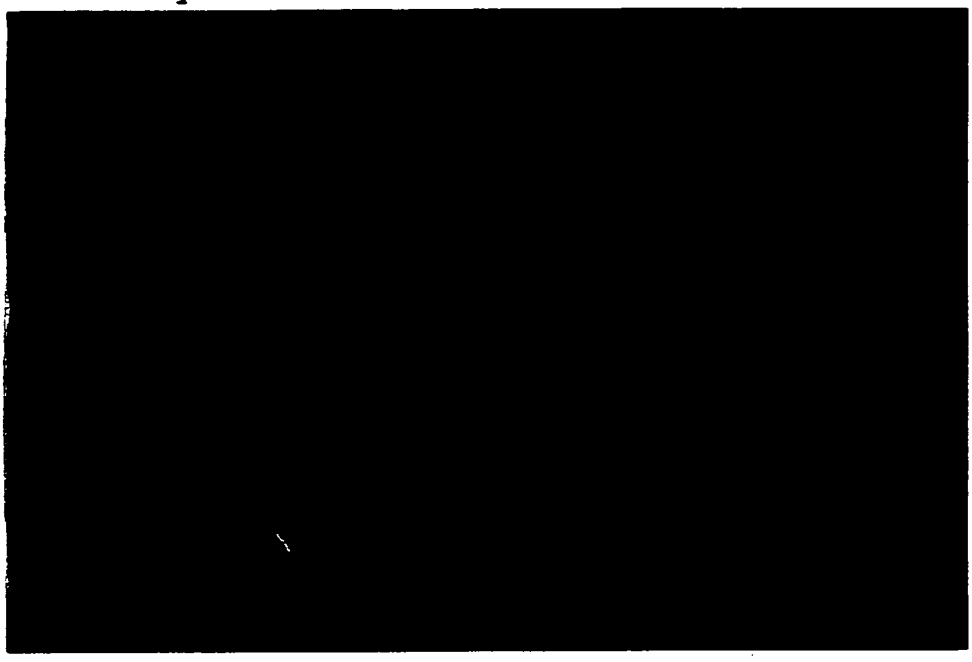
Comments: This appears to be the same paper as WP14.

Closet or Clothespress

Only remnants of a single layer of paper (WP16) are left within the closet. A sample was removed from the north wall. A coat of paint had been applied over the original pattern, and some of that pattern has bled through the paint, taking on a pattern of its own in colors of light and dark green. When the paper was viewed under a microscope and paint was scraped away with a wire probe, the green color appeared to contain bronzing powder. Other scrapings in areas where green had not bled through did not produce any other paint or original pattern. The pattern that is visible (in bleeding form) is very similar to but not the same as part of the pattern found on sample WP06.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP16
LOCATION: 2nd Fl., Closet or clothespress, N. wall, single layer



TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Stylized basketry; post-1880	None found
PRINCIPAL COLORS:	White ground w/ lt. and dk. green bleeding through	
PAINT TYPE:	Distemper? overpaint	
PRINTING TECHNIQUE:	?	
PAPER TYPE:	Chemical Wood Pulp	
PAPER MANUFACTURING METHOD:	Machine-made	
PAPER TEXTURE:	Smooth	

Comments: This paper is painted over with white paint and the green from the former pattern bled through. The green that bled is probably bronzing powder. This paper is similar to WP06 found in the Northwest Room. A manufacturer's name is printed on the seam: George M. Albert.

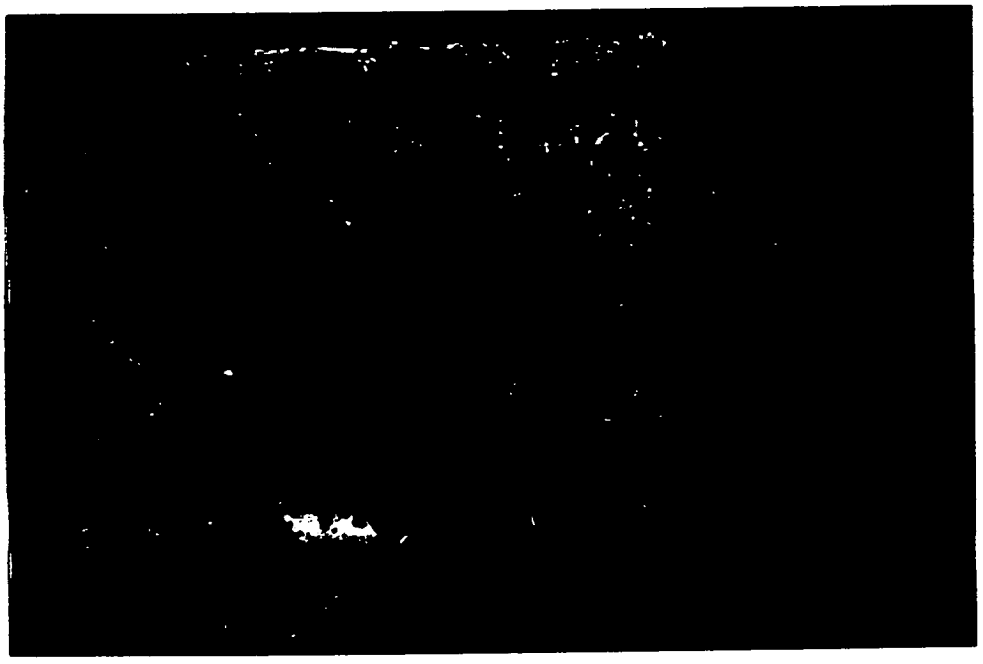
Stair to Third Floor

A paper sandwich consisting of two papers was found on the walls of the third floor stairway, pasted over a bright pink, lime-based paint. The paper is not in very good condition, most likely due to direct exposure from years of a leaking roof. However, the bottom paper (WP17) is the earliest wallpaper found in the house. The paper appears to represent an ashlar design, with a facsimile of an architectural molding used as the border. Extra strips may have been supplied with the paper, or the installers cut them from the rolls, in order to add or simulate more mortar joints on the background of the paper. In addition to being the oldest paper found, this paper is also the most interesting.

The top paper (WP18) is a standard, inexpensive paper that most likely dates to the twentieth century based on its pattern. The paper is a chemical wood pulp composition, dating it after 1880.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP17
LOCATION: Stair to 3rd Fl., SW corner and S. wall., first of two layers.

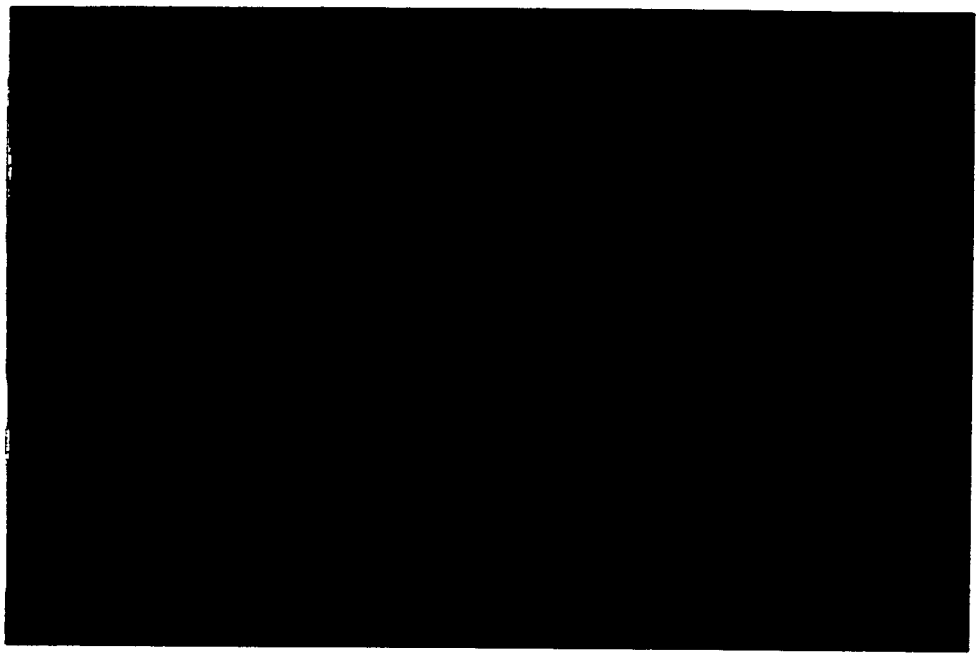


PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Building ashlar?; ca. 1850-1860	Architectural molding; ca. 1850-1860
PRINCIPAL COLORS:	Gray and/or green ground w/ added off-white strips w/ white and gold edging	Yellow, brown, gold/tan, dk. brown
PAINT TYPE:	Distemper	Distemper
PRINTING TECHNIQUE:	Block	Block
PAPER TYPE:	Rag	Rag
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made
PAPER TEXTURE:	Smooth	Smooth

Comments: This is the oldest paper found in the Johnson House.

NATCHEZ NATIONAL HISTORICAL PARK
WILLIAM ROBERT JOHNSON HOUSE
NATCHEZ, MISSISSIPPI

SAMPLE NUMBER: NATC WJ WP18
LOCATION: Stair to 3rd Fl., SW corner and S. wall, second (top) layer of two.



TOP

PHYSICAL CHARACTERISTICS	WALLPAPER	BORDER
PATTERN AND DATE:	Foliated; 20th C.	Classic curvilinear; 20th C.
PRINCIPAL COLORS:	Off-white ground w/ lt. cream	Off-white ground w/ lt. cream
PAINT TYPE:	Distemper	Distemper
PRINTING TECHNIQUE:	Machine	Machine
PAPER TYPE:	Chem. Wood Pulp	Chem. Wood Pulp
PAPER MANUFACTURING METHOD:	Machine-made	Machine-made
PAPER TEXTURE:	Smooth	Smooth

VI. MOLDING PROFILE ANALYSIS

Methodology

Four molding types were measured and recorded for this study, including window sash muntins, window and doorway architraves, door panels, and baseboards. Molding profiles in the William Robert Johnson House were measured using a commercial profile gauge. The outline of each profile was then recorded onto tracing vellum with a mechanical pencil in order to transfer the most accurate outline of the profile to paper. Typically, a minimal amount of paint has been deposited on the woodwork in the Johnson House, considering the house had been occupied for approximately 135 years. Therefore, the woodwork currently reflects conditions close to the original profiles of the respective elements, except where it has been gouged or nicked. A concerted effort was made to measure profiles where gouges or nicks were not present.

Comparison of like profiles suggests the same installation date. Slight differences in profiles may mean the blades of the molding cutters splayed or dulled, or more likely, a different blade was used, suggesting a different installation date. This study represents a more detailed molding profile investigation than presented in the 1979 Historic Structure Report by BCT.

Analysis

Window Sash Muntins

All of the structure's extant window sash muntin profiles were measured and recorded, except two sash found in the third floor dormer windows: they were so worn, no profiles could be taken. Based on records kept by Johnson, a total of twelve single masonry arches were built during the original construction of the house. These can be traced to three window openings on the north facade (second floor), three window openings on the west facade (second and third floors), and on the south facade, three window openings on the first floor level and two window openings and one doorway on the second floor level. Due to alterations, window openings were added, or in one case, changed to a doorway. Muntin profiles should echo the story of this evolution.

Four different types of muntin profiles were observed. The most prevalent type, noted as Type "A", was composed of a simple ovolo with a fillet. Three different variations of the Type "A" profile, noted by different sizes or shapes of individual details, were found in the Johnson House. The most common variation is believed to represent the original window sash, and was found in the first floor openings on the south wall; the second floor openings in the southwest room, south wall (upper sash only); the northwest room, north wall, west opening; the northeast room, north

wall; the southeast room, south wall (lower sash is installed backwards); and the third floor opening on the west wall (lower sash only).

The second variation was found in the lower sash of the second floor's southwest room's south wall opening, and its origin or date of installation is unknown. Its ovolo is slightly more elongated than the original sash's muntin, and its fillet is shorter and slightly narrower.

The third variation represents a so-called reproduction, installed in the center window of the second floor on the north facade during the 1980's restoration. Its ovolo is more elongated than the original's, and its fillet is much broader.

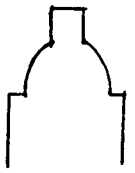
The Type "B" muntin profile may represent original fabric, installed as an afterthought during construction. The documentation supports the idea that the third floor dormers were added during construction, but not part of the original plan. On October 9, 1840, Johnson recorded in his papers that he had "Partly made a bargain with Geo. Weldon to install dormer windows." Construction had been underway for some time, and the shell of the house was completed shortly thereafter, by November of the same year. Bills from the carpenters Tucker and Weldon, respectively, indicate separate entries for dormer work. Tucker's March 24, 1841, bill charges Johnson for, "puting up studing & Finishing around Dormer windows - $8.00" and "puting in framing timbers in 2 wind ows. & Making 2 window Frames - $8.00." While Tucker's second entry is less specific, the first clearly refers to the dormers. Weldon's bill of March 11, 1841, shows he charged Johnson $75.00 for two dormer windows. These may be the sash represented by the different, or Type "B", muntin profile. Physical evidence substantiates that the dormers were installed with different materials from the majority of the remainder of the third floor room. The plaster lath in 98% of the room is circular sawn, while that found in the two closed-in window openings on the east wall is split, and the lath found within the dormers' framing is mixed among several different manufactured types.

Type "C" muntins were found in the first floor window openings on the west wall, probably installed ca. 1844. Johnson's diary entry of November 28, 1844, states that the "Glass Frames" were moved from his brick store to the "House in State St." While the exact date of installation is unknown, paint evidence seems to support the 1844 installation date. (The window architrave profiles are also different from the original architraves.)

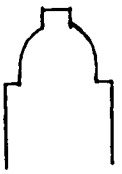
The sash represented by Type "D" muntins are found in the west window opening of the northwest room on the second floor. Since it is believed that this opening was original, the original sash was probably replaced with the existing sash. The date of this replacement is unknown.

SASH MUNTINS (all sash contain six-over-six lights)

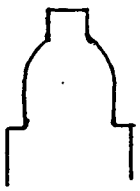
TYPE "A"



1st Fl. S. Wall Windows
2nd Fl. SW Room, S. Wall Window, upper sash only
NW Room, N. Wall, W. Window Opening
NE Room, N. Wall Window
SE Room, S. Wall Window (lower sash installed backwards)
3rd Fl. W. Wall Window, lower sash only (upper sash on floor is very worn and may be different)
DATE: 1840-41 (original construction)



2nd Fl. SW Room, S. Wall Window, lower sash only
DATE: Unknown

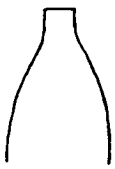


2nd Fl. NW Room, N. Wall Window, E. Opening
DATE: 1980's reproduction

NOTE: Sash removed from W. Wall Window in SW Room.

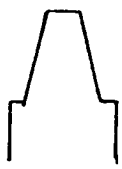
SASH MUNTINS (cont.)

TYPE "B"



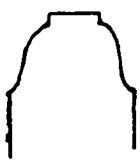
3rd Fl. N. Wall Dormers, E. Opening, upper sash only (lower sash different and too worn to record); W. Opening, lower sash only (upper sash too small for opening and too worn to record)
DATE: 1840-41 (afterthought to original construction?)

TYPE "C"



1st Fl. W. Wall Windows
DATE: ca. 1844

TYPE "D"



2nd Fl. NW Room, W. Wall Window
DATE: Unknown

Window and Door Architraves

Only three major types of architrave moldings were found in the Johnson house. The most prevalent group, Type "A", included those beginning with a fillet, followed by a quirked cyma reversa, and ending with a fillet. Within the Type "A" grouping, five different variations were found. It seems that three of these variations were used in the original construction, one representing the original window openings on the first and second floors, one representing the original doorways on the second floor (except for the two doorways in the clothespress), and one representing the original window opening in the west wall of the third floor. In all cases, the quirked cyma reversa is the same is shape and size, but the length of the end fillet varies slightly. Was the same molding plane used on all of these moldings, with the end splaying out the longer it was used, or were three different but similar planes used? Perhaps finding the answer to this question is less important than concluding that all of these moldings were installed at the same time.

The fourth variation displays an overall more broad profile, an initial fillet that is much wider than the original three, a deeper quirked cyma reversa, and a larger and more angled end fillet. This molding apparently was installed ca. 1844 when Johnson had two additional windows installed at the first floor level on the west facade.

The last variation represents a reproduction molding that was installed during the 1980's construction phase. While it is similar to the original moldings, the convex part of its cyma reversa has been flattened and broadened. This molding was found around the three north doorways on the first floor, and around the eastern window on the north wall of the northwest room on the second floor. All of these openings were restored to their original appearances ca. 1980's.

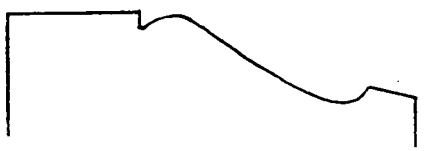
Type "B" molding was found in only one location: around the south door on the first floor. This fillet with a quirked grecian ovolo was installed ca. 1842, when Johnson probably converted the center window (south facade) on the first floor, to a doorway.

The most plain moldings are found in the closet under the stair to the third floor, referred to as the clothespress in the Johnson documents. A plain board (Type "C") frames the doorways on the interior of the closet, which dates to the original construction.

WINDOW AND DOOR ARCHITRAVES

TYPE "A"

1st Fl. S. Wall Windows
2nd Fl. All Windows, except NW Room, N. Wall, E. Opening
DATE: 1840-41 (original construction)

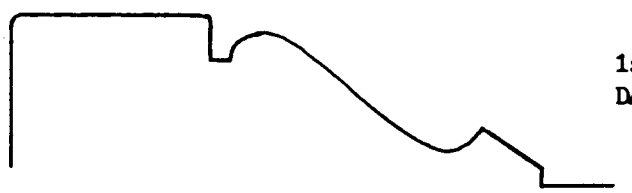


2nd Fl. All Doorways, except two inside clothes-press
DATE: 1840-41 (original construction)

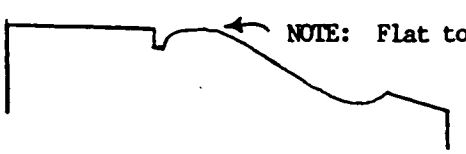
NOTE: Very similar to above, except shorter end fillet

3rd Fl. W. Wall Window
DATE: 1840-41 (original construction)

NOTE: Very similar to both of above, except longer end fillet



1st Fl. W. Wall Windows
DATE: ca. 1844

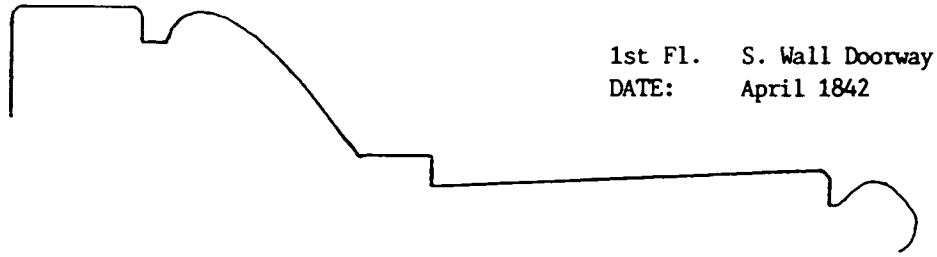


NOTE: Flat top is accurate reading

1st Fl. N. Wall Doorways
2nd Fl. NW Room, N. Wall, E. Opening
DATE: ca. 1980's reproduction

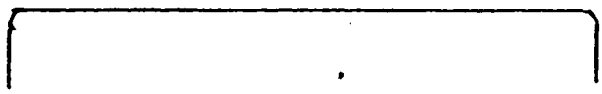
WINDOW AND DOOR ARCHITRAVES (cont.)

TYPE "B"



1st Fl. S. Wall Doorway
DATE: April 1842

TYPE "C"



2nd Fl. Both Doorways in Clothespress
DATE: 1840-41 (original construction)

NOTE: All first floor interior and partitions and doorways had been removed by date of investigation, 3/93.

Door Panels

The interior doors on only the second floor were measured for molding profiles, since all of the post-original partitions on the first floor had been removed. In addition, the first floor south or rear door panels were measured. The panels of the three reproduced doors in the north facade, first floor were not measured.

All of the second floor doors, except the one between the hall and the northwest room and the one between the northwest and southwest rooms, have a recessed trimmed panel on one side, and a flat panel, only slightly depressed, on the other side. The molding of these panels is represented by Type "A" door panel profile. The other two doors on the second floor have recessed panels with Type "A" moldings on one side, and a slightly different but similar molding profile on the other side where raised panels occur, represented by Type "B" profile. Both types of doors appear to represent the original installation period.

The exterior south door on the first floor has only a flat panel, and is classified as Type "C" for this study. Documentation suggests that this door was installed in April of 1842.

DOOR PANELS

TYPE "A" - RECESSED PANELLED DOOR ONE SIDE ONLY, OTHER SIDE HAS FLAT PANEL

2nd Fl. All Doors, except one between Hall and NW Room, and one between NW Room and SW Room
DATE: 1840-41 (original construction)

TYPE "B" - RAISED PANEL DOOR ON ONE SIDE ONLY, OTHER SIDE SAME AS ABOVE

2nd Fl. Door between Hall and NW Room, and Door between NW Room and SW Room
DATE: 1840-41 (original construction)

TYPE "C" - FLAT PANEL, NO TRIM

1st Fl. S. Wall Door
DATE: April 1842

Baseboards

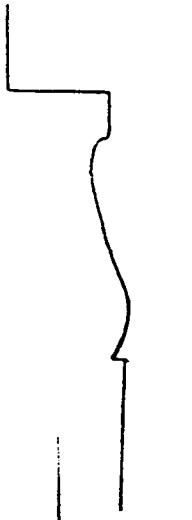
A complete profile study of baseboards was not undertaken due to a presumed understanding of partition installations, for which baseboards would provide evidence. Baseboard profiles were taken on the second floor, in the northwest room, where the east wall baseboard is not mitered into the north wall baseboard, a condition which is typical at all other original intersecting walls. At first glance, the west wall baseboard (Type "A") is different than the baseboard found on the north and east walls (Type "B"). The fact that the north and east walls reflect the same baseboard profile suggests that they were installed at the same time (paint analysis verifies this), and that perhaps Johnson made a change in his floor plan during construction, making two smaller rooms instead of one large room in the north half of the house. Then why would the west baseboard profile be different from the other two? Upon closer examination, they may not be different, but in fact the carpenter may have held the molding plane at a different angle. Therefore the profile appears to be the same, but with a different slant.

Plain boards without trim were found surrounding the third floor open space at the baseboard level, as well as within the clothespress. These are both believed to be original. No baseboard profiles were measured at the first floor level because the baseboards are no longer attached to the walls.

BASEBOARDS

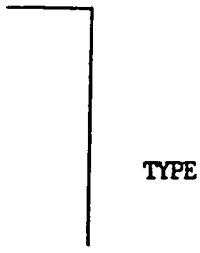
TYPE "A"

2nd Fl. NW Room, W. Wall
DATE: 1840-41 (original construction)



TYPE "B"

2nd Fl. NW Room, N. and E. Walls
DATE: 1840-41 (original construction)



TYPE "C"

3rd Fl. Whole Room
DATE: 1840-41 (original construction)

VII. NAIL ANALYSIS

Several nails were extracted from fabric that was assumed to be original to the structure. All cut nails had the same characteristics and all but three were returned to their locations after examination. The three that were saved were removed from third floor fabric: one from the ceiling lath; one from the east wall of the east dormer; and one from the east wall, former window opening that is covered over with lath. The use of the same type of nails throughout the third floor (and the second floor) proves that, although different lath types were found in the dormer and covered window areas in the east wall, they were installed at the same time or within a short time span. These nails date to between ca. 1840-1850, with sheared, square tips, and grasp marks from the heading process impressed on the top third of the nail shaft. The square tips denote a change in the rolled-iron industry (and therefore the cut-nail industry) that occurred in the late 1830s.

This comparison of nail characteristics to dates of manufacture is based on eastern American nail production. Its incredible target to the date of original construction of the Johnson House proves that the Mississippi River allowed this small town, in what was then the western civilized territory (by contemporary standards), direct access to the newest available products.

One large screw was found loose on the second floor, possibly from an original door hinge. It dates to the generation of screws that immediately preceded the gimlet point or modern screw, which was patented in 1846.

VIII. CONCLUSIONS AND RECOMMENDATIONS

No physical evidence was uncovered during this study that refutes any major understanding to date of the evolution of the William Robert Johnson House. In general terms, the structure retains its basic original form; the front and rear facades of the structure were probably exposed brick (although this deduction concerns an investigation beyond the scope of this study), and the west facade was probably stuccoed; the first floor was one large room, with the extant window and door openings by 1844; the second floor was subdivided when it was constructed in the same plan that exists today; and the third floor was also probably one large room with the same extant openings, including the dormers.

The purpose of this study was to ferret out finishes dating to between ca. 1841 and 1851, relative to the Johnson House. Based on the information presented in this report, certain specific recommendations can be made for restoration finishes. They are as follows:

Exterior

1. All wood trim should be repaired and painted in a good oil-base paint to match Munsell 10R 9/1 (off-white).

2. Any repointing should utilize sands that match those derived from samples M01, M12 through M15, M20 and M21. Although original mortar was not found during this investigation, it most likely was similar to the original stucco. This recommendation is based solely on this assumption. The original mortar would have been a lime mortar. Therefore if portland cement is used during restoration, it should be a relatively soft mix, probably similar in color to the original stucco.

2. The west wall should be restuccoed using sands that match samples M01, M12 through M15, M20 and M21. The original stucco was lime-based and was probably a two-part system. This should be duplicated during the restoration. If portland cement is used for the stucco mix, it should be a relatively soft mix. Every attempt should be made to match the color of the original stucco, some of which still remains on the structure. It is acceptable to use a masonry colorant if necessary. The issue as to whether the stucco should be scored needs more investigation. Now that the number of stucco installations have been identified, it should be easier to identify the original intallation by peeling back post-original layers.

Interior

First Floor

1. All plaster should be reinstalled, repaired, and patched. The

sands should match those used in samples M04, M05, and M07 through M11. Animal hair (pig, horse, etc.) should be added to the plaster mix.

2. Paint and/or molding profile analysis supports the archival documentation that the first floor south doorway was installed ca. 1842, and that the two west window openings were installed ca. 1844. Therefore all of the extant openings should remain and be repaired. Window sash should find its rightful home, as directed in the muntin section of the Molding Profile Analysis (Type "A" for south wall windows, Type "C" for west wall windows). If the baseboards are currently in storage, they should be reinstalled.

3. All interior wood trim, except the mantel, should be painted in oil-base paint to match Munsell N 9.0/ (white). The mantel should be painted black to match Munsell N 0.5/. This latter finish originally had a high gloss. Although first floor baseboards were not sampled for paint analysis, they should be painted to match the remainder of the trim, which follows the same pattern that occurred on the upper floors.

4. The plaster walls were originally bare or papered. Since no dirt lines were evident next to the substrate in the room's plaster samples, the room may have been papered. If a study of commercial buildings in Natchez ca. 1840, has been written, it should be reviewed in order to confirm that wallpaper was a standard finish in commercial spaces. Since no wallpaper samples were found that might provide a pattern on which to base a reproduction paper, a commercially-available reproduction paper appropriate to the period should be selected. (Reference Catherine Lynn's Wallpaper in America and Richard Nylander's Wallpapers for Historic Buildings.)

Second Floor

1. All plaster should be repaired, and patched. The sands should match those used in samples M04, M05, and M07 through M11. Animal hair (pig, horse, etc.) should be added to the plaster mix.

2. All picture rails should be removed. The drapery rod holders in the northwest room should also be removed. Based on paint analysis, a picture rail may have been original to the hall (none exists there now. All wood trim should be repaired as necessary. Window sash should find its rightful home, as directed in the muntin section of the Molding Profile Analysis (Type "A" for all openings).

3. All baseboards, window and door trim, window sash, the mantel in the northwest room, and doors except the three installed in the doorways of the northwest room should be painted cream to match Munsell 10YR 9/2. The mantel in the southwest room should be painted a glossy black to match Munsell N 0.5/. The three doors

in the northwest room were grained during the decade to which the house is to be restored. That graining still exists under modern paint. A decision should be made whether the graining will be exposed by chipping off later paint and damaged areas will be patched; or that the graining will be replicated on the same doors, by applying a base coat of cream-colored paint (Munsell 10YR 9/2) and reproducing the same graining style. Each method has its drawbacks. The first method can cause damage to the graining finish, and graining finishes can be difficult to spot patch. The second method covers over the historic finish that is still intact, and reproduces something new, even though the earlier finish is preserved under the new one.

4. Since no original wallpaper was found, reproduction wallpaper dating from ca. 1840 to ca. 1850 could be selected to hang on the walls of certain rooms on the second floor. Not all rooms should be wallpapered because they were not originally papered. Areas targeted for paper and paint are listed below:

Hall -	Walls:	Pink Calcimine (pigmented) to match Munsell 2.5R 7/8
	Ceiling:	Calcimine (unpigmented)
Southwest Room -	Walls:	Either leave finished plaster bare or coat with calcimine (unpigmented)
	Ceiling:	Calcimine (unpigmented)
	Plaster Firebox Surround:	Unfinished
Northwest Room -	Walls:	Paper
	Ceiling:	Paper
Northeast Room -	Walls:	Paper
	Ceiling:	Calcimine (unpigmented)
Clothespress -	Walls:	Finished plaster
	Ceiling:	Finished plaster
Southeast Room -	Walls:	Calcimine (unpigmented)
	Ceiling:	Calcimine (unpigmented)

Stair to Third Floor

1. The wood trim stair risers, treads, and baseboard stringers should be painted cream to match Munsell 10YR 9/2. Then the wood elements should be varnished.

2. The walls should be painted in the same pink calcimine used on the walls of the hall. This paint should match Munsell 2.5R 7/8.

Third Floor

1. The balustrade and rail at the top of the stair to this level retain their original finish, but they are so dirty that the finish is very degraded. They were originally finished in the same manner as the adjacent stair's woodwork, with a cream-colored base paint covered with a varnish layer. Since varnishes darken with age, the balustrade and rail should be repainted and revarnished, rather than attempting to clean them.

2. Window sash should find its rightful home and those that are not historic should be removed, as directed in the muntin section of the Molding Profile Analysis (Type "A" for west wall opening and Type "B" for the dormer openings). Reproduction sash should be manufactured as necessary. All woodwork should be repaired where necessary.

3. All plaster should be replaced, repaired, and patched as needed. The sands should match those used in samples M04, M05, and M07 through M11. The attic or third floor plaster samples appear to contain hair other than animal hair. Johnson sold human hair to plasterers, which is recorded in his diary. In lieu of human hair, animal hair (pig, horse, etc.) should be added to the plaster mix.

4. All wood trim, except that which is associated with the stair, should be painted cream to match Munsell 10YR 9/2.

5. There is no evidence of wallpaper in this room. In fact, when the plaster samples from this room were examined under the microscope, no calcimine layers were present on the ceiling sample, and only one layer was found on the wall samples. Therefore the walls should be calcimined (unpigmented), and the ceiling should remain as finished plaster.

General Recommendations

The extant wallpaper in the stair to the third floor should be saved. The remaining paper was left on the wall during the site investigation in order to keep the evidence in its original location, until the renovation occurred. Now that the restoration will progress, and this paper is the only historic wallpaper of any significance in the structure, it should be systematically removed from the walls, separated if desired, but most importantly, stored in acid-free tissue paper and/or folders. The backside of the remaining hall paper should also be examined for fragments of the earliest paper as it is stripped from the walls.

Munsell color swatches are presented on the following page.

Munsell Color Notations

10R 9/1

N 9.0/

N 0.5/

10YR 9/2

2.5R 7/8