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BUILDING MATERIAL ANALYSIS OF THREE FAIRMOUNT PARK HOUSES

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A THESIS

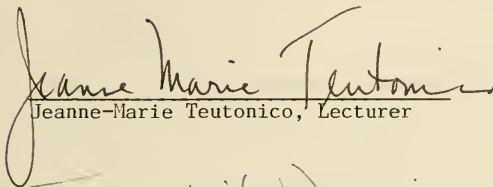
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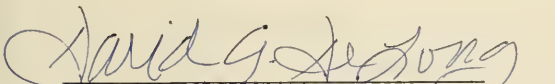

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Introduction

A building's structural evolution is often difficult to document through written and visual materials alone. Analysis of the building material itself can give a clearer understanding of the building's original physical composition and subsequent alterations. It is for this reason that this thesis will focus on the physical and chemical analysis of building materials. For each building selected in this study a short historical background and present physical and structural review will be given. This will be followed by the results of the paint and mortar analysis.

The Fairmount Park Commission has been kind enough to allow three of their buildings to be used in this study. The houses are: 1) Rockland in East Fairmount Park on Mount Pleasant Drive, 2) The Monastery in Wissahickon Park on Kitchen's Lane and 3) 206 Lincoln Drive in Rittenhouse Town on Lincoln Drive. (see Appendix #1). These three buildings were chosen for different reasons. 206 Lincoln Drive may soon undergo restoration if fundraising by The Friends of Historic Rittenhouse Town proves successful. Rockland is rented by the American Rowing Society. The society is planning to renovate the building, and at the present time is repainting the interior. Other renovations are planned for the interior and exterior of the building. Mortar and paint analysis are important for this renovation work. The Monastery was

chosen for two reasons. The first and foremost was that the researcher at the commencement of this study lived at the site, and this allowed an in-depth study of the building's materials as well as its deterioration processes. The second is that this building is presently undergoing renovation; an attempt is being made to document past paint and plaster surfaces in the building before they are removed because of their deteriorated condition.

Review of Sampling Technique and Analysis Procedure.

In each of the buildings, paint, plaster and mortar samples were obtained. Each sample was chosen for what it would reveal about its materials composition and also what it may reveal about the building's structural evolution. A change in paint layers from one wall to another in a room may indicate a past alteration to that room. Differences in mortar composition may indicate an addition, alteration or a repair to a building. So the aim of material analysis is two fold. The first is to better understand the materials used in past building traditions; the second is to compile information on the building's structural evolution.

All sample sites were recorded on floor plans (See Appendix #2). The samples were placed in small plastic bags and given code numbers. Masonry and wood samples were not taken because their removal was deemed to be too destructive to the buildings.

Procedure for Paint Analysis

Paint analysis is a time-consuming and difficult task; much care needs to be taken at all times. The process of identifying the media and pigment of a single paint layer in one paint sample can take up to one hour. A single paint chip can contain up to thirty layers of paint. With sixty-two samples to analyze it became clear that an in-depth analysis of each individual layer of

paint contained in every paint sample would be impossible. To reduce the amount of time spent on each sample only the first one to three layers of paint were studied in depth. The media, pigment and paint colors were matched. Because a Munsell chart was not available the colors were matched to a Philadelphia paint company's colors. Many of the white samples were not matched; most had a linseed media and had yellowed. The various samples of white were not exposed to U.V. light in order to bring back their truest shade.

Paint samples were extracted with an "Exacto" Knife from each building by cutting into the substrate. In most cases the paint was too brittle to obtain a one inch square sample without the paint flaking off the substrate. Since the one-inch square sample was found to be impossible, smaller samples were taken with more success. Where it was possible, paint samples were taken from the walls and woodwork. Not all rooms in each building were done. Once the paint samples were coded and brought to the laboratory the paint samples were set into small ice trays using small balls of clay to keep them upright, while a polyester casting resin was poured to encase half of the sample. Once the polyester resin had hardened, the samples were removed, tagged and examined. Two microscopes were used. The first was a stereoscopic microscope with a magnification from 10X to 30X. It is with this microscope that most of the work was done. The

second microscope was a stage microscope with a magnification from 10X to 100X, and was used to examine pigments and crystal formation. A polarizing microscope was not available.

The procedure for paint analysis begins with the recording of the paint layers in the paint chip. The color names given in this step are arbitrary and do not reflect a color match. It is suggested in some paint analysis procedures that the paint chip be sanded flat before recording the number and color of paint layers. In the experience of the experimenter this procedure did not always yield the most information. If the sample contains an oil-based media it will take on a shine that refracts light and blurs the divisions between the layers. Sanding also removes the natural fracture between layers found in an unsanded sample. It was necessary to experiment. In some cases the layers were easier to determine before sanding; occasionally they more difficult to discern.

Once all layers have been recorded, one half of the sample was tested for the presence of lead, using a .1 molar solution of sodium sulfide. If the paint layer contains lead, the solution will turn black. It is important to treat only one half of the sample; if several consecutive layers react the lines between layers are obscured and distinguishing the layers becomes difficult. The unrelated sections are needed as a reference. After this the sample is then subjected to UV light. Any white layer of paint that did not react with the sodium sulfide

and fluoresces yellow-green may contain zinc oxide. This pigment was not used in the United states until after 1840. The presence of zinc oxide in a paint layer, therefore, indicates that it was applied to the structure after 1840.¹

These two tests were performed on all samples and always completed first because these tests would not destroy the paint sample. The other tests for media could destroy a sample, so they were done last. The next step was to remove the first three layers from the paint chip. This was done under the stereoscopic microscope with a razor blade. The paint layer was lightly scraped to expose a fresh surface and the color was matched. It should be noted that for accurate color matching a larger sample should be examined under natural light. Next the paint layer surface was again scraped and the fragments placed on a glass slide and treated with reagents to determine the pigment and media of each layer. Finally the media of all the layers were determined. Four solvents were applied in this order: Water to test for water based paints, dichloromethane to test for latex-based paints, dimethylformaldehyde for oil-based paints and hydrochloric acid for lime or calcimine paints. This order was used because each test is progressively more destructive to the sample. Water will only dissolve water-based paints and has no effect on the other paints. Dichloromethane dissolves latex paints and slightly

softens oil-based paint, but has no effect on calcimine paints. Dimethylformaldehyde dissolves both oil and latex paints but has no effect on calcimine paints.

Hydrochloric acid is applied last because it will react with many of the pigments used in all paints. If all of the previous tests fail, then the acid will react with the paint to confirm a calcimine-based paint. If the acid is applied first it can give a false positive and destroy the sample. Unfortunately the paint sample is destroyed in the above test. It is for this reason that it is important to have two samples of every paint chip. (See Appendix #3 For Chemical test)

Procedure for Mortar Analysis

Mortar and plaster samples were taken at the edge of damaged areas where the materials were still sound. 50-gram samples were obtained from each building, coded and stored in a plastic bag and brought to the laboratory. Twenty-five grams of mortar was ground to a fine powder using a mortar and pestle. This powder was placed in a 1000 ml beaker with 300-400 ml. of 3M. HCl. The hydrochloric acid reacts with lime and other calcium carbonate based binders found in mortars. When the acid reacts with the binder, carbon dioxide is produced. The solution bubbles and foams as the binder dissolves. When all the binder has reacted with the hydrochloric acid the solution no longer foams. The remaining solution consists of water containing the byproducts of the reaction (CaCl)

and the insoluble portion of the binder (sand and fine impurities). The solution is then washed with large amounts of water and swirled to suspend the fines (very small silt particles). The fines and the liquid solution are decanted off. The aggregate remains in the beaker. The fines are caught in the filter paper and the liquid is contained in a 500 ml. filter flask. There are two methods of filtering liquid from a solid: either by gravity filtration where the liquid drains through the filter paper by gravity or by the use of a vacuum system that pulls the liquid through the filter paper. The second method of filtration was used in the procedure because it is less time-consuming.

Once the sand and the fines have dried they are weighed. This weight is then subtracted from with the initial 25-gram sample to obtain the weight of the binder. The weighted percentage of binder, fines and aggregate contained in the mortar sample can then be calculated.

The aggregate is then subjected to a grain size distribution test. The aggregate is placed on the top of a stack of sieves which descends in mesh size from 2.36 mm to 75 um. Through ten minutes of gentle shaking the sand or aggregate is separated by grain size. The amount of sand caught in each sieve is weighed and compared to the initial sand sample. The end result is a grain size profile of the aggregate.

The Monastery: Historical Development and Conditions Survey

The Monastery was constructed by 1752 for Joseph Gorgas, and stands three and one-half stories high.³ It was made from rubble fieldstone with a cut ashlar front. Today the exterior of this building looks much the same, except for minor additions and alterations (for 1760 floor plans see Appendix #4). Additions constructed before 1803 included a kitchen wing and small bake oven covered by a shed. By 1900 a pantry had been added to the kitchen wing. Subsequently, after 1900, the small bake oven and shed were removed.⁴ Interior alterations were made during the 1830s when Joshua Garsed owned the property. These alterations are recorded in Notes on Germantown written by John Fanning Watson. He described the alterations: "the place was last owned and occupied by Joshua Garsed, a large manufacturer of flax and twine... He has shut up many of the former windows, before equal to four to every chamber, making two on every angle of the square. Those who saw it [the Monastery] sixty years ago say that it then had a balcony all around the house - at the second story."⁵ In an article for the Germantown Telegraph Watson also wrote that Garsed had closed up the corner chimneys and modernized the house to make it a comfortable dwelling. Others said that the center stairs in the house were removed and new ones put up in a different location.⁶ (for 1840 floor plans see Appendix #5) After Garsed's

tenure, little was done to the house in the way of alterations other than inadvertent changes due to poor maintenance. These occurred after William Gordon Kitchen's death in 1871. He had owned the property since 1853, and during this time the buildings and lands had prospered. However, in 1873, after his death, the City of Philadelphia bought much of the mill lands which had supported the building. The Kitchens moved from the property in 1876; as a result of the buildings abandonment, its pent eaves fell off and the roof collapsed. The City of Philadelphia finally purchased the property in 1889 (See Appendix #6).⁷ After minor repairs were made the building was rented to the Kitchens Lane Golf Club, which undertook a thorough renovation of the building in 1900. In this renovation, the windows which Garsed removed were replaced. Two entry doors were added on the ground floor on the west side of the building. The small bake oven and shed was removed from the kitchen wing⁸ and a porch was added to the main wing.

The building today is much like it was after the 1900 renovation, although the wrap-around porch was removed sometime after 1935 and a front and back porch were put in its place. Interior alterations since 1900 include the alteration of the kitchen fireplace during the 1960s by the insertion of a smaller fireplace in the original hearth. The eighteenth-century wooden mantle was cut into and part of the mantle shelf removed. The mantle

remains in this condition today. The building's interior finishes were vandalized when it was vacant between 1960 and 1980. Shutters in the parlor were removed. All of the balusters on the stairs were broken and many of the walls damaged and defaced. Many of the interior plaster surfaces were lost because of water damage. Only one plaster ceiling survives on the first floor, and one on the second. Several of the ceilings on the third and fourth floor also remain. Sometime before 1969, the kitchen wing suffered a small fire which destroyed the dormer window and the roof. By 1969 the house was slated for demolition, but was saved when it was suggested that a children's museum be placed in the building. This idea never came to fruition, and it was not until 1980 that renovation began.

The roof was replaced on both the main and kitchen wings. The third and fourth floors were altered to accommodate an apartment. In comparing the 1935 HABS drawings with what exist today, the changes become clear (see Appendix #7). The third floor southeast bedroom was converted into a kitchen by removing a closet along the south wall and moving the entrance to the wall between the two south bedrooms. This created a new circulation pattern between the new kitchen (formerly the southeast bed room) and the new living room (formerly the southwest bedroom). A bathroom was installed in the third floor northeast bedroom. On the fourth floor a wood board partition along the west side of the stairs was moved to

the east side to create a room on the northeast side of the building. The wall between the southwest and the northwest rooms was removed to create one long room along the west side of the building. A partition separating the third floor apartment from the second floor was also installed. At this time baseboard heating was introduced into the second through fourth floors. Little in the way of alterations occurred on the second floor when a second apartment was added in 1986. A closet door was removed from the southeast bedroom and used for a closet door on the third floor living room. The bathroom was renovated and a closet added to this northeast room. The first floor main wing was unaltered, except for repainting and the substitution of sheetrock walls for damaged plaster walls. All the balusters on the stairs are new. Minor alterations have occurred in the kitchen wing. The wood floors in both the kitchen and the pantry had completely decayed and were replaced. A built-in kitchen cabinet was removed along with the remains of the plaster and lath ceiling. In 1986, the pantry was converted into a small modern kitchen by removing a pantry closet and changing the basement stairs. At the east end of the pantry a bathroom has been proposed but never fully installed. There is no heat in the first floor. A hot air system had been proposed.

Very little has changed on the exterior of the building due to the 1986 alterations. A small roof which

once sheltered the kitchen entry door was removed. The pantry window where the modern kitchen was installed was replaced and a section of the kitchen wing was repointed.

Conditions Survey

The building is presently in relatively stable condition. However, there are some plaguing deterioration mechanisms that have yet to be addressed. The first is water penetration into the foundation. This problem is caused by two factors: no gutters on the building and poor ground drainage patterns. The lack of gutters allows water to drain directly through the foundations, removing mortar from between the stone. As water pools in the basement it will elevate the humidity of the air, in turn causing the wood floor joists to begin to decay.

The second source of leakage into the building is via ground drainage. The Monastery sits on a plateau above the Wissahickon Creek, but not at the highest point of the surrounding grounds. Higher fields behind the house drain into the back yard of the building. Here, water pools along the west wall and back porch of the building. As a result, water is absorbed into the masonry wall by capillary action. In turn, both the interior plaster and the exterior stucco are spalling off the stone surface (see typographical map of site Appendix #9).

There is one structural crack in the main building, hidden by the roof of the kitchen. This crack is in the

northwest corner of the main building and runs from the second floor northwest window on the west wall of the building to a hole in the wall where plumbing has been punched through the exterior wall of the main building (see Appendix #10). The positioning of the crack seems to indicate that this corner of the wall has moved or is moving away from the rest of the building. Whether or not this crack is growing is unknown. At this point the progress on this crack cannot be monitored.

The other outstanding problem with the Monastery is the condition of the masonry joints (see Appendix #11). The gaps between the stone at the peaks are very large. 100 % repointing may not be necessary. However, the roof peaks, foundations and kitchen wing require immediate repair.

Paint Analysis for The Monastery

The objective in examining the painted surfaces in the Monastery was twofold. The first was to determine the comparative ages of the existing finishes in the building through the examination of the number of paint layers. The second was to determine the composition of the earliest paint layers in each sample. This may reveal if the paint was applied in the eighteenth century or if it was applied in a later renovation.

In observing the style of the finishes in the Monastery it appears as though the main building was altered in 1840 and 1900. The Kitchen wing seems to have the oldest existing finishes, even though structural evidence indicates that it is a later addition to the main building. By combining written information, structural evidence and results of paint and mortar analysis, the relative age of the existing finishes will be determined.

Sample Locations

On the exterior of the Monastery samples were taken from painted woodwork and stucco on the first floor level. On the interior samples were taken from the walls and wood work in three rooms on the first floor. These rooms were the kitchen, parlor and the small music room under the stairs. The entry on the first floor and rooms on the upper floors were not done because much of the paint

layers were removed during renovation work (see Appendix #2 for sample locations).

Results/Conclusions

Interior/Kitchen

All of the information gained from the paint analysis indicated that there is little eighteenth-century paint if any on the first floor of the main building. However, the interior finishes of the kitchen may be from the eighteenth century. The doorway molding from the entry to the kitchen may also be original. The fireplace mantle is of the same age, as is the doorway to the loft. The question remains, are these older elements unaltered since the kitchen wing was added? At this point all that can be determined is that these three elements are of the same age. The reason their age in relation to the age of the kitchen addition is in question is that in probing the wall on the northeast side of the kitchen wing an older plaster layer was found an inch below the present plaster layer. This indicates that this wall was altered. There is other evidence that the kitchen was altered: scars on the west wall of the kitchen suggest that a fireplace or bake oven was once here. Scars from a stair that descended into the basement predate the fireplace or oven in this same area. One explanation for these older elements being of the same age (even though the walls around them indicate alteration) is that the wooden

elements may have been moved and re-used as the kitchen changed. The conclusion is that the wooden elements are eighteenth century but they may not be in their original location.

The ceiling beams were originally exposed in the kitchen and whitewashed. Twenty-nine layers of whitewash accumulated before a plaster and lath ceiling enclosed the beams. The loft above the kitchen, as well as the section of wall above the fireplace were also whitewashed. The rest of the walls that are seen today were covered in a light green oil-base paint. In time, perhaps after the fireplace was no longer in use, the area above the fireplace was painted the same color as the walls of the room.

It is difficult to conjecture how the kitchen looked when it was first built. The first layer of wall paint is covered by a completely new layer of plaster, which includes a brown coat and white plaster. This in turn is covered by twenty-nine layers of white wash and the ceiling was then enclosed with plaster and lath. The color of the first paint is red (iron oxide); the paint found on all of the older wood work is also red. It was common to use iron oxide as a primer coat on wood work. Thus, the first paint combination may have been red walls with white woodwork that was then varnished. The ceiling beams were exposed and whitewashed as was the area above the fireplace. After the original plaster layer was covered, the ceiling remained exposed and white washed; the walls

were a light green and the woodwork was white.

Later in the paint sequence both the wall and woodwork colors become stronger. The woodwork was painted consecutively pink, green, yellow and then grained. The walls were painted strong greens and yellows. Finally, white regains its appeal and is used on all surfaces.

Music Room

The music room has been altered. At some point a new white coat of plaster was applied to the walls in this room. The west wall of this room is spalling badly because of rising damp; the older layer of plaster can be seen. This layer consisted of a base coat with fibers and a white coat of lime. This in turn was coated by thirteen layers of whitewash. The white plaster coat was applied over the whitewash and painted nine times. The woodwork in this room has very few layers of paint. The doorway which leads to the exterior on the west side of this room was added in 1900. It has the same number of paint layers as the doorway molding on the opposite side of the room. Stylistically the molding used in this doorway is older but seems to have been re-used in this location. The window is older than the rest of the woodwork in this room; it has three more layers of paint and the first coat is the same iron oxide with which the woodwork in the kitchen was coated. This suggests that the window may be an original element or at least contemporary with the kitchen finishes. The

fireplace, although it is in an 1840s style, seems to have been re-used, because it has the same number of paint layers as the doorways. The one difference is that the fireplace has a base coat of black. This fireplace may have been marblized, a common finish in the period 1820-1840. This room seems to have gone through two alterations; once in 1840 with the alteration of the fireplace and in 1900 when the door to the exterior was added and the door leading to the entry was also altered.

Based on the composition of the paint and on a comparison of paint layers with a known 1900 alteration the wall surfaces seen in this room today are probably post-1840, and most likely twentieth-century coatings. The wall begins white; this may be a primer coat for the next red coat of paint. Three out of the four samples show the next layer of paint as a translucent gray color. After this there seems to be a difference in how the wall just below the ceiling was painted as compared with the rest of the wall. The three samples taken from the middle of the wall show a red, yellow and then a green or blue sequence in paint layers. The sample from high up on the wall does not contain these colors but remains a cream white. The evidence indicates a polychromatic decorative treatment. This was a common wall treatment during the Victorian era. Another section two feet below the ceiling may have been wallpapered. The plaster wall on the northwest side of this room has the remnants of a glue on

the surface. All wall surfaces eventually return to white and are now painted green.

To determine the first paint colors applied to this room is difficult. At one point the walls were whitewashed, but what the woodwork was like is unknown. The woodwork treatment that exists seems to date from the 1900s, and the wall from somewhat before.

Parlor

The parlor shows much of the same treatment as the music room. The walls have been replastered and the previous plaster layer has been whitewashed, although not as extensively as in the other rooms. There is very little paint on the woodwork; it dates from the 1900 restoration. The woodwork dates from the 1840s; the earlier paint may have been removed when the twentieth-century paint was applied.

Exterior

The treatment of the first floor exterior of the Monastery has changed through the years. The front or the southeast wall under the porch was originally ashler cut stone pointed with white mortar. At some time the pointing mortar was whitewashed. In 1900, when doors were introduced into the west side of the building, a porch which wrapped around three sides of the house was put in place and the first floor exterior was stuccoed with a very soft mortar. The mortar was then painted seven times, mostly in shades of white but once blue. The back of the house (which like the two sides of the building is

rough field stone rubble with white mortar joints) was originally left bare. However, when a small shelter was placed over the back entrances to the kitchen and the main house (before 1900) the walls in this area were white washed. Twenty-two applications of white wash were applied over the pointed stone work before stucco was placed over the white washed walls in 1900.

Frequent periods of abandonment and neglect of the Monastery have left very little exterior paint. The samples taken were generally inconclusive, but they indicated that the oldest windows on the first floor are those on the kitchen wing and that the first coat of paint was iron oxide. This was probably a primer coat not a final coat (see Appendix #13 for test results and Appendix #12 Paint Stratigraphy).

Mortar Analysis for the Monastery

Objective and Sample Locations

The main building of the Monastery has a kitchen addition, and a thick masonry wall may have been introduced on the interior of the building between the parlor and the entry. Mortar samples were taken from these areas to see if there mortar compositions differed. Exterior mortar samples were taken from stucco added in the 1900 (photographs taken at this time verify its date), a modern stucco patch applied in 1985 and deep mortar samples from the walls of the building. These samples were taken in these locations in order to determine if the later mortar applications were compatible with the original mortars. The composition of the original mortars was also needed if a new mortar was to be produced to repoint the building in areas of damage.

Results/Conclusions

There are six types of mortar found in the Monastery. These include two types of interior mortar The first #1 contains animal hair and is used to cover the interior wall of the main building, the second #2 is an interior deep mortar taken from the interior center wall of the parlor. Four types of exterior mortars included, #3 a deep soft yellow mortar found only in the exterior walls of the main building; #4 a white pointing mortar found in main building on the surface of the deep yellow mortar; #5

a white mortar found through out the kitchen wing exterior walls; and finally #6, modern mortars characterized by their gray color, slow dissolution in acid, and low percentages of fines and binder.

Interior Mortars

#1: Interior brown coats found beneath new layers of plaster in the parlor, music room and kitchen were similar. All contained animal hair fibers. The sample from the parlor had a higher concentration of fibers than did the other two samples. The percentage of fines in the interior sample were 5% with the kitchen wing having 12% fines. The colors of the fines from the kitchen and the music room are identical although the sample from the kitchen has twice the amount of fines. The percent of binder in these samples ranged between 30 and 40 percent of the total sample. The amount of aggregate was between 50 and 60%. The aggregate range is narrow with most falling between 600 um and 150 um. The sample in the kitchen and the music room may be of the same period the parlor sample may be later. The interior brown coats are 21-M-M, 16-M-M, 15-M-M, and 11-M-M.

#2: A second interior mortar sample (17-M-M) taken from deep within the stone wall that separates the parlor from the entry in the main building did not have the characteristic yellow color of a deep mortar found in the exterior walls of the building. This mortar is gray white

and much harder, it has a lower content of fines (11.67 %) than exterior deep mortars. The aggregate range is much the same as the exterior deep mortars but the percent of sand is higher (58.9%). This deep mortar is more like a pointing mortar in its hardness and amount of binder (29.43 %). However, it differs from pointing mortars in its range of aggregate. It is for this reason that the term transitional mortar has been applied to this sample. It has been suggested that this wall was added when a center fireplace was constructed. This mortar analysis tends to support this hypothesis.

Exterior Mortars

#3: The deep mortar found on the exterior walls of the main building of the Monastery is characterized by a burnt umber color and a high percentage of fines (15% - 30%). The range in aggregate size can be quite large with up to 24 % of the aggregate being larger than 2.35 mm. This mortar is very soft with a binder content ranging from 30% to 50 %. It washes away quickly once exposed to the elements (see samples 10-M-M, 13-M-M-B, 5-M-M, 3-M-M, 8-M-M. Appendix # 14)

#4: The pointing mortar was found throughout the main building. It is characterized by a smaller range in the aggregate size, (most of the sand falling between 1.18 mm and 150 um) its hardness and white color. The percentage of binder (40 % to 58 %) usually exceeds that of the aggregate (37 % to 44 %). It was used as a pointing mortar above the deep yellow mortar in the main building

(see Samples 4-M-M, 2-M-M, 6-M-M, 13-M-M-A Appendix #14).

#5: This type of mortar was found in the kitchen wing. All samples, whether from the interior or the exterior had the same basic composition. The percent of sand was between 45 and 53, with fines from 10 to 18 percent and binder from 30 to 40 percent. This difference in sand/binder proportions collaborates with historical evidence that the kitchen wing was added sometime after construction of the main building. (see samples 9-M-M, 12-M-M, 14-M-M, 1-M-M).

#6: Modern mortars found on the Monastery have a higher percentage of aggregate (73 %) with a smaller range in aggregate size (between 600 um and 150 um). The amount of fines is very low (5%). The hardness varies with the type of binder used. Sample 7-M-M was very hard and was very difficult to dissolve. This may indicate the use of a Portland or natural cement. There were two cases of this type of binder in the Monastery. One was the stucco on the west side of the main building (6-M-M-S) and the other was a stucco repair.

The analysis indicates that all but the modern mortars used lime for a binder. This is indicated by the relative softness of the mortars and high acid soluble portion and gas evolution during dissolution. The aggregate used in all of the mortars found at the Monastery (except the modern mortars) came from the Wissahickon Creek. The

color, composition and range in particle size is the same. For finer work the larger aggregate was removed (see Appendix #14 for all data sheets).

The mortar analysis also indicates that the wall between the entry and parlor was a later addition. The Kitchen wing was also a later addition. However, unlike the mortar from the parlor wall the kitchen wing mortar composition is very similar to that of the mortar from the main building. This information probably indicates that the kitchen wing was added earlier than the wall between the parlor and entry.

Recommendations

Deterioration caused by water penetration into the basement and the foundations of the building could be eliminated or mitigated by placing gutters on the building and regrading the land in the upper fields behind the building. Gutters would keep water out of the basement and regrading would redirect water runoff to storm drains that lined the access road to the site.

The introduction of hot air heat into the first floor should be done with caution. Punching a large hole through the main building wall below a stress crack may destabilize this corner of the building. Also, introduction of this type of heating system into the first floor will require partial removal of the 19th-century floors. Before this type of heating system is introduced into this building it is recommended that a complete study of the wall movement be made. Alternative heating systems with less impact on the structure should be considered. This would determine if a hot air system is appropriate for this building.

The repointing of the Monastery should be a priority in its restoration. The roof peaks and kitchen wings need immediate attention. A lime-based mortar using one part hydrated lime to three parts washed and sieved Wissahickon Creek sand should be used.

The stucco on the first floor exterior should also be

completely removed so that the foundations may dry. The stone beneath the stucco, once exposed, may bare the scars of past windows and doors. This should also be repaired. It should be noted that without removing the water from the foundations the repointing of the first floor stone work will deteriorate quickly. It is also recommended that if there is a desire to repaint the first floor of the Monastery in the colors revealed in this study, a second study with emphasis on the composition of the first paint layer be completed and the color matching be done in natural light based on larger samples scraped down to the desired layer. If general color schemes only are needed, then the findings in this study could be used.

In conclusion the Monastery's present condition is stable and the rehabilitation of the interior progresses. However, the continued deterioration of the building's foundations and walls should be addressed. Ignoring this problem will only defeat the rehabilitation of the building in the long run.

206 Lincoln Drive: Historical Development
and Conditions Survey

This building being studied sits on a bank above Lincoln Drive in Wissahickon Park. Once one of many buildings comprising Rittenhouse Town, it now stands in a small cluster of six structures. 206 Lincoln Drive is one of the oldest buildings on this site; it was erected on a tract of land purchased from Samuel Carpenter by William Rittenhouse and others in 1705/6. William Rittenhouse had already constructed the first paper mill in the colonies on this land in 1693. This building and the site surrounding it were of a great importance to colonial Philadelphia, and the family has played a significant role in Philadelphia⁹ history. It is said that as the family enlarged, so did their buildings. 206 Lincoln Drive has been altered from a two and one-half story dwelling to a three-story stucco and stone building with several additions. Additions include a two and one-half story structure on the east side, a two-story wood frame addition on the back of the house, and a porch which united the three-story building with its two and one-half story addition. (see Appendix #15)

Before a complete discussion of 206 Lincoln Drive can be undertaken, it must be understood that this site is very difficult to document. The Rittenhouses who settled and built a modest-size village at this site did not record their real estate transactions with the Department

of Deeds and Records in Philadelphia. The few deeds that do exist often list past transactions, but without detail as to what improvements were on the site when those transactions took place. This makes it very difficult to determine when this building was constructed or altered, and by whom. The first deed that was found in the City Archives was written in 1760 and reviews the title transfers between 1690 and 1760.¹⁰ (See Appendix #16)

By the language in this deed, 206 Lincoln Drive could have been constructed at any time between 1706 and 1760. Unless earlier deeds are found, it is not possible to date this building through deeds. The use of maps has also been found to be unsatisfactory. The surveys done by Christian Lehman between 1764 and 1772 do not supply any answers. The first map done in 1746 and reviewed in 1764 was drawn to show the division of property below the 20 acre plot upon which 206 Lincoln Drive sits. No dwellings are shown. Other maps done during this time do not include dwellings. It is not until 1772 that the surveys begin to show buildings. 206 Lincoln Drive and several other buildings appear in a 1772 survey showing the division of the William Rittenhouse property. The building is shown again in 1774, when Jacob and Abraham Rittenhouse divided the 18¹¹ acre plot bought from William Rittenhouse in 1760. (for maps see Appendix #17) Even the interior of this building has been altered drastically over time, and its layout is of little help in determining its original configuration or age.

For the purposes of this study it will be assumed that the dwelling was constructed sometime before 1760. By looking at the surveys done in 1772, the building seems to be two and one-half story. The other buildings that exist today on this site are also two and one-half story. Unfortunately there is no hard evidence in the written record to confirm the assumption that this building was originally two and one-half story, instead of three. By looking at the inventory of furnishings found in Jonathan Rittenhouse's will the number of rooms can be speculated upon. There seem to have been one or two bed chambers, an entry, kitchen and dining room. This would equal a total of four rooms in the house, two rooms on the first floor and two on the second indicating a small two story house. (See appendix #18). Reviewing insurance survey maps done between 1874 and 1924, it is not clear whether the building was altered from a two and half story building to a three story as many secondary sources¹² insist. A change in the footprint is evident, though. In 1884 the footprint is essentially a square; this changes by 1892 when the building becomes oblong with a small extension on the back.¹³ This change in footprint coincides with the change in ownership, from the estate of Naomi Rittenhouse to William Umsted.¹⁴ William Umsted is credited with adding the two and one-half story masonry¹⁵ structure to the original section of the building. He

must have also added the the small two-story wood frame section on the back of the building. In 1911 the footprint changes to show the addition of the wooden porch. The footprint of the masonry section is unchanged, but the number of floors is given as three.¹⁶ Since the footprint of the building is the same as the 1891 map it may be concluded that Ulmsted completed the major alterations. This included raising the roof of the original portion from two and one-half story to three story, the two and one-half story Victorian addition, the wooden addition on the back of the building, and the wooden porch after the turn of the century. In 1916 a written survey of the building, done for Fairmount Park before they purchased the property in 1917, describes the structure as follows:¹⁷

The Nurses home which was formerly the old mansion consisting of a three story stone building with two story stone and attic addition. The first floor has one large room with open grate, three other rooms, sun parlor, bath room with toilet.

The second floor contains three rooms, each with large fire places, one small room and large bath room with porcelain tub, shower enclosed in marble, toilet and wash stand. The third floor contains three rooms and attic used for storage.

The house is wired for electricity...

There have been a few changes in the house since this time. The fireplaces have been removed from the second floor, and the second floor shower is no longer enclosed in marble.

Conditions Survey

Since this house is a collection of additions the roof can be a problem where old and new join. At the head of the stairs on the second floor of the two and one half story addition there is evidence of a roof leak where the two roofs meet. Other roof leaks are seen in the old wing of the building on the third floor. Above the stairs, and in the small back room the plaster ceilings shows signs of water penetration. The worst water damage is seen on the third-floor chimney stack (See appendix #19). A large section of the interior plaster has fallen away from the chimney to expose the brick. On the floors below, the problem is repeated. Water is seeping into the chimney through poor flashing around the chimney on the roof and destroying the interior plaster in the older wing of the house. A glaring problem seen on the exterior of the building is the delamination of the white coat in the stucco. This creates large holes in the surface. The paint is also peeling on all surfaces. The general overall appearance of this building is poor. Some work was performed on the exterior of this building during the 1970s. All of the existing window frames, sills, and sash inside and out were to be restored, cleaned, repaired and painted and made operable and weather tight. Not all of this work was completed. New shutters were made where they were lost and the back door leading from the wooden frame addition was altered (see elevations Appendix #15).

The number of windows that were repaired is not known.

The house is presently being used as a residence and is in a poor state of repair. The heater is not working properly and emits black smoke through out the interior of the building. The roof is failing in several places and should be repaired or replaced.

The interior of 206 Lincoln Drive at present is in relatively good condition. Patching of plaster and a new coat of paint will solve most of the interior problems as long as the roof is repaired. There is some water penetration in the basement but it does not seem to be a major problem (See Appendix #20).

206 Lincoln Drive Paint Analysis

206 Lincoln Drive is a building that is not well-documented in written history and yet the folk history surrounding this building is very strong. There are plans to "restore" this building to its perceived original configuration of a two and one half story building. The paint analysis was used in this building to try and determine if any of the "original" finishes still existed in this building, so that if restored, the sections of original fabric could be salvaged. The second aim of the paint analysis was to document the structural evolution of the building. The older sections of the building should have more layers of paint than later additions.

Sample were taken from opposite ends of the building on the first floor. The dining room on the west end and the living room on the east end. Paint samples were also taken on each floor of the west end on the building to see if there was a significant change in paint layers between the second and third floors.

Results/Conclusions

The early date placed on the west end of this building is not substantiated by paint analysis. This does not mean that the building was not constructed in 1720; it merely suggests that the interior of 206 Lincoln Drive is not the original interior. The number of paint layers is not extensive; calcimine or lime wash is not found and zinc oxide appears early in the paint sequences, thus post dating

the subsequent paint layers to after 1840.

Exterior

Although little evidence remains of the earliest painted finishes, paint analysis does reveal how the building changed in the late nineteenth and early twentieth centuries. The number of paint layers found on the first floor west side exterior is much greater than on the east side first floor. This was expected since it was known that the east end of the building was added at the end of the nineteenth century. The existing exterior wood work of 206 Lincoln Drive has always been white oil-based paint. It was not until recently that the color was changed to green. The stucco that is seen on the building is a second coat with a very fine white aggregate, indicating that it is a twentieth-century application. This stucco also has several layers of paint applied to its surface. The porch floor was initially painted gray; its color then alternated between green and gray with gray finally becoming the predominant color (see Appendix #21).

Interior

First Floor

Paint samples were only taken from the woodwork on the first floor because any damage to the walls was deemed unacceptable. Analysis indicated that the dining room baseboard was usually painted white in earlier periods of its history. Out of the thirty-three layers found in this sample twenty-four were white. It is not until later in

the paint series that other colors begin to appear. Yellow, orange and red are found once, and blue twice at different intervals. The window lintel reflects the same patterns. It was originally painted white (seventeen layers of twenty-four); blue and yellow appear once in the sequence. Woodwork in the living room was painted in various shades of white fifteen times. Once again the number of paint layers on the west side of the building outnumbers the amount on the east side of the building. The one area where this does not hold true is the kitchen. The sample taken from the wooden panel in the kitchen has very few paint layers. The wooden panel may not be original to the kitchen, or paint layers were removed before a fresh coat of paint was applied.

Upper Floor

There is very little paint on the second and third floors of the west wing. The second floor was painted only seven times, while the third floor was coated only three or four times. The third floor was also replastered some time in the recent past. Another plaster layer can be seen where a roof leak has destroyed a section of the ceiling. It has been suggested that the third floor was an addition. The lack of paint seems to support this hypothesis. However, it is more likely that the surfaces seen on the second and third floor postdate that alteration and reflect changes during the later nineteenth century. It is possible that

when the east end addition was added these small west end rooms were remodelled and then rarely used.

The second floor west room wall colors were not white. The walls were initially painted yellow; that color reappears once again later in the sequence. Several shades of blue occur four times in the series with orange, pink and white occurring once. The white is the last applied paint color. The woodwork in the second floor hallway reverts back to white, although blue shows up three times in the sequence. The wall color in the stair hallway on the east end of the building is white half of the time and shades of blue or green the rest of the time. The trend seems to be a color treatment of the walls and white woodwork; this pattern continues on the third floor. Yellow and green and white are the recurring colors found on the walls and ceilings, while the wood work is white (see Appendix #22)

Mortar Analysis for 206 Lincoln Drive

Mortar analysis was performed to find the original composition of existing mortars and stucco finishes, but due to limited access to samples in areas not damaged, key mortar samples were not taken. Only four mortar samples were examined, two are from the third floor interior, one from the basement and the fourth is a surface layer of stucco from the first floor exterior.

Interior

The two samples taken on the third floor are almost identical in the percentage of sand, binder and fines, ie., 2-Ri-M: 67.03 % sand, 5.5 % fines and 27.43 % binder; 3-Ri-M: 65.42 % sand, 6.91 % fines and 27.67 % binder. The aggregate found in both samples seems to have come from the creek which runs by this building. The only noticeable difference in composition is that the sample from over the stairs (2-Ri-M) contains animal hair while the one on the fireplace chimney does not. Also the chimney sample has a larger aggregate range than the ceiling sample. The difference in composition of these two mortars may be due to where they are applied. The ceiling mortar may need the additional reinforcement that the animal hairs provided. The wall mortar may not need to be as strong so the animal hair is omitted.

The sample in the basement differs from the third floor mortars. The aggregate is not from the creek. There

were no large lime chunks found in the mortar, and the mortar was much harder than the mortars on the third floor. However the proportion of sand, fines and binder is much the same, ie., 4-Ri-M 64.19 % of sand, 6.78 % of fines and 29.03 % of binder. This seems to imply that the sand was shipped from another location and a hydraulic binder was used instead of a lime binder, but the ratio of binder to aggregate was maintained.

The other mortar sample (1-Ri-M) is a modern application of a white plaster coat on stucco. The aggregate has been selected for size and is very uniform. It has a high content of binder making it more similar to a plaster than a stucco. Percent of binder is 72.79, percent of fines 9.45 and percent of sand is 17.76 (see appendix #23 for data sheets).

Recommendations

The roof repairs should be made a priority in this building. The deterioration seen on the interior plaster ceilings and walls will only get worse with time. The areas where different roof structures meet seem to be weak points in this roof design. After repairs are complete these areas should be examined for leaks once a year. The spalling stucco on the exterior should be repaired using a compatible stucco that is determined through mortar analysis, and then painted. The interior after both the heater and roof has been repaired needs to be repainted. All of the exterior woodwork needs to be repainted. It should be noted that the first paint color found on the building was white not green.

The color combinations revealed in this study indicate that the late nineteenth and early twentieth-century wall treatments were white woodwork with wall surfaces of white blue or yellow. Before any conclusions are drawn regarding the age of this building or the period of the existing interior finishes, it is strongly recommended that deep wall samples be taken. Original plaster samples may be found beneath the nineteenth and twentieth-century plasters. This may lead to a better understanding of the building's structural evolution through time. Minor damage to small sections of wall is well worth the information to be gained. In addition Mr. Peter Odell holds samples from his restoration of the kitchen fireplace which could provide useful information.

Rockland: Historical Development
and Conditions Survey

Rockland, a striking example of Federal architecture, was built c. 1810 by George Thomas. He owned the property until the death of his wife five years later. He then sold the house to Issac Jones, whose family owned the property until the City of Philadelphia purchased it in 1870 (see Appendix #24).¹⁹ During Issac Jones' occupancy the house must have been quite opulent, judging from the inventory of furnishings found with his will (see Appendix #25).²⁰ Once the city came into possession of the property, its uses varied from residence to headquarters for several groups, the last two being the International Gastronomic Society (1979-1983) and the present tenant, the American Rowing Historical Society (since 1986).²¹

Rockland is a three-story masonry building with pebble-dash stucco walls and a ruled ashlar entry. Unlike the other buildings in this study, Rockland has changed little through the years. There have been no additions, and few alterations. One exception which has changed greatly is the basement. Once the location of the kitchen, it is now used for storage and contains only the furnace. The fireplace and bake oven have been bricked up, and a new cement floor put down. The kitchen is presently located on the first floor in the small room opposite the stairs. The upper floors have not changed, although a

bathroom has been introduced on the second floor in a small room adjacent to the stairs (see floor plans Appendix # 26).

Even though Rockland has not undergone major alterations, it has seen hard times. A description of the building found in the Engineers' Survey Notebook reviews
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Rockland's condition around 1868:

Bergdoll floor in cellar or basement bad, one side falling in. First floor good. Glass Broken-45 panes. Second floor good. Stairs good. Third floor good. Tin Roof on look out wants a little repairing around trap door. Banister on top broken, the other part of roof is shingle, not very good. 39 feet front, 40 feet deep. Front porch wants repairing.

Many of the problems described above can be seen recurring today. Several glass panes are missing in the windows; the front porch as well as the back need repair; the balusters on the roof were removed when roof work was completed in 1983. Chronic roof leaks have damaged plaster on the third floor. Plaster and wood deterioration has occurred through out the building due to the lack of heat, and to water penetration. But unlike other park houses, Rockland has not been neglected. The deterioration seen in the building today has occurred since 1976, when approximately \$130,000 was paid for its restoration. But since then, little maintenance has been performed by the tenants. Adding to this problem was the lack of heat, which resulted in the freezing of water pipes, this in turn caused the destruction of the heating system and some of the
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interior finishes.

Conditions Survey

The basement is showing signs of rising damp with effluorescence on the walls. During heavy rains, water comes into the basement through a door on the south side of the building. Also, a constantly dripping valve in the basement soaks the floor and walls. Panes of glass that are missing throughout the building need to be replaced. The third floor ceilings are damaged from past roof leaks and most of the painted surfaces in the building are peeling.

The exterior of Rockland is showing the signs of little or no maintenance. Although the interior shows these same signs, the exterior renovation cost will triple quickly if nothing is done. The stucco on the wall is beginning to spall off. This may be due to poor ground drainage, which allows water to be absorbed by the masonry and carried up the wall by capillary action. When the water freezes it forces the stucco off the wall. Much of the wood fenestration is decaying from lack of paint. The back porch baluster has been partially removed and a section of it lies below the porch. The bottom section of the leaders from the gutters has been dislodged, so that water sprays onto the building walls and seeps into the foundations.

There is a structural deformity in the south wall of Rockland. It is not know how severe this problem is is

not known; the situation may have stabilized. However, the south wall of Rockland at about its center bows out and drops. There is a definite deflection of the wall at the base. A crack is seen extending from the roof to the ground on this wall. The interior shows the effects of the drop; the window frame in the dining room is askew, as is the window frame above on the second floor (see appendix #27).

Paint Analysis for Rockland

Rockland is a high-style Federal building, built much later than the other two vernacular buildings examined in this study, and essentially unaltered structurally. It is a building in which the initial paint treatments could be revealed through paint analysis. The entry, dining room and stair hall were sampled because it was felt that these rooms would have been ornately decorated because they would have been used for entertaining. Also, if a restoration of this building was completed the correct wall treatments would be an important factor in its restoration.

Results/Conclusions

Of all three buildings examined in this study, Rockland has the most interesting and diverse wall treatments. Both wallpaper and graining were seen in the paint samples. The front porch columns were painted various shades of white; there was not any evidence of sand in any layer.

Interior

All of the first floor of Rockland was wallpapered at one time. Evidence of this is can be found in the corners where the walls meet the wood work. Samples taken in the middle of the walls will only record paint applied after the wallpaper was removed. This was not realized until the samples were analyzed in the laboratory. In examining the sequence of layers it becomes evident that the paint

samples without wallpaper are missing the first layers of paint.

The first floor samples that are complete show the first paint color as a translucent blue in the entry and dining room. This is probably a Prussian blue in linseed oil, but tests of different samples showed different results. This blue also ran along the stairs below the chair rail. The area above the chair rail on the stair hall was painted white. The next applied layer on the first floor was wall paper. The entry paper was a red and green, while the dining room paper was green. The wall below the chair rail on the stairs carried wallpaper the same color as in the entry to the second floor while the area above the chair rail remained white.

A comparison of the number of paint layers on the stair woodwork (23) and that of the doorway between the dining room and entry (Door-14, molding-8) suggests that the doorway between the dining room and the entry may not have been painted. The first layer of paint on the doorway is a pale, greenish-tinged white. This changed to a gray. Light greens and yellows followed, until it was grained, as were the stairs. The stairway woodwork was painted white until late in the paint sequence and then it was grained twice. The stairs then revert back to white. It should be mentioned that the floral pattern found on the stair woodwork is made from lead and is not carved from wood (see Appendix # 28 and Appendix # 29).

Conclusions

Rockland was found to be the most colorful of all three buildings examined in this study. In the Monastery and 206 Lincoln Drive, the predominant color was white. In Rockland there were many shades of blue, green and yellow. Red is rare, as in the other buildings. Of all the buildings, Rockland has been altered the least and still remains faithful to its architectural intent. If one were to choose a building to "restore" this would be very good candidate.

Mortar Analysis of Rockland

Mortar analysis was done on Rockland to determine the composition of the existing plaster and mortar surfaces. The analysis of the exterior rubble dash stucco was important because visual inspection of the exterior wall revealed that there were two separate applications of this type of stucco. The analysis would reveal if these two applications were of the same composition.

Exterior

Of the five mortar samples taken from Rockland three are from the exterior. A deep mortar sample was taken from beneath two layers of rubble dash stucco on the exterior of the building (2-Ro-M). This deep mortar is characterized by its softness; its binder-to-aggregate ratio is one-third to two-thirds by weight. The two rubble dash stucco samples on top of this deep mortar both have a one-quarter to three-quarters ratio of binder to aggregate (1-Ro-M, 6-Ro-M). However, there is a large difference in the aggregate size and coloration between the two rubble dash stuccos. The original stucco aggregate (6-Ro-M) looks as though it came from the Schuylkill River. It has mica shards and small chunks of schist stone. The overall color of this aggregate is iron brown. The newer stucco 1-Ro-M (probably a twentieth-century application) looks as though its aggregate comes from beach sand. It contains large white round pebbles not found in the original stucco. As a result this stucco is much more

lumpy and white in color.

Interior

The samples taken from the interior of the house came from the basement and the third floor. The basement sample is probably the original plaster surface in this location (3-Ro-M). It is a brown coat with animal hair to add strength. It has the same characteristics as the brown coat mortars found in the other two buildings but the amount of binder indicates a pointing mortar when compared to this sample group. The high binder content may be due to a layer of pure lime plaster covering the brown coat. The percentages by weight are: 26.29% aggregate, 10.67% fines and 63.03 % binder.

The third floor sample is a plaster with a fine white aggregate (4-Ro-M). It is very similar to the stucco sample on the exterior of 206 Lincoln Drive. It has a very high binder content, and a low fines content. The actual percentages are 31.73 % sand, 3.31 % of fines and 64.94 % binder (see appendix #30 for Mortar Data Sheets).

Recommendations

A routine maintenance schedule needs to be developed for Rockland. The repairs that are needed today are recurring problems that show at regular intervals. The damage to the third floor ceiling is from roof leaks. This roof seems to be predisposed to leakage in certain areas. For this reason the roof should be routinely inspected for holes. The rest of the interior painted surfaces are in poor condition due to the lack of heat during the winter months. A tenant that occupies the building year round is necessary. The other maintenance problems discussed in this paper are easily corrected with some diligence. The leaders that are missing their bottom sections are easily corrected. The water coming into the basement through the door could be stopped by regrading the land outside. Broken windows can be replaced. All of the suggested repairs are minor in nature and would not consume large amounts of time or resources.

Sections of the stucco on the exterior of the building are spalling off the building. At some point this building will once again need to be restuccoed. When this occurs it is suggested that the aggregate used in the new stucco resemble aggregate found in sample 6-Ro-M using a lime binder in the proportions of one quarter lime binder to three quarters aggregate by weight.

The use of the information provided by the paint

analysis should only be used as a starting point. If it is desired to reproduce the first paint found on the wood work and walls it is suggested that further study be done. Paint analysis is a complicated procedure and verification of these results are recommended. Also exact color matching using large samples under natural or simulated natural light.

Mortar Analysis: Conclusion

In this study of mortars it was found that 206 Lincoln Drive and the Monastery used similar aggregates. Both buildings are located in the Wissahickon Valley and used sands harvested from the local creeks. If other sand types were found in the mortar of these two buildings, it was concluded that these were later mortar applications. Similarity were found in all three buildings in the proportions of binder and aggregates found in different types of mortars used in the construction of the buildings. Bedding mortars or deep mortars found between the masonry have a large range in aggregate size. The older the building the larger this range becomes. The older buildings also have a higher content of fines in the bedding mortars. This could be that the sand was taken directly from the creeks and not sieved to removed the fines. The percent of binder is often equal to the amount of sand. Average proportions are: Sand 35-50%, Fines 9-30% and the binder 35-50%. Pointing mortars have a higher percentage of binder than sand and the amount of fines is much lower than in the bedding mortar. Pointing mortars are harder and have a smaller range in aggregate size; the larger particles are not found in a pointing mortar. Average proportions by weight are: Sand 30-45%, binder 40-60% and fines 4-10%.

Interior mortars usually contain more binder than sand except in the Monastery where the sand exceeds the

binder; in all buildings the aggregate is much finer than in either the bedding or pointing mortars. The interior mortars also tend to have animal hair or straw added to as reinforcement. Average proportions by weight are: 30-50% sand, 30-60% binder and 5-8% fines. The last category of mortars has been called "modern mortars." These differ from the above mortars in their strength and proportions of sand and binder. The amount of binder is very low and the amount of fines minimal. The aggregate size is always narrow. Average proportions by weight are: 70-80% sand, 5-10% fines, and 20-30% binder.

It should be understood that the above conclusions are drawn from only three houses. There are strong similarities, not shared with Rockland, between the materials used in the construction of the Monastery and 206 Lincoln Drive. More buildings need to be studied, with an understanding of when they were built and by whom. This study drew comparisons between two buildings constructed in the early to mid-eighteenth century and a third that was constructed in the early nineteenth century. The technique of construction may change over time and the conclusion in this study may only apply to buildings constructed before 1820. For an accurate understanding of building construction a larger number of buildings need to be studied.

Paint Analysis: Conclusions

Information about the buildings and progression of additions was clearly reflected in the number of paint layers applied to each structure. No conclusions were drawn in regard to identification of pigments in the first paint layers. Further work in needs to be done in this area. Perhaps to establish both an exterior and interior palette for buildings of different periods before evidence is destroyed by renovation.

In conclusion it was found that paint analysis is a valuable tool in determining the relative age of the additions and alterations found in a building. It also documents exterior and interior decorative treatments not often recorded in written documentation of buildings.

Conclusions/Recommendations

The restoration of a building is a long and involved process. It can often be expensive and time consuming. Before any restoration is attempted for a building of historical value a through investigation into the written documentation and structure needs to be performed. The physical analysis of the building is as important as the investigation of the written documentation. The building itself contains a wealth of information that is often ignored. Through a detailed examination of the building material a complete history of a building's interior and exterior treatments and alterations can be compiled. In any building there will be gaps, but with this information decisions on future interventions can be made.

In conclusion, a restoration of a building should not be started without a complete analysis of that building's structure and materials. These will reveal information on the physical changes that the building has experienced through its history.

The buildings in Fairmount Park are a rich and vital resource for the park and the public. It is unfortunate that so many of them are under-utilized and poorly maintained. Attempting to manage many structures in a large and diverse area such as Fairmount Park is difficult. The policy at this point is to deal with each building as an isolated entity, solving the problems generated by each building as they occur. In order to

generate funds and support to maintain all of the structures, it is suggested that a master plan be developed which examines the buildings and their environs as a whole. The historical background, present physical condition and use of all the buildings needs to be documented. Then the area in which each building stands needs to be studied to determine how this section of the park is used by the public and what is needed to accommodate the public's needs. A list can be generated as to what is needed in this area. The list may contain: bathrooms, information center, ranger stations, bike and boat rental, concession stands, stables, restaurant, house museum, nature center. Once this list is compiled it can then be used to determine a use for particular buildings, taking into account the building's historical background and structural alterations. With information in hand a policy can be developed on how to improve both the park and the structures within it. Once generated the master plan can then be used to generate funds from the public and private sector.

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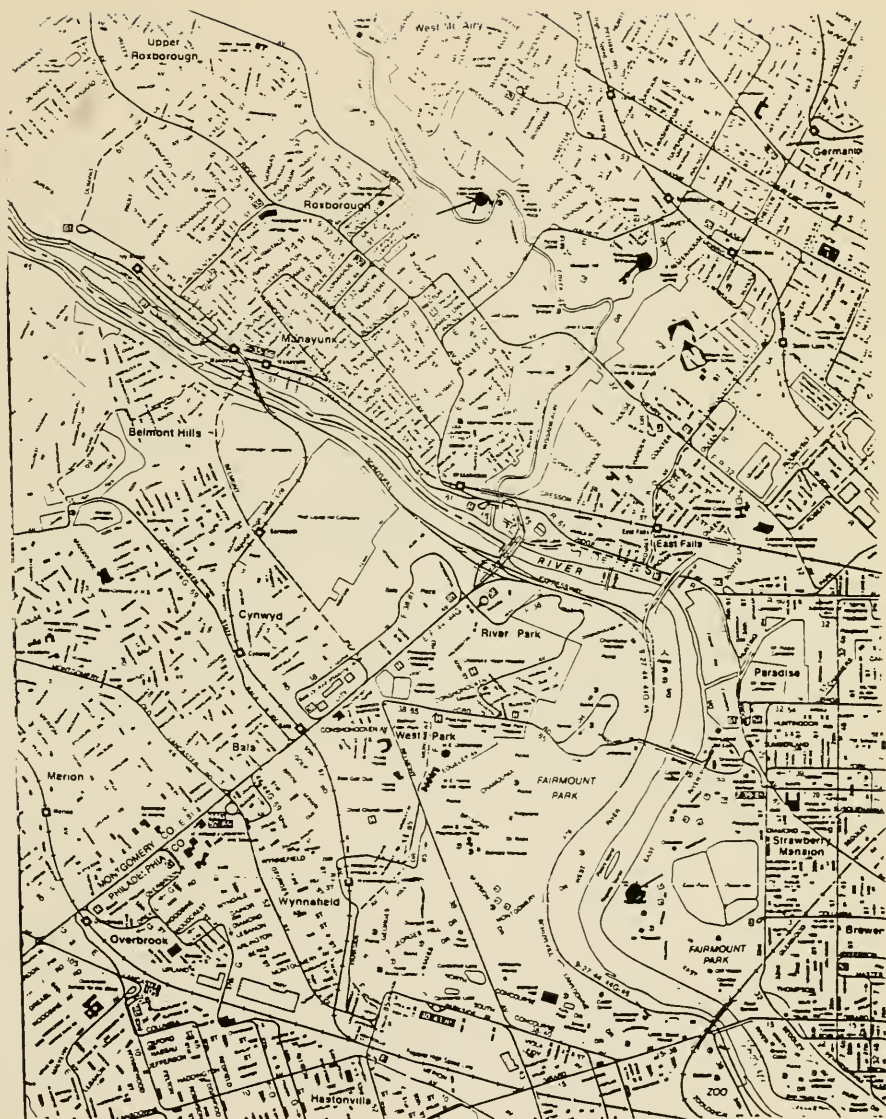
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Appendix #1
Site Locations



Appendix #2
Sample Locations for Each Building.

Sample Sites for the Monastery. Explanation of Code, i.e. 1-M-M: this means the first mortar sample from the Monastery. 1-M-P is the first paint sample taken from the Monastery. All sample sites are plotted on floor plans or elevations.

Written description of sample sites taken from the Monastery.

- 1-M-M: Exterior southeast wall of kitchen wing.
- 2-M-M: Exterior southeast wall of main building, west corner, ribbon pointing found beneath stucco.
- 3-M-M: Exterior southeast wall of kitchen wing mortar sample taken beneath 1-M-M.
- 4-M-M: Exterior southeast wall of main building, west corner, mortar sample from beneath ribbon pointing 2-M-M.
- 5-M-M: Exterior southeast wall of main building, west corner, deep mortar sample from beneath 4-M-M.
- 6-M-M: Exterior northwest wall, east corner on main building pointing found beneath 6-M-M-S.
- 6-M-M-S: Exterior northwest wall, east corner on main building surface stucco.
- 7-M-M: Exterior southwest wall main building, 20th century stucco.
- 8-M-M: Exterior southwest wall main building. Deep mortar sample from where 20th-century door was introduced into the wall.
- 9-M-M: Exterior northwest wall, kitchen wing, west corner mortar sample.
- 10-M-M: Exterior northwest wall, east corner of main building, deep mortar sample beneath 6-M-M.
- 11-M-M: Interior, center of northwest wall kitchen wing, mortar and plaster sample from between beams right below the ceiling.
- 12-M-M: Interior northeast wall kitchen wing, mortar sample from above window in loft.
- 13-M-M: Interior, crawl space above modern kitchen. Originally the northeast wall of main building now enclosed in the crawl space. Mortar sample a. White pointing mortar.
b. yellow mortar beneath the white pointing.
- 14-M-M: Interior, crawl space above modern kitchen, originally the southeast wall of kitchen. Mortar sample.
- 15-M-M: Interior west room or music room, southwest wall mortar and plaster sample beneath 18-M-M.
- 16-M-M: Interior, northwest wall of parlor above door from the entry to the parlor. Top plaster layer over 20-M-M and 21-M-M.
- 17-M-M: Interior, northwest wall of parlor. Mortar sample taken from the stone wall exposed by the removal of door molding.
- 18-M-M: Interior, southwest wall of music room, top plaster sample above 15-M-M.
- 19-M-M: Interior northeast wall music room, mortar sample just below ceiling center of the wall.
- 20-M-M: Interior: northwest wall parlor above door from the entry to the parlor, plaster layer between 16-M-M and 21-M-M.
- 21-M-M: Interior, northwest wall parlor above the door from the entry to the parlor, brown coat beneath 20-M-M.

Monastery Paint Samples

1-M-P: Exterior, northwest wall, paint sample from east side shutter center window.

2-M-P: Exterior, northeast wall, kitchen wing first floor window lintel.

3-M-P: Exterior, northwest wall, kitchen wing, east window.

4-M-P: Exterior, southeast wall main building, west corner, paint sample from on top of stucco see 2-M-M.

5-M-P: Exterior, northwest wall, kitchen wing, west corner, white wash sample.

6-M-P: Exterior, northwest wall, main building, east corner, white wash layer between 6-M-M and 6-M-M-S, Stucco-white wash-mortar.

7-M-P: Exterior: southeast wall, west corner, main building. Paint on ribbon pointing, white wash-stucco-paint-ribbon pointing mortar, see 4-M-M and 5-M-M, and 4-M-P.

8-M-P: Interior: northwest wall, kitchen wing, center of wall beneath ceiling. Mortar plaster and paint sample beneath a later mortar and plaster coat.

9-M-P: Interior, northeast wall, kitchen wing, paint sample from fireplace mantle.

10-M-P: Interior, northeast wall, kitchen wing, paint sample from wall above fireplace mantle.

11-M-P: Interior. whitewash from kitchen wing beams.

12-M-P: Interior: Northwest wall, kitchen wing, white wash layer over 11-M-M.

13-M-P: Interior: Northeast wall, kitchen wing, paint sample from door to loft.

14-M-P: Interior: Northwest wall, kitchen wing, wall paint sample from center of the wall four feet above the floor.

15-M-P: Interior, southwest wall, kitchen wing, door jamb, door way from kitchen to entry.

16-M-M: Interior: Northeast wall kitchen wing, paint sample from on top of 12-M-M. Loft space, below window.

17-M-P: Interior: Northeast wall. Kitchen wing, white wash sample from stair to loft.

18-M-P: Interior, Northwest wall, main building, music room, paint sample, west corner wall.

19-M-P: Interior, northwest wall, main building, music room, window molding.

20-M-P: Interior, southwest wall, music room, second paint layer found beneath plaster layer 18-M-M. On top of 15-M-M.

21-M-P: Interior, Southwest wall, main building, music room, door way moulding to exterior.

22-M-P: Interior, Southwest wall, main building music room, paint sample from wall over fireplace mantle.

23-M-P: Interior, Northeast wall main building, music room, paint sample from center wall just below the ceiling.

24-M-P: Interior, Northeast wall, door way to entry from music room. Molding of the door way.

25:

26-M-P: Interior southeast wall parlor, doorway moulding, doorway from entry to parlor.

27-M-P: Interior, southwest wall, main building, music room, paint from fire place mantle.

Sample Sites for Rockland

Mortar

- 1-Ro-M: Exterior, East side, Rubble dash stucco beneath the north window.
- 2-Ro-M: Exterior, East side, layer of stucco beneath the rubble dash stucco 6-Ro-M. Under north window.
- 3-Ro-M: Interior, West wall of stair way into basement.
- 4-Ro-M: Interior, third floor. Plaster sample from underneath the stairs to the roof.
- 5-Ro-M: Interior, dining room, south side, ceiling. Plaster sample.
- 6-Ro-M: Exterior, east side, rubble dash stucco underneath 1-Ro-M. Under north window.

Paint

- 1-Ro-P: Interior, paint sample from stair baseboard final.
- 2-Ro-P: Interior, South side dining room, ceiling paint sample.
- 3-Ro-P: Interior, South side paint sample from ceiling in dining room.
- 4-Ro-P: Interior, West side wall south section, paint sample one foot from ceiling
- 5-Ro-P: Interior, second floor paint sample above chair rail.
- 6-Ro-P: Interior, first floor entry, paint sample of trim around doors.
- 7-Ro-P: Exterior, east side, paint samples from porch columns.
- 8-Ro-P: Interior, south side of dining room, paint sample from rosettes on ceiling.
- 9-Ro-P: Interior, west wall, northwest corner, paint sample from below the chair rail.
- 10-Ro-P: Interior, east side, entry, wall paper sample.
- 11-Ro-P: Interior, east Side, entry, paint sample.
- 12-Ro-P: Interior, stairway wall second floor above chair rail.
- 13-Ro-P: Interior, doorway between entry and dining room, paint sample from molding.
- 14-Ro-P: Interior, stairway wall, second floor below the chair rail.

206 Lincoln Drive

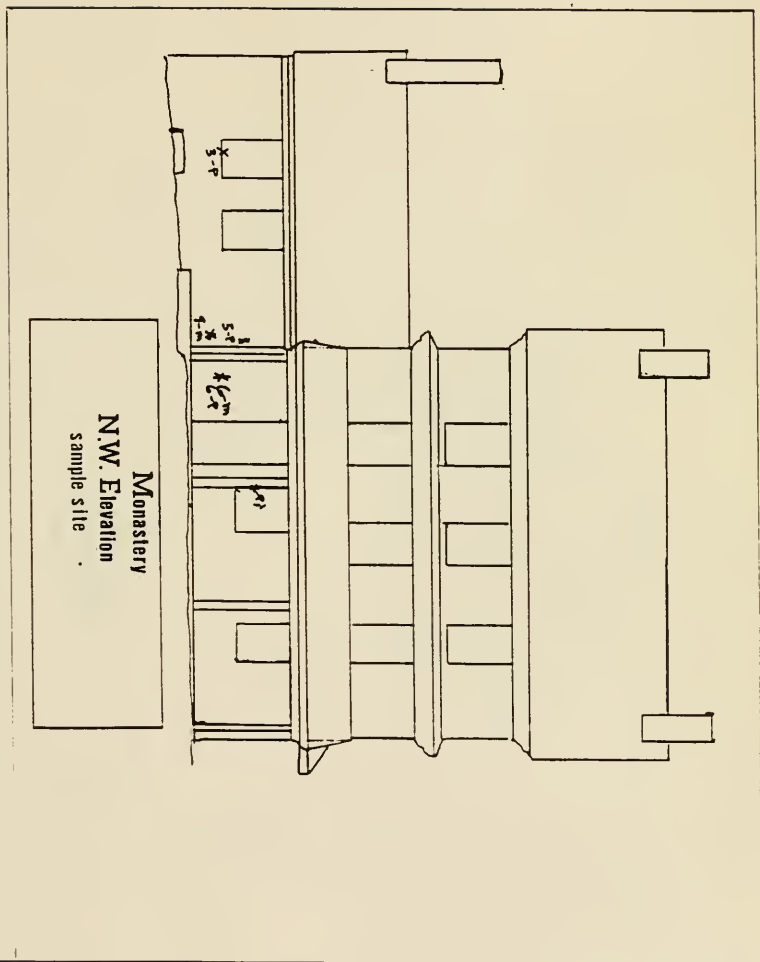
Mortar

- 1-Ri-M: Exterior, south face, Victorian addition, white coat of stucco.
- 2-Ri-M: Interior, plaster sample from the third floor above the door which leads to the west side room.
- 3-Ri-M: Interior, mortar and plaster sample from fireplace chimney stack in the west room.
- 4-Ri-P: Interior, mortar sample west side of basement wall.
- 5-Ri-P: Interior, plaster sample from the ceiling above the stairs on the third floor.

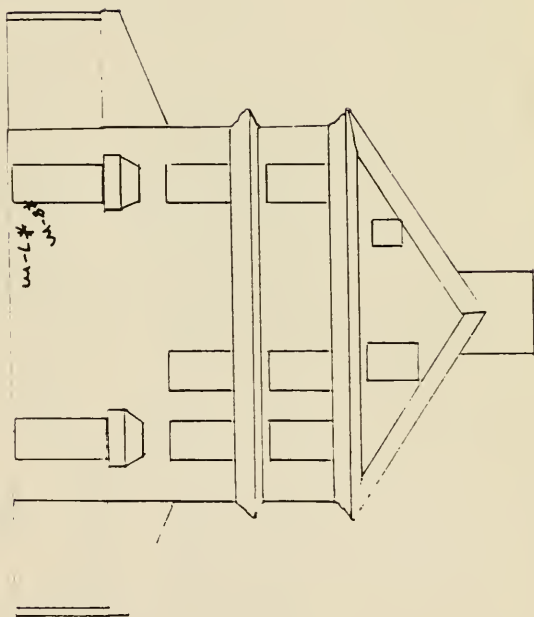
Paint

- 1-Ri-P: Interior, second floor south side, doorjamb, on door way leading from the stairway to the west side room.
- 2-Ri-P: Interior, third floor, south side, door jamb, on the door way leading from the stairway to the west side room.

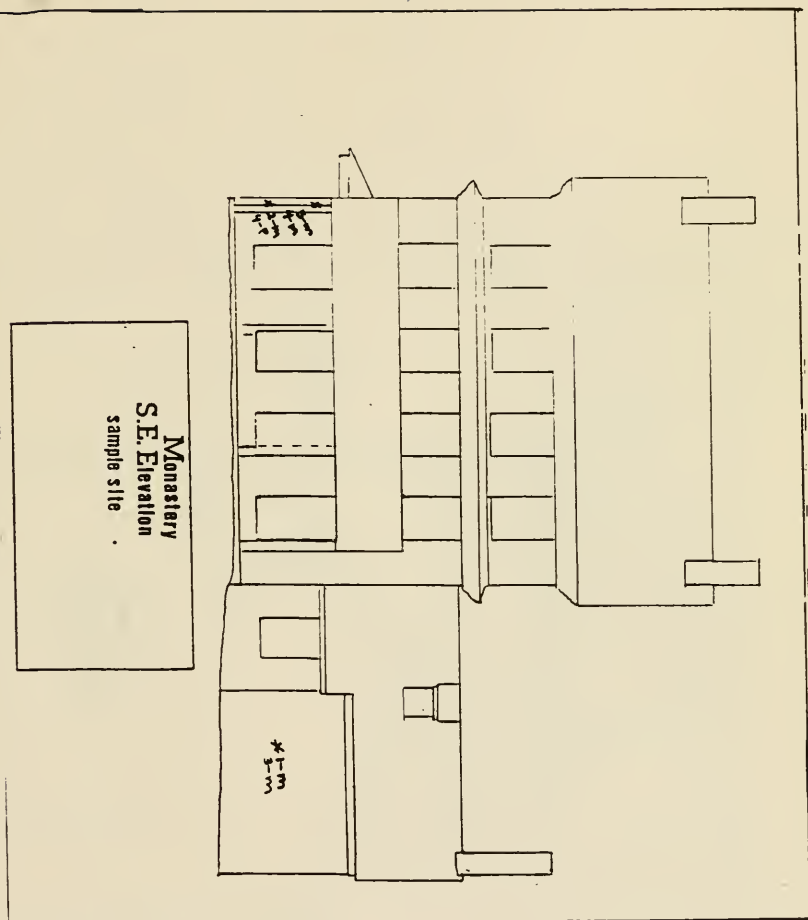
- 3-Ri-P: Interior: east wall in the living room southeast window lintel.
4-Ri-P: Interior: doorway from living room to stairway/entry. Sample taken from entry side of moulding.
5-Ri-P: Interior: third floor, west room ceiling paint and plaster.
6-Ri-P: Interior, west wall. West room second floor southwest corner.
7-Ri-P: Interior, First floor kitchen opposite entry door on wooden partition.
8-Ri-P: Exterior, east wall, southeast window lintel and shutter.
9-Ri-P: Exterior. South wall, Victorian wing southeast window.
10-Ri-P: Exterior. South side west section of porch.
11-Ri-P: Exterior. South wall, Victorian wing entry door moulding.
12-Ri-P: Exterior. South wall, West section, 4th window from the east.
13-Ri-P: Interior, south wall, dining room, west window lintel.
14-Ri-P: Interior, south wall, dining room, southwest corner baseboard.

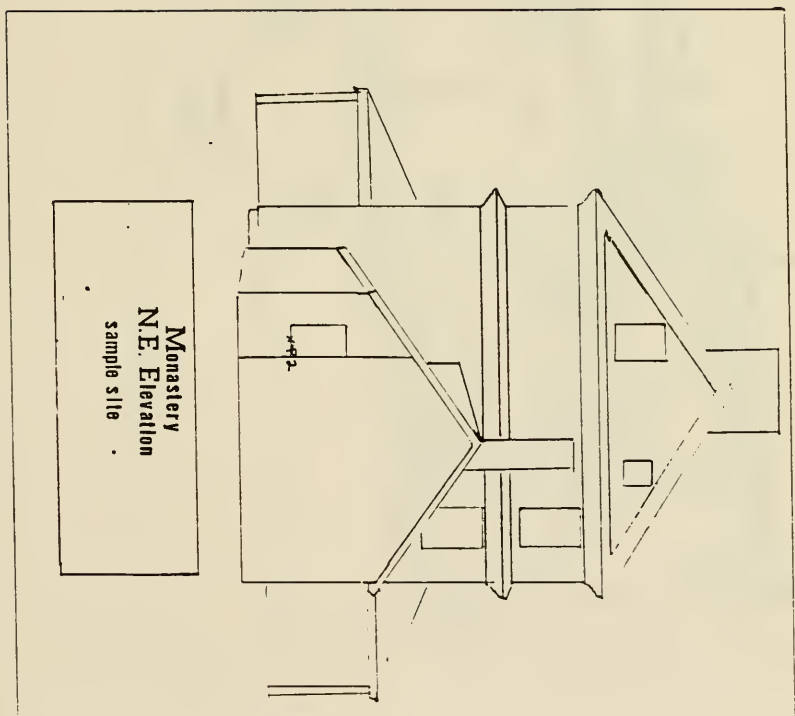


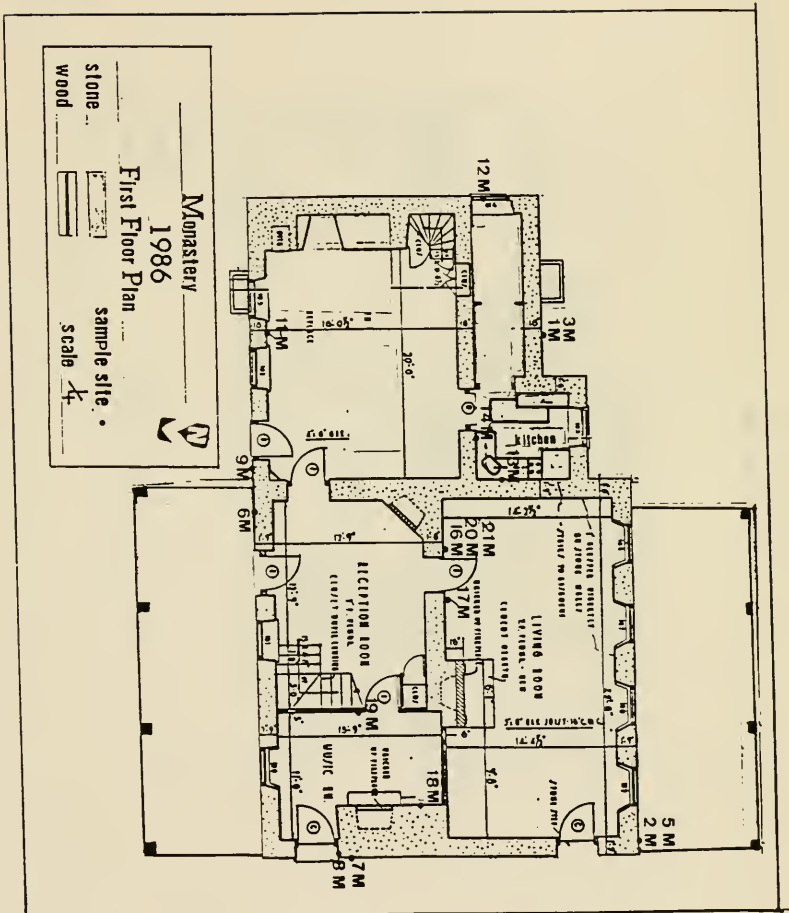
611



Monastery
S.W. Elevation
sample site



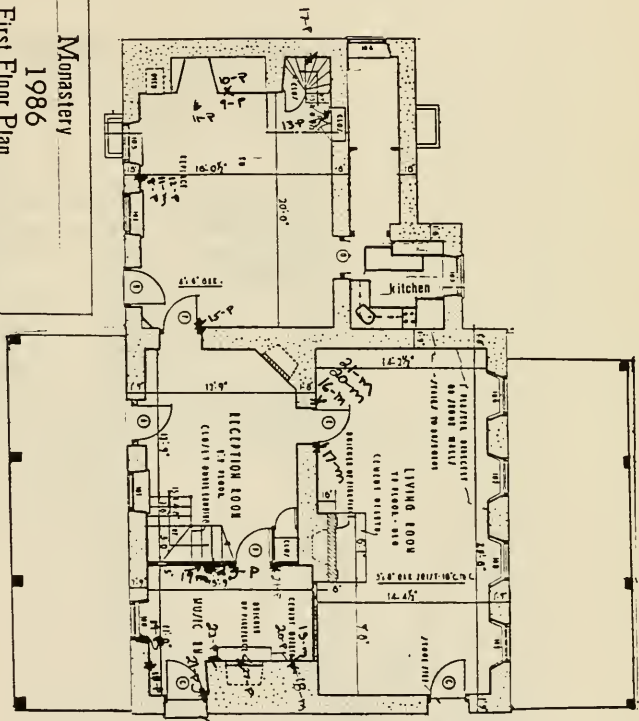


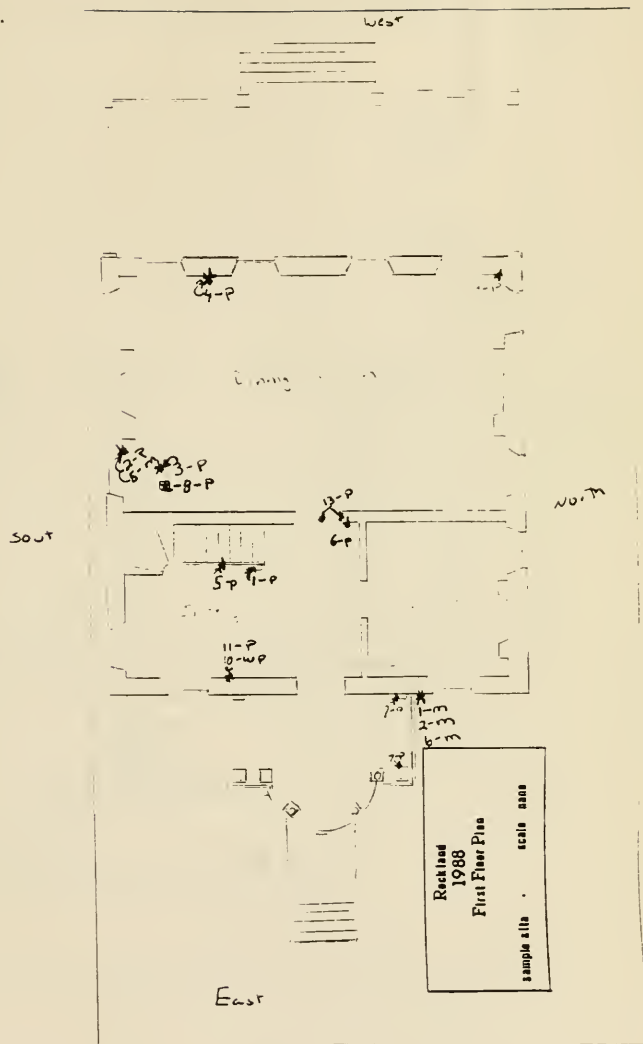


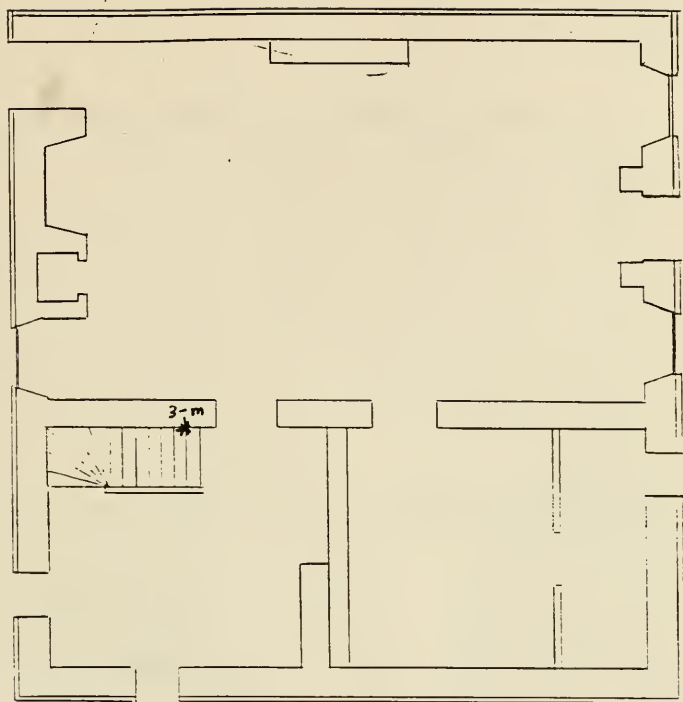
Monastery
1986
First Floor Plan

stone
wood

Sample s.l.b. #
scale 1/4"







Rockland
1988
Cellar Floor Plan

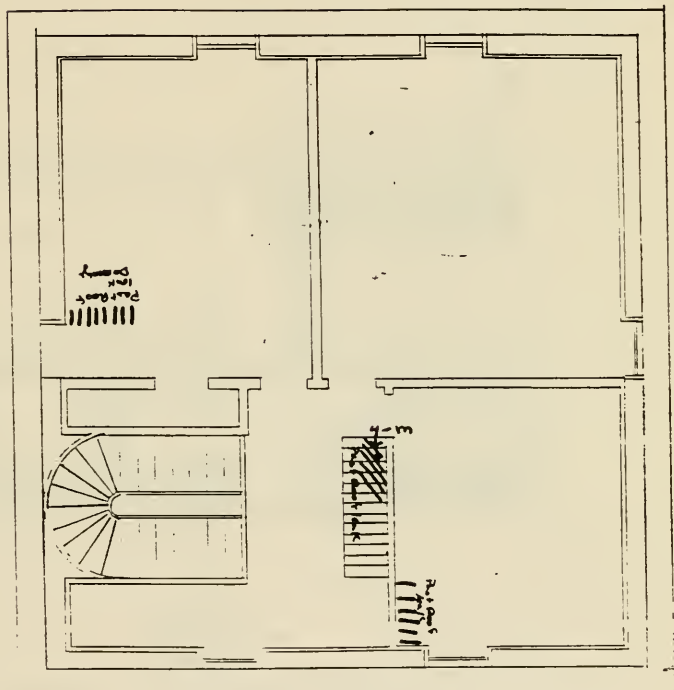
sample site scale none



Rockland
1988
Second Floor Plan

sample site

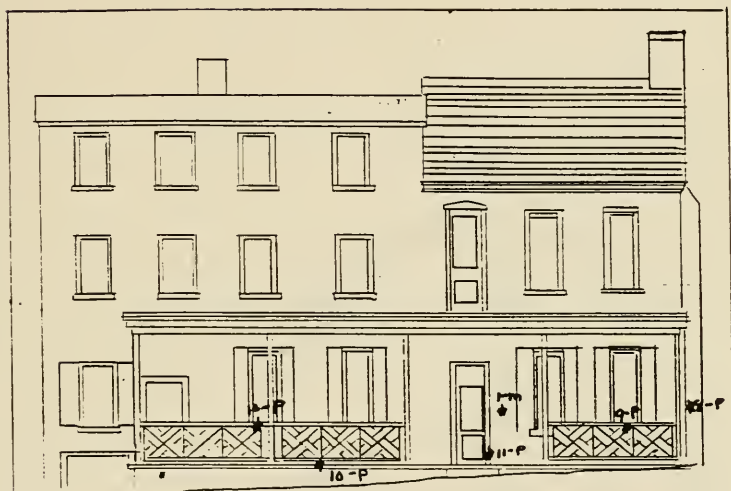
scale none



Rockland
1988
Third Floor Plan

sample site

scale none



206
Lincoln Drive
Elevation

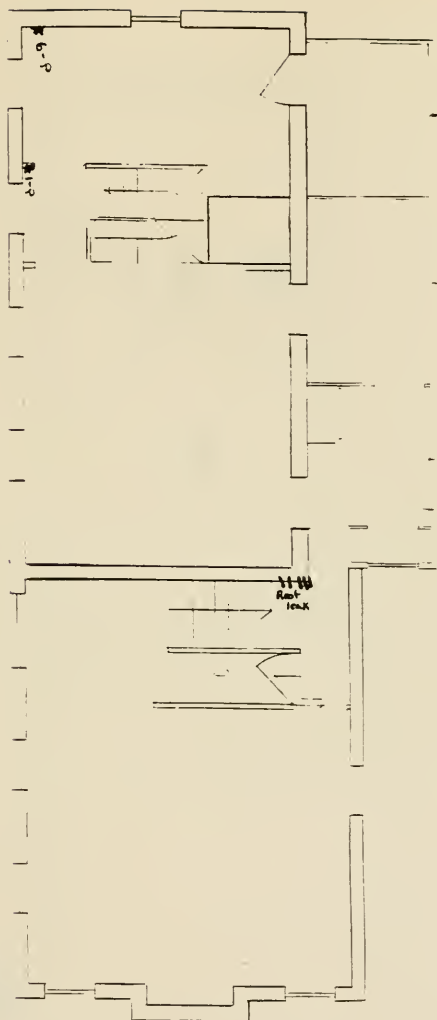
sample site

scale $\frac{1}{8} = 1'0"$

South Face



206
 Lincoln Drive
 Elevation
 sample site • scale $\frac{1}{8} = 1'0"$
 West Face



206
Los Angeles Drive
East Floor Plan
sample site
scale none

Appendix #3
Chemical Test for Paint Analysis
List of Pigments With Chemical Names

The chemical test used in this study are from:

Gettens, Rutherford J. and George L. Stout. "The Stage Microscope in Routine Examination of Paintings" Technical Studies, vol. IV, No. 4, April, 1936.

Plesters, Joyce. "Cross-section and Chemical Analysis of Paint Samples" In: Studies in Conservation Vol. 2, No. 3, April 1957. pp.110-155.

JOYCE PLESTERS

Cross-sections and Chemical Analysis of Paint Samples

Received 30/1/56

TABLES FOR IDENTIFICATION OF PIGMENTS Pages 134-155

N.B. A dash '-' under solubilities indicates that there is no visible effect
after a few minutes' immersion in the reagent.

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	11N ₂ O ₅ (concentrated)		
Azurite (mountain blue, blue verditer).	Basic copper carbonate, $2\text{CuCO}_3 \cdot \text{Cu(OH)}_2$.	Natural mineral known from very early times.	Bright, slightly greenish blue crystalline fragments, often irregular in size and shape.	Very soluble, with effervescence of CO_2 to give a green solution.	Slow hydrolysis takes place with formation of black CuO on the surface of the pigment particles.	Very soluble, with effervescence of CO_2 to give a pale blue solution.	Black residue of copper oxide Cu_2O .	<p>(i) Dissolves in excess ammonia producing a deep blue solution of copper ammonia complex.</p> <p>(ii) Test for Cu^{++} with sodium dichloridocarbonylate: 1 drop of the solution of pigment in HCl or HNO_3 is dropped on to filter paper and held over ammonia. A small drop of the reagent (5 or 10% solution in water) is added. An orange-brown spot is formed if Cu^{++} is present. (It produces only a white turbidity, and interference by Fe^{++} can be prevented by adding citric acid solution to the test drop before rendering it ammoniacal.)</p> <p>(iii) Test for Cu^{++} with rubricane acid (dihydroxamide): A drop of the acid solution of the pigment is placed on filter paper and held over ammonia. A drop of reagent (1% rubricane acid in ethanol) is added. In the presence of Cu^{++} a greenish black coloration or precipitate is produced. (If the presence of Cu^{++} is suspected, acetic acid is first added when the central greenish-black spot due to Cu^{++} will be surrounded by an orange zone due to Co^{++}.)</p>

Cross-sections and Chemical Analysis of Paint Samples

Blue line	Basic copper carbonate, $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$	An artificially prepared substitute for Azurite; recipes for its manufacture are given from medieval times onwards	Usually more rounded and finer particles than those of Azurite.	As above.	As above.	As above.	As above.	As above.
Ultramarine, natural.	A complex compound of sodium, aluminium, silicate and sulphur, of somewhat variable composition, but approximating to $3\text{Na}_2\text{O} \cdot 1\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 2\text{Na}_2\text{S}$.	From the blue mineral Lapis Lazuli in which it occurs with calc spar and iron pyrites.	Clear, often slightly purplish blue crystalline particles of irregular size and shape. A few orange-red particles of iron pyrites are often seen, and white crystalline material, which viewed between crossed Nicol prisms proves to be the doubly refracting calcite.	Becomes white and an effervescence of H_2S is produced (this can often be detected by smell).	—	Reacts quite slowly, the colour changing to pale yellow.	—	<p>Tests for hydrogen sulphide evolved on treatment with hydrochloric acid:</p> <p>(i) Sodium-azide/iodine reagent:</p> <p>A drop of dilute acid is added to the pigment followed by a drop of the sodium azide/iodine reagent (e.g. sodium azide, e.g. potassium iodide and a small crystal of iodine in 3 ml. of water). Bubbles of nitrogen rise to the surface and the orange colour of the reagent fades if sulphide is present (it remains in the absence of sulphide).</p> <p>(ii) The presence of H_2S may be ascertained by the blackening of lead acetate or sodium plumbite papers, or of a length silver wire dipping into the drop. The reaction is best carried out in a crucible covered with a glass cover slip to prevent escape of the H_2S.</p>

Pigment	Chemical Composition	Origin, or Date of Invention	Appearance under low magnification	Solubilities			Effect of heat	Specific Tests
				3N HCl	4N NaOH	11N ₂ O ₃ (concentrated)		
Ultramarine artificial.	As above but approximate formula $\text{Na}_{2-10}\text{Al}_2\text{Si}_4\text{O}_{12}\text{S}_2$ (See ILAPEN and RORTT [29] for modern views on structure.)	Manufacture first discovered by Guimet in 1828.	Usually smaller and more rounded pigment grains than those of lapis ultramarine. Moreover, there are few colourless particles and no doubly refracting calcite crystals, or particles of iron pyrites.	As above.	As above.	In samples examined in the National Gallery, artificial ultramarine seems to be attacked more rapidly. This does not seem to be wholly due to particle size. Most samples of the artificial pigment had become wholly pale yellow in less than half an hour, but the lapis variety was still blue after 2 hours.	—	As above.
Smalt	A potassium silicate glass coloured blue with cobalt oxide.	Manufactured Eilhardt [17] reports it to be mentioned first in 1584.	By transmitted light, usually a rather pale blue. Very characteristic glassy fragments, often very coarse.	—	—	—	Melts at high temperatures	The pigment can be put into solution by fusing in a platinum spoon with sodium fluoride and a drop of concentrated sulphuric acid. The residue dissolved in a drop of water usually gives a fairly pink solution. This solution may be used for tests for Co^{2+} : (a) Test for Ca^{2+} with oxalate. (b) Test for Ca^{2+} with oxalate- β -naphthol. (Reagent solution is 1 gnl. of solid in 50 ml. glacial acetic acid diluted to 100 ml. with water.) 1 drop of test solution (neutral or weakly acid) is spotted onto filter paper and 1 drop of reagent added. The reagent alone gives a yellow spot. Fe^{2+} if Co^{2+} is present a

Cross-sections and Chemical Analysis of Paint Samples

deep orange-red spot appears in the center. (If the presence of Fe^{++} is suspected a few drops of a 10 % solution of trisodium phosphate should be added to the test drop as the precipitate. Ferric phosphate does not react with the reagent.)

(ii) Test for Co^{++} with rubanic acid:

A spot of the test solution on filter paper is held over ammonia and then a drop of reagent (1 % in ethanol) is added. In the presence of Co^{++} an orange-brown spot is formed (if Co^{++} is also present this gives a greenish-black spot in the center of the orange colour due to Co^{++}).

(i) Soluble in chloroform giving a deep blue solution, and partially soluble in white spirit giving a pinkish-mauve solution.

(ii) Bleached by sodium hypochlorite solution.

With gentle heat sublimes with a purple vapour, then decomposes giving a brown sublimate, dark fumes and a characteristic smell.

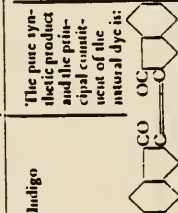
Decomposes to a dark brown precipitate.

Slowly turns brown on prolonged immersion, and partly dissolves.

Slowly turns brown on prolonged immersion, and partly dissolves.

Very dark blue, and of very fine particle size. The dye stuff seems to stain oil films.

A blue dye from a plant. The plant contains a glucoside which on hydrolysis with acid gives the blue dye stuff and glucose. The synthesis of indigo was discovered in 1880 by Haeuer.



Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Cobalt blue (Thénard's blue).	Cobalt aluminate, $\text{CoO} \cdot \text{Al}_2\text{O}_3$	A synthetic pigment discovered by Thénard in 1802.	Pure blue rounded particles, moderately fine and of irregular size. Bright blue by transmittance light.	—	—	—	—	The pigment may be put into solution by fusion in a platinum spoon with either sodium persulphate or a mixture of sodium carbonate and sodium peroxide. The melt is extracted with dilute nitric acid and the test for Co^{++} given under 'Smalt'. It can be carried out on the solution. $\text{Al}(\text{OH})_3$ may be precipitated as $\text{Al}(\text{OH})_3$ from the solution by addition of sodium hydroxide.
Cerulean blue.	Cobaltous stannate, $\text{CoO} \cdot n\text{SnO}_2$	A synthetic pigment known as a chemical compound in the 19th century but not introduced as a pigment until 1860.	Green-blue, finely divided, rounded particles.	—	—	Sufficiently soluble, with heating, to give a pale blue solution.	—	The tests for Co^{++} mentioned under 'Smalt' may be applied to the solution in nitric acid, or if the specimen is not sufficiently soluble, to the solution obtained by the fusion treatment described under 'Cobalt blue'.

GREEN PIGMENTS.

Green Earth (terre verte).	Variable in composition; a complex hydrous silicate of Fe, Mg, Al and K. The green colour is caused by a small amount of Fe^{++} .	Known from earliest times as a natural mineral.	Usually coarse crystalline particles of a rather blue-green, sometimes tinged with brown. Colourless particles are usually present also.	Partially soluble to give a pale greenish solution.	Partially soluble to give a greenish grey ppt. of $\text{Fe}(\text{OH})_3$, which becomes brown on standing.	Soluble, giving a reddish solution.	Gradually turns golden brown.	(i) Tests for the presence of Fe^{++} may be carried out on the solution of the pigment in conc. HCl; (ii) $\text{K}_4\text{Fe}(\text{CN})_6$ gives Prussian blue; (iii) KCN gives red ferric thiocyanate; (iv) Tests for Fe^{++} in the presence of Fe^{+++} ; (v) The greenish ppt. of $\text{Fe}(\text{OH})_3$ obtained by treatment with NaOH may be oxidized immediately to brown $\text{Fe}(\text{O})_2$ by addition of a drop of hydrogen peroxide.
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Cross-sections and Chemical Analysis of Paint Samples

								<p>(b) A drop of the acid test solution is placed on a spot plate lined with paraffin wax. The yellow test solution is decolorized by adding a crystal or two of potassium fluoride (Fe^{+++}, K_2FeF_6). A drop of α-α-diphenyl reagent (2% in ethanol added). Fe^{+++} produces a pink coloration.</p>
Malachite (monomale green).	A basic copper carbonate, $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$	Known from earliest times as a natural mineral; often occurs in conjunction with azurite, 4%.	Crystalline fragments, a rather pale, blue-green in colour.	Soluble with effervescence of CO_2 giving a green solution.	Unaffected in the cold, but on warming, the particles partially dissolve giving a pale blue solution and they become coated with black CuO .	Soluble with effervescence of CO_2 giving a blue solution.	Black residue of CuO .	The solution in acid may be used for the test for copper described under 'Azurite' (see 'Blue Pigments').
Verdigris	Usually the dibasic copper acetate, $\text{Cu(CH}_3\text{COO)}_2 \cdot 2\text{Cu(OH)}_2$	Prepared from ancient times by corroding copper with vinegar.	Clear blue-green crystals, sometimes pointed needles. Colour often very strong.	Soluble giving a green solution.	Soluble, giving a pale blue ppt. of copper hydroxide which turns black on boiling.	Soluble giving a green solution.	Gives off a smell of acetic acid on warming (vapour turns Universal Indicator paper red). Further heating converts into black CuO .	(i) The tests for Cu^{++} described under 'Azurite' may be carried out on the solution of the pigment in dil. HCl , or HNO_3 . (ii) Tests for acetate: (a) Warming with dil. H_2SO_4 usually yields a smell of acetic acid. (b) Addition of silver nitrate solution to a solution of the pigment in HNO_3 produces a white ppt. of silver acetate.
Transparent copper green.	Not strictly a pigment. A transparent green varnish is formed if a copper salt is dissolved in a resin such as Venice turpentine, when the Cu^{++} ion forms a salt with the resin which is transparent.	Laurie [1] claimed to have found this type of paint on illuminated manuscripts dating from the 8th century.	Clear rather grey-green when freshly prepared or in good preservation; when decayed becomes brown. On pictures it is sometimes mixed with lead white or an opaque yellow-green.	Partly soluble giving a solution of CuCl_2 .	Disintegrated, the remaining component being dissolved and pale blue copper pyrophosphate being precipitated.	Soluble, giving a brown solution.	The resin usually gives off a characteristic resinous smell on warming, then the resins and becomes brown. Finally an incombustible black residue of CuO remains.	The solution in acid usually contains sufficient Cu^{++} for the tests listed under 'Azurite' ('Blue Pigment') to be carried out.

GREEN PIGMENTS (Contd.)

Pigment	Chemical Composition	Origin, or Date of Invention	Appearance under Low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Cobalt Green (Blumant's green, zinc green).	A compound of cobalt oxide and zinc oxide of rather indefinite proportions. Probably there is a small proportion of CuO to ZnO.	A synthetic pigment discovered by Blumant in 1780, but not used as a pigment until the nineteenth century.	Fine regular rounded particles, rather bluish-green by reflected light, but pure green by transmitted light.	Slightly soluble on heating, and more so with conc. HCl giving a pale pink solution.	—	Slowly soluble with heating to give a pale blue solution.	—	(b) Tests for Co ⁺⁺ listed under 'Sual' (Blue Pigments) may be made on the solution of the pigment in nitric acid. (d) Test for Zn ⁺⁺ with dilute zinc: A drop of the test solution on a spot plate is made alkaline with 2N NaOH, a few drops of dilute solution (to mg. in 100 ml. of carbon tetrachloride) are added. The solution is stirred and the CO ₂ evaporated by blowing. A raspberry red solution (indicating precipitates present) indicates Zn (the test is specific for Zn in alkaline solution).
Chromium Oxide Green, opaque.	Anthracene Chromic Oxide, Cr ₂ O ₃ .	Vauquelin, the discoverer of chromium, suggested the use of Cr ₂ O ₃ in ceramic glazes in 1809, but it practically did not appear as an artist's pigment until some years later. [See Laurie (1).]	Rather dull olive green opaque granules, usually rather coarse; high refractive index.	—	—	—	—	The pigment can be put into solution by fusing with a mixture of sodium carbonate and sodium peroxide on a platinum spoon and dissolving the melt in a drop of conc. H ₂ SO ₄ . The chromium goes into solution as sodium chromate. Tests for chromium as chromate may be made on this solution. (b) Test for Cr ₂ O ₃ with diphenylpicazoline: To a drop of test solution on a spot plate are added 1-2 drops of the reagent (5% diphenylpicazoline in ethanol). A violet colour is formed in the presence of chromate.

(ii) Addition of a drop of AgNO_3 to a drop of the solution on a spot plate or filter paper gives a brick red ppt. of silver chromate.

(iii) Lead acetate solution gives a yellow ppt. of PbCrO_4 , soluble in HNO_3 .

Viridian (Cinnabar green).	Transparent hydrous oxide of Chromium $\text{Cr}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$.	Synthetic pig- ment first pre- sented by Painche in 1838. (See Church (40).)	Brilliant some- what blue-green colour; particles usually large, ir- regular, slightly rounded, and ex- ceptionally trans- parent. Refract- ive index is lower than that of the opaque oxide.	—	—	As above.		
Chromite Green (Cinnabar Green).	A mixture of Prussian blue; $\text{Fe}_3\text{I}(\text{CN})_6$ with chrome yellow, i.e. lead chromate Pb CrO_4 .	Chrome Yellow was described by Vanquelin in 1809, so that the first manu- facture of chrome green must be after this date.	Colour varies from gray green to blue-green. (The latter known as Cinnabar green.) The blue and yellow particles are often not distin- guishable since the Prussian blue seems to coat the yellow particles.	The lead chrom- ate is dissolved with parts of white lead chlo- ride. The Prussian blue is unchanged, so that the colour of the sample changes from green to blue.	The Prussian blue is dis- solved with pptn. of orange-brown ferric hydrox- ide, so that the colour of the sample changes from green to brownish yellow.	Partly soluble; the lead chro- mate dissolves to give a yellow solution, the Prussian blue remains un- changed.	Turns yellow- brown owing to the forma- tion of ferric oxide.	(i) Tests for CrO_3 —listed under 'Chromium oxide green-opaque' may be made on the sample treated with acids. (ii) Tests for Pb^{++} may be made under the same condi- tions (these tests are listed under 'Lead White') see 'White Pigments and Veris'. (iii) See 'Prussian blue' (Blue Pigment) for tests for this pigment.

Joyce Plesters

GREEN PIGMENTS (Contd.)

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				in HCl	in NaOH	in HNO_3 (concentrated)		
Scheele's Green.	Copper-hydroarsenite, $\text{Cu}_2(\text{AsO}_3)_2$ (fluor composition varies with mode of preparation).	A synthetic pigment invented by Scheele in 1778.	Bright lime-green irregularly shaped flakes of varying size. Rather opaque.	Soluble giving a green solution.	Soluble with formation of a pale blue ppt. of $\text{Cu}(\text{OH})_2$.	Soluble giving a blue solution.	Black residue of CuO .	(i) Tests for Cu^{+2} , as listed under 'Aurifer' (see 'Blue Pigments') may be made on the solution in dil. acid. (ii) Tests for As: (a) The pigment is dissolved in conc. HCl and a drop or two of saturated stannous chloride solution added. The mixture is then warmed. Arsenic is precipitated as a blackish brown solid (the Cu^{+2} is reduced to colourless cuprous chloride and does not interfere). (b) A drop of the test solution (or a few grains of pigment) is warmed in a platinum crucible with a drop or two of ammonia and of hydrogen peroxide (10%). It is then acidified with acetic acid and 1-2 drops of AgNO_3 solution (1%) added. A red-brown ppt. of silver arsenate is formed in the presence of As. (Since chromates interfere, the absence of 'Chrome Green' (q.v.) must be proved before this test is made.)
Emerald Green (Schweinfurt Green, Paris Green, Veronese Green.)	Copper acetate-arsenic: $\text{Cu}(\text{CH}_3\text{COO})_2 \cdot 3\text{Cu}(\text{AsO}_3)_2$	A synthetic pigment first made at Schweinfurt, Germany, in 1814.	Distinctive brilliant bluish-green, small rounded grains, some with the appearance of being trefoil or quadrifol in shape, probably owing to a depression in their surface.	As above, but an almost colourless solution.	As above.	As above.	As above.	As above.

Vermilion (Cinnabar)	Red mercuric sulphide, HgS .	Occur as a natural mineral cinnabar, but has been synthesized from early times.	Very deep red by transmitted light. Pigment size and crystallinity vary; natural and synthetic varieties are not distinguishable.	—	—	Very slightly soluble.	No change at moderate temperatures but softens at 380°C .	(i) Test for Hg^{++} : The pigment may be dissolved in a platinum spoon by repeated treatment with hot HCl . The residue is red, solved in a drop of dil HNO_3 , a drop of this solution is placed on filter paper impregnated with freshly prepared diphenyl carbazone reagent (1% in ethanol). A violet-blue fleck indicates Hg^{++} . (ii) Test for Sulphide: On the solid pigment is placed a drop of sodium azide/hydrazine reagent. Bubbles of gas (nitrogen) rise to the surface if sulphide is present and the yellow colour of the reagent fades.
Iron oxide reds (Ital red, Indian red, Venetian red, light red, haematite, Mars red, etc.).	Iron oxide, either anhydrous, Fe_2O_3 , or hydrated, $\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$.	Occur widely as natural minerals, also made artificially (the Mars colours).	Some varieties (e.g. haematite) are transparent and red by transmitted light. Others are quite opaque. It is difficult to distinguish the artificial varieties from the natural.	Some specimens are slightly soluble.	—	Partly soluble.	—	The pigment is soluble in concentrated HCl giving a yellow solution of FeCl_3 . Test for Fe^{+++} : (i) Potassium ferrioxalate gives a ppt. of Prussian blue. (ii) Potassium thiocyanate gives a blood red coloration.
Red lead (minium).	Lead tetroxide, Pb_3O_4 .	Orange-red, finely divided, may be crystalline or amorphous.	Artificially made, but known from antiquity.	Dissolves with ppm. of white PbCl_2 .	—	A brown ppt. of lead dioxide is formed.	—	Tests for Pb on soln. in HNO_3 : (i) a drop of dil. HCl and a drop of KI solution gives a yellow ppt. of PbI_2 , which after warming recrystallizes in golden 'spangles'. (ii) a drop of dil HCl plus a drop of K_2CrO_4 solution gives a yellow ppt. of PbCrO_4 .

Pigment	Chemical composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Dragon's blood	A natural resin (for chemical composition see Robertson and Whalley [11]).	From a tree in East Asia; known in medieval times (See Thompson [12]).	Dark red by reflected light but clear orange-red by transmitted light.	Partly soluble, giving a yellow solution.	Partially dissolves to an orange-red turbid solution.	Disintegrates to a dark brown mass.	Melts then evolves benzoic acid (characteristic smell). See Gettem and Stout [16].	Soluble in alcohol, benzene and chloroform to give bright red solutions.
Madder Lake (Crimson madder).	A mixture of two hydroxy-andraquinone dyes, alizarin and purpurin, obtained on to a base which is usually Al(OH) ₃ .	Extracted from the root of the madder plant.	Usually a very fine powder, crimson red in colour. In oil films the separate patches cannot be seen owing to the transparency of the Al(OH) ₃ .	The Al(OH) ₃ partly dissolves and the colour of the pigment becomes more orange.	Soluble, giving a purplish solution.	Decomposes to a dark brown solution.	Colour changes to purple brown, then black and finally only a pale grey ash of Al ₂ O ₃ remains.	(i) Tests for the dye stuff: (a) On addition of excess dil. H ₂ SO ₄ the Al(OH) ₃ base is dissolved and a fluorescent orange of the dye stuff formed. (b) Natural madder lakes often fluoresce whitish in u.v. owing to the presence of purpurin. (ii) Test for Al(OH) ₃ with Morin reagent: The paint fragment is treated with NaOH which dissolves out the medium and the Al(OH) ₃ . A drop of the Morin reagent (acid solution in methanol) is placed on filter paper and dried. A drop of the test solution is added and the paper again dried. On addition of a drop of dil. HCl the spot fluoresces yellow-green in u.v. (A blank test should be done with the reagent).
Alizarin crimson.	A single hydroxy-andraquinone dye stuff, alizarin, on a base of Al(OH) ₃ .	Synthesised for the first time in 1868 by Gräbe and Lieberman.	As above.	As above.	As above.	As above.	As above.	As above, except that in the case of test (i) (b), the absence of purpurin means that there is no fluorescence under u.v. light.

Cross-sections and Chemical Analysis of Paint Samples

Brown Madder (bount madder)	Madder or alizarin charred by heating.	See above.	As above, but a dull brownish or purplish red.	As above.	As above.	See above.	As above.	See above.
Cobalt Violet, dark.	Anhydrous cobalt phos- phate $\text{Co}_3(\text{PO}_4)_2$.	Preparation described in 1859 by Salvetat.	Irregular par- ticles, red- violet in trans- mitted light and highly reflect- ing.	—	—	Somewhat soluble.	—	(i) Test for Co: heated under "Snalt" (see "Blue pigment") can be made on the solution in aqua regia. (ii) Test for Phosphate: A few grains of pigment are placed on filter paper, moistened with a drop of ammonium molybdate solu- tion and warmed over a flame. A drop of benzidine solution (0.05 g. base or chloride in to int. conc. acetic acid, then diluted with water to 100 ml.) is added and the moist flock held over NH_3 . A brilliant blue colour forms around the sample.
Cobalt Violet, light.	Anhydrous cobalt arsenate, $\text{Co}_3(\text{AsO}_4)_2$.	Appeared about 1880 (see Ethier [27]).	As above.	—	—	—	—	Tests for Co: (i) (ii) Test for Arsenate: see tests under Scheele's Green (“Green Pigment”).
Manganese Violet (Nitro- berg Violet, Permangan Violet).	Fusion product of manganese dioxide and ammonium phosphate.	Prepared first by E. Leykauf in 1868.	Rounded gran- ules of rather irregular size, bright red-violet by reflected light, but pale trans- parent mauve by transmitted light	On heating grad- ually turns black with evolution of Cl_2 .	Black ppt. of MnO_2 .	—	Greyish residue.	Test for Mn: The sample of pigment is mixed with solid K_2CO_3 and potassium nitrate (KNO_3) and fused on platinum foil. A green mass of alkali manganate is formed. This is soluble in water, and on standing is oxidized to purple alkali permanganate.

Pigment	Chemical composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Yellow Ochre (Golden Ochre, Mass Yellow).	Hydrated iron oxide, Fe ₂ O ₃ ·H ₂ O. The natural ochres may contain aluminium silicate and other impurities.	Natural minerals are widely distributed, but an artificial variety (Mass yellow) is also made.	Usually very small regular grains, rather dull golden yellow by reflected light.	Some samples are slightly soluble, giving a yellow solution of FeCl ₃ .	—	Partly soluble, giving a yellow solution.	Turns brown-red on loss of combined water.	Soluble in hot concentrated HCl giving a yellow solution of FeCl ₃ . The tests for iron given under 'Green Earth' (see 'Green Pigments') may be carried out on this solution.
Maxicret and Litharge.	Principally lead arsenite Pb ₃ (AsO ₃) ₂ , but litharge usually contains a little red lead, Pb ₂ O ₃ .	Manufactured pigment known from antiquity. Masticot is the refined oxide made by roasting lead white; litharge is the fused oxide made by oxidation of molten lead. (See Gatten and Stout [24].)	Usually of fine almost amorphous texture like lead white. Masticot is pale yellow, litharge a little more orange, owing to the presence of red Pb ₂ O ₃ .	Soluble with pptn. of white PbCl ₂ .	Soluble on heating, as sodium plumbite.	Readily soluble.	Unaffected at moderate temperatures. (Changes to red Pb ₂ O ₃ if heated above 400° C.)	The solution in acids may be used to carry out any of the tests for lead given under 'Red Lead' (see 'Red Pigments').
Orpiment (King's Yellow)	Yellow arsenic sulphide, As ₂ S ₃ .	Natural mineral, used from antiquity.	Bright golden yellow occurs in small flakes or in fibrous masses, has a glossy or waxy looking surface.	On heating goes into solution with evolution of H ₂ S.	Soluble giving sodium arsenite and sulphuric arsenites.	Soluble (decomposes to give As and H ₂ SO ₄).	Sublimes, then becomes colourless owing to oxidation to the trioxide As ₂ O ₃ .	(i) Tests for As listed under 'Scheele's Green' (see 'Green Pigments') may be carried out on the solution in alkali. (ii) Test for Sulphide: The sodium azide/iodine test given for Vermilion (see 'Red Pigments') may be made on the solid pigment.

Cross-sections and Chemical Analysis of Paint Samples

1. 7

Reagent.	Orange-red arsenic sulphide As_2S_3	Natural mineral often occurring with Orpiment.	Similar to above, but more orange by transmitted light, orange-red, it has a slightly lower R.I. than Orpiment.	As above.	Soluble.	As above.	Melts at $310^\circ C$.	As above.
Napier Yellow (Antimony Yellow).	Lead antimonate, $Pb(SbO_3)_2$	Manufactured pigment whose history is obscure. (See Gellens and Stout [24])	Very fine granules, like Massicot in appearance. It is difficult to see a crystalline form. Colour varies from lemon-yellow to orange-yellow.	Partially sol. with white $HgCl_2$ pptd.	Partially sol.	Soluble.	Sublimet with an orange-yellow vapour.	(b) Test for Antimony: a drop of the solution of the pigment in HCl is treated with 1 drop of conc. H_2SO_4 on platinum foil and a zinc filling added, and allowed to stand for 5-10 min. with the Zn and Pt in contact. The platinum darkens when Sb is present, and the element separates on the platinum in black plates (As gives mainly gaseous hydride, Sn gives a grey deposit only). (d) Test for Pb: under 'Irid Lead' (see 'Irid Pigments').
Chlorine Yellow.	Lead chromate $PbCrO_4$	Preparation described by Vauquelin in 1809.	Brilliant yellow; particle size varies; usually very fine crystals; rather opaque.	Soluble, with pptn. of white $PbCl_2$ and an orange solution of chromic acid.	Soluble giving a yellow solution.	Soluble giving a yellow solution.	—	(c) Tests for Pb^{+2} : These listed under Irid Lead (see 'Irid Pigments') may be employed with the solution of the pigment in acid. (d) Tests for CrO_4^{+2} : These may be found under 'Chromium Oxide Green', 'Opaque' (see 'Green Pigments') and may be carried out on the solution of the pigment in acid.
Barium Yellow.	Barium chromate, $BaCrO_4$	As above.	By reflected light, bright lemon yellow; by transmitted light, nearly colourless; fine structure.	Soluble, giving a yellow solution.	Soluble, giving a yellow solution.	Soluble, giving a yellow solution.	—	(e) Tests for Ba^{+2} : (a) To a solution of pigment in HCl or HNO_3 , is added H_2SO_4 ; a white ppt. of insoluble $BaSO_4$ is formed. (b) Flame test gives a pale green flame. (c) Tests for CrO_4^{+2} , see 'Chlorine Yellow', above.

Pigment	Chemical Composition	Origin, or Date of Invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	H ₂ SO ₄ (concentrated)		
Strontium Yellow (Lemon Yellow).	Strontium chromate, Sr CrO ₄ .	As above.	A little stronger yellow than BaCrO ₄ . Finely divided crystalline mass consisting of needles.	As above.	As above.	As above.	—	(i) Tests for Sr ⁺⁺ : (a) Addition of H ₂ SO ₄ to the acid test drop gives a white ppt. of insol. SrSO ₄ . (b) Flame test gives a crimson flame. (ii) Tests for CrO ₄ ⁻ : see 'Chrome Yellow'. (iii) Test with Sodium Rhodanate for distinguishing between Barium and Strontium in lemon yellow: 1 drop of the neutral test solution is spotted on filter paper and 1 drop of the reagent (0.2% aq.) added. Ba ⁺⁺ and Sr ⁺⁺ both give a red-brown spot, but the colour due to Sr ⁺⁺ disappears with 1 drop of dil. (1 in 20) HCl; the Ba ⁺⁺ colour remaining as a bright red spot.
Cobalt Yellow (Aurcolin).	Potassium cobaltinitrite, CoK ₃ (NO ₂) ₆ .H ₂ O.	Discovered by N. W. Fisher in 1848.	Small crystals and clusters of crystals, yellow by transmitted light.	Slightly soluble giving a yellow solution.	Slightly soluble.	Soluble, giving an orange solution.	When heated strongly, gives black CoO, and oxides of nitrogen.	The residue from combustion can be dissolved in dil. HCl or HNO ₃ and the solution used for tests for Co ⁺⁺ fixed under 'Sinh' (see 'Blue Pigments').
Calcium Yellow.	Calcium Sulphide, CaS.	A synthetic pigment prepared by pyrolysis of a mineral from which but there is no record of its ever having been used as a pigment). First observed by Stranget in 1848.	Colour varies from lemon yellow to orange, probably according to particle size, the orange usually being coarser. All types are, however, comparatively finely divided.	Insoluble in the cold; partly soluble on heating, with evolution of H ₂ S.	—	Soluble, with evolution of H ₂ S.	At high temperatures brown CaO is produced.	(i) Test for Ca ⁺⁺ with diphenylpicrylhydrazide: A drop of the test solution is mixed on a spot plate with a drop of NaOH (10%) and of KCN (10%), a drop of reagent (0.1% alcoholic solution of diphenylpicrylhydrazide) and two drops of formaldehyde (40%). In the presence of Ca ⁺⁺ a blue-green ppt. or colour above the liquid is obtained.

gives a violet colour with formaldehyde. The colour should be compared with a blank using the reagents only.

(ii) Test for Sulphide: The sodium azide/iodine test described under 'Vermilion' (see 'Red Pigments') can be used with the solid pigment.

BROWN AND BLACK PIGMENTS.

Raw Sienna	Hydrated ferric oxide, $\text{Fe}_2\text{O}_3 \cdot 11\text{H}_2\text{O}$.	Natural mineral.	By reflected light, a golden-brown; by transmitted light, a mixture of transparent yellow, red-brown and colourless particles can be seen, as well as opaque brown ones.	Slightly soluble, especially on heating. (Usually insufficient to give a blue colour with $\text{K}_2\text{Fe}(\text{CN})_6$.)	—	Partly soluble.	Colour changes to the darker warmer brown of Burnt Sienna (see below), the anhydrous oxide.	The pigment will dissolve in hot concentrated HCl giving a yellow solution. The test for iron may be carried out on this solution which is lined under 'Green Earth' (see 'Green Pigments').
Burnt Sienna.	Anhydrous Ferric Oxide, Fe_2O_3 .	Prepared by calcining Raw Sienna.	Most of the grains are reddish brown. No visible crystalline form.	As above.	—	As above.	—	As above.
Raw Umber.	Hydrated Ferric Oxide $\text{Fe}_2\text{O}_3 \cdot 11\text{H}_2\text{O}$ with a proportion of Manganese dioxide MnO_2 (from 8-16 %)	Natural mineral.	Fine darkish yellow-brown grains mainly, but some orange, yellow and colourless particles.	As above.	—	As above.	Lowers water to become the anhydrous oxide (Burnt Umber (see below) which is a darker, redder brown.	(i) Tests for Fe^{+++} as for Raw Sienna. (ii) Tests for Mn: (a) Catalytic oxidation to permanganate: A little of the pigment or a drop of its solution in H_2O_2 (Cl^- must be absent) is mixed with a drop of conc. H_2SO_4 in a platinum spoon. A drop of AgNO_3 solution (0.1 %) is stirred in, followed by a milligram or two of ammonium persulphate. The mixture is gently heated. In the presence of Mn a red-violet colour due to the permanganate is formed.

Pigment	Chemical composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	11N ₂ O ₅ (concentrated)		
Burnt Umber.	Anhydrous ferric oxide Fe ₂ O ₃ , with a proportion of manganese dioxide, MnO ₂ .	Prepared by gently heating raw Umber.	As above, but a little darker, redder brown in colour, and slightly more transparent.	As above.	—	As above.	—	(i) Tests for Fe ⁺⁺⁺ , as for Raw Sienna. (ii) Tests for Mn, as above.
Blumen (aplatum, minium, biate).	A mixture of hydrocarbons with organic and inorganic impurities and of variable composition. (See Church [30] and Gentert and Stout [24])	Blumen or aplatum occurs as a semi-fine mineral deposit. Minium is a pigment made from the aplatum used to encaustic in the Egyptian mummy. Biate is a tarry material from burned wood.	Dark brown amorphous solid, semitransparent and orange-brown by transmitted light. It is partially soluble in oil media giving a translucent brown film.	—	Soluble, giving an orange-brown solution.	Soluble, giving a red-brown solution.	At first melts to a black tarry liquid. Dense yellow-brown fumes are then produced, with a pungent, tarry odour, and a brown distillate collects at the mouth of the ignition tube. Finally only a very small residue of incombustible inorganic matter remains.	(i) At least part of the material is soluble in benzene, petroleum ethers and other organic solvents. (ii) The incombustible residue usually gives a positive test for iron (see tests for Fe ⁺⁺⁺ under 'Green Earth', 'Green Pigments').
Van Dyck Brown (Caswell Earth, Cobque Earth).	Consists of as much as 90 % of organic matter (hydrocarbons similar to those of Blumen), together with iron oxide, alumina, silica, etc.	A mineral deposit similar to Liguite.	As above, but of a more heterogeneous appearance, and with granules of inorganic brown pigment.	—	As above.	As above.	As above, but leaves rather more incombustible residue.	As above.

Cross-sections and Chemical Analysis of Paint Samples

Carbon black (Charcoal black, lamp black, vine black, graphitic).	Consists primarily of carbon as the free element. Impurities vary a little, as to source, e.g. lamp black contains hydrocarbons.	Except for graphite, which is a natural mineral (but can also be prepared artificially), carbon blacks are all produced by the partial combustion of organic materials such as wood and oil. Most forms were known from earliest times.	Except for graphite, which is in the form of flaky grey-black crystals, all these pigments are black or blackish brown opaque materials. The particle size varies greatly; lamp black is very fine, whereas charcoal is often seen as rather coarse jagged chips; yet other forms are granular.	—	—	—	Can be almost completely burnt in air (except for minute amounts of inorganic impurities).	Not necessary.
Bone black (Ivory black, Animal black).	Consists of little as to % carbon, the remainder being mainly calcium phosphate $\text{Ca}_3(\text{PO}_4)_2$ with a little calcium carbonate.	Obtained by charring animal bones (or tusks) in a restricted air supply.	The carbon seems to be mixed in with the calcium phosphate, and the general appearance is of translucent blackish brown grains of rather irregular shape, but with no separate black and white particles.	—	—	—	A white residue of calcium salts remains after combustion.	(i) For Ca^{++} : (a) The insoluble residue gives a bright red flame test. (b) The insoluble residue is soluble in dilute acids, but on adding $(\text{NH}_4)_2\text{CO}_3$ in excess a white ppt. of CaCO_3 is formed. (ii) Tests for PO_4^{--} : The ammonium molybdate/borax test given for 'Cobalt Violet, dark' (see 'Red and Violet Pigments') may be applied to the insoluble residue.
White pigments and fillers.	Calcium carbonate CaCO_3 .	Natural deposit.	Fine white or whitish powder; Low R.L.	—	—	—	None until very high temperatures when CaO formed.	(i) On heating with dil. H_2SO_4 and evaporating to dryness, recrystallization of the residue from dil. HCl gives characteristic 'wheat-sheaf' formations of needles of gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. (ii) A flame test gives the brilliant red colour caused by Ca .
Chalk (Whiting, Lime-white).	Calcium carbonate CaCO_3 .	Natural deposit.	Fine white or whitish powder; Low R.L.	—	—	—	None until very high temperatures when CaO formed.	(i) On heating with dil. H_2SO_4 and evaporating to dryness, recrystallization of the residue from dil. HCl gives characteristic 'wheat-sheaf' formations of needles of gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. (ii) A flame test gives the brilliant red colour caused by Ca .

Pigment	Chemical composition	Origin, or date of invention (if after 1760)	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Gypsum.	Calcium sulphate dihydrate, CaSO ₄ · 2H ₂ O.	Natural deposit.	Usually fine granular crystalline mass.	Moderately soluble.	—	Moderately soluble.	At 110° C. loses water of crystallisation (giving plaster of Paris). Water vapour condenses at the top of the tube.	(i) On dissolving in dil. HCl and allowing to crystallise out, characteristic 'whiskers' of gypsum needles are formed. (ii) Flame test for Ca. (iii) To test for SO ₄ ²⁻ , boil the sample with dil. HCl, filter off and add BaCl ₂ solution to the filtrate. A white insoluble ppt. of BaSO ₄ is formed if sulphate is present.
Anhydrous Calcium Sulphate (anhydrite).	CaSO ₄ .	Prepared by calcining gypsum.	Fine white powder.	Moderately soluble, but less so than gypsum.	—	Moderately soluble.	No effect; with a dry sample no water vapour is given off on heating.	(i) (ii) and (iii) as above. (iv) To distinguish from gypsum by the hydrated state, a slightly greater solubility in water place a grain or two of the solid on a spot plate; add 2-3 drops of 4% Na ₂ CO ₃ solution redendred with phenolphthalein. Stir the ppt. with a platinum wire. Gypsum decolorizes the solution in 4-5 min., the anhydrite in 15-25 min. (N.B.—Analysis of gesso inerts are best done by X-ray crystallography method.)
Lead white.	Basic lead carbonate, 2PbCO ₃ · Pb(OH) ₂ .	Artificially prepared from very early times.	Fine white powder (individual grains and crystallinity only seen at very high power).	Soluble, giving a white ppt. of PbCl ₂ , soluble on heating.	Partially soluble as sodium plumbite.	Soluble.	Turns yellow owing to the formation of Manicot (lead monoxide, PbO).	Tests for Pb ²⁺ are given under Red Lead (see 'Red Pigments') and can be carried out with the solution of the pigment in HNO ₃ (dilute).

Cross-sections and Chemical Analysis of Paint Samples

Zinc white (Chinese white)	Zinc oxide, ZnO.	Artificially prepared. The use of ZnO as a pig- ment was first suggested in 1782.	Very finely divided white powder.	Completely sol- uble, with no effervescence.	Soluble as sodium stearate.	Completely soluble with no effervescence.	Turns yellow on heating but be- comes white again on cool- ing.	(i) Not blackened by H_2S , since ZnS is white. (ii) Test for Zn with dilute HCl : 1 drop of the solution in place with a few drops of dilute HCl solution (to mag- netic) to 100 ml. CCl_4 . The CCl_4 is evaporated while stirring. A raspberry red colour shows the presence of Zn. (The test is specific for Zn in alkaline solution.)
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METALS USED AS PIGMENTS.

Gold.	Metallic ele- ment, Au.	Known from antiquity.	Colour varies, with the degree of purity being sometimes pinkish and sometimes yellowish. Bright metallic sheet which does not tarnish. Used as thin beaten sheets or "leaves" laid down on the picture surface, or as a powder like an ordinary pigment.	—	—	—	—	Soluble in aqua regia (3 conc. HCl /1 conc. HNO_3), and unattacked by any other reagents. The following tests may be made on the solution: (i) Test for Au with benal- dine: A drop of the test solution and a drop of benalidine re- agent (0.05 % in 10 % acetic acid) are spotted on to filter paper. In the presence of Au a blue colour is formed. (ii) Test for Au with Rhodamine B: 1 drop of solution in aqua regia is mixed on a spot plate with 1 drop of reagent (0.01 g. in 100 ml. water). The solu- tion is stirred with a few drops of benzene. If Au is present the benzene layer becomes red-violet to pink, and after a min. fluoresces orange under u.-v. light.
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METALS USED AS PIGMENTS (Contd.)

Pigment	Chemical composition	Origin, or date of invention	Appearance under low magnification	Solubilities			Effect of heat	Specific tests
				3N HCl	4N NaOH	HNO ₃ (concentrated)		
Silver.	Metallic element, Ag.	Known from antiquity.	When untreated has a white metallic sheen, but rapidly discolours in an impure atmosphere, owing to the formation of a film of black sulphide.	Very slight solvent action.	—	Dissolves with evolution of nitrogen oxides (brown fumes with characteristic colour).	—	(i) To the solution in HNO ₃ is added dil. HCl. A white ppt. of AgCl is formed, darkening on exposure to light and soluble in excess NH ₃ . (ii) Addition of K ₂ CrO ₄ to the test solution produces a ppt. of brick-red silver chromate, Ag ₂ CrO ₄ . (The reaction is best seen on a spot plate.) (iii) Test with <i>p</i> -dimethyl-amino benzylketone rhodamine: A drop of the neutralized test solution is stirred on a spot plate with a drop of KCN solution (10 % aq.). A drop of the reagent (0.05 % in ethanol) is added followed by dil. HNO ₃ until the mixture is acid. A pink colour indicates Ag. (Under these conditions Ag does not give a coloured compound.)

Cross-sections and Chemical Analysis of Paint Samples

Tin.	Metallic element, Sn.	Known from antiquity and sometimes used on pictures in the Middle Ages.	Lustrous white metal, unaltered by air and water.	Disolves rather slowly in the diluted acid.	Disolves very slowly on heating forming sodium stannate, Na_2SnO_3 .	A film of hydrated stannic oxide becomes formed on the surface of the metal, and the action slows down and stops.	—	<p>The metal dissolves quite rapidly in conc. HCl, forming stannous chloride. This solution can be used for the following tests for Sn:</p> <p>(a) With ammonium phosphomolybdate: Filter paper impregnated with a solution of phosphomolybdic acid is held over NH_3 until yellow ammonium phosphomolybdate is formed and then dried. A drop of the test solution produces a blue spot if Sn is present.</p> <p>(b) Test with Cacotheline: Filter paper is impregnated with a sat. aq. solution of the reagent. A drop of the test solution is added before the paper is quite dry. According to the amount of Sn a red circle or ring is formed on the paper coloured yellow by the reagent, surrounded by a colourless zone.</p>
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THE STAGE MICROSCOPE IN THE ROUTINE EXAMINATION OF PAINTINGS

By RUTHERFORD J. GETTENS and GEORGE L. STOUT

Technical study of paintings as this may be carried out for the purposes of historical research, museum record, care, and treatment, has to do with a large number of questions about the materials which make up these works of art.¹ Some such questions will have to go without an answer and others will have to be referred to specialists for a type of investigation which may not be suitable to a museum laboratory. There are many, however, which can be answered with relative ease and often with entire certainty by the museum examiner when he can take specimens from the painting and study them with a stage microscope.

Examination of specimens naturally can not displace the surface examination which is carried out by eye and with a binocular microscope, and often it can do no more than corroborate what has been found out by established optical means such as radiography, photography by infra-red radiations, and observations by ultra-violet light. Specimens from a picture are studied for the purpose of answering very specific questions about materials, their constitution, or their behavior in response to solvents or reagents. These are questions which could not be answered by study of the painting itself. For the curator, the student, or the conservator, analysis needs to be kept down to rudimentary tests which can be quickly made and which are calculated to help in reaching conclusions important to the purpose at hand. The tests that are suggested here, as the result of some experience, will have to be selected according to that purpose, and all

¹ An outline for recording the results of a general technical examination has already been suggested by a committee of the American Association of Museums (see 'A Museum Record of the Condition of Paintings,' *Technical Studies*, III [1935], pp. 200-216).

STAGE MICROSCOPE IN EXAMINATION

REAGENTS ³ (Distilled water)

Acids—Hydrochloric acid, concentrated

Hydrochloric acid, dilute (1 vol. conc. acid to 5 vols. water)

Nitric acid, concentrated

Nitric acid, dilute (1 vol. conc. acid to 7 vols. water)

Sulphuric acid, dilute (1 vol. conc. acid to 10 vols. water)

Alkalies—Ammonia, dilute (1 vol. conc. ammonia to 5 vols. water)

Sodium hydroxide, dilute (5 g. NaOH to 100 cc. water)

Salts—Potassium iodide (powdered crystals)

Potassium ferrocyanide (powdered crystals)

Potassium mercuric thiocyanate (crystals) ⁴

ORGANIC SOLVENTS ⁵

Ethyl alcohol (95 per cent)

Acetone

Ethylene dichloride

Xylene (xylol)

Naphtha (V M & P)

MOUNTING MEDIUMS

Glycerine and water (1 : 1) for temporary mounts

Canada balsam for permanent mounts

³ The strong acids should be kept in small, capped bottles provided with a ground-in glass stopper which is drawn to a fine point for dropping. The dilute liquid reagents and organic solvents may be contained in small dropping bottles with ground-in pipette and rubber bulb. (In order to keep the stopper of the sodium hydroxide solution from being 'frozen,' it is well to put a film of paraffin or grease around it.) Dry reagents can be kept in small salt bottles.

⁴ Potassium mercuric thiocyanate is not easily obtainable and it may have to be specially prepared in a chemical laboratory. Directions for making it are given by Chamot and Mason (*Handbook of Chemical Microscopy* [New York: John Wiley and Sons, 1931], II, 394) as follows: 'Dissolve 3 to 5 parts of KSCN (potassium thiocyanate) and 1 part of Hg(SCN)₂ (mercuric thiocyanate) in a minimum quantity of water and evaporate in a desiccator. Collect the first crop of tabular crystals, wash with alcohol, and dry.'

⁵ Preliminary study seems now to indicate that a small amount of dye held in solution

a mutilation of the design is not to be contemplated. This does not make such a severe restriction as may at first appear. Obviously, the minute quantities required for microscopic study can always and easily be supplied from the support, from the ground where it extends beyond the paint film or is exposed in lacunae, and from the surface film where it runs over the edge of the paint film, or where its ultimate location beneath the rabbet of a frame makes the removal of superficial flakes entirely harmless. The sampling of the paint film itself is sure to be more difficult, but it is usually possible to find locations at the edge or bordering lacunae where specimens can be safely removed. If these are so large as to be easily visible to the eye, they are apt to be an extravagance for microscopic study. Sampling is ordinarily done with a fine steel needle or the small steel harpoon commonly used in biological laboratories. The process of removing small samples in the field provided by a binocular microscope or a high-power magnifying lens and of transferring these to a glass slide without applying pressure, or in any other way endangering the painting, can be worked out by any examiner who is familiar with museum technique.

Among the other articles of equipment useful in the routine microscopic examination of specimens from paintings is a set of reference or comparison slides. The extent to which such a set can be built up is, of course, the problem of each examiner. Responses of known film materials to solvents and reagents, if they can be preserved for reference, will be valuable, for the memory of the examiner is seldom sufficiently stocked with their appearance. Slide reference material may include, also, specimens that are preserved for record on a particular painting. This method is little used to date but is one which is capable of almost unlimited growth and value. Small metal carriers for object slides are available in the market, so cut that they will fit into 3 × 5 inch filing cabinets; various types of containers for storing microscope slides are to be had.

when a drop of dilute acetic acid is placed on it, this estimate can be accepted. (This and other reactions of the two materials are shown in Table I.) For negative confirmation, or to try the specimen for calcium sulphate (gypsum) in the event that it has not shown the typical response of a carbonate, a drop of water is put on it and into this is dipped a thin rod that has been moistened with dilute hydrochloric acid. If the specimen contains gypsum, this will recrystallize and, after the drop has stood for a minute or so, until the water has partially evaporated, the edge will contain the characteristic needle-shaped (acicular) crystals of this mineral (see Figure 3). In general, gypsum makes a softer plaster than lime, is more finely crystalline, and rarely contains any large admixture of sand.

Cloth that is used for the support of paintings is almost sure to be either of linen or of cotton fibre. Since the former was far the more prevalent during the Renaissance in Europe, it may be of some value to distinguish between them. The fibres, combed or pulled out at the ends of threads, can be studied by transmitted light if they are put on a microscope slide and teased apart with a needle. They may be sealed in one of the usual mounting mediums for more permanent record. If they are of linen, the fibres will be long, and will show joint-like cross-markings that make them look rather like bamboo; they will also show longitudinal striations; the natural fibre end, though rarely seen, is gradually tapered. Cotton fibres are smoother than linen, are usually twisted, have no nodes or joints, and look like tubes with thickened walls; they are not so long as linen, and the natural end of the fibre is blunt.* (Compare the two photomicrographs in Figure 2.)

The fibres that go into the paper used as a support for painting are much the same as those prevalent in cloth supports, but do

* See John S. Skinkle, *Elementary Textile Microscopy* (New York: Howes Publishing Co., 1930), pp. 64-68.

STAGE MICROSCOPE IN EXAMINATION

include a few others and, because of their relation in paper structure, are somewhat more difficult to identify. Staining tests for paper are now fairly standard and have a considerable variety, both in the solutions used and in the results obtained. According to H. N. Lee,⁷ a traditional stain (like the one frequently called 'the Herzberg stain') is made up as follows: '. . . iodine 1 part, potassium iodide 5 parts, water 30 parts, zinc chloride 40 parts. Dissolve the potassium iodide and then the iodine in the water and add the zinc chloride. Allow the mixture to stand, decant the clear liquid and store in a brown bottle.' Before the stain is applied, a few fibres of the paper are separated in water on the microscope slide and are allowed to dry. When the stain solution has been put on the fibres and they are studied at 50X with either daylight or artificial light, the following reactions are observed:⁸

Blue—thoroughly purified wood, straw, grass, and similar fibres.

Brownish red—the cotton-type group, *i.e.*, cotton, linen, ramie, hemp, paper mulberry, and bleached Manila hemp.

Yellow—woody fibres when not chemically purified from wood itself, straw, or grass. Partly purified woody fibres are less yellow and show greenish, brownish, or even blue or reddish if nearly pure. Papers showing yellow, greenish, or brownish fibres will also show a red or pink with the phloroglucin test.

The grounds and paint films of pictures had best be considered, not according to their positions in the structure of a painting but according to the two principal ingredients that compose them—the medium and the pigment or inert substance. In routine museum examination definite data about the medium can not now be expected. Often the original structure has soaked up film materials put on the surface either by the original designer or during later treatment. Extensive study has been made in an effort to bring the types and combinations of painting mediums within a range where detection is

⁷ 'Established Methods for Examination of Paper,' *Technical Studies*, IV (1935), p. 8.

⁸ *Ibid.*

STAGE MICROSCOPE IN EXAMINATION

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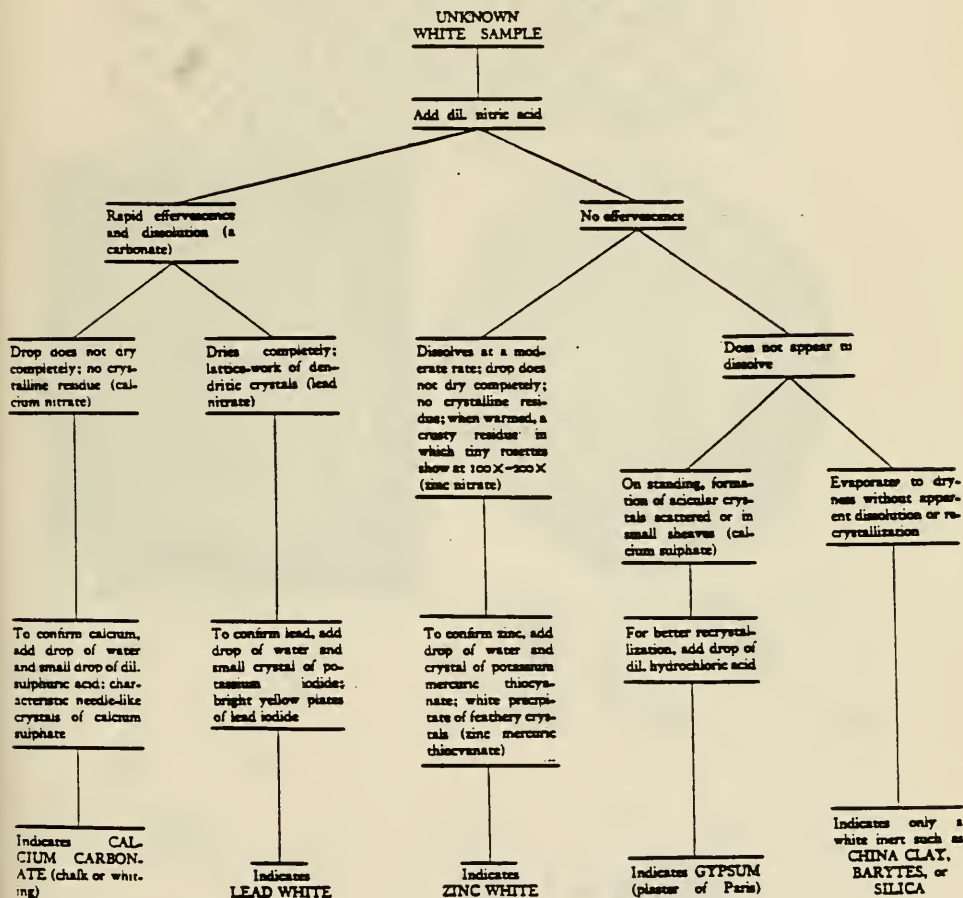
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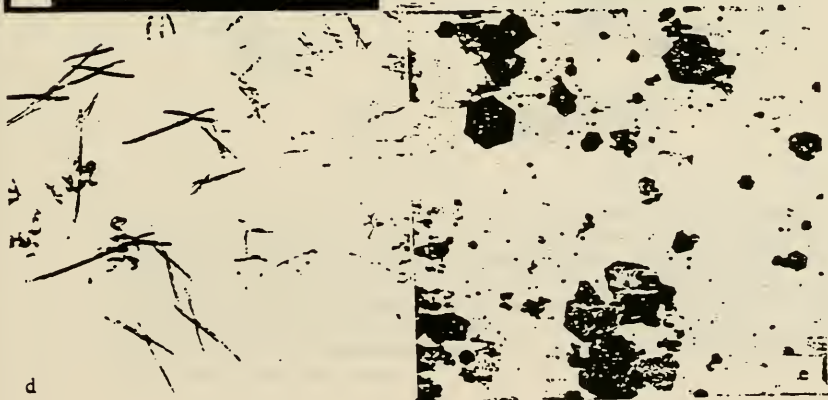
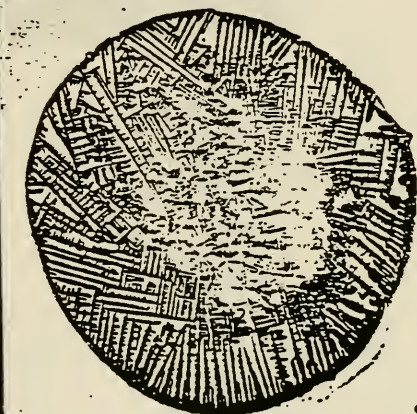
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⁸ *Ibid.*

TABLE I
RECOGNITION OF CERTAIN WHITE PIGMENTS AND INERTS





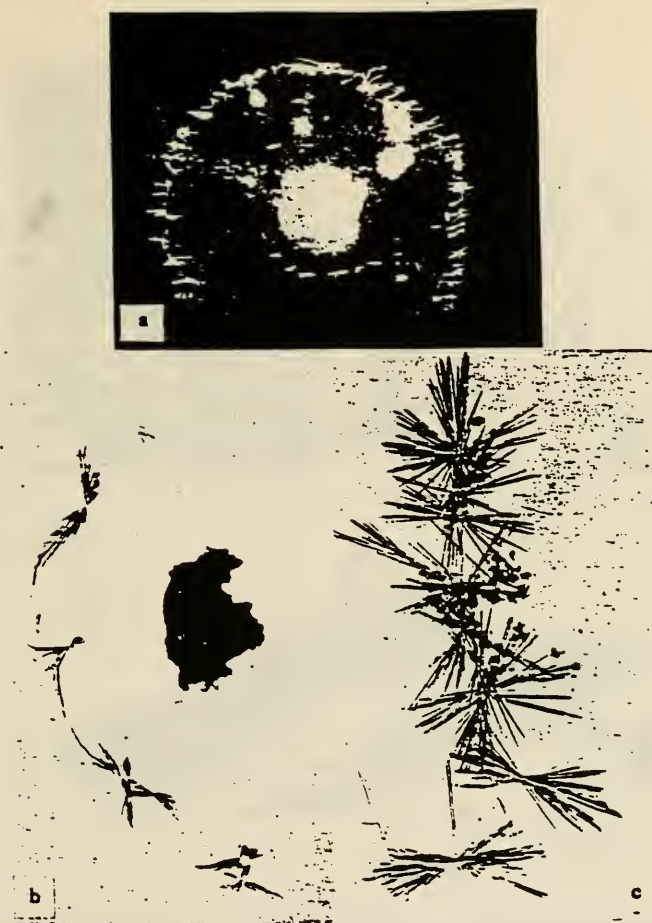


FIGURE 3. Photomicrographs of recrystallized calcium sulphate indicate its appearance under different conditions of illumination and magnification. In *a*, by reflected light and at 35 \times , a hedge of the crystals may be seen. They have formed at the edge of a drop of dilute hydrochloric acid which was applied to the small specimen of plaster of Paris at the center. In *b* the calcium sulphate has recrystallized from a particle of light gray paint film taken from a Fayum portrait; it is seen by transmitted light at 75 \times . In *c* are shown, also by transmitted light and at 75 \times , a group of well-formed sheaves of hydrated calcium sulphate crystals.

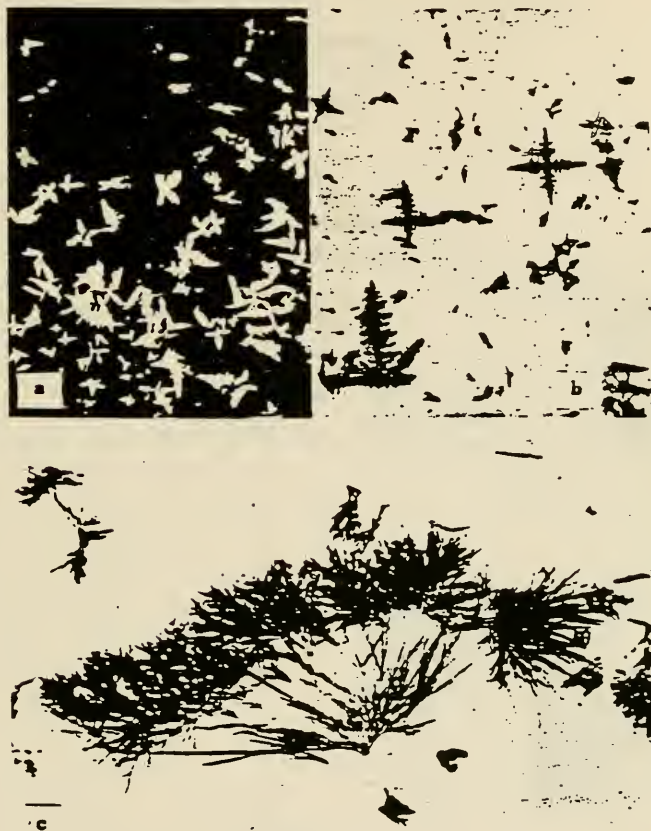
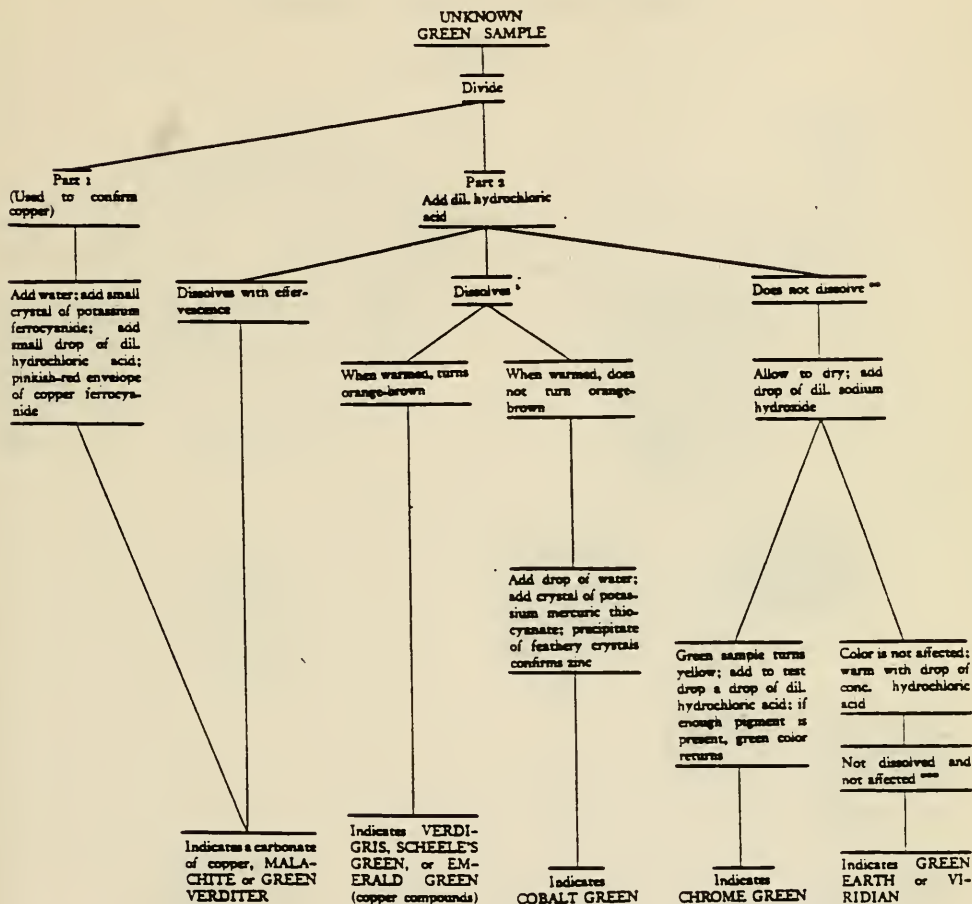


FIGURE 5. Crystals of zinc mercuric thiocyanate show highly characteristic forms. In *a*, white, feathery aggregates of these crystals are seen by reflected light at 50X. In *b*, by transmitted light at 100X, crosses with fern-like arms predominate. In *c* with the same illumination and magnification another preparation shows this precipitate in mossy aggregates. Differences in concentrations of the reagents cause these differences in form.

TABLE II
RECOGNITION OF CERTAIN TYPES OF GREEN PIGMENTS

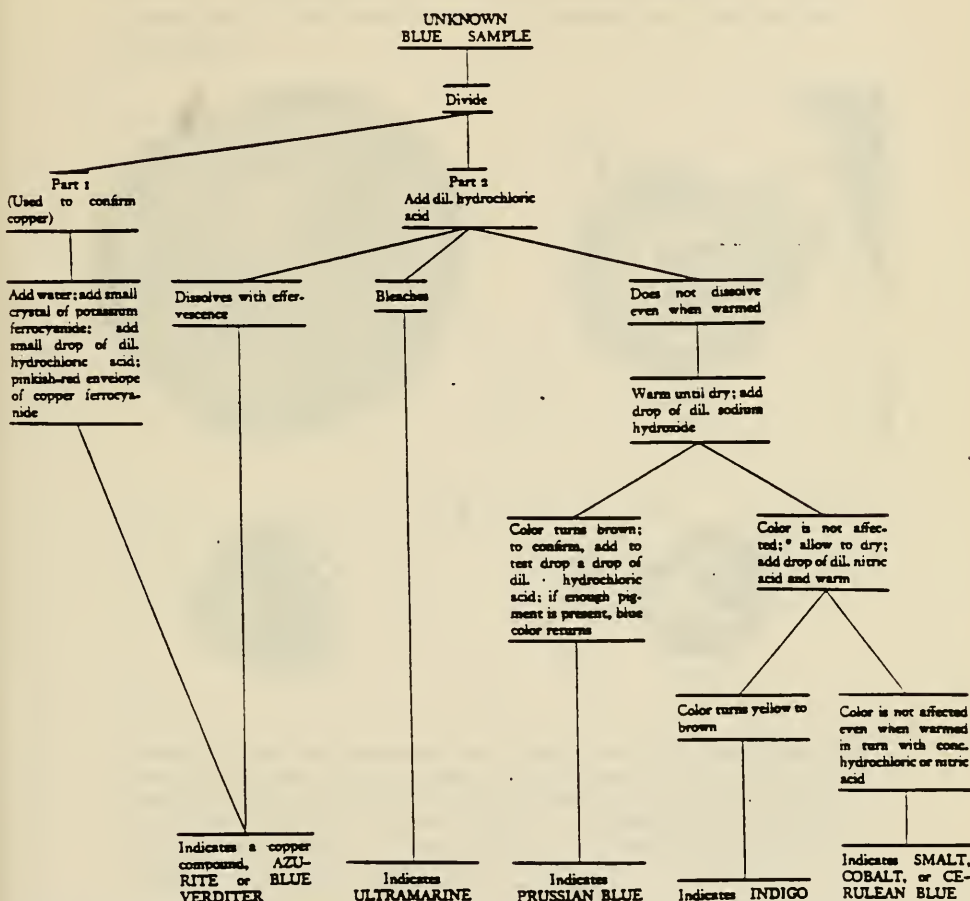


* In cobalt green, if the sample is large, there may be a pale, blue-green residue.

** Change from green to blue color occurs at this point, however, in chrome green and is the first indication of that pigment.

*** Effervescence may occur at this point from the action of the acid on a sodium carbonate impurity in the sodium hydroxide.

TABLE III
RECOGNITION OF CERTAIN TYPES OF BLUE PIGMENTS



vescence of the copper carbonates.) Natural ultramarine is much coarser and is less homogeneous in particle size than artificial ultramarine.

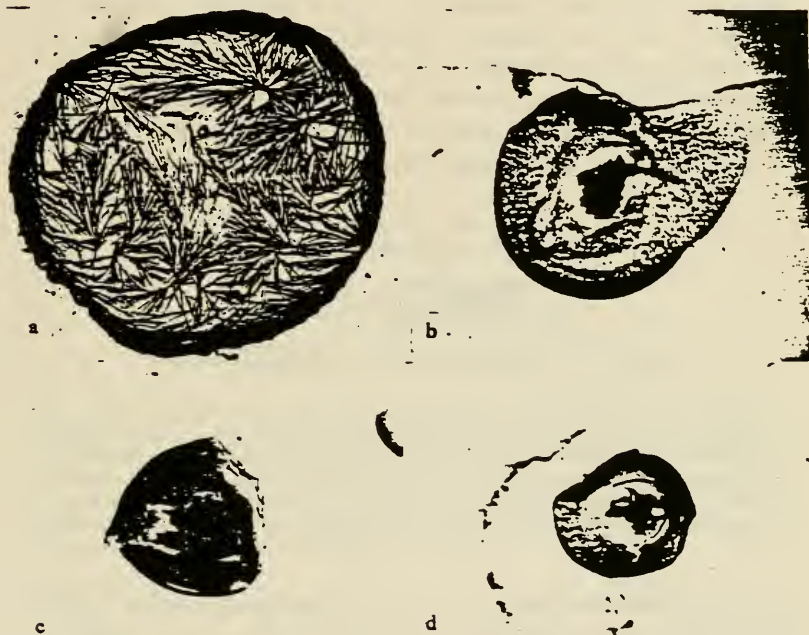


FIGURE 6. When dilute hydrochloric acid is added to most of the copper pigments, a residue of pale green, grass-like crystals of cupric chloride is obtained. When warmed, these crystals turn dark orange-brown, as may be seen in *a*, by transmitted light at $25\times$. In *b*, *c*, and *d* are shown, by the same illumination and magnification, variations of the pinkish-red envelope that surrounds a particle of a copper-bearing pigment when it is treated with acid-ferrocyanide solution. The dark particle in the middle is the treated specimen. In *b* and *d* the edge of the test drop is seen.

If the blue color in the sample being examined is unaffected by dilute hydrochloric acid, it is allowed to dry and is treated with a drop of dilute sodium hydroxide.

STAGE MICROSCOPE IN EXAMINATION

ingredients. In routine museum examination, solubility tests are practically the limit to which microscopic study can go. Particles of the surface film can usually be removed with comparative ease and be placed on microscope slides. The changes in such particles made by drops of solvent—xylene, alcohol, or toluene, for example—can be observed and the results noted. If the particles break down either on first or on repeated application of these solvents, it can be assumed that the surface film is largely composed of a soft resin. If dilute sodium hydroxide is required to disintegrate the specimen, the film

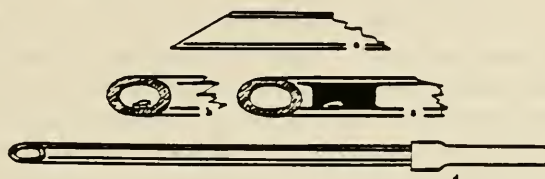


FIGURE 7. A diagram explains part of the method for capillary immersion of a surface film specimen in a stained solvent. A small dropper with a rubber bulb is used to apply the solvent to the mouth of the tube. The ground, angular shape of the end of the large capillary is shown in profile, twice actual size, in *a*. The position of the sample in the mouth of the tube is indicated in *b* and, in *c*, the way a drop of stained solvent draws up the sample. Below (*d*) is a diagram of the whole tube in actual size. At the end a small piece of rubber tubing helps in delivering the drop.

is probably composed largely of oil or of a hard resin fused in oil. The obvious exception would be a film that had been recently applied and in which solvents would strongly affect the fresh oil; general observations or the record of the painting ought to indicate this condition.

The difficulty with the application of solvent in drop form to specimens of surface film is its rapid evaporation. This can be greatly reduced and the test of solubility made more easily readable by a process of capillary immersion of these specimens in a stained solvent. The stain in this case has no preferential character so far as resins are

STAGE MICROSCOPE IN EXAMINATION

concerned, and is used only to produce sharper definition in the field. Malachite green, a dyestuff which is soluble in water and in a few of the organic solvents, has been tried for this purpose. It is taken up to at least 0.01 per cent by ethyl alcohol, acetone, ethylene dichloride, diacetone alcohol, and probably by other solvents particularly of the alcohol and ketone groups. Particles of the resin, approximately a half millimetre square, are put in the end of a large capillary (having an inside diameter of about 1 mm.) which is ground down to a shape like that of a hypodermic needle (Figure 7). At the other end is a short piece of rubber tubing. A drop of the stained solvent is placed on the resin particle which is taken up by it and is carried a short way into the tube by capillary movement. It can stay there for some minutes without losing enough solvent to prevent its easy delivery on a slide. The drop is delivered by pressing the rubber tube and a second drop of pure stained solvent is put on the same slide. After both this and the specimen are thoroughly dry, the slide is washed with water until the stain that was carried by the solvent alone has disappeared. This leaves a small drop of sharply-defined, stained, dissolved or undissolved resin, and comments about solubility can be made from this more exactly than from exposure of the solvent on the slide alone (Figure 8). If there is pigment in the surface film introduced for the purpose of darkening the tonality of the painting, particles of that will be left in the drop and will be held in place by the surrounding resin.

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FIGURE 8. Examples of drops of stained solvent after varnish specimens had been left in them for 20 minutes each. Immersed specimens were kept in a capillary for that time and after the drops were delivered on a slide and were dry, they were washed with water to remove excess stain. Complete solution occurred with mastic in acetone (*a*), copal in acetone (*c*), mastic in ethylene dichloride (*d*), and dammar in ethylene dichloride (*e*). Particles of undissolved resin are left in the specimens of dammar in acetone (*b*) and of a proprietary amber varnish in ethylene dichloride (*f*). Dark particles in the other fields are lint caught from the air when the specimen was drying. (Magnification in all cases is 9X.)

Pigments Tested for During Paint Analysis

Common Name	Chemical Name	Chemical Formula
-------------	---------------	------------------

White Pigments

Lead White	Basic Lead Carbonate	PbOH
Whiting	Calcium Carbonate	CaCO
Zinc White	Zinc Oxide	ZnO
Gypsum	Calcium Sulfate Dihydrate	CaSO ₄ ·2H ₂ O
Titanium White	Titanium Dioxide	TiO

Green Pigments

Verdigris	Dibasic Copper Acetate: Two Parts Cupric Acitete One Part Cupric Hydroxide Five parts Water	$2Cu(CH_3COO)_2:Cu(OH)_2:5H_2O$
Scheele's Green	Copper Hydro-arsenate	CuHASO ₃
Emerald Green	Copper Aceto-arsenate	$Cu(C_2H_3O_2)_2 \cdot 3Cu(AsO_2)_2$
Chromium Oxide Green	Anhydrous Chromic Oxide	Cr ₂ O ₃
Viridian or Guignets Green	Chromic Hydroxide	Cr(OH) ₃ · nH ₂ O
Chrom Green	Mixture of Prussian Blue and Chrome Yellow	$Fe_4[Fe(CN)_6]_3 + PbCrO$

Blue Pigments

Prussian Blue		
Berlin Blue		
Chinese Blue	Ferric Ferrocyanide	Fe ₄ [Fe(CN) ₆] ₃
Paris Blue		
Hamburg Blue		
Mineral Blue		
Azurite	Basic Copper Caarbonate	2CuCO ₃ -Cu(OH) ₂
Ultramarine (Lapis Lazuli)	Sodium Aluminum Silcate and Sulfur	Na ₇ Al ₆ Si ₆ O ₂₄ S ₂
Colbalt Blue	Cobalt Aluminate	CoO·Al ₂ O ₃

Red Pigments

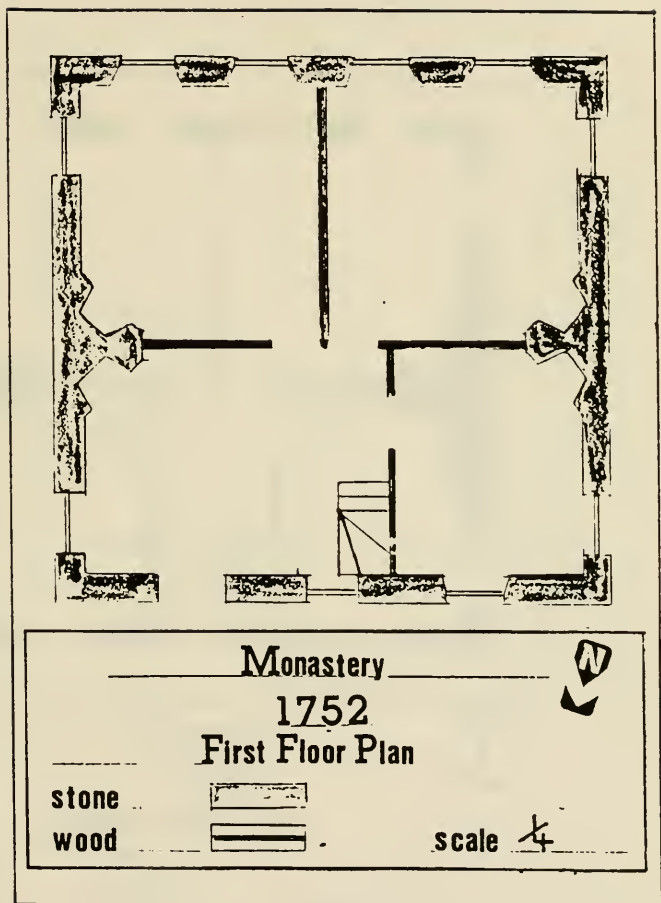
Vermilion	Red Mercuric Sulfide	HgS
Chinese Red		
Cinnabar		
Iron Oxide	Ferric Oxide	Fe_2O_3
Red Lead	Lead Tetroxide	Pb_3O_4
Madder	Extract from the root of the madder plant on Aluminum Hydroxide Base.	Alizarin $\text{C}_{14}\text{H}_8\text{O}_4$ Purpurin
Alizarin	" "	$\text{C}_{14}\text{H}_8\text{O}_4$

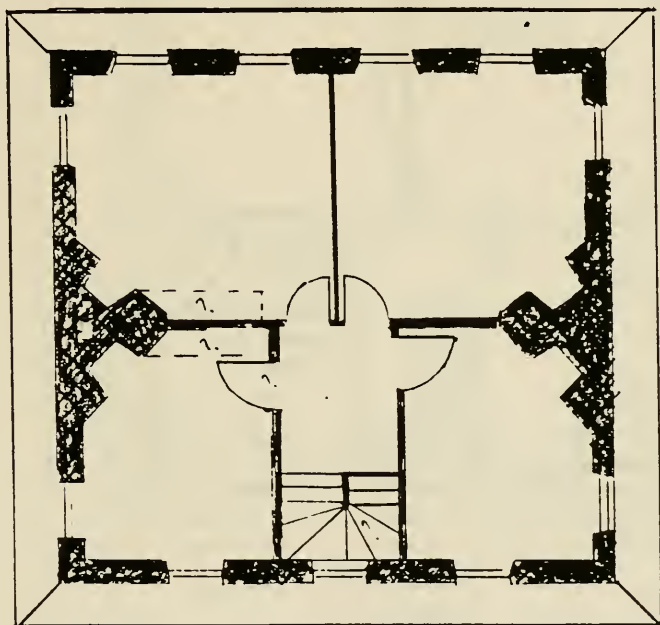
Yellow Pigments

Litharge	Lead Monoxide	PbO
Yellow Ochre	Hydrated Ferric Oxide	$\text{FeO}(\text{OH}) \cdot n\text{H}_2\text{O}$
Naples Yellow	Lead Antimonate	$\text{Pb}_3(\text{SbO}_4)_2$
Barium Yellow	Barium Chromate (IV)	BaCrO_4
Strontium Yellow	Strontium Chromate (IV)	SrCrO_4
Cobalt Yellow	Cobaltic Potassium Nitrite	$\text{CoK}_3\text{NO}_{12}$
Cadmium Yellow	Cadmium Sulfide	CdS

Appendix #4
Monastery
1760 Floor Plans

These floor planes are based on the Historical American Building Survey architectural drawings done in 1935 and a visual inspection of the structure. (The basement and the fourth floor are omitted.)

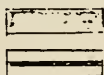




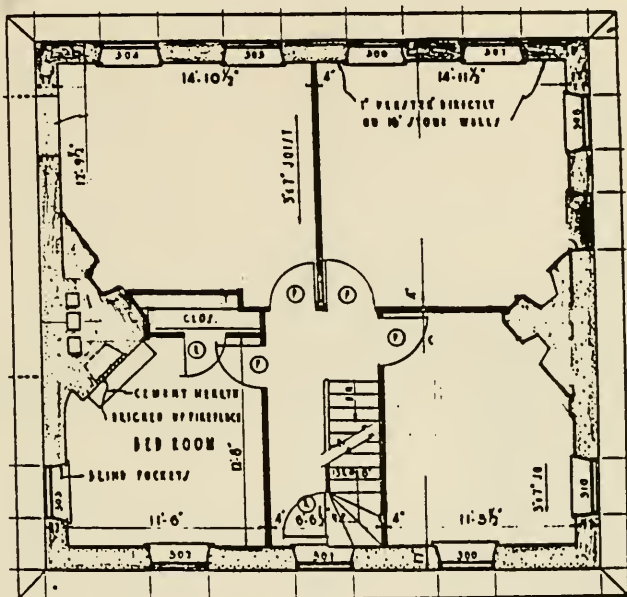
Monastery
1752
Second Floor Plan



stone
wood

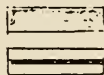


scale $\frac{1}{4}$



Monastery
1752
Third Floor Plan

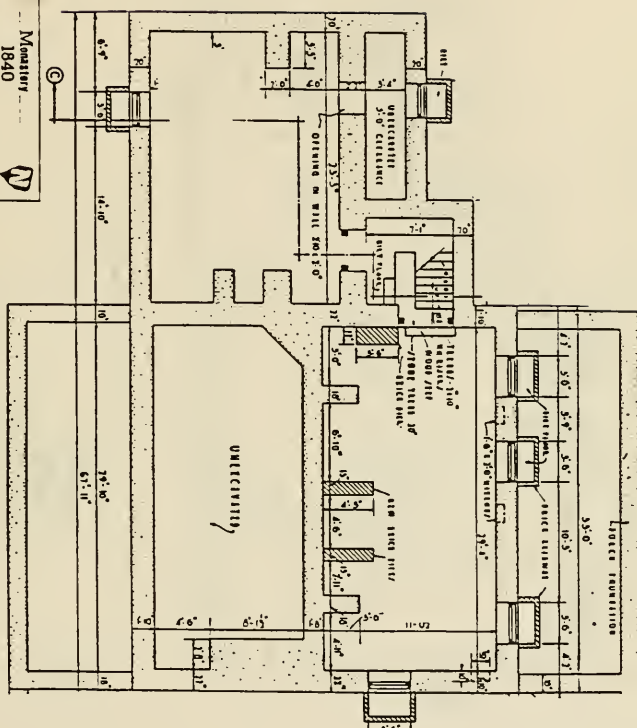
stone
wood



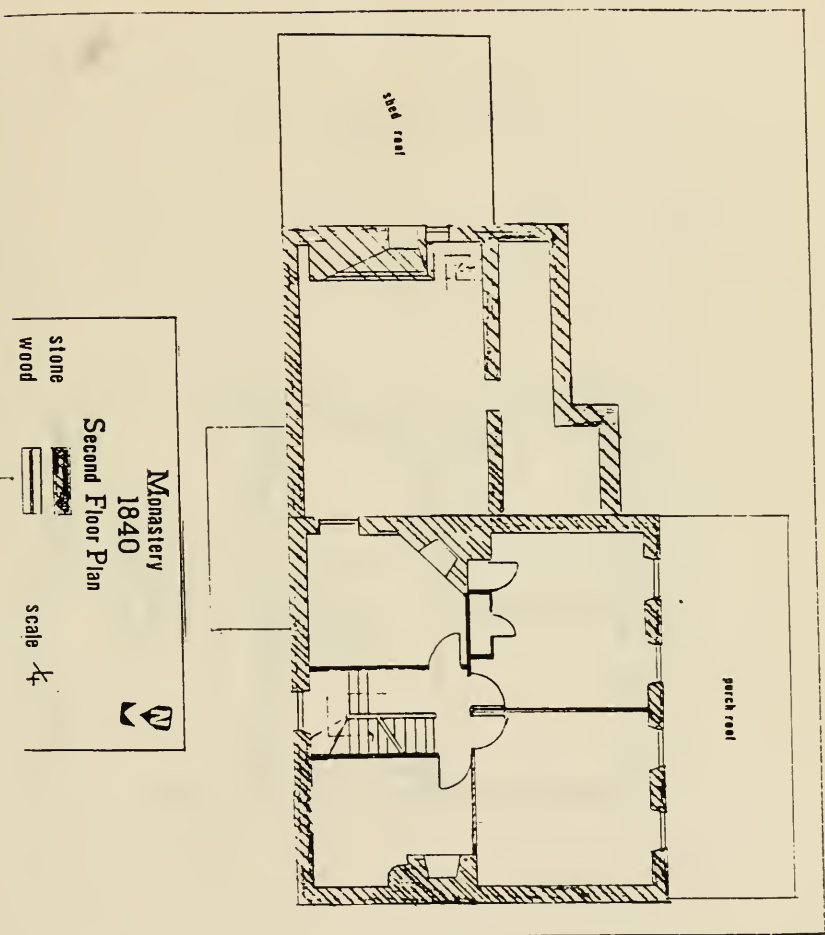
scale $\frac{1}{4}$

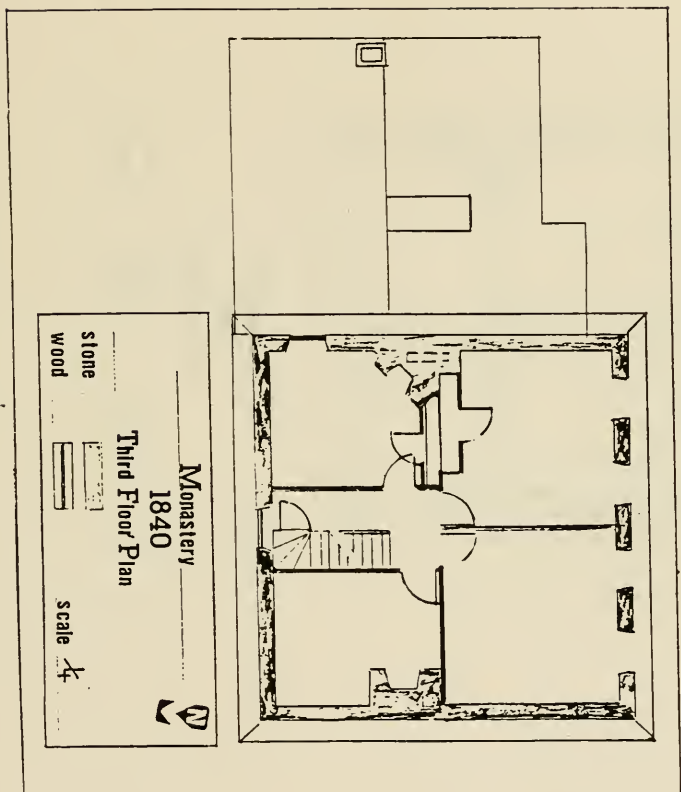
Appendix #5
Monastery
1840 Floor Plans

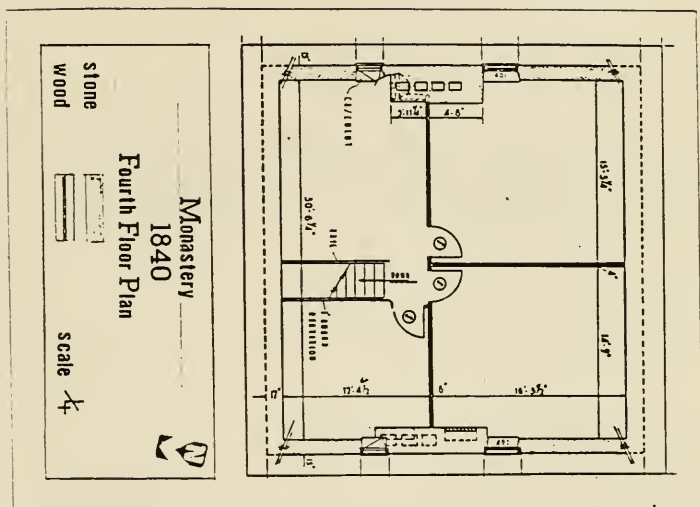
These floor plans are based on the Historical American Building Survey drawings done in 1935 and visual inspection of the building.



Montclair
1840
basement floor plan
scale 1" = 4'







Appendix #6
Chain of Title for the Monastery
Form the Title Registry of the Department of Records,
Philadelphia City Hall, Philadelphia Pa.

Chain of Title for the Monastery Mansion

Philip Lehman: Sept. 2, 1685. Letter of patent to Philip Lehman for 200 acres of land in Roxborough Township. Patent Book A-Foil. 106, cited in Deed book H-2-214.

John Jennet	Deed Book, E-5-199 cited in Deed Book, H-2-214	Jan. 9, 1685/6
-------------	---	----------------

Henry Frey	Deed Book, B-2-360 cited in Deed Book. H-2-214	Oct. 1. 1692.
------------	---	---------------

Henry Frey splits the lot into two pieces and sells twenty acres to George Jacob on Feb. 3, 1724, which, on March 2, 1729/30 is in turn sold to Jacob Rinker. Both transactions are cited in Deed Book H-2-21. Two and a half acres of the twenty acres is sold to Benjamin Shoemaker on Nov. 3, 1742. A 100 acre portion of the original lot is sold to John George Wood on March 9, 1729.

John George Wood	Deed Book, H-2-214 100 acres for 87 pounds.	March 9. 1729
------------------	--	---------------

From 1742 to 1746 Benjamin Shoemaker buys up the two tracts of land mentioned above and two others.

The lots are:

To Benjamin Shoemaker	Nov. 3, 1742	From Jacob Rinker
	Deed book, H-12-321	
	2 acres and 149 1/2 perches	

To Benjamin Shoemaker	Oct. 29, 1742	From John Gomrey
	cited in Deed Book H-12-306 along with the	
	complete chain for this property, which contained a messuage	
	plantation and two tracts of land, one of thirty-seven 1/2 acres	
	and the other of eighty-five acres. The deeds for this	
	transaction can be found in the Germantown Historical Society.	
	See Appendix #1	

To Benjamin Shoemaker	March 21, 1745/6	From John George Wood
	Deed Book, H-12-299	
	3 acres 73 perches	

In 1746/7 Benjamin Shoemaker sells all four lots to John Gorgas.

John Gorgas	Deed Book, H-12-306	March 2, 1746/7
	3 acres and 72 perches	
	2 acres and 149 1/2 perches	
	85 acres	
	37 1/2 acres	

Described in the Deed as two tracts of land and a Messuage Plantation
Paid 300 Pounds

John Gorgas sells partial interest in these tracts of land to several people.

To Jacob Simon	Deed Book, H-12-314	Nov. 27, 1747
Michael Pelsner	Sold 1/2 interest three tracts of land:	
	3 acres and 72 perches	
	2 acres and 149 perches	
	27 acres part of the 85 acres.	

To Adam Yager	Nov. 16, 1751	From Jacob Simon
	Deed book, E.F.-15-182	
	Convey 1/4 interest in the land which	

was originally sold to Simon by John Gorgas.

In 1752 Joseph Gorgas begins to buy up all the interest to the property which his brother John originally owned. The deeds describe the improvements made on the land as: A saw mill, grist mill, and several other messuages and buildings.

To Joseph Gorgas	April 6, 1752	From John Gorgas
	Deed Book, H-2-356	

Conveys the moiety of two acres of land part of the twenty-seven acres. On this land Joseph Gorgas is credited with the building of the house. "... Where upon the above named Joseph Gorgas has since at his own cost and charge built and erected a stone three story house of messuage on a certain piece or spot of ground part of the aforesaid 27 acres."

To Joseph Gorgas April 10, 1752 From Adam Yager
Skin Dresser Deed Book H-2-359
Paid Five Pounds

Sold 1/4 interest in a stone messuage and two-acre lot part of the 27 acre lot.

To Joseph Gorgas April 15, 1752 From Mary Pelsner
Miller late Skin Dresser Deed Book, H-2-362 Widow of
Paid 25 Pounds Michelle Pelsner

Description of the tracts of land includes this description of the improvements that "Jacob Simon, John Gorgas and Michael Pelsner who in possession of the other moiety did build and erect a Grist Mill, Saw Mill and several other messuages and buildings." Mary Pelsner sells her 1/4 interest in the land and improvements to Joseph Gorgas.

The remaining 1/4 interest in the three tracts of land which was bought from John Gorgas by Adam Yager is never conveyed to Joseph Gorgas. It is reunited with the whole when Peter Care buys the property.

To Joseph Gorgas Deed Book, H-12-302 Dec. 21, 1759
Interest in three tracts of land and whole
interest in nine acres, which was part of the twenty-seven acre tract.
The mills are mentioned in this deed but a messuage is not.
Paid 600 pounds.

To Edward Milner June 8, 1761 From Joseph Gorgas
of Roxborough Deed Book, I-3-317
Miller Paid 1500 dollars.
Conveyed to Edward Milner interest in three tracts of land. Two acres 149 perches, 3 acres 72 perches and 27 acres. See Appendix #2. "On the first tract of land there is a certain Messuage or tenement erected and on the second and third a grist mill, or a corn mill and a saw mill." The improvements are further described as: "on the first described tract of land with the messuage or tenement and other buildings and improvements there on erected by the said Joseph Gorgas by force and virtue of some good conveyance or assurance in the law duly had and executed."

To Peter Care March 17, 1775 From Edward Milner
Deed Book, I-14-279

John Chambers, Book seller Convey 1/2 interest gentleman
George Davis Paid \$1.00.
Description of land: Paper mill, messuage and tracts of land.

To John Lonstroth July 13, 1818 From Samuel Campbell,
Merchant Deed Book, MR-17-40 et al.
Description of land: eighty-three acres containing five
tracts of land and a messuage, paper mill and tenement.

To The Pennsylvania Company for Insurance on lives and Granting
Annuities Assignees. Deed Poll, District Court, Recorded in
Book F page 166. June 16, 1832.
The Pennsylvania Company. Vs. John Longstroth, Deed to the
Pennsylvania Company. Paid \$7,000 for five tracts of land containing
83 acres on which a messuage and paper mill stood.

To Joshua Garsed et al. Aug. 10, 1832 From The Penn.
of Frankford Deed Book, AM-29-681 Company.
John Raines Paid 10,000
Joshua Garsed Jr. 83 acre lot.
William Willock
Under firm of Garsed, Rains
and Co. Manufactures.

To John Brock and Sept. 11, 1841
James Hart Deed Poll, District Court, recorded in Book K page
344. The Pennsylvania Company for Insurances in lives and
Granting Annuities Vs. Joshua Garsed Jr. and William Willock
deeded to John Brock and James Hart. Eighty-three acres with
tenement and paper mill.

To Elisabeth Weest April 15, 1843 From John Brock
Deed Book, RLL-7-34 et al.

To William Kitchen Nov. 24, 1853 From Francis Weest
William Gordon Kitchen Deed Book, TH-52-264 Nephew of
Paid \$10,500 Elizabeth.
Elizabeth died in testate, property was given to her nephew.

To William Gordon Kitchen Sept. 15 1864 From William Kitchen
Deed Book, LRB-51-173
Convey 1/2 interest

In 1871 William Gordon Kitchen died in testate and property was given to his wife, Susan Kitchen, and their seven children. In this same year the City of Philadelphia determined that it needed this land for Fairmount Park. In 1873 the City of Philadelphia paid Susan Kitchen and her seven children \$53,500 for the property which ran along the Wissahickon Creek.

To The City of Philadelphia March 31, 1873 From Susan Kitchen
Deed Book FTW-41-283 et al.

To The City of Philadelphia June 30 1898 From Susan Kitchen
Deed Book WMG-327-215

The Monastery Mansion was built between 1747 and 1752. It is clear from the deeds that Joseph Gorgas built the house.

Sources:

Title Registry of the Department of Records, Philadelphia City Hall.

"Brief of Title to a Tract of land, part of which is included in the bounds of Fairmount Park, the property of The Estate of William Gordon Kitchen." Fairmount Park Commission, Box #8, William Gordon Kitchen, City Hall Archives, City Hall Annex, Philadelphia.

Fairmount Park Commission, Box #8-A, Susan Kitchen, City Hall Archives, City Hall Annex, Philadelphia.

Appendix #Z
Monastery

1935 Floor Plans and 1986 Floor Plans

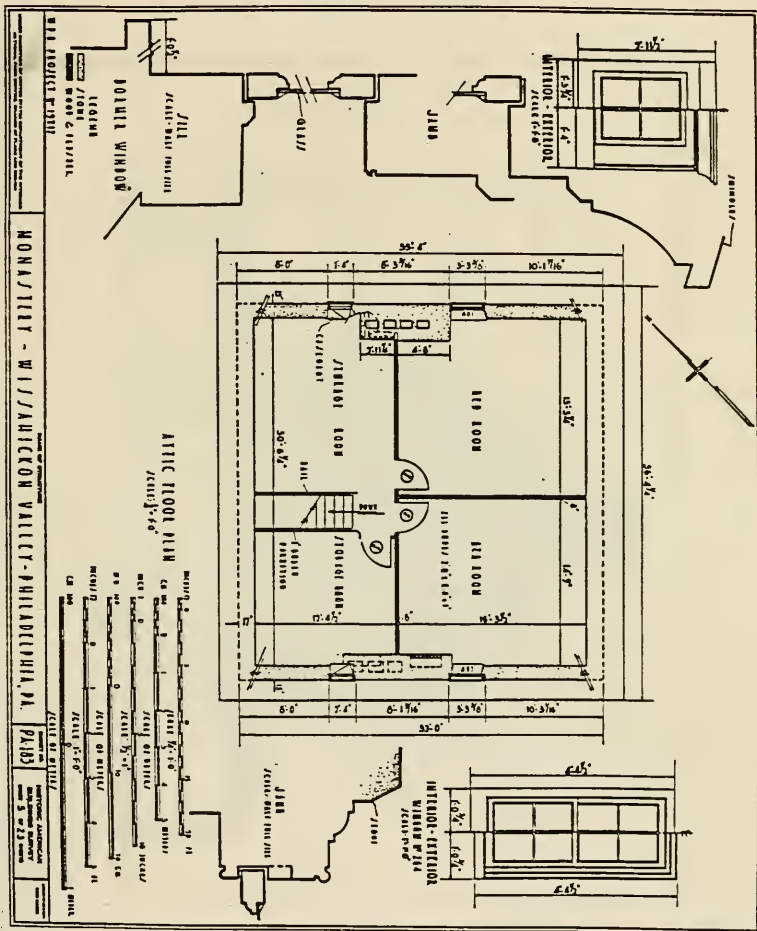
1935 Historic American Building Survey Drawings

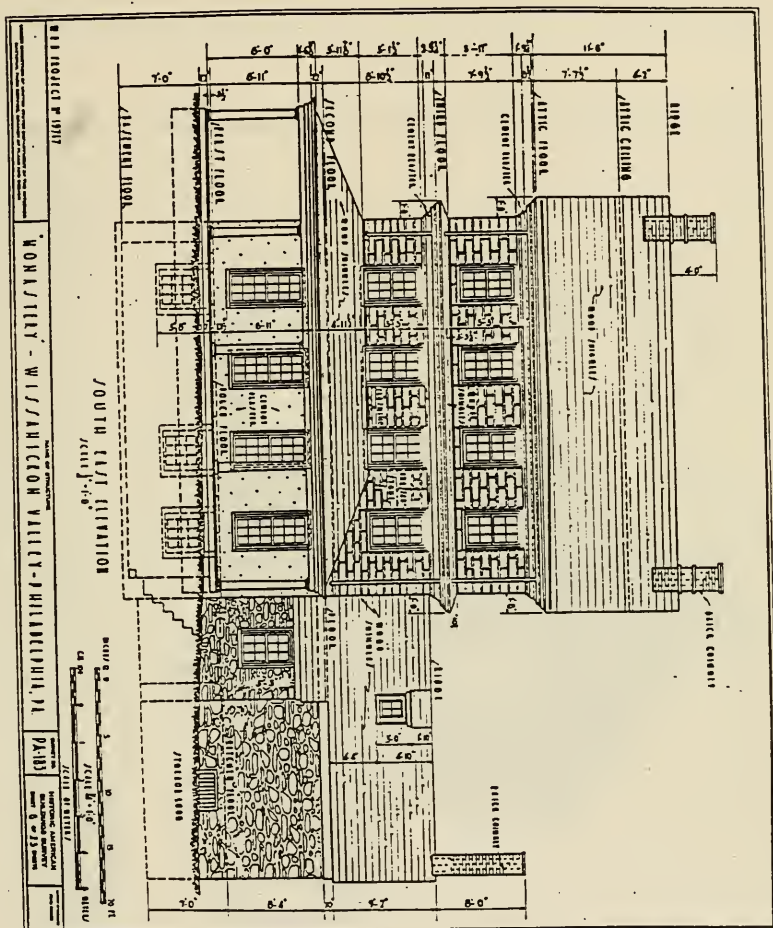
The 1986 Floor Plans are based on the Historic American Building Survey drawings and the presents configuration of the building.

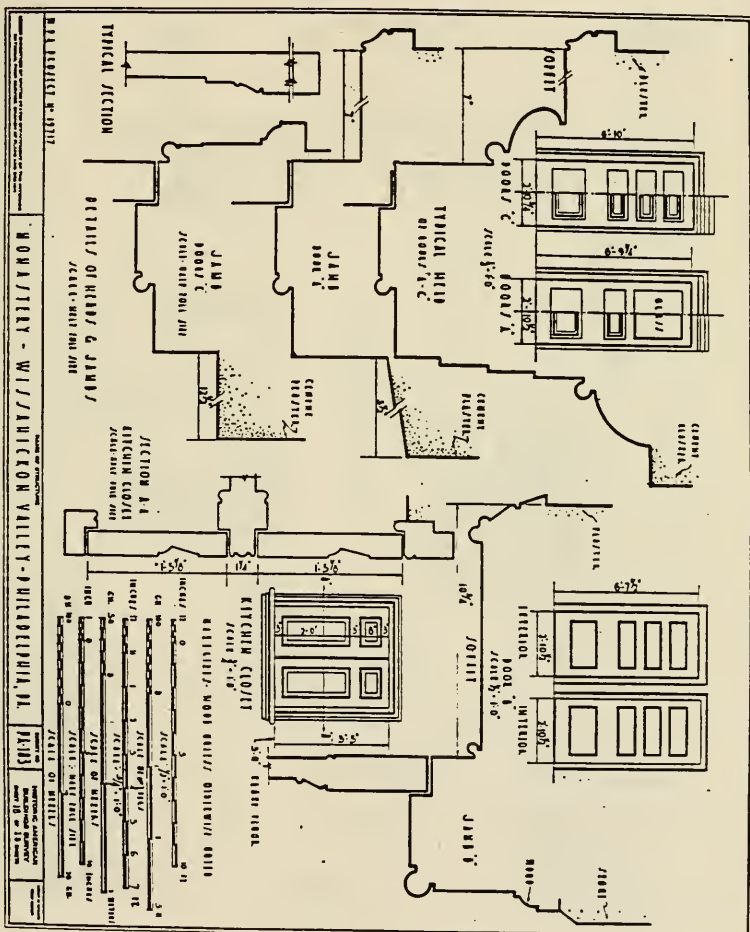




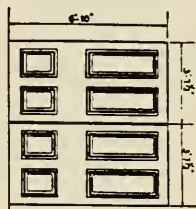








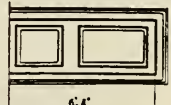
DETAIL OF DOOR / 2nd C. 3rd FLOOR /



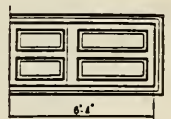
DOOR / W



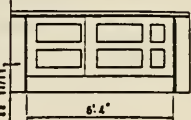
DOOR / W



DOOR / E-1
ELEVATION OF DOOR /
SCALE 1/8" = 1'-0"



DOOR / F



DOOR / F



DOOR / F
ATTIC FLOOR

TYPICAL DETAIL OF WOOD & JOIST CEILING

SCALE: 1/8" = 1'-0"

SECTION OF DOOR W

TYPICAL SECTION FOR ALL OTHER DOOR /

SCALE: 1/8" = 1'-0"

WALLING / WOOD BRICK / CHIMNEY / ROOF



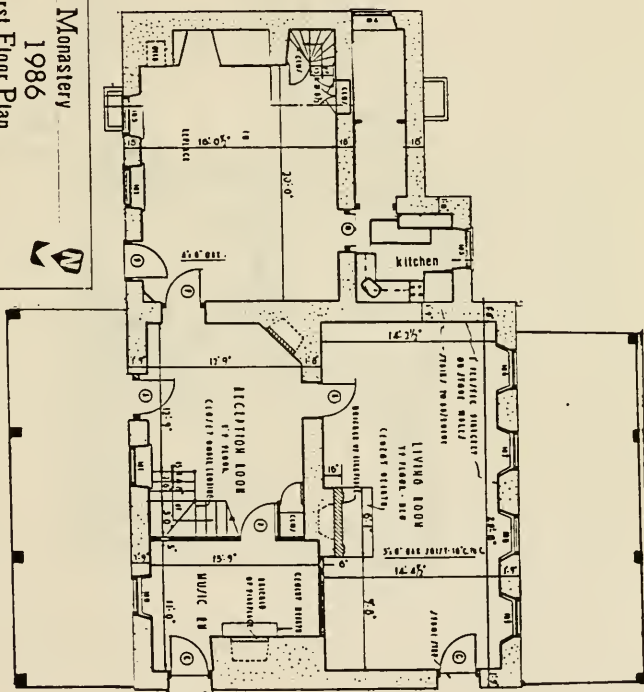
WPA PROJECT # 19710		NAME OF ARCHITECT	
WONA/TERT WIS/ARLICKON VALLEY-PHILADELPHIA, PA		DATE	
PERIOD		DRAWING SCALE	
DATE OF SITE		DATE OF 1st SET	

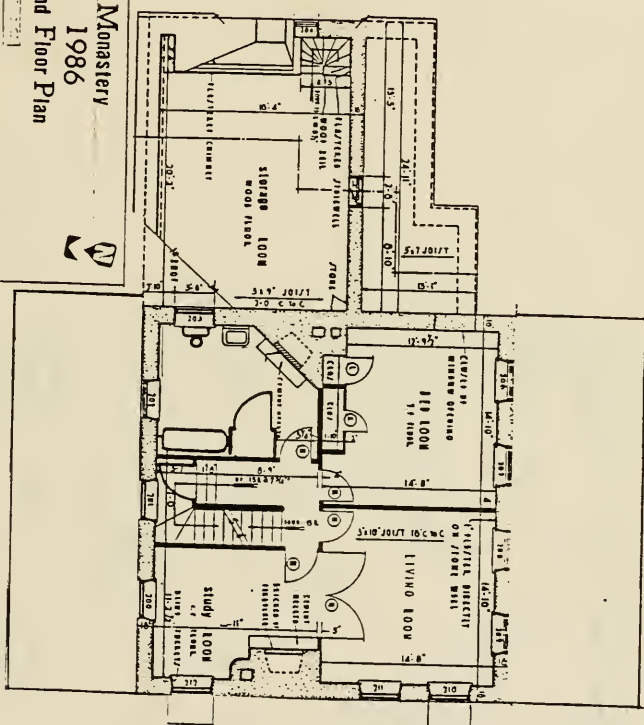
Appendix #Z
Monastery

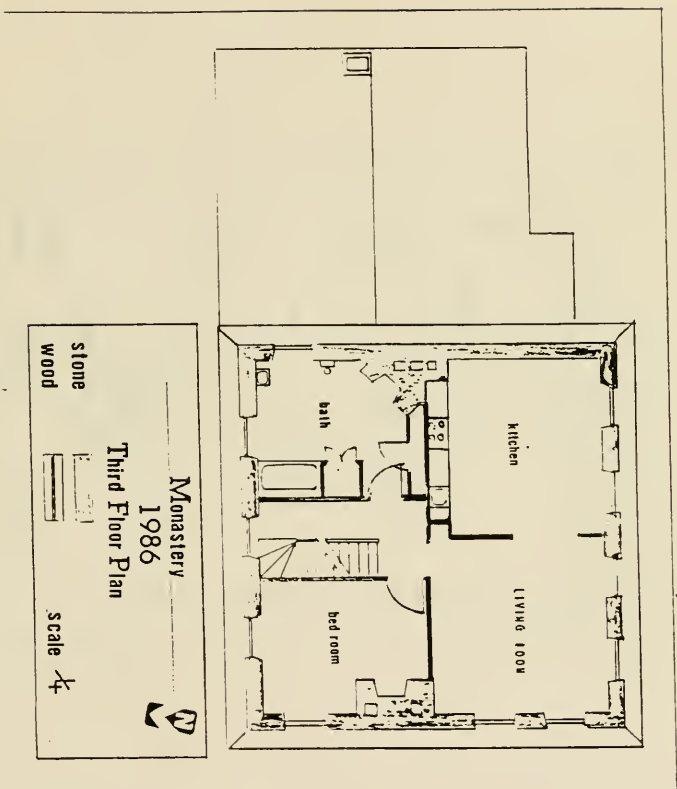
1986 Floor Plans

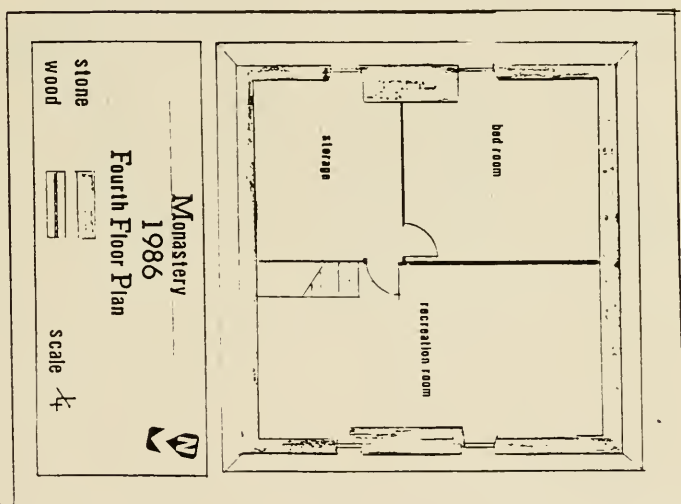
The 1986 floor plans are based on the Historic American
Building Survey drawings and the present configuration of
the building

Monastery
 1986
 First Floor Plan
 Stone
 Wood
 Scale 1/4" = 1'-0"

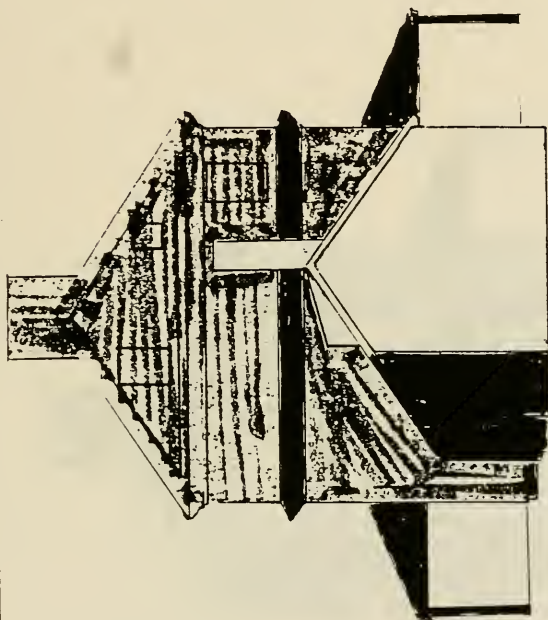




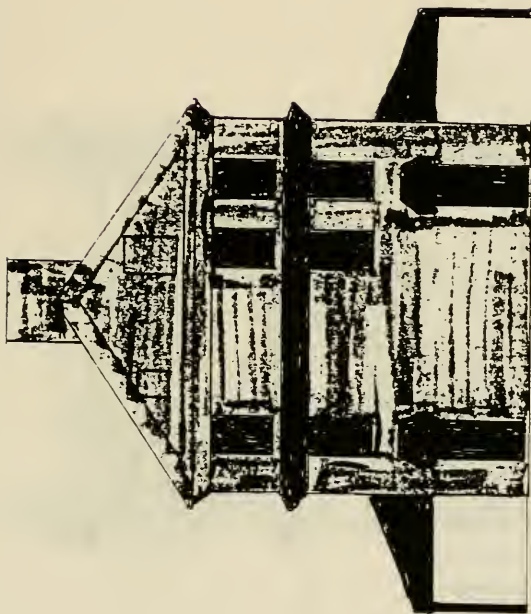




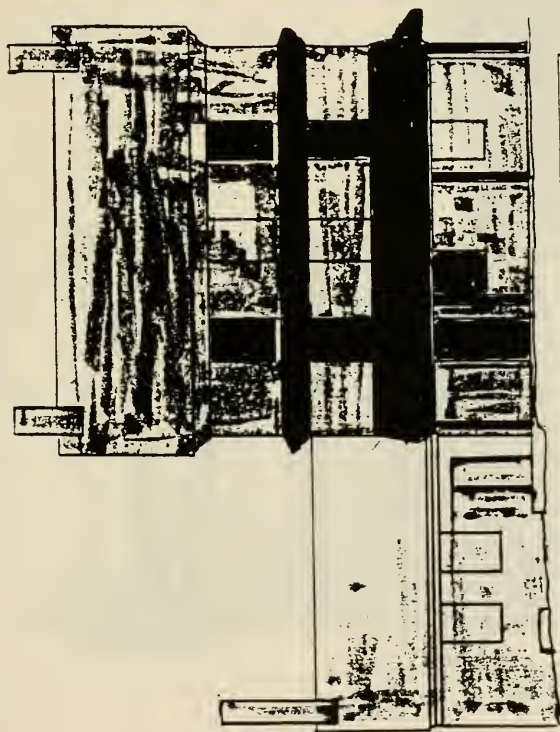
Appendix #8
Monastery Building Alterations



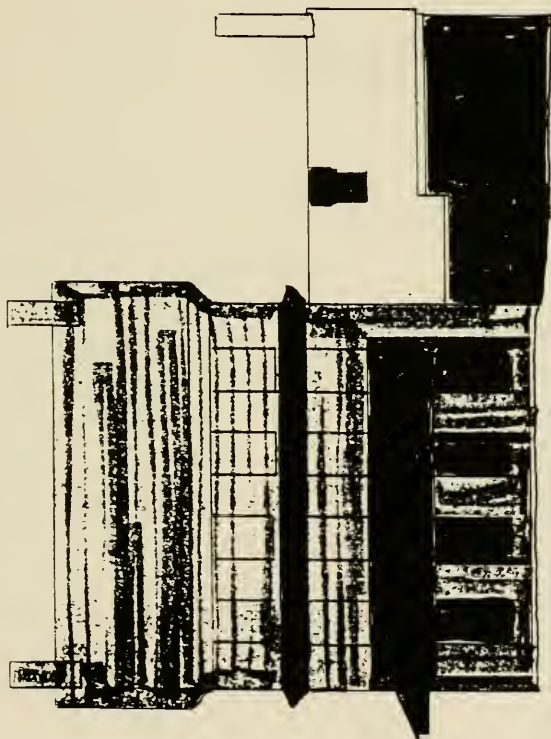
Monastery
N.E. Elevation
1752 about 1850 19th cent. —
18th cent. 20th cent. —



Monastery	
S.W. Elevation	
1752	19th cent.
18th cent.	20th cent.



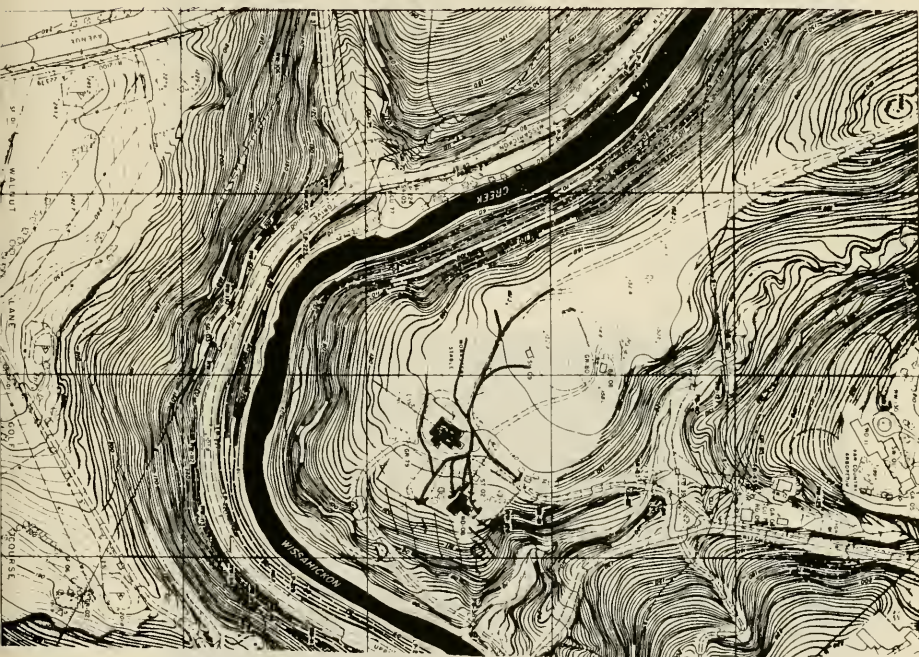
Monastery
N.W. Elevation
1752 ———
18th cent. ———
19th cent. ———
20th cent. ———



Monastery
S.E. Elevation
1752 — 19th cent. —
18th cent. 20 cent. —
removed —

Appendix #2
Ground Drainage

One of the problems facing the Monastery is ground water entering the building. This topographical map with the red arrows shows how the water drains on this site. The drainage problem could be eliminated through regrading of the area so that water was directed into existing storm drains. Following photographs demonstrate drainage patterns into the back yard of the building.





Crack found in the main building wall looking from the loft above the kitchen. Below the structural crack plumbing and heating pipes have been introduced through the main buildings exterior wall.



Appendix #11
Exterior Maintenance Problems

The Monastery

Northwest and Southwest Elevation

The building needs gutters, repointing and repainting. The effect of rising damp are seen on the southwest elevation.



Southeast Elevation

The cornices and porch need repainting. The stucco of the first story needs to be removed and the wall underneath repaired.



Northeast Elevation

The peaks on the main building and the kitchen wing need repointing.



Appendix #12
Monastery Paint Stratigraphy

Appendix #13
Monastery Paint Data Sheets

Phase I: Sequence of Layers 1-m-p

Structure Monastery
 Location of Sample exterior NW Wall, shutter states window in main building
 Date Removed April 1988 Removed By MAV
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
compare to kitchen paint sample

DATA: Microscopic Analysis

COIES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. <u>yellow white</u>	<u>Na₂S</u>
2. <u>white</u>	<u>Na₂S</u>
3. <u>white</u>	
4. <u>gray</u>	<u>Na₂S</u>
5. <u>white</u>	<u>Na₂S</u>
6. <u>yellow</u>	
7. _____	
8. _____	
9. _____	
10. _____	
11. _____	
12. _____	
13. _____	
14. _____	
15. _____	

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

A 96886367 D

Phase II: Analysis and Recommendations ^{1-m-8}

Structure Masonry
 Location of Sample Shutter, main bldg.
 Date Removed April 1988 Removed By MV

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____
 No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DME</u>	<u>Softened</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___. Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead white</u>	<u>KI</u>	<u>yellow pit</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white
 Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Rube Egg ^{13th 24(w)} Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: 7-23-88 By Whom: mjj

Phase I: Sequence of Layers 2-m-p

Structure Fineston

Location of Sample Exterior NW Wall Kitchen First floor window

Date Removed April 1988 Removed By DNV

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

may have been moved

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate:	Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>wood</u>	<u>No 2s</u>			
1. <u>white</u>	<u>+</u>	<u>DMF HNO₃</u>	16.	
2. <u>yellow thick</u>	<u>+</u>	<u>DMF HNO₃</u>	17.	
3. <u>white</u>		<u>DMF HNO₃ - 17/18</u>	18.	
4. <u>white</u>	<u>+</u>	<u>DMF</u>	19.	
5.			20.	
6.			21.	
7.			22.	
8.			23.	
9.			24.	
10.			25.	
11.			26.	
12.			27.	
13.			28.	
14.			29.	
15.			30.	

Summary:

sample fractured and hard to read

Phase I: Sequence of Layers 3-m-P
 Structure Monastery
 Location of Sample NW Wall Kitchen window east window
 Date Removed April 1988 Removed By MA
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
to see if window

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OH)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Neat UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: Lead Na2S

1. <u>Red</u>	<u>+</u>	<u>DMF</u>
2. <u>White</u>	<u>+</u>	<u>DMF</u>
3. <u>Yellow</u>	<u>+</u>	<u>DMF</u>
4. <u>-</u>		
5. <u>White</u>		<u>DMF</u>
6. <u>White</u>		<u>DMF</u>
7. <u>White</u>		<u>DMF</u>
8. <u>White - opaque</u>		<u>DMF</u>
9. <u>Yellow - opaque</u>		<u>DMF</u>
10. <u>-</u>		
11. <u>White</u>	<u>+</u>	<u>CHCl3</u>
12. <u>White</u>	<u>+</u>	<u>CH2Cl2</u>
13. <u>Unsoluble</u>		<u>CH2Cl2</u>
14. <u>-</u>		
15. <u>-</u>		

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Phase II: Analysis and Recommendations 3-m-P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied #1

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DME</u>	<u>+ softening</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
#1 { <u>Iron oxide</u>	<u>K₂Fe(CN)₆</u>	<u>yellow → blue</u>
<u>Iron oxide</u>	<u>K₂H₂O</u>	<u>black</u>
#2 { <u>Iron oxide</u>	<u>Na₂S</u>	<u>yellow</u>
<u>" "</u>	<u>K₂</u>	<u>yellow</u>

PIGMENT AND MEDIUM TYPE: #1

Probable pigment(s): iron oxide
 Probable medium: insoluble

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams Redwood Red (Moss) 94325 (type #1)

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: 3-m-P
 Report prepared - Date: 5/23 By Whom: mm

Phase I: Sequence of Layers 4-m-P

Structure Monument

Location of Sample Exterior SE Wall base bldg. W corner on top of structure

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turpentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: Structure

1. <u>White</u>	<u>DME</u>	<u>HCl Ag</u>
2. <u>Yellow</u>	<u>Na₂S</u>	
3. <u>Yellow</u>	<u>DME</u>	
4. <u>Blue</u>	<u>DME</u>	
5. <u>White</u>		
6. <u>Yellow</u>		
7. <u>White</u>	<u>4/</u>	
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		
13. _____		
14. _____		
15. _____		

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Phase II: Analysis and Recommendations

4-m-p

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1 & 2

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	dissolved
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no ☐ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
#1 Whitening	dissolves in HCl	_____
#2 yellow containing lead	Alas	black
chrom yellow	Silver nitrate	Red color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #1 whitening in linseed oil

Probable medium: #2 chrom yellow in linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Eugene 6th 21/W Sherwin-Williams

needs more yellow

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers

Structure S-m-P

Location of Sample M-1000-5 exterior NW Wall Kitchen wing w corner

Date Removed April 1988

Removed By mv

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate:	Chromochronology	Comments
<u>mortar</u>	<u>HCl</u>	<u>Na₂S</u>
1. <u>Thick white</u>	<u>+</u>	<u>NR</u>
2. <u>-</u>		
3. <u>white</u>		
4. <u>-</u>		
5. <u>white</u>		
6. <u>-</u>		
7. <u>white</u>		
8. <u>-</u>		
9. <u>trans white</u>		
10. <u>white</u>		
11. <u>trans white</u>		
12. <u>white</u>		
13. <u>-</u>		
14. <u>white</u>	<u>✓</u>	<u>✓</u>
15. <u>-</u>		

Substrate:	Chromochronology	Comments
<u>trans white</u>	<u>AU</u>	<u>Na₂S</u>
16. <u>Thick white</u>		
17. <u>-</u>		
18. <u>white</u>		
19. <u>-</u>		
20. <u>white</u>		
21. <u>white</u>		
22. <u>white</u>		
23. <u>white</u>		
24. <u>white</u>		
25. <u>white</u>	<u>✓</u>	<u>✓</u>
26. <u>orange</u>		
27. <u>-</u>		
28. <u>-</u>		
29. <u>-</u>		
30. <u>-</u>		

Summary:

Phase II: Analysis and Recommendations

Structure Plaster

Location of Sample 75-M-13

Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thickness, thickness glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	<u>HCl</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Whiting</u>	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Whiting

Probable medium: Whitewash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 6-m-p

Structure Monastery
 Location of Sample W.W. Wall Kitchen wing, West corner
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.). white wash

Chromochronology Comments

Chromochronology Comments

Substrate: Monastery

1. white wash

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

22. white wash

23. _____

24. _____

25. _____

26. _____

27. _____

28. _____

29. _____

30. _____

Summary:

22 layers of white wash

Phase II: Analysis and Recommendations 6-m-p

Structure _____
 Location of Sample _____
 Date Removed _____ Removed by _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	<u>HCl</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒. Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>whiting</u>	<u>HCl</u>	<u>+</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): whiting (lime)
 Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleacning purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 7-m-P
 Structure Masonry
 Location of Sample Interior SE Wall, West corner. Paint on brick pointing
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OH)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)
_____	_____	_____
_____	_____	_____

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments	Chromochronology Comments
Substrate: <u>mortar</u>	
1. <u>white</u> <u>HCl</u>	16. _____
2. _____	17. _____
3. _____	18. _____
4. _____	19. _____
5. _____	20. _____
6. _____	21. _____
7. _____	22. _____
8. _____	23. _____
9. _____	24. _____
10. _____	25. _____
11. _____	26. _____
12. _____	27. _____
13. _____	28. _____
14. _____	29. _____
15. _____	30. _____

Summary: layer of whitewash or calcimine over mortar

Phase II: Analysis and Recommendations 7 m.p

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness
 glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____
 Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 8-m-R
 Structure Monastery
 Location of Sample Kitchen was interior NW wall first paint layer
 Date Removed April 55 Removed By mv
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
Kitchen was added 1800 layer of plaster + paint
found water present layer

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: mgx tar
 1. Plaster / lime
 2. very thin layer of red / HCl
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____
 11. _____
 12. _____
 13. _____
 14. _____
 15. _____

Chromochronology Comments

16. _____
 17. _____
 18. _____
 19. _____
 20. _____
 21. _____
 22. _____
 23. _____
 24. _____
 25. _____
 26. _____
 27. _____
 28. _____
 29. _____
 30. _____

Summary:

Phase II: Analysis and Recommendations γ -m-p

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis to determine 1st layer

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	<u>AlCl</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Iron oxide</u>	<u>Neg</u>	<u>Blue color change</u>
<u>Red lead</u>	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Iron oxide
 Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Iron oxide red Sherwin-Williams _____

RECOMMENDATIONS

Color: Iron oxide in lime wash
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: 5/1/79 By Whom: mv

Phase I: Sequence of Layers

9-m-P

Structure Masonry

Location of Sample Interior NE Wall Kitchen wing fireplace mantle

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. Red Na₂S
2. Black glaze -500
3. Yellow white Na₂S
4. Brown yellow white ?
5. -
6. White Na₂S
7. Brown ?
8. -
9. Yellow white brown ?
10. -
11. Brown yellow Brown ?
12. -
13. White Na₂S
14. -
15. White

Summary:

? = color too dark to tell

Chromochronology Comments

16. White
17. White
18. -
19. Yellow white
20. Black glaze
21. Yellow cream
22. Pale pink
23. Green Lt.
24. Lt. green
25. Lt. green
26. cream
27. cream
28. white
29. -
30. -

Phase II: Analysis and Recommendations 9-m-P

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>part</u>	<u>dissolved</u>
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Iron oxide</u>	<u>LF</u>	<u>Blue color</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Iron oxide

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.) Mo SS

Butens paint color _____ Sherwin-Williams Bookend Red
94325

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: 9-m-P

Report prepared - Date: 7/24 By Whom: mv

Phase I: Sequence of Layers 10-m-p

Structure Monastery
 Location of Sample Tower, NE Wall, Paint above fireplace mantle
 Date Removed April 1988 Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>Plaster</u>		16. <u>cream</u>	<u>Naz S</u>
1. <u>white</u>		17. <u>—</u>	
2. <u>—</u>		18. <u>cream yellow</u>	<u>Naz S light</u>
3. <u>Brownish white</u>		19. <u>cream yellow</u>	<u>Naz S light</u>
4. <u>—</u>		20. <u>—</u>	
5. <u>Brown white</u>		21. <u>Thin cream</u>	
6. <u>Brown white</u>		22. <u>green</u>	
7. <u>Brown white</u>		23. <u>thin cream</u>	
8. <u>—</u>		24. <u>yellow</u>	<u>DMF</u>
9. <u>Brown white</u>		25. <u>cream</u>	
10. <u>Brown white</u>		26. <u>cream</u>	
11. <u>—</u>		27. <u>yellow</u>	
12. <u>Brown white</u>		28. <u>yellow</u>	
13. <u>yellow white</u>	<u>Naz S</u>	29. <u>cream</u>	<u>✓</u>
14. <u>yellow cream</u>	<u>Naz S</u>	30. <u>—</u>	
15. <u>—</u>			

Summary:

Phase II: Analysis and Recommendations 10-m-p

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied 41
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>-</u>
Latex	_____	_____
Whitewash/calcimine	<u>HCL</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	<u>H₂SO₄</u>	<u>long reader</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____
 Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color made to match color / Dark smoke ^{because of}
 Sherwin-Williams

RECOMMENDATIONS

Color: _____
 Paint Type: white wash

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 11-m-P
 Structure Monastery
 Location of Sample Tower whitewash from kiln beams
 Date Removed April 1988 Removed By MVS
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: Plaster
 1. Yellow white
 2. white
 3. white
 4. white
 5. white
 6. white & thin
 7. white
 8. white
 9. white thick porous
 10. white thick porous
 11. Bright white ropey thick
 12. white
 13. yellow white
 14. white
 15. yellow white

Chromochronology Comments

16. white
 17. white
 18. white
 19. white
 20. white
 21. forms thick white
 22. " " "
 23. thin white
 24. Bright white
 25. Bright white
 26. white
 27. white
 28. white
 29. white
 30. white

Summary:

No reaction w/ Na₂S No lead
reacted w/ HNO₃

Phase II: Analysis and Recommendations 11-m-2

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>-</u>
Latex	_____	_____
White wash/calcimine	<u>HNO₃</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓ Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Whiting</u>	<u>HCl</u>	<u>Evolution of gas</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: 11-m-2

Report prepared - Date: 7/23 By Whom: M. J.

Phase I: Sequence of Layers 12-m-p

Structure Masonry
 Location of Sample Interior NW Wall Kitchen wing, white wash over 11-m-m
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OH)
	Fracture ()	Turentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: Plaster

1.	white	ACI
2.	white	
3.	white	
4.	white	
5.	white	
6.	—	
7.	—	
8.	white	
9.	white	
10.	white	
11.	—	
12.	white	
13.	white	
14.	yellow white	
15.	white	

Chromochronology Comments

16.	translucent white	HCl
17.	white	
18.	—	
19.	white	
20.	white	
21.	white	
22.	bright white	
23.	—	
24.	white	
25.	white	
26.	—	
27.	bright white	
28.	thick white	
29.	white	
30.	white	

Summary:

No reaction w/ Na₂S Single contaminated
✓ Fe from mortar

Phase II: Analysis and Recommendations

12-M-T

Structure Monomer
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calcimine	<u>HCl</u>	<u>+</u>
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color test for zinc ox.
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Whiting</u>	<u>HCl</u>	<u>+</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): White wash with whiting
 Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 13-m-p

Structure Monastery
 Location of Sample Interior NE Wall kitchen wing off door to loft
 Date Removed April 1988 Removed By MS
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. Red
2. Yellow
3. Green
4. Orange
5. White
6. Orange
7. Light blue
8. Green
9. Yellow copy
10. White
11. White
12. Yellow
13. Thin yellow green
14. Orange
15. Blue

Chromochronology Comments

16. ---
17. white
18. lime
19. ---
20. ---
21. ---
22. ---
23. ---
24. ---
25. ---
26. ---
27. ---
28. ---
29. ---
30. ---

Summary:

Phase II: Analysis and Recommendations 13 m-p
Structure _____
Location of Sample _____
Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DmF</u>	<u>Softens</u>
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
#1 <u>Iron oxide</u>	<u>Potassium ferrioxalate</u>	<u>Blue pH</u>
#2 <u>Lead</u>	<u>st</u>	<u>yellow</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color white very bright Sherwin-Williams Bookwood Rev
no match

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 14-m-p
 Structure Morastery
 Location of Sample Interior, NW wall, kitchen wing, Center 4 ft above
 Date Removed April 1988 removed By MPJ Floor
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
addition to main building c. 1880

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromect.). First layers transparent Brown

Chromochronology Comments

Substrate: Plaster

1. Brown Yellow G
2. Translucent lt green lt green
3. Black line HCl
4. Translucent lt green HCl
5. Dark line
6. Translucent Brown HCl
7. Tan
8. Black line lt green
9. lt green lt green
10. Black line lt green
11. Tan lt green
12. Black line lt green
13. Yellow white lt green
14. Tan lt green
15. Black line

Chromochronology Comments

16. Tan lt green
17. Black line lt green
18. Yellow lt green
19. Black line lt green
20. Yellow lt green
21. Black line lt green
22. Green lt green
23. Black line lt green
24. Yellow lt green
25. White lt green
26. White lt green
27. Cream lt green
28. Cream lt green
29. White lt green
30. White lt green

Summary:

Phase II: Analysis and Recommendations 14-m-p

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied Layer # 1, 2

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): Thick ropinessMEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

Dm++

Latex

Whitewash/calimine

140+

Waterbased distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)Flourescence under near ultraviolet: yes _____ no ✓ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Spot Test

Reaction

calimineH₂SO₄+PIGMENT AND MEDIUM TYPE:Probable pigment(s): CalimineProbable medium: linseed oilCOLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONSColor: white limePaint Type: linseed oilDOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 15-m-P

Structure Monastery

Location of Sample Interior, S.W. wall / Kitchen wing Door Jambs Entry

Date Removed April 1988 Removed By M.K.G.

Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

Door way 18th century molding

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.). 2 layers of graining

Chromochronology Comments

Substrate: wood

1. red - thin
2. white slight haze
3. glaze -
4. white yellow slight haze
5. glaze
6. white
7. glaze
8. white haze
9. glaze
10. white
11. -
12. white haze
13. -
14. white haze UV
15. -

Chromochronology Comments

16. Yellow cream UV
17. -
18. white haze
19. Brown glaze
20. Yellow cream
21. Pink DMF
22. Green
23. Green
24. Green
25. white
26. Yellow
27. white
28. -
29. -
30. -

Summary:

Phase II: Analysis and Recommendations 15-m-P

Structure Monastery

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Layer 1, 2, 3

No. of Layers to be Studied 1, 2, 3

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): Red very Thick - ropiness,
2nd layer shows Brush mark,

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Oil

Latex

White wash/calcimine

Water based/distemper

Varnish

Shellac

Chemical

DMS

NA

Reaction

-

+

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Red

white

Spot Test

Potassium Ferrocyanide

K.F.

Reaction

+ Blue PPT

+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): *1 Iron oxide *2 Lead white

Probable medium: xx1 Calcimine 2 Calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Iron oxide Red Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 7-m-P

Structure Monastery

Location of Sample Interior N.E. wall, Kitchen wing, wall in loft over stairs

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na-S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OH)
	Fracture ()	Turpentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate:	Chromochronology	Comments	Chromochronology	Comments
	<u>Plaster</u>	<u>HCl</u>		<u>red</u>
1.	<u>Pink</u>	<u>+</u>	16.	<u>red</u> <u>+</u>
2.	<u>white</u>	<u>+</u>	17.	<u>white</u> <u>+</u>
3.	<u>white</u>	<u>+</u>	18.	<u>Yellow</u> <u>DMF</u>
4.	<u>white</u>	<u>+</u>	19.	
5.	<u>white</u>	<u>+</u>	20.	
6.	<u>-</u>		21.	
7.	<u>white</u>	<u>+</u>	22.	
8.	<u>white</u>	<u>+</u>	23.	
9.	<u>white</u>	<u>+</u>	24.	
10.	<u>white</u>	<u>+</u>	25.	
11.	<u>white</u>	<u>+</u>	26.	
12.	<u>white</u>	<u>+</u>	27.	
13.	<u>-</u>		28.	
14.	<u>white</u>	<u>+</u>	29.	
15.	<u>orange</u>	<u>+</u>	30.	

Summary:

Phase II: Analysis and Recommendations (7-m-P)

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied 2

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DM &</u>	<u>-</u>
Latex		
Whitewash/calcimine	<u>W/ing</u>	<u>+ H₂SO₄ crystals</u>
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Lead Red</u>	<u>KT</u>	<u>-</u>
<u>Lake Pigment</u>	<u>H₂SO₄</u>	<u>-</u>
<u>Iron Oxide</u>	<u>HCl + Potassium Ferrocyanide</u>	<u>+</u>

PIGMENT AND MEDIUM TYPE:

Sample found can be matched w/ Iron

Probable pigment(s): Iron oxideProbable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Between Ras berry creamEutens paint color and Pink Grottes Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers 18-m-P

Structure Monastery

Location of Sample Interior, N.W. wall / main building / music Room / w.c. + corner wall

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
	Primer (P)	Hydrochloric Acid (HCl)
	Glaze (G)	Dimethylformamide (DMF)
	Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
	Shellac (S)	Water (H ₂ O)
	Wall paper (W)	Alcohol (OR)
	Fracture ()	Turpentine (TURP)
	Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>Plaster</u>			
1. <u>Glaze</u>		16. _____	
2. <u>Yellow white</u>	<u>Na₂S</u>	17. _____	
3. <u>Pink</u>	<u>Na₂S</u>	18. _____	
4. <u>Pink</u>		19. _____	
5. <u>Thick Translucent gray</u>		20. _____	
6. <u>Thin Bright Red</u>		21. _____	
7. <u>Thick Translucent</u>		22. _____	
8. <u>Bright yellow</u>		23. _____	
9. <u>Thin white</u>		24. _____	
10. <u>lt Blue</u>	<u>Na₂S</u>	25. _____	
11. <u>Cream white</u>	<u>Na₂S</u>	26. _____	
12. _____		27. _____	
13. <u>cream</u>	<u>DMF / CH₂Cl₂</u>	28. _____	
14. <u>cream</u>	<u>DMF / CH₂Cl₂</u>	29. _____	
15. _____		30. _____	

Summary:

Phase II: Analysis and Recommendations 18-m-P

Structure Monasteri

Location of Sample _____

Date Removed April 1988Removed By mvj

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis * 1, 2

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>* 1, 2 DMF</u>	<u>Satend</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>* 1 Lead white</u>	<u>KI</u>	<u>yellow ppt</u>
<u>* 2 Iron oxide</u>	<u>HCl + K₄Fe(CN)₆</u>	<u>blue ppt</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Ser albaProbable medium: Linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

* 1 PatinaButens paint color * 2 Bitter sweet P^Y Sherwin-Williamsneeds more orange

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 17-m-P

Structure Monastery
 Location of Sample Interior molding/music room/N.W. wall
 Date Removed April 1988 Removed By M.V.D.
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate:	Chromochronology	Comments	Chromochronology	Comments
1. <u>Red</u>	<u>17a-5</u>		16.	
2. <u>Blue</u>			17.	
3. <u>Dark green</u>	<u>17a-5</u>		18.	
4. <u>Yellow white</u>	<u>17a-5</u>		19.	
5. <u>Tan white</u>			20.	
6. <u>White</u>			21.	
7. <u>Yellow white</u>	<u>17a-5</u>		22.	
8. <u>White</u>			23.	
9. <u>Yellow white</u>	<u>17a-5</u>		24.	
10. <u>White</u>	<u>17a-5</u>		25.	
11. <u>Yellow white</u>			26.	
12. <u>White</u>			27.	
13. <u>White</u>			28.	
14. <u>White</u>			29.	
15.			30.	

Summary:

*182 red with translucent blue layer over

Phase II: Analysis and Recommendations 17-m-P

Structure monastery

Location of Sample same

Date Removed April 1988

Removed By mkj

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis *1, *2

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMS</u>	<u>-</u>
Latex		
Whitewash/calimine	<u>HCE</u>	<u>+</u>
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>*1 Red lead</u>	<u>KI</u>	<u>yellow P#</u>
<u>Iron</u>	<u>Ky Fe (CN)₆</u>	<u>blue</u>
<u>*2 Blue ultramarine</u>	<u>diag</u>	<u>color change</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Lead oxide + Iron oxide

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Notes: Red - Iron oxide + lead in whitewash/calcimine

Paint Types: Blue: ultramarine in calcimine

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 20-m-P

Structure Monastery

Location of Sample Interior SW wall music room 2nd paint layer

Date Removed April 68 Removed By WTF

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

Room altered after 1840

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate:

1. <u>white</u>	
2. <u>white</u>	
3. <u>white</u>	
4. <u>white yellow</u>	
5. <u>white</u>	
6. <u>white</u>	
7. <u>white</u>	
8. <u>white</u>	
9. <u>white</u>	
10. <u>white yellow</u>	
11. <u>white yellow</u>	
12. <u>white</u>	
13. <u>white</u>	
14. <u>white</u>	
15. <u>plaster - reverse</u>	

Chromochronology Comments

16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 20-m-P

Structure Marble

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thickness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitevaen/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
Na ₂ S	<u>No reaction any layer</u>	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no _____, Color _____

Probable pigment associated with fluorescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Zinc Ox</u>	<u>HCl + Potassium Sticcyanide</u>	<u>Blue color</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE: too difficult to distinguish layers between 12-15
Whiting & Zinc ox.

Probable pigment(s): Zinc ox

Probable medium: calc. mine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 21 m - P

Structure Monastery

Location of Sample main Room doorway to exterior

Date Removed April 1988

Removed By DVO

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

1900 addition

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turpentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy, etc.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>wood</u>			
1. <u>cream</u>	<u>DMF 1/25</u>	16.	
2. <u>cream</u>	<u>DMF 1/25</u>	17.	
3. <u>cream</u>	<u>DMF 1/25</u>	18.	
4. <u>cream</u>	<u>DMF 1/25</u>	19.	
5. <u>cream</u>	<u>DMF 1/25</u>	20.	
6. <u>white</u>	<u>DMF</u>	21.	
7.		22.	
8. <u>cream</u>	<u>DMF</u>	23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations 21-m-P

Structure Demolition

Location of Sample _____

Date Removed April 1988

Removed By mvj

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thickness, thickness glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead</u>	<u>Na₂S</u>	<u>Turned Black</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead

Probable medium: oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 22-m-p

Structure Monastery
 Location of Sample Interior id wall music room wall over fireplace
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>White</u>			
1. <u>6 yellow white</u>		16.	
2. <u>yellow white</u>	<u>Mass</u>	17.	
3. <u>Red - pink</u>	<u>part of red reacted</u>	18.	
4. <u>—</u>		19.	
5. <u>trace gray</u>		20.	
6. <u>red line</u>		21.	
7. <u>yellow</u>		22.	
8. <u>green</u>	<u>Mass</u>	23.	
9. <u>yellow cream</u>	<u>Mass</u>	24.	
10. <u>yellow cream</u>	<u>Mass</u>	25.	
11. <u>green</u>		26.	
12. <u>lt. green</u>		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations

Set 22-m-8

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	Soluble
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no _____ Color _____

Probable pigment associated with flourescence: _____

#	Possible Pigment Type	Spot Test	Reaction
#1,2	Lead white	KI	yellow color
	Red	Potassium Thiocyanide	yellow color
	Red	KI	yellow color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #1,2 Lead white (linseed oil)

Probable medium: #3 chalk hard a transparent over it

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color #3 buttersweet pink Sherwin-Williams

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 23-m-B

Structure Monastery
 Location of Sample Interior NE Wall movie room just below ceiling center
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
This wall may have been moved.

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>Plaster</u>	<u>DMF</u>		
1. <u>Gr</u>		16.	
2. <u>Yellow white</u>	<u>DMF</u>	17.	
3. <u>Yellow white</u>	<u>Na₂S</u>	18.	
4. <u>Red</u>		19.	
5. <u>translucent</u>	<u>DMF Fluoresces</u>	20.	
6. <u>translucent</u>	<u>DMF</u>	21.	
7. <u>yellow white</u>	<u>Na₂S</u>	22.	
8. <u>yellow white</u>	<u>Na₂S</u>	23.	
9. <u>yellow white</u>	<u>Na₂S</u>	24.	
10. <u>—</u>		25.	
11. <u>yellow white</u>		26.	
12. <u>green</u>		27.	
13. <u>lt. green</u>		28.	
14.		29.	
15.		30.	

Summary:

Phase I: Sequence of Layers 23-m-8

Structure Monastery
 Location of Sample Interior NE Wall mass room just below ceiling center
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
This wall may have been moved:

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster	Chromochronology	Comments		Chromochronology	Comments
1. <u>G</u>		<u>DMF</u>	16.		
2. <u>yellow white</u>		<u>DMF</u>	17.		
3. <u>yellow white</u>	<u>Na₂S</u>	<u>DMF</u>	18.		
4. <u>pink</u>			19.		
5. <u>translucent</u>		<u>DMF Fluoresces</u>	20.		
6. <u>translucent</u>		<u>DMF</u>	21.		
7. <u>yellow white</u>	<u>Na₂S</u>		22.		
8. <u>yellow white</u>	<u>Na₂S</u>		23.		
9. <u>yellow white</u>	<u>Na₂S</u>		24.		
10.			25.		
11.			26.		
12. <u>yellow white</u>			27.		
13. <u>green</u>			28.		
14. <u>lt green</u>			29.		
15.			30.		

Summary:

Phase II: Analysis and Recommendations

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>+</u>
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Fluorescence under near ultraviolet: yes no ✓, Color _____

Probable pigment associated with fluorescence: _____

#	Possible Pigment Type	Spot Test	Reaction
<u>#1</u>	<u>lead white</u>	<u>KI</u>	<u>yellow</u>
	<u>red</u>	<u>KI</u>	<u>yellow/orange</u>
	_____	_____	_____
	_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white / linseed oil

Probable medium: red lead / linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

#1 5th 25 standard (w)

Butens paint color 3 6th 25 pink Sherwin-Williams _____

needs more orange

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 24-m-p
 Structure Impervious
 Location of Sample small room door molding
 Date Removed April 1955 Removed By mv
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
The door was seen to have been moved

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments			Chromochronology Comments		
Substrate:					
9	1. Bright white	CH ₂ Cl ₂	7. Inc Ox	16.	
8	2. —			17.	
7	3. yellow white	CH ₂ Cl ₂	7. Inc Ox	18.	
6	4. —			19.	
5	5. cream	DMF oil		20.	
4	6. —			21.	
3	7. yellow cream	Na ₂ S	HCl 10.1	22.	
2	8. bright white	Na ₂ S	HCl 10.1	23.	
1	9. bright white	Na ₂ S	HCl 10.1	24.	
	10. —			25.	
	11. —			26.	
	12. —			27.	
	13. —			28.	
	14. —			29.	
	15. —			30.	
Summary:					

Phase II: Analysis and Recommendations

24-m-P

Structure

Location of Sample Rooming moldy - music room

Date Removed

Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis try to date early layers

No. of Layers to be Studied

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thickness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

DMF

+ 1 layer #5-1

Latex

CH₂Cl₂

7.9

White wash/calcimine

HCl - slow react.

1-3

Waterbased/distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Fluorescence under near ultraviolet: yes ☒ no ☐ Color yellow green

Probable pigment associated with fluorescence:

	Possible Pigment Type	Spot Test	Reaction
1-3	<u>Lead</u>	<u>Na₂S</u>	<u>+ Black</u>
7.9	<u>Zinc ox</u>	<u>Blanching ferrous sulfate</u>	<u>+ Blue color</u>

PIGMENT AND MEDIUM TYPE:

1-3

Probable pigment(s): lead white / 2-9 Zinc ox / Zinc oxProbable medium: water based oil / Latex

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date: 11-17 By Whom: mo

Phase II: Analysis and Recommendations 26-m-P

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thickness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 26-m-8

Structure Walls

Location of Sample Doorway, main room, from back of room

Date Removed Removed By

Significant Facts Regarding The Structure's History Which Pertain To The Analysis (data constructed, significant alterations (blue printed))

1. <u>Plaster</u>	2. <u>Plaster</u>	3. <u>Plaster</u>	4. <u>Plaster</u>
5. <u>Plaster</u>	6. <u>Plaster</u>	7. <u>Plaster</u>	8. <u>Plaster</u>
9. <u>Plaster</u>	10. <u>Plaster</u>	11. <u>Plaster</u>	12. <u>Plaster</u>
13. <u>Plaster</u>	14. <u>Plaster</u>	15. <u>Plaster</u>	16. <u>Plaster</u>
17. <u>Plaster</u>	18. <u>Plaster</u>	19. <u>Plaster</u>	20. <u>Plaster</u>
21. <u>Plaster</u>	22. <u>Plaster</u>	23. <u>Plaster</u>	24. <u>Plaster</u>
25. <u>Plaster</u>	26. <u>Plaster</u>	27. <u>Plaster</u>	28. <u>Plaster</u>
29. <u>Plaster</u>	30. <u>Plaster</u>	31. <u>Plaster</u>	32. <u>Plaster</u>

DATA: Microscopic Analysis

CODES	Finish	Reaction of	Sodium Sulfide	(Na ₂ S)
1	Primer (P)		Hydrochloric Acid	(HCl)
2	Glass (G)		Dimethylformamide	(DMF)
3	Varnish (V)		Methylene Chloride	(CH ₂ Cl ₂)
4	Shellac (S)		Water	(H ₂ O)
5	Wall paper (W)		Alcohol	(CH ₃)
6	Fracture (F)		Turpentine	(TURP)
7	Dist. Layer (D)		Neat UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychrome, etc.)

Substrate	Chromochronology	Comments	Chromochronology	Comments
1	White	Plaster	16	
2	White	Plaster	17	
3	White	Plaster	18	
4	White	Plaster	19	
5	White	Plaster	20	
6	White	Plaster	21	
7	White	Plaster	22	
8	White	Plaster	23	
9	White	Plaster	24	
10	White	Plaster	25	
11	White	Plaster	26	
12	White	Plaster	27	
13	White	Plaster	28	
14	White	Plaster	29	
15	White	Plaster	30	

Summary:

Modern paint/bead/hot/cold

Phase I: Sequence of Layers b-m-m

Structure Monochrome

Location of Sample Exterior SE wall main bldg W

Date Removed April 88

Removed By MJ

Significant Facts Regarding The Structure's History Which May Pertain To The Analysis (date constructed, significant alterations, dates painted)

Found below a layer of stucco

DATA: Microscopic Analysis

CODES		Reaction of Sodium Sulfide	(Na.S)
-Finish (F)		Hydrochloric Acid	(HCl)
Primer (P)		Dimethylformamide	(DMF)
Glaze (G)		Methylene Chloride	(CH ₂ Cl ₂)
Varnish (V)		Water	(H ₂ O)
Shellac (S)		Alcohol	(OR)
Wall paper (W)		Turpentine	(TURP)
Fracture ()		Near UV Light	(UV)
Dirt Layer (-)			

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate: <u>Plaster</u>	Chromochronology	Comments	Chromochronology	Comments
1. <u>white</u>		<u>HCl</u>	16.	
2. <u>white</u>		<u>HCl</u>	17.	
3. <u>white</u>		<u>HCl</u>	18.	
4. <u>white</u>		<u>HCl</u>	19.	
5. <u>white</u>		<u>HCl</u>	20.	
6. <u>white</u>		<u>HCl</u>	21.	
7. <u>white</u>		<u>HCl</u>	22.	
8. <u>white</u>		<u>HCl</u>	23.	
9. <u>white</u>		<u>HCl</u>	24.	
10. <u>white</u>		<u>HCl</u>	25.	
11. <u>white</u>		<u>HCl</u>	26.	
12. <u>white</u>		<u>HCl</u>	27.	
13.			28.	
14.			29.	
15.			30.	

Summary:

No reaction w/ Na₂S

Phase II: Analysis and Recommendations b-m-mStructure Monomeric

Location of Sample _____

Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis test for layerNo. of Layers to be Studied 1-2Reason for Layer Selection: in layer

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>—</u>
Latex		
Whitewash/calcimine	<u>HCl</u>	<u>+</u>
Waterbased/distemper	<u>H₂O</u>	<u>—</u>
Varnish		
Shellac		
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Whiting</u>	<u>H₂SO₄</u>	<u>Partial formation of residue = calcium sulfate</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): WhitingProbable medium: Whitewash like in H₂O

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color NA Sherwin-Williams NA

RECOMMENDATIONS

Color: lime wash: saturated lime patina thinner with H₂O toPaint Type: make the paint

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 9-m-m

Structure Masonry

Location of Sample Extreme NW wall kitchen wing, west corner

Date Removed Mar 1988 Removed By PMV

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

to find how many layers on exterior of building

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture (-)	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromect.).

Substrate:	Chromochronology	Comments
1. <u>Mortar</u>	<u>HCL</u>	<u>Na₂S</u>
2. <u>Brick</u>	<u>HCL</u>	<u>Na₂S</u>
3. <u>"</u>	<u>HCL</u>	<u>Na₂S</u>
4. <u>"</u>	<u>HCL</u>	<u>Na₂S</u>
5. <u>"</u>	<u>HCL</u>	<u>Na₂S</u>
6. <u>"</u>		
7. <u>"</u>		
8. <u>"</u>		
9. <u>"</u>		
10. <u>"</u>		
11. <u>"</u>		
12. <u>"</u>		
13. <u>"</u>		
14. <u>"</u>		
15. <u>"</u>		

Chromochronology	Comments
16. <u>"</u>	
17. <u>"</u>	
18. <u>"</u>	
19. <u>"</u>	
20. <u>"</u>	
21. <u>"</u>	
22. <u>"</u>	
23. <u>"</u>	
24. <u>"</u>	
25. <u>"</u>	
26. <u>"</u>	
27. <u>"</u>	
28. <u>"</u>	
29. <u>"</u>	
30. <u>"</u>	

Summary:

White wash

Phase II: Analysis and Recommendations g-m-m
Structure _____
Location of Sample _____
Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 12-m-m

Structure marble

Location of Sample kitchen left mortar above window

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: mortar

1. white
2. white
3. pink
4. white
5. white
6. white
7. —
8. white
9. white
10. white
11. —
12. thick white
13. —
14. thick white
15. white

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

white wash

Phase II: Analysis and Recommendations

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calimine	HCl	+
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ✓, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Na₂S</u>	<u>Lead</u>	<u>-</u>
<u>HCl</u>	<u>+</u>	<u>_____</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE: unable to test #3 because whole sample contaminated with ironProbable pigment(s): white wash

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers 10-m-m

Structure Parassey

Location of Sample Plaster layer over 15-m-m / music Room

Date Removed April 1984

Removed By MVA

Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: <u>Marble</u>	
1. <u>Plaster (pink tinge)</u>	
2. <u>white</u> <u>Na₂S</u> <u>DMF</u>	
3. <u>Glaze</u> <u>DMF</u>	
4. <u>Yellow white</u> <u>Na₂S</u> <u>DMF</u>	
5. <u>orange</u> <u>Na₂S</u> <u>DMF</u>	
6. <u>red</u> <u>DMF</u>	
7. <u>—</u>	
8. <u>yellow</u> <u>Na₂S</u> <u>DMF</u>	
9. <u>blue</u> <u>Na₂S</u> <u>DMF</u>	
10. <u>cream</u> <u>DMF</u>	
11. <u>Green</u> <u>DMF</u>	
12. <u>—</u>	
13. <u>—</u>	
14. <u>—</u>	
15. <u>—</u>	

Chromochronology Comments

16. <u>—</u>
17. <u>—</u>
18. <u>—</u>
19. <u>—</u>
20. <u>—</u>
21. <u>—</u>
22. <u>—</u>
23. <u>—</u>
24. <u>—</u>
25. <u>—</u>
26. <u>—</u>
27. <u>—</u>
28. <u>—</u>
29. <u>—</u>
30. <u>—</u>

Summary:

Phase II: Analysis and Recommendations 18-m-m

Structure monasteryLocation of Sample sameDate Removed April 1988Removed By MKG

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis X1

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glossiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>Dmf</u>	<u>softened</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>X1 lead white</u>	<u>WGS</u>	<u>turned Black</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Lead whiteProbable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 20-m-m

Structure Marble
 Location of Sample Interior NW Wall above entry door | Parlor
 Date Removed May 88 Removed By mg
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
layer between 6-m-m & 21-m-m

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>mortar</u>	<u>401</u>	<u>16.</u>	<u>1125</u>
1. <u>plaster</u>	<u>+</u>	17.	
2. <u>glaze</u>	<u>+</u>	18.	
3. <u>white</u>	<u>+</u>	19.	
4.		20.	
5.		21.	
6.		22.	
7.		23.	
8.		24.	
9.		25.	
10.		26.	
11.		27.	
12.		28.	
13.		29.	
14.		30.	
15.			

Summary:

Phase II: Analysis and Recommendations 25-11-177

Structure

Location of Sample

Date Removed

Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.):

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

Latex

Whitewash/calcimine

Waterbased/distemper

Varnish

Shellac

HCl

bubbles

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☐ no ☒ Color

Probable pigment associated with flourescence:

Possible Pigment Type

Spot Test

Reaction

Whiting

HCl

+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): whitewash ~ thin plaster layer

Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color

Sherwin-Williams

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date:

By Whom:

Appendix #14
Monastery Mortar Data Sheets

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name Monastery Sample No. 1-m-m

Date Oct 4 1988 Origin of sample Monastery

Visual description of sample (color, texture, hardness, inclusions, etc.):

Light brown, sandy, hard
breaks in small pieces
no binder visible

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.10
Weight of filter paper (W_2) = 6.29
Weight of filter paper + dry fines (W_3) = 10.40
Weight of dry fines ($W_3 - W_2$) = 4.11
Weight of dry sand (W_4) = 13.52
% of sand ($(W_4/W_1) \times 100$) = 53.9
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 16.37
% of dissolved binder = 29.73

Observations: dissolution of binder, color of liquid:

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm —
2.36 mm —
1.18 mm —
600 um 1.54
300 um 2.33
150 um 2.71
75 um 2.9
53 um 3.2
38 um 3.5

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 2-m-m-7-m-m ^{Sum}
 Date 7/11/41 Origin of sample Prague, Czechoslovakia
 Visual description of sample (color, texture, hardness, inclusions, etc.): Small amount of dust
corner pieces containing some red paint
very hard
very hard

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.10 ^{spilled}
 Weight of filter paper (W_2) = 6.30 + 0.53 ^{6.83}
 Weight of filter paper + dry fines (W_3) = 7.83
 Weight of dry fines ($W_3 - W_2$) = 1.53
 Weight of dry sand (W_4) = 10.44
 % of sand ($(W_4/W_1) \times 100$) = 41.54
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 6.10
 % of dissolved binder = 5.13

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

	% Finer than	
4.75 mm	100	100
2.36 mm	100	100
1.18 mm	100	100
600 um	100	100
300 um	100	100
150 um	100	100
75 um	100	100
53 um	100	100
38 um	100	100

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 3-m-m *Deep murr*
Date _____ Origin of sample masonry
Exterior S.W. wall, kitchen wing Below
Deformations 1-m-m
Visual description of sample (color, texture, hardness, inclusions, etc.): Soft, by chunks of lime yellow brown
Even chunk 1 = lime green
substantially yellow

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.06
Weight of filter paper (W_2) = 6.22 + 5.7 = 6.79
Weight of filter paper + dry fines (W_3) = 10.72 g
Weight of dry fines ($W_3 - W_2$) = 3.73
Weight of dry sand (W_4) = 9.77 g
% of sand ($(W_4/W_1) \times 100$) = 37.30 %
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 15.64 %
% of dissolved binder = 53.07 %

Observations: dissolution of binder, color of liquid: greenish yellow

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
2.36 mm _____
1.18 mm _____
600 μ m _____
300 μ m _____
150 μ m _____
75 μ m _____
53 μ m _____
38 μ m _____

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name Sample No. 4-m-m 2-m-m

Date 10/17/28 Origin of sample

Visual description of sample (color, texture, hardness, inclusions, etc.):

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.04
Weight of filter paper (W_2) = 6.30 + .53 = 6.83
Weight of filter paper + dry fines (W_3) = 7.88
Weight of dry fines ($W_3 - W_2$) = 1.05
Weight of dry sand (W_4) = 9.28
% of sand ($(W_4/W_1) \times 100$) = 37.05
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 4.22
% of dissolved binder = 71.25

Observations: dissolution of binder, color of liquid:

Characterization of Sand:

Microscopic Examination

% Finer than

4.75 mm	
2.36 mm	
1.18 mm	
600 μ m	
300 μ m	
150 μ m	
75 μ m	
53 μ m	
38 μ m	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. S-m-m
Date Feb 12 1968 Origin of sample manuscript
5 liter 35 mm x 25 mm x 10 mm
deep mortar sample nominally 4-m-m
Visual description of sample (color, texture, hardness, inclusions, etc.): light brown, fine, hard, no inclusions
sample is very hard, no inclusions, no air

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.0
Weight of filter paper (W_2) = 6.28 + .57 = 6.85
Weight of filter paper + dry fines (W_3) = 11.29
Weight of dry fines ($W_3 - W_2$) = 4.41
Weight of dry sand (W_4) = 11.77
% of sand ($((W_4/W_1) \times 100) =$ 46.72%
% of fines ($((W_3 - W_2)/W_1 \times 100) =$ 17.62%
% of dissolved binder = 35.66%

Observations: dissolution of binder, color of liquid: _____
Sample is hard

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
2.36 mm 100
1.18 mm 100
600 um 100
300 um 100
150 um 100
75 um 100
53 um 100
38 um 100

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 6-m-m
 Date _____ Origin of sample Monastery
Below NW wall of main
Building, pointing below 6-m-m-s
 Visual description of sample (color, texture, hardness, inclusions, etc.): white w/ aggregate very noticeable
very hard
Iron fragments

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.01
 Weight of filter paper (W_2) = 5.942 57.642
 Weight of filter paper + dry fines (W_3) = 5.174
 Weight of dry fines ($W_3 - W_2$) = 1.075
 Weight of dry sand (W_4) = 11.19
 % of sand ($(W_4/W_1) \times 100$) = 44.74
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 4.30
 % of dissolved binder = 48.22

Observations: dissolution of binder, color of liquid: _____
limy green liquid

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm 100
 2.36 mm 100
 1.18 mm 100
 600 um 100
 300 um 100
 150 um 100
 75 um 100
 53 um 100
 38 um 100

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 11-11-11-11
Date Jan 4 1957 Origin of sample Marble
Visual description of sample (color, texture, hardness, inclusions, etc.): Very fine, white, smooth, hard, no inclusions
Substrate: none, all pure
Iron shavings

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.13
Weight of filter paper (W_2) = 6.27 + 56.683
Weight of filter paper + dry fines (W_3) = 8.33
Weight of dry fines ($W_3 - W_2$) = 1.50
Weight of dry sand (W_4) = 18.45
% of sand ($(W_4/W_1) \times 100$) = 73.55
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 5.97
% of dissolved binder = 20.49

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than
4.75 mm _____
2.36 mm 57 3.22
1.18 mm 47 4.21
600 μ m 27 10.71
300 μ m 23 15.15
150 μ m 20 19.5
75 μ m 18 24.3
53 μ m 15 29.8
38 μ m 12 35.8

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 7-m-m
Date Jan 16 1988 Origin of sample Masonry
1980 exterior cement SW wall masonry
Visual description of sample (color, texture, hardness, inclusions, etc.): Uniform grey color - Very hard
Some fragments

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.06
Weight of filter paper (W_2) = 5.84 + 5.12 = 6.39
Weight of filter paper + dry fines (W_3) = 7.72 g
Weight of dry fines ($W_3 - W_2$) = 1.33 g
Weight of dry sand (W_4) = 12.34 g
% of sand ($((W_4/W_1) \times 100) =$ 73.34 %
% of fines ($((W_3 - W_2)/W_1 \times 100) =$ 5.30 %
% of dissolved binder = 2.36 %

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than

4.75 mm	_____	
2.36 mm	<u>1.2</u>	2.3 %
1.18 mm	<u>1.2</u>	4.8 %
600 um	<u>1.2</u>	15.7 %
300 um	<u>1.2</u>	47.3 %
150 um	<u>3.35</u>	13.7 %
75 um	<u>1.2</u>	4.8 %
53 um	<u>1.2</u>	4.8 %
38 um	_____	

19.3 %

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 8-m-m
Date June 21 Origin of sample Monasterio
Deep mortar sample from 11th
Century Door introduced into use 11
Visual description of sample (color, texture, hardness, inclusions, etc.): Yellow - burnt color in color, show cracks
Chunks of Lime, 1 mm dia against soft.
wood - 21.5

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.01
Weight of filter paper (W_2) = 6.341 562/1.90
Weight of filter paper + dry fines (W_3) = 13.88
Weight of dry fines ($W_3 - W_2$) = 6.98
Weight of dry sand (W_4) = 7.43
% of sand ($(W_4/W_1) \times 100$) = 29.70%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 27.92%
% of dissolved binder = 42.42%

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
2.36 mm _____
1.18 mm _____
600 um 130
300 um 25
150 um 5
75 um 1
53 um 1
38 um _____
734

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 7-m-m

Date _____ Origin of sample room

Visual description of sample (color, texture, hardness, inclusions, etc.): _____

_____ light green

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.55
Weight of filter paper (W_2) = 6.25 + .54 = 6.79
Weight of filter paper + dry fines (W_3) = 11.31
Weight of dry fines ($W_3 - W_2$) = 4.51
Weight of dry sand (W_4) = 11.51
% of sand ($((W_4/W_1) \times 100) =$ 45.14
% of fines ($((W_3 - W_2)/W_1 \times 100) =$ 5
% of dissolved binder = 30.12

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
2.36 mm 5.13
1.18 mm 10.44
600 um 10.85
300 um 20.17
150 um 25.7
75 um 10.85
53 um 2.17
38 um 11.42

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 10
Date _____ Origin of sample monument
6 ft. base of monument
very weathered
Visual description of sample (color, texture, hardness, inclusions, etc.): Brownish in color
large stones in some places, soft
Liquid - pinkish

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.01
Weight of filter paper (W_2) = 6.24 + .56 = 6.80
Weight of filter paper + dry fines (W_3) = 11.89
Weight of dry fines ($W_3 - W_2$) = 5.09
Weight of dry sand (W_4) = 11.03
% of sand ($(W_4/W_1) \times 100$) = 44.10
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 20.30
% of dissolved binder = 35.55

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than

4.75 mm	—
2.36 mm	—
1.18 mm	—
600 um	—
300 um	—
150 um	—
75 um	—
53 um	—
38 um	—

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 11-m-m
 Date _____ Origin of sample Monastery
Interior, Center of NW wall Kitchen area
North of paint sample & flow ceiling between them
 Visual description of sample (color, texture, hardness, inclusions, etc.): Hard, chunks of lime, white
fibers, while some have brown
by chunks of lime Trans shards

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.07
 Weight of filter paper (W_2) = 5.79 + .53 = 6.32 g.
 Weight of filter paper + dry fines (W_3) = 6.83 g.
 Weight of dry fines ($W_3 - W_2$) = 0.21 g.
 Weight of dry sand (W_4) = 13.54 g.
 % of sand ($(W_4/W_1) \times 100$) = 54.20%
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 12.96%
 % of dissolved binder = 33.90

Observations: dissolution of binder, color of liquid: limy green color

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm —
 2.36 mm —
 1.18 mm —
 600 um —
 300 um —
 150 um —
 75 um —
 53 um —
 38 um —

100% 100%

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 2-0000

Date 1/10/55 Origin of sample 1000

Visual description of sample (color, texture, hardness, inclusions, etc.): _____

_____ Orange liquid

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.16
Weight of filter paper (W_2) = 6.20 + 52 = 6.73
Weight of filter paper + dry fines (W_3) = 9.40
Weight of dry fines ($W_3 - W_2$) = 2.67
Weight of dry sand (W_4) = 12.38
% of sand ($(W_4/W_1) \times 100$) = 49.25
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 10.65
% of dissolved binder = 40.25

Observations: dissolution of binder, color of liquid: _____

_____ Orange liquid

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____

2.36 mm 2.58
1.18 mm 2.58
600 um 2.58
300 um 2.58
150 um 2.58
75 um 2.58
53 um 2.58
38 um 2.58

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. B-m-m 4
Date _____ Origin of sample monaster
interior, cross space above parking lot
white pointing mortar, unusual of masonry
Visual description of sample (color, texture, hardness, inclusions, etc.): white - hard (various size of aggregate)
Iron shreds

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.11
Weight of filter paper (W_2) = 582 - 53 = 635
Weight of filter paper + dry fines (W_3) = 7.45 g
Weight of dry fines ($W_3 - W_2$) = 1.10 g
Weight of dry sand (W_4) = 9.29
% of sand ($(W_4/W_1) \times 100$) = 36.9%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 4.38%
% of dissolved binder = 58.63%

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
2.36 mm _____
1.18 mm _____
600 μ m _____
300 μ m 3.5%
150 μ m 1.72%
75 μ m _____
53 μ m _____
38 μ m _____

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name mf Sample No. 13-m-m-B
Date June 14 Origin of sample monastery
Interior, crawl space above modern kitchen, original
exposed NW wall of main building, yellow mortar below white pointing
Visual description of sample (color, texture, hardness, inclusions, etc.): yellow, almost burnt umber in color
chunks of lime, large pieces of quartz,

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.20
Weight of filter paper (W_2) = 6.36 \times .56 = 6.92
Weight of filter paper + dry fines (W_3) = 15.25
Weight of dry fines ($W_3 - W_2$) = 8.33
Weight of dry sand (W_4) = 9.51
% of sand ($(W_4/W_1) \times 100$) = 37.73
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 33.05
% of dissolved binder = 29.22

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____

_____	2.36 mm	<u>2.21</u>
_____	1.18 mm	<u>1.42</u>
_____	600 um	<u>1.24</u>
_____	300 um	<u>1.21</u>
_____	150 um	<u>1.18</u>
_____	75 um	<u>1.17</u>
_____	53 um	<u>1.17</u>
_____	38 um	<u>1.17</u>

4.75

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 14-m-m
Date June 21 1988 Origin of sample Monastery
Interior, transverse above kitchen (modern)
original kitchen wall, SE wall.
Visual description of sample color, texture, hardness,
inclusions, etc.): white, chunks of lime, hard
various sizes of aggregate.
lime - red
lime yellow orange

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.16
Weight of filter paper (W_2) = 6.24 + .57 = 6.81
Weight of filter paper + dry fines (W_3) = 9.65
Weight of dry fines ($W_3 - W_2$) = 2.84
Weight of dry sand (W_4) = 12.22
% of sand ($(W_4/W_1) \times 100$) = 48.6
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 13.3
% of dissolved binder = 38.2

Observations: dissolution of binder, color of liquid: lime yellow-orange

Characterization of Sand:

Microscopic Examination

12.19

	% Finer than	
4.75 mm	100	11.75
2.36 mm	100	10.50
1.18 mm	100	10.25
600 um	100	10.25
300 um	100	10.25
150 um	100	10.25
75 um	100	10.25
53 um	100	10.25
38 um	100	10.25

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 16-m-m
Date _____ Origin of sample monument
Inter. NW wall Parlor above door
Layer over 20-mm & 21-mm
Visual description of sample (color, texture, hardness, inclusions, etc.): White Plaster - fine even
Plaster w/ Brown coat below
Transverse

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.04
Weight of filter paper (W_2) = 571.55 = 6.26
Weight of filter paper + dry fines (W_3) = 766.9
Weight of dry fines ($W_3 - W_2$) = 195.4
Weight of dry sand (W_4) = 12.79
% of sand ($(W_4/W_1) \times 100$) = 51.02%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 55.90
% of dissolved binder = 43.34%

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

_____	% Finer than 4.75 mm	_____
_____	2.36 mm	_____
_____	1.18 mm	_____
_____	600 um	_____
_____	300 um	_____
_____	150 um	_____
_____	75 um	_____
_____	53 um	_____
_____	38 um	_____

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 15-m-m
 Date _____ Origin of sample MURRAY
INTAKE UNIT FROM 0.75 m. DEEP
SW WITH THE W & PAULY WELLS 15 m-m
 Visual description of sample (color, texture, hardness, inclusions, etc.): white binder w/ fine sand some white
inclusions in sand chunks fine binder

Mortar Analysis:

Original weight of powdered sample (W_1) = 26.14
 Weight of filter paper (W_2) = 6.32 ~~8.5~~ $6.32 = 6.87$
 Weight of filter paper + dry fines (W_3) = ~~8.02~~ 7.98
 Weight of dry fines ($W_3 - W_2$) = ~~17.79~~ 1.11
 Weight of dry sand (W_4) = 14.79
 % of sand ($(W_4/W_1) \times 100$) = 56.5%
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 44%
 % of dissolved binder = 3.2%

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:Microscopic Examination

% Finer than 4.75 mm _____
 2.36 mm 1.5 30%
 1.18 mm 1.2 10%
 600 um 2.54 15%
 300 um 5.2 10%
 150 um 4.61 10%
 75 um 5.2 10%
 53 um 1.1 1.5%
 38 um _____

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 17-m-m
Date June 14 1988 Origin of sample 100% Portland Cement
Visual description of sample (color, texture, hardness, inclusions, etc.): light gray, smooth, hard, no inclusions

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.05
Weight of filter paper (W_2) = 46.30 ± 0.85
Weight of filter paper + dry fines (W_3) = 9.77
Weight of dry fines ($W_3 - W_2$) = 2.92
Weight of dry sand (W_4) = 14.75
% of sand ($(W_4/W_1) \times 100$) = 58.9
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 11.67
% of dissolved binder = 29.43

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

14.72

	% Finer than	4.75 mm	7.5 mm
2.36 mm	100	100	
1.18 mm	100	100	
600 um	100	100	
300 um	100	100	
150 um	100	100	
75 um	100	100	
53 um	100	100	
38 um	100	100	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 21-m-m
 Date June 16 1988 Origin of sample Interp., 1/4 W
Well, parlor above the car farm
the entry b the parlor, south corner
 Visual description of sample (color, texture, hardness, inclusions, etc.): variation in aggregate size, fineness of fiber
micro, yellow, brown - soft

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.05
 Weight of filter paper (W_2) = 6.24 + .56 = 6.80
 Weight of filter paper + dry fines (W_3) = 2.13 g
 Weight of dry fines ($W_3 - W_2$) = 1.33 g
 Weight of dry sand (W_4) = 15 + 5 = 20
 % of sand ($(W_4/W_1) \times 100$) = 61.7 %
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 5.32 %
 % of dissolved binder = 32.5 %

Observations: dissolution of binder, color of liquid: white - brown liquid

Characterization of Sand:

Microscopic Examination

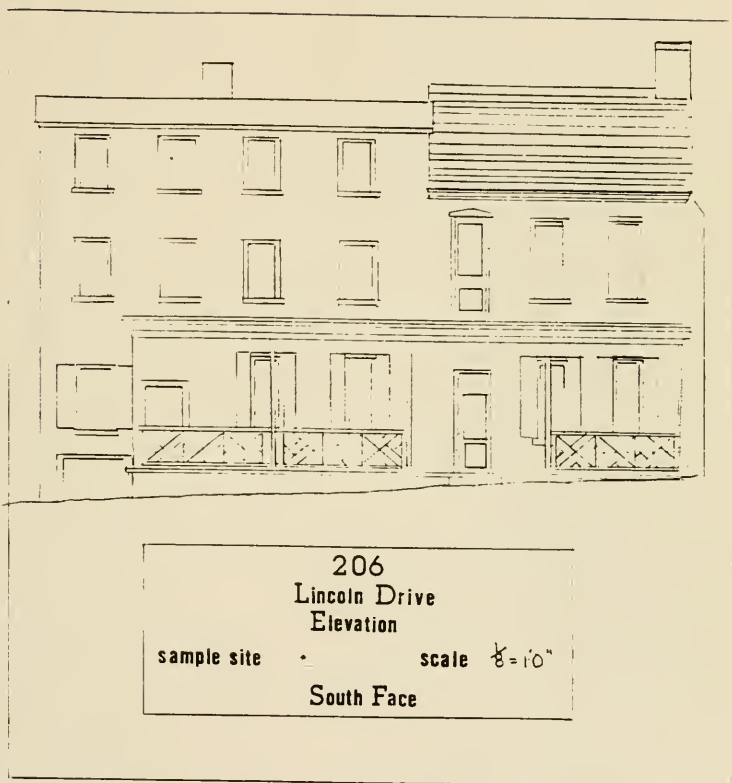
	% Finer than	
4.75 mm		
2.36 mm	.06	.39%
1.18 mm	.36	2.35%
600 um	1.82	12.21%
300 um	7.79	50.88%
150 um	4.42	28.82%
75 um	.71	4.63%
53 um	.10	.63%
38 um		
Total		15.31 .9%

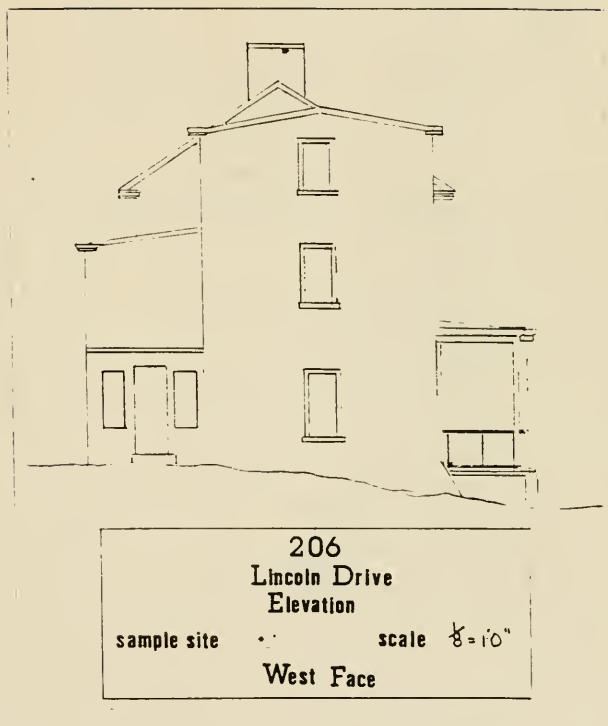
Appendix #15

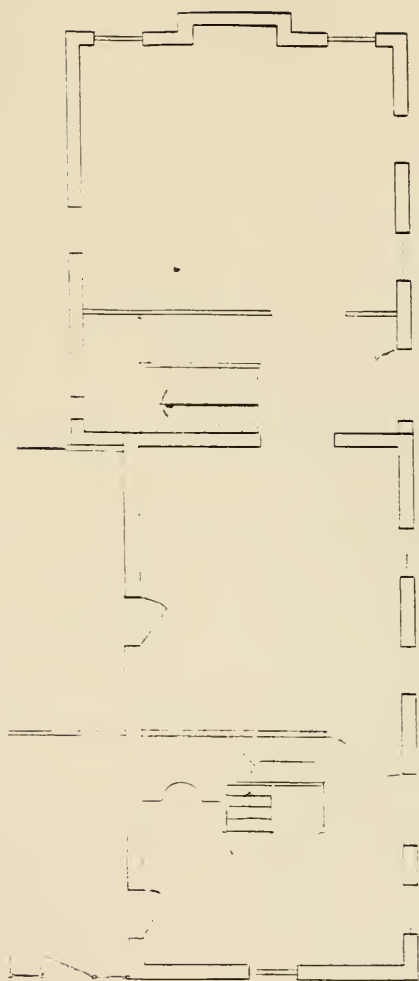
206 Lincoln Drive

Elevations and Floor Plans

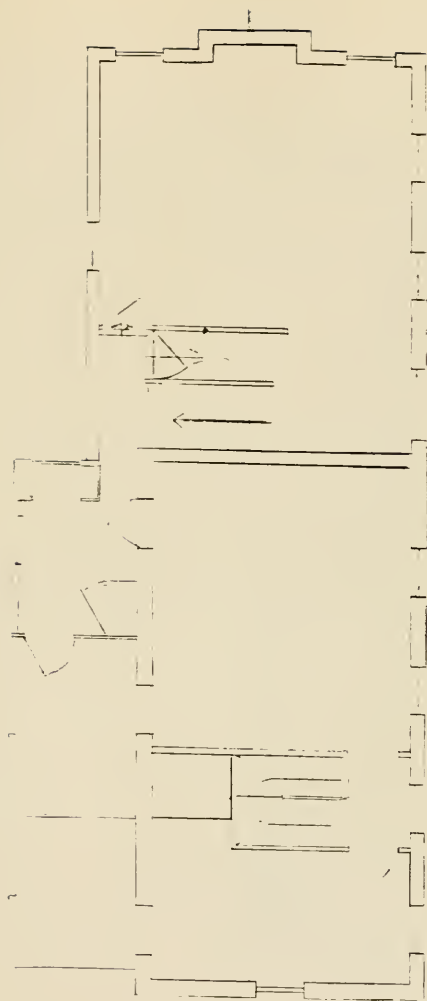
Elevations are from the Fairmount Park Commission file:
206 Lincoln Drive. Floor plans were done from visual
inspection of the building.



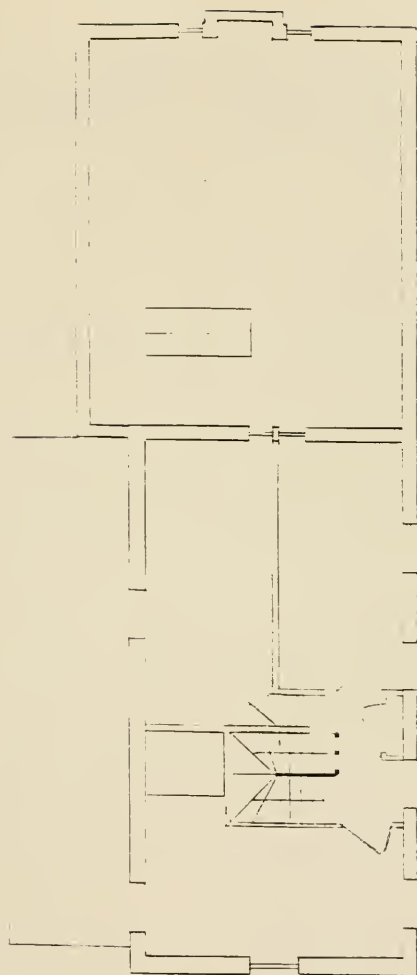




206
 Lincoln Drive
 Floor Plan
 sample site . scale 1/8" = 1'



206
 Linene Drive
 Floor Plan
 sample site
 scale 1:100



206
Lincoln Drive
Third Floor Plan
sample site . scale none

Appendix #16

206 Lincoln Drive Chain of Title
From the Title Registry of the Department of Records,
Philadelphia City Hall, Philadelphia Pennsylvania.

Chain of Title for 206 Lincoln Drive

The first seven transaction are contained in a Deed between William Rittenhouse on the one part and Jacob and Abraham Rittenhouse on the other. This deed was found in the Peter Rittenhouse envelope, Fairmount Park Commission Files, City Archives, City Hall Annex, Philadelphia Pa.

June 4, 1693 From William Harwood Cited in next deed
 To Samuel Carpenter
 20 acres part of a 100
 acre tract of land

1690 Agreement between Samuel Carpenter on the one
part and William Rittenhouse (First Generation) and others for
ground rent of 20 acres of land for the next 990 years.

Cited in next deed

Feb. 9, 1705/6 From Samuel Carpenter Cited in next Deed
 To William Rittenhouse (1st gen.)

Deeds 20 acres ,a paper mill and other
improvements for 975 years with a ground rent of 5 shillings
sterling payable on september 9th. of each year.

Feb. 12, 1705/6 From William Rittenhouse Cited next Deed
 To Claus Rittenhouse

For three-1/4 parts of 20 acres of land, a paper
mill and improvements. Subjected to a ground rent of 5 shillings
a year payable on September 9th. of each year. To Samuel
Carpenter. And one pepper Corn to William Rittenhouse per year.

1708 From William Rittenhouse Cited in next deed
 To Clause Rittenhouse
 One-1/4 part of the above described lot.

William Rittenhouse dies intestate and Clause
being the only son inherits the last portion of the 20 acres and
paper mill.

May 24, 1734 Will of Clause Rittenhouse Will Book: E
 To William Rittenhouse (2nd. Gen.) pg. 280
 20 acers and Paper mill

Nov, 21 1760 From William Rittenhouse (2nd. Gen.) Paper maker
 To Jacob and Abraham Rittenhouse, Paper makers
 For the sum of 370 pounds sterling
 18 acers containing a paper mill . and singular
 other mesuage tenement building, edifices improvements ways
 passages mill dams mill race head waters and other water course.
 Subjected to a yearly rent of 5 shillings sterling payable to
 Samuel Carpenter.

The above deed found in Peter Rittenhouse
 envelope in the Fairmount park commision files, City Archives.

March 1, 1785 From Jacob Rittenhouse Paper Maker Deed Book:D
 Abraham Rittenhouse, Miller vol 20 pg.56
 To William Rittenhouse (3rd. Gen.) Miller
 For 1000 pounds silver or gold.

Three lots of ground. The first contianing 9 acres and stone
 messuage, part of the 18 acre lot that William Rittenhouse (2nd.
 Gen.) sold to Jacob and Abraham Rittenhouse. The second lot
 containing 4 and 1/2 acre and 192 perches. The third a ten acer
 lot with grist mill. The first lot is subjected to a ground rent
 of 3 pence per acre payable on the 29th day of september to
 Samual Carpenter.

Break in chain. William Rittenhouse
 Maybe to Henry Rittenhouse

Nov. 23. 1812 From Henry Rittenhouse Cited in next deed
 To Daniel Rittenhouse and
 Jacob Rittenhouse
 Both have equal shares
 Two lots

April 21, 1817 From Jacob Rittenhouse Cited in next Deed
 To Daniel Rittenhouse
 1/2 share of 2 lots

Sept. 24, 1851	From Daniel Rittenhouse To Jonathan Rittenhouse Farmer 5 lots of land containing 20 1/2 acres, Paid 4000 dollars	Deed Book: GWC. vol.122,pg 420
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Lot # 3 has a ground rent of 3 pence per acre payable on September 29th of each year. Also an old paper mill on this same lot is excluded from the deed. This is the same property of 9 and 1/2 acres.

Jan. 11, 1881	Will of Jonathan Rittenhouse To Naomi Rittenhouse	Will Book:60 pg.219 #60 1881
---------------	--	------------------------------------

March 1887	Will of Naomi Rittenhouse To William G. Foulke Last surviving Trustee	Will Book:140 pg. 549 #283. 1889
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May 29, 1891	From William G. Foulke To William Umsted Paid One Dollar	Deed Book: TG. vol.60 pg.129
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April 25, 1914	From William Umsted To Providence General Hospital	Deed Book: ELT vol.335pg.403
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July 21, 1917	From Providence General Hospital To City of Philadelphia	Deed Book: JMH vol.252pg.127
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Appendix #17

Christian Lehman Surveys

From the Christian Lehman Papers, Roxborough File,
Manuscripts Department, Historical Society of Pennsylvania
Philadelphia Pennsylvania.

DRAGGOT OF THE DIVISION OF THE LAKE OF WILLIAM JEFFERSON



Appendix #18

Will of Johathan Rittenhouse, #63-1881: Register of Wills,
City Hall Annex, Philadelphia Pennsylvania.

Inventory of Johathan Rittenhouse

By Robert Thomas and Howard W. Lloyd. February 1881

Household Goods:

Clock	40.00
Cupboard	5.00
Settee	1.00
Dining Table and Chairs	6.00
Kitchen Furniture and Cooking Utinsils	10.00
Bedstead and Chamber Carpet	5.00
Bureau	10.00
Stove	2.00
Single Bedstead	2.00
Entry Carpet and Oil Cloth	5.00
Extention Table and Carpet	

Contence of Barn:

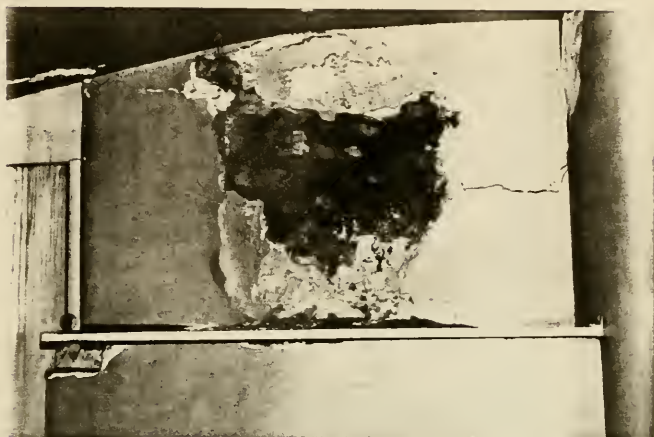
Cow	40.00
Heiffer	36.00
Dearborn Harness	6.00
Cart Gears	5.00
Garden Tools	1.50
Wheel Barrow	.75
Sleigh	7.00
Bells	.50
Cart	20.00
Old Carriage	20.00
Hay and Straw	40.00
Ladder, Lot of Tools	10.00
Lead Pipe	8.00
Patent Balance	2.50
Chickens	5.00
Premis on West Side Wissahickon Ave, Homestead, Teniment Barn and other Buildings	620.00
Other Property listed.	

Will of Johathan Rittenhouse, #63-1881: Register of Wills, City Hall Annex, Philadelphia Pa.

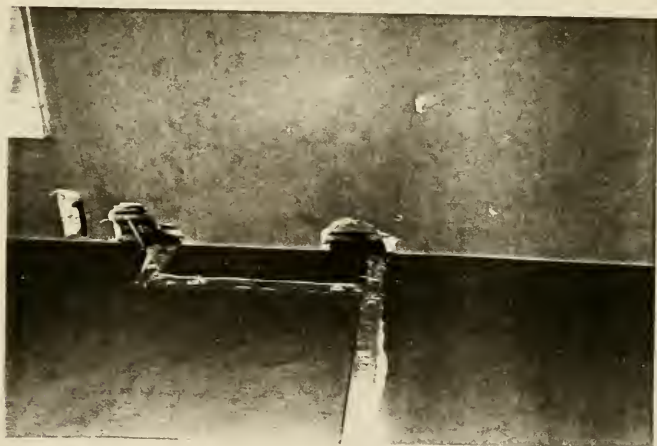
Appendix #19
Water damage caused by roof leak.

Appendix #22
Rockland Paint Data Sheets

Third Floor Vest Room.
Water damage to the plaster surface on the
chimney stack.



Third-floor vest room: evidence of the removal of an old
electrical system. The ceiling and walls were never repaired.



Appendix #20
Exterior Maintenance Problems

206 Lincoln Drive:

North and West Elevation

The paint is peeling on all surfaces and the porch ceiling is in poor condition.

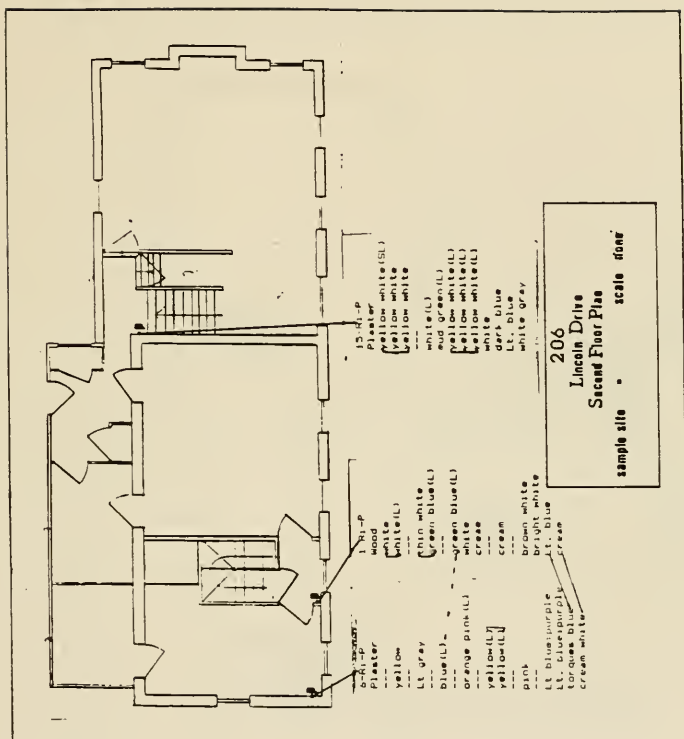


East Elevation

This is the newer Victorian addition but the same conditions still persist (peeling paint and stucco). The north elevation also shows the same problems.



Appendix #21
206 Lincoln Drive Paint Sample Stratigraphy



Appendix #22
206 Lincoln Drive Paint Data Sheets

Phase I: Sequence of Layers 1-81-P

Structure Witchamery

Location of Sample Interior 2nd fl old section floor joists to west room

Date Removed March 1954

Removed By HT

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Neat UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. white
2. white Na₂S
3. white-yellow
4. greenish blue Na₂S
5. greenish blue Na₂S
6. white
7. cream
8. -
9. cream
10. -
11. greenish blue
12. white blue
13. -
14. lt blue
15. cream

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Phase II: Analysis and Recommendations 1-P, -P

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied #2

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

DMF

+

Latex

White wash/calamine

Water based/distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Spot Test

Reaction

#1

lead

#3

lead

KI

yellow

HCl

—

no discoloration

Prussian Blue

NaOH

NR

Lead II Glu

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 2-PB1-P
 Structure Rittenhouse 706
 Location of Sample Surface 3rd fl South side from door jacks leading to kitchen
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
addition

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. Green
2. Yellow white Na₂S DMF
3. White Na₂S DMF
4. —
5. White Na₂S DMF
6. White
7. —
8. White Na₂S DMF
9. White
10. Green Na₂S DMF
11. Green
12. White
13. —
14. —
15. —

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Phase II: Analysis and Recommendations 2 - 2 - P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DME</u>	_____
Latex	_____	_____
Whitevasn/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no _____, Color yellow green
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>#2 Zinc lead</u>	<u>HNO₃</u>	<u>+</u>
<u>#3 Zinc Ox</u>	<u>Sw Fe (CN)₆</u>	<u>Blue gray color</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Primer white (lead in base) oil
 Probable medium: final coat zinc in oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase II: Analysis and Recommendations ³⁻²¹⁻⁸

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1 of zinc oxide after 1548

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>layers soften</u>
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no _____, Color Yellow green

Probable pigment associated with flourescence: zinc oxide

Possible Pigment Type	Spect Test	Reaction
<u>zinc oxide</u>	<u>.2m</u>	<u>+</u>
_____	_____	<u>+</u>
_____	_____	<u>+</u>
_____	_____	<u>+</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): zinc oxide

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers

Structure Pittsburgh

Location of Sample Basement walls

Date Removed March 1988

Removed By MVT

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turentane	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: Mortar

1. <u>white - ropey</u>	<u>HCl</u>
2. <u>white</u>	<u>HCl</u>
3. <u>white</u>	<u>HCl</u>
4. <u>white</u>	<u>HCl</u>
5. <u>white</u>	<u>HCl</u>
6. <u>white</u>	<u>HCl</u>
7. <u>white</u>	<u>HCl</u>
8. <u>white</u>	<u>HCl</u>
9. <u>white</u>	<u>HCl</u>
10. <u>white</u>	<u>HCl</u>
11. <u>white</u>	<u>HCl</u>
12. <u>white</u>	<u>HCl</u>
13. <u>white</u>	<u>HCl</u>
14. <u>white</u>	<u>HCl</u>
15. <u>white</u>	<u>HCl</u>

Chromochronology Comments

16. <u>white</u>
17. <u>white</u>
18. <u>white</u>
19. <u>white</u>
20. <u>white</u>
21. <u>white</u>
22. <u>white</u>
23. <u>white</u>
24. <u>white</u>
25. <u>white</u>
26. <u>white</u>
27. <u>white</u>
28. <u>white</u>
29. <u>white</u>
30. <u>white</u>

Summary:

white wash

Phase II: Analysis and Recommendations 4. a. - m

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil _____

Latex _____

Whitewash/calimine _____

Waterbased/distemper _____

Varnish _____

Shellac _____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no _____, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Spot Test

Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____

Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers $S-R-P$ / also mortar

Structure Kettenholz

Location of Sample  over stairs

Date Removed March 28, 1968 Removed By MJT

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

Section guided to original 2 1/2 story structure

DATA: Microscopic Analysis

CODES	Finish	(F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer	(P)	Hydrochloric Acid	(HCl)
	Glaze	(G)	Dimethylformamide	(DMF)
	Varnish	(V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac	(S)	Water	(H ₂ O)
	Wall paper	(W)	Alcohol	(OH)
	Fracture	(-)	Turpentine	(TURP)
	Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy, etc.).

no reaction w/ CH_2Cl_2

Chromochronology	Comments	Chromochronology	Comments
------------------	----------	------------------	----------

Substrate: Mortar

1. <u>Plaster</u>	
2. <u>white</u>	HCl white wash
3. <u>—</u>	
4. <u>plaster</u>	
5. <u>yellow</u>	NaOH IMF
6. <u>yellow</u>	
7. <u>green</u>	NaOH IMF
8. <u>—</u>	
9. <u>—</u>	
10. <u>—</u>	
11. <u>—</u>	
12. <u>—</u>	
13. <u>—</u>	
14. <u>—</u>	
15. <u>—</u>	

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Art a station a Potserim Ferrocarril
barricada de la guerra

Phase II: Analysis and Recommendations S.R. 7

Structure Pitt.

Location of Sample 3rd fl. adv. stairs

Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis see what first white layers

No. of Layers to be Studied 41

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color

Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
whiting	HCl	+
test for green iron silicate		

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): white wash

Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 6-8-P

Structure Antithesis
 Location of Sample 7th fl. west wall SW corner
 Date Removed March 1988 Removed By me
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: Plaster

1. —
2. yellow Sanderson DMF
3. —
4. Lt. Gray Antithesis DMF
5. —
6. Blue Na₂S DMF
7. —
8. Orange Pink Na₂S DMF
9. —
10. yellow Na₂S DMF
11. yellow Na₂S DMF
12. —
13. Pink
14. —
15. Lt blue - Purple

Chromochronology Comments

16. Lt Blue - Purple
17. Orange Blue
18. Orange Blue
19. —
20. —
21. —
22. —
23. —
24. —
25. —
26. —
27. —
28. —
29. —
30. —

Summary:

Phase II: Analysis and Recommendations ¹⁻²⁻²

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>4/DMF</u>	<u>softened</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead</u>	<u>K+</u>	<u>+</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white
 Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color snow goose Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: 1-61-5
 Report prepared - Date: 11-25 By Whom: mj

Phase I: Sequence of Layers 2 7-R1-P
 Structure 206 kitchen
 Location of Sample from kitchen work opposite entrance
 Date Removed March '85 Removed By mg
 Significant Facts Regarding The Structure's History Which May Pertain To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentane (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments		
Substrate: wood, putty	Na ₂ S	DMF
1. <u>Glaze - brownish</u>	+	+
2. <u>orange-white</u>	+	
3. <u>orange-white</u>		
4. <u>orange-white</u>	+	
5. <u>orange-white</u>		
6. <u>orange-white</u>	+	
7. <u>orange</u>		+
8. <u>Thin dark green</u>		+
9. <u>orange-white</u>		+
10. <u>orange-white</u>		+
11. <u>orange-white</u>		+
12. _____		
13. _____		
14. _____		
15. _____		

Chromochronology Comments

16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

Summary:

Phase II: Analysis and Recommendations 7-12-P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #182

No. of Layers to be Studied ~187

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	IME	softener layer
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no ☐ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
lead	KI	yellow
chrom. yellow	silver nitrate	red color
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): chrom. yellow w/white lead

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color 6th 22 (w) Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers E-R-P
 Structure 144-1000 106
 Location of Sample Intersect window Intel SE window east side
 Date Removed March 88 Removed By MS
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OH)
	Fracture ()	Turentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>wood No. 5</u>			
1. <u>Glaze</u>	+	16.	
2. <u>yellow glaze</u>	+	17.	
3. <u>yellow</u>	+	18.	
4. <u>white</u>	-	19.	
5. <u>thin cream</u>	+	20.	
6. <u>cream</u>	+	21.	
7. <u>cream wh. w.</u>	-	22.	
8. <u>yellow white</u>	-	23.	
9. <u>yellow white</u>	+	24.	
10. <u>yellow white</u>	+	25.	
11. <u>yellow white</u>	+	26.	
12. <u>yellow white</u>	+	27.	
13. <u>thin white</u>	-	28.	
14. <u>green</u>	-	29.	
15. <u>green</u>	-	30.	

Summary:

Phase II: Analysis and Recommendations *6. R. P.*

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis *#1, 2*

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<i>glaze DMF</i>	<i>Softens - dissolves</i>
Latex	<i>white DMF</i>	<i>softens</i>
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☐ no ☒, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<i>lead</i>	<i>MgS</i>	<i>turned black</i>
_____	<i>HC</i>	<i>+</i>
_____	<i>K⁺</i>	<i>yellow color</i>
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): *lead white*
 Probable medium: *linseed oil*

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers

9-Ki-P

Structure left hand
 Location of Sample South face SE window lintel
 Date Removed March 66 Removed By MT
 Significant Facts regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
Addition after 1890

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments				Chromochronology Comments			
Substrate:	Na ₂ S	HCl					
1. white bright	+	+	+	16.			
2. white bright	+	+	+	17.			
3. white	slight			18.			
4. white	-	+		19.			
5. white	-	+		20.			
6. white	slight	-		21.			
7. green		+		22.			
8. white gray - yellow		+		23.			
9. green		+		24.			
10. white		+		25.			
11. green		+		26.			
12.				27.			
13.				28.			
14.				29.			
15.				30.			

Summary:

orig. color w/ white w/ lead base

Phase II: Analysis and Recommendations

Structure 9-K1-PLocation of Sample Bldg. window south side St. window exteriorDate Removed March 55 Removed By mv

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Composition of 1st layer

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): all relatively similar thickness

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>Dmr</u>	<u>softened</u>
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead whiteProbable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: tit aniumPaint Type: linseed oil

DOCUMENTATION

Sample/slide NO: 9-K1-PReport prepared - Date: 7/19 By Whom: mv

Phase I: Sequence of Layers 10-Ri-P

Structure 10-Ri-P
 Location of Sample sample porch board NW of old section
 Date Removed March 88 Removed By my
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
Site if age of porch later than windows

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments		Chromochronology Comments	
Substrate: Wood			
1. Gray	+	16. Gray	1+
2. Green	+	17. Gray	1+
3. Gray	+	18. Gray	1+
4. Blue	+	19. 1/2 Gray	+
5. Blue	+	20.	
6. Blue green	+	21.	
7. Gray	+	22.	
8. Gray	+	23.	
9. Dark Gray	+	24.	
10. Gray	+	25.	
11. Green	+	26.	
12. Gray	+	27.	
13. Gray	+	28.	
14. Gray	+	29.	
15. Gray	+	30.	

Summary:

Phase II: Analysis and Recommendations ^{pg. 2}

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Blue translucent = 1

No. of Layers to be Studied Green #2

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	<u>very slow reaction</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no. Color _____

Probable pigment associated with flourescence: _____

	Possible Pigment Type	Spot Test	Reaction
<u>Blue</u>	_____	_____	_____
<u>Chrom Green</u>	<u>Prussian Blue</u>	_____	<u>Paper turns yellow</u>
	<u>Prussian Blue</u>	_____	<u>Green turns brown</u>
	_____	_____	<u>Brown → Blue</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: 10-R1-P

Report prepared - Date: March 1988 By Whom: mf

Phase I: Sequence of Layers 1 - 15

Structure

Location of Sample

Date Removed

Removed By

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate:

1. 6.1.7.1
2. 6.1.7.2
3. 6.1.7.3
4. 6.1.7.4
5. 6.1.7.5
6. 6.1.7.6
7. 6.1.7.7
8. 6.1.7.8
9. 6.1.7.9
10. 6.1.7.10
11. 6.1.7.11
12. 6.1.7.12
13. 6.1.7.13
14. 6.1.7.14
15. 6.1.7.15

Chromochronology Comments

16. 6.1.7.16
17. 6.1.7.17
18. 6.1.7.18
19. 6.1.7.19
20. 6.1.7.20
21. 6.1.7.21
22. 6.1.7.22
23. 6.1.7.23
24. 6.1.7.24
25. 6.1.7.25
26. 6.1.7.26
27. 6.1.7.27
28. 6.1.7.28
29. 6.1.7.29
30. 6.1.7.30

Summary:

Phase II: Analysis and Recommendations

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
Pinkish white	_____	_____
Yellowish white	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 12-P, -P

Structure 706 Kitchen

Location of Sample quadrant hotel ex. west end

Date Removed March 85 Removed By my

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

2nd section of floor should have more layers than
11 X-P or 11-P-15

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments
Substrate: <u>wood</u>	
1. <u>white</u>	<u>HCl</u>
2. <u>white</u>	
3. <u>white</u>	<u>uv yellow</u>
4. <u>white</u>	
5. <u>white</u>	
6. <u>white</u>	<u>zinc ox.</u>
7. <u>white</u>	<u>Na₂S</u>
8. <u>white</u>	<u>Na₂S</u>
9. <u>white</u>	
10. <u>white</u>	
11. <u>white</u>	
12. <u>white</u>	
13. <u>white</u>	
14. <u>white</u>	
15. <u>white</u>	

Chromochronology	Comments
16. <u>white</u>	<u>Na₂S</u>
17. <u>white</u>	<u>Na₂S</u>
18. <u>white</u>	
19. <u>white</u>	<u>Na₂S</u>
20. <u>white</u>	
21. <u>white</u>	<u>Na₂S</u>
22. <u>white</u>	
23. <u>white</u>	
24. <u>gray green</u>	
25. <u>green</u>	
26. <u>white</u>	
27. <u>white</u>	
28. <u>white</u>	
29. <u>white</u>	
30. <u>white</u>	

Summary:

Phase II: Analysis and Recommendations 12-21-10

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied 4th - 7th layers

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	<u>HCL</u>	<u>F</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with fluorescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Calcimine</u>	<u>3 WHO.</u>	<u>formation of long needles</u>
<u>Zinc oxide</u>	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color white Sherwin-Williams _____

RECOMMENDATIONS

Color: low white wash

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: 12-21-10 By Whom: _____

Phase II: Analysis and Recommendations B-Ri-P

Structure B. H. HouseLocation of Sample Front Porch Dining RoomDate Removed April 1988Removed By mvj

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis To see if front layer is Zinc OxideNo. of Layers to be Studied 1Reason for Layer Selection: If Zinc Oxide window sill Data to the 1800's c 1848

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>+</u>
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no ☐ Color Yellow green

Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
<u>Zinc oxide</u>	<u>Potassium ferrocyanide</u>	<u>Blue/Color</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Zinc OxideProbable medium: Linseed oil Paint not older than 1830/window sill that age

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: Zinc Oxide w/ Linseed oil

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers

Structure 11-11-P
 Location of Sample Interior base coat in dining room old section
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments		Chromochronology Comments	
Substrate: wood	Na ₂ S	Fluores	DMF
1. Glaze	-	-	
2. white-trim	-	+	
3. white	-	+	
4. white	+		
5. white	+		
6. white	+		
7. white	+		
8. white	+		
9. white	+		
10. Dark paint	+		
11. white	+		
12. yellow-white	+		
13. white	+		
14. thick white layer of paint			✓
15. white			HCl
16. white	+	Fluores	
17. bright wh.	-	+	+
18. yellow	-		+
19. 1/2 orange	+		+
20. white	+		+
21. blue	white		+
22. white	+		+
23. bright white	-		+
24. white	-		+
25. white	-		+
26. white	-		+
27. white	-		+
28. white	-	HCl	+
29. blue	-		+
30. bright white	-		+
31. blue			
32. bright white			

Summary:

very thin layers

Phase II: Analysis and Recommendations 14-21-P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 203 for zinc ox

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>+</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☒ no _____, Color yellow green

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>HNO₃ - no reaction</u>	<u>for zinc ox</u>	_____
<u>+</u>	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): zinc oxide

Probable medium: intended oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: 7/70 By Whom: mg

Phase I: Sequence of Layers 206 Ritten.

Structure 206 Kittenhous Hallway R1-15-P

Location of Sample

Date Removed

Removed By

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

exterior of new section

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ()
Dirt Layer (-)

Reaction of Sodium Sulfide (Na₂S)
Hydrochloric Acid (HCl)
Dimethylformamide (DMF)
Methylene Chloride (CH₂Cl₂)
Water (H₂O)
Alcohol (OR)
Turpentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments		Chromochronology Comments	
Substrate:			
13 1. white gray	-	+	16.
12 2. black	-	+	17.
11 3. dark blue	-	+	18.
10 4. white	-	+	19.
9 5. yellowish	Na ₂ S	-	20.
8 6. yellowish	Na ₂ S	-	21.
7 7. yellow white	Na ₂ S	-	22.
6 8. brown green	Na ₂ S	-	23.
5 9. white	Na ₂ S	-	24.
4 10. black line	Na ₂ S	-	25.
3 11. yellow white	-	+	26.
2 12. yellow white	-	+	27.
1 13. yellow white	Na ₂ S slight	-	28.
14.	-	+	29.
15. Primer	-	+	30.

Summary:

Phase II: Analysis and Recommendations * -15-8

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ✓, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Lead</u>	<u>potassium Iodide</u>	<u>+ yellow color</u>
<u>chrom yellow</u>	<u>silver nitrate</u>	<u>—</u>
<u>Alkyl Yellow</u>	<u>hot silver</u>	<u>—</u>
<u>Prussian blue</u>	_____	_____

PIGMENT AND MEDIUM TYPE: No positive reaction w/any of the white pigment

Probable pigment(s): ?
 Probable medium: oil or latex

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 3-R1-m

Structure 291 R1-m

Location of Sample 291 R1-m Enigma near H₂O damage

Date Removed March 88

Removed By MW

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chronochronology Comments

Substrate: Mortar

1. 1 layer of white wash on plaster
2. 1 layer of white wash on plaster
3. 1 layer of white wash on plaster
4. 1 layer of white wash on plaster
5. 1 layer of white wash on plaster
6. 1 layer of white wash on plaster
7. 1 layer of white wash on plaster
8. 1 layer of white wash on plaster
9. 1 layer of white wash on plaster
10. 1 layer of white wash on plaster
11. 1 layer of white wash on plaster
12. 1 layer of white wash on plaster
13. 1 layer of white wash on plaster
14. 1 layer of white wash on plaster
15. 1 layer of white wash on plaster

Chronochronology Comments

16. 1 layer of white wash on plaster
17. 1 layer of white wash on plaster
18. 1 layer of white wash on plaster
19. 1 layer of white wash on plaster
20. 1 layer of white wash on plaster
21. 1 layer of white wash on plaster
22. 1 layer of white wash on plaster
23. 1 layer of white wash on plaster
24. 1 layer of white wash on plaster
25. 1 layer of white wash on plaster
26. 1 layer of white wash on plaster
27. 1 layer of white wash on plaster
28. 1 layer of white wash on plaster
29. 1 layer of white wash on plaster
30. 1 layer of white wash on plaster

Summary:

Sample contaminated w/ salts

Phase II: Analysis and Recommendations 3-R-100

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 5-R-m
 Structure Paintwork 2016
 Location of Sample Paintwork above stairs on third floor
 Date Removed March Removed By my
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
3

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>Plaster</u>	<u>Na₂S</u>		
1. <u>Red stain</u>		16.	
2. <u>Yellow stain</u>		17.	
3. <u>transparent grey green</u>	<u>slight</u>	18.	
4. <u>transparent grey green</u>	<u>slight</u>	19.	
5. <u>white</u>	<u>+</u>	20.	
6. <u>white</u>	<u>+</u>	21.	
7. <u>grey thin green</u>	<u>+</u>	22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations S-a-m

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #3

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	<u>+</u>
Latex	_____	_____
White wash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒, Color _____

Probable pigment associated with fluorescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead</u>	<u>KI</u>	<u>yellow color</u>
<u>other Naples yellow or litharge</u>	_____	_____
<u>no reaction to chrom yellow</u>	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Camille 1269(W) Sherwin-Williams _____

the paint has been yellowed over time

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 2-Rim
 Structure 206 kitchen
 Location of Sample interior sample above door to wet room 3rd floor
 Date Removed March 88 Removed By _____
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
Addition after original construction

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ Cl ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: <u>Plaster</u>	Chromochronology	Comments	Chromochronology	Comments
1. <u>Thick white</u>	<u>Na₂S</u>	<u>HNO₃</u>	16.	
2. <u>white</u>	<u>-</u>	<u>+</u>	17.	
3. <u>white</u>	<u>-</u>	<u>+</u>	18.	
4. <u>white</u>	<u>-</u>	<u>+</u>	19.	
5. <u>white</u>	<u>-</u>	<u>+</u>	20.	
6.			21.	
7.			22.	
8.			23.	
9.			24.	
10.			25.	
11.			26.	
12.			27.	
13.			28.	
14.			29.	
15.			30.	

Summary:

Phase II: Analysis and Recommendations 2-12-71

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis to see if white wash
 No. of Layers to be Studied all
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calimine	<u>HCl</u>	<u>+</u>
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead</u>	<u>Na₂S</u>	
<u>whiting</u>	<u>HCl</u>	<u>formation of gas</u>
	<u>H₂SO₄</u>	<u>formation of color</u>
		<u>crystals</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____
 Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Appendix #23
206 Lincoln Drive Mortar Data Sheets

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 1-Ri-m
Date _____ Origin of sample 206
Exterior, South base, Richmond Rd.
white (any stone)
Visual description of sample (color, texture, hardness, inclusions, etc.): white w/ aggrmt
and some small concrete
aggrmt

Mortar Analysis:

Original weight of powdered sample (W_1) = 19.78
Weight of filter paper (W_2) = 52 + 53 + 53 = 158
Weight of filter paper + dry fines (W_3) = 8.77
Weight of dry fines ($W_3 - W_2$) = 1.89
Weight of dry sand (W_4) = 3.55
% of sand ($(W_4/W_1) \times 100$) = 17.96%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 9.45%
% of dissolved binder = 72.59%

Observations: dissolution of binder, color of liquid: lime water - liquid

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm

2.36 mm	51	6.15
1.18 mm	15	24.15
600 um	15	32.5
300 um	2	50.5
150 um	2	60.5
75 um	2	70.5
53 um	2	
38 um	2	

Dem Herr

show

Name _____ Sample No. 2-Ri-m

Date _____ Origin of sample 206 Riffhooes
interior, plaster, from 3rd floor
above entrance door

Visual description of sample (color, texture, hardness,
inclusions, etc.): white w/ fiber very sm. aggregates
Sgt. iron fragments

Original weight of powdered sample (W_1) = 25.06

Weight of filter paper (W_2) = 5.77456 = 6.33

Weight of filter paper + dry fines (W_3) = 7.72 g

Weight of dry fines ($W_3 - W_2$) = 1.39 g

Weight of dry sand (W_4) = 16.80

% of sand ($(W_4/W_1) \times 100$) = 67.03%

% of fines ($(W_3 - W_2)/W_1 \times 100$) = 5.54%

% of dissolved binder = 27.43%

Observations: dissolution of binder, color of liquid: _____
_____ lime green color

1679

& Finer than	4.75 mm	—
	2.36 mm	1.83
	1.18 mm	4.7
	600 um	3.71
	300 um	4.87
	150 um	7.74
	75 um	4.2
	53 um	1.33
	38 um	—

ex. 21 (continued)

Sample

MORTAR ANALYSIS: DATA SHEET

206 Rittenhouse

Name _____ Sample No. 3-Ri-m

Date _____ Origin of sample 206 Rittenhouse
Interior, mortar & plaster from chimney

Visual description of sample (color, texture, hardness, inclusions, etc.): Very soft Iron Brown, w/ lime chunks

Iron fragments - abt
2 fragments
Liquid ~~white~~ Red

Mortar Analysis:

Original weight of powdered sample (W_1) =	<u>25.02</u>
Weight of filter paper (W_2) =	<u>5.91 + 56.47 g.</u>
Weight of filter paper + dry fines (W_3) =	<u>8.20 g.</u>
Weight of dry fines ($W_3 - W_2$) =	<u>1.73 g.</u>
Weight of dry sand (W_4) =	<u>16.37 g.</u>
% of sand ($(W_4/W_1) \times 100$) =	<u>65.42%</u>
% of fines ($(W_3 - W_2)/W_1 \times 100$) =	<u>6.91%</u>
% of dissolved binder =	<u>27.67%</u>

Observations: dissolution of binder, color of liquid: _____

milky, 2 fragments, Red

Characterization of Sand:

16.37

Microscopic Examination

% Finer than	mm	
4.75	mm	—
2.36	mm	—
1.18	mm	—
600	um	—
300	um	—
150	um	—
75	um	—
53	um	—
38	um	—

1146 - 1617

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 4-Ri-m
Date _____ Origin of sample Rittenhouse 206
Interior, mortar sample, west side of
basement wall
Visual description of sample (color, texture, hardness, inclusions, etc.): Hard, white, Aggregate of various sizes
Surface has been white washed
no lime chunks

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.05
Weight of filter paper (W_2) = 5.99 + .55 = 6.44
Weight of filter paper + dry fines (W_3) = 8.14 g
Weight of dry fines ($W_3 - W_2$) = 1.70 g
Weight of dry sand (W_4) = 16.08 g
% of sand ($(W_4/W_1) \times 100$) = 64.19%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 6.78%
% of dissolved binder = 70.9 29.03%

Observations: dissolution of binder, color of liquid: _____

Yellow liquid

Characterization of Sand:

Microscopic Examination

% Finer than

4.75 mm	100%
2.36 mm	100%
1.18 mm	100%
600 um	100%
300 um	100%
150 um	100%
75 um	100%
53 um	100%
38 um	100%

Appendix #24

Rockland Chain of Title

Form the Title Registry of the Department of Records,
Philadelphia City Hall, Philadelphia, Pennsylvania.

Recited in Patent

Recited in Patent

Nov. 21. 1754	From Edward Warner et. all Trustees of Thomas Shute Joseph Shute did not pay 900 pounds currency rents. To Abel James 200 acres	Recorded: March 1. 1760 Deed Book: H No. 14, pg. 377
June 29. 1756	From Abel James To Joseph Shute 200 acres	Recorded: Feb. 28. 1760 Deed Book: H No. 10, pg. 376
July 22. 1756	From Joseph Shute To John Lawrence 12 acres part of the original 200 acres	Recorded: June 26. 1779 Deed Book: I No. 17, pg. 89
July 24. 1765	From John Lawrence To John McPherson 20 Acres	Recorded: Dec. 1769 Deed Book: I Vol. 6, pg. 514
May 21. 1776	Mortgage John McPherson To Thomas Mason on the 20 acres To secure the payment of 920 pounds with interest	Recorded: Aug. 10. 1776 Mortgage Book: X No. 20, pg. 82

In 1803 the property is in dispute between Mary Ann McPherson
Administrator of John McPherson's Estate. Vs. John Mason Thomas
Paul Executors of Thomas Mason Deceased. Awarded to John Mason
and Thomas Paul.

March 6. 1805	Deed Fall John Barker High Sheriff To John Mason and Thomas Paul Awarded the 20 acres.	Supreme Court Book: C, pg. 16
Nov 1. 1809	From John Mason and Thomas Paul To George Thomas 20 acres	Recorded: June 26. 1809 Deed Book: 1C No. 2, pg. 164
Sept 10. 1815	From George Thomas To Isaac C Jones Paid 25,000 Dollars	Recorded: Oct. 10. 1815 Deed Book: MR No. 4, pg. 245

Certain Message of Teniment and tract or piece of
land...Containing 20 acres. This is the first time the building

is mentioned.

Oct. 22, 1828	Mortgage To Isaac Jones From Thomas Firth	Records Oct. 25, 1828 Mortgage Book: GWR, No. 11, pg. 640
Satisfied December 27, 1834		

Nov. 7, 1828	Deed of Trust From Isaac C. Jones To John Carpenter and Thomas Firth	Recorded: Nov. 11, 1828 Deed Book:
GWR, No. 26, pg. 298		

Jan. 21, 1834	Deed Endorsed: From Thomas Firth To Isaac C. Jones	Recorded: Jan. 25, 1835 Deed Book: AM. No. 4, pg. 476
---------------	--	--

Sept. 21, 1865	Will of Isaac C. Jones	Will Book: 59, pg. 398
----------------	------------------------	---------------------------

Appointed both Samuel Jones and Isaac Jones his
executors and stated that they should sell all or part of his
real estate.

From 1867 on the city of Philadelphia was in the process of
buying this land from Isaac Jones Executor of Isaac C. Jones
Estate.

March 19, 1870 Deed Roll Release Isaac Jones Executor of Isaac
C. Jones estate to the City of Philadelphia.

Deed Book:
No. pg.

From: A Brief of Title to Rockland containing 26 acres. Estate of
Isaac C. Jones. Fairmount Park Commission files. Box H-3000. City
Archives, City Hall Annex, Philadelphia Pa.

Appendix #25

Inventory of Issac Jones

From the will of Issac Jones #52, 1865. Register or Wills.
City Hall Annex, Philadelphia Pa.

Inventory of Issac Jones		
Dobble Bedstead and Bedding	.....	15.00
Single	.....	10.00
Table With Drawers	.....	3.00
Chairs	.....0.25 each...	1.25
Odd Chairs and Bedstead	.....	3.00
Air Tight Stove and Front	.....	4.00
Lot of Worn Matting and Sundrys	.....	3.00
Bedstead and Bedding	.....	5.00
Bureau, Table, and 3 Chairs	.....	5.00
Bureau and Book Case	.....	12.00
3-Moh hair Seat Chairs	.....1.50 each...	4.50
Small Wood Chair	.....	.50
Small Bedstead and Bedding	.....	15.00
Large	.....	25.00
Looking Glass	.....	2.00
Sheet Iron Stove	.....	1.50
Wash Table	.....	2.00
Chamber Set	.....	6.00
Carpet	.....	5.00
Single Bedstead and Bedding	.....	15.00
Case of Drawers	.....	10.00
5 Chairs	.....0.25 each...	1.25
Wash Stand	.....	.50
Bureau	.....	5.00
Table Stand	.....	1.00
Chamber Chair	.....	2.00
Small Looking Glass	.....	1.00
Carpet	.....	5.00
Chest of Drawers	.....	15.00
Wardrobe and Table with Drawers	.....	10.00
Single Bedstead and Bedding	.....	12.00
	.....	20.00
Subtotal		220.50
Looking Glass	.....	2.00
Table With Drawers	.....	3.00
Candle Stand Table	.....	1.00
6 Yellow Chairs	.....0.25 each...	1.50
Carpet	.....	2.00
2 Large Bureaus	.....10.00 each...	20.00
7 Hair Seat Chairs	.....1.50 each...	10.50
Rocking Chair, Large	.....	2.00
, Small	.....	.50
Wash Stand and Furniture	.....	5.00
Cain Seated Chair	.....	1.00
Cain Backed Chair	.....	1.00
Bedstead and Bedding	.....	40.00
Dressing Table with Glass	.....	10.00
Large Wardrobe	.....	20.00
Small Bedstead and Bedding	.....	17.00
1 Stove	.....	5.00
1 Card Table	.....	5.00
1 Carpet	.....	20.00

2 Looking Glasses	.....4.00 each...	8.00
2 Bureaus	.....7.00 each...	14.00
" Plain	.....	5.00
Wash Stand	.....	5.00
1 Set Chamber Ware, Pitcher	.....	4.00
2 Looking Glasses	.....3.50 each...	7.00
1 bedstead and Bedding	.....	30.00
4 Cane Seated Chairs	.....0.25 each...	1.00
1 Small Hinge Table	.....	.50
Carpet	.....	5.00
Entry Carpet	.....	2.50
Entry Table	.....	2.50
Side Board	.....	5.00
Mahogany Table	.....	4.00
" "	.....	4.00
" "	.....	3.00
Subtotal		488.50
Fire Screen	.....	.50
Small Table and Dressing Case	.....	1.00
8 Rush Seated Chairs	.....0.25 each...	2.00
Looking Glass	.....	5.00
Carpet	.....	5.00
Clock	.....	4.00
Looking Glass	.....	5.00
4 Rattan Seat Chairs	.....0.25 each...	1.00
2 Rush Seat Chairs	.....	.25
Round Table	.....	1.00
Desk Book Case	.....	5.00
1 Lot of Books	.....	25.00
1 Looking Glass	.....	15.00
6 Hair Seated Chairs	.....1.50 each...	9.00
" " Rocking Chair	.....	1.50
2 Rush Bottom Chairs	.....	1.00
1 arm Chair	.....	.50
1 Set Tea [Poy ?]	.....	5.00
Center Table	.....	4.00
2 Stools	.....1.00 each...	2.00
Screen	.....	.50
Card Table	.....	4.00
Carpet (Brussil)	.....	20.00
" " (back Parlour)	.....	20.00
8 Hair Seated Chairs	.....1.50 each...	12.00
2 Rush " "	.....	1.00
Hair Seated arm Chair	.....	.50
" " Rocking Chair	.....	3.00
Looking Glass	.....	15.00
Stove Air Tight	.....	10.00
Work Table and Pair Foot Stools	.....	4.00
Sofa	.....	5.00
1 Pair China Stools	.....	2.00
Pair Mantle Vases	.....	4.00
Counting House Desk and Stool	.....	2.00
Entry and Stair Carpet	.....	8.00

Entry Hat Rack	.....	1.50
Mohogany Table	.....	4.00
Mohogany Table Small	.....	1.00
Umbrella Stand	.....	.25
Clock	.....	2.00
Kitchen Table, Chain and with Kitchen Utensills.....		10.00
1 set China Crockery and Glass.....		10.00
1 Lot SilverWare (Old) 210 oz. at 1.25 per oz.		262.50
Gold Watch, and Chain	.....	60.00
Pier Table Marble Top (Parlour).....		4.00
Roan Hourse	.....	175.00
Single Carriage...25.00, and Harness...10.00.....		35.00

-Rockland Place-

1264.50

1 Bay Horse	.....	100.00
1 Dun Horse	.....	125.00
Market Wagon and Cart	.....	100.00
Lot of Agricultural Impliments.....		15.00
Red Cow (Dry)	.....	30.00
White Cow	.....	35.00
Lot of Old Furniture	.....	30.00

Cash

435.00

353.88

2053.38

1 Lot East India China

30.00

Total

2083.38

Philadelphia: July 17, 1865 Completed By James Willson and Isaac L. Wister.

Will of Issac Jones #52, 1865. Register of Wills. City Hall Annex, Philadelphia Pa.

Appendix #24

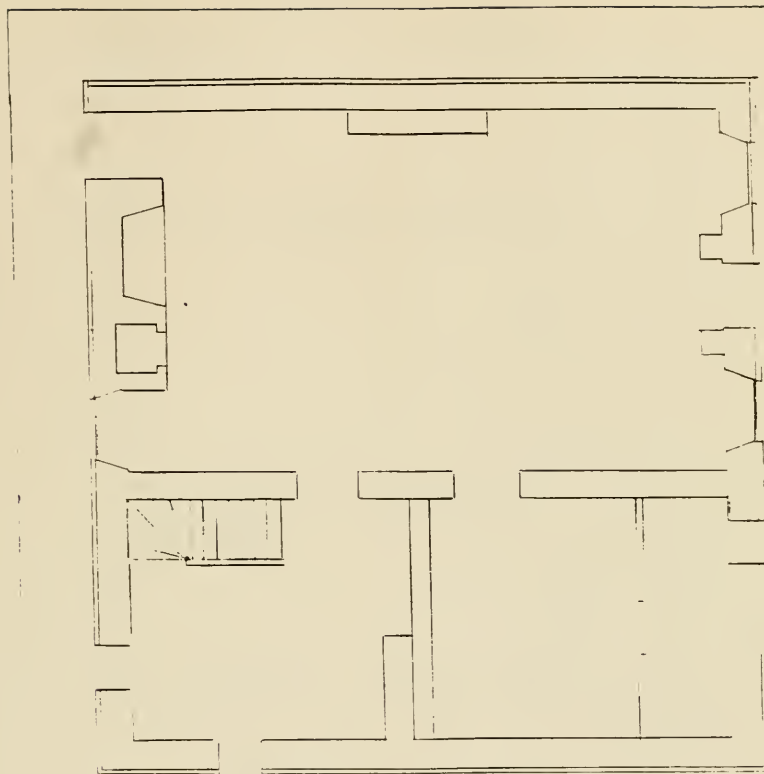
Rockland Floor Plans

From: Rockland File, Fairmount Park Commission Files.,
Fairmount Park Commission. Memorial Hall Philadelphia Pa.

Appendix #26


Rockland Floor Plans

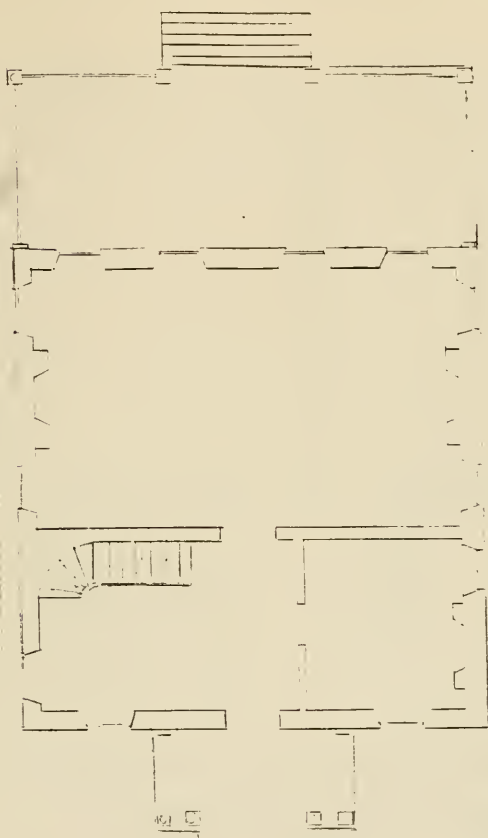
From: Rockland File. Fairmount Park Commission Files.,
Fairmount Park Commission, Memorial Hall Philadelphia Pa.



Rock land
1988
Cellar Floor Plan

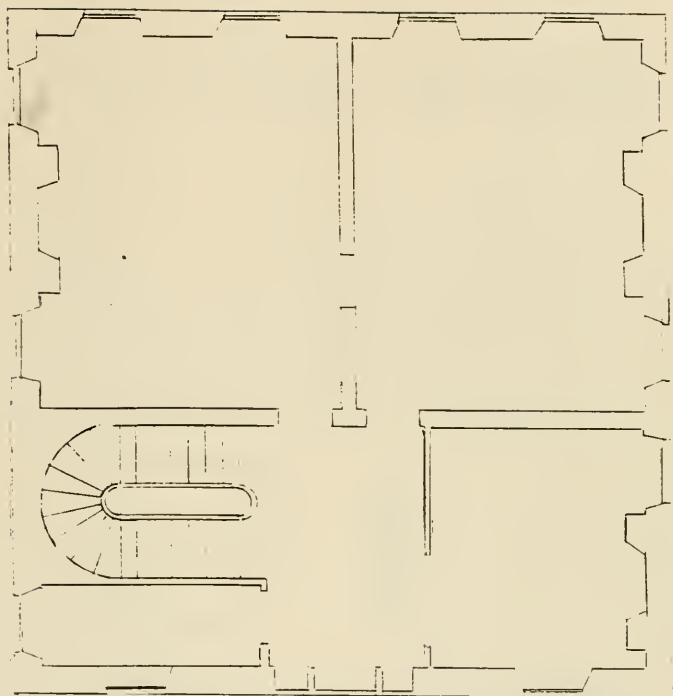
sample site . scale none





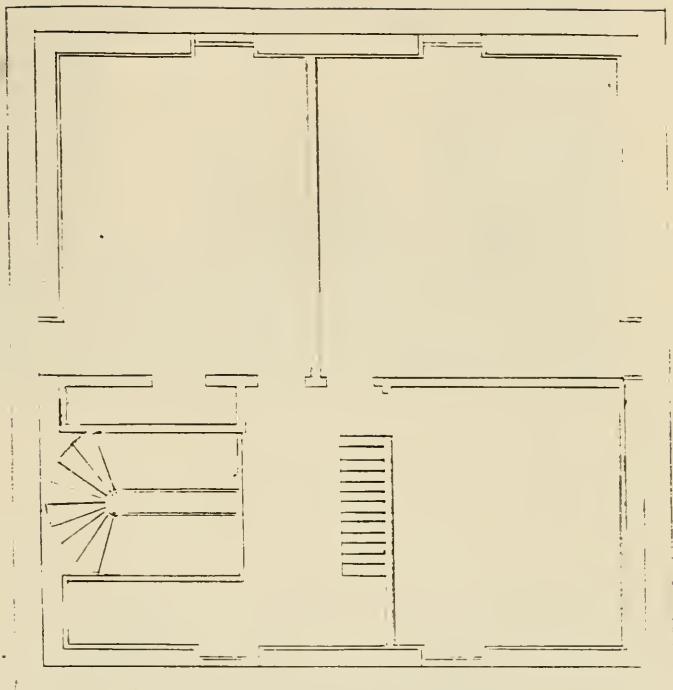
Rockland
1988
First Floor Plan

sample site scale none



Rock land
1988
Second Floor Plan

sample site • scale none



Rockland
1988
Thlrd Floor Plan



sample site

scale none

Appendix #27
Rockland
Exterior Maintenance Problems

Rockland East Elevation



North Elevation



Rockland West Elevation



South Elevation

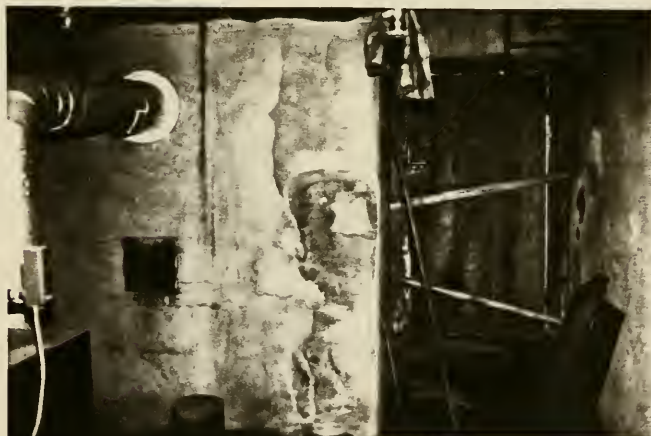


Maintenance Problems Encountered at Rockland

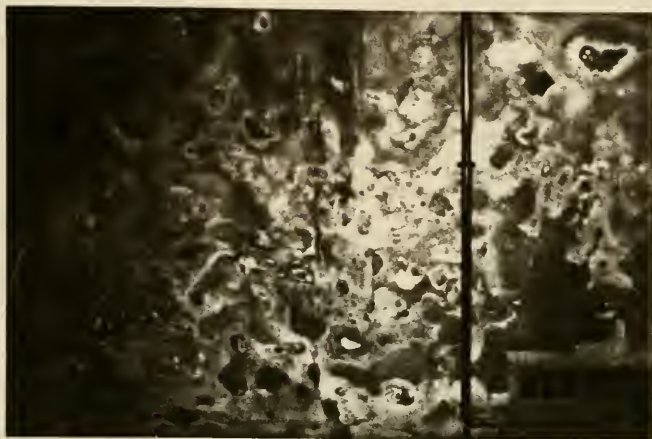
Leaking Water Valve in the Basement



Water seeps through a basement door during heavy rain.
Evidence of rising damp on the wall.



East wall of basement is covered with salt deposits left by evaporating water.



South Elevation, structural problem: this wall drops and bulges out.



Crack in South Wall Extending from Roof to above the
Deformation.



The interior first floor window in the dining room and the second floor window above show the effect of the drop in the wall.



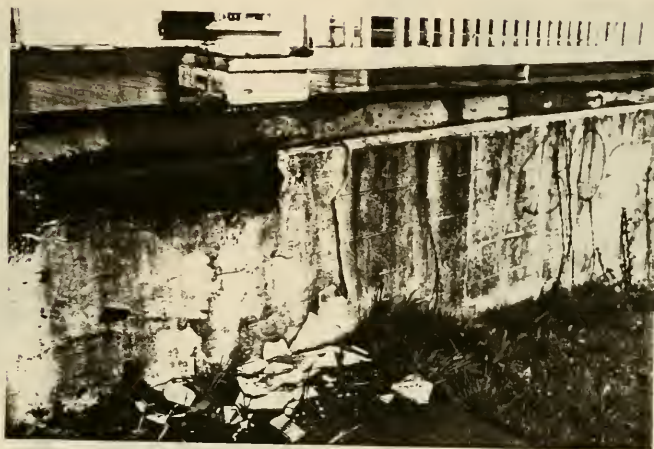
Water penetration into the wall has caused the delamination of the rubble dash stucco in certain areas. The wooden porch column also shows the effects of water.



A broken leader pipe drains rain water onto the building wall and a section of porch balluster is seen on the ground. On the opposite side of the building the leader is also broken



When the back porch stairs were removed some of the ruled stucco was damaged.



All of the interior surfaces are peeling.



Damage to the third floor ceiling caused by a bad roof.

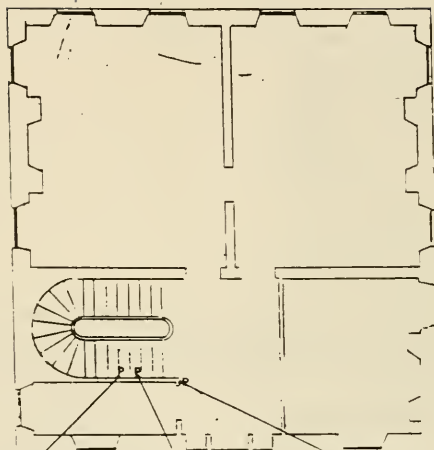


Appendix #28
Rockland Paint Stratigraphy



Rockford
1988
Second Floor Plan

sample site • scale none



16-Rc-F
Plaster
yellow white
yellow white
thin trans. blue
green
red
yellow wall paper
dark green
red pink

green

yellow
blue
dlt. green
dlt. green
rose
rose
red spotted line
yellow
whitethin
blue

22-Rc-F
Plaster
white
white
white
white

white
yellow white
yellow white

brown white

white
brown white
brown white
fracture
white
orange

blue
dlt. blue
red pink line
yellow
white
bright white
white
blue

24-Rc-F
Plaster
trans. white
dlt. green
blue
greenish pink
dlt. pink
pink-rose

light white trans
light white trans
blue grey

Phase I: Sequence of Layers 1-R0-P
 Structure Portland
 Location of Sample Interior paint sample from staircase board finish
 Date Removed March 1988 Removed By MVJ
 Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OH)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: wood

1.	<u>—</u>		
2.	<u>white</u>	<u>Na₂S</u>	<u>DMF</u>
3.	<u>white</u>	<u>Na₂S</u>	<u>DMF</u>
4.	<u>translucent gray</u>		
5.	<u>white</u>	<u>Na₂S</u>	<u>DMF</u>
6.	<u>—</u>		
7.	<u>white</u>	<u>Na₂S</u>	<u>DMF</u>
8.	<u>translucent gray</u>		
9.	<u>—</u>		
10.	<u>white</u>	<u>Na₂S</u>	
11.	<u>yellow white</u>	<u>Na₂S</u>	
12.	<u>white</u>	<u>Na₂S</u>	
13.	<u>white</u>	<u>Na₂S</u>	
14.	<u>—</u>		
15.	<u>gray white</u>	<u>DMF</u>	

Chromochronology Comments

16.	<u>white</u>	<u>DMF</u>
17.	<u>gray white</u>	
18.	<u>—</u>	
19.	<u>white</u>	
20.	<u>white</u>	
21.	<u>red</u>	
22.	<u>black</u>	
23.	<u>cream</u>	
24.	<u>lt. brown</u>	
25.	<u>brown</u>	
26.	<u>black</u>	
27.	<u>red</u>	
28.	<u>brown</u>	
29.	<u>white</u>	
30.	<u>—</u>	

Summary:

Phase II: Analysis and Recommendations 1-25-P

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied #1, 2, 3

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

#1 & #2 DMF

softened by DMF

Latex

Whitewash/calimine

#3 HCL DMF

Waterbased/distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ✓, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Spot Test

Reaction

#1 lead white

K₂

yellow ppt

#2 lead white

K₂

-

#3 lead white

K₂

-

#4 cobalt blue

blue HNO₃

irregular blue prisms

PIGMENT AND MEDIUM TYPE:

→ mixture contaminated from other layers

Probable pigment(s): #1 & #2 lead white in linseed oil

Probable medium: #3 cobalt blue / lead filler / calcium

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____

Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: 1-25-P

Report prepared - Date: 25 By whom: MVJ

Phase I: Sequence of Layers Z-Po-P

Structure Korland
 Location of Sample interior south side dining room ceiling paint sample
 Date Removed May 1968 Removed By MS
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
none being able related

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OH)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate:	Chromochronology	Comments
<u>Plaster</u>	<u>7 coats</u>	<u>DMF</u>
1.	<u>6</u>	<u>-</u>
2.	<u>yellow white</u>	<u>light</u>
3.	<u>yellow white</u>	<u>thick</u>
4.	<u>yellow white</u>	<u>thick</u>
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 2-20-88

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	Left over
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ☐ no ☒ Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
#3 lead white	KI	Yellow
#2 white	HNO ₃	Red coloration
_____	H ₂ SO ₄ + heat	Formation of brown crystals
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #3 lead white
 Probable medium: #2 white in based oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: July '88 By Whom: Mx

Phase I: Sequence of Layers 3-Ro-W

Structure Portland

Location of Sample Interior South side From ceiling dining room

Date Removed removed By mvj

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: Plaster			
1. white	HNO ₃	16.	
2.		17.	
3. white w. H	DMF	18.	
4. white	DMF	19.	
5. white	DMF	20.	
6. white	DMF	21.	
7.		22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations 3-10-7

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied #1 layer

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calcimine	<u>Al HCl</u>	<u>evolution of gas</u>
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead/white</u>	<u>HNO3</u>	<u>evolution of gas</u>
<u>lead</u>	<u>KI</u>	<u>no reaction</u>
<u>white</u>	<u>H2SO4</u>	<u>no reaction</u>

PIGMENT AND MEDIUM TYPE:Probable pigment(s): whiteProbable medium: calcimineCOLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)Butens paint color white Sherwin-Williams _____RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATIONSample/slide NO: 2-RO-PReport prepared - Date: July 23 By Whom: MVJ

Phase I: Sequence of Layers

Structure H-Ro-F - RocklandLocation of Sample Interior west side dining room wall south side 1' from ceilingDate Removed March 85Removed By DMV

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>Plaster</u>			
1. <u>white</u>	<u>Na₂S HCl/DMF</u>	16.	
2. <u>transparent Lt Blue</u>	<u>Na₂S HCl/DMF</u>	17.	
3. <u>green wall paper</u>	<u>DMF</u>	18.	
4. <u>Red</u>	<u>DMF</u>	19.	
5. <u>Yellow cream</u>	<u>DMF</u>	20.	
6. <u>Yellow cream</u>	<u>Na₂S DMF</u>	21.	
7. <u>Lt Blue</u>	<u>DMF</u>	22.	
8. <u>Blue</u>	<u>DMF</u>	23.	
9. <u>Blue</u>	<u>DMF</u>	24.	
10. <u>gray</u>	<u>DMF</u>	25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

wall paper w/ Herbol stain color yellow
weakly fibres not chemically

Phase II: Analysis and Recommendations 4-20-P
Structure _____
Location of Sample _____
Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____
Reason for Layer Selection: _____
Visual Characteristics of Layer to be Matched: (relative thinness, thickness
glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
#1 #2 / egg white	Na ₂ S + HCL calcium + red soil	+
Prussian blue	NaOH + HCL	Blue → Brown → Blue
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE: Wall paper yellow + blue pigment = green
red colored strands dissolving in H₂O

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 5-10-8
 Structure wood
 Location of Sample 702 floor (int. to room above ch. 101)
 Date Removed March 88 Removed By MVJ
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
1810

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turpentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology	Comments		Chromochronology	Comments
Substrate: <u>Plaster</u>	<u>(H₂S)</u>			
1. <u>translucent white</u>	<u>HCl</u>	-	16.	
2. <u>lt green</u>	<u>HCl</u>	-	17.	
3. <u>blue</u>			18.	
4. <u>lt green</u>			19.	
5. <u>lt pink</u>			20.	
6. <u>pink - rose</u>			21.	
7. <u>black translucent white</u>			22.	
8. <u>brilliant white</u>			23.	
9. <u>black - grey</u>			24.	
10.			25.	
11.			26.	
12.			27.	
13.			28.	
14.			29.	
15.			30.	

Summary:

Phase II: Analysis and Recommendations 5-120-P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	white	white
Latex	green	green
Whitevasn/calimine	blue	blue
Waterbased/distemper	red	red
Varnish	yellow	yellow
Shellac	orange	orange
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no _____, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
Whitene	H ₂ SO ₄	formation of calcium sulfate crystals
Copper containing	Potassium ferrocyanide	red color in dry state, red, green
Painting blue	Calcium/NaOH but not brown liquid	
Charcoal blue	Potassium manganate thiocyanide	Positive test dark blue rectangular prism

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 6-RD-P
 Structure Verland
 Location of Sample Interior wall paper sample of trim around doors
 Date Removed March 22 removed by MMV
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: wood

1. <u>green white</u> <u>Na₂S</u> <u>HCl</u>
2. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
3. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
4. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
5. <u>white</u> <u>DMF</u>
6. <u>green tan</u> <u>DMF</u>
7. <u>yellow white</u> <u>DMF</u>
8. <u>yellow white</u> <u>DMF</u>
9. <u>yellow white</u> <u>DMF</u>
10. <u>yellow white</u> <u>DMF</u>
11. <u>yellow white</u> <u>DMF</u>
12. <u>yellow white</u> <u>DMF</u>
13. <u>yellow white</u> <u>DMF</u>
14. <u>yellow white</u> <u>DMF</u>
15. <u>yellow white</u> <u>DMF</u>

Chromochronology Comments

Substrate: wood

16. <u>green white</u> <u>Na₂S</u> <u>HCl</u>
17. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
18. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
19. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
20. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
21. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
22. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
23. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
24. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
25. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
26. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
27. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
28. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
29. <u>gray</u> <u>Na₂S</u> <u>HCl</u>
30. <u>gray</u> <u>Na₂S</u> <u>HCl</u>

Summary:

Phase II: Analysis and Recommendations 6-R0-T

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied #1, 2Reason for Layer Selection: First Coat

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

#1, 2

Chemical

Reaction

Oil

MF

Latex

Whitewash/calimine

#1, 2 HCl+ / H₂SO₄

Waterbased/distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type

Spot Test

Reaction

#2 lead whiteKTYellow#1 " "KT+PIGMENT AND MEDIUM TYPE:Probable pigment(s): lead whiteProbable medium: linseed oilCOLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

#1 Efflorescent

Butens paint color #2 2541 Vista Sea Sherwin-WilliamsRECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers 7-120-8

Structure 120-8
 Location of Sample Room on front porch
 Date Removed March 27 Removed By WVS
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate: <u>wood</u>	Chromochronology	Comments	Chromochronology	Comments
1. <u>Yellow white</u>	-	<u>Na₂S</u>	16. <u>yellow white</u>	+
2. <u>-</u>	+		17. <u>yellow white</u>	+
3. <u>Yellow white</u>	+		18. <u>yellow white</u>	+
4. <u>-</u>	-		19. <u>yellow white</u>	+
5. <u>yellow white</u>	+		20. <u>white gray</u>	+
6. <u>yellow white</u>	-		21. <u>yellow</u>	+
7. <u>yellow white</u>	-		22. <u>white gray</u>	+
8. <u>dark translucent - epoxy</u>	-		23. <u>white gray</u>	-
9. <u>yellow white</u>	-		24. <u>white gray</u>	-
10. <u>-</u>	-		25. <u>white gray</u>	-
11. <u>yellow white</u>	-		26. <u>white white</u>	-
12. <u>-</u>	-		27. <u>gray</u>	-
13. <u>Yellow white</u>	+		28. <u>yellow-white</u>	+
14. <u>-</u>	-		29. <u>-</u>	-
15. <u>Yellow white</u>	+		30. <u>Primer - white</u>	+
			<u>cream yellow green</u>	

Summary:

Phase II: Analysis and Recommendations 7-20-7

Structure

Location of Sample

Date Removed

Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.):

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	softened
Latex		
White wash/calcimine	Ca	
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color

Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
lead	Naz S	turned black

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead & lime

Probable medium: oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color amount of dirt makes this impossible Sherwin-Williams

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date:

By Whom:

Phase I: Sequence of Layers 8-RO-P
 Structure Portland
 Location of Sample Interior Dining room South Ceiling
 Date Removed March 1968 Removed By MVS
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OR)
	Fracture ()	Turpentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Substrate: <u>Plaster</u>	Chromochronology Comments		Chromochronology Comments
1. <u>Wm</u>	<u>see</u>	16.	
2. <u>Wm</u>	<u>see</u>	17.	
3. <u>Yellow treatment</u>	<u>see</u>	18.	
4. <u>Wm</u>	<u>DMF</u>	19.	
5. <u>Wm</u>	<u>DMF</u>	20.	
6. <u>Wm</u>	<u>DMF</u>	21.	
7.		22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations - 12-7

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____
 No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness
 glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>DMF</u>	_____
Latex	_____	_____
Whitevaan/calcimine	<u>HCl</u>	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>lead white</u>	<u>Na₂S</u>	<u>+</u>
_____	<u>Na₂S</u>	<u>+</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead oxide
 Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color white Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 9-60-P
 Structure Kirkland
 Location of Sample Interior W. wall NW corner below chair rail
 Date Removed April 88 Removed By MM
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
no alteration c. 1810

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na.S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: <u>Plaster</u>	Chromochronology Comments	Chromochronology Comments
1. <u>Red</u>	<u>and /</u>	16. _____
2. <u>Yellow</u>	<u>primer DMF</u>	17. _____
3. <u>Yellow</u>	<u>None DMF</u>	18. _____
4. <u>Blue</u>	<u>DMF</u>	19. _____
5. <u>White thin</u>	<u>primer CH₂CL₂</u>	20. _____
6. <u>Coag</u>		21. _____
7. _____		22. _____
8. _____		23. _____
9. _____		24. _____
10. _____		25. _____
11. _____		26. _____
12. _____		27. _____
13. _____		28. _____
14. _____		29. _____
15. _____		30. _____

Summary:

Phase II: Analysis and Recommendations 7-R-⁶P

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 1st 3 layers 1,2,3

No. of Layers to be Studied _____
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>Red - DMF</u>	<u>-</u>
Latex	_____	_____
White wash/calcimine	<u>Red HCL</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
<u>White oil</u>	<u>DMF</u>	<u>+</u>

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no . Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Iron oxide</u>	<u>Butyltin ferrocyanide</u>	<u>+</u>
<u>Red white</u>	<u>RT</u>	<u>+ both primer & finish coat</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Red Iron oxide White lead white
 Probable medium: Red calcimine White linseed oil

COLOR: (Match sample to color standards: place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: Red iron
 Paint Type: White - titanium oxide in linseed oil

DOCUMENTATION

Sample/slide NO: 4-82-1
 Report prepared - Date: July By Whom: MLV

Phase I: Sequence of Layers 10-80-1
 Structure Workland
 Location of Sample Interior east side entry
 Date Removed March 85 Removed By PHV
 Significant Facts Regarding The Structure's History Which May Pertain To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate:	<u>Plaster</u>		
1.	<u>White</u>	16.	
2.	<u>translucent blue green</u>	17.	
3.	<u>dark</u>	18.	
4.	<u>orange yellow wall paper</u>	19.	
5.	<u>dark green</u>	20.	
6.	<u>orange</u>	21.	
7.	<u>orange</u>	22.	
8.	<u>orange</u>	23.	
9.	<u>orange</u>	24.	
10.	<u>orange</u>	25.	
11.	<u>orange</u>	26.	
12.	<u>orange</u>	27.	
13.	<u>orange</u>	28.	
14.	<u>orange</u>	29.	
15.	<u>orange</u>	30.	

Summary:

Phase II: Analysis and Recommendations (O-20-7)

Structure _____
 Location of Sample _____
 Date Removed _____ Removed by _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
White wash/calcimine	_____	_____
Water based/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no _____, Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
_____	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 11-R0-P
 Structure Rockland
 Location of Sample Lower east side entry
 Date Removed March 88 Removed By MV
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)
c 1810

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OR)
Fracture ()	Turentine	(TURP)
Dirt Layer (-)	near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments				Chromochronology Comments			
Substrate: <u>Plaster, Mortar</u> (<u>H₂O</u>)							
1.	<u>Orange yellow</u>	-	+	+	16.		
2.	<u>Olive</u>	-	+		17.		
3.	<u>Light green</u>	-	+		18.		
4.	<u>Thin white layer</u>	-	+	+	19.		
5.	<u>White</u>	-	+		20.		
6.	<u>Yellow</u>	-	+	+	21.		
7.	<u>White</u>	-			22.		
8.	<u>Blue</u>	-			23.		
9.	<u>White line</u>	-			24.		
10.					25.		
11.					26.		
12.					27.		
13.					28.		
14.					29.		
15.					30.		

Summary:

Phase II: Analysis and Recommendations 11-10-8

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied 7/2
 Reason for Layer Selection: _____
 Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, etc.): thin w/247 shine

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>ZnO</u> +	-
Latex	<u>NaCl</u> -	-
Whitewash/calcimine	<u>NaCl</u> -	-
Waterbased/distemper	<u>H₂O</u> +	-
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Orange</u>	<u>Negative Na₂S₂O₈ Chromate</u>	<u>inert</u>
<u>Blue</u>		<u>inert</u>

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Blue - Ultramarine
 Probable medium: Orange yellow - ochre

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Orange Liberty gold Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 12-KO-P

Structure Rockland

Location of Sample interior, stairway wall 2nd floor above chair rail

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: <u>Plaster</u>	Chromochronology Comments		Chromochronology Comments
1. <u>white</u>	<u>HCl</u>	16.	
2. <u>white</u>	<u>HCl</u>	17. <u>white</u>	<u>DMF</u>
3. <u>white</u>	<u>HCl</u>	18. <u>orange</u>	<u>DMF</u>
4. <u>white</u>	<u>HCl</u>	19. <u>—</u>	
5. <u>—</u>		20. <u>Blue</u>	<u>DMF</u>
6. <u>white</u>		21. <u>lt Blue</u>	<u>DMF</u>
7. <u>—</u>		22. <u>Red Pink</u>	<u>DMF</u>
8. <u>yellow white</u>	<u>HCl</u>	23. <u>Yellow</u>	<u>DMF</u>
9. <u>Yellow white</u>	<u>HCl</u>	24. <u>Orange</u>	<u>DMF</u>
10. <u>—</u>		25. <u>Orange white</u>	<u>DMF</u>
11. <u>Brown white</u>		26. <u>white</u>	<u>DMF</u>
12. <u>—</u>		27. <u>Blue</u>	<u>DMF</u>
13. <u>white</u>	<u>HCl</u>	28. <u>—</u>	
14. <u>Brown white</u>	<u>HCl</u>	29. <u>—</u>	
15. <u>Brown white</u>	<u>HCl</u>	30. <u>—</u>	

Summary:

No lead

Phase II: Analysis and Recommendations ^{✓ R-2}

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 1-4

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thickness, thickness glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>✓</u>	<u>✓</u>
Latex	_____	_____
Whitewash/calimine	<u>✓</u>	<u>✓</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no, Color _____

Probable pigment associated with fluorescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>Red white</u>	<u>✓</u>	<u>✓</u>
_____	<u>✓</u>	<u>✓</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color white wash Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: white wash

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: 7/25/86 By Whom: MT

Phase I: Sequence of Layers 13-R0-P
 Structure Rockland
 Location of Sample Interior doorway between living & dining room from molding
 Date Removed March 1988 Removed By THV
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
Primer (P)	Hydrochloric Acid	(HCl)
Glaze (G)	Dimethylformamide	(DMF)
Varnish (V)	Methylene Chloride	(CH ₂ Cl ₂)
Shellac (S)	Water	(H ₂ O)
Wall paper (W)	Alcohol	(OH)
Fracture ()	Turpentine	(TURP)
Dirt Layer (-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: Putty

1. <u>Yellow white</u>	<u>Na₂S</u>	
2. <u>white</u>		
3. <u>white</u>		
4. <u>Green white</u>	<u>Na₂S</u>	<u>DMF</u>
5. <u>Green white</u>	<u>Na₂S</u>	
6. <u>Gray white</u>	<u>Na₂S</u>	
7. <u>Yellow white</u>	<u>Na₂S</u>	
8. <u>Yellow white</u>	<u>Na₂S</u>	
9. <u>Light green</u>	<u>Na₂S</u>	
10. <u>Brown glaze</u>		
11. <u>Green</u>		
12. <u>White</u>		
13. <u>White</u>		
14. <u>Green</u>		
15. <u>Yellow cream</u>		

Chromochronology Comments

16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 13-20-P

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	<u>Dmf</u>	<u>+</u>
Latex	_____	_____
Whitewash/calimine	<u>HCl</u>	<u>+</u>
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
<u>#1 lead</u>	<u>Na₂S</u>	<u>turned black</u>
<u>#2 zinc o.</u>	<u>NaOH + HCl + FeCl₃(LN)</u>	<u>+</u>
<u>whiting</u>	<u>HCl</u>	<u>+</u>
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): leadProbable medium: calimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 14-R0-P
 Structure Rockland
 Location of Sample Interior, entrance wall 2nd floor below chair rail
 Date Removed _____ Removed By _____
 Significant Facts Regarding The Structure's History which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.). Wall paper

Chromochronology Comments

Substrate: Plaster Na₂S
 1. 2 layers yellow ochre
 2. the translucent lime - oil
 3. green - translucent
 4. Red wallpaper / yellow center - water
 5. soluble
 6. Green
 7. Blue
 8. Green
 9. Blue
 10. lt. Green
 11. lt. Green
 12. lt. Green
 13. lt. Green
 14. Thin red spiral line
 15. Yellow

Chromochronology Comments

16. Thin white
 17. Red
 18. Red
 19. Red
 20. Red
 21. Wallpaper has been pigment
 22. - tan dark green
 23. Wallpaper - Red brown
 24. - Paper
 25. - Red green
 26. - Red green
 27. - Red Pink
 28. Red
 29. Red
 30. Red

Summary: Hertzog most's yellow some red strands

Phase II: Analysis and Recommendations ¹¹⁻⁸²

Structure _____

Location or Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied #1, 2, 3, 4

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

#1 DMF

+

Latex

#2 DMF

+

Whitewash/calimine

Waterbased/distemper

#4 Water-based H₂O

soluble

Varnish

Shellac

#1 & 3 DMF

+

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)Flourescence under near ultraviolet: yes no ✓, Color _____

Probable pigment associated with flourescence: _____

#2 Prussian Blue H₂N₂ - No color A NaOH = Brown color

Possible Pigment Type

Spot Test

Reaction

#1

H₂SO₄

long reaction

#1 lead

#1

red color

#4 Iron oxide

H₂SO₄

red color

#3 Copper / Chromium

H₂SO₄ + H₂O

- reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____

Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____

Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____

Report prepared - Date: _____

By Whom: _____

Phase I: Sequence of Layers 6-RO-m

Structure Dockland

Location of Sample exterior east side rubble dash - stone balustrade

Date Removed _____ Removed By _____

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES	-Finish (F)	Reaction of Sodium Sulfide	(Na ₂ S)
	Primer (P)	Hydrochloric Acid	(HCl)
	Glaze (G)	Dimethylformamide	(DMF)
	Varnish (V)	Methylene Chloride	(CH ₂ CL ₂)
	Shellac (S)	Water	(H ₂ O)
	Wall paper (W)	Alcohol	(OH)
	Fracture ()	Turentine	(TURP)
	Dirt Layer (-)	Near UV Light	(UV)
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: <u>stucco</u>			
1. <u>orange paint layer</u>	<u>DMF</u>	16. _____	
2. _____		17. _____	
3. _____		18. _____	
4. _____		19. _____	
5. _____		20. _____	
6. _____		21. _____	
7. _____		22. _____	
8. _____		23. _____	
9. _____		24. _____	
10. _____		25. _____	
11. _____		26. _____	
12. _____		27. _____	
13. _____		28. _____	
14. _____		29. _____	
15. _____		30. _____	

Summary:

Phase II: Analysis and Recommendations 1-10-74

Structure _____
 Location of Sample _____
 Date Removed _____ Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	_____	_____
Latex	_____	_____
Whitewash/calcimine	_____	_____
Waterbased/distemper	_____	_____
Varnish	_____	_____
Shellac	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes _____ no _____, Color _____
 Probable pigment associated with flourescence: _____

Possible Pigment Type	Spot Test	Reaction
Lead	_____	_____
Iron oxide	_____	_____
_____	_____	_____
_____	_____	_____

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): _____
 Probable medium: _____

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____
 Paint Type: _____

DOCUMENTATION

Sample/slide NO: _____
 Report prepared - Date: _____ By Whom: _____

Phase I: Sequence of Layers 5-80-m
 Structure Rockland
 Location of Sample Tween dining room south side ceiling
 Date Removed March 88 Removed By MVJ
 Significant Facts Regarding The Structure's History Which May Pertain The
 To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)	Reaction of Sodium Sulfide (Na ₂ S)
Primer (P)	Hydrochloric Acid (HCl)
Glaze (G)	Dimethylformamide (DMF)
Varnish (V)	Methylene Chloride (CH ₂ CL ₂)
Shellac (S)	Water (H ₂ O)
Wall paper (W)	Alcohol (OR)
Fracture ()	Turpentine (TURP)
Dirt Layer (-)	Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbling, polychromy ect.).

Chromochronology Comments

Substrate: Water
 1. white HCl Water
 2. white HCl DMF
 3. _____
 4. _____
 5. white HCl DMF
 6. white HCl DMF
 7. _____
 8. _____
 9. _____
 10. _____
 11. _____
 12. _____
 13. _____
 14. _____
 15. _____

Chromochronology Comments

16. _____
 17. _____
 18. _____
 19. _____
 20. _____
 21. _____
 22. _____
 23. _____
 24. _____
 25. _____
 26. _____
 27. _____
 28. _____
 29. _____
 30. _____

Summary:

Phase II: Analysis and Recommendations S-120-m

Structure _____

Location of Sample _____

Date Removed _____

Removed By _____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis _____

No. of Layers to be Studied _____

Reason for Layer Selection: _____

Visual Characteristics of Layer to be Matched: (relative thinness, thickness, glassiness, ropiness, ect.): _____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium

Chemical

Reaction

Oil

Dmf

2nd + 4th layer softens

Latex

Whitewash/calimine

Waterbased/distemper

Varnish

Shellac

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Fluorescence under near ultraviolet: yes no ☒ Color _____

Probable pigment associated with fluorescence: _____

Zinc oxide
Possible Pigment Type

uv light

Spot Test

Reaction

2 lead white

a few spots of lead

Black

whitening

impure H₂O₂

traces of peroxide

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Mixture of whitening and lead white

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color _____ Sherwin-Williams _____

RECOMMENDATIONS

Color: _____

Paint Type: _____

DOCUMENTATION

Sample/slide NO: S-120-m

Report prepared - Date: _____ By Whom: _____

Appendix #30
Rockland Mortar Data Sheet

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. FR-11
Date _____ Origin of sample Rockland
Exterior, East Side, Public Data Sheds
Below North window
Visual description of sample (color, texture, hardness, inclusions, etc.): 2 pebbles in white mortar
with small layer of fine pebbles & yellow mortar
below
Iron fragments

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.16 gm
Weight of filter paper (W_2) = 5.87.55 ^{20.42}
Weight of filter paper + dry fines (W_3) = 9.07 gm
Weight of dry fines ($W_3 - W_2$) = 1.65 gm
Weight of dry sand (W_4) = 14.77 gm
% of sand ($(W_4/W_1) \times 100$) = 58.70%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 6.55%
% of dissolved binder = 34.75%

Observations: dissolution of binder, color of liquid: _____
Clear Green
g

Characterization of Sand:

Microscopic Examination

14.77

% Finer than	mm	
4.75	mm	—
2.36	mm	—
1.18	mm	—
600	um	—
300	um	—
150	um	—
75	um	—
53	um	—
38	um	—

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 2-R0-m
 Date _____ Origin of sample Rockland
Exterior, E side Highway front
6-R0-m
 Visual description of sample (color, texture, hardness, inclusions, etc.): off Brown White soft very
by chunks of thin of lime and fine ground sand

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.10
 Weight of filter paper (W_2) = 5.94 + 1.56 = 7.50
 Weight of filter paper + dry fines (W_3) = 9.66
 Weight of dry fines ($W_3 - W_2$) = 2.26
 Weight of dry sand (W_4) = 13.43
 % of sand ($(W_4/W_1) \times 100$) = 53.51%
 % of fines ($(W_3 - W_2)/W_1 \times 100$) = 9.00%
 % of dissolved binder = 37.5%

Observations: dissolution of binder, color of liquid: _____

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm _____
 2.36 mm _____
 1.18 mm _____
 600 um _____
 300 um _____
 150 um _____
 75 um _____
 53 um _____
 38 um _____

13.45

1

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 3-Ro-m

Date _____ Origin of sample Rock Island
Interior, west wall of stairway to Basement

Visual description of sample (color, texture, hardness, inclusions, etc.): White Brown w/ fiber - UG-55 Pt

a top plank layer of Brown coat Below
fibers Iron Scaffolding

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.10

Weight of filter paper (W_2) = 5.75 + 57.6326

Weight of filter paper + dry fines (W_3) = 9.00

Weight of dry fines ($W_3 - W_2$) = 2.68 g

Weight of dry sand (W_d) = 6.675 g

% of sand $((W_4/W_1) \times 100) =$ 26.7%

% of fines $((W_3 - W_2)/W_1 \times 100) =$ 10.6720

% of dissolved binder = 63.23%

Observations: dissolution of binder, color of liquid:_____

Texas 1. 1946 (1946) 1946 1946

Characterization of Sand:

Microscopic Examination

Finer than	mm	%
4.75	mm	1.16
2.36	mm	3.17
1.18	mm	16.92
600	um	15.56
300	um	22.91
150	um	27.03
75	um	12.67
53	um	2.11
38	um	

6.62

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. 4-20-m
Date _____ Origin of sample Rock lane
Inter 3rd floor from below stair w
roof
Visual description of sample (color, texture, hardness,
inclusions, etc.): very light, white, fine grain
Difficulty in dissolving may be gypsum
plaster

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.05
Weight of filter paper (W_2) = 5.60 + .57 = 6.17
Weight of filter paper + dry fines (W_3) = 7.00 g
Weight of dry fines ($W_3 - W_2$) = .83 g
Weight of dry sand (W_4) = 7.95 g
% of sand ($(W_4/W_1) \times 100$) = 31.75
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 3.3150
% of dissolved binder = 64.9070

Observations: dissolution of binder, color of liquid: yellow liquid

Characterization of Sand:

Microscopic Examination

795
300 500 1000 2000 4000 8000 16000 32000 64000 128000 256000 512000 1024000 2048000 4096000 8192000 16384000 32768000 65536000 131072000 262144000 524288000 1048576000 2097152000 4194304000 8388608000 16777216000 33554432000 67108864000 134217728000 268435456000 536870912000 1073741824000 2147483648000 4294967296000 8589934592000 17179869184000 34359738368000 68719476736000 137438953472000 274877906944000 549755813888000 1099511627776000 2199023255552000 4398046511104000 8796093022208000 17592186044416000 35184372088832000 70368744177664000 140737488355328000 281474976710656000 562949953421312000 1125899906842624000 2251799813685248000 4503599627370496000 9007199254740992000 18014398509481984000 36028797018963968000 72057594037927936000 144115188075855872000 288230376151711744000 576460752303423488000 1152921504606846976000 2305843009213693952000 4611686018427387904000 9223372036854775808000 18446744073709551616000 36893488147419103232000 73786976294838206464000 147573952589676412928000 295147905179352825856000 590295810358705651712000 1180591620717411303424000 2361183241434822606848000 4722366482869645213696000 9444732965739290427392000 18889465931478580854784000 37778931862957161709568000 75557863725914323419136000 151115727451828646838272000 302231454903657293676544000 604462909807314587353088000 1208925819614629174706176000 2417851639229258349412352000 4835703278458516698824704000 9671406556917033397649408000 19342813113834066795298816000 38685626227668133590597632000 77371252455336267181195264000 154742504910672534362390528000 309485009821345068724781056000 618970019642690137449562112000 1237940039285380274899124224000 2475880078570760549798248448000 4951760157141521099596496896000 9903520314283042199192993792000 19807040628566084398385987584000 39614081257132168796771975168000 79228162514264337593543950336000 158456325028528675187087900672000 316912650057057350374175801344000 633825300114114700748351602688000 1267650600228229401496703205376000 2535301200456458802993406410752000 5070602400912917605986812821504000 10141204801825835211973625643008000 20282409603651670423947251286016000 40564819207303340847894502572032000 81129638414606681695789005144064000 162259276829213363391578010288128000 324518553658426726783156020576256000 649037107316853453566312041152512000 1298074214633706907132624082305024000 2596148429267413814265248164610048000 5192296858534827628530496329220096000 10384593717069655257060992658440192000 20769187434139310514121985316880384000 41538374868278621028243970633760768000 83076749736557242056487941267521536000 166153499473114484112975882535043072000 332306998946228968225951765070086144000 664613997892457936451903530140172288000 1329227995784915872903807060280344576000 2658455991569831745807614120560689152000 5316911983139663491615228241121378304000 10633823966279326983230456482242756608000 21267647932558653966460912964485513216000 42535295865117307932921825928971026432000 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ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name _____ Sample No. G-RO-m
Date _____ Origin of sample Rockland
outside rubble dash stucco
underneath 1-20-m
Visual description of sample (color, texture, hardness, inclusions, etc.): Brown rubbery w/ large aggregate
Soft iron fragments
lime

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.06
Weight of filter paper (W_2) = 5.72 + .54 = 6.26
Weight of filter paper + dry fines (W_3) = 9.01 g
Weight of dry fines ($W_3 - W_2$) = 1.75 g
Weight of dry sand (W_4) = 17.22 g
% of sand ($(W_4/W_1) \times 100$) = 68.71%
% of fines ($(W_3 - W_2)/W_1 \times 100$) = 6.98%
% of dissolved binder = 24.31%

Observations: dissolution of binder, color of liquid: _____
lime - yellow - clear

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm 100
2.36 mm 100
1.18 mm 100
600 um 100
300 um 100
150 um 100
75 um 100
52 um 100
38 um 100

5. 17.20 g
composition - 100%
16.74%
10.3%
2.0%
1.2%

Anne & Jerome Fisher

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