

# Finish Notes™

The newsletter of architectural finishes investigation  
from Frank S. Welsh company

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## WELCOME TO OUR NEWSLETTER

*There is a variety of interesting topics related to the restoration of historic buildings & conservation of artifacts. We feel it would be valuable to discuss and share them with our many clients around the country.*

*We would like to publish information about your projects to share with others. Please call us with any questions; we will answer them in print and help when you call.*

*We would like to welcome Maria Thompson to the Finish Notes production team.*

## On the Right Track – Grand Central Terminal



Grand Central Terminal, 42nd Street (south) facade, ca. 1929

Thousands of gold stars in a cerulean blue sky, high above the heads of passersby, are undergoing restoration at New York's Grand Central Terminal. The makeover of the terminal has been a long time coming.

The imposing Beaux Arts building straddling Park Avenue at 42nd Street was designated a landmark in 1967 by the New York City Landmarks Preservation Commission and almost immediately its status was in jeopardy. McKim, Mead and White's colossal Pennsylvania Station was demolished a few years earlier and by the late 1960's Grand Central's owner, The Penn Central Transportation Company, had plans to build a fifty-five story skyscraper over the terminal, effectively destroying the qualities which made the building special. Public and private voices united in a chorus of dissent and in 1978 the United States Supreme Court upheld the validity of the terminal's landmark status.

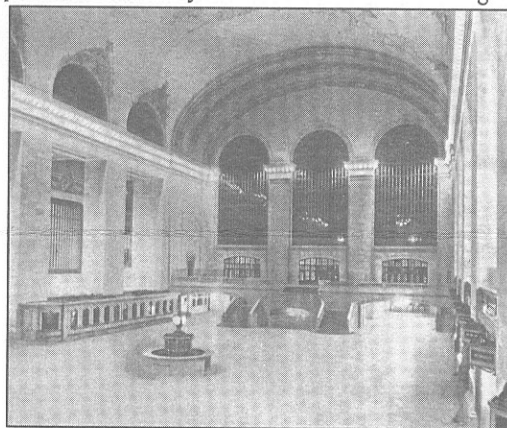
The Committee To Save Grand Central Station worked to increase public awareness of a building which met not only the practical needs of a passenger railroad terminal but also the symbolic heritage of industrial might clothed in classical grandeur. In the late 1980's, investigation and planning for the restoration and reconfiguration got underway.

One of the fundamental areas of inquiry was to determine the nature and color of the original surface finishes of both the interior and exterior of the building. Our firm was retained to perform the paint archeology for architects Beyer, Blinder, Belle.

The on-site investigation was directed by Frank S. Welsh, and, as with any paint research project, sampling was done in areas that were typical as well as those likely to vary from the norm. Microscopical analysis was performed on approximately 1,000 samples gathered from thirty-two rooms to determine the types of coatings and their original colors and appearance. (The findings were presented in a 250 page report which followed the format we outlined in "Guidelines for Planning Architectural Finishes Investigations," in the Spring 1994 special publication of *Finish Notes*.)

While it is our goal to let the building speak for itself, we also rely on the paper trail of documentation and historical evidence. Photographs, for example, are often helpful in depicting changes in decorative schemes or providing interpretive clues for physical findings. In this case, written materials attested to significant additions and alterations, such as the 1945 resurfacing of the Sky Ceiling in the Express Concourse, and photographs documented the building's generally monochromatic color scheme.

When Grand Central opened in February 1913, it was hailed as the world's greatest railway terminal. The building was the product of a stormy collaboration between design competition



Express Concourse, looking west, 1913. Note the interplay between the monochromatic wall surface, dark painted windows and elaborate sky ceiling.

winners Reed and Stem of St. Paul, Minnesota and the New York firm of Warren and Wetmore. Reed's elevated "circumferential roadway" and bridge across 42nd Street combined with an elaborate system of ramps and passageways to make the station an engineering marvel. Whitney Warren's monumental 42nd Street facade, with its three arched windows topped by a huge clock and mythological sculpture of Mercury, Hercules and Minerva, lent an importance and dignity to rail transportation which surpassed the Roman facade of the rival Pennsylvania Station.

The exterior is constructed of Stony Creek granite and Bedford limestone, always exposed in its natural finish. The building's mass is relieved by decorative finishes in the form of

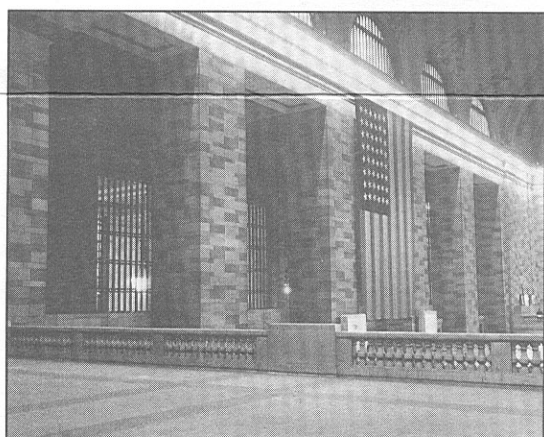
painted metalwork and naturally finished wood, the latter protected by several layers of shellac. Where ferrous metals are used on window sash, door frames, grilles, pilasters, and marquee framing and brackets, they were originally painted light grayish olive to resemble antique oxidized bronze. However, its most recent coating conforms to an International Style aesthetic and resembles dark bronze anodized aluminum.

The terminal's interior spaces catered to the long distance traveler and the first great room entered from 42nd Street is the Waiting Room. An elaborately modeled ceiling partitions the room into manageable segments and reinforces its rectilinear dimensions. Lounges and rest rooms were located at the east and west ends of the room, which was lit by chandeliers and natural light from the large southern windows. Classical symmetry was maintained by windows in the north wall and doors leading to the Express Concourse.

Surface finishes in the Waiting Room echo the theme established by the monochromatic 42nd Street facade and set the tone for the entire terminal. The lower walls are made of slabs of polished Botticino marble, which is a pale yellowish color, and the upper walls are covered with "Caen stone," a cementitious cast material that presents a sandy, tooled finish in imitation of stone. Originally, the ceiling was unpainted and finished with a cementitious gypsum/lime plaster, giving the entire room the appearance of natural stone. In the 1920's, however, the walls and ceiling were painted, destroying the monochromatic theme and dulling the effectiveness of the visual play between the polished and sandy surfaces.

If buildings have hearts, the Express Concourse, where earth meets sky, has a vitality all its own, apart from the bustle of rail travel. From the floor of Tennessee marble to the vaulted ceiling with its constellations and Milky Way 125 feet above, the Express Concourse is an example of public architecture as an ennobling and edifying device. Because of the ceiling height and a surrounding balcony, the walls divide themselves into three distinct areas, from the standpoint of surface finishes. The lowest range is polished Botticino marble and the middle range, from balcony floor to cornice, is the same Caen stone material used in the Waiting Room. The cornice and end wall tympani are covered with hard surface plaster, coated with an oil base paint decorated to resemble stone.

Perhaps, the most important question we were asked to answer was to discern the nature of the original surface finish for the imitation Caen stone walls. A bit of detective work helped. A 1913 advertisement for "Knickerbocker Caen Stone Cement" claimed it was noted for its "shade of color," and, as stated, early

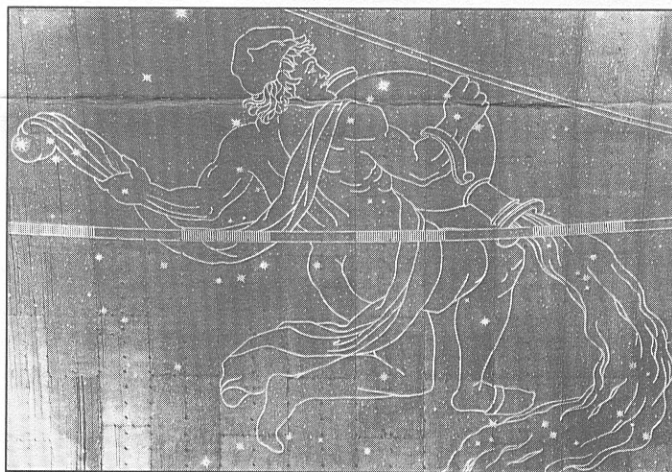


Angle view of the south wall of the Express Concourse from the east balcony, showing the imitation Caen stone walls painted to simulate different colored blocks of stone, ca. 1943.

photographic evidence suggested a monochromatic color scheme. But photos from a slightly later period showed a strong contrast in coloration, which suggested a different surface treatment. Paint samples from the Caen stone were analyzed in the laboratory, with the polarized light microscope, and the original unpainted scheme was verified. We identified titanium dioxide white pigment, a product unavailable commercially before 1917 and not

widely used until the 1920's. This finding, coupled with the documented history that the station received a major face lift in the '20's, enabled us to be confident of our conclusion that the original Caen stone wall surfaces were unpainted.

Another important question focused on the famous Sky Ceiling. Installation of a new cement plaster panel ceiling and the repainting of the constellations were described in *Railway Age Magazine*, September 29, 1945, but there was much debate about the original surface that survives beneath it and the appropriate restoration route. The client removed a small triangular panel and exposed the original plaster and paint. The original ceiling was badly deteriorated. The best samples from this area were located under the original gold leaf decoration. With the aid of the stereomicroscope, we color matched the best samples and used the polarized light microscope to analyze both the pigment composition and the binder of the blue paint. The original Sky Ceiling's light blue paint was made with calcium carbonate, ultramarine blue, and chromium oxide green, bound together in a tempera medium.



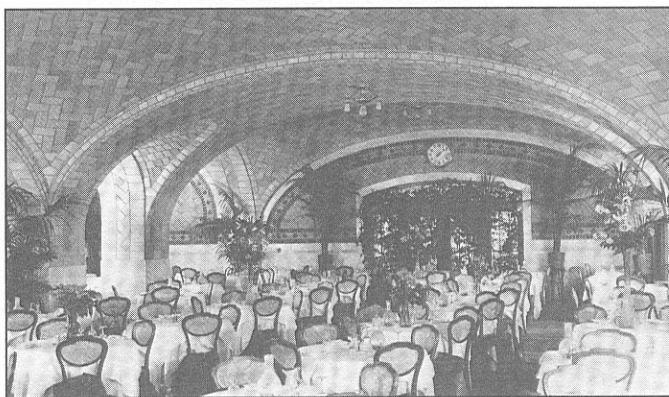
1989 view of the southeast corner of the Sky Ceiling, showing the stars and figure of Aquarius on the cement plaster panels installed in 1945.

The 1945 cement plaster panel ceiling, now covered with grime, initially carried four oil base paint coatings with varying tints of light blues and greens, applied in sequence to give the illusion of depth. In addition, the cerulean blue was stippled with daubs of different colors to heighten the sky effect when viewed from a distance. Cleansing of the star constellations and zodiac signs is underway as part of a two year, \$175 million restoration project and we are supplying Munsell Color Samples to the painting contractors for use in matching the new paints.

Even those who know of Grand Central only by hearsay have probably heard about the famed Oyster Bar. In the unique design of the station, service facilities and restaurants were located around the perimeter of the building and accessible via a series of interconnecting ramps. The Oyster Bar is located on an intermediate level under the Waiting Room. The shallow vaulted ceiling and multiple arches give the space a grotto-like effect, which is enhanced by the use of cream colored Guastavino tiles on the ceiling and walls. Metalwork on the door and transom frames conforms to the treatment of metal in other parts of the building - it is painted a light grayish olive to resemble oxidized bronze.

Another point of major interest to the architects and planners was the original condition of the ramp leading to the Oyster Bar. The walls of this low ceilinged passageway are polished Botticino marble, but the plaster ceilings, painted light yellow to match the marble, are not original to the building. Early photographs show the Oyster Bar Ramp as a grand space lit by immense spherical chandeliers. In 1927, when the ticket office administrative area was extended southward over the ramp, the archways were infilled and painted to match the marble surrounds.





The Oyster Bar in 1913. Ceiling and vaults are Gustavino tile with recessed panels of brick laid in a basketweave pattern.

Since 1913, Grand Central Terminal has changed with the fortunes of rail travel. Mid-century passengers travelled on trains with names like the Empire State Express, Yankee Clipper and 20th Century Limited. After the 1968 merger of the New York Central and Pennsylvania Railroads, the terminal continued as a hub for commuter rail and subway passengers. The building still works in meeting modern needs and also evokes bygone days when it was considered "gateway to a continent." Its restoration and adaptation reflect a renewed sense of the validity of railroads. Perhaps, in one sense, the great age of rail travel is being revisited and will be propelled into the new century, combining a heritage of grand public spaces with efficient transportation.

Frank S. Welsh Company has performed microscopical paint and color analysis on this and other major terminals, e.g. Washington, D.C.'s Union Station, assisting in their rejuvenation.

## "Technology on a Budget" Workshops for Investigating and Sampling Historic Finishes

Are you an historic site manager? A preservation officer overseeing a wide range of buildings? An architect in charge of a restoration project? What happens when you have those nearly impossible decisions to make about allocation of limited resources? We may be able to help.

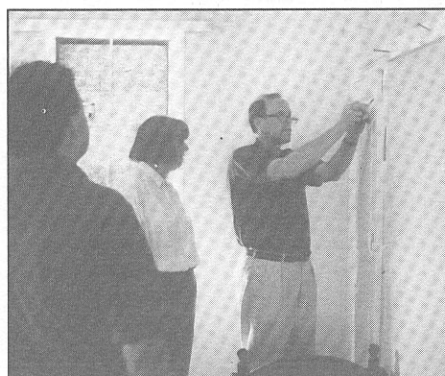
Recently, Frank Welsh travelled the country giving on site seminars in the logistics of microscopical analysis of surface evidence and the methodology of gathering samples. Just as in any research project, the conclusions are based on the evidence. Hints on selecting and retrieving intact color samples from wood, plaster, metal and masonry surfaces were crucial to the success of two different projects in Nantucket and along the Rio Grande.

Preservation Institute Nantucket (PI:N) is a well respected summer program in architectural preservation sponsored by the University of Florida in Gainesville. Frank Welsh, a member of the visiting preservation faculty, devised a plan to enlist Institute participants in assisting with a project at the Maria Mitchell Birthplace. This project was coordinated by Greg Hall, AIA, of the PI:N faculty and offered participants the opportunity to conduct hands-on sampling under professional guidance, with the knowledge that their work benefited an historic site.

The Mitchell House, built in 1790 and home of America's first woman astronomer, demonstrates the style and configuration of a typical Nantucket Quaker dwelling of the 1820's. The house is part of the Maria Mitchell Science Center and is noted for its decorated interior.

Two rooms, the old kitchen and a second floor bedroom, were selected for investigation. Sampling fundamentals were discussed and demonstrated. Student volunteers, x-acto® knives in hand, retrieved and labeled over twenty samples, which Frank Welsh analyzed using a stereomicroscope. The scope was set up so students could view the prepared samples. When all was said

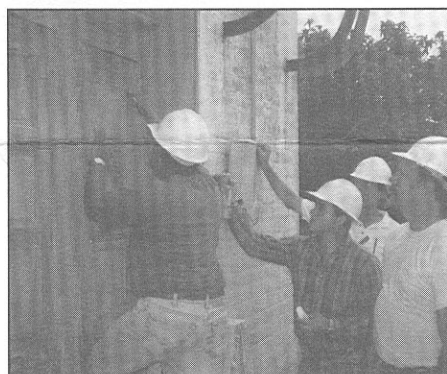
and done, this workshop benefited not only the Maria Mitchell Association by providing a rudimentary report of surface finishes for a portion of the house interior, but also gave students insight into the fieldwork requirements for investigating historic architectural coatings.



Frank giving PI:N class on-site instruction in paint sampling techniques at the Maria Mitchell Birthplace.

In Texas, along the Rio Grande, the mission was a bit different. The Los Caminos del Rio Heritage Project is an international effort with Mexico to document shared historic and cultural resources and utilize them to contribute to the economic revitalization of a 200 mile corridor from Laredo-Nuevo Laredo to Brownsville-Metamoros. The workshop, requested by Jim Bigger of the Texas Parks and Wildlife Department, focused on buildings in the Roma National Historic Landmark District and required analysis of interior and exterior finishes. Roma gained fame as a port in the 19th century because it was the terminal navigation point of the river and the beginning of a major overland route to Mexico. In the early 20th century, Roma was a noted border crossing town, featuring an elaborate suspension bridge. Buildings in the historic district include several late 19th century stores, houses and a hospital.

Frank Welsh reviewed tips for paint sampling and recommended a format for recording sampling information with restoration crew members from the Texas Parks Department. For the initial phase, the two story 1884 Guerra Store and Residence, considered the "jewel" of the group, was selected for demonstration sampling. More than 69 samples were gathered over two days. The period of historic significance was 1915 rather than 1884 because extensive early 20th century modifications were well documented.



Restoration crew members from the Texas Parks and Wildlife Department gather paint samples from the Guerra Store and Residence.

## Call us to set up a workshop

Similar workshops can be tailored for your specific needs. Overviews and demonstrations explaining the procedures for architectural finishes investigations are part of the workshop, which is a practical aid for those inclined to try a do-it-yourself cost conscious approach. The sessions emphasize proper sampling philosophy and techniques. Copies of our popular Paintpamphlet, the 1995 "Quick Tips for Paint Sampling," and a form specifying sampling information with a check list are available on request. We can also assist you in devising a long term program of sampling and analysis, so you can proceed with planning and grant applications.

Workshops are a handy preservation tool for Historic Main Street Coordinators, State, Local and Federal Historic Site Administrators, and preservation groups with active restoration crews.

Recently, in Akron, Ohio, we conducted a training workshop on taking paint samples for three staff members of Stan Hywet Hall. This workshop gave staff an appreciation of the research which goes into analysis of historic finishes and the opportunity to avail themselves of laboratory data on the collected samples.

## Limed Oak

The Church of the Redeemer in Bryn Mawr, Pennsylvania is an 1881 Gothic Revival gem whose exterior decorative scheme was significantly changed by a 1911 addition, incorporating a narthex and porte cochere on the west end of the building. The central doorway and two side entries feature paired wood panel doors, with iron hardware, which, over the years, were damaged by exposure to sun, rain and an interior radiator leak. In the mid-20th century, the overall visual effect was altered when the doors were stripped, repaired, restained and varnished. Last year, when restoration was authorized, an investigation and microanalysis by Frank Welsh disclosed that originally the doors were treated to resemble limed oak, a finish which makes the wood look bleached and aged. Restoration of this multi-step refinishing process of staining, filling and varnishing was recommended.

To achieve a limed appearance, open grained woods are finished in a manner resembling pickling. An earlier edition of *Finish Notes* (Spring, 1993) referred to a project at the Eliel Saarinen House in Bloomfield Hills, Michigan where the wood was pickled using a solution of caustic lime.

At Redeemer, the liming process began with stripping, followed by sanding and the application of a very dark brown stain. An off-white paste varnish was then rubbed on and wiped off, so it filled only the open wood grain. Two very thin coats of semi-gloss marine varnish were brushed on, sanding between each coat, to seal the finish and protect the doors from the weather. Application of a coat or two of dark paste wax may be used as a final step to tone the whiteness of the filler.

With a process such as this, it is necessary to experiment with one door or surface. When one is refinished to everyone's satisfaction, the remaining surfaces may be tackled. Remember to keep accurate notes of all the various materials, applications and steps so you can successfully duplicate the process. At Redeemer, we suggested that work proceed on only one pair of doors at a time.

## Pickling Pine and Chicken Soup

There are almost as many "recipes" for liming oak and pickling pine as there are for chicken soup. Oak may be given a bleached and aged appearance using Dick Fitch's procedure, which is similar to that employed at the church in Bryn Mawr. Fitch, one of the best paint chemists in the business (see *Finish Notes*, Fall 1993), recommends staining the wood with the "required color," leaving little or no stain in the pores of the wood surface. After a thorough drying, a white gel stain is applied to fill in "the pores and voids characteristic of oak wood." Dick Fitch prefers using a brush and suggests applying the stain in the direction of the grain, working on a surface small enough so the stain may be wiped off while still wet. First, work across the grain with a brush or cloth over a felt pad, lightly wiping the wood. Then, wipe with the grain to remove as much stain as possible from the flat surfaces. Sometimes the brush or cloth must be changed frequently.

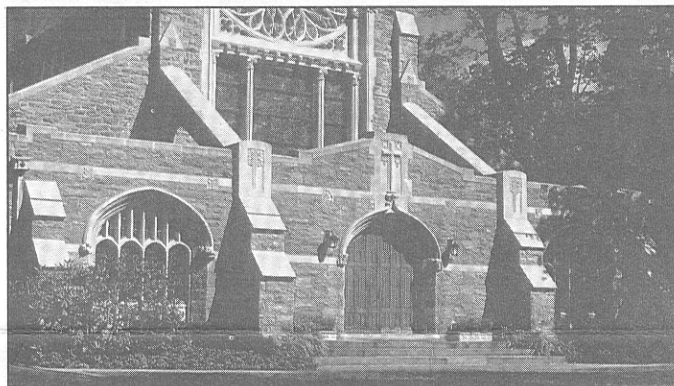
Detailed descriptions of treating open and closed grain woods may be found in *The Complete Manual of Wood Finishing* by Frederick Oughton (New York, 1982).

### MOVING ON?

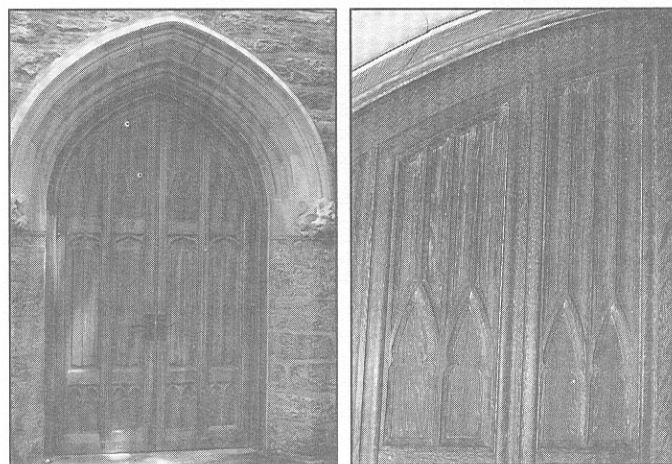
Let us know if you change address so we can continue to send *Finish Notes*™.

## Is the Budget Route for you?

We can assist you in devising a creative way to help your staff or volunteer corps gain a greater appreciation of paint and architectural finishes interpretation. We'll teach you to do the field work so you can obtain accurate paint sample information. Take advantage of our budget route to improved technology in paint analysis.



Church of the Redeemer (1881), Bryn Mawr, PA, showing the 1911 addition of the one story narthex. The west front doors are visible in the photograph and are shown prior to restoration.



These doors show the effect of the finishing process known as liming, which gives open grain wood the appearance of age from weather-bleaching.

### DO YOU NEED A COLOR SAMPLE?

The Frank S. Welsh Company is a distributor for all sources of color samples including those made by the Munsell Color Company. Call us to place your order.

### FRANK S. WELSH COMPANY

The Frank S. Welsh Company specializes in microanalysis of old and modern coatings such as paints, varnishes, wallpapers, and fabrics on all substrates from buildings as well as from historic artifacts. The company analyzes and evaluates color and composition. We have performed coatings, pigment, fiber and media analyses along with color evaluations on hundreds of restoration/conservation projects across the U.S. and in foreign countries since 1974. Our experience in color services as well as our laboratory expertise using stereomicroscopy and polarized light microscopy can provide unequalled accuracy and results from coatings analysis.

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