

Finish Notes™

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

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WELCOME TO OUR NEWSLETTER

Our last issue generated much interest in color, specifically the more demanding standards for color quality and control. Following up on that, we devote this issue to the various applications of color assessment, spectrophotometry, improved quality control and consistency of color documentation.

Cost Effective High-tech Inpainting

What do you do if you have a relatively small yet highly visible area in a very important room that needs repainting? Many people would opt for repainting the entire room out of concern about blending the new paint perfectly with the old. For a long time this was the only error-free approach.

Now there is an alternative that is less costly and more convenient. It is a very simple yet high-tech method that uses spectrophotometry to aid in formulating a new paint perfectly color matched to use for inpainting. It saves hundreds and more typically even thousands of dollars in repainting costs. This can be a critical economic decision for a wide variety of managers responsible for the maintenance of painted finishes in all types of buildings — especially museums.

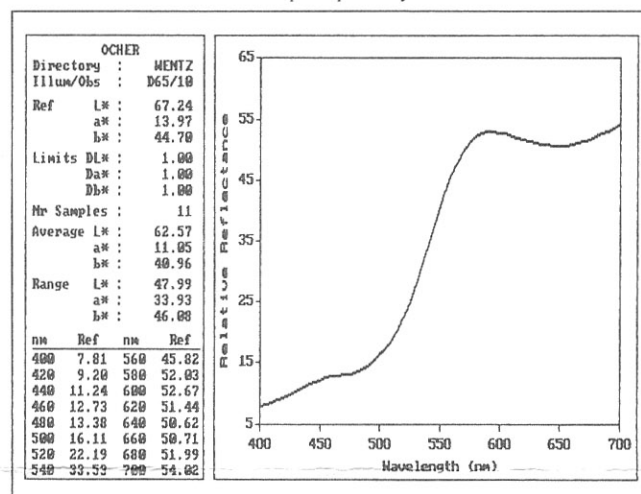
Repaint or Inpaint?

Elizabeth Gamon, executive director at the restored 1758 Peter Wentz House in Worcester, Montgomery County, Pennsylvania, faced this painting dilemma last year. The interior of the house has not been repainted since its 1976 restoration. The overall condition of the paints is still excellent. However, the ochre colored trim in the parlor was dirty and there were several areas which were blemished — window benches, a section of chair rail and some small areas on the door trim. Mrs. Gamon had reservations about touch-up painting or inpainting the blemished areas because several years ago in an upstairs bedroom new blue touch-up paint which was applied to the trim did not precisely match the old. Every time a professional photographed the room, the flash brought out the color difference between them. This

apparent color variation is what color and appearance professionals call metamerism. To avoid that problem again she wanted to completely repaint the front parlor's trim.

In turn, I suggested that she opt for a more high-tech approach to resolving the problem. I explained that with my portable spectrophotometer we could measure the color of the paint in situ and have a paint manufacturer make a new paint to precisely match — in all light sources — the existing paint and use it to touch up or inpaint only the blemished areas and consequently eliminate the expense of repainting the whole room. She agreed.

This spectral data was measured and collected from the 1976 restoration paint in the Peter Wentz House parlor using our portable spectrophotometer and SpectroStart™ quality control software, courtesy of X-Rite® Corporation. The 16 point reference values are plotted on the graph to give this color curve, which is a fingerprint of the 1976 yellow ochre paint on the trim. This is all that PPG Industries needed to make a new paint precisely matched to the old.



Measuring the Old....Making the New

In the parlor we measured the ochre trim paint with the spectrophotometer and the associated computer software package to obtain the necessary color information (called spectral data). The whole process took less than 30 minutes. We telephoned the spectral data into the technical labs of the paint manufacturer that we selected to work with us. Using their bench top spectrophotometer and their computer formulation software they generated a formula to tint a paint that exactly matched the Wentz parlor paint in all illumination sources. This is called a nonmetameric match. On the chair rail in the parlor we applied the paint to the blemished section. After a two-day drying period we could not discern any differences at all in the color and appearance. It was a perfect match.

If you remember that the paint lab never saw a sample of the original color (they only saw the spectral data measured by the spectrophotometer) you can begin to appreciate the state of the art in spectrophotometry and computer color matching today and the incredible cost savings that this type of application can offer museum, conservation and associated fields. (Elizabeth Gamon can be reached at the Peter Wentz House at 610-584-5104).

The Peter Wentz House
in Worcester, PA

Several areas of the yellow ochre colored trim in the parlor, restored in 1976, were blemished and dirty. Instead of repainting the entire room we used spectrophotometry and computer formulation software to make a new paint for in-painting. We achieved a perfect color match.



COLOR PRODUCTS AND SERVICES EXPAND

Be Consistent When Identifying Colors

It is very important to think ahead and to be consistent in the way you identify your colors in reports and in specifications. Color references that use both scientific and non-scientific color systems should not be inter-mixed in the same report or specification. For example: a report or specification should not identify one color by Munsell notation, another color by Plochere, and another by Benjamin Moore, etc. Send us your color samples, even if they are ones that you have made yourself, and have us read them with our spectrophotometer. We will give you scientifically accepted reference values. It is essential to scientifically describe where your color is within color space so a paint company or fabricator can match it precisely, both now and five, ten or even twenty years from now.

Use L* a* b* and Munsell

As described in *Finish Notes*™ #2, Fall 1993, Supplement #1, the most widely used color system in use today is the CIE LAB, L* a* b* mathematical color system. The L* a* b* reference values can be converted, using computer software, to an equivalent Munsell Color System notation. Either Munsell or L* a* b*, but preferably both, reference values should be used to document all colors. This is now standard procedure in all our reports and specifications. We use both because oftentimes government agencies still require that all colors be identified, meaning matched, according to the Munsell Color System.

Bear in mind that matching to the Munsell Color System does not mean that the actual color sample has to be a Munsell color card. Anyone's color cards can be used. It simply means that the color match must be referenced to the Munsell system of color notation.

We have provided analytical and color system conversion services to a number of restoration professionals who mailed their own color cards to us for measurement so they could be consistent and describe the colors in their reports with both CIE LAB and/or Munsell values. Your color sample can be as small as 1/2 inch, although we can measure a surface as small as 1/4 inch. The cost for each measurement — \$10.

Accurate and Economical: Custom Color Cards

We have built a custom color reference library which contains over 15,000 colors in addition to the 2700 color cards (samples) in the Munsell Color books. If you are looking for a color which is between those 2700, the chances are eight in 10 that we can help you locate exactly what you need. Using CIE-to-Munsell conversion software we can determine the Munsell color notation for any color you require. Simply send us the reference notation. We will search our extensive library and use the spectrophotometer to find your custom color.

We did just that for Philadelphia architect Hyman Myers, for one of his restoration projects in Newport, Rhode Island. We were able to provide him with five custom color samples overnight to use for a design meeting the next day.

Quality Assurance For Color Matching: Spec's and Certification

When colors are designated in a painting specification, generally the document simply says "match the color provided" and no details are given as to the quality of the matching and evaluation process. It is generally inferred that any lighting conditions will do and that if the match is somewhat visually close, that too will do.

But, for the architect and/or administrator of a restoration, the paint analysis project usually represents a considerable investment of time and resources. In order to benefit from the precision work of microanalyzing the historic finishes and their colors, it is imperative to guard that investment. Quality control is essential.

Color Matching Specifications Available

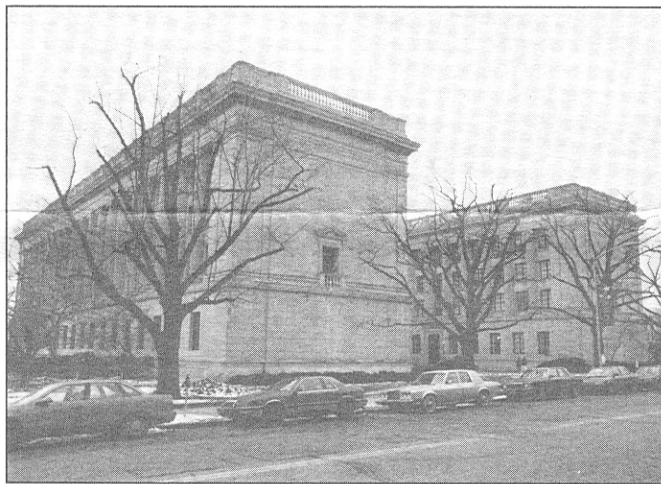
Specifications for color matching and subsequent evaluation guarantee consistency and accuracy in one of the most important elements of the entire painting project: color. A specification for color matching establishes the conditions of illumination and the methods which will be used for the assessment process.

To satisfy this void in the typical painting spec. we have written out in detail a complete specification for color matching following the CSI format for section 09900 — PAINTING. It is part of *Finish Notes*™, Spring, 1994, and is called Supplement #2. It is available upon request. Simply phone or fax and we will send it to you.

Reduce Conflict of Opinion...Get a Certificate of Color Match

A color matching specification also establishes a way to have all color evaluations reported on to certify accurate color matching — similar to any independent lab's certification of compliance. We have provided this Certification of Color Matching service to many projects over the past year. Among those receiving Certification of Color Matching service are:

- The Orangerie (1909) at Kykuit, the Rockefeller's home in Pocantico Hills, New York, supervised by Charles Granquist of The Rockefeller Brothers' Fund and by architect Herbert S. Newman, New Haven, Connecticut.
- The New Jersey State House Annex (1930), Trenton, New Jersey. Supervised by Architect Ann Weber of Ford Farewell Mills and Gatsch, Princeton, NJ.
- The Grange (1850s), Havertown, Pennsylvania. Supervised by John Milner Architect, Chadds Ford, PA.



New Jersey State House Annex (1930), Trenton, NJ. Fifteen paint color matches were made by Con-Lux paint company of Edison, NJ and submitted to us by architect Ann Weber from Ford Farewell Mills and Gatsch, Princeton, NJ, for our spectrophotometric measurement and visual assessment to obtain a Certification of Color Match. Initially 5 submittals were rejected because they were outside of the established tolerance limits. They were redone and re-submitted and subsequently certified.

Where Did The Adirondack Chair Come From

by Fred Clement

Everybody knows what an Adirondack Chair is. The angled, slat-backed chair dots lawns across the U.S. But strangely, nobody knows for sure where it originated. Tradition maintains that the chair was invented years ago somewhere in New York State's Adirondack Mountains. But there is no evidence to confirm that. Tradition then says that wealthy visitors to the sumptuous "Great Camps" on the North Country's post card-perfect lakes took home the chair and made it an American classic, familiar in all corners of the U.S.

My goal is to pinpoint where the chair was invented, identify its maker and prove — or disprove — that it was indeed first made in the Adirondacks. Frank Welsh is helping me do this.

By way of background, the Adirondack Chair did not pop up out of nowhere. It had a pedigree. Furniture experts agree that its forebear was the certifiably Adirondack "Westport Chair." This chair was first made in the village of Westport on Lake Champlain's western shore.

Adirondack Carpenter Harry C. Bunnell

It differed from the Adirondack Chair in that it used a single flat board for a chair back, not slats. Designed by Westport native Thomas Lee, the chair was patented by Lee's hunting buddy, a sometimes out-of-work carpenter (like many still in the Adirondacks). His name was Harry C. Bunnell. Bunnell manufactured a number of variations of the Westport Chair — a tete-a-tete, child's chair and one convertible to a rocker. Around 1930, he stopped making them. Forestry had dried up the supply of huge trees needed to make the wide, knot-free single-board backs. At about the same time, the furniture experts say, the Adirondack Chair made its debut.

My belief is that when Bunnell ran out of the right stuff to make Westport Chairs, he came up with one more variation — slats. This theory has a defect: There is no evidence that Bunnell ever made an Adirondack Chair. Besides, these chairs typically were made of pine or other soft woods, and their life spans were

limited. So if Bunnell ever made one, it was probably turned into firewood long ago.

Then recently I found two, both identifiable by Bunnell's unmistakable signature mark. The chairs' owner, a descendant of a well-known Adirondack family, couldn't believe they were not junk. He turned one into kindling before agreeing to lend me the other.

Microanalysis Reveals Green Stain & Mold

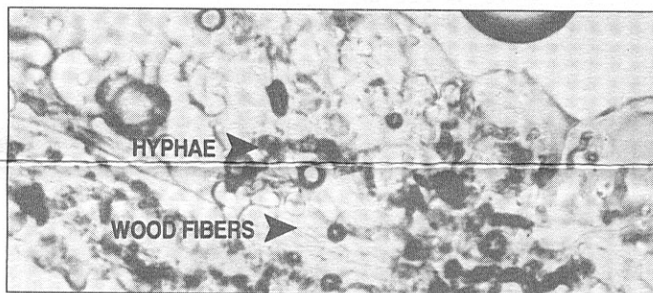
Frank Welsh examined it and documented its paint history. He found that it had three coatings. The two most recent (dark blue and light green) were paints. The original coating was not. Microchemical tests with bromocresol purple indicated an oil medium. The original coating was a very thin and translucent layer of dark green stain. Frank Welsh examined the green pigment using polarized light microscopy and found chrome yellow, Prussian blue and calcium carbonate. He took the samples out to Chicago to the McCrone Research Institute and where he examined the green stain with Kelly Silfies, operating the scanning electron microscope (SEM). The scan identified aluminum, silicon, lead, chromium and iron.

Interestingly, Frank determined that original Bunnell Westport Chairs were not painted either. This contradicted some of the literature about this chair. Frank analyzed one dated 1922. The original coating was oil, perhaps linseed oil, according to his analysis. He found no pigment particles. Instead, he and Dr. Walter C. McCrone found mold spores, segments joined together in snake-like branches called "hyphae." A kind of fungus, they appeared light yellow to dark brown, transparent to translucent, and now contribute to the chair's distinctive and characteristic brown color.

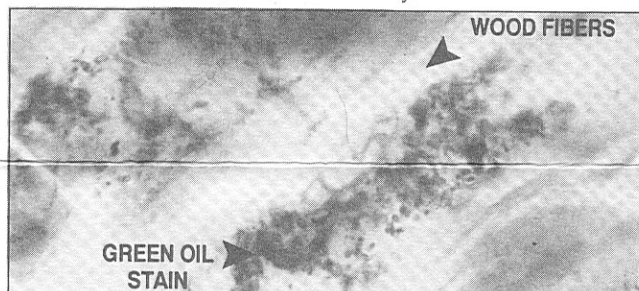
Frank's analyses revealed that Bunnell used his Westport Chair techniques on the Adirondack Chair, coating them with an eye toward exposing rather than hiding the natural wood grain. Certainly in appearance and coating treatment, the two chairs are similar. If Bunnell did make the very first Adirondack Chair, then the piece Frank analyzed may be the only evidence yet found capable of linking this American icon to its place of origin.

Fred Clement has an editorial services business in Rosemont, Pennsylvania and can be reached at 610-527-4707.

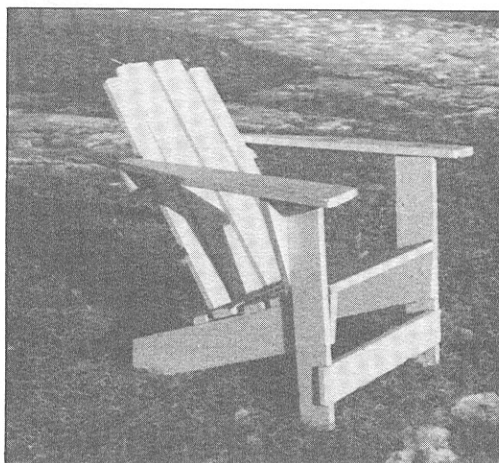
Photomicrograph of sample from 1922 Bunnell Westport Chair showing wood, oil coating, and small, dark, snake-like mold spore segments called hyphae.



Photomicrograph of sample from c. 1930s Bunnell Adirondack Chair showing wood fibers and a green oil stain tinted with chrome green which is made with Prussian blue and chrome yellow.



An original Bunnell Westport Chair (1922) that was coated originally with oil and has never been painted.



Later (c. 1930s) Bunnell Adirondack Chair was originally stained a dark green and in more recent times painted over with several layers of opaque paints.

Recommended For Art and Architectural Conservators

Reading

- Katlan, Alexander W., *American Artists' Materials Suppliers Directory, Nineteenth Century*, published by Noyes Press in 1987.
- Katlan, Alexander W., *American Artists' Materials, A Guide to Stretches, Panel, Millboards, and Stencil Marks*, published by Sound View Press in 1992.

We have both these invaluable references in our library. The conservator needing information on these subjects from the 19th and 20th centuries will find it here.

- *Paint in America*. The long awaited *Paint in America* manuscript is going to press and will be available for purchase in October, 1994. The publisher is Preservation Press.

The preface is by Roger W. Moss. The introduction is by Sara B. Chase. The contributing authors include: Abbott Lowell Cummings, Richard M. Candee, Ian C. Bristow, Roger W. Moss, Frank S. Welsh, Thomas H. Taylor, Nicholas A. Pappas, Matthew J. Mosca, Myron O. Stachiw, Christy Cunningham-Adams, Morgan W. Phillips, Andrea M. Gilmore, Eugene Farrell, Brian Powell and Richard Newman.

Meeting

- *Painted Wood Symposium*. The Wooden Artifacts Group of the American Institute for Conservation (AIC) is sponsoring a meeting this Fall on "Painted Wood: History and Conservation." It will be held November 12 - 14 in Williamsburg, Virginia. Conservators from around the country will gather to discuss the conservation of decoratively painted wooden artifacts within their cultural context. Carey Howlett is the symposium director. Call him for information at: 804-220-7076.

Quick Tips

Pin Holes Can Identify Latex Paints

Oftentimes when you plan to repaint you need to know whether your existing paint is oil or latex. This question is particularly relevant for repainting exteriors. A quick way to determine the difference is to get a good magnifying glass and carefully inspect the surface of the old paint film in several locations.

If you see a lot of pin holes in the surface that look like air bubbles were there and went pop, then chances are very high that you are looking at a latex paint. Water-based latexes can trap a lot of air when they are stirred and brushed on. When the paint film dries, that trapped air escapes and the paint film does not flow back together at the popped air bubbles so it leaves tell-tale pock-mark like scars.

Micro-FTIR Confirms

This quick method did not work though on the exterior paint from the Lancaster County Courthouse in Lancaster, Pennsylvania. We had to rely on micro-Fourier Transform Infrared Spectroscopy (FTIR) to confirm that the paint was an acrylic latex. In the process of our initial polarized light microscopical examination of the paint we noticed a fibrous mineral. Checking references and literature we identified it as Wollastonite, a white extender pigment which is often confused with asbestos.

Are you moving?

Please send us your new address so we can update our files and keep *Finish Notes*™ on schedule to you.

More On Lead Paint...

We received many comments and questions concerning our article on lead paint in our last issue. We felt the level of response warranted additional coverage in this issue.

Lead paint is a major issue outside of historic preservation—specifically with the paints and coatings industry. Have you heard of "Title X" — that's Title Ten? This is the common name for the new federal law on lead paint. Its official name is THE RESIDENTIAL LEAD-BASE PAINT HAZARD REDUCTION ACT OF 1992. There is an excellent article on this law in the May 1993 issue of *PCI, Paints & Coatings Industry* on pages 36 and 37.

To quote some of their points:

"...Title X gives the EPA until early 1994 to produce guidelines for controlling lead dust and worker exposure from renovation and remodeling activities. It also allows OSHA until mid 1993 to develop an interim standard for protecting construction workers from exposure.

...Title X also authorizes establishing a national laboratory certification program, so that labs analyzing materials for the presence of lead will have to demonstrate proper analytical techniques and quality assurance programs.

...Currently, most people performing lead inspections, designing lead abatement jobs, or doing abatement contracting do not have to be formally trained in this work, although a few states do have such a requirement. Title X sets up a national program, similar to the Model Accreditation Program developed in 1987 for dealing with asbestos in schools.

and finally...

...it is not hard to imagine how mandatory screening programs, new federal disclosure regulations and awareness programs under Title X and new state laws and regulations could lead to a substantial number of lead-related tort cases. Everyone involved in a lead related industry would do well to keep track of these developments and consult with counsel to engage in a preventative law program that can prevent or minimize future liability."

Planning your next paint analysis project? Don't forget the PAINTPAMPHLET™. This handy guide helps you take your own samples in step-by-step fashion. Then mail to us for lab analysis. Cost: \$5.

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. © July, 1994.

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