

**Title: Recent Studies on Modern Paints**

**Date: September 2013**

Gamblin Artists Colors is the only major colorhouse dedicated solely to oil painting, and our mission is to lead oil painting into the future. Bringing insights from the field of painting conservation to your palette is an important aspect of our work. The development of Gamvar Picture Varnish, Gamblin PVA Size and our FastMatte Alkyd Oil colors were all guided by our longstanding collaboration with conservation scientists.

In recent years the field of conservation has put considerable resources towards studying modern paints. Most of that effort has gone to study a range of issues and unknowns with acrylic emulsion paints. Other painting media, however, continue to be studied, including oil colors.



Two symposia have been held where scientific papers have been presented to share the research with the whole field of conservation. The first symposium, Modern Paints Uncovered (1), took place at the Tate Modern in May of 2006. The second, Issues in Contemporary Oil Paint, was held in the spring of this year in Amersfoort the Netherlands. I spoke and participated in the symposium this spring and want to give you a report on points of interest to contemporary painters.

Gate of Amersfoort, Photo: Catherine Gamblin



My talk was A Manufacturers Perspective on the Making of Color for Today's Painters.

It is relatively rare for a non scientist to be invited to speak at these conferences so I wanted to give them an appreciation of the challenges and advantages of being a paint maker today. I discussed a great range of topics from pigment particle size, to the wealth of color today for the artist, to the effect of the state of contemporary art education on art making, the cost of making fine materials, and many more subjects.

Photo: Catherine Gamblin

## Summary | Creating permanent paintings

In Amersfoort, scientists stated numerous times the importance of varnishing oil paintings to prevent many of the problems that aged oil paintings can exhibit. In fact most of the specific conservation issues related to the art works discussed in Amersfoort were on unvarnished modern paintings! Jay Krueger, head of painting conservation at the National Gallery, said it best and most directly: unvarnished paintings open the door to oxidized surfaces (color change and change in surface character), migration of materials to the surface (efflorescence), and dirt that sticks to the painting that can never be fully cleaned off. He said that much of the story of modern art is fragility from paint application and surface quality.

Since founding our colorhouse, we have refrained from telling you what to do. We have never wanted to put “rules” between you and your ideas. With that said, we have been talking about the importance of varnishing for 20 years now, encouraging artists to varnish their work unless they truly dislike the look. Though I was came to it reluctantly and got some push-back, I felt it was the right thing to do. And I felt better about it after the top conservation scientists opened the conference by underlining the importance of varnishing.

Two other important steps to consider are painting on rigid supports and a proper oil painting ground. This gives your painting a great foundation, and if you have chosen a panel as your support your painting will never crack from the flexing of the paint film.

One final area of study and advice is worth mentioning. When thinning oil colors, we recommend using a mixture of Gamsol and medium, rather than Gamsol alone. This not only creates a stronger, more flexible paint layer, but also helps avoid surface oxidation and other potential issues described by Jay Krueger.

We are most fortunate to be painting and paint making at this time in history. Conservation scientists are confirming that contemporary materials coupled with established painting techniques lead to the ultimate permanence in comparison to other media. There is just nothing more natural or enduring than oil painting.

## Some perspective on oils and acrylics

The goal of painting conservation is to restore aged or damaged paintings, as much as possible, to the artist’s original intent. This goal is complicated by the fact that as all paint films age there is at least a slight change in how colors and surfaces look. And with the newer mediums such as acrylics, we are just now learning the extent to which age related change can happen.

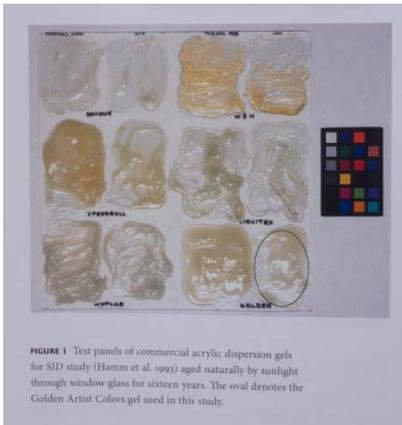


FIGURE 1 Test panels of commercial acrylic dispersion gels for SID study (Hamm et al. 1993) aged naturally by sunlight through window glass for sixteen years. The oval denotes the Golden Artist Colors gel used in this study.

I remember the 60's, when both acrylics and I were quite young, acrylic paints were **believed** by some artists to have none of the drawbacks of oils, i.e. dried fast, did not change color as they aged, did not crack....but the truth about acrylics has proven to be very different and much more complicated than that.

Through the papers delivered at the Modern Paints Uncovered, a great deal is revealed about acrylics. Acrylics major issues are a "tendency of acrylic emulsion paints to collect surface dirt, their propensity to adhere to adjacent surfaces, and the sensitivity of the mediums to water and solvents typically used in art conservation", (2) and "at cold temperatures acrylic films will shatter." (3) In addition, as described in various Golden technical bulletins (4), the acrylic medium

undergoes a color change, usually a yellowing, as it ages.

### It's dirt simple

In Amersfoort, *Issues in Contemporary Oil Paint*, the scientists stated numerous times the importance of varnishing oil paintings to prevent many of the problems that aged oil paintings can exhibit. One such problem is a simple one: dirt. Oil paintings aren't subjected to the same soot and dust that they were in centuries past. Yet the slow accumulation of dirt, particularly to textured works, remains a top problem for conservators and consideration for painters. Over time, this dirt becomes more difficult to remove and, in many cases, can never be fully removed.

Fortunately, there is a simple and reliable remedy: varnishing. Varnishing creates a surface less receptive to dirt. More importantly, our Gamvar Picture Varnish enables an artist or conservator to easily remove the varnish - along with any accumulation of dirt on top of it - with Gamsol. Gamsol will not dissolve underlying paint layers. After cleaning, the painting may be varnished again with Gamvar.

### Oxidation

Oxidation of a paint surface as it ages is important, but it is not something we think about as painters. It is something totally out of our control, and something that happens slowly over a long period of time. But here are some quotes from Jim Coddington, head of Conservation at MOMA that say it better than I can:

"The most important external cause of degradation (of a paint film) is usually the environment. Under natural or artificial conditions, light, oxygen from the air, temperature, and the relative humidity are continuously interacting with works of art and with any painted surface."

"The chemical aging of polymer paint can occur through oxidation and elimination reactions..."

"The physical behavior of paint changes accordingly, with increasing hardness, stress resistance, and embrittlement."

"Physical aging also develops in paint, affecting mainly its optical characteristics and mechanical properties..." (5)

As stated above by Jay Kruger, varnishing keeps much of the environment away from the paint surface greatly reducing the damage to the paint film that can happen from oxidation.

#### Water Sensitivity | Over-thinning of oil colors and absorbent grounds

Water sensitivity is the problem of color dissolving when touched by water on a swab such as in the cleaning process.

Anna Cooper, Courtauld Institute, reported that water sensitivity can be caused by a lack of binder. She reported on one Clifford Still painting painted on a highly absorbent ground. The ground sucked the oil out of the paint and the result is high water sensitivity. Why water sensitivity is important to the conservator is that in the cleaning process they want to use the mildest solvent possible to clean a painting. If water works to remove the dirt then that can be the best choice as a mild solvent.



In the light of this fact you should be aware that acrylic grounds are highly absorbent, and oil grounds are not. One of the things I brought up during my address is that I asked the science community to study the effect of the change, virtually overnight (30 years), that oil painting has gone through in terms of grounds. A few decades ago nearly 100% of oil paintings were being painted on oil grounds, and now my guess is that 97% are being painted on acrylic grounds. Not only do oil and acrylic age differently, but they differ greatly in their absorbency. This change of grounds may be significant; I will not trust an answer either way until our very talented scientists publish papers on this topic. So I personally have not been a convert to acrylic grounds. I am one of the 3% who use oil grounds.



Henk van Keulen, Netherlands Cultural Heritage Agency, and Maude Daudin-Schotte, freelance conservator, reported on experiments to clean unvarnished pictures that show both water and solvent sensitivity. This can happen when the artist “breaks” the binder by over diluting the paint with solvents. This is one of the issues conservators experience with works by painters such as Mark Rothko and Ad Reinhardt (6).

Mark Rothko, No.1 Untitled Red and Blue 1954

Also it was discussed by Klass Jan van den Berg, Netherlands Cultural Heritage Agency, that oil colors containing magnesium carbonate as an extender showed a high degree of water sensitivity. No Gamblin oil colors contain magnesium carbonate.

## Efflorescence | A clear answer



Fig. 1: SEM secondary electron image of the fatty acid efflorescence of sample from an oil painting by Ethel Walker, c.1925

Efflorescence on a painting is the deposit that results from the process of a growth of crystals on the surface. There can be a number of causes or types of efflorescence, not all of which are completely understood by the conservation community. The long term and permanent solution to efflorescence is varnishing. Efflorescence is not a problem on varnished paintings.

Klass Jan discussed the possibility of efflorescence being caused by free fatty acids in oil paints and by the use of stearates as a stabilizer.

The issue of efflorescence on oil paintings was discussed by a number of other speakers: Jay Krueger, and Aviva Burnstock and Alysia Sawicka, both from the Courtauld Institute. Acrylics are sensitive to a similar phenomenon when the surfactant in the paint accumulates on the surface (6).

The problem of efflorescence in oils is relatively unpredictable: In some colors, in some instances, fatty acids or stearate comes out of the paint film and accumulates as salts on the surface in small whitish crystals. These crystals can be easily removed by dry brushing or a mild solvent. But they may come back.

## Zinc Oxide

Gillian Osmond, Queensland Art Gallery Gallery of Modern Art, reported on the dangers of the overuse of zinc oxide. The contribution of zinc oxide to brittleness in paintings has been known for many years.

As an aside, Marion Mecklinberg did the initial research at the Smithsonian's SCRME in the 90's on zinc oxide and brittleness in oil paint films. When he released his findings related to zinc oxide we consulted with him and lowered the levels of zinc oxide in the few colors that contained it to levels well below those recommended by Mecklinberg. Zinc White, however, remains zinc oxide of course.

Gillian's work gave insight into the cause of this brittleness. Briefly, zinc oxide can cause the formation of zinc soaps which can accumulate between paint layers and increase the potential for cracking.

Zinc White remains a valuable color for use in glazing and scumbling. But we recommend using a good deal of medium with Zinc White in these techniques. We do not recommend using Zinc White as the primary white when painting on flexible supports such as stretched canvas.

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All in all it is interesting to note that oil colors, while they can have age related issues, those issues are no worse than the age related changes of acrylics. Perhaps the biggest problems with aged oil

paintings are the cracking that comes from mistreating oil paintings, and yellowing that can come from some resins used as varnishes (Gamvar does not have these problems).

The issues of oil painting are certainly no worse than the insolvable problems of acrylic paintings attracting dirt and dust, their sensitivity to water and solvents that would be used to clean them, and their great sensitivity to cracking in the cold if moved or dropped. I only mention this because this understanding of how acrylics age is new information to most artists.

Acrylics do not age any better or worse than oils. They age differently. We have to make this conservative statement at this time. But we should keep in mind that after 550 years we truly know how an oil painting ages and the stresses that it undergoes. In 100 more years the story about acrylics might be quite different.

In this age of instant gratification and disposability, why this fixation on permanence? It is one of the ideas about oil painting that is most important to me as your paint maker...that you can make a painting with our materials using sound technique and your statement will be in the world, as you intended for hundreds of years.

Robert Gamblin



Image Robert Speaking at Amersfoort

Photo: Louise Wijnberg

#### References:

- 1 Modern Paints Uncovered, Proceedings from the Modern Paints Uncovered Symposium

By Thomas Learner, Patricia Smithen, Jay W. Krueger and Michael R. Schilling

Getty Publications

This collection of papers is now available through Amazon.

2 Modern Paints Uncovered

From Formulation to Finished Product: Causes and Potential Cures for Conservation Concern in Acrylic emulsion Paints.

James Hayes, Mark Golden, and Gregory D. Smith

3 Modern Paints Uncovered

Modern Paints, Conservation of  
James Coddington

4 Just Paint Issue 23

5 Modern Paints Uncovered

The Macro-and Micro assessment of Physical and Aging Properties of Modern Paints.

Oscal Chiantore and Dominique Scalarone

6 Modern Paints Uncovered

Laser Cleaning of a Study Painting by Ad Reinhardt and the Analysis/Assessment of the Surface after Treatment

Carol Stingari, Christopher W. McGlinchey, Kristalia Melessanaki, Sjoerd Postma, and Corey D'Augustine