Gamblin Studio Notes

Studio Safety and Artists' Pigments #13

Understanding proper use of painting solvents and contemporary painting mediums is the number one key to working in safe studios. While toxicity of solvents and mediums is critically important for oil painters, I would like to focus this issue of the "Gamblin Studio Notes" on artist's pigments.

After talking with painters for 25 years, I realized that artists can oversimplify "art hazards." Many believe that "oil paints are hazardous and acrylic paints are not hazardous." I always respond: **I would eat any color in oil before I would eat that same color in acrylic.**

Think about this: Ultramarine Blue oil color is made from ultramarine blue pigment (complex silicate of sodium & aluminum PB29) ground into vegetable oil (linseed oil, poppy oil or safflower oil). Ultramarine Blue acrylic color is made from the same ultramarine blue pigment ground into plastic. The linseed oil is a component in my dog's food; the plastic is what the dog dish is made from!

So color for color, the pigments used in artists' colors are not necessarily hazardous. Linseed oil is naturally occurring vegetable oil. Perhaps because acrylic paints can be diluted with water, artists think using them is safer (of course, not for the environment. I do not recommend artists wash any materials down the drain).

But no doubt, water is much safer than solvents. This is why my concerns for studio safety have always focused on solvents. By using Gamsol and other high quality brands of odorless mineral spirits, artists can reduce their exposure to solvent to levels that are permissible and still enjoy the pleasure and challenge of working with oil colors.

Historically, painters have been exposed to much higher levels of toxic pigments than painters today.

Lead based pigments:
The root of the simplistic notion that "oil paints are hazardous" comes from the use of lead based pigments. Until the 20th century, lead whites (Flake White, Cremnitz White) were the only white pigments available that were reasonably opaque and with which artists could create impasto. In the 1800's, Zinc oxide pigment was first ground into oil. But because of Zinc's transparency and tendency to dry slowly, it was not a good replacement for lead white. So lead white continued to dominate oil painting until the mid 1920's when non-toxic Titanium White (titanium dioxide pigment) began to take over the palette. (Click here for a comparison chart of artists grade whites.)

Some artists continue to use lead white because of its interesting working properties. Lead whites, in general, are characterized by

- a heavy texture,
- slightly warm color,
- more opalescent than opaque in thin applications.

This last point is why lead white is most valuable in portrait painting. As the light on a figure slides off the highlight into the shadow, the opalescence of lead white paint allows the under painting to be skillfully revealed as a halftone.

Titanium (titanium dioxide) White is the most reflective pigment

- 97.5% of available light that reaches the pigment is reflected,
- most opaque white oil paint,
- a lighter more buttery paste than lead,
- the most brilliant of the white pigments.

Working with portrait painters, and a few others, who wanted a nontoxic option to lead white, I painted with lead white for a few years. I came to appreciate its unique working properties. Over the course of the next few years, I formulated Flake White Replacement

- a heavy dense paste,
- very lean—a good under painting color,
- slightly warm in color,
- nontoxic,
- less opaque and more opalescent than Titanium.

In addition to white lead, lead based compounds were the base of a number of warm colors on artists' palettes such as Lead Tin Yellow, Chrome Yellows and Red Lead.

Most of these colors were made obsolete by the creation of Cadmium Yellow in the latter part of the 19th century. Because Cadmium Yellow pigments were more expensive, they did not completely push lead based yellows off most palettes until mid 20th century. Today it is nearly impossible to find Chrome Yellow in any manufacturer's line of color. The Cadmiums are just as opaque, possess a much cleaner color, and have a much lower level of toxicity.

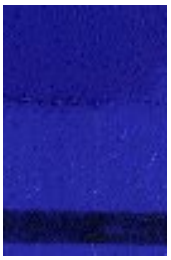
Cadmium pigments:
In the hundred years since their first manufacture, cadmium pigments now have a very low level of bio-available cadmium metal in their chemical composition. Unfortunately, many painters still consider Cadmium artists' colors highly toxic. If Cadmium pigments were made from cadmium metal they would indeed be highly toxic. Cadmium pigments are actually made from cadmium compounded with sulfur for the Cadmium yellows (sulfur and zinc for Cadmium Lemon and Cadmium Yellow Light). To make Cadmium reds and Cadmium oranges, cadmium is compounded with sulfur and selenium.

American manufacturers of cadmium pigments have developed production systems that yield cadmium pigments that are relatively insoluble in the human digestive system. They have been so successful that Gamblin Cadmium oil colors DO NOT REQUIRE an ASTM health-warning label for ingestion. Over 25 years ago when I first started making oil colors, cadmium pigments were much more soluble in the human system than they are now. Cadmium pigments contained about 1000 parts per million (PPM) bio available cadmium. Now cadmium pigments that I choose to make Gamblin Artists Colors contain only about 5 PPM cadmium that can be absorbed through ingestion.

European brands sometimes carry health warning labels if the Cadmium pigments used come from a factory that cannot meet these standards.

Cadmium pigments remain hazardous if they are inhaled. I recommend you use NIOSH dust respirator if you sand surfaces made with a high percentage of Cadmium colors. Inhalation exposure can also occur while making paint by hand grinding cadmium colors. **But there is no dust or fumes that come off paints from the tube.**


Cobalt Pigments:
The only color in our line that carries a health-warning label is Cobalt Violet. The pigment is a compound of cobalt and phosphate. If you eat Cobalt Violet, you can expect cobalt to enter you body. It is safe to touch and to paint with, but not to eat.


Cobalt Blue is a compound of cobalt and aluminum. Cobalt Green is a compound of cobalt and zinc. Oil colors made from these compounds do not carry health-warning labels because the cobalt cannot be readily absorbed into the body. Just like when using Cadmiums, artists should not inhale the dust from cobalt pigments.

Arsenic Pigments:
Emerald Green was one of the few colors based on arsenic. Copper aceto-arsenite, known as Schweinfurt Green, Paris Green, or Emerald Green is highly toxic. It was used most commonly as a rat poison in city sewers.

Emerald Green, an important color for the Impressionists, was lost to artists solely because of its toxicity. Emerald Green was their truest cleanest green of the 19th century. No other green lightfast pigments of high chroma were available to painters until Phthalo Green was first made before World War II. Emerald Green was brighter than most greens so the color was used in spite of its toxicity.

The Impressionists used three greens:

- Emerald Green,
- Viridian,
- Prussian Green (mix of Prussian Blue and chrome yellow).



The arsenic-based Emerald Green should not be confused with Viridian. In some painting books, Viridian is referred to as Emerald Green. Viridian is made from nontoxic hydrated chromium oxide.

Emerald Green was discontinued by World War I. As a contemporary landscape painter, I never knew about Emerald Green. So I never missed the color on my palette. When Ross Merrill and I recreated an Impressionists palette using contemporary oil colors for our "Lessons from the Impressionists" workshop, I realized the only color missing was Emerald Green. Most of the Impressionists' colors are still in use. For the few colors that have been discontinued, we have excellent substitutions. We absolutely had to have Emerald Green!

The Smithsonian Institution had sent me a pigment sample of Emerald Green to formulate into oil color in 1989. I had a draw down of the color plus a small sample of pigment. By playing with color, I recognized that I could make a close copy based on Titanium White and Phthalo Green. When I decided to add seven new colors to the Gamblin palette this year, I went to work to make an exact copy of Emerald Green. Gamblin Emerald Green matches qualities of the original without any toxicity.

Manganese Pigments:
The toxicity of manganese is much lower than the metals previously discussed in this newsletter. Still as paintmakers we handled Manganese Blue pigment with caution. One day in early 1990's, I ordered more manganese blue (barium magnate) pigment and found out that it was no longer available.

This color is no longer being manufactured because the art artists.grade.oils industry was the last consumer of the pigment. As an industry, our use of pigments is too small to keep a pigment alive. Because barium magnate had no industrial customers, they decided not to go to the expense of retrofitting their factory to eliminate the toxic waste bi-products from the manufacturing process.

Manganese Blue was unique. It was the coldest (shifted to green) cleanest blue. The color is like a breath of fresh air next to Ultramarine (which looks downright purple next to it.) It was transparent with a beautiful clean transparency.

Copying a color and getting all of the characteristics to match can be a long and difficult process. You might easily match the mass tone but the tint will be off or the tint is right but the transparency is wrong. Of the colors I have formulated to match historical colors, I am most proud of Gamblin Manganese Blue Hue.

The "Hue" designation can cause some confusion. "Hue" means the color has been recreated with different pigments. Gamblin Manganese Blue Hue or Naples Yellow Hue are called hues because the original pigment has limited availability. For some discontinued pigments such as Indian Yellow and Emerald Green, the original pigments used to make the colors are no longer available. So we can drop the "Hue" designation.

Gamblin Artists Colors' palette includes a few additional "hue" colors:

- Naples Yellow Hue and Flake White Replacement. We have decided that lead pigment is too toxic for Gamblin workers to handle safely.
- Cerulean Blue Hue. Cerulean Blue Hue has a mass tone only match as a lower cost option for those who want an opaque blue in a series 2 color. Cerulean Blue costs $22.63 per 37 ml tube. Cerulean Blue Hue costs $9.77 per 37 ml tube.

Last Notes:
Because the art artists.grade.oils industry is perhaps the second most regulated in America, you can easily know which artists.grade.oils are hazardous by their Federal health warning labels on the packaging. ASTM (American Society of Testing and artists.grade.oils) wrote the health labeling standard adopted into Federal Law based on toxicology reports so consumers can easily recognize artists.grade.oils that may put their health at risk.

Look for this language on the label:
"Health Label conforms to ASTM D-4236."

If there are any hazards associated with the material they will be stated. No warnings, no problem.

Artists no longer have to wonder or worry. They also do not have to rely on out of date or wrong information from others. All you need to know is printed on the label!

If you have any further questions about studio safety and artists' pigments,
please feel free to contact us.

Sincerely,

Robert Gamblin

Thank you very much for your interest in our Gamblin Studio Notes.
If you are interested in sharing your impressions about Gamblin Artist's Colors,
please visit our **Gamblin Artist's Survey**

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