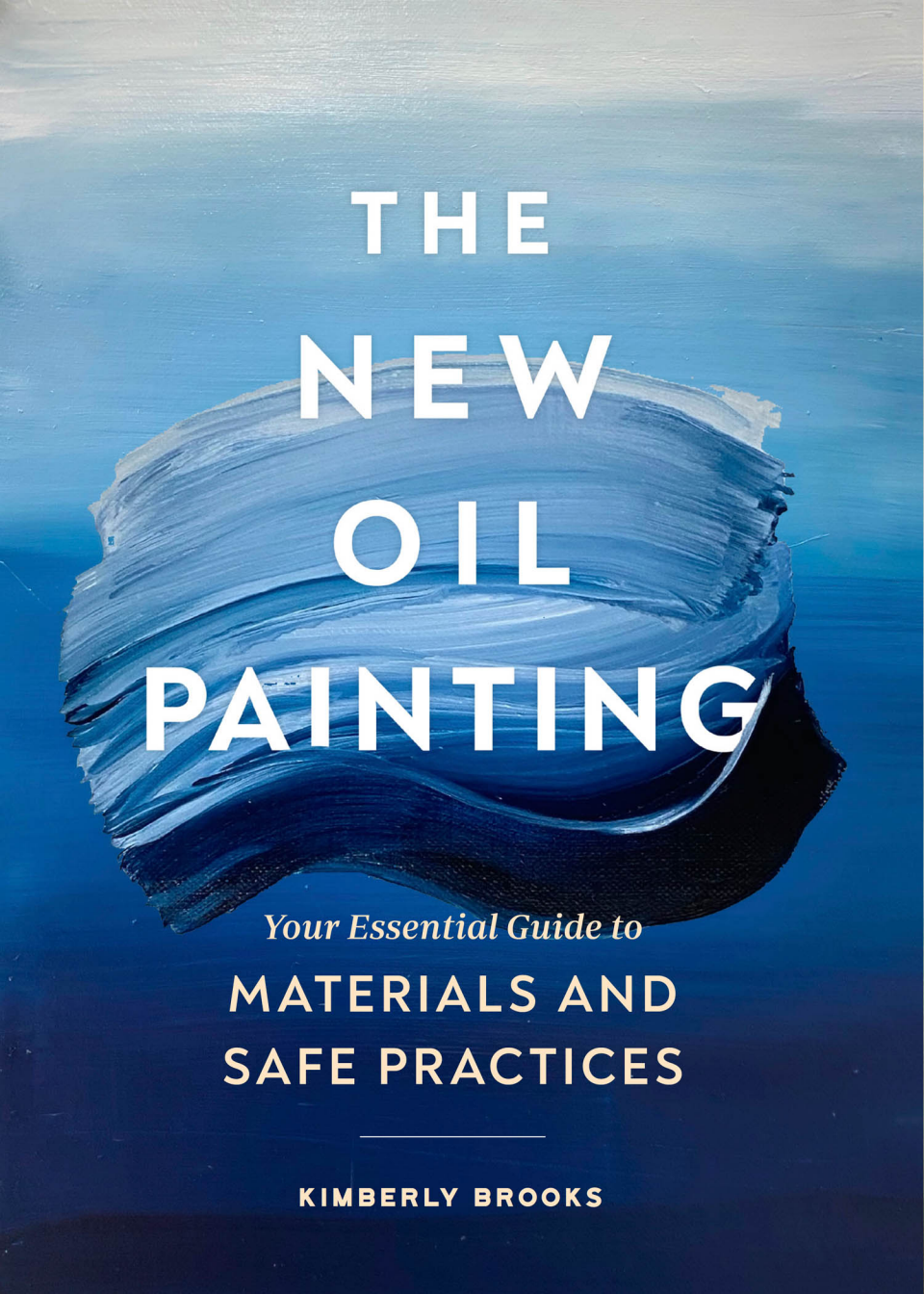
THE
NEW
OIL
PAINTING
Your Essential Guide to
MATERIALS AND
SAFE PRACTICES
KIMBERLY BROOKS

THE NEW OIL PAINTING

Your Essential Guide to

MATERIALS AND SAFE PRACTICES

KIMBERLY BROOKS

CHRONICLE BOOKS
SAN FRANCISCO

To my students, all artists, and anyone who has ever felt the urge to paint.

See Newoilpaintingbook.com/extra to access supplementary videos for this book.

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Painting is like a thread that runs through all the reasons for all the other things that make one's life.

—GEORGIA O'KEEFFE

There is no science without fancy and no art without fact.

—VLADIMIR NABOKOV

INTRODUCTION

What, you must be wondering, could possibly be new about oil painting?

What could be new about this centuries-old art that requires no screen or electricity to make or enjoy? What could be new about a medium so seductive that many who try it just once will decide instantly that it is how they want to spend the rest of their lives?

Too many oil painters don't really know much about the materials they're using or why they're using them. They assume they need paint, canvas, linseed oil, and some kind of solvent to thin the paint. Too often, selecting the right materials is a hit-or-miss proposition. Some experiment with the oddly named items on the shelves. Many artists intuit which colors and mediums to use and eventually learn only by trial and error. That's about it.

I remember the first time I ever painted in oil as if it were yesterday. Already an avid artist who had worked with pencil, pen, and watercolor and had dabbled in acrylics, I was initially hesitant to use the medium for two reasons. First, I put it on a pedestal, as if one needed special

permission to try it. Second, I knew it involved materials that were somehow dangerous. But I couldn't resist and did it anyway. And as soon as I did, I knew that I would be using this medium for the rest of my life.

After twenty-five years, I revere the medium even more, but regarding solvents, I only wish I had known then what I know now.

The pigments in paints are the same regardless of medium, whether oil, watercolor, gouache, pastel, or acrylic. Oil paint is not inherently dangerous unless ingested. I could also argue that using oil paint might even be better for the environment as it will less likely end up being washed down the drain, which is so often the case with water-friendly mediums. The problem is that so many people have been taught that in order to paint with oil, they need solvent, both to thin the paint and to clean the brushes. Only they don't.

WHY DO PEOPLE THINK THEY NEED SOLVENTS?

There are so many reasons. Misconceptions about the "lost techniques of the old masters" contributed. One of those supposed lost techniques was adding resins for glazing, a unique feature of oil painting that allows the artist to put one translucent layer of color over another. Resins, such as damar, come in the form of crystals and require solvents to dissolve them. Beginning in the nineteenth century, incorporating resins (tacky, shiny, fast-drying additives) had become *de rigueur*. And now solvents are too often

incorrectly considered vital to thin oil paint regardless of whether or not resins are present.

After years of research and experimentation; consultations with modern experts, chemists, and conservators; and investigations of the methods of many painters who lived hundreds of years ago, I learned and confirmed that commonly used stearates, driers, solvents, and resins are unnecessary. More importantly, they're not good for us.

The New Oil Painting connects artists with the materials they use every day, the ones they should avoid, and the ones they should consider. Giving artists the sunlight of modern science will only help them become even better painters.

The New Oil Painting is not about technique. It is not about art history, composition, or how to make a sunset glow. It is about all the things we *use* to make the magic happen. It is both a reference manual and a survival guide, intended for experienced oil painters and for new painters who are approaching the art for the first time. I draw equally from ancient manuscripts, modern chemistry, and the history of materials, and show how things have changed and stayed the same.

HOW THIS BOOK IS ORGANIZED

The first part of the book, "Understanding Your Materials," covers the history, chemistry, and properties of pigments and mediums; explores the tools the artist needs to obtain (both in and beyond art stores) for oil painting; and includes

some of the great manufacturers making materials today. In the chapter on mediums, I disclose the radically simple ingredients needed to make your own mediums and steps to take for avoiding exposure to harmful solvents.

The second part, "Best Practices," is a collection of basic steps, both physical and mental, to help artists adopt methods when painting, designed to aid them in their reduction of solvents. Topics include mixing colors, thinking in three dimensions, cleaning brushes, and toning a canvas. I address the questions I'm most frequently asked by my students.

I am grateful to be living in this new, enlightened era of oil painting, where the science and the history of what we use illuminates and elevates the art we make.

The switch to solvent-free oil painting has been life-changing for me and everyone I know who has made the conversion. When I walk into my studio—or even a classroom with ten oil painters and one window—I'm no longer confronted by the overwhelming odor of solvents. Instead I only smell the aroma of someone's coffee.

I am thrilled to shed light on and share with you this safer, simpler, and more ancient way to paint. And I hope to empower *anyone* to mix their own mediums, avoid harmful fumes, live longer, and create more art.

KIMBERLY BROOKS

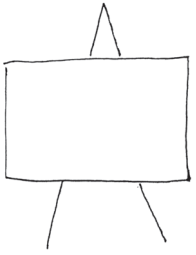
LOS ANGELES, 2020

For information about my art, workshops, and other offerings, visit Kimberlybrooks.com.

PART 1

UNDERSTANDING YOUR MATERIALS

YOUR SPACE



Claiming a space of your own to paint is the first step.

Whether it's a spacious warehouse or a corner of your living room, find a space to set up your studio. It should be a place where you can go regularly. The goal is to have a frictionless experience, one that will allow you to walk in and quickly get to work.

If you're just starting out, any space will do. You can start with just an easel and a nearby table to set your palette, brushes, and paints on. Using safe and best practices means your studio will have no solvents or toxic smells, so it can be right in the heart of your home. Natural light is ideal but not essential. My own studio has skylights and French doors that open to a small garden, as well as a sink, a radio, and an old wooden

desk. I mix my paints on a large turquoise table with a thick piece of glass for a palette.

When selecting an easel, you have many options, ranging from heavy easels with all the bells and whistles to more affordable, thin, collapsible aluminum tripods with a simple ledge for your brushes and a clamp for the canvas top. Or, like me, you can skip the easel entirely: I hang canvases or panels directly on the wall instead. Not only does it save space, but it also allows me to paint more with my body, always moving backward and forward. It makes me feel bolder and less fussy.

In lieu of a hammer and nail, here are some easel options for you to consider:

EASELS

$

Stanrite #500 Aluminum Easel

Easels by Blick Studio

Creative Mark Table Easel

SoHo Urban Artist Lightweight Mahogany French Easel
(INCLUDES DRAWER)

Blick French Easel by Jullian
(INCLUDES DRAWER)

$$

Testrite “Superior” Studio Easel

The Dulce Easel

Creative Mark Mirage All Media Adjustable Studio Easel
(WITH WHEELS)

Da Vinci Multi-angle Convertible Easel

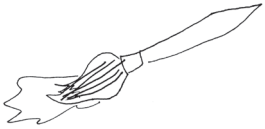
$$$

Santa Fe Easel

Halley Easel

University Easel

PAINT



What is paint? Paint, first and foremost, is magic. It is color encased in tiny metal tubes, waiting to be spread around a surface to create anything you wish. Like I said: *magic*. Some painters paint for years knowing little more than that—without an understanding of the chemical nature of paint. But a basic knowledge of this material (one you might well spend the rest of your life coaxing onto a surface) will greatly enrich your experience. What is in these tubes, exactly? Paint has three main components: pigment, binder, and often, additives.

PIGMENT

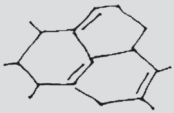
The part of paint we love, its color, is composed of pigments. Pigments are tiny rocks. Unlike dyes, pigments do not dissolve. They vary in density, chemical composition, size, and shape. Under a microscope, those tiny particles are either spherical, flat, round, or cylindrical. All these attributes subtly affect the way they behave under your brush. The same pigments are used in all paints—whether oil, acrylic, or gouache.

BINDER

A binder, sometimes referred to as a *vehicle*, holds the pigment and secures it in place, forming a film as it dries, not unlike how mortar holds bricks. The most common binder for oil paint is linseed oil. Other types of binders are used for different mediums. For example, gum arabic is used for watercolor, egg with water for egg tempera. The amount of oil needed for oil paint depends on the particle size and other characteristics of a given pigment, resulting in some colors requiring more binder than others.

ADDITIVES

Additives stabilize, thicken, and suspend the particles of pigment better in the binder. Historically, the original additive was beeswax. In the modern era, other additives such as aluminum stearate and barium sulfate were introduced, both of which lend a buttery texture to most paints made today. Outside of the tube, driers such as cobalt can be added, but these should be avoided as they are hard to dose and cause premature aging.



DRYING OILS

The oils used in oil painting are known as drying oils. They allow the paint to dry and harden over time. The primary drying oil used in oil painting is linseed from the flax plant. Linseed oil molecules contain long, spindly chains of carbon and hydrogen atoms, which are perfect for forming bonds and cross-linking as they harden; this process is called **polymerization**. Other drying oils include walnut, safflower, and poppy, which generally extend the drying time and don't create quite as strong a paint film as linseed oil because they have fewer double bonds.

Drying oils dry by a process called **oxidation**, whereby those long molecular chains absorb oxygen from the air. Oxidation is exothermic, meaning that, as an oil absorbs the oxygen atom, heat is released. This is why rags soaked in linseed oil, particularly boiled linseed oil, can spontaneously catch fire. Drying oils release no harmful fumes, nor are chemicals released as they oxidize. As drying oils oxidize, they increase in weight over time.

Oil paintings may feel dry to the touch after a few days, but they don't actually dry completely for one to two hundred years.

Not all oils are drying oils. For example, petroleum-based mineral oil ("baby oil") and olive oil hardly oxidize or dry at all. Linseed oil dries to the touch in three to ten days, whereas walnut, poppy, and safflower oils stay wet much longer. The nature of the different drying oils you will encounter while tinkering with mediums is essential to understanding safe practices.

Read more about linseed and drying oils in "Mediums."

A BRIEF HISTORY OF PIGMENTS

PREHISTORIC

Carbon Black

Yellow and Red Ochre
(IRON OXIDE)

Green Earth

Chalk
(CALCIUM CARBONATE;
SEE "MARBLE DUST" UNDER
"MEDIUMS")

EGYPTIAN
4000–300 BC

Lapis Lazuli
(LAZURITE)

Azurite

Egyptian Blue

Malachite

Orpiment

Cinnabar

Red Lakes

GREEK
500–100 BC

Chrysocolla

Verdigris

Red Lead

Vermilion

Sepia

Flake White

RENAISSANCE
1400–1700

Ultramarine
(PURE LAZURITE)

Lead-Tin Yellow

Naples Yellow

Indian Lake

Cochineal Lake
(FROM BUGS)

Umber

Sienna

INDUSTRIAL AGE
1700–1870

Prussian Blue

Ultramarine

Copper Arsenate

Lead Chromate

Zinc Oxide

Alizarin

MODERN AGE
1870–PRESENT

Azo
(HANSA YELLOW)

Cadmium pigments

Phthalocyanine Blue, Green

Titanium White
(DIOXIDE)

Quinacridone pigments

THE OIL REVOLUTION

The history of painting is very much the history of the discovery of different binders for the same pigments. Over thirty-five thousand years ago, the earliest painters used spit, dirt, and ash. After that came the wet plaster of fresco, examples of which date back to AD 200 to 600. Artists eventually discovered that pigment mixed with egg yolk or egg white made a fine combination called **egg tempera**. Egg tempera is a beautiful and vibrant medium but has some issues: It is porous and easily stained, and it dries so fast it often requires cross-hatching in order to blend colors. It also dries brittle, making solid surfaces like wood the only viable substrate.

Starting in the early Renaissance, sun-thickened linseed, walnut, and other drying oils were used as varnishes to protect paintings made using egg tempera. Painters started to notice something interesting. In addition to protecting the top layer, the shinier surface offered richer dark colors and enabled miraculous atmospheric effects through layering and **glazing** that could not be achieved with fresco and tempera. Furthermore, the oil made the paintings flexible, which meant that cloth could be used as a surface. Enraptured with the possibilities, craftsmen began to experiment with this flexible oil medium. While oil was used as a binder in paintings discovered in the Bamiyan caves of Afghanistan that date back as early as the eighth century, the technique really took off in Europe in the early 1400s. Since oil allowed painters to use a more flexible support, cloth substrates became popular, particularly for their portability, which was important for the monumental works created for patrons during that time.

OPACITY & TRANSLUCENCY

One of the most beguiling features of learning to paint is getting to know each pigment's characteristics, such as the degree to which it is transparent as it spreads across a surface. This quality is determined by the shape, size, and other properties of the pigment's particles. Each pigment falls on a scale between **transparent** (see-through) and opaque (fully covering, or not see-through). In general, smaller particle sizes offer more coverage, and different combinations of pigments create different degrees of **opacity**.

Opaque colors more easily obscure underlying colors. They are great for several techniques, including **scumbling**, which means either putting a lighter color over darker colors or blending pigments together with a dry brush. Opaque colors are essential for **alla prima** painting, wherein an artist makes a painting in one sitting, as well as **grisaille**, in which an artist creates a monochromatic form as an underpainting. Opaque pigments are also used for creating large, flat areas of color. Opaque colors can be made by mixing pigments together, as long as at least one of them is opaque.

Transparent colors feel oilier and are ideal for glazing colors on top of a lighter background. Transparent colors mixed together, but *not* mixed with any opaque colors, tend to darken and collapse into one another. The effect is like laying colored sheets of glass on top of one another, eventually turning the resulting color into something resembling black.

Manufacturers have devised four general categories of paint: opaque, semiopaque, semitransparent, and transparent. But I prefer to simplify the list into two categories—opaque and transparent—to focus on each pigment's primary characteristic. When I hand this list to my students, they act as if I've handed them a pile of gold.


OPAQUE & SEMIOPAQUE PAINTS

WHITES
Titanium White
Lead White

YELLOWS
Yellow Ochre
Naples Yellow
Chrome Yellow
Cadmium Yellow
Lemon Yellow
Jaune Brilliant
Nickel Titanium Yellow

REDS & ORANGES
Scarlet Lake
Cadmium Red
Cadmium Orange
Light Red
Venetian Red
Terra Rose
Vermilion
Indian Red
Red Ochre
Mars Red

GREENS
Chromium Green Oxide
Permanent Green
Cadmium Green
Burnt Green Earth
Chromium Oxide Green

BLUES
Cobalt Blue
Cerulean Blue

VIOLETS
Cadmium Purple
Mars Violet
Caput Mortuum Violet
Dioxazine Purple

BLACKS/BROWNS
Lamp Black
Mars Black
Peach Black

BROWNS
Van Dyke Brown
Burnt Umber
Raw Umber
Mars Brown
Brown Ochre


TRANSPARENT & SEMITRANSPARENT PAINTS

WHITES
Zinc White
Transparent White

YELLOWS
Raw Sienna
Indian Yellow
Hansa Yellow
Gold Green
Cobalt Yellow Lake
Transparent Gold Ochre

REDS & ORANGES
Permanent Rose
Permanent Crimson
Alizarin Crimson
Transparent Orange
Transparent Oxide Red
Rose Madder

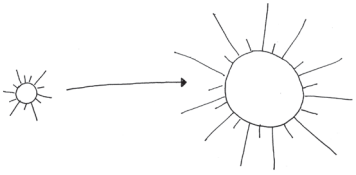
GREENS
Viridian Green
Terre Verte
Sap Green
Phthalocyanine Green

BLUES
Ultramarine Blue
Phthalocyanine Blue
Prussian Blue
Indigo Blue
Manganese Blue
Cobalt Blue

VIOLETS
Cobalt Violet
Manganese Violet
Carbazole Violet
Quinacridone Violet
Rose Doré
Dioxazine Purple
Ultramarine Violet

BLACKS & NEUTRALS
Ivory Black
Davy's Gray
Payne's Grey

BROWNS
Burnt Sienna
Raw Umber
Sepia
Brown Pink
Burnt Umber



PIGMENTS THROUGH THE AGES

If you were to view the entire history of painted artworks over time, the most distinct characteristic you would observe would be the transition of colors from natural to brighter to brightest. Then, if you were to shrink yourself to the atomic level and visit the same pigments, you would see a dramatic proliferation of carbon atoms. This was due to the rapid development of organic pigments in the nineteenth century.

When thinking about paints, instead of thinking of them as colors in tubes, think of them as physical substances in their own right. Let us start with their chemical properties. Pigments are either **organic** or **inorganic**. Inorganic pigments include natural salts and minerals extracted directly from the earth. They

are insoluble in solvents and have a full-shade tint, giving off many notes of colors. They may not be as bright as modern pigments, but they have more durability and are more opaque. Organic pigments, on the other hand, contain carbon atoms and are derived from a living organism, such as a plant, animal, or insect.

In addition to being either organic or inorganic, pigments are also either natural or **synthetic**. Naturally occurring pigments are found in nature, whereas synthetic pigments are created in a lab or via some human intervention, often by introducing additional compounds. For example, Lead White, produced by exposing lead metal to acetic acid until a white powder forms, is inorganic and synthetic. The original Rose Madder is natural and organic, from the root of the madder plant. Yellow Ochre is naturally occurring from the earth and therefore inorganic. Prussian Blue is made in a lab and one of the first modern, synthetic, organic pigments. While we still use many natural inorganic earth pigments today, we can attribute the general trend toward brightness to advancements in modern chemistry in the nineteenth century. These, in turn, were primarily driven by the textile and dye industries looking to create more colors at a lower cost.

In this section, I present three different types of pigments in order of their discovery: natural, mineral, and modern (Fig. 4, 5, 6). Please see the color section after Page 112 for visual references.

NATURAL PIGMENTS

Natural earth pigments are inorganic compounds that come from the earth and are ground, sifted, washed, and sometimes cooked. Most are iron oxides, semitransparent, and permanent. They have **hues** that mostly resemble what you see in nature. Since clay, **chalk**, and silica are present in varying degrees in different locations, true natural earth pigments are never exactly the same. They include ochres, siennas, and umbers (Fig. 1).

Natural organic pigments come from plants, insects, or animals but are rarely used today because they are **fugitive**, meaning that they fade over time. These include Indigo, extracted from the plant *Indigofera tinctoria* L. and fermented in vats; Sepia, a reddish-brown color derived from the ink sac of a cuttlefish; Indian Yellow from the urine of animals fed on turmeric or mango leaves; and Carmine Red from the cochineal bug. Almost all natural organic pigments have been replaced by modern, synthetic, organic versions, even though the pigment names are often the same when you find them in the art store.

MINERAL PIGMENTS

When metal tools were developed in the Bronze Age (1500 to 1000 BC), they allowed craftsmen to extract minerals in rock form. Mineral pigments are naturally occurring, inorganic, metallic salts. Their emergence in painting must have been thrilling to the patrons and craftsmen of the time—a shock wave on par with the much later transition from black-and-white to color photography.

Mineral pigments are brightly colored compounds. They have excellent body and lightfastness but are expensive to produce. In the Renaissance, they were so coveted that commissioning a painting often involved intense negotiations about the exact amount of mineral pigments the artist would use, based on what the patron could afford. Examples of natural, inorganic mineral pigments include Vermilion (from the mineral cinnabar), a bright orange red (from realgar), a brilliant yellow (from orpiment), a deep blue (from lapis lazuli), a pale blue (from azurite), and a green (from malachite) (Fig. 2).

MODERN PIGMENTS

I always hoped the origin story of modern pigments might be food-related, like the discovery of penicillin from the mold on cheese. But the development in the nineteenth century of modern, synthetic, mostly organic pigments involves petroleum and coal tar instead. Given that fossil fuels such as these are formed from the remains of organic matter, this makes perfect sense. Still, it's fun to imagine the delighted surprise of British chemist William Henry Perkin, who, while hunting for a synthetic quinine to treat malaria in 1856, accidentally discovered Mauveine, the first **aniline**-based, synthetic dye, instead.

Modern pigments exhibit brighter and more unusual colors than pigments seen in nature. Just think about that for a minute: We now visually experience colors brighter than any humans have ever seen before. Though the very small particles of synthetic pigments appear transparent under a microscope, they nevertheless have an incredibly high

tinting strength (relative to their inorganic counterparts) due to the sheer quantity that can be absorbed in oil. Modern organic pigments are in general less toxic, less expensive, and more permanent than the natural versions of the pigments whose names they often still bear.

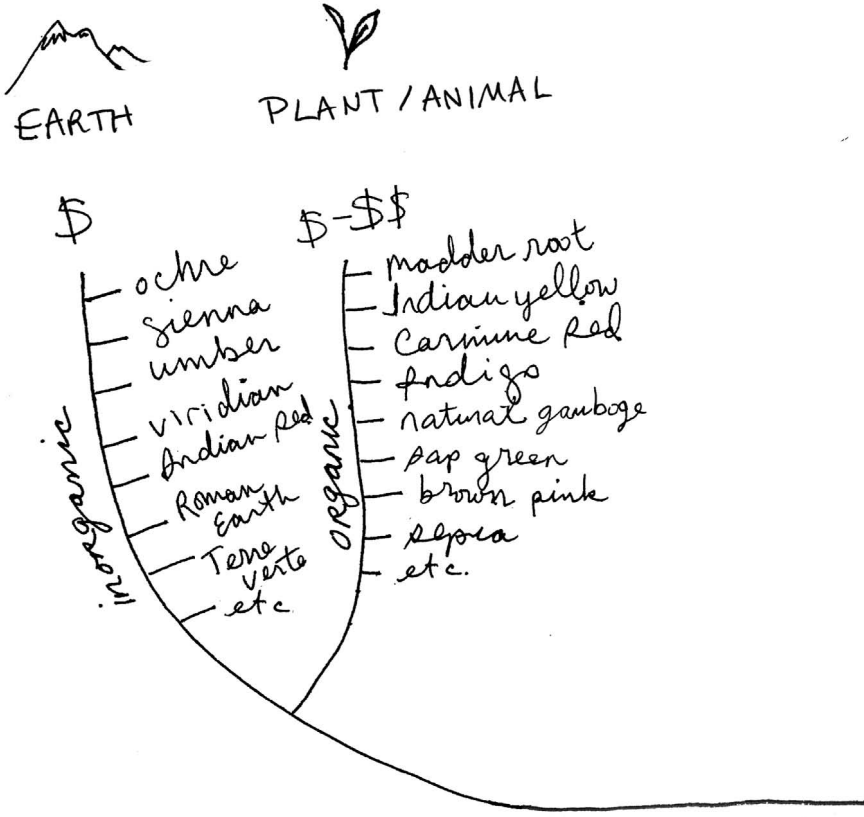
Modern pigments are not inferior because they're synthetic. But in some cases, revisiting the inorganic, original version is worthwhile. Consider Ultramarine Blue, a modern, organic pigment now considered a staple but so named because Europeans had to travel "over the sea" to acquire the gemstone lapis lazuli, which was mined in Afghanistan. While both the naturally occurring lapis lazuli and the synthetic, organic version now made in a lab contain silica, alumina, soda, and sulfur, the original mineral has a crystalline structure that gives greater depth and beauty than its oily, artificial, less-expensive counterpart. The difference between the full shade of the natural versus the one-note color of the synthetic is not unlike the difference between eating a banana versus something with artificial banana flavoring.

Meanwhile, never underestimate the tinting strength of an organic, synthetic pigment. Looking back, I could have saved so much time if an early instructor hadn't suggested that I **tone** my canvas with Phthalocyanine (Phthalo) Blue, a modern, organic blue so intense and dominating that I spent every future layer of paint trying to counteract it and feeling like a character in Dr. Seuss's *The Cat in the Hat Comes Back* who struggles to manage a pink bathtub ring as it spreads throughout the entire city (Fig. 3).

CHROMOPHORES

Color is created when light falls on a substance and the wavelengths that are not absorbed are reflected back into our eyes. Modern organic pigments have molecules called *chromophores*, in which a shifting cloud of electrons affects the absorption of certain wavelengths of light. Chromophores are unique to biological molecules, which have evolved to capture or detect light energy. White light—all the colors mixed together—shines onto the chromophore, and only the color that does not get absorbed makes it back out and into our eyes.

Chromophores contain double chemical bonds called *azo bridges* that vibrate like an instrument when hit by light—yielding a "note" of color, not unlike plucking the string of a cello. Without azo bridges, inorganic pigments offer a full-shade tint (thanks to their crystalline structure); organic pigments, in contrast, give off a pure, single color.


EARTH
PLANT / ANIMAL
$
$-$$
inorganic
ochre
sienna
umber
viridian
Indian red
Roman Earth
Terre verte
etc
organic
madder root
Indian yellow
Carmine Red
Indigo
natural gamboge
pap green
brown pink
sepia
etc.

MINERAL

$ - $$$$

- Cadmium Red. yellow
- Lazurite
- azurite
- Cerulean Blue
- malachite
- Cobalt Blue
- chromate
- lead white
- Manganese Blue
- Zinc White
- etc.

inorganic

PETROLEUM

$ - $$

- Napthol red
- ultramarine blue
- Alizarin Crimson
- Quinacridones
- Phthalo Blue
- Manganese Blue hue
- Sap Green
- Dioxazine
- Hansa yellow
- Prussian Blue
- etc.

modern organic

WHITES & BLACKS

WHITES

When it comes to oil painting, white deserves special attention. In other mediums, such as watercolor, artists often rely on the white of the paper or substrate for luminosity. But in oil painting, colors are often mixed with white (as well as with other colors, usually with the lightest colors on top), necessitating white paint as a permanent fixture of most oil palettes. The first white to make its appearance in painting was Lime White, or chalk (**$CaCO_3$**), which is still widely used today as an additive or medium but has virtually no tinting strength (meaning it is virtually transparent in oil and makes whatever it is mixed with partially or entirely see-through). It was not until Lead White made its grand debut that painting really got interesting (Fig. 7).

LEAD WHITE

A major breakthrough in painting over a thousand years ago, Lead White pigment was born from a beautiful luminescent powder made from lead carbonate. It is also called Flake White, referring to the way the white powder literally flakes off the lead metal during the creation process. In the **Dutch stack process**, coils of lead are submerged in pots containing acetic acid, then stacked in a shed surrounded by decomposing manure to create heat. The chemical reaction that produces the pigment occurs over many months. As a material for oil painting, Lead White is frankly sublime. It is permanent, not affected by light or humidity, and requires very little oil to create an unusually strong paint film. Lead White has reddish and yellow undertones and is ideal for warm highlights. It has a ropy quality and changes texture when agitated. This quality, known as **thixotropy**, makes Lead White wonderful to mix with other colors.

If this sounds too good to be true, Lead White certainly has its drawbacks. Lead poisoned the highborn of Rome who drank beverages cooked in lead vessels, and it ravaged the skin of Elizabeth I, who used it in cosmetics to enhance her porcelain complexion. Lead White is toxic to ingest or inhale. However, inhalation can only occur when the pigment is used in its powder form, something that is neither necessary nor possible when it is suspended in oil paint. It also blackens during prolonged exposure to sulfur, which was a real problem in the era of gas lamps in the nineteenth century. Lead house paint was banned in the 1960s, but thankfully lead artists' paints were not. Because of its complicated reputation, Lead White is not introduced in grade schools but is safe for people committed to not eating it, licking it, or inhaling dry particles of it. It remains an important artist material, and manufacturers still make it today.

ZINC WHITE

When Zinc White was discovered in the 1800s, it was at first embraced as an alternative to Lead White, but later it was found to create a brittle paint film and cause cracking. Zinc White was considered especially valuable for making tints with other colors. Zinc has a translucent, perfect white quality and has the effect of scattering tiny particles of thinly sliced mica. Despite these apparent advantages, Zinc White makes a rather brittle, dry paint film over time. The more we learn about zinc, the less it is recommended for painting. It is advised not to use it for an acrylic **ground**—a white paint layer typically applied on a surface that provides a barrier between the oil paint and the substrate (see "Ground" and "Sizing")—or to mix it with lead as an additive, as cracking will result.

TITANIUM WHITE

Titanium White, made of titanium dioxide (TiO_2), is a modern, synthetic, organic pigment that was embraced due to being not only more economical than Lead White but also nontoxic if ingested. Like all modern, organic pigments, it has an extremely high tinting strength, meaning that less is needed for the same lightening effect. It has a bluish undertone and is ideal for creating cool highlights.

MIXING TRANSPARENT HUES WITH WHITE

Be aware that mixing a transparent color with White, particularly Titanium White, will not bring about a paler version of the same hue but rather a whitened pastel version. For example, glazing Ultramarine Blue on a white surface will result in a brilliant blue, but if you mix Ultramarine with white, you will have an opaque pastel blue. Similarly, glazing Rose Madder or Alizarin Crimson on a white surface will render a brilliant pink but mixed with a white will create a color more like bubble gum.

BLACKS

If you ever want to make a majority of painters look guilty, ask them what they use for black. A few will announce a tried-and-true recipe. Many others will make sure no one is listening and then lean forward and say, "I use mine out of the tube." Black paint was once an integral part of a classical painter's palette, but the nineteenth-century impressionists all but banned it from their palettes in favor of capturing shadows and light as they are actually created—as variations on the natural refractions and combinations of the visible color spectrum. Ever since, artists have felt pressure to create blacks on the spot. The reasoning holds even more true today: The array of colors we have is head-spinning, and if you can create a color, especially a dark, out of two or three others, you will get an astonishing depth—almost a shimmering as the concentration of each color wavers in and out of focus. A common recipe for black is Burnt Sienna or Burnt Umber and Ultramarine Blue. I once created a painting that employed every type of black I had in a tube; some receded into the shadows, and others pushed forward. Here are the common black pigments out of the tube, should you choose to use them (Fig. 8).

IVORY BLACK

Ivory Black was originally made by slowly burning ivory or bone in hot ovens, but the modern, organic version requires no such measures. Ivory Black is semitransparent. It has a moderate tinting strength and is a good all-around mixing black, best for tinting. A version known as Vine Black was traditionally produced by charring dried grape vines, and Lamp Black was produced by collecting soot from oil lamps.

MARS BLACK

Mars Black is a synthetic iron oxide, not as black as Ivory Black but with three times the tinting strength. It overwhelms color mixtures but is useful when you want a strong, opaque black for large, flat areas or accents like those of the German impressionists.

CHROMATIC BLACK

Made by mixing two or three modern, organic colors, **Chromatic Black** is also available for purchase by some manufacturers. It is very intense black and is ideal for mixing with other transparent colors when you don't want to give up their transparency. You can mix your own by using variations of Phthalo Green, Alizarin Crimson or Quinacridone Red, and Ultramarine Blue.

VAN DYKE BROWN

Van Dyke Brown, named after the painter Anthony Van Dyck, is a semitransparent, warm brown/black. Commonly used in paintings by masters, including Rubens, Van Dyke Brown is made by combining asphalt-like black with iron oxide.

ROMAN EARTH BLACK

Roman Earth Black is a too-often-overlooked natural earth black that has warm undertones and is very permanent. It is a beautiful option for grisaille.

PAYNE'S GREY

Not really a black but worth mentioning here, Payne's Grey is named after William Payne, who painted watercolors in the late eighteenth century. The color was originally a mix of Prussian Blue, Yellow Ochre, and Crimson Lake but is now more often a mixture of Ultramarine or Phthalo Blue and Black and sometimes of Ultramarine and Burnt Sienna. It is great for storm clouds or cool shadows and is semitransparent.

TORRIT GREY

I think of pigments as their own kind of gold. I would never let a single swatch of color, no matter how small, go down a drain or end up in a landfill. Enter Torrit Grey, a marketing invention by Robert Gamblin, who in the 1990s, started collecting the fine dust that was accumulated in the similarly named Donaldson Torit air filtration system designed to protect workers involved with the machines that grind the pigments. Each year produces a different mixture of pigments, and the color Torrit Grey now has a following. Some artists even fetishize and covet certain years no less ardently than they would a rare French Burgundy. You can also make your own by never wasting a single drop of mixed paint. If you ever mix a color that isn't quite right or have leftover paint you don't need to save, make your own by using one of the many methods I offer to store used color. It also offers the perfect mysterious mixture with which to tone a canvas or create a grisaille.

VANTABLACK

A relatively new black that has created quite a stir is called Vantablack. Created by Surrey NanoSystems for use in the defense industry, this pigment is touted as having the ability to swallow light like a black hole. It is considered the blackest pigment ever created and would be fascinating to experiment with but for the fact that the company made an exclusive deal with the artist Anish Kapoor so that no other artist can use it. While we may be currently deprived, other companies, in defiance, are busy trying to create blacks that rival its intensity.

LAKES

While perusing brightly colored tubes of paint, newcomers to the art store might notice the common use of the word *lake* in color names and connect paints' oily and translucent nature with light reflecting off a body of water. But the term *lake* actually refers to an integral part of the pigment-making process: a technique used to make dyes bind to an insoluble salt.

The secret of organic, synthetic pigment lies in carbon's amazing ability to combine with itself in a great variety of atomic structures—chains, branches, and benzene rings—producing almost limitless molecular variations. The resulting brightly colored dye is then converted into a pigment by binding to an inert substrate—this is laking. The practice is not new. Pigments from the time of the Romans through the eighteenth century were laked onto **calcium carbonate** (chalk) or aluminum potassium sulfate. Modern synthetic, organic dyes are also sometimes laked onto chromium, iron, tin, or other metals to heighten the color of an inorganic pigment. Since the age of industrialization, over seven thousand organic dyes synthesized from coal tar and petrochemicals have been converted into pigments. The exceptions are Phthalocyanines and Quinacridones, which do not require laking and are also used in important printing inks.

Before I understood the history and chemical characteristics of pigments, I thought of different colors as having personalities. I even called certain natural earth pigments "the parents" because they were always on my palette and were the ones I grew to rely on the most. Only later did I discover that inorganic pigments are in fact needed to anchor modern synthetic, organic dye pigments.

IF I HAD A MAGIC WAND . . .

If I were in charge of introducing people to oil painting, aside from making them stop using solvents, I would encourage first-time painters to start with one dark, neutral color and white to help them focus on articulating form and dimension. I would then have them use only two colors for the same purpose (for example, Burnt Sienna and Ultramarine Blue) before engaging with more colors as they began to appear throughout history. I'd do this the same way that, if I were a tailor and teaching someone to sew, I would start out in cotton and focus on the silhouette—only later introducing wool and silk. Most new students want to start with the loudest modern, organic colors, but this can be a major distraction (not to mention leading to paintings you might need to view with a pair of sunglasses).

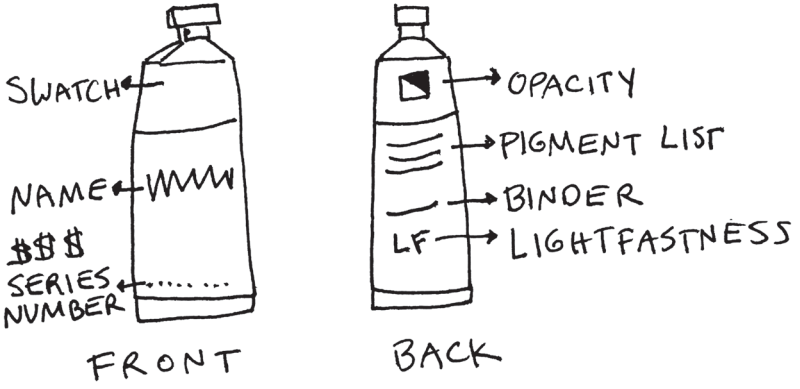
PAINTING & ALCHEMY

To appreciate the inner workings of an oil painter's mind, it helps to understand the connection between oil painting and alchemy. Alchemists engaged in a protoscientific practice that spanned over millennia and across many cultures, drawing from chemistry, mysticism, philosophy, and religion. In the early Renaissance, at the same time oil was played with as a medium, alchemists were in pursuit of *lapis philosophorum,* or the philosopher's stone, a legendary mystical substance that could turn lead into gold or produce the elixir of life that would lead to enlightenment or immortality.

Picture our painting ancestors in the same laboratory with the alchemists, tinkering with oils and earthen rock, working by candlelight. The alchemists combined earth compounds and oil and attempted to turn a slurry of manure, cement, or coal into gold. Alchemists begin with a **materia prima**, or *first matter*, a primitive, formless base. Artists likewise start with an **imprimatura**, an atmospheric chaos of color, by toning a canvas. Like the alchemist, artists also push, pull, and glaze with oil, earth, and semiprecious minerals, in pursuit of an image and a similar kind of transcendence. For an excellent book on this subject, see *What Painting Is*, by James Elkins.

HOW TO READ A PAINT TUBE

Every brand has a slightly different method of showing what is in each paint tube, but there are some consistent elements.



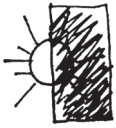
PIGMENT NAME & COLOR INDEX

Pigment names are the same across paint brands. Yellow Ochre is always Yellow Ochre; Burnt Umber is always Burnt Umber. When manufacturers use the word *hue*, it means they have approximated the color by combining different pigments. For example, Cerulean Blue Hue is often a combination of Phthalo Blue mixed with white to make something that approximates the color of Cerulean Blue without actually using Cerulean Blue pigment. The label will have a pigment list indicating the pigments used to create the hue.

The pigment name may also include a two-letter abbreviation. This is the color index. It refers to a sort of periodic table of pigments. You can find the complete list at www.artiscreation.com. The initial *P* stands for "pigment," *D* for "dye," and *S* for "solvent."

VEHICLE/BINDER

The vehicle describes what holds the paint particles together. This description generally always lists the oil binder (most commonly linseed oil but sometimes safflower or walnut oil) but may or may not list additives, driers, or fillers, such as barium sulfate, aluminum stearate, and chalk.

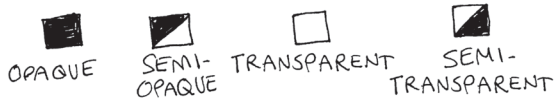


LIGHTFASTNESS

Lightfastness is the degree to which a pigment will fade when exposed to sunlight. Lightfastness ratings are based on the American Society for Testing and Materials (ASTM): ASTM I—excellent, little or no fading; ASTM II—very good, some fading; ASTM III or higher—not sufficient to be used in artists' paints. **Permanence** is an associated term that relates to a pigment's ability to continue existing in a given state. Pigments that fade are known as fugitive.

SERIES NUMBER

Paint series numbers are essentially a pricing strategy; paint prices reflect how expensive the color is to produce or reflect the rarity of the pigments. The lower the series number (Series 1, for example), the less expensive the paint. Certain colors are always in the same series number regardless of brand of paint. For example, Yellow Ochre paint tends to be Series 1, as it is a naturally occurring, inorganic pigment and not expensive to produce. On the other hand, Cobalt Blue paint is typically Series 4, regardless of brand or style of paint, because it is a more expensive color to produce.

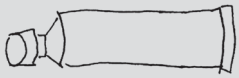


OPACITY/TRANSPARENCY

Although not required on the label, the opacity or transparency of a pigment will sometimes be listed, referenced by empty, filled, or partially filled squares, as shown in the illustration above. As you get familiar with the difference between inorganic and organic pigments, knowing their relative opacity or transparency will become second nature.

SEAL OF APPROVAL OR CAUTION

An *AP* in a circle at the bottom of the paint tube represents approval from the Arts and Creative Materials Institute (ACMI), whereas a *CL* in a circle refers to cautionary labeling, suggesting that chronic use is bad for you.



THE PAINT TUBE: A MIRACULOUS INVENTION

Over the centuries, the odyssey of how freshly mixed paint was preserved started with many improvised methods, all in pursuit of minimizing the drying oil's contact with oxygen lest it dry prematurely. Pig bladders were found to be useful. The painter could tie, squeeze, then retie the bladders for later reuse. As early as the seventeenth century, "colourmen" brought premixed bladders to the artists' studios. In 1841, John Goffe Rand, an American artist, invented the paint tube, which allowed paints to become even more portable. This happened at a time when many new modern colors became available thanks to advances in chemistry. The portability of the paint tube, combined with a plethora of new modern, synthetic pigments, greatly enhanced the popularity of **plein air** (outdoor) painting. Painting outside and seeing light in a new way helped give birth to Impressionism.

CONGRATULATIONS!

You are living in the golden age of paint accessibility. Imagine the lengths painters went to years ago, trading furs in exchange for colored rocks mined from the caves of Afghanistan. Today, the segment of the industry focusing on making high-quality artists' materials is small but growing, as more and more people become cognizant of the benefits and subtleties that result from quality pigments and materials. Like other artists, I have become attached to certain colors within certain brands. This list of paint brands is not comprehensive but contains brands I have tested.

SELECTED PAINT BRANDS

$$$ PREMIUM

RUBLEV
Rich, handmade, no additives.

OLD HOLLAND
Ground with stone, heavy pigment saturation, since 1664.

MICHAEL HARDING
Handmade, no driers or fillers, buttery texture.

M. GRAHAM
Uses walnut oil binder, dries slowly.

WILLIAMSBURG
Handmade, uses traditional beeswax as an additive. Made by the same manufacturer that makes Golden acrylic paints.

SENNELIER
Handmade. Uses safflower oil.

DANIEL SMITH
Handmade, consistent, durable, wide range of colors, some oil separation.

VASARI
Handmade, no additives.

LUKAS
Used by Van Gogh, since 1862.

CHARVIN EXTRA FINE
A favorite of Cézanne and Bonnard, since 1830 (2 lines).

$$ ARTIST GRADE

WINSOR & NEWTON
Affordable, reliable color, mixes well.

DA VINCI
Affordable.

GAMBLIN
Wonderful range of colors, reasonably priced.

REMBRANDT
Unique colors, mixes well, a bit oily.

GRUMBACHER
Mixes well, vibrant colors, oil separation.

$ STUDENT GRADE

WINTON
Student grade for Winsor & Newton, contains a lot of filler, low coverage.

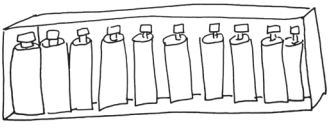
GAMBLIN 1980
Mixes well, nice packaging, limited selection of colors.

VAN GOGH
Flows well, consistent color, mixes well, some oil separation.

BLICK STUDIO
Affordable, high pigment load, dry in the tube.

DALER-ROWNEY GRADUATE
Large tubes, reasonably priced, low pigment load.

DALER-ROWNEY GEORGIAN
Affordable, mixes well, limited color selection.



GREAT BEGINNER SETS

$$$ Williamsburg

Sennelier

Old Holland

Rublev

$$ Rembrandt

Gamblin

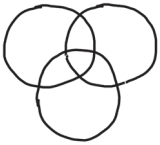
Grumbacher

Winsor & Newton

$ Blick

Utrecht

Van Gogh



COLORS I LIKE TO HAVE AROUND

The different brands, and colors within each brand, have different characteristics, which you will become more familiar with over time. I personally stick with artist-grade and premium-grade paints. Often, I will get enamored with a single color or set of colors, in addition to the list I provide below, which might cast a hue across an entire body of work. The colors listed below are ones I always have within reach (Fig. 9).

- Ultramarine Blue
- Terre Verte
- Cerulean Blue
- Burnt Umber
- Burnt Sienna
- Raw Sienna
- Yellow Ochre
- Cadmium Yellow Light
- Alizarin Crimson
- Quinacridone Violet
- Ivory Black
- White

MEDIUMS

Some consider mediums the lifeblood of oil painting. Others hardly use any at all. Working in concert with the oil and pigment in the tube, mediums alter the consistency, drying time, and finish. They can make the paint more transparent and are often used for glazing, which involves creating a sheer, tinted layer over a surface to add just a hint of color in certain sections, perhaps blush on a cheek, or over an entire area, as if laying down a barely colored veil. Thicker mediums can create an **impasto** effect. Whether premade or mixed by you, mediums are best mixed directly with the paint on your palette before applied to a surface.

It is important to note that when using any quality oil paint that the delicate ratio of pigment to binder,

which varies for each color, is mostly ideal in the tube. In addition to altering the viscosity of the paint, mediums are chiefly used from a desire to glaze and/or speed up the drying time. Unfortunately, the quest for "lost secrets of the old masters" by a daisy chain of authors in the last few centuries has led to confusion about the elegance of oil by introducing the idea that you need resins and, therefore, solvents.

In this section, I describe the natures of the different medium ingredients—both drying oils and other components—that you'll need to keep handy to transform, detoxify, and expand your painting experience. I teach you to embrace the radically elegant process of making your own mediums as you go and when to choose a premade version for safety. I discuss how to make a putty medium using different forms of oil and **calcite**, or other dusts, including ground crystals and glass, all of which elicit different effects.

It's hard to overstate how revolutionary it is to have this paradigm shift from the notion of requiring solvents to not requiring solvents in oil painting. Too many of us begin the painting journey frozen in front of an apothecary-like assortment of mediums at the art store, not sure what to use, when, and why. If I do nothing but assure you that you need little other than paint, then the battle to ensure the safety of your practice is half won. This is how you eliminate toxic solvents from your painting practice.

LINSEED OIL

Drying oils have different properties relating to drying time, durability, and finish, depending on the plant from which they come and the way they are processed. The best for oil painting is linseed oil, which is the focus of this section. Other drying oils to consider as a medium or medium ingredient are described afterward.

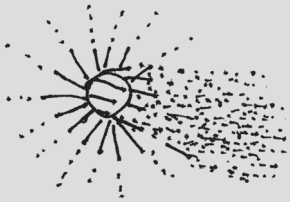
Linseed oil hails from the seeds of the flax plant, *Linum usitatissimum*. It is extracted by cold-pressing flaxseed. The oil itself is a golden yellow, brown, or amber and hardens when exposed to air. It requires a barrier, or **size** (see "Surfaces"), to protect the surface on which it is painted. Three different processes result in the oils that are most suitable for oil painting.

REFINED LINSEED OIL

Refining oil bleaches and removes unwanted wax and gums and makes a better vehicle for paint-making. It also lowers the acidity from the raw oil state. In contrast, raw, cold-pressed linseed oil takes several weeks to cure, has a much higher acidity, and will darken over time. Refined oil is also used to thin the viscosity of bodied oils, which are described in the next section. Refined linseed oil was a favorite of Rembrandt, whose oils were hand-pressed and hand-refined.

BODIED LINSEED OIL

Bodied linseed oil has a thicker viscosity and is created by heating refined linseed oil to high temperatures without oxygen. The resulting polymerized oil yellows less and has a thicker viscosity and higher gloss. Bodied oil is often referred to as *stand oil* (from the eighteenth-century Dutch process that required the oil to "stand" so the impurities could settle on the bottom). Another subset of bodied oil is burnt plate oil or vacuum-bodied linseed oil, which is used in printmaking to cut the viscosity of the ink. Bodied oils are used only in very small amounts.



SUN OIL

The most ancient form of bodied oil is sun oil. This oil is made by exposing glass-covered trays of linseed or walnut oil in the sun for a long time, generally in the summer. Afterward, any bugs or particles are sieved out. These prepolymerized oils possess improved drying properties, less tendency to wrinkle, and a higher pigment saturation than refined linseed oil.

BOILED LINSEED OIL

Boiled linseed oil has an amber color, dries naturally in less than two days, but is rarely offered in a quality suitable for fine art oil painting. While a small number of artist manufacturers, such as Rublev Pale Drying Oil by Naturalpigments.com, are starting to make it available, boiled linseed oil is more commonly produced by larger scale paint manufacturers to cure wood surfaces, including the wood on ships. Do not use boiled oil from the local hardware store as most manufacturers of boiled oil do not remove the protein from the oil first and therefore add unwanted driers. Choosing which manufacturers of boiled linseed oil to trust outside of those who specifically make artists' materials is as much of an art as it is a science. I look for those who display a rigorous devotion to the purity of their materials and explicitly state that they do not add driers after boiling and sterilizing a cold-pressed linseed oil. It should be used very sparingly as a medium, and it is the most flammable of all the oils when left on rags.

With the exception of boiled linseed oil, I only use drying oils made for artists. Unless specifically stated otherwise by the manufacturer, most linseed oils are refined according to standards that were developed commercially for the food industry and are designed to maximize shelf life. They often contain preservatives and require additional driers to enhance their oxidizing potential for the artist. What does this mean for you? Consult the "Resources" section, and when in doubt, *buy linseed oil made specifically for artists.*

FIRE SAFETY FOR LINSEED OILS

Rags used or soaked with any linseed oil must be disposed of in a metal pail or trash can with a tight-fitting lid to prevent fires in the event that they spontaneously combust due to the natural oxidation of the oil and the air.

LINSEED OILS

BODIED

Art Treehouse

Gamblin Stand Oil

Old Holland Stand Oil

Rublev Vacuum-Bodied Linseed Oil

Sennelier Stand Oil

Williamsburg Stand Oil

Winsor & Newton Stand Oil

BOILED

Allback Boiled Linseed Oil

Ottosson Purified Boiled Linseed Oil

Rublev Pale Drying Oil

REFINED

Art Treehouse

Gamblin Refined

Grumbacher Refined

Natural Pigments Refined Aged

Sennelier Refined

Utrecht Refined

Winsor & Newton Refined

OTHER DRYING OILS

There are numerous drying oils that artists have used and experimented with throughout the centuries. The ones discussed here are most commonly found in art stores and are easy to incorporate into your medium-making practice. Each have pros and cons: They tend to dry slower, yellow less, and have a less durable paint film than linseed oil. When used as an additive, these other drying oils can be used to keep paint **open**—that is, they cause the paint to stay wet longer—or they can be used alone for various effects. Because they develop a weaker film, they may become slightly more brittle than linseed oil over time.

WALNUT OIL

A favorite of Leonardo da Vinci, Raphael, and Perugino, walnut oil dries more slowly and has less tendency to yellow than linseed oil but is also less durable.

SAFFLOWER OIL

A favorite of Cézanne and Pissarro, safflower oil is commonly used as a binder in white paints, as it yellows less than other oils. It is also considered a semidrying oil—meaning that it takes much longer to dry and doesn't dry as completely as linseed oil. The degree to which it slows down the drying time of paint depends on a variety of factors, including how much oil you use. Because of safflower oil's slow drying rate, some manufacturers add metal driers to it.

Safflower and walnut oil are also excellent for resting your brushes in between painting sessions in lieu of cleaning them with solvents. This is a well-documented practice from hundreds of years ago.

POPPY OIL

Poppy oil is another clear, semidrying oil that dramatically slows the drying time and leaves a more brittle paint film than linseed oil does. The trade-off between yellowing and durability is inherent in the respective fat contents of the oils: High fat is responsible for both linseed's yellowing and its durability, while lower fat makes other oils, such as poppy oil, both clearer and more brittle.

CLOVE OIL

Though it's not as commonly used, you might come across clove oil, which is derived from the leaf of the clove plant via steam distillation. An essential oil, it is sometimes sparingly added to other oils in order to slow their drying times. It is so powerful that even the aroma will slow down oxidation. I know of painters who put a few drops on a paper towel that they then include in a covered tray of mixed paint—this prevents the paint from drying for days longer than it would on its own. Clove oil smells wonderful, and only a drop is necessary if added to a medium—it has been known to lead to darkening over time if overused. It must be stored like all essential oils: Protect it from light and air (meaning, no half-empty bottles).

MAKING YOUR OWN MEDIUM

Linseed and other drying oils alone qualify as a medium. However, by adding the components described in this section, you can easily create your own, more complex mediums, providing you with a nearly infinite range of effects. The most common method for mixing a medium is adding stone dust or chalk to oil to make a putty. Since the addition of chalk decreases the drying time, you can always alter the medium with a small amount of clove, poppy, safflower, or walnut oil to counterbalance this effect and keep the paint open longer.

Mixing the additives in this section (primarily chalk or **marble dust** or calcite) with different types of linseed oils is the secret to opening up a whole new world of painting without solvents.

CALCITE/CHALK

The term *calcium carbonate ($CaCO_3$)* is sometimes used to refer to chalk, stone dust, marble dust, calcite, or whiting. Three types of calcium carbonate are used in painting: crystalline (calcite), metamorphic (marble dust), and sedimentary (chalk). Some people call it all *calcite*, and others call it all *chalk*. Used since Greek and Roman times, calcite becomes transparent in oil and can make even the most opaque colors more transparent. All forms of calcium carbonate are **oleophilic**, meaning that they love oil. Calcite is the same white powder often sprayed over oil spills to help with cleanup; it is also used in antacids. The different types of calcite have subtly different effects: a putty made with marble dust tends to be whiter and more opaque; a putty made with chalk (a favorite of Rembrandt and Chardin) is more **thixotropic**, meaning that it stiffens up when at rest and becomes more liquid upon being moved around, as when being mixed.

CHALK, CALCITE & MARBLE DUST

NATURAL PIGMENTS CHALK

Natural Pigments Carrara Bianco White Marble Dust

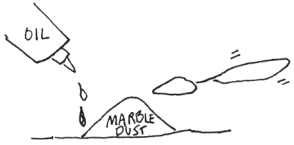
Natural Pigments Botticino Marble Dust

Natural Pigments Verona Bianco Marble Dust

Kremer Stone Chalk #58162

Fredrix Marble Dust

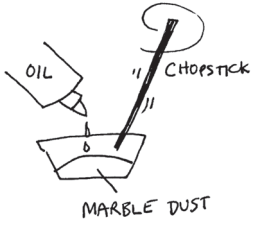
Earth Pigments Whiting Chalk



HOW TO MAKE YOUR OWN PUTTY

You can experiment with making your own medium using any combination of the oils and calcites/chalks we've discussed. Start with one type of chalk or marble dust of any kind. I keep a sealed container of some form of calcite on my mixing table at all times. To start my painting day, I put a few tablespoons of chalk in a low cup and squirt different types of oil right into it, depending on the flow I'm going for. Mix about a 1:2 ratio of chalk or stone dust to oil. I make a batch before each painting session and then mix the putty directly into my paint mixtures, at about a 3:1 ratio of putty to paint. The result is a much wider range of visual effects than I could get from paints straight out of the tube (Fig. 10).

My preferred medium is marble dust with one or two linseed oils, but I'm always experimenting. While many painters who make their own putty use a palette knife to mix the oil and chalk directly on the palette surface, I like to stir the two in a small cup with a chopstick. This is especially useful for glazing. The more marble dust you add, the thicker and more transparent your medium will become. To learn much more about making your own mediums, I highly recommend Tad Spurgeon's comprehensive book, *Living Craft*.



The secret to learning how to make your own putty is to start simply. When I first began experimenting with homemade putty, I was seeking a replacement for faster-drying mediums that emit strong odors (a.k.a. *volatile organic compounds*, or *VOCs*) and were obviously unhealthy, especially with prolonged exposure. I started by mixing different ratios of a fast-drying linseed oil and a chalk. I liked the way this combination dried overnight and had a satin finish. Later I experimented with different oils, chalks, and ground glass powder. Today, my repertoire includes all different types of oils and dusts, depending on the effect I want.

ADDITIONAL ADDITIVES

SILICA

Silica is the most abundant element in the earth's crust and fills our beaches with sand. Silica is the same as **silicon dioxide (SiO_2)** and is derived from finely ground quartz crystals. In the sixteenth century, the Venetians added ground silica to their mediums. Unlike calcite, silica does not speed up drying time. In combination with chalk, as a powder, silica provides texture and body. Even though it is essentially ground glass, it doesn't offer the luminosity or transparency of chalk. A version created using heat, known as *fumed silica*, acts as a transparent thickening agent without affecting color. Products known as *gels* are typically made by combining oil with fumed silica. The resulting substance does not yellow and offers a medium free of solvents, resins, and driers. I do not recommend buying fumed silica as a separate additive in order to create a gel yourself. It is very dangerous to inhale and requires an impractical amount of hazardous equipment to do it safely. Instead I recommend that you explore premade medium gels on the market. Oil gels are wonderful nonyellowing mediums, and I am continually amazed by their usefulness.

EGG

After you're well versed in oil-and-chalk mediums, you might consider expanding your repertoire like Rembrandt or van Eyck by adding a touch of egg. Even the smallest amount of egg added to a paint or a putty makes it begin to seize or stiffen by drying quickly. Yolk accelerates drying times but becomes brittle over time and, beyond very small amounts, is better confined to wood-backed panels. Including a touch of a beaten whole egg accelerates drying but also adds initial flow. In general, oil should, by far, make up the majority of the mixture. An egg-oil emulsion is also perfect for fast drying underpainting. When using a yolk, poke the membrane so just the contents of the yolk come into the mixture. This is all you need.

WAX

Two main types of wax are used in oil painting, with one more common than the other, depending upon the century. Regular beeswax was the emulsifier of choice in the nineteenth century (instead of the aluminum stearate more commonly used to emulsify paints today). And nowadays petroleum-based "cold wax" has arguably spawned a new art form that borders on encaustic. This second type of wax is called *cold* because heat is not required to shape it. However, cold wax often contains resins and often requires solvent. Cold wax is an interesting medium to experiment with if you use it with moderation and ventilation, but it is also new, and not much is known about how it will age.

THIS IS ALL YOU NEED

Painting students are consistently fed false claims about the "techniques of the old masters." They are all too frequently taught to create concoctions of resin, linseed oil, and solvents and instructed that this was the practice of great painters of the past. This is *not safe for you*, nor is it good for the painting (see "Resins: A Wild Ride and a Toxic Detour"). Surprising as this may seem, given how closely associated solvent has become with oil painting, modern conservators and investigators concur that the paintings of Raphael, Rembrandt, van Eyck, Velázquez, and Vermeer were made primarily without resins or solvent. In fact, their ingredients were far simpler: linseed oil, stone dust, and occasionally egg. This is where your solvent-free practice begins.

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PREMADE PUTTIES & GELS

A number of manufacturers are beginning to offer premade mediums using chalk, and/or barite, and/or silica-based additives. Premade putties can be useful if you don't want to mix your own mediums or don't have chalk easily available to mix with your oil. They also offer a consistent ratio of chalk to oil, which can be helpful. I haven't tried them all yet, but I list some notable ones here.

CALCITE PUTTIES

These premade mediums combine well-mixed linseed oil, calcite, and occasionally barium sulfate.

- Rublev Velázquez Medium
  (linseed oil and calcite)
- Williamsburg Extender Medium
  (linseed oil, marble dust, and barium sulfate)
- Allback Linseed Oil Putty
  (linseed oil and marble dust)

IMPASTO MEDIUMS

Impasto mediums combine calcite and silica with bodied linseed oil for thicker applications of paint and impasto techniques.

- Rublev Impasto Medium
  (linseed oil, silica, and calcite)
- Art Treehouse Impasto

PREMADE GELS

As mentioned in the section on silica, these new gels can revolutionize your painting practice. They offer a very light, nonviscous means of extending pigment in the form of a nonyellowing medium.

- Rublev Oleogel
  (fumed silica and linseed oil)
- Rublev Walnut Oil Gel
  (fumed silica and walnut oil)
- Art Treehouse Walnut Painting Gel
  (fumed silica and water-washed walnut oil)

BEST PRACTICES FOR USING MEDIUMS

Here are some best practices to follow when using mediums.

- Be wary of using too much. A few drops of most things is plenty. Use a 1:2 ratio of chalk or stone dust to oil to create putty, and about a 3:1 ratio of putty to paint.
- If you want to keep your paint open longer (that is, have it dry more slowly), consider adding walnut, poppy, or safflower oil to your paints. However, the slower-drying oils should be reserved for the top layers, otherwise you will cause wrinkling or seeping.
- In general, purchase oils only from manufacturers that specialize in artists' materials. Do not buy boiled oil from the hardware store; it is completely different, contains additives, and is not suitable for oil painting. Oils from health food stores have added vitamin E as a preservative to prevent oxidation, which is exactly what you don't want. Even from art supply brands, beware of bottles that are simply called *mediums*, as they often have chemicals that you do not want in your oil painting, or they require solvent.
- Using only drying oils and safe additives such as chalk and silica (whether premade or making your own as you go) will greatly expand your powers as a painter.

RESINS: A WILD RIDE AND A TOXIC DETOUR

Resins are a viscous, organic compound generally secreted from trees, most notably fir and pine. Resins require solvents to dissolve. The use of resins in painting became commonplace in the nineteenth century, and the ubiquity of the solvent turpentine became commonplace as a result. Why did resins catch on?

Early painters crushed their own pigments and mixed their own paints. The industrialization of artists' materials, starting with selling premixed paint in pig bladders then leading up to the invention of the paint tube in 1841, increased paint accessibility and created an even greater distance between those who created and those who applied paint. This fissure, along with the increased popularity of painting, led many to a hunt for the techniques of the old masters. However, no guide books for painting technique existed at the time. No one actually knew exactly how the old masters had painted. Books began to appear that speculated about these older

techniques. Jean-François Léonor Mérimée's *The Art of Painting in Oil and in Fresco* (1839) and Sir Charles Eastlake's *Methods and Materials* (1847) both concluded, erroneously as it turns out, that a hard resin varnish (such as amber or copal) was a foundational "lost" component of older painting.

The famous concoction of using equal parts damar varnish (a resin), solvent, and commercial stand oil made its first written appearance in artist/theorist Max Doerner's *Materials of the Artist and Their Use in Painting, with Notes on the Techniques of the Old Masters* (1934), but it is not based on any previously documented practice. This recipe was then turned into gospel by Ralph Mayer in his *Artist's Handbook of Materials and Techniques* (1940). Even today, you would be hard-pressed to walk into any oil painting studio without seeing a copy of this book. Jacques Maroger, once the technical director at the Louvre, added to the canon of pontifications about the "secrets of the old masters" with his version of a medium that uses mastic (a resin from the pistachio tree), turpentine, and black oil, an oil created by heating it with litharge (lead monoxide) until it becomes polymerized and pre-darkened.

The impact of this misinformation has been tremendous. Solvent has by now become ubiquitously associated with oil paint, to the point where it is used to thin paint even when no resins are present. The pungent smell elicits a Pavlovian response, causing many people to associate it with creativity itself. When I used to paint with solvents, visitors to my studio would walk in, take a deep breath, and exclaim, "Oh, I love the smell of oil painting."

Fortunately, modern science has intervened. In the well-documented book *Rembrandt: Art in the Making* (2006), modern conservators using high-tech paint film analysis, gas chromatography, and mass spectrometry have proven, on the molecular level, that Rembrandt's paintings were mostly made with linseed oil, chalk and a little bit of egg. In fact, the medium components of painters including Raphael, van Eyck, Vermeer, and Velázquez were no different.

This is not to say that resins were never used. In paintings as early as the Renaissance, resins such as amber, copal, and sandarac were used in very small amounts for specific colors, usually in a glaze, but never as a foundational component in the whole painting. Sometimes they were added as part of the imprimatura over a carefully rendered composition so as to preserve the drawing as well as add a midtone. When authors like the sixteenth-century Vasari and nineteenth-century Eastlake wrote that Leonardo da Vinci used a mixture of sandarac resin and oil of spike of lavender as a varnish, their evidence as to what degree he did so was not definitive. Resin, though occasionally dissolved in solvent for glazing, was not the secret ingredient of the old masters' painting after all.

The moral of the story is that resins are not good for you or your painting—they necessitate solvents, the inhalation of which poses health hazards, and solvents themselves weaken the paint film.

It can be hard to break old habits. But just because we have grown accustomed to associating resins and solvents with the very concept of oil paint (I'm looking at you, turpentine) does not mean that they are in fact the most effective—never mind safest!—way to paint. They're simply not.

SOLVENTS

Far too many painters are taught to paint with an open tin of solvent near a stack of paper towels beside their palette in order to constantly dip and rub paint off their brush on the paper towel when they need to dip into a new color or want to thin the paint before sliding it across the canvas. In truth, this could not be further from best practices. Open tins of solvents off-gas and deliver harmful VOCs in the air. I've walked into classrooms where I felt I might pass out from the fumes. The gross overuse of solvent—particularly as a paint thinner and brush cleaner—is a relatively recent development in art history, starting around the nineteenth century and really taking off in the twentieth.

WHAT DO SOLVENTS DO?

Solvents thin the viscosity of the paint, delay the drying time, and inhibit the oxidation process that a drying oil needs to bind with the pigment (prohibiting the polymerization that is actually critical for oil painting). Solvents come in three classes: true, such as turpentine, which thins and dissolves resins; latent, such as mineral spirits, which dries by evaporation; and diluent, which alters the evaporation rate. Resins dry through solvent evaporation; oils dry through natural oxidation. To put a finer point on it: *If you are not using resins, you do not need solvent.*

All solvents, including turpentine, paint thinner, mineral spirits, and varnish, emit toxic VOCs as they dry, which, when inhaled, affect the central nervous system and can cause kidney damage, among other ills. Not only are VOCs bad for the air, but if poured down the sink, they send harsh toxins into the water supply. They also continue to off-gas from finished paintings. A series of medical papers published in Denmark concluded that chronic exposure to organic solvents can lead to presenility or "chronic solvent-induced encephalopathy, also called *painter's dementia*." Long-term exposure to solvents causes cancers (particularly lymphoma, the ailment that struck Bob Ross), neurological disorders, and a variety of lung issues.

As if the health hazards weren't enough, solvents also lead to numerous painting problems. They create uneven drying areas. They change the composite of the oil, which in turn creates differences in pigment solubility. This last issue is especially troublesome considering that inorganic and organic pigments react differently in solvents—so using the same solvent across multiple paint colors can ruin each color in a different way. Given all of this, you may wonder why anyone uses solvents at all. But bad habits are hard to break, and it can be truly challenging to buck the received wisdom of generations of art teachers and students.

In this section, I describe solvents that you might encounter as suggested alternatives to turpentine. Though you might turn to them occasionally for specific effects, none of these should be used as a part of your *regular* practice. As you get used to using chalk in oil, you will quickly learn that this is a much better way to "thin" paint straight out of the tube—lessening the intensity of the pigment while producing a much stronger paint film.

ODORLESS MINERAL SPIRITS

Odorless Mineral Spirits are a petroleum-based distillate with the aromatic solvents largely removed from it. Aromatic solvents are the most harmful types of petroleum solvents. But even though the label says "odorless," it is by no means harmless to use. It is still a solvent and still emits VOCs.

There are several brands of Odorless Mineral Spirits on the market but only a few marketed just to artists, with the most common being Gamsol, created by Gamblin. Whereas turpentines are solvents specifically for resins, odorless mineral spirits are for **alkyds**. It is more expensive than other types of thinners but is worth it because it has the lowest evaporation rate of all commonly used solvents (whether marketed as odorless or not).

In the rare instances when I want certain strategic drip effects, I only use this type of solvent. I use it by the drop. I also only use it at the end of a painting session so I can leave the room immediately afterward. Never keep it in open containers or mixing cups, as the fumes are harmful and are immediately absorbed through the skin. If you must, store small amounts in a squeeze bottle with a cap so it does not get into the air around you. If you're using more than just drops at a time, you're doing something wrong.

OIL OF SPIKE LAVENDER

Oil of spike lavender is an essential oil from the fragrant flowering lavender plant *(Lavandula latifolia)* and is sometimes used as a thinner, although the scent, while pleasant in small doses, can be overpowering if more than a few drops are used. Remember, just because something is called "natural" or "organic," it doesn't mean risk-free. I recently saw a post on Facebook from a woman who ended up with burns all over her body from using four drops of oregano oil in her bath. She was astonished that an essential oil could do this, but it can. Remember, these are highly concentrated plant-based chemicals.

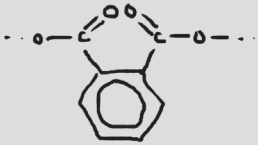
Unfortunately, unless you know where you're getting it from, oil of spike lavender sold to artists is almost never natural and is commonly cut with toxic or problematic ingredients such as turpentine, terpineol, d-limonene, or camphor and, as such, requires ample ventilation. Both the synthetic and natural versions are also deeply harmful to marine life in even the smallest amounts, and great care must be taken not to rinse any containers that held oil of spike lavender down the sink. Any version of it must be disposed of where one would dispose hazardous waste.

OIL OF ROSEMARY

You might also encounter oil of rosemary. It was well known among painters up until about a hundred years ago, but its use was gradually eclipsed by turpentine, and art supply manufacturers no longer sell it. For those who like to experiment, oil of rosemary is even stronger than oil of spike lavender, and an even smaller amount is needed. Just like oil of spike lavender, a bottle of pure oil of rosemary will be very expensive, if you're getting the real thing. As with all solvents, avoid ingesting, inhaling, or getting it on the skin.

SOLVENTS

- "Gamsol" Odorless Mineral Spirits (OMS), Gamblin
- Rublev Rubesol Color Mineral Spirits
- Rublev "Spike Oil"
- Art Treehouse "Oil of Spike Lavender"
- Art Treehouse Biobased Thinner



WE NEED TO TALK ABOUT ALKYDS

The oil painter today will no doubt encounter alkyds in various forms. Alkyds are a synthetically produced resin derived from alcohols and organic acids and often involve other components, including metallic driers. The term alkyd comes from a combination of the words alcohol and acid ("alcid"). Like most resins, alkyds speed the drying time. Artists can find alkyd paints, mediums, and grounds. Many artists, seeking to exclude resins and solvents such as mineral spirits, opt to avoid them. Others think of them as the greatest innovation for oil painting since the 1400s. For other industries, alkyds can offer a way to use eco-friendly, non-petroleum-based sources in order to create **polymers**. Some paint distributers steer away from alkyds for political reasons. For example, cobalt, the commonly used metal drier, is mined in the Democratic Republic of Congo, which has issues with child labor.

There are some alkyd-based, solvent-free gels that are ripe for experimentation. I personally avoid all mediums that require or smell like solvent. Introducing any resin-based component also means the artist has to be conscientious of the organization of materials so that the least flexible and most flexible are layered from bottom to top (fat over lean). Remember that all resins are mostly employed to achieve glazing, which calcite or a fumed silica-based gel can also perform just fine.

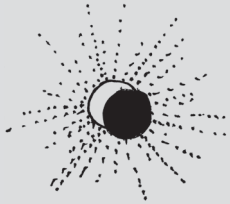
WATER-MIXABLE OIL PAINTS

When I first tried to wean myself off solvents, the first thing I did was purchase water-mixable, also known as *water-miscible*, oil paints. Water-mixable oil paints are created by integrating emulsifiers or mixing substances that will make oil mix with water. That's a pretty incredible feat, especially when you consider that the common simile for two things that do not belong together is "like mixing oil with water." In the case of water-mixable oils, the binding oil in the paint is often mixed with just enough soap to make them miscible with water.

The idea of soap in my oil paint seemed odd, but I was willing to try anything to kick my dangerous solvent habit. But, personally, I didn't like it. I admit that I didn't really give it a chance or give myself enough time to acclimate to the notion of mixing oil and water. I missed the type of evaporation that I thought only

solvent effects could render (no more!). When I didn't get the effects I was looking for with these paints, I continued my pursuit, and that is when I discovered the miracle of oil and chalk. When I conceptually started embracing chalk as a way to lessen a pigment intensity (rather than with any kind of thinner, like solvent, or in this case, water), water-mixable paints lost their appeal.

However, if you are in the process of leaving solvents behind or want to pick up a simple entry-level solvent-free practice, water-mixable oil paints may be just right for you. But don't ever rinse your medium-mixing bowls or palettes down the drain simply because they wash with water. As you will see in "Cleaning Brushes" under "Best Practices," getting pigment down the drain can and should be avoided at all costs.



MY STORY

I was in the middle of making a large painting of Cadmium Red, Rose Madder, and Prussian Blue. I was stapling the canvas to a wall—something I tried to help me avoid the sense of the canvas as an object—and it was a hot summer day. The mediums I was using at that time were a typical oil painter's cocktail of "odorless" terpenoid, Liquin, and linseed oil. With my face so close to the canvas, I was holding my breath from the fumes. No longer able to stand it, I walked outside, gasping for fresh air.

Something was not right. I felt dizzy, and my eyes felt like they were pushing against my sockets. I drew deep breaths, but no matter what I did, I felt like I wasn't getting enough air. I felt weak and continued to be short of breath. I felt terrible and went to bed for four days.

I knew that the materials had made me ill. I didn't paint for six months. Without painting, I felt as though someone had taken my voice away. It was heartbreaking.

This is what led me to spend several years researching safer ways to paint. In that process, I happened on the work of Tad Spurgeon, who was clearly on to something, and ordered a first edition of his book, *Living Craft*. This was when blogging was relatively new,

and I was editing a major art forum at the time. I invited Tad to write about his experiences on our site. Ever since, I have been on a journey of discovery, history, and chemistry. I've been lucky enough to get to meet many like-minded people along the way.

Changing my routines to avoid using solvent was profoundly worth it. I could get back in the studio and start painting with oils again. Learning to make mediums or using extra brushes to break the habit of constantly dipping a brush in solvent when changing colors (see "Brushes") can be a deceptively simple first step. Having eliminated solvents, I encourage anyone who loves painting and life to do the same.

BRUSHES

Great brushes are a must. This doesn't mean you need to buy hugely expensive brushes, but it does mean you need to know what to look for.

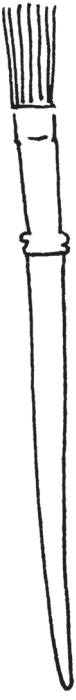
The number of brushes you use is key for safe practices. Having more brushes allows you to devote one brush to each color. This is how you avoid having open containers of solvent in which to dip, then wipe, a single brush to change color. Assigning a separate brush to each color also makes for crisper colors. If you look at pictures of great painters in action, you will often see four or five brushes sticking between their fingers for this reason. (See "Setting the Table" under "Best Practices.")

In general, start your painting session with the larger brushes, then go smaller as you refine. You will develop a relationship with your brushes as you use each type. As you get to know all of them, you will become more aware of their particular strengths.

Using the right shape of brush is essential for controlling the paint. I generally buy brushes in person, because I like to feel them. New painters commonly buy right-cornered "brights" and "flats" in lieu of "filberts" (brushes with curved corners), because their angled top offers the promise of more precision and control. However, while suitable for geometric shapes, artists learning how to create form and sculpt with color are better off with a rounder shape.

ROUND

Pointed tip; holds a lot of paint but also is capable of detail.



FLAT

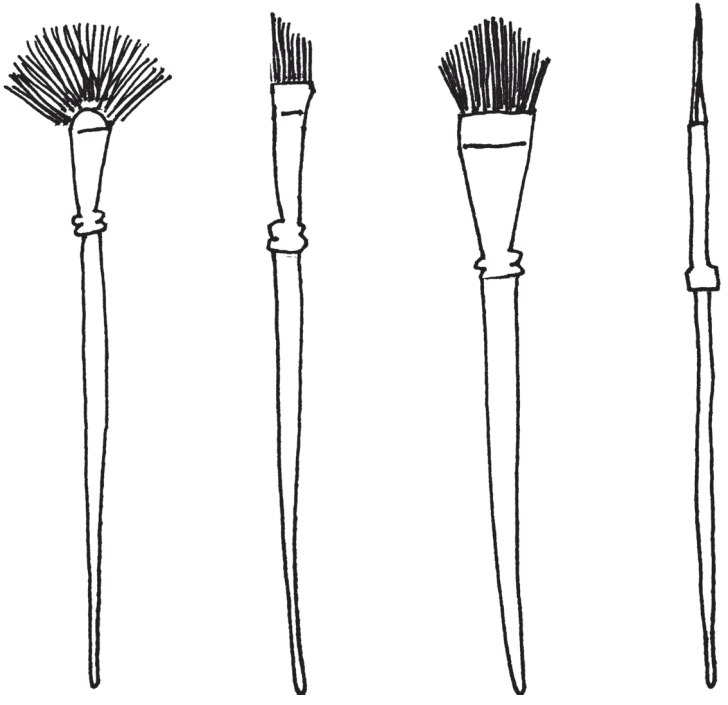
Flat top; suitable for spreading paint evenly across a surface.

BRIGHT

Short, flat top, with stiff bristles; good for impasto.

FILBERT

Thick and flat with rounded tip; suitable for rendering shapes.



FAN

Spread natural hairs; good for subtle blending and textural effects.

ANGLE

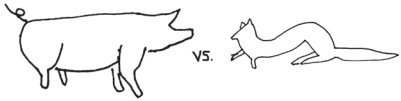
Angled; suitable for detail and geometric shapes.

MOP

Large and soft with rounded edge; suitable for glazing and scumbling.

RIGGER

Round with long hairs; good for fine lines, like the rigging on ships.



BRISTLE VERSUS HAIR

There are many different kinds of animal and synthetic hair brushes, but we can divide them into two general categories (Fig. 11).

1. Coarser bristle brushes (with either natural bristles from coarse-coated animals such as pigs and horses, or else synthetic replicas that emulate animal bristles) are best for laying down a lot of color. The colder the climate the animal comes from, the better. These days, most natural bristle comes from China. Never trim or cut bristle, as you'd be losing the desirable split ends that allow you to hold more paint.

2. Softer hair brushes (such as natural sable, camel, or ox, or their synthetic equivalents) are smaller, offer more control, and are better for detail. Synthetic sable brushes offer great durability and the ability to hold more paint. In general, start a painting with bristle and refine with hair. Hair brushes are commonly referred to as sable, but they are actually from a weasel. Brushes referred to as having camel hair are actually from a pony, and sabeline brushes are made from ox hair. There are other exotic types of brushes, of course, made from silk, ostrich feather, and swan down. None come from endangered species, and animals are thankfully never killed for their tail.

CHIP BRUSHES

Chip brushes are wide, inexpensive, disposable bristle brushes that are vital for any studio practice. They usually can be purchased by the box with a 1-, 2-, or 3-inch width (I prefer the 3-inch). These are available at any house-paint or home-improvement store, or you can buy a box of twenty for about ten dollars on Amazon, at Ikea, or at a hardware store. Often the kinds sold at the art store are too high a quality, more dense, more expensive, and more likely to leave an unwanted mark. Because the brushes I'm referring to are cheap and disposable, they won't require washing and will therefore help you avoid hurting the environment by possibly getting pigments, oils, or other washing chemicals down the drain. They are excellent for underpainting, laying down large areas of color, **oiling out**, which involves applying a fine layer of oil over a painting before going back into it, scumbling, or dry-brushing/blending more than one color together. And the large size keeps you loose. Because chip brushes are inexpensively made, be sure to have a set of tweezers handy to pull off any unwanted hair that might be left on the canvas after use. Lastly, chip brushes are great for glazing larger areas, which involves laying down a transparent layer.

PALETTES

PALETTE SURFACES

There are several different types of surfaces on which to mix your colors, including glass, palette paper, and wood.

GLASS

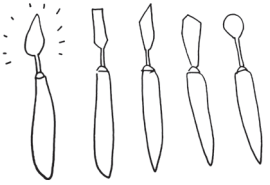
Glass is ideal if you have a stationary working space such as a tabletop you can lay a large piece of glass out on. The glass will have a slight green tint, as you need to work with a certain thickness to be safe, so you'll just want to take that into account as you look at colors. You can scrape paint off glass easily with a razor blade. Any local glass company can cut a piece to size for you. There are also many ready-made sizes available at art stores.

PALETTE PAPER

Palette paper, which often comes in pads, is disposable, portable, affordable, and ideal for students. These pads also offer a great way to keep a record of certain color mixtures as you make them. A coating on one side prevents oil from leaking onto the sheet below. For my students, I recommend a sheet size of at least 20 x 16 inches. You'll need the space to mix and think about color.

WOOD

Wood is great for plein air painters who want a simple, portable surface that will withstand wind. The wooden palette with the hole for the thumb has become an icon for painting in general and is available in every art store. Palettes in this shape are also made from different kinds of materials as well, with an eye on being sturdy but not having a heavy weight.



PALETTE KNIVES

Many people think palette knives, which come in a range of shapes and sizes, are useful only for creating an impasto effect. However, one primary function of the palette knife is mixing colors. In fact, a palette knife is as vital in the studio as a chef's knife is in the kitchen.

To mix colors, it's best to use a palette knife and not a brush. Its flat steel head enables you to spread an even layer of mixed color, confirming you've got the hue you want. For years, I bought the wrong palette knives for this purpose; while a long, finger-shaped knife may work great for impasto, the best one to use for mixing has a slightly pointed, teardrop shape and is about 1.5 to 2 inches from the bottom to the tip.

I can spot the more experienced painters in my classes immediately by how much time they spend mixing colors on a palette with a palette knife before their brush hits the surface. Inexperienced painters want to start painting right away. But artists who develop their color stories before they start painting save time later on, because they avoid the lack of color harmony that might appear on the canvas later. (See "Color Mixing Golden Rules" under "Best Practices.")

SURFACES

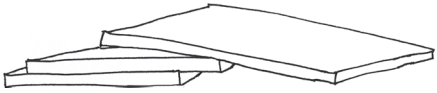
Certainly, there can be nothing more satisfying than assembling your own stretcher bars and building up and sanding down your own surface. Nor is anything more glorious than painting on a ground or substrate of your own making. Everyone should try it at least once, and there are many books and resources devoted to this very subject.

However, the variety of excellent substrates—accessible, premade canvases and panels—has never been greater. (Note that while the word *canvas* technically refers to cotton fabric, I use it to refer to any cloth substrate.) If you buy a prestretched canvas with great-quality linen, even if the stretcher bars aren't of the highest quality, the canvas or linen can be restretched or mounted later on should a masterpiece appear beneath your brush.

The different substrates used for oil painting have a huge impact on the feel of paint as it slides across the surface, and they offer an equally wide variation on how the artist will approach a work of art. Surfaces can be as hard and smooth as glass or as rough as a burlap sack. The rougher the canvas, the more **tooth** it has. The advantage of a canvas having tooth is that it interrupts the movement of the brush and helps hold the paint more securely.

Painting evolved from fresco (wet plaster) to egg tempera, both involving hard substrata. But the discovery of oils allowed for monumental works to be created on flexible linen. This made it much easier for merchants and craftsmen to transport the paintings, as the art didn't have to be created on site. Surfaces that have been painted on range from marble, metal, plastic, and wood to linen, cotton, and other types of cloth. When it comes to cloth, the heavier the better.

The choice of substrate is a personal one. In general, a rigid support provides the best longevity. For a cloth surface, linen is superior to cotton. Either can be mounted on panel. When I teach, I have limited time with my students in the wondrous world of painting with oil, and I expect them to come with paint-ready surfaces. Since your time might also be limited, I focus on premade canvas options in this chapter. But I do recommend building and treating your own substrates someday (Fig. 12).



COMMON SUBSTRATE MATERIALS

Painters often refer to their substrates as canvases, when in reality substrates are composed of something entirely different or of more than one component. Linen stretched on a board made of wood or metal can be used, for example. Substrates as luxurious and impractical as marble have been used to support an oil painting. The most common substrates include the following examples.

LINEN

The more I learn, the more I am fascinated by the history of linen as a material. It is considered a holy cloth in most religions. In ancient Egypt, for example, it was used for burial shrouds and symbolized light and purity. Woven fabric from the flax plant has been discovered from as early as thirty-six thousand years ago. A signature characteristic of linen is that the threads are strong and not elastic. In fact, linen is two to three times stronger, absorbs moisture better, and dries more quickly than cotton. It has an enticing cross-weave that comes in different textures, from superfine portrait through medium to coarse.

When linen is affixed to the top of a wood or metal, also known as a *panel* (either solid or composite), it is referred to as *linen on panel*. Cotton used in this way is called *canvas on panel*. When stretched between stretcher bars, linen is strong, lightweight, and easy to transport. If you paint your own *Mona Lisa* on linen cloth, you can always then mount it on a hard surface and help it last an extra hundred years beyond what it would on stretcher bars or rolled away.

MOTHER-CHILD REUNION

The fibers from the flax plant are used to make the linen that artists paint on. Do you remember what else comes from the flax plant? Linseed oil. I loved using linen as a substrate for years before I learned that it came from the very plant whose cold-pressed seeds offered the ideal medium for oil painting. The harmony of reuniting the oil and the fibers from the same plant in a work of art made me love it even more.


Natural Earths
VENETIAN RED
RAW SIENNA
BURNT UMBER
BURNT SIENNA
YELLOW OCHRE
TERRE VERTE

Figure 1

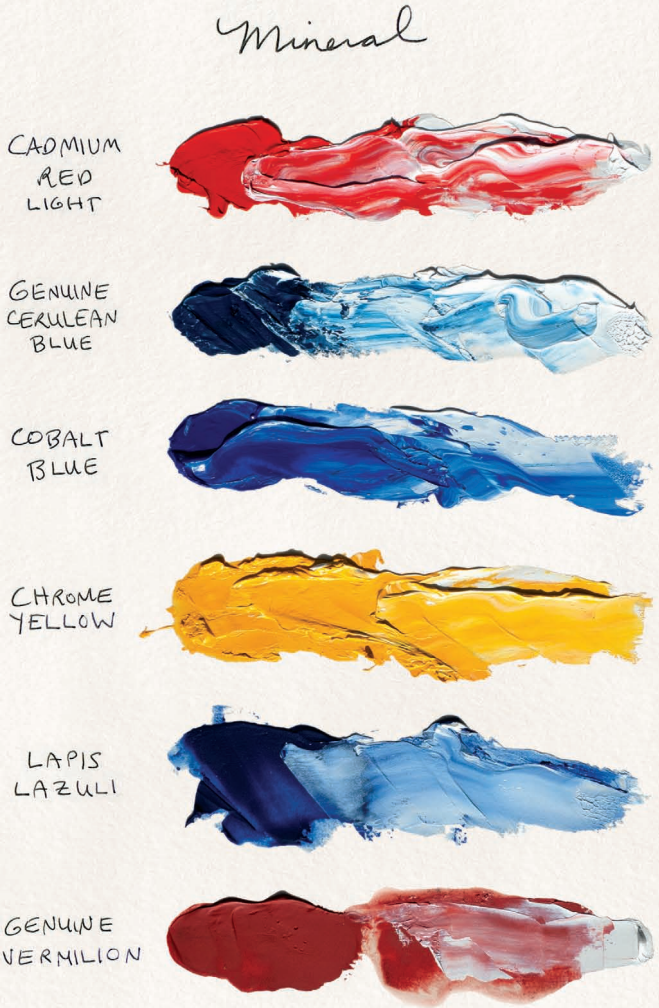

Mineral
CADMIUM RED LIGHT
GENUINE CERULEAN BLUE
COBALT BLUE
CHROME YELLOW
LAPIS LAZULI
GENUINE VERMILION

Figure 2


Modern
SAP GREEN
PRUSSIAN BLUE
QUINACRIDONE VIOLET
CADMIUM YELLOW LIGHT
MANGANESE BLUE HUE
PHTHALO GREEN

Figure 3

Figure 4

Figure 5

Modern

Historical vs. Modern

LAPIS LAZULI

ULTRAMARINE BLUE

Figure 6


Blacks
LEAD WHITE
TITANIUM WHITE
IVORY BLACK
MARS BLACK
VAN DYKE BROWN
PAYNE'S GREY
ROMAN EARTH

Figure 7

Figure 8


COLORS TO HAVE AROUND
CADMIUM YELLOW LIGHT
ULTRAMARINE BLUE
CADMIUM RED LIGHT
IVORY BLACK
RAW SIENNA
CERULEAN BLUE
BURNT SIENNA
BURNT UMBER
ALIZARIN CRIMSON
TITANIUM WHITE

Figure 9


MIXING SOLVENT-FREE MEDIUM
MARBLE DUST
LINSEED OIL
MARBLE DUST
LINSEED OIL
MARBLE DUST
LINSEED OIL
MARBLE DUST
LINSEED OIL

Figure 10


Bristle vs. Hair
NATURAL BRISTLE
SYNTHETIC BRISTLE
NATURAL HAIR
SYNTHETIC HAIR

Figure 11

Figure 12

Figure 13

Figure 14

Figure 15

Figure 16


STARTER PAINT SUPPLIES
SEALED CONTAINER FOR STORING COLOR
MARBLE DUST
LINSEED OIL

Figure 17


Cleaning Brushes
The Masters
BRUSH CLEANER
and PRESERVER
SAFFLOWER OIL
BRUSH CLEANER & RESTORER
NETTOYANT ET RESTAURATEUR POUR PINCEAUX
LIMPIADOR Y ACONDICIONADOR DE PINCELES

Figure 18

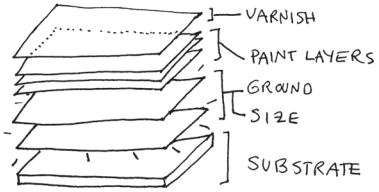
Figure 19

COTTON

The earliest recorded use of cotton as a fabric occurred in 6000 BC. Cotton duck (from the Dutch *doek*, meaning "linen canvas") is most commonly offered for canvases in art stores and is the least expensive option. It has a slightly dimpled surface, depending on how much **gesso** is applied. Gesso is a type of ground added to cotton or linen to protect the surface. Some artists apply many layers of gesso and then sand it to get a surface as smooth as glass.

PANEL

Panel is essentially wood, stone, metal, or any hard substrate you might paint on. Panels are perfect for smaller painting experiments. In addition, a hard support structure is best for the longevity of any oil painting because of the way oil dries, hardens, and becomes vulnerable to the elements. Fabrics, such as linen and cotton, expand and contract over time in response to the humidity of the environment; in addition, they increase the painting's exposure to the elements and cause it to age more rapidly. The disadvantage of larger works on panel is that they're heavier to transport and more expensive to ship.



THE ANATOMY OF AN OIL PAINTING

If you buy premade canvases, several of the following steps will likely have been done for you. However, if you are preparing your own surfaces, you'll need to know what products to use, and that depends on the surface you want. Imagine the anatomy of a canvas from the bottom upward. This illustration shows the different types of barriers required between the surface and the paint. The types of barriers you need will depend on the type of surface you want and the longevity and feel you desire.

A barrier is needed to seal the surface of raw canvas or panel. This barrier will be sizing, ground, or both. It prevents the oil in the paint from sinking into the raw surface and potentially rotting the substrate.

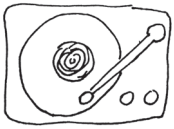
Fabric substrates (whether canvas on panel or stretched on stretcher bars) need sizing if you're using an oil-based ground. You can skip the sizing if you are using an acrylic ground (see "Acrylic Gesso"), but you will need many more layers of acrylic ground to get as smooth a surface as you would with sizing plus an oil-based ground, and the feel of gesso and/or acrylic gesso will always be more absorbent.

SIZING

Sizing is a term that always confused me when I first started painting, because it has nothing to do with the size of anything. Rather, it is the barrier artists put on a surface before applying a ground or an oil paint layer. The purpose of the sizing is to adhere to the substrate and provide a film to protect it from the paint.

RABBIT SKIN GLUE

The historical and traditional way to size a surface was to apply an animal collagen, such as rabbit skin glue (RSG). Fortunately for rabbits, it has since been scientifically confirmed that RSG is not, in fact, the best type of barrier. It continually absorbs moisture from the atmosphere, and this leads to flexing, which eventually causes the oil paint to crack. Rabbit skin glue is still available, however, if you want to give it a try. It comes in powder form, and you slowly heat it with water and white pigment to make a mixture. This sizing shrinks when it dries, tightening the linen and giving it a drum-like surface.



PVA SIZING: THE MODERN SOLUTION

Modern sizings are PVA ("polyvinyl acetate") or acrylic dispersion, which, unlike RSG, do not absorb ambient moisture into the fabric. The key element to look for in a modern sizing is a neutral pH. As long as you do that, you need not worry as much about chemicals in modern sizings as you would in other oil painting materials.

GROUND

After sizing a canvas comes the application of a ground.

HISTORICAL GESSO

The original historical ground was gesso. Gesso was first made in medieval times with parchment glue and well-slaked plaster. *Slake,* or **slaking**, is a term used to describe plaster or a like substance that has been evenly distributed. The word *gesso* is Italian for "gypsum" (calcium sulfate dihydrate), which, when mixed with water and animal glue, creates a luminous painting surface. This original gesso is a mixture of plaster and/or calcite and glue (often RSG). It was used and sometimes still is used for treating raw wood panels before the paint layer was applied. Multiple layers of gesso can be sanded to a smooth, ivory-like surface. A regular (less smooth) ground requires about two coats of gesso.

ACRYLIC GESSO

Today, we have acrylic gessoes that are more gritty and absorbent than their historical forerunners. They serve the same purpose and do not require sizing. Acrylic gesso is similar to acrylic paint but thinner. Since the name *gesso* is used for both the modern acrylic and historical versions, it can cause confusion among painters, especially since one requires sizing and the other does not. Just be clear about which one you've purchased, and remember that you only need to size first if you're using the nonacrylic version.

Acrylic gesso requires about four coats. Give it three full days to dry, and then wipe off the surface to remove any particles left over from the acrylic evaporation process.

ALKYD-BASED GESSO

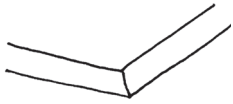
Another type of ground is made from an alkyd resin, titanium dioxide, and chalk. It is less absorbent than acrylic gesso, and paint laid on top of it will better retain its color saturation. Alkyd-based gesso does not require sizing and needs only about two coats.

OIL (LEAD-FREE) OR LEAD GROUND

Oil ground refers to a coating that either contains Lead White (hence having lead) or is "lead-free," which means that the coat contains Titanium White along with other possible materials. The former was more common before acrylic gesso was invented. The lead-free version made its appearance due to the toxicity of lead. It remains highly desired for its smooth and buttery surface and strong support film, but it is more expensive to purchase and to make than acrylic gesso and takes far longer to cure before paint can be applied. It requires sizing and two to four coats, depending on the smoothness of surface you're looking for. The more coats, the smoother the surface will be after sanding.

OIL VERSUS ACRYLIC: THE GOLDEN RULE

The thought of layering oil paint atop an acrylic ground brings up an oft-repeated notion about oil versus acrylic paint: *You can paint oil over acrylic, but you can't paint acrylic over oil*. Imagine painters who have heard this throughout their painting journey, holding a brush of acrylic paint an inch from an oil painting and wondering whether the art police would break down the doors should the brush touch its surface. There are a million exceptions to this rule, and even more examples where it has been broken without too much incident, but the true reason for it is that the acrylic will eventually flake off the oil paint, threatening the longevity of the art.



STRETCHED CANVAS DEPTH

The depth of a painting refers to how far its surface would be off the wall if you were to hang it without a frame. Many new artists start out wanting "The Important Feeling" and will buy canvases with an arbitrarily deep profile (up to two inches). Canvases with too much depth also take up too much space in the studio and will reinforce the feeling that the painting is a precious object, limiting your sense of freedom. It is also difficult to find frames for canvases with larger depths. There are a number of options for buying or making a surface with a thinner profile.

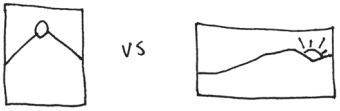
PANEL

If its heavier weight is practical for you, panel, which is rigid and also has a thin depth, is actually the best for archiving purposes. You can buy pretreated panels, just like pretreated canvases, or you can size raw panels yourself using the materials listed under "Sizing."

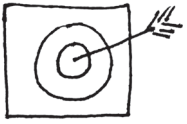
UNSTRETCHED CANVAS

Another option is to buy canvas by the roll and staple cutout pieces directly to a wall. (Be sure to leave an extra 3-inch margin so you can frame your work later.) I tried this for an entire body of work and benefited from how it made the paintings feel less precious. But I found the drawbacks to be twofold: First, I couldn't easily turn the paintings to face the wall while drying, and it is vital to have a "fresh look" experience when reevaluating a painting before diving back in to a new layer. Second, when it came to stretching the final product, if it was not aligned perfectly on the first try, the whole painting had to be restretched, which was costly and wasted time.

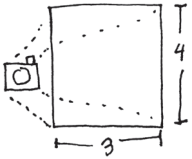
ORIENTATION & PROPORTION



The three most common types of shapes are rectilinear in the form of portrait, landscape, and square. (Circles, ovals, and even triangles do exist but are more rare and often custom created or built.) Each contributes to the subject matter and affects the way the viewer's eye travels across the canvas. Portrait draws the eye vertically; landscape, horizontally.

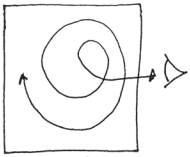


Some painters, wanting "The Contemporary Feeling," opt for square, which can feel "industrial." The square orientation draws your eye to the center of the composition.



The most common sizes of premade canvases are portraits or landscapes in aspect ratios of 2:3 (e.g., 12 x 18 inches), 3:4 (e.g., 36 x 48 inches), and occasionally 4:5 (e.g., 24 x 30 inches). These proportions (in various measurements) are the most common for the mass-produced canvases sold in art stores.

When viewing art in galleries and museums, you'll notice that most serious contemporary painters seldom use standard aspect ratios for their canvases. Rather, the aspect ratios of the art they exhibit more often have proportions between 4:5 or even closer to 5:6. The reason, I surmise, is that because the 3:4 ratio invokes a standard size, the resulting artwork can look like a copy of a photograph or like it came premade from an art store.



Some artists, on the other hand, use standard ratios all the time. A few years ago, David Hockney made great use of 4:3 ratio canvases by clustering them together in a grid pattern for his London exhibition on nature. Many artists use canvases that are almost but not quite square (7:8 ratio, for example), which causes the eye to travel around the canvas longer.

When I build a body of work for an exhibition, I sometimes get many canvases in the same proportion, even if in different sizes. This not only unifies the look of the show but also allows me to avoid constant compositional reorientation. It's a personal preference.

CUSTOM-MADE STRETCHER BARS & PANELS

Some manufacturers make custom museum-quality stretchers using the latest technologies. Most of the time, this is not necessary. When learning the piano, you don't need to practice your scales on a Steinway. Unless you're already selling, the highest-quality stretcher bars might stifle your sense of experimentation. Some artists also purchase pre-primed fabric and purchase their own stretcher bars to assemble or send it to a canvas maker and have it stretched into specific sizes.

Regardless of how you arrive at a stretched canvas, it is important to note that a best practice for longevity is to cover the back of the canvas with a hardboard (such as matboard or fiberboard) after it's on the stretcher bars to prevent the cloth from being directly exposed to the open air and, hence, the moisture that emits naturally from the walls of any type of building.

PAPER & CANVAS PADS

To avoid thinking about the surface altogether, another option is to paint on pads of various materials first. Try oil paper or even primed cotton or linen, which is sold in pads of paper-like sheets. Just be aware that the texture and drag of paper feel very different from those of canvas, and paper is much more absorptive, requiring a lot more paint.

A heavy watercolor paper that has been thinly primed with an acrylic gesso primer also works fine, but the main challenge there is warping. In the last decade, a pre-primed line of oil paper has emerged that does not require gesso. However, I've experimented with it and observed that the oil still seeps through.

The reality is that paper is the weakest and most ephemeral of all substrates. This is why paintings on paper are often displayed behind glass in the darkest room of a museum. And this is also why we don't have studies or sketches from the "masters," except for those that were painted on vellum (treated animal hide) rather than paper. Sketching or practicing in oil on paper can be useful, but I personally prefer to use canvas or panel for the main event.

When I was transitioning to a solvent-free oil-and-chalk method, I used a "pad" of primed linen to experiment. If I made a piece I loved, I could always affix it to a hard surface later using an acrylic gel medium, which functions like glue. (I know of artists who augment oil paintings by affixing painted paper fragments to them using acrylic gel medium.) Just make sure the back side of the paper or cloth is primed with gesso before mounting it in this way.

PREMADE CANVASES & PANELS

Over the years, I have tested many of the premade canvases and panels on the market, though new products do crop up from time to time. I steer my beginning students toward finer-woven, oil-primed linen on stretcher bars with a with a ⅞-inch depth. Cotton, while less expensive, is a harder surface to paint on if it's not high quality or you aren't familiar with the brand. For this reason, I encourage students to try linen rather than cotton and to opt for thin-framed depth while experimenting. If they make a masterpiece and worry that such a simple substrate setup will not last, they can always affix it to a panel or frame it later.

PREMADE CANVASES & PANELS

$$$

Raphael Oil-Primed Belgian Linen

Museo Alu-Frame Stretched Linen

ArtFix Belgian Linen

Artefex ACM Aluminum Composite Material Boards

Old Holland Claessens Oil-Primed Stretched Linen

Pissarro Professional Oil-Primed Canvas

Fredrix Lead-Free Classic Oil-Primed Linen

Claessens Oil-Primed Linen

$$

Centurion Deluxe Linen
(COMES IN BOXES OF THREE OR SIX WITH THIN FRAMES, IDEAL FOR WORKSHOPS!)

Odessa Stretched Linen

Senso Raw Canvas

Paris Oil-Primed Linen

Fredrix Linen

Blick Premier Deluxe Cotton

Winsor & Newton Professional Cotton

$

Practica Cotton

Paramount (All Media) Cotton

The Edge (All Media) Cotton

Blick Academic Cotton

Masterpiece Cotton

Winsor & Newton Classic Cotton

PAPER & CANVAS PADS

PAPER BRANDS

Arches Watercolor

Daler-Rowney Watercolor

Strathmore 300 or 400 Series

Canson Canva-Paper

Canson Montval

Yupo Ultrasmooth

CANVAS PADS

Centurion Deluxe Oil-Primed Linen

Senso Clear Multimedia Linen Pads

Fredrix Canvas Pad (Cotton)

GESSO, SIZING & MEDIUMS WITH PAPER

Liquitex Acrylic Gesso

Winsor & Newton Acrylic Clear Gesso

Golden Gesso Primers and Grounds

Acrylic Medium, for adhering paper, any brand

DIGITAL TECHNOLOGY

Has there ever been a time when painters haven't hungered for ways to shorten the distance between what they can see or imagine and what they can communicate on canvas? In David Hockney's illuminating book *Secret Knowledge,* he showcases the extent to which painters have always used technology to copy reality better. Instead of demonizing modern technology as the antithesis of our ancient practice, let's consider it as a possible extension of our medium. One can only imagine what Leonardo da Vinci would have done with the tools available today.

THE INTERNET

The Internet itself is a prime example of a technology artists can employ for their art. It allows us to find any image to use as a source of inspiration, no matter how far outside our geographical neighborhood or contemporary timeline. We can view the works of virtually any artist, living or dead.

In addition, the Internet offers unlimited exhibition space. All artists should have their own website to showcase their work. Art needs oxygen. Exposure can lead to opportunities that will enable you to make more art. Many services, such as WIX and Squarespace, offer easy templates to set up your site and charge only a nominal monthly fee. Stick with the simplest, least distracting template possible. Only your work should shine.

SOCIAL MEDIA

If you only have one social media platform, it should be Instagram. This is where people go for visual content. Follow as many artists as you can (my handle is @kimberlybrooksartist). I like to think of posting my work on Instagram as an extension of my art-making practice. Even if you don't want to deal with social media at all, I still recommend that you set up an Instagram account. Make a grid of nine paintings or details, link to your artist's website in your profile bio, and never look at it again (if you must). To be an artist today and not have this type of social media account is to not exist. If a tree falls in the forest . . .

PHOTOSHOP

Photoshop not only is an extraordinary collaging tool but also can be used to alter photographs of your artworks in progress so you can play with what your next painted layer might look like before actually touching brush to canvas. This dramatically increases the possibilities for experimentation. Rudimentary knowledge of Photoshop is a painter's best friend. I spend at least one class with all my students showing them its capabilities, and they always gasp in amazement.

To get started with Photoshop, learn to use just the top four toolbar items: Select, Marquee, Lasso, and Magic Wand. If you know these, you know 70 percent of what you need to use the program effectively as a painter. You can alter and take apart your half-finished paintings virtually as many times as you want before committing to what you'll actually do next. I offer a class just for artists at kimberlybrooks.com/photoshop. You can get a subscription for a nominal fee at Adobe.com. It's worth it.

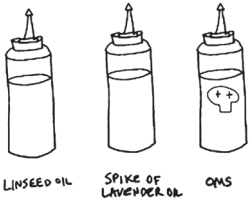
NON-ART STORE SUPPLIES

Some of your most useful art supplies will be found at restaurant supply, beauty supply, or hardware stores.

COFFEE TINS & MASON JARS

Use wide-mouthed containers, such as coffee tins and mason jars, to allow your brushes to fan outward and keep wet brush colors separated. Never put solvent in a large can and place your brushes upside down in it as if to clean them between uses. You will not only be carelessly releasing harmful VOCs into the air, but you will also ruin your brushes by resting them on the tuft and socket. Also, do not leave in-use brushes haphazardly on your worktable or palette surface. While

painting, they should be upright in a designated wide-mouthed container and fanned out so they do not touch other brushes with color on them. This avoids the need for dipping them in solvent and lessens the risk of a muddy palette.



PLASTIC SQUIRT BOTTLES

If you do use solvents, minimize their exposure to the air by storing them in squeeze bottles with caps. Uncap them only to dispense the solvent. I sometimes store my drying oils in squirt bottles to unify my paint setup. Most restaurant supply stores carry plastic squirt bottles for condiments.

HAMMER & NAILS

A hammer and nails are not simply for hanging finished paintings. If you can, I recommend painting with your canvas nailed directly on a wall instead of on an easel. This is for several reasons. First, it saves space in the studio. Second, the easel encourages sitting for long periods of time, whereas if you paint on the wall standing up, it's better exercise and you can more easily walk back and forth to see the big picture. It becomes a dance. Also, when you stand and look at a painting on the wall, the angle and plane from which you're viewing the painting replicates the viewer's perspective, whether in a home, a gallery, or a museum. Directly facing a painting creates a one-on-one relationship with your art.

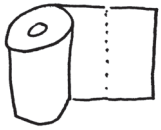
STOOL, LADDER, CHAIR

Having a steady support mechanism for working every aspect of a painting is an essential element of a good studio practice. If you're making a big picture, use a proper step stool, a ladder, or better yet, a scaffold for larger paintings. In addition, I like having a chair at the back of my studio just so I can sit and contemplate a work in progress.

RAGS

The rag is truly just as vital a tool for painting as a brush, but it doesn't get nearly as much attention. Where the brush adds, the rag takes away. It is used to wipe away a glaze to reveal highlights or to remove unwanted strokes over an oiled-out surface. It can also be used to spread paint to create an atmospheric effect. When you paint solvent-free, this is especially useful and important. The rags that come in bundles at paint stores usually have a lot of uneven pieces with seams and sometimes varying amounts of lint. If they're too long, you risk dragging them along the lower part of the

painting and making an unwanted mark. I cut my own rags and keep a stack of 8 x 8-inch pieces of the most lint-free cotton I can find, usually my son's old T-shirts. It's worth reiterating that you must dispose of any oil-soaked rags in a sealed metal container to avoid a fire hazard. Another safeguard is to soak them in water and then seal them in a plastic bag with the air squeezed out to further avoid the possibility of combustion.



PAPER TOWELS

Paper towels are a critical supply for an oil painter. Use paper towels to wipe your palette knife between colors. I fold up a stack of paper towels accordion-style to the left of my palette because I'm right-handed and keep my palette to the right of me while I paint. With the towels to the left of the palette, I can clean my palette knife (or brush) close to both the painting and the paint. An alternative to paper towels is a hardback book with uncoated paper that can lie flat. It has a much higher surface area for wiping your mixing palette knife clean, and all the colors on the text have the effect of making a beautiful by-product if you don't mind losing the ability to read the book.

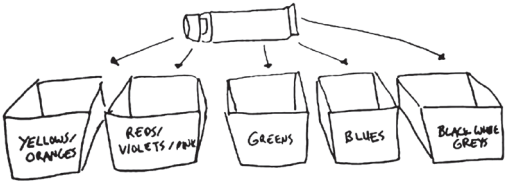
PLASTIC CUPS & CONTAINERS WITH LIDS

Disposable plastic cups are ideal to help you avoid washing pigments or oils down the drain. Using plastic cups helps you retain and reuse your materials and keeps you from washing metal or glass containers for reuse, which avoids getting pigments in the water supply. Suitable cups and containers are available in many sizes at restaurant-supply stores. I use the smaller ones intended for drinks as containers for mixing mediums and the midsize takeout-food containers with airtight lids for storing mediums.

Lidded containers can also be used to store excess paints or paint swatches. Using a palette knife, scoop up your carefully formulated colors from the palette and then wipe them against the rim of a container, and seal it. Write the pigment recipe, along with the name of the painting, on the lid with a Sharpie. I often have multiple containers for each layer of a single painting. There are many ways to keep these paint swatches wet longer, including storing them in the fridge or adding to the container a paper towel with a few drops of clove oil. When the paint does dry, it forms a skin that I can pop whenever I want to use the color I saved.

CHOPSTICKS

I like to use chopsticks to mix the mediums and glazes I make from linseed oil and marble dust. I then pour the resulting mixture on the palette and mix in color (often with a chip brush) before adding it to the canvas.



SHOEBOXES & STORAGE CUBES

Old shoeboxes make great storage containers for extra oil paints, which can be sorted by color. I divide my paints into green, blue, red/violet, yellow/orange, and black/gray/white boxes. I also love to use foldable cloth storage cubes for everything else in my studio. Use whatever it takes to keep you organized so you can spend your time painting instead of searching for materials you may need in any given moment.

INSTRUMENT TRAY

An instrument tray on wheels (or a hair dryer stand from the beauty supply store) is excellent for keeping commonly used paints at hand but off your palette table, and you can easily roll it around the room as you need it. I keep my paint tubes in rainbow order on the tray, arranging them from warm to cool colors. I love the slightness of this simple tray, which I can roll or fling around the room as I paint, as if I had my own private butler holding my paints for me. Available on Amazon or at any beauty supply or medical equipment store.

WHITE ARTIST'S MASKING TAPE

Rather than the blue or yellow painter's tape commonly found in hardware and paint stores, I prefer white artist's tape, which will not interfere with my sense of color if I'm using it on or near the canvas. Our eyes are more sensitive than we think.

GLOVES

I always wear gloves when I paint to protect my skin from exposure to any heavy metals from the more specialized mineral inorganic pigments I use, such as Lead White, Cadmium Yellow, and Vermilion. I recommend that you wear gloves, too. Gloves come in different materials, all of which are protective, including latex, vinyl, and nitrile. Neoprene gloves are only necessary with solvents, which of course I recommend avoiding. I prefer lightweight, clear vinyl gloves for a few reasons: They're loose-fitting, and they don't make my hands sweaty. They aren't a bright color and thus won't distort the colors I'm seeing.

APRON OR WORK OUTFIT

Putting on an apron before I paint feels ritualistic, like the beginning of a religious ceremony. It means I'm ready for action. Plus, I save time by not having to change into painting clothes every time I paint.

CHECKLIST

ART STORE

- Paints
- Brushes
- Brush Cleaners
- Canvas or Panel
- Canvas Paper
- Palette Knives
- Palette Surface
- Drying Oils
- Chalk or Marble Dust
- Varnish
- White Artist's Tape
- Metal Butcher's Tray

RESTAURANT, BEAUTY, OR HARDWARE STORE

- Instrument Tray
- Hammer and Nails
- Easel (optional)
- Cotton Rags
- Paper Towels
- Disposable Plastic, Lidded Containers
- Gloves
- Apron
- Chopsticks
- Worktable
- Metal Garbage Pail with Lid
- Sharpies

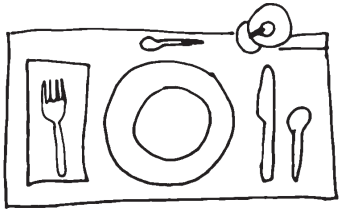
PART 2

BEST PRACTICES

As with any creative endeavor, uncertainty regarding painting technique can all too easily bloom into an unnecessary obstacle. This section addresses the most common questions I get, even from experienced painting students. Many of these practices are particularly helpful when converting to solvent-free painting. These simple suggestions provide not just direction, but relief.

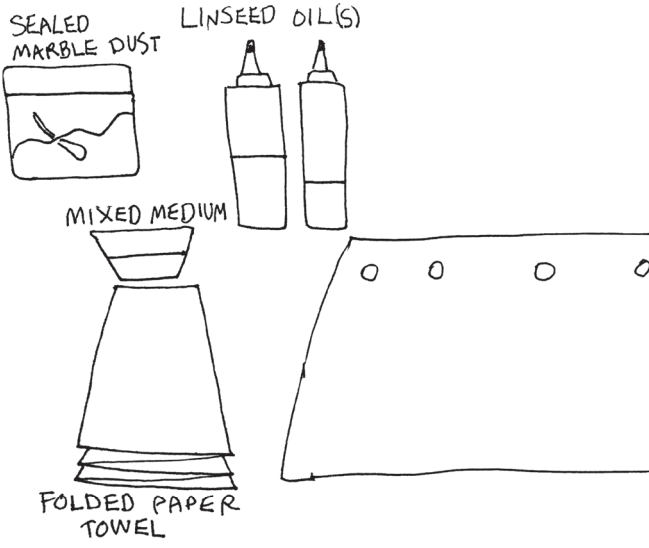
Remember, painting is not merely drawing on a surface and filling in the colors. Rather, it is a space for you to create, discover, and set free. Let nothing stand in your way. I encourage you to experiment with these practices, and keep the ones that work best for you.

SETTING THE TABLE



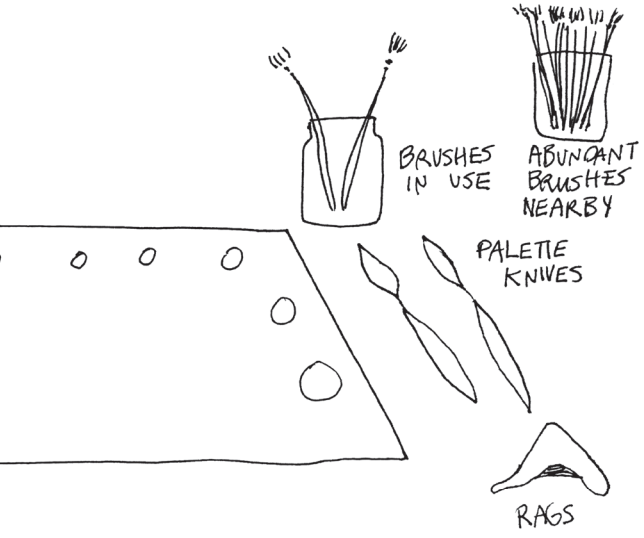
Setting the table before painting brightens the ritual and enhances creativity. Like the careful precision of a Japanese tea ceremony, or the laying out of china and silverware before a special meal, making a conscious effort to set the table paves the way for new possibilities every time you enter the studio.

Setting the table in a consistent fashion each time you begin painting will help your hands and body become more fluent with where things are in space so you can spend more time and energy painting. You should never have to think about where you need to lay your hand to grasp for what you want in a moment. Imagine how disorienting it would be if, every time you went to drive your car, the steering wheel and pedals



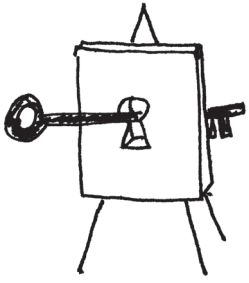
were in a different place and you had to retrain your brain. A proper and consistent setting will more quickly usher you into the painting mind-set. All these measures I recommend add up, so the effort you expend will be directed toward what is happening on the canvas.

The diagram depicts a palette surface of your choosing with the colors along the top and one side so as not to interfere with the mixing area. On the left are paper towels folded accordion-style and a small cup of medium of your choice. I mix a fresh batch of medium (some combination of linseed oil and marble dust) every



day. I have nearby a sealed container of marble dust and linseed oil in a ketchup bottle. In the upper right is a mason jar with used paint brushes fanned outward so that the colors do not pollute one another. Another jar holds unused brushes that are ready to go. Near that is a palette knife, which is essential for mixing colors on the palette. And below that is the indispensable rag. Because I'm right-handed, my canvas would be to the left of this whole setup.

TONE YOUR CANVAS FIRST



Artists most often need an *imprimatura* to begin. Traditionally artists start with an earthy, atmospheric mass. Contemporary artists add their own twist, like Helen Frankenthaler, who poured paint on the backs of the canvases in order to react to the shapes created on the other side. Best to leave the blank page to our artistic cousin, the writer. Unlike the medium of watercolor, where the white of the substrate provides the light and darks are added, painting with oil involves adding light, and starting with a percolating rumble of colors only makes any added layers richer. Traditional Renaissance painters carefully mapped or transferred a drawing onto a surface and then applied a toning layer that served as a fixative for the drawing and also

created colors other than white on which to apply paint. Colors shift in appearance depending on the colors and **values** that surround it. This first layer does not have to be perfect by any means—in fact, the lightest atmospheric layer of color will do. It is simply a way to start the process. Common toning colors involve earth tones such as Raw Umber or Sienna. Many contemporary artists use hot pinks and then paint more subtle hues over them. Whether or not toning colors are visible in the resulting painting, they make the colors above jump and sparkle nonetheless.

Toning a canvas has many other advantages. It unites color values and invigorates areas of the painting that are uniform. Toning can also act as an outline for the central picture. There are many different approaches to starting a painting by toning a canvas. Some artists use one or two colors to create shadows and provide contrast for the complementary colors to come. Others create a sketch by laying down an atmospheric tonal layer then using a rag to wipe away areas of it to expose the lighter ground underneath, thus loosely mapping and blocking out a composition with paint. Another excellent method is to recycle an old painting by toning it with a thin glaze before beginning a new composition on top. The partially obscured painting underneath will offer unexpected areas of excitement and the painter a chance to rejoice in discovering where it might lead.

Most artists today are taught to tone a canvas with paint diluted by solvent. Therefore, artists seeking to

make the conversion to solvent-free painting struggle most with this first layer. Instead of using solvent, try creating a transparent mixture of chalk and oil, and use a chip brush or rag to spread it around with color and create atmosphere. Yes, it takes a bit longer to dry, but it maintains the integrity of the materials and is very easy to get used to. Remember that you need only a minuscule amount of oil. I always tone multiple canvases at once, often with just one disposable chip brush. If the canvas has an absorbent, non-oil-based ground on it, you can also do the toning in watercolor, but it has to be applied relatively dry. Golden makes an absorbent, acrylic gesso, and after it is dry, and because it's a water-based medium, you can consider toning the surface with a very thin, matte acrylic or watercolor.

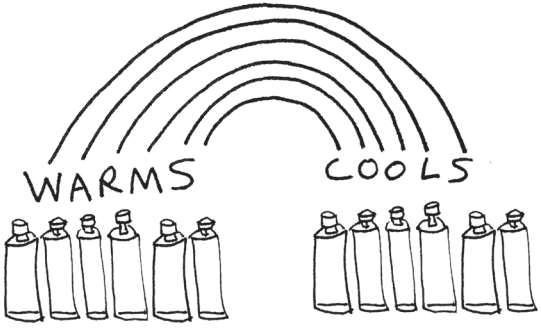
Regardless of your method, the atmosphere created by toning does more than merely spring applied colors to life; it turns the canvas into a window revealing the endless possibilities of what the painting can be. Starting a painting on white is akin to listening to music in mono, or to landing at Charles de Gaulle Airport to visit Paris but never leaving the tarmac. Starting with color opens the doors to richness. The image on the painting should be conjured as much as rendered. Give yourself that chance by toning the canvas first.

COLOR MIXING GOLDEN RULES

Palettes are ideas. Creating a space to be thoughtful about how to tilt a color cool or warm, dark or light is an essential part of beginning a painting or a new layer. Many rookie painters get so excited by color that they rush to lay down paint too quickly without taking the time to array their colors before them. Having the color story figured out before you start painting can allow you to get lost in the moment better.

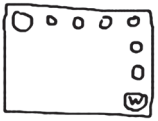
TOOLS FOR COLOR MIXING:

- Paints
- Any kind of table or surface near your canvas
- As large a mixing surface as your space can handle
- A palette knife with a wide surface (not a brush)
- Paper towels, folded accordion-style
- Plastic tubs with lids



LAY OUT YOUR TUBES OF PAINT IN RAINBOW ORDER.

I generally have two rows, with the top being warms (reds, yellows, pinks, violets) and the bottom cools (blues, greens, blacks). I always have a larger tube of white. Organizing colors to start a painting session is an excellent way to collect your thoughts. I keep my paints on an instrument tray that I can move out of the way later.



ORGANIZE YOUR COLORS ON THE PALETTE.

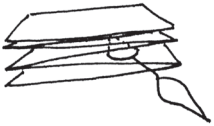
Squirt your colors at the edge of your palette. Too many young students squirt their colors in the middle, ruining precious mixing real estate. I keep a dab of all of the colors that I commonly use at my fingertips so that I don't have to take out a tube of paint every time. Clockwise from the top are the earth tones (Burnt Umber, Burnt Sienna), the blues (Cerulean, Ultramarine, Cobalt, or whatever else I'm using), the yellows, and the reds, ending with white. If you're right-handed, you'll want to have your palette close to your right side.

WORK OUT YOUR PALETTE BEFORE YOUR BRUSH HITS THE CANVAS.

Taking a few moments to work out the color palette of your next painting layer before you touch the canvas will catapult your painting skills to a whole new level. I keep a notebook on my desk just for color recipes. I smear small swatches directly on the paper and write the pigment combinations down, lest I forget. I approach painting the way a scientist approaches an experiment or a chef a recipe.

USE A PROPER PALETTE KNIFE.

An ideal palette knife for mixing has a blade shaped like a 2-inch-long leaf with a pointy tip. I don't recommend the one that looks like a bent butter knife unless mixing in large quantities.

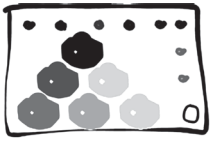


AVOID CONTAMINATION.

To avoid color contamination, wipe the palette knife completely clean every time you incorporate a new color. Do this with your accordion-folded stack of paper towels. Each time you mix a color, you can easily slide the knife underneath a fold in the paper towel, press the top with your hand, and pull it out perfectly clean.

COLOR MIXING PYRAMID METHOD.

The color universe is a big place. Reduce your anxiety by starting with the darkest tones first and building from there. Don't be stingy. Mix your color using an amount of paint at least the size of a squashed orange. The swatch at the top of the pyramid should be the darkest. Once you have a color you like there, remove half of that winning combination, putting a quarter of it to the lower right and a quarter to the lower left. Then add white to them in varying degrees and/or alter or tint them warm or cool as necessary. Remember, colors

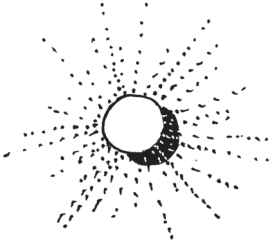


speak to each other and change their appearance depending on what is next to them. If a color doesn't work, scrape it off your palette entirely, but save it for future use. Perhaps you might want to make your own Torrit Grey or a mixture with which to tone a canvas (Fig. 13–16).

SAVE YOUR UNUSED COLOR.

After you've completed a painting layer (or if you have mixed excess color), gather the excess paint of each color swatch off your palette with a palette knife and pull it against the edge of a disposable plastic cup before sealing it with an airtight lid. In permanent marker, I write the paint pigments I used to make the colors, along with the name of that painting and layer, if applicable, on the cup. When you're ready to return to a painting, you can open the cup, pierce the skin that has formed on any of the swatches, and squeeze out the paint you want to use.

LIGHT OVER DARK, FAT OVER LEAN



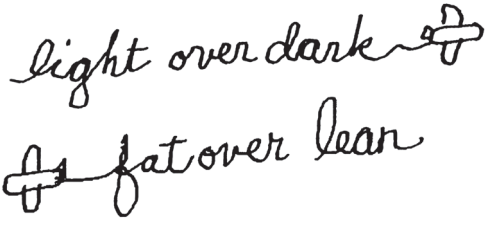
LIGHT OVER DARK

Just like in Genesis, in order to create light, you must first have darkness. Oil painters know the expression "**Light over dark**" and repeat it in their heads as if it were a sacred mantra. When approaching a painting, start with the shadows or darkest areas first. Darker paints tend to be leaner and have less oil, and they can be applied more thinly than their lighter, fattier counterparts. Even in the case of an abstract, work on the darkest areas first. Then, either going in **wet-on-wet** or after each layer dries, slowly build up the color from darkest to lightest. The painting will come alive.

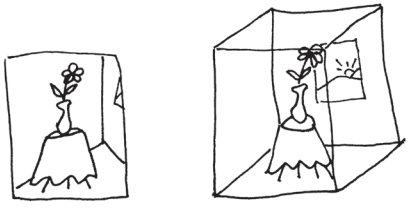
The next time you go to a museum or gallery, scrutinize the order in which the paint was applied, and you will see this principle again and again. I'm most impressed when I see a painting where the shadows are the thinnest of darkest glazes and the highlights are by nature fatter and clearly the last applied. When I see a shadow painted with a dark, opaque color, it feels like a change or an afterthought, like deciding to move the front door to the side of a house.

FAT OVER LEAN

One rule of oil painting is "Flexible over less flexible," which can also be expressed as "Fat over lean." Since oil hardens, gains weight, and expands as it dries, you risk the top layer cracking and cupping if it is leaner than the layer below. It might take years, but it will happen. Adding to this, lighter colors, especially whites, tend to be mixed with oils that are less yellowing—such as safflower or walnut—and those oils also have a slower drying time and harden less. So follow this rule: Keep the underlayers thin and matte, and use thicker oil only as necessary to saturate the final layer.


light over dark
fat over lean

THINK IN THREE DIMENSIONS



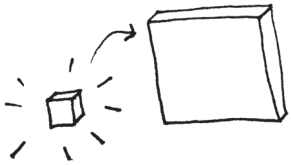
"I saw the angel in the marble and carved until I set him free."

—MICHELANGELO

Part of the wonder and magic of oil painting is its ability to create three-dimensional space. Let's use decorating a room as a metaphor. At first the room is empty, and you start by painting the walls. Then you choose the rug and the largest pieces of furniture. Next, you slowly layer the finishing touches of objects and window dressings. If you're depicting a pattern, find the underlying shapes and shadows before dappling or streaking the pattern on top. If you're depicting a landscape, start with the sky, and slowly progress toward you, painting the closest elements last.

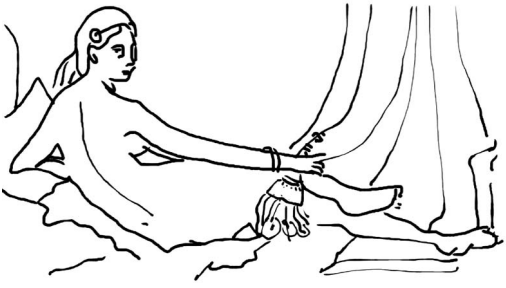
Don't start with the eye. Think in terms of shapes rather than lines. Many people who are attracted to painting have spent years drawing first, perhaps in their notebook margins at school or in a sketchbook. But painting doesn't have to be and rarely is a line-based art. If you're painting a face, find the planes and shadows of the head, and slowly work toward the refinement of features last. Too many of my students start with the details first, such as the eye. This affliction, which I call **premature articulation**, is common among new painters. It can easily be avoided if you consciously start thinking about composition in three dimensions: Begin at the back, and move forward.

STUDIES & MAQUETTES



Many painters create smaller studies in various media before beginning a primary work. This can involve everything from sculpture to photography to collage, and sometimes all three. Photoshop has also become an integral part of the composition process for some painters. However you create your composition, a helpful second step is articulating the paint layering strategy you might employ to achieve the effects you want before starting on a larger surface. These painting studies (also known as *maquettes*, a term borrowed from sculpture) help the artist gauge color, the architecture of each layer, and overall composition. When I make maquettes, I often discover accidents I want to

keep—elements I did not originally envision but that I find so exciting that they will make it into the larger incarnation. What is the ideal size of a maquette? While the choice is ultimately personal, over the years, I have learned that when it comes to studies, size does matter. Too large and you end up incorporating too much detail; too small and you don't have enough space to really see how a larger version might turn out. I used to favor a very small 6 x 8 inches, which would force me to have zero detail. When I went too large, beyond 9 x 12 inches, I found myself overarticulating details. Nowadays, I think 8 x 10 inches is the ideal size for planning a larger painting. All of these common sizes are available in most surface types.



CLEANING BRUSHES

I shudder to think how much turpentine I poured down the drain cleaning brushes when I first started to paint, not to mention how many brushes I thought were ruined, threw away, and had to replace. It's amazing how many painters yearn for a better way to clean their brushes that won't hurt the brushes or the environment. In the past, painters did not use solvents to clean their brushes. Traditional oil painters, such as Rembrandt, typically used walnut or linseed oil instead.

Over a decade ago, I tried every product and method imaginable to rid my practice of solvents and to avoid washing any chemicals or pigments down the drain. In the end, the simplest and best method is

the well-documented way painters did this hundreds of years ago: Wipe off any excess pigment with a rag, store the brushes horizontally in an angled tray of walnut or safflower oil overnight, and then wipe off the excess oil at the beginning of the next painting session. I employ a variation on this cleaning method with the following materials (Fig. 18):

- Paper towels, rags, or an old hardback book
- A glass container with a metal coil inside
- An enamel butcher tray
- Walnut or safflower oil or nonoily cleaning solution
- Soap (Masters Brush Cleaner and Preserver or Murphy Oil Soap)

BRUSH CLEANER

What kind of brush cleaners you use may vary depending upon how often you want to clean your brushes thoroughly, your proximity to a sink, and how often you paint.

SLOW-DRYING OILS

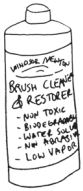
The oil that you use in a slightly tilted tray to loosen excess pigment and condition brush hairs overnight should be walnut or safflower oil. In this case, an oil from the health-food store is fine, since it is not used on the painting but only to keep the paint from drying on the brush and making it easy to wipe off for the next painting session. A small batch of slow-drying oils can be reused, as the pigment will drift to the bottom of the tray.

VEGETABLE OIL

Instead of a nonoily brush cleaner, you can use any vegetable oil (the thinner, the better) to rinse your brushes. Remember that like dissolves like. In this case, oil rinses off oil.

SOAP

Another cleaning solution is good, old-fashioned soap. You would only use soap if you do not want to store the brushes in oil and instead want to get rid of any oil whatsoever. Any soap is viable as a brush cleaner, including dishwashing liquid. Use it for cutting excess oil rather than as a means of removing pigment. For years, I have been using Masters Brush Cleaner and Preserver or Murphy Oil Soap.



NONOILY BRUSH CLEANERS

A relative newcomer to the market, and one I use, is Winsor & Newton Brush Cleaner and Restorer. It is **biodegradable** and has a low evaporation rate. I use this as the second step in brush cleaning (after first wiping off excess pigment) in lieu of a solvent. I keep it in a glass container with a metal coil on the bottom. When you wipe the brush on the coil, the pigment particles sink to the bottom, just as they would in a solvent. I don't change the accumulated solution more than once every six months, and I never pour it down the drain. Instead, I dispose of it by pouring it on paper towels in the metal trash can where I keep any oil-soaked rags. I only dispose of these items in a hazardous-waste facility—and once every six months or so is often enough, even if I paint every day.

CLEANING BRUSHES, STEP-BY-STEP

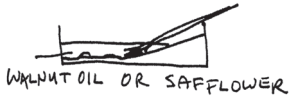
STEP 1

Wipe the excess pigment from your brushes on a paper towel or on a page of an old hardcover book (yes, this is a thing).

STEP 2

Option 1: Rinse brushes in vegetable oil (the thinner, the better).

Option 2: Use a biodegradable non-oily brush cleaner in a glass container with a metal coil in the bottom. (A metal coil can be obtained at any brick-and-mortar or online art supply store.) Wipe the submerged brushes on the coil, let the paint pigment settle to the bottom, and don't dump out the container.



STEP 3

If you're cleaning a brush to reuse it immediately, simply use a slow-drying oil (such as safflower oil or a vegetable oil) to rub the excess pigment off the brushes. If you're cleaning your brushes overnight, lean them in an enamel butcher or painter's tray that is partially filled with walnut, safflower, or vegetable oil (or Winsor & Newton Brush Cleaner and Restorer). Angle the tray and then rest the long brush handles against the lip of the tray so that only the hairs soak in the liquid overnight. (Note: If you use a brush-cleaning solution and it touches the wood of your brushes, it will take the paint off.) This step loosens up the paint particles and moisturizes the bristles simultaneously. You do not need to dispose of the oil or solution afterward; it can be used for months. Sometimes I just use dishwashing liquid in water for this step.

STEP 4

Using a rag, thoroughly wipe the excess oil or cleaner from the brushes. Swirl the brushes on a soapy surface such as the Masters or any bar of soap. Solid soap is preferable to liquid soap as it lessens the amount of oil or pigment that can get rinsed down the drain. I remove any excess pigment or oil with a rag or paper towel.

STEP 5

While you rinse the brush hairs with water to get off any soap, rub the base of the hairs between your thumb and forefinger until they're clean.

AFTER CLEANING BRUSHES

- Always dry your brushes flat.
- When storing them upright, lean them on the ferrule, not the hair.
- Shape your brushes with gum arabic, which dissolves in water.
- Don't use any cleaning product with grit.
- Dispose of any liquid at an authorized hazardous-waste facility.

STORING YOUR WORK

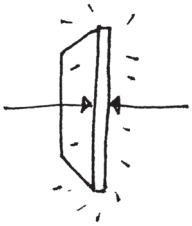
An artist often works on several paintings at once. Oil paint dries slowly, and you'll be waiting two days to a week between layers (and most paintings are composed of multiple layers). Rather than thinking of this delay as a problem, consider it a luxury. The passage of time offers you an opportunity to *not see* your painting while a layer is drying. Giving your eyes and mind a break from a piece will give you a fresh take the next time you see it—and this is a true gift.

To take full advantage of this opportunity, store your paintings in progress in a manner that allows you to avert your gaze from them. Face them toward the wall, with the largest painting closest to the wall

and smaller paintings leaning against the bigger ones. The smaller paintings that lean against the taller ones will only have their very topmost painted edge touching the back, nonpainted edge of the painting in front of them. Even the smallest studio space can be maximized this way. It will save space and also protect your paintings from ambient dust.

Remember that oil becomes clearer in sunlight. If you ever have a painting in storage that looks a little yellow or dull, all you have to do is expose it to sunlight, and the yellow will fade away.

FRAMING & PAINTING THE SIDES



When all is said and done between you and your canvas, the question emerges, To frame or not to frame? The answer is that it depends. If you're exhibiting your work in a gallery or exhibition space, the decision will be as much dependent on the curator or dealer, the type of space, and what is in fashion at the time as it will be on your own preference. Some artists view the nature of the support as an integral part of the work itself. I recently met with an artist whose work, which was en route to the prestigious Venice Biennale, was meant to be hung unstretched from binder clips nailed into the wall to represent an aspect of her childhood in Africa.

These days, most galleries that do frame opt for a simple wooden frame with a quarter-inch "float" (the distance between the edge of the painting and the frame), which often requires that the framer paint the side edges of the stretched canvas black. In the last fifteen years or so, it has become *en vogue* to present all manner of paintings frameless. In that case, the question becomes, What should these edges look like? The answer, once again, is that it depends. If the sides look amazing, if there are gorgeous drips exactly where you want them, leave them. Drips are a narrative unto themselves, indicating where the artist left off and the paint continued on. They are to be revered and treasured.

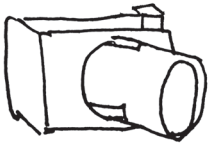
However, if the sides do not look so great, or if there are unwanted fingerprints or residual sloshes of paintings underneath, you will more likely want to paint the sides white: no distraction, as clean as a crisp white shirt. If the painting rests on a white wall, the white edges will disappear, giving the illusion of a surface floating on its own.

Does that mean that you should just get a tube of white acrylic paint and slather it on the sides in an afternoon? A lot of artists do just that. But I find that the hotness of that bright white is often at odds with an oil painting. To cure this ill, I buy three different types of white: Titanium, Unbleached Titanium, and Parchment. I put them on a piece of palette paper with a brush reserved for this purpose, and I mix a version of white

that has just a touch of warmth and variation. As a result, the edge does not compete with the wall or the painting. This combination simulates the creamy lusciousness of a traditional oil-primed canvas, regardless of your actual surface. Like painting itself, the choice to frame or paint the exposed sides is a personal one.

DOCUMENTA

TION

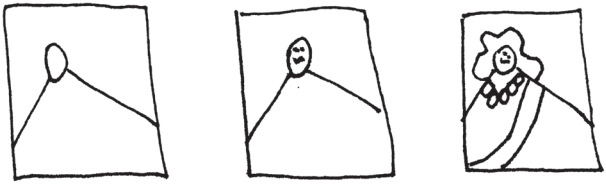


Documenting your work, both as you go and at the end, has two major benefits. First, it is an excellent way to record your progress and to see the development of a painting. You can learn a lot this way. Smartphone cameras can now produce photographs of excellent quality and are perfect for this purpose.

The second benefit—really an essential part of an artist's practice—is keeping a record of the final painting. For this, smartphones aren't enough. The pictures should be print-quality for press and publication purposes. Even if you're a beginner, you must always entertain the possibility that you may one day need at

least a postcard for a show (and maybe someday even have a book published of your work!).

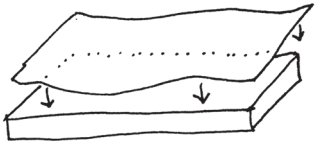
For print documentation, you'll need a better camera. Smartphones capture images in JPG format (a compressed format that saves space), which is fine for the Internet but has color distortion that is not ideal for high-quality printing. For that, you'll need a digital single-lens reflex (DSLR) camera or one of the newer digital mirrorless cameras. For documenting your work, I recommend taking pictures in the RAW or TIFF file format so that you maintain the highest possible resolution. The TIFF format is specifically for print. A simple way to capture an accurate color picture of your painting is to position it outdoors, directly facing the sun, and take a picture with a good-quality digital camera. Otherwise, you can have your work professionally photographed by someone who specializes in documenting art. Although more expensive, a professional photographer will produce excellent results.



DOCUMENT WORKS IN PROGRESS

People always ask me if I'll miss a painting after it's placed in a home or collection. "Au contraire," I respond. It is an honor to have my work included in a personal or public collection; I relish the opportunity. But another reason why I don't mind is that I know that, if I have good documentation, I will still have a record of the spirit of the work, even if the original is no longer in my possession.

VARNISHING



Some artists talk about varnishing the way others talk about flossing. They look both ways and then ask, "Do you varnish your paintings?" A sort of helplessness overcomes even the most experienced artists when the subject of varnishing arises. Sometimes this is simply because of all the different information out there—what's right? But it's also because we often sell our work before it is ready to be varnished (you can't varnish a painting until at least six months after you stop painting), and then who knows what will happen to our paintings after that? On the other hand, some artists I know relish this final act. Varnishing makes the darks richer and the colors come alive as if the paint

were wet again. Some painters don't varnish at all, but I don't recommend this if you want the painting to last.

Varnish is effectively a disposable paint layer that should remain transparent, colorless, and removable with *certain types* of solvent. Since ultraviolet (UV) rays promote the oxidation of paint, it is important to be aware of which varnishes turn yellow when exposed to sunlight. Varnishes that are nonyellowing and long-lasting need not be removed and replaced as frequently as other varnishes. Which kind of varnish finish you use is also an aesthetic choice that will affect the final appearance of a painting.

It is essential to apply a varnish to a painting that is completely clean, dry, and free of dust. The "Varnishing Dos" and "Varnishing Don'ts" lists will guide you. Remember that the discovery of oil painting itself began with a search for a way to varnish and protect egg tempera paintings. It turns out that oil was great for painting but not for varnishing because it yellowed over time, as do natural resins such as damar or mastic. Synthetic varnishes are most desirable.

VARNISHING DOS

- Do wait at least six months after the painting has dried.
- Do before varnishing, clean the painting with a thin brush of fine hair, such as goat.
- Do remove the existing varnish (if any).
- Do document/photograph your painting before varnishing to avoid sheen.
- Do place your painting on top of a board that is larger than the canvas.
- Do apply the varnish in a dust-free room.
- Do use a relatively stiff, thin, wide brush. Synthetics are fine, as is goat hair.
- Do apply two layers.
- Do use synthetic varnishes, as they do not yellow.
- Do start with an isolating varnish (such as Laropal A 81), then finish with Regalrez 1094.

VARNISHING DON'TS

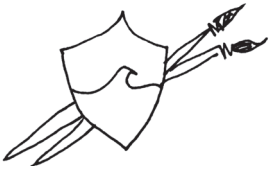
- Don't clean the painting with a feather duster or cloth.
- Don't attempt to remove an existing varnish with acetone, linseed oil, turpentine, window cleaner, tack cloth, or an eraser.
- Don't apply two layers of matte varnish, as refraction will dull the painting. Beware of matting agents in general. A better though more laborious process for achieving a matte finish is to apply wax after a gloss varnish. Always apply a glossy varnish first.
- Don't pour the varnish on and spread it with a brush. Instead, evenly apply it with a lightly loaded brush.
- Don't spray on a first layer. The droplets will cause diffraction, and you risk getting an orange peel finish.
- Don't use retouching varnishes; they are merely diluted varnishes that can cause blooming or tackiness from varnishing an overly matte area.

There are a multitude of varnish brands. The following list contains the ones that I have personally tried.

VARNISH

- Akron P-90
- Conservar Finishing Varnish
- Eastman Regalrez 1094
- Gamblin Gamvar
- Gamblin Gamvar 1094 + UVS Finishing Solution
- Liquitex Soluvar Polymeric Varnish
- Laropal A 81 (used in conservation)
- MS2A
- Royal Talens Picture Varnish
- Winsor & Newton Artists' Gloss Varnish
- Winsor & Newton Artists' Aerosol Spray Varnish

SAFETY



If you're one of those people who likes to start books at the end, you're in great luck. Here's what you need to know: There's no need to use resins or solvents; don't eat paint; don't put it on your skin; and don't inhale it. Remember that there is no such thing as nontoxic when it comes to paints. Toxicity ratings for pigments vary from slightly to highly toxic regardless of the type of exposure, based on the assumption that a person has ingested a spoonful. If you're not eating it, rubbing it on your skin, or inhaling it, the toxicity rating of paint is effectively zero (Fig. 19).

MIXING YOUR OWN PAINTS

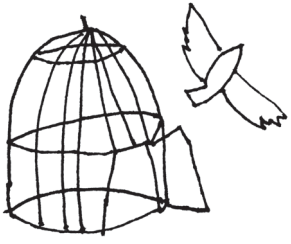
If you want to mix your own paints using raw pigment and binder, you would need to take extraordinary precautions to do it safely, including using a sandblasting box, a method to collect dust that might escape, and a special exchange air ventilation system, to capture the particles that you could still inhale but cannot see. As a practitioner of safe practices, I do not recommend doing it yourself, especially today when we have access to such dedicated artists' paint manufacturers.

DISPOSAL

Hazardous and toxic materials are in everything from electronics, pesticides, and household cleaners to cosmetics and motor oil. Dispose of anything containing pigments or oils, including cleaning water from rinsed containers, at an authorized hazardous-waste facility, rather than dumping it down the drain. I would argue that oil painters are actually far less likely to put oil-based products down the drain for fear of clogging it than painters in the watercolor, acrylic, or water-miscible oil communities, who use water as a solvent and routinely (and incorrectly) turn to the sink for cleanup.

Remember that, in rare instances, linseed oil–soaked rags can spontaneously combust, so use a metal trash can with a lid for them. To find a place to dispose of the contents of that can, conduct an online search for "hazardous waste disposal near me."

ART IS LOVE



If you are an experienced painter wanting to transform your practice, I hope the information in this book has illuminated the materials and inspired you to avoid using solvents. If you are a new painter, I hope this book provides a solid foundation of knowledge to enhance your learning experience. Painting can transform the way you see and experience the world. Everyone has art inside them. I hope this information helps you set yours free.

GLOSSARY

Alkyds: Synthetically produced resins derived from alcohols and organic acids, often involving other components (like metallic driers), that are used as drying aids. The term alkyd comes from a combination of the words alcohol and acid ("alcid").

alla prima: A technique in which layers of wet paint are applied to previous layers of wet paint. From the Italian for "first attempt." This is a common technique for **plein air** painters and any painter who wants to complete a painting in one day. Also known as **wet-on-wet**.

aniline ($C_6H_5NH_2$): An organic compound that was used to create the first synthetic dye pigments. It was later found to be fugitive (likely to fade), and consequently new synthetic dyes were given the name "permanent," as in Permanent Red, when the formula was changed.

biodegradable: Capable of breaking down into natural materials in the environment without causing harm. For example, when a substance *biodegrades* into carbon dioxide, water, and other naturally occurring materials, the substance seamlessly mixes back into the earth, leaving no toxins behind.

calcite ($CaCO_3$): A fine white powder made from limestone or marble and used in oil painting mediums. Also referred to as **calcium carbonate** or **chalk**, the latter of which more typically refers to a compressed version of the same substance.

chalk: A form of **calcite ($CaCO_3$)**. Mixed with oil, it becomes translucent and can be used in a medium. It is also used in a **ground**.

Chromatic Black: A black created by mixing together nonblack, usually transparent, colors.

Dutch stack process: A process for making Lead White in which containers of lead coils in vinegar are placed in a shed with horse manure. The low, prolonged heat of decomposition aids the chemical reaction, and the white lead that flakes off the coils is used for oil paint.

egg tempera: A type of paint that uses egg (the white, the yolk, or a mixture of both) as a binder.

gesso: Acrylic gesso is a similarly named but entirely different product. From the Italian word for "gypsum." A primary ingredient in the plaster concoction used to create a surface for paint.

glaze, glazing: To create a transparent layer across a previously painted surface. Glazing over textured surfaces will illuminate previously unseen dimensions, like spreading jam over cream cheese. Glazing always occurs over a completely dry surface and reduces brightness, making the painting darker. Traditionally glazing is used for establishing shadows on an early layer with opaque colors applied on upper layers. Many artists employ glazing colors to create a harmonious hue, as in music. For example, instead of glazing Ultramarine Blue over a blue surface, an artist might try violet or green to enrich the color. Glazed objects on a painting appear closer. In old masters' works, skies are often opaque while figures in the foreground are glazed.

grisaille: A painting executed entirely in monochrome or near-monochrome, usually in shades of gray. It is particularly used in large, decorative schemes in imitation of sculpture. Grays are rarely made simply with black and white. My favorite combination is Burnt Umber and

Ultramarine Blue. Mixing certain types of opposite colors will make the gray shimmer as it oscillates between the warmer and cooler versions of itself. From the French for "grays."

ground: A technique used to create the first layer of a paint surface. Also, the term sometimes refers to different types of layering techniques that produce different painting effects.

hue: A color or shade.

impasto: The three-dimensional texture of a painted surface, especially that achieved with a palette knife.

imprimatura: An atmospheric midtone applied on a blank canvas.

inorganic: Not derived from or consisting of living matter.

light over dark, fat over lean: A phrase that refers to the basic understanding of how oil paints work. The leanest, least oily paints and darkest colors should be used on the bottom layers, whereas the fattest and lightest colors should be on top. If the bottom layers are not leaner than the top layers, the paint will crack. Lean layers are, in general, darker than white.

marble dust. See **calcite**.

oiling out: The process of putting the faintest layer of oil over a painting before starting to work on it.

opacity, opaque: The quality of being impervious to the rays of light. Opaque paint is nontransparent and covers the layer underneath. Compare **transparency**.

open: A paint that dries more slowly and stays wet longer.

organic: Derived from or consisting of living matter.

oxidation: The process by which drying oil absorbs oxygen and polymerizes. See also **polymer**.

plein air: Painting outside. From the French term for "in the open air."

polymer, polymerization: A chain of molecules that becomes stronger and harder as it dries. When oil polymerizes, it changes molecular structure while retaining its chemical ingredients.

premature articulation: The tendency of newer artists to start the most detailed or exciting part of a painting first. If you're doing a portrait, don't start with the eye.

scumbling: Applying a thin lighter layer above a dry underlayer. Also refers to blending colors with a dry brush.

silica (or silicon dioxide, SiO_2): A nonreactive material and one of the most commonly found minerals in nature. Silica is the major component of sand and also appears as quartz. Fumed silica, produced in a flame, is a common thickening agent for paints and is used with linseed oil in certain gel mediums, such as Oleogel.

size (or sizing): A barrier applied on a surface to provide a separation between paint layers or between paint and an oil ground.

slaking: Dragging a brush back and forth across a surface.

stippling: Creating an image or shape using small dots.

synthetic: A substance that has undergone chemical synthesis, in particular to mimic a natural substance.

thixotropic, thixotropy: Having the characteristic of stiffening up when at rest and becoming more liquid when being moved around, such as when being mixed.

tone: To create a thin glaze of paint across a surface.

tooth: The resistance on a canvas and its subsequent ability to absorb oil.

translucency. See **transparency**.

transparency, transparent: The quality of being fine enough to be seen through. Transparent colors are great for **glazing** and tinting existing colors. They have a higher oil content than opaque colors, and some are viscous. Also known as **translucenc**y. Compare **opacity**.

value: The lightness or darkness of a color.

wet-on-wet. See **alla prima**.

RESOURCES

Artiscreation.com
Artistcraftsman.com
Artistsupplysource.com
Arttreehouse.com
Blueridgeoilpaint.com
Blueroosterartsupplies.com
Brooksartacademy.com
Cheapjoes.com
Danielsmith.com
Davecorcoran.co.uk
Davinciartistsupply.com
Dickblick.com
Earthandflax.com
Earthpigments.com
Gamblincolors.com
Graphicchemical.com
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This book would not have been possible without several sages in the field who have guided me on the path to painting safely and gaining a much better understanding of my materials. These luminaries include Tad Spurgeon, artist and author of *Living Craft*, whose diligent research with linseed oil and calcite opened my eyes at a time when I needed it most (see Tadspurgeon.com). Recently, I have come across the work of George O'Hanlon, founder of Naturalpigments.com and the brand Rublev, who not only offers a generous wealth of knowledge through his website and best practices workshops but also makes some of the most excellent paint products produced today. A special thanks also to Robert Maynord of the Art Treehouse (Arttreehouse.com), whose unique curiosity and dedication to arts education and history have led him to resuscitate and make available historical materials for experimentation.

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ABOUT THE AUTHOR

Kimberly Brooks is a contemporary American artist. She is known for her portraits and landscapes in series addressing identity and memory (*Mom's Friends*, *The Stylist Project*, *I Notice People Disappear*). Her paintings have been exhibited and featured internationally, and her work has also been the subject of several books, including *Brazen: A Painting and Poetry Collection* and *Fever Dreams*. Brooks has spoken about her work and the science of creativity to museums, at TEDx, and for various arts and culture podcasts. As a writer, Brooks founded and regularly contributes to the blog *First Person Artist*. She conducts workshops at institutions such as the Anderson Ranch Arts Center and the Otis School of Art and Design, as well as online via her acclaimed artist program. She lives and works in Los Angeles. Learn more at **Kimberlybrooks.com**.

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