

# Koo Schadler

## EGG TEMPERA MISCONCEPTIONS



*"Egg tempera is a simple, cheap, easy-to-use technique that produced gorgeous effects...Yet nobody seems to know it."*  
Robert Vickrey (1926-2011)

There are many misconceptions regarding egg tempera, and reasons for their existence and persistence. A superficial understanding of tempera limits its potential. This appendix hopes to dispel some of the myths.

### THE REASONS FOR MISCONCEPTIONS

#### Reason #1: The Influence of the Renaissance

Egg tempera reached its peak of popularity and achievement in the early Renaissance (approximately 1400-1450) in Italy, and is notably associated with that time and place. Most Italian, early Renaissance paintings present a less naturalistic, more idealized rendering of the world: minimal light and shadow effects; more high-key (light) values; purer, less dirtied color; cooler color temperatures; less fully three-dimensional forms. For the most part these visual choices are *not* inevitable to egg tempera. Instead they reflect the less realistic, more spiritually oriented medieval perspective still present in early 1400s Italy (consequently changed by the Renaissance). Because most of these paintings were done in egg tempera, people presume the medium (rather than the culture and its thinking) accounts for this aesthetic.

Misconceptions also arise from egg tempera's association with the Italian Renaissance guild and its working methods. Masters and guilds taught a successful but prescribed way of developing a painting. It's not the only way to work in tempera, but often is presented as such.

#### Reason #2: Egg Tempera's Disappearance

Renaissance artists aspired to increasing realism in images. Oil painting has advantages over tempera in depicting realistic, three-dimensional forms (as described in several 'misconceptions' that follow) and, by the late 1400s, oil became the predominate medium of the Renaissance. Egg tempera slipped into obscurity and, from this vacuum, misconceptions emerged.

#### Reason #3: The Icon Painting Tradition

Following the rise of oil paint, the only artists who continued to work primarily in tempera were iconographers. They developed a successful but restricted working method in which individual creativity and an understanding of the medium's possibilities were (and still are) generally not encouraged (since 'writing' an icon is, primarily, a devotional act). Icon paintings are beautiful but represent a narrow slice of egg tempera's capabilities, yet often are seen as the full extent of tempera's range.

#### Reason #4: Egg Tempera's Current Lack of Usage

Very few contemporary painters work full time in egg tempera, so there are not many experienced voices to counter popular misconceptions repeated by non or inexperienced tempera painters.

#### Reason #5: Commercially Produced Paints

For centuries artists made paint from scratch, which gave them an intimate understanding of the properties of pigments and paint. With the rise of mass produced art supplies, many contemporary artists are materially uninformed, and misinformation arises from the lack of knowledge.

#### Reason # 6: Lack of Study and Research<sup>1</sup>

Pure egg tempera paint cannot be commercially produced - it would putrefy if put a tube. With no market for the medium, the paint industry has little incentive to do research on egg tempera (aside from curiosity and a desire to support the mediums, as evidenced by a very few companies). There are some museums and conservators who have studied tempera - but, compared to oil, it is less researched (particularly contemporary tempera paintings) and not nearly as well understood.

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<sup>1</sup> There are admirable exceptions, including: essays by the conservators Turnbull, Massing, Phenix & Kempfski in "Mixing and Matching, Approaches to Retouching Paintings," Archetype Publications 2010; the work of Dr. Joyce Stoner; "Tempera Painting Between 1800 and 1950" conference, 2018, Doerner Institute in Munich; and George O'Hanlon's (of Natural Pigments) development of products for tempera painters, including a synthetic polymer tempera ground. Still, research into egg tempera is minimal compared to other mediums.

## EGG TEMPERA MISCONCEPTIONS

Misconceptions are in **bold**, followed by what I believe is a more accurate understanding of the medium. I've simplified responses in an attempt at brevity.

### HISTORY

**1. The early Egyptians used egg tempera.** The earliest *known* egg temperas were painted by Greco-Roman artists living in Egypt during the first few centuries AD – which is technically the late Roman period, not ancient Egypt. Egyptian artists ‘tempered’ pigments with various water-based binders: gum Arabic, animal glue, and casein. Museums refer to all of these paints generically as temperas, which makes it difficult to know what binder was used.<sup>2</sup> Although it is tempting to presume early Egyptians worked in egg tempera there is not yet, as far as I know, *definitive* proof.<sup>3</sup>

**2. Egg tempera was the primary medium of the Renaissance.** Along with fresco, egg tempera was the principal painting medium of the Renaissance, but for only a short time. Tempera predominated in the medieval era and into the first few decades of the 1400s in Italy. In northern Europe, however, oil painting, which was used sporadically throughout the middle ages, was a thoroughly mastered medium by the early 1400s (as exemplified by Campin, Van der Weyden, Van Eyck and many other Northern masters). The northern oil technique and aesthetics soon traveled south and by the 1440s many Renaissance painters were transitioning to oil. By the late 15<sup>th</sup> to early 16<sup>th</sup> century and the high Renaissance, egg tempera was nearly obsolete.

**3. Egg tempera was the primary medium of medieval manuscript illumination.** While some percentage of yolk binder was used for illuminating, egg tempera is neither the only nor definitive medium used by medieval scribes; gum Arabic or glair, which is made from egg white, are more common. As with ancient Egyptian art, conservators apply the word ‘tempera’ broadly to denote many water-based paints. To be fair, museums have limited resources, and analyzing the binder of every illumination would be a monumental task, so the generic use of ‘tempera’ serves a purpose. Still, it would be helpful to bring clarity to the word and, when known, to specify the binder in a tempered paint, as museums are working to do.<sup>4</sup>

**4. 15<sup>th</sup> c. Flemish masters (such as Van Eyck) underpainted with egg tempera, and/or alternated layers of egg tempera and oil.** There's no evidence that egg tempera was widely used by old master painters as an underpainting or in a layered, mixed medium technique. There *is* evidence that traditional painters, including Van Eyck, at times modified oil paints in specific and purposeful ways, in limited areas of a painting, to achieve specific goals. Modifying ingredients included small amounts of chalk, resins and occasionally egg yolk (to stiffen paint and speed drying time). The Mischtechnik (‘mixed technique’ in German) was developed in the 20<sup>th</sup> century by Otto Dix and Ernst Fuchs (probably

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<sup>2</sup> The word ‘tempera’ has a long and convoluted history, as examined in the books *Painting in Tempera c. 1900* and *Tempera Painting Between 1800 and 1950. Experiment and Innovation from the Nazarene Movement to Abstract Art* (see bibliography). The term is so confusing, in fact, that the second book is a collection of papers delivered by conservators and art historians from around the world, at a 2018 conference in Munich, the partial intent of which was to try to define the word tempera! Museum and conservation communities *generally* define ‘tempera painting’ as pigments bound in a water-soluble emulsion. This broad category may include nearly any water-based paint, whether the binder is egg, glair, oil + egg (tempera grassa), casein, animal glue or gum Arabic (even though gum Arabic is not itself an emulsion, but rather an emulsifying agent). This lexical confusion shows up in the general public via the assumption that anything labeled ‘tempera’ is specifically egg tempera (such as kid’s tempera paint) when most often there is no egg yolk in the binder.

<sup>3</sup> I can’t say for sure what is the earliest known egg tempera painting, as not all ancient paintings have been properly analyzed for medium, are known or accessible to the public. The two earliest examples I found are: (1) the Severan Tondo, Staatliche Museum, Berlin, dated to the 2nd C. AD, listed as egg tempera on the museum website, and (2) a 4<sup>th</sup> C. AD mummy portrait in the Petrie Museum, London, reliably identified as egg tempera through scientific analysis. It’s tempting to presume ancient Egyptians worked in egg tempera, but I don’t yet know of a definitive example. Many other civilizations, from the Mediterranean basin to the Far East, probably also used egg tempera; for example, chemical analysis of the 6<sup>th</sup> c. AD Giant Buddhas of Bamiyan, Afghanistan, revealed egg and milk proteins present in the paint, indicating the use of egg tempera and casein. See Lluveras-Tenorio, A., Vinciguerra, R., Galano, E., Blaensdorf, C., Emmerling, E., Perla Colombini, M., Birolo, L., & Bonaduce, I. (2017). *GC/MS and proteomics to unravel the painting history of the lost Giant Buddhas of Bamiyan*. PLoS ONE, 12(4).

<sup>4</sup> The website of the Fitzwilliam Museum, Cambridge, England ([www.fitzmuseum.cam.ac.uk/illuminated/manuscript](http://www.fitzmuseum.cam.ac.uk/illuminated/manuscript)) has an excellent section devoted to illuminated manuscripts, with descriptions of materials and methods used in each manuscript. Pigments are described in depth, but binders rarely specified, unfortunately – although museum staff told me “research is continuing.” I did find this mention of egg yolk in the listing for the *Initials from Choir Book*: “Egg yolk is present in areas painted with red lead, and probably also with vermilion...The image of St Laurence also contains small amounts of egg yolk... the same binder was also employed in the initial and border ornament...In all three cases, the spectral signature which identifies the binder is not as intense as would be expected if egg yolk had been used alone. It is possible that whole egg was used, or else that a small amount of egg yolk was added to another type of binder, perhaps to improve the handling properties of the paint.”

inspired, to a degree, by Max Doerner's influential but often speculative book in which he stated that Van Eyck used egg oil emulsions with an oil varnish). Mische alternates layers of egg tempera, tempera grassa and/or oil paint in varying ways, depending on the method. It's entirely speculative to say Van Eyck or any other old master used the 'Mische' technique.

## AESTHETICS

**5. Egg tempera paintings are high-key (light in value).** A high-key painting is one in which middle to light values predominate. Many early Renaissance paintings are high-key, but this has more to do with medieval/late gothic aesthetics than egg tempera. If one uses a predominance of middle to dark value pigments, the resulting painting (regardless of medium) will be low-key, not high.

Three other factors contribute to the notion that temperas are inevitably high-key. **1.** Unvarnished tempera paintings do not darken with age, as do oils and their varnishes – so the light values in a tempera painting stay lighter than their equivalents in oil. **2.** The darks in an unvarnished tempera, while qualifying as low-key, are not quite as deep in value as the same darks in oil (see Misconception #6, below). **3.** Because tempera is applied in very thin layers, it has less covering power and opacity than oil, and to address this some tempera painters add white to nearly every color, which results in a high-key. Despite these factors it is possible to paint in tempera with primarily mid to dark values and thereby create a low-key (dark value) tempera painting.

**6. It is not possible to get deep blacks in egg tempera.** Given the thinness of the medium and white gesso ground on which it sits, it takes several layers of paint to build up a rich dark in tempera – but it can be done and without much difficulty (especially atop an ink under drawing, or over a mid-value, opaque layer of paint such as Indian red). Dark values in tempera appear less saturated and deep than in oil due to the 'refractive index value' (RIV) and 'pigment volume concentrate' (PVC) of each medium. Still, an egg tempera 'black' qualifies as black; and if you varnish an egg tempera, the darks become as deep and saturated as in oil.

**7. The color in tempera paintings is purer, more 'jewel-like' than in other mediums.** Due to tempera's high PVC, colors are less saturated than in oil paint.<sup>5</sup> And unlike oil binders, which yellow (to varying degrees) with age, egg yolk does not affect pigment color as a painting ages. However this does not mean egg temperas are invariably pure, colorful paintings. The pigments in tempera are the same as in other mediums, and an artist can opt for a low chroma palette (as did Andrew Wyeth [1917-2009] who used mostly earth pigments). An artist also can dull down or dirty colors by intermixing. The notion that tempera paintings are inevitably more colorful comes from their association with early Renaissance painting, in which color is less naturalistic, less affected by light and shadow, and thus higher in chroma. 'Jewel-like' color is an aesthetic choice rather than inherent to the medium.

**8. Egg tempera has a cooler color temperature than oil.** This is another example of an aesthetic left over from early Renaissance art, which often favored a cooler, more 'ethereal', less warm and earthy overall color temperature. It's true that an *un*varnished tempera painting does not yellow with age, and thus better maintains cool color temperatures over time. Equally true, oil paint and varnishes yellow to some degree and hence their color temperature may warm with age. Still, it's possible to paint predominately 'warm' paintings in tempera, as well as 'cool' paintings in oil.

**9. You can't convincingly model three-dimensional form in egg tempera.**

Three-dimensional form is conveyed through light and shadow effects. The more extreme the light to shadow transition (the brighter the lights, the deeper the darks) the more volumetric forms appear. These effects are possible in egg tempera. However, they are probably easier to do in oil. Deep shadows appear darker in oil than tempera (see Misconception #6). Oil paints can be applied impasto, which intensifies the light effect in highlights (versus tempera, which must be applied thinly). It's easier to transition from one value to another in oil because paint can be physically blended (whereas tempera brushstrokes can't be reworked; only optical blending is possible, through the accumulation of layers). All of this does *not* mean tempera is incapable of rendering illumination and three-dimensional form; only that those things can be rendered more readily, and a bit more dramatically, in oil.

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<sup>5</sup> See the excellent article "Pigment Volume Concentration and its Role in Color," by Sarah Sands, for an explanation of why this is so. It includes images that show how a single color (ultramarine blue) changes its value, chroma and opacity depending on binder. <https://www.justpaint.org/pigment-volume-concentration-and-its-role-in-color>.

*"I've always been interested in Cennini talking about that you can't go after light effects [in tempera], and I said what a stupid remark."<sup>6</sup>  
Andrew Wyeth (1917-2009)*

**10. You can't paint chiaroscuro in egg tempera.** It's probably easier to paint chiaroscuro (dramatic light and shadow) effects in oil - but, as explained in Misconception #9, it's possible to do in egg tempera too.

**11. Egg tempera is best suited for realistic painting.** Tempera tends to attract draftsmen and representational painters due to how readily one can 'draw' with the brush and render details. Yet the splattering, scraping, applied texturing, endless glazing, and flinging of paint that one can accomplish in tempera makes it ideally suited to abstraction. Some established, non-representational painters who've used egg tempera include: Stan Berning, Santa Fe, NM; Frank Connet, Chicago; Nina Murdoch, UK; Zarina Stewart-Clark, UK; Kathleen Waterloo, Chicago; Nan Montgomery, DC and NH (Nan happens to be my neighbor). As far as I know, there are only a few 'rules' in egg tempera: work on an absorbent ground, temper properly, don't work impasto. I used to tease students that as long as one follows those rules, you can paint however you like, even with toes. One day a student replied, "I actually do paint with my toes!" And she does - she showed me.



One of my classroom demo panels, made into a small, abstract painting. *Demo Work II. Egg Tempera (no oil).* 8 x 10," 2016.

**12. Egg tempera is a luminous medium (the most luminous medium).** Egg tempera can be a luminous medium *if* the means by which luminosity is achieved are addressed: create a light effect in a painting, contrast values and chroma, apply glazes, work with inherently luminous colors. Painting on a reflective, white ground also contributes to a luminous effect. By using these same means, other mediums appear luminous too (i.e., Rembrandt's *oil* paintings are amongst the most luminous in art history). Neglect these considerations - in egg tempera or any medium - and a painting won't appear luminous.

In other words, luminosity is a result of visual considerations and working methods rather than the exclusive property of one medium. Due to common working methods in tempera, the medium has a tendency to appear luminous - but it's not a given. (For more, refer to the "Luminosity" appendices.)

**13. Even darks appear luminous in egg tempera.** It's a bit of a contradiction to expect dark values to radiate light. True, darks may be glazed with transparent color to modify temperature, add a bit of chroma, increase the atmosphere in a black - but those things don't make dark colors 'luminous'. After all, dark is the opposite of light! Nonetheless, dark values play a role in luminosity. For example, the brilliance of a bright, yellow flower can be enhanced if set against a black ground. Not only is it unnecessary to make everything in a painting luminous; a lack of brilliance in some areas can contrast with and thus intensify radiance elsewhere. Darks can contribute to luminosity, even if they aren't themselves luminous.

**14. Oil paints are better, more versatile than egg tempera.** Oil paints do some things more easily and/or better than egg tempera (see Misconceptions #6, 9 & 10). There are other things egg tempera does especially well: precise lines, multiple and quick drying paint layers (including nearly endless glazes and scumbles); faux and textural effects (wood, stone); linear patterns.



On a base coat of Mars black (column C) various glazes were applied (column A) The results (column B) show the subtle yet wonderful, enriching effects of glazing on top of black.

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<sup>6</sup> I like this quote of Wyeth's because it speaks to his feisty, rebellious nature. However, in Cennini's defense, his 14<sup>th</sup> c. book *Il Libro dell'Arte* discusses several times how to paint light and shadow on forms. I asked Lara Broeke (who did the most recent and authoritative translation of Cennini's book), and she noted that it's actually the first chapter of Thompson's book, *Egg Tempera Painting*, that focuses on the linearity, limited tonality, and less naturalistic range of egg tempera. Her guess is that Wyeth mistakenly attributed Thompson's thoughts to Cennini. I've seen this confusion (between Thompson's translation of Cennini's text and Thompson's own book on tempera painting) before, and agree that it's a likely explanation for Wyeth's thinking.

Many things explain the contemporary preference for oil: A modern interest in greater realism and three-dimensional form (both of which egg tempera can achieve but oil does more readily); more access to oil painting supplies, teaching and information; the immediacy of working in oils (comes from a tube versus made from scratch). Oil is a wonderful and very popular medium but isn't inherently superior to egg tempera.

## MATERIALS & WORKING METHODS

**15. Egg Tempera is a more toxic medium.** The binder in egg tempera is yolk - a non-toxic, food grade substance. Tempera's diluent is water, also harmless (unlike oil solvents, which contain noxious, volatile organic compounds [VOCs] to varying degrees). The pigments used in egg tempera are identical to those in other paints - i.e., cadmium orange is the same whether in oil, acrylic, watercolor, or tempera. Pigments range from non-toxic to poisonous and are taken into the body in three ways: absorption through the skin, ingestion via the mouth, or inhalation. The latter is applicable only to powdered pigments, so the idea that egg tempera is more toxic likely comes from the fact that tempera artists start with powdered pigments.

Too much dust of any sort is a lung irritant, and inhalation creates an avenue for taking in toxicity, so tempera artists should work carefully with powdered pigments. I convert pigments into pastes (and wear an N95 mask when doing so). Once in paste form, pigments are no more or less harmful than in other paints.

**16. Egg tempera is a less toxic or non-toxic medium.** I've had several students turn to tempera because they've developed a reaction to oil paint. The various drying oils (linseed, walnut, poppy, safflower) in oil paint are *not* toxic (although some individuals may be allergic to them). Potential toxicity in oil paints come from various modifiers (cobalt or lead dryers, resins dissolved in solvent, etc.) and solvents. Tempera is less toxic in these respects, as there are no additives and its solvent is water. However, as mentioned in Misconception #15, pigments can be harmful depending on type and how they're handled in powdered form.

**17. Expensive, kolinsky sable watercolor brushes are requisite for tempera painting.** Because tempera is a water-based paint that dries to the touch within seconds, it excels at making fine lines. Early Renaissance painters were less interested in natural, atmospheric effects; they generally didn't try to counter tempera's inherent linearity and modeled form with crosshatched lines. Kolinsky (a type of weasel) sable, round watermedia brushes come to an especially precise point and are very good at making fine lines, so they're often recommended for tempera artists. However I prefer synthetic brushes, especially Taklons, which come to a point but also can be shaped between fingers into a broader stroke. I also work with large, flat watercolor brushes; inexpensive, hardware store 'chip' brushes; kitchen and cosmetic sponges; rubber stamps; fingertips; and anything else that suits the task at hand. Sable brushes work well with egg tempera but are *not* requisite.

**18. Tempera must be painted on wood panels and traditional gesso, sanded ivory-smooth.** Egg tempera has a high pigment content that makes it a less flexible paint; and because the fatty lipids that give plasticity to the paint are mobile, and can effloresce out over time, tempera paint gets more brittle with age. For these reasons, working on a rigid support is important. However it doesn't have to be a wood panel. Wood, the best option in the Renaissance, has drawbacks: a grain pattern that can telegraph through paint layers, and a tendency to absorb and release water (causing movement and cracks). Aluminum or plastic panels *may* prove better supports for some working methods. It's also possible to apply tempera to paper or parchment - as long as they are made relatively inflexible (mounted on a solid support, bound in a book) and paint is applied thinly.

While tempera behaves and adheres best on very absorbent grounds, it doesn't necessarily have to be 'true gesso' (animal glue and chalk or gypsum). So far I've found nothing to equal the absorbency of true gesso on a wood-based support. However several manufacturers now offer high PVC, synthetic polymer-based grounds marketed specifically for egg tempera. In my experience, these *slightly* less absorbent surfaces don't work as well for water intensive methods (petite lac, sponging, many quickly applied layers) but are suitable for primarily dry brush work. I know several artists who paint in egg tempera on synthetic polymer gesso with success.

Sanding gesso to perfection was requisite for Renaissance artists who wanted a gold-leafed surface to emulate actual metal. Smooth gesso is lovely to paint upon, but technically not a necessity (except to mimic gold).

**19. Never obscure the gesso in an egg tempera painting; the white of the gesso is requisite for luminosity.**

The white of the gesso shows through and plays a consequential role *if* a painter works with thin and transparent paint. However if a painter opts to work in tempera with dense paint, accumulate multiple layers, and/or use white to impart opacity and body, after a certain number of layers the gesso eventually is obscured. This doesn't mean a painting can't appear luminous. After all, one of *the* most luminous painters in history, Rembrandt, working in oil, developed his paintings with opaque, covering paint, then glazed atop; the same can be done in egg tempera. Opaque paint and scumble layers can serve, like gesso, as a reflective backdrop to glazes. Additionally there are other equally (if not more) important considerations to creating luminosity in an image that have nothing to do with the white of the ground (see luminosity appendices). Finally, how can darks be rendered if a white ground shows through? Gesso *must* be fully covered to achieve truly dark values.

This isn't to say that a white gesso ground is irrelevant.<sup>7</sup> It facilitates building mid to light values (which can go slowly in egg tempera, given the general thinness of the paint). And, in areas with minimal paint application, a gesso ground does show through and contribute to the final visual effect. But if a painter wants true darks in an image (a full range of values *is* a cornerstone of strong design) and/or to work with many layers of opaque, bodied paint, there's no escaping the fact: the gesso gets covered.

**20. Egg tempera paintings are small.** Various factors can make egg tempera a slow medium: many painters do preparatory drawings and studies, and/or ink underdrawings; paint is made from scratch (although, with experience, I'm able to mix a palette in about 20 minutes, cleanup is quick, and a preservative can extend the paint's viability); and most artists build up *many* layers. All these things are time consuming, and it's common to see tempera paintings of a small to modest size. However, historically tempera paintings were often impressively large (granted, Renaissance masters had assistants to help the process along), and there are a few contemporary tempera artists working on expansive surfaces as well. Depending on an artist's working methods, circumstances, goals and nature (patient and persevering!), it's certainly possible to make large scale egg tempera paintings.

**21. Any colored powder can be combined with yolk to make paint.** While this is physically possible, if you want a painting to last you should use permanent (chemically stable) and lightfast (won't fade) pigments. Many organic, plant-derived colors are very pretty but fade, often quickly. Beets exude a gorgeous red but if you turn it into pigment the color won't last. You also should know the toxicity of a color. I recommend buying artist grade pigments from a respected supplier so you can look up a color's properties and understand it. If you want to make your own pigments, a good place to start is native earths, which are inorganic and durable (although they should be 'levigated' or rinsed of organic matter before use).

**22. You must grind pigments before working with them.** There is a distinction between grinding and dispersing (or milling). A chunk of lapis lazuli stone is ground (pulverized) into powder with a mortar and pestle. A powdered pigment is *already* ground to the correct particle size. (Many pigments have an optimal size – if ground too fine, their color changes). So you don't need to *grind* powdered pigments from the art store; you need to *disperse* them, either within water (to make pigment paste) and/or within egg yolk (to make tempera paint). While a muller and glass slab or mechanical mill are best for dispersing large amounts of paint, a palette knife works well for small quantities. Small



**Top.** Egg tempera artist Eileen Kennedy developing her 24 x 30" painting *Bycatch* via countless brushstrokes. **Bottom.** Lora Arbrador, (cofounder, along with Michael Bergt, of the modern Society of Tempera Painters) standing next to her 8' x 4' painting, *Birds of Prey* 🙏. Arbrador builds up large surfaces using low nap house paint rollers, large sea sponges, bits of memory foam mattress, and brushwork.

<sup>7</sup> A white ground in an oil painting is more consequential because oil paints can become transparent with age.

particle sizes pigments make smoother paint but require more effort to properly disperse. Large particle size colors (such as earth pigments) can feel (and sound) gritty during dispersion, but their large particles more readily disperse. If a stable color such as an earth pigment is unpleasantly gritty to *disperse*, then you may *grind* it to a smaller particles size.

**23. You must work with traditional pigments.** Renaissance egg tempera painters worked exclusively with traditional pigments for the obvious reason that they had no other option. Historic colors have benefits and drawbacks: lead white makes strong paint films but is toxic; alizarin is beautifully transparent but fugitive; vermilion is a gorgeous red but made from mercury; genuine ultramarine blue (lapis lazuli) is less chromatically overwhelming (compared to its modern counterpart) but extremely costly – and so on. Working with traditional colors is not required, nor do they invariably translate into an old master masterpiece. I recommend choosing pigments based on an understanding of their characteristics and if they further your goals as a painter versus due solely to an historic pedigree.

**24. To make pigment paste combine powdered pigment and water in a jar and shake vigorously.** For shaking to succeed, you'd need *a lot* of water; enough that you'd make a messy pigment *liquid* instead of a pigment paste. Add just enough water to yield a toothpaste-like consistency, and stir rather than shake.

**25. The fresher the egg, the stronger the yolk sac.** It does seem that the yolk sacs of old eggs are prone to breaking. However I've worked with fresh laid eggs from a neighbor's free-range hens, and sometimes they too have thin, easily torn sacs. A yolk sac is not a certain determinant of an egg's freshness.

**26. Brown eggs are better than white eggs.** Having worked with hundreds of eggs of both colors, I haven't noticed a difference.

**27. There is a single, correct ratio of egg yolk to water to make egg yolk medium.** Tempera texts often state a specific ratio of yolk to water to make egg yolk medium; they may state 1 part egg to anywhere from 2 to 9 parts water. In fact, the ratio is not fixed but variable, and depends on the artist (what sort of medium is preferred) and the nature of the specific yolk (how rich it is). The water in egg yolk medium ultimately evaporates out of tempered paint once it's applied and has dried. Water is not the binder; it's merely the vehicle (diluent) that thins and helps you manipulate the paint. So you can add any percentage of water you like to create whatever working properties you desire in a medium and paint (thin, thick, or in between). Additionally, not all yolks are the same – some require a bit less water, others more, to achieve the consistency of medium you prefer. Rather than measure, it's better to mix a medium that feels correct relative to your needs. (In egg tempera, the critical ratio is the amount of egg yolk to pigment. That ratio is, more or less, one part yolk to one part pigment, regardless of how much water has been added to either a medium or pigment paste.)

**28. You must add vinegar (or vodka, or wine) to egg yolk medium.** Vinegar, alcohol, and other acidic liquids can preserve egg yolk and help hydrophobic pigments combine with water. However acidity can be detrimental to some colors (i.e., ultramarine is susceptible to acid). I don't use a preservative in my medium. Under average studio conditions, yolk medium lasts perfectly well for 1 or 2 days (on especially hot days I keep my jar of medium in a dish of ice). I keep medium refrigerated between painting sessions, and crack a fresh egg as needed. As for dispersing, only a few colors need help doing so; to those pigments pastes I add a few drops of 95% pure alcohol (isopropyl, grain) which also, conveniently, works as a disinfectant and preservative.

**29. The more egg yolk medium in a glaze, the more brilliant and glowing the color appears.** The primary function of yolk is to bind pigments to each other and the painting surface. Using increasing amounts of egg won't increase the 'glow'; it merely creates a gummy surface more likely to crack or effloresce unneeded lipids. Egg yolk doesn't create beautiful colors – pigments do. Whatever the medium, a good glaze is one in which a thin, transparent layer of color is evenly dispersed. A medium (which, in tempera, is egg yolk and water), thinned to the proper consistency, is merely the means to achieve this.

If a painting is under-tempered (not enough egg), applying an *occasional*, watered-down layer of egg yolk medium (called a 'nourishing layer') can improve tempering, increase saturation and change the transparency of some pigments. But too many nourishing layers cause problems - don't overdo them.

**30. Egg tempera paint stinks.** Only if you work with rotten eggs. Start with a fresh egg as needed, keep yolk medium cool, refrigerate when not in use, add a bit of a preservative (95% pure alcohol) if necessary, and make sure brushes, sponges, and eyedroppers (particularly the dropper head) are cleaned after use. And don't put pure egg tempera paint in a tube – that *will* soon stink.

**31. Commercially produced egg tempera paints in tubes are the same as homemade tempera paint.** Most tubed 'egg tempera' paints are actually tempera grassa, an emulsion of egg yolk and a drying oil. Tempera grassa has some of the properties of both egg tempera and oil painting and is a viable medium – however it's not the same as pure, homemade egg tempera and behaves differently. The tubed egg tempera paints made by Zecchi are composed of freeze-dried egg yolk, gum Arabic, and a tiny amount of preservative. Little to no testing has been done on the short or long-term properties in a paint film of dehydrated egg; so the purpose or viability of its use in tubed paint is, at this point, unclear.

**32. You begin a tempera painting with an ink underdrawing and/or green earth underpainting.** The systematic working methods of traditional painters weren't arbitrary or merely for the sake of difficulty - they helped painters make good visual decisions. For example, a strong arrangement of values is fundamental to a good design. Most traditional methods include a monochromatic stage, such as an ink underdrawing, so that the artist can clearly see the value pattern divorced of color. Ink on white gesso also is a good way to establish a drawing and enhance darks in a composition. A green earth underpainting contributes to cool halftones in flesh, another old master aesthetic. In short, the traditional egg tempera working method is a good one *if* you aspire to traditional aesthetics. But if you don't aspire to those visuals, then neither an ink underdrawing nor green earth layers are required.

It's also possible to achieve traditional aesthetics using modern working methods. For example, I don't do an ink underdrawing to see values; instead I scan my full color, initial 'mockup' on the computer and convert it to black and white. Nor do I use ink to develop darks because I quickly build up layers of dark with sponged on, relatively thick paint, another unconventional but effective approach. Successful as they are, the Italian Renaissance and icon methods for tempera are not the only ways to develop tempera paintings.

**33. Colors should not be intermixed on the palette.** Thanks to modern chemistry, contemporary painters can choose from an extensive selection of intense, high chroma pigments. Strong, pure colors were much harder to come by prior to the industrial revolution of the 1700s; consequently, Renaissance painters were reluctant to intermingle their few colorful and generally costly colors (such as lapis lazuli blue) with an inexpensive, common earth pigment. Additionally, ancient thinking reflected belief in a universe organized through divinely ordained hierarchies: sexes were kept separate, races didn't intermingle, king and peasant were forever distinct, and, according to some Egyptian and medieval texts, colors should not be intermixed. For both practical and philosophical reasons, early tempera painters kept pigments in individual palette wells and only mixed colors 'optically' by applying successive layers of unadulterated hues. Glazing with pure color is still a useful option for modern tempera painters. However it's also perfectly fine to intermix pigments directly on the palette, as do painters in all other mediums.

**34. Egg tempera is applied in hatch strokes. Form is modeled via crosshatching.** Tempera's ability to render fine lines makes it well suited to crosshatching, and volumetric forms are often modeled that way. But there are many other ways to apply tempera: broad strokes made with a flat brush, puddles of color laid down in a "petit lac" wash, atmospheric daubs left by a sponge. I model form with a combination of sponged on layers and brushstrokes, applied so thinly they leave virtually no mark behind and thus can be applied in almost any direction. Cross hatching is not requisite.

**35. Egg tempera paintings have a soft, 'egg-shell' shine.** The surface of a properly tempered egg tempera yields a low level shine, often compared to an eggshell. This is an accurate but limited description of egg tempera's range of finishes. I've seen unpolished egg temperas with flat, matte surfaces, and others rubbed to glossy, porcelain-like perfection. To achieve a glossy finish it's important to have excellent tempering (correct ratio egg to pigment) and to begin very *gently* polishing the surface early on in the painting process. Don't bring out too great a shine at first, or subsequent paint layers may bead up and not adhere well. Just stay attentive to the surface while painting, keeping it lightly polished and smooth throughout; then, when the painting is complete and fully cured, polish up to greater gloss.



Any soft cloth (silk, worn cotton) or minimally abrasive material (fine cheesecloth, microfiber) can be used. Polish with attention and care, so as not to mar the surface. Properly tempered paint is well bound and can tolerate a gentle buffing to smooth out microscopic surface irregularities (created by tempera's high pigment load). Eventually, with enough gentle buffing, you may pull out a nearly mirror-like shine. It's also fine *not* to polish and have a matte finish.

**36. Egg tempera paintings should not be varnished.** A cured egg tempera painting can be polished to bring out a finish unlike any other medium, and many tempera painters promote (sometimes zealously) this unique look. Varnishing comes with consequences; it alters a painting's appearance, saturates colors and values (which may be desirable or not, depending on the artist) and changes tempera's natural 'egg-shell' finish to either matte, semi-gloss, gloss or high gloss, depending on the varnish. Varnishing offers protection to the original tempera surface, which has some unique vulnerabilities. However varnishes settle into and mechanically adhere with porous, high PVC egg tempera paint, making removal extremely difficult, and may yellow (more or less, depending on the varnish) with age.<sup>8</sup> In other words, there are pros and cons to varnishing (as is true for varnishing other mediums), just as there are pros and cons to not varnishing.

It's also worth noting that most, if not all, Renaissance egg tempera paintings have been varnished at some point in their long lives. The traditional egg tempera images so many people love and want to emulate probably all have some sort of coating on top; as do the majority of Andrew Wyeth's egg temperas.

**37. Once cured, egg tempera paintings are waterproof.** Polymerized egg tempera paint is no longer water soluble, and water on top of a cured surface generally beads up and seemingly resists absorption. However the paint is not actually impervious to water, like a raincoat. Cured egg tempera retains a microscopic porosity, and water on the surface can, over time, enter into and potentially damage a painting.

**38. Egg tempera paintings are among the most durable in art history.** There are some very old egg tempera paintings (nearly two thousand years, in fact). However there are very few of them (we have no idea how many ancient temperas did *not* survive); most were helped in their preservation by being cloistered, funerary portraits living within the dry climate of Egypt; and there are many equally old (or older) paintings in other mediums (watercolor, fresco, distemper). It's not quite accurate to give egg tempera special status as a uniquely durable, ancient paint.

Some egg tempera, Renaissance masterpieces are beautifully preserved, while others are in terrible condition. Again, we don't know how many temperas did *not* survive from the 15<sup>th</sup> century; and it's hard to say the extent to which a work has benefited from restoration (a conservator once told me that Renaissance paintings have been restored, on average, 7 to 8 times). Every 'historical' (in use for a few hundred years or more) medium has strengths (it wouldn't have endured, otherwise) and weaknesses (as do all material objects). Egg tempera is no different. Relative to long term durability it has both positive attributes (rigid support, thin paint layers) and detrimental ones (water attracting support, ground and paint layers, less flexible high PVC paint, mobile lipids that tend to effloresce). All artwork is vulnerable to damage if poorly made or treated, and egg temperas are no exception.

**39. Egg Tempera is a fragile medium, especially compared to oil.** Due to high PVC, the surfaces of egg tempera paintings are more open than oils, and this porosity increases vulnerability to moisture, mold growth and other unwanted substances. Tempera's high PVC also creates a microscopically irregular surface (versus the smoother, more sealed surface of oils), and so temperas are more difficult to clean as they age.<sup>9</sup> And while all paint films, including oil, lose plasticity over time, tempera paint films are more brittle to begin with (again, due to high pigment content) and grow increasingly so with age (because of efflorescing lipids).

On the other hand, there are several aspects of egg tempera that contribute to durability. Temperas are almost universally painted on solid substrates (most often wood-based, occasionally aluminum) which provide better long term support to aging paint films (even with wood's drawbacks, it's still generally preferable to canvas). Most oils are painted on canvas, which can flex, expand, or puncture, leading to cracks, delamination, and holes. While oil has an advantage over tempera in terms of paint film flexibility, tempera generally has the benefit of a rigid support.

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<sup>8</sup> Isolating the porous surface of egg tempera with a very thin, minimal coating of a flexible, non-yellowing isolator allows subsequent varnish layers to be more readily removed as needed.

<sup>9</sup> Varnishing egg tempera helps protect the original paint surface and allows for cleaning. However varnishing high PVC paint surface also comes with challenges and drawbacks, as discussed in Misconception #36.

Additionally egg tempera is applied in *very* thin layers (it's not capable of thick or impasto paint) and thin paint films are less likely to crack or delaminate. Oil can be applied thinly too (although rarely as thin as tempera) but is often applied much thicker or impasto.

Finally, most modern oil painters work with tubed paints. Commercially produced supplies offer artists the 'luxury', if they so choose, to not fully know or understand their supplies. Because pure egg tempera would putrefy in a tube, tempera artists *must* make paint from scratch. Most tempera artists also make their own gesso panels. These practices often compel tempera painters to understand materials and methods on a deeper level. In short, tempera painters are often (albeit not uniformly) informed craftsmen (as once was true of all traditional artists), and this can translate (although not invariably) into better-made paintings.

In short, each medium comes with benefits and drawbacks, and ultimately all paintings are perishable. Egg tempera paintings do have important vulnerabilities, but given that the medium has been in use for nearly two millennia, (if not longer – more than oil), talk of its extreme fragility can be overstated.

**40. Egg tempera paintings should be framed under glass.** Egg tempera takes 3 to 6 months to cure (depending on layers, drying conditions, etc.). Until then, the surface is vulnerable to scratches. Once polymerized the paint is more durable; even so, a high PVC surface has inherent vulnerabilities. Glass protects the surface but, on the downside, can interfere with seeing/experiencing a painting, and potentially prevent air flow or trap moisture (and water is one of the worst challenges to a painting, adversely affecting every element). Given the above, my preference is to protect my work with a varnish, no glass. However framing under glass unquestionably imparts some benefits, and conservators may recommend it for tempera. There are pros and cons to either approach (as well as to no protection).

**41. Egg tempera is labor intensive. It's a very difficult medium.** There is truth to this, but it tends to be overstated. Yes, it takes time to make paint from scratch - especially if you're a beginner. It takes effort to furnish a studio with unfamiliar supplies and become conversant with them. The requisite craftsmanship in tempera makes the initial learning curve steeper than a store bought, tubed paint. And the layering necessary to develop an image can feel, at times, endless (i.e., don't become a tempera painter if you want to produce a large inventory of artwork each year). In the seeming tidal wave of new information and unfamiliar techniques, beginners may forget that regular practice brings knowledge, skill and efficiency. After years of working in tempera my studio is well equipped, I understand the medium, and it takes a fraction of the time it once did to prepare my palette for the day (in about 10 to 20 minutes I'm ready to paint). On the other end, clean-up is easy, fast and non-toxic (it takes literally a minute to scrap my palette clean and wash out my brushes). It's also important to remember that become masterful in *any* medium is a challenge; the necessity of perseverance and patience is not unique to egg tempera but a part of most artists' journeys.

All mediums have inherent frustrations and limitations, and tempera is no exception. But if you find a paint that suits your nature and goals, it likely feels sensible and well-behaved. Tempera, for the most part, is a deliberate, slow, layered, meditative way to work. It's not for everyone, but for those to whom it is suited, egg tempera makes all the sense in the world – especially if you overcome the misconceptions that unnecessarily narrow its potential.

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