

The Pete Swann Quick Guide to Painting with Egg Tempera

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Painting is a bit like chess - an hour to learn, a lifetime to master. Here's a quick guide to that first hour...

About egg tempera

Egg tempera has a long history as a painting medium. It was widely used in ancient Egypt, Greece and the Roman world and there are many surviving examples. It involves mixing powdered pigment with egg yolk and water to make an emulsion. The paint is quite translucent and dries very quickly so it can be layered into complex compositions. The paint remains soft for a while but gradually hardens into a tough film of extraordinary durability. Egg tempera protects and preserves the support that it is painted on and tends to brighten with age. Oil paint is acidic, causes its canvas to slowly disintegrate and darkens with age.

The most famous egg tempera painting is probably Botticelli's Birth of Venus from 1485. The medium was in widespread use in medieval times and the early renaissance, particularly for religious icon paintings. Many of them survive in perfect condition due to the properties of the emulsion. After about 1500, when oil paint became widely used in Europe, the popularity of egg tempera rapidly declined. In later centuries William Blake used it, and there was a modest revival in the 20th century by Marc Chagall, Giorgio di Chirico, Mark Rothko and others.

When I first tried it I worked on paper and cardboard. Later on I discovered that renaissance painters sometimes glued linen onto wooden panels and primed them thickly with gesso, sanding them down to make a smooth white surface to paint on. After much trial and error with different kinds of board, linen and glue I worked out how to make this kind of panel. However I prefer the colour, texture and absorbency of raw linen and usually prime it only with egg wash.

The quick-drying quality of egg tempera paint means that, traditionally, images are built up from flat areas of colour with hatching, stippling and over-painting to create shading. However on raw linen it's possible to work wet-on-wet and to blend and shade much more naturalistically. Where more layers of paint are applied, the texture gradually becomes smoother and less absorbent. This makes faces, in particular, really stand out and look uncannily three dimensional and life-like. Clothing, in portraits, also looks incredibly realistic, either retaining the natural texture of the linen, or a smoother texture where there are more layers of paint.

For more abstract work you can take advantage of the incredible range and subtlety of colours that are achievable. It's said that tempera probably allows the greatest colour range of any medium, but that it tends to have a high key (rather bright). I find dark is perfectly achievable, particularly on linen without white priming. In fact I have 5 different black pigments and the translucence of the tempera medium shows up the differences between them very clearly.

Working with powdered pigments is one of the real treats of tempera painting. Some of the colours have an almost mystical quality, and that's before you even start painting. Staring into a jar of ultramarine or magenta pigment is quite mesmerising. I find myself trying to recreate that experience in my paintings. Not as straightforward as you might think.

Essential equipment

Pigments: Powdered pigment is the raw colour of paint and hundreds of different ones are available. Some are made from coloured clay found in specific locations, some are natural minerals, ores or metal oxides. Many are manufactured by chemical processes and some are toxic. The best supplier in the UK is Cornelissen (www.cornelissen.com), available online or from their shop in Great Russell Street. BE WARNED: if you go there you will come back significantly poorer!! There's a lot to say about pigments, but almost any will work with tempera. The best way to learn is by doing.

Brushes: soft watercolour brushes tend to work best, but it depends what you're working on. Any brush will do to start off with. An old stiff brush for mixing is useful and will save expensive watercolour brushes from getting ruined. Pointed Chinese style ink painting brushes are nice to work with. Rosemary & Co brushes (www.rosemaryandco.com) are good quality and great value.

Palette: the best ones for small work are the ceramic watercolour type with 6 sloping wells. They are easier to clean than plastic ones and last forever (until you drop them on a hard floor!). Best of all is the Jason Skill palette (shaped like the ceramic ones but much bigger and made of a very durable plastic - only available from his website: jasonskill.com).

Jars: 2 large ones for water (one will do but you'll have to change it more often) and a small one for the egg medium. An empty one for brushes.

Paper towels: regular kitchen roll. The heavy duty ones (such as Regina Blitz) last longer and can even be left to dry out and re-used.

Eggs: save the organic ones for breakfast! Any eggs will do, fresh ones are a bit easier for making the medium. You're going to mix the yolk with contaminants of varying toxicity, so don't waste the expensive ones on painting.

Palette knife: for getting pigment out of jars. Pointed trowel-shaped ones are good because you can pick out a very tiny amount or a big pile with the same tool. An old teaspoon will do almost as well.

Easel: not really essential to begin with, but useful if you have one.

Squirty bottle: for spraying water onto your support (empty bottles of cleaning fluid work fine once you've rinsed them out). Again, not essential, but a good way to wet your paper/canvas evenly for applying washes.

What to paint on (“Supports”)

Watercolour paper: the best stuff to start off with. It's all ready to go and doesn't need any preparation. Heavy weight paper will wrinkle less, but when you're just playing around it doesn't matter so much. Paper can also be glued onto wooden panels, or cardboard (see appendix and follow instructions as for canvas). However it's much harder to get off if you want to re-use the panel.

Cardboard: behaves in a similar way to paper, but less prone to wrinkling. If it curls after drying, try coating the back of it with egg medium. Brown or grey card may be primed with white tempera paint (or any other colour) if you wish.

Wooden boards: unprimed wooden panels are good supports, but prone to warping. To avoid this use only 18mm thick waterproof or marine grade plywood and coat the back and edges with varnish, shellac or egg medium and allow to dry (for more info see appendix).

Canvas: cotton or linen canvas may be used but must be pre-shrunk then stretched onto frames or glued to board (see appendix). If stretching canvas onto frames the finished painting must always be kept flat. Properly dry egg tempera is hard and brittle and if the canvas is folded or rolled the paint may shatter into powder (!). That's why my preferred support is linen canvas glued onto marine plywood. It's rigid and if prepared properly doesn't warp easily (see appendix). Whatever you do, use only egg medium (with or without pigment added) as a primer. I don't recommend acrylic gesso or primer. Egg tempera doesn't flow well on acrylic.

Gessoed panels: Perhaps this should be first on the list - it's the traditional support of icon painters and other medievalists, but I never use these. I don't know anywhere that sells them, and they're a lot of effort to make. If you decide to make them don't use acrylic gesso - it's rabbit skin glue or nothing!

Masonite/plasterboard: I've never used this but I've read that it works OK.

Others: Various kinds of wood can be used if you can get suitable panels. Poplar was widely used in the past. Oak is excellent, but heavy and expensive. Take precautions to avoid warping. Aluminium is used by some painters. It tends to come in thin sheets so would need a frame and probably anodising to create a good key for the paint. I did consider stone or unglazed ceramic tiles, but haven't tried them. If you come across any other good supports let me know!

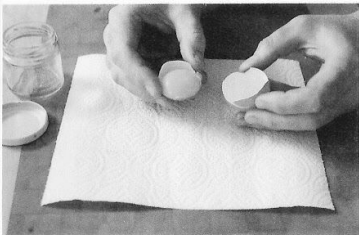

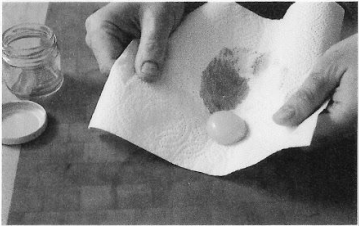
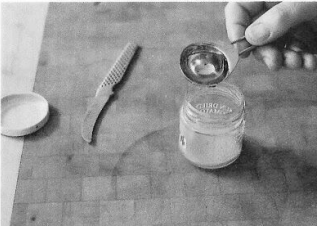
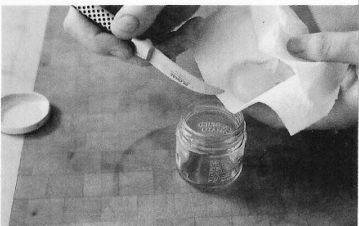
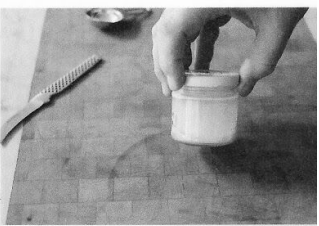
Making the medium

Medium is just another word for the glue which binds pigment together to make paint. It could be linseed oil, gum arabic, acrylic or whatever. In our case it's egg yolk. If you've ever left a plate after breakfast with egg yolk on it and not washed it up until dinner time you'll know how it sticks and you have to scrape quite hard to get it off. This is what makes it great for paint.

You will need: an egg (fresh ones are easier to work with), a small jar, a paper towel, water, a container to save the egg white in (if you want to keep it for making meringues).

Egg Tempera Painting

Making the egg yolk medium

	1. Crack open an egg and separate out the white, saving it for making meringues.	4. Allow the yolk to run into the jar while the membrane sticks to the paper towel.	
	2. Carefully tip the yolk onto a paper towel and roll it around to dry off the mucus.	5. Add about the same amount of water to the yolk (approx. one tablespoon).	
	3. Roll it to the edge of the towel, hold it over a small jar and pierce with a sharp point.	6. Put on the lid and shake the jar to mix it up well. There's your painting medium!	

If your egg yolk breaks before you've done all this, don't panic, it happens all the time. Just tip it out onto your paper towel, hold it over the jar and allow as much of the yolk as possible to run into the jar. Try not to let too much white get into it, but a small amount won't matter.

You may be surprised how much painting you can do on paper with one egg yolk. You'll soon work out how much you need, and for larger paintings you might want to make up 2 or more eggs worth of medium.

If you have some left at the end of your session put it in the fridge. It will last about 2 days if chilled in between times. When it starts to smell bad wash it down the sink. Freshly applied tempera has a distinctive aroma, but it's very subtle and not unpleasant.

Getting Started

This assumes you're working on watercolour paper. Set out all your equipment so it's easy to reach: jars of water, pigments, brushes, paper towels, palette knife (or teaspoon). Make up the egg medium. Pour a small amount into one of the wells on your palette. Choose a colour to start with.

Now, this simple sequence is VERY important. Get into the habit straight away:

1. Take the lid off the jar of pigment and use your teaspoon (or palette knife) to take out a little bit and add it to the medium (or put it on the edge of the palette).
2. **Put the lid back on the jar immediately.**
3. **Wipe your palette knife clean with a paper towel !**

Whenever you take pigment from a jar **always do this!** It will prevent you spilling pigment (which is a devil to clean up) by knocking over jars, and it will prevent pigments getting cross-contaminated with other pigments.

How much pigment to use

First thing to say is, probably less than you think. A little goes a long way with tempera, a bit like watercolour. But there is one important rule: **don't overload the medium**. Medium is basically glue; if you add too much pigment there won't be enough glue to hold it all together. In the case of tempera, the paint will dry matt and chalky and the pigment will rub off easily. You can't add more pigment than you have egg yolk, and remember the medium is half water. So whatever quantity of medium you have in your palette, you can add HALF that volume of pigment. It's not super critical - you can add less pigment - but when you spoon it out try and judge it so you have about half as much by volume as you have medium. Adding less pigment will mean you have excess yolk, which is not really a problem, but it will make the paint more waxy-looking and technically it's a bit of a waste of medium. Better to use less medium and fill it to capacity with pigment. You can then dilute it with water to make it thinner and more transparent. If you accidentally dump too much pigment into your medium either scoop some out and put it on the side (**NOT** back in the jar), or add more medium. Always add pigment to medium **BEFORE** diluting with more water. If you've got a watery mixture of paint and you want to add more pigment, add a few drops more medium.

Mixing pigments

You can, of course, mix your pigments but **ONLY** do it on the palette - not in their jars! The only exception to this is if you use a lot of one colour mixture. Then you might want to take a new jar and mix the powdered pigments together in it. I use a mixture I call "linen" a lot. It's mostly burnt umber and yellow ochre and it's the colour of linen, but darker. It's very useful for monochrome underpaintings on linen, and pre-mixing it saves a bit of time and gives you a consistent colour

So when you mix pigments, add them directly to a quantity of medium, remembering not to overload it. **OR** put each one in a little pile on the edge of your palette and add them a bit at a time until you've got the colour you want. In critical situations test the colour - it won't always look exactly the same when it's dry (see below). This brings me on to...

Drying

Tempera medium is an emulsion of water and the fat particles in egg yolk. No matter how many layers you paint, it always dries flat and without any physical texture whatsoever. The finish can be adjusted a little, between matt and satin. The less water you add the more waxy looking it will be, and the finished painting can be “varnished” with egg medium, which will give it added lustre and protection.

Superficially egg tempera dries pretty fast. Unless you make your support very wet, the paint will film over within seconds, depending on the ambient temperature. There are two important consequences of this:

1. You can paint over it very soon
2. You can't blend it very easily on the support

Also **very important** to know: it dries a shade **darker** than it looks when wet. So when trying to match an already painted colour you will need to make your mixture a tiny bit lighter than it looks when dry. There is an exception to this: when working on wet raw linen things will tend to appear darker until it dries.

To accelerate drying it's OK to use a hairdryer, but keep it moving so the painting doesn't get too hot in one place. This is particularly useful in the early layers if you're working very wet.

Another important characteristic of egg tempera is that the paint is invariably quite translucent. This has 2 important implications:

1. To make a very dense, opaque colour you will need 3-4 layers
2. Two overlapping layers of different colours will give you a 3rd colour

The disadvantages of egg tempera - quick drying, flat, translucent - are also its advantages, so it's about learning to play to its strengths and avoid trying to do things that won't work. Play is the key word here. You will learn by doing, the more the merrier. When starting out just experiment with the paint and learn how it behaves. Try things out, without worrying about the end result. “See what you paint, don't paint what you see”, and you will soon discover what you can do with it.

For the longer term...

As mentioned earlier, the medium is very protective of its support. It takes years to fully harden, but for all useful purposes it's properly dry within 6-8 months. It will then last indefinitely. The egg will preserve the pigments and support until the end of time (barring natural disasters, fire etc.). On the blog pages of my website you'll find more info about this and an Egyptian mummy painting from the first century AD. When you look at this, and medieval icon paintings, notice how bright and clear the colours are and how beautifully preserved. Oil paint is acid and slowly eats away at its canvas and requires relining every 100 years or so. It also darkens with age. Egg yolk is pH neutral, an amazing natural protective coating, and your paint layers will brighten and become more translucent with age.

Handy hints:

1. As with oil paint, for preference work "lean to fat". In other words use more water in the early layers and more egg in later layers. However I wouldn't stress about this. I've NEVER had a tempera painting crack, on any surface. The only way it will do this is if you leave a puddle of yolk to dry on it. Even then you might get away with it. Generally speaking it's very forgiving like that. I have a painting on canvas with about 30 layers of paint in one area. You can still see the texture of the canvas through it although it is a bit smoother, and it hasn't cracked.
2. Start bold and wet and add detail in later layers. You can wet watercolour paper and do washes at the early stages, but once the paper (or canvas) is impregnated with egg yolk this won't work any more.
3. Pigments don't all behave the same way. Some mix easily and flow smoothly, others are a bit gritty or fluffy and don't combine well with the medium. Some are very translucent, others more opaque. Some colour mixtures work well, others may look rather dull. Some stain everything, other wash out easily. The only way to learn is to play!!
4. Pigments that stain, like phthalo green and blue, quinacridone magenta, carbon black, can be cleaned off with washing powder, more egg yolk, or lavender oil. When washing your palette and brushes sprinkle on a little washing powder, allow it to dissolve, and scrub well. For brushes, particularly your mixing brush, dip it in egg medium, work it around on the palette and rinse with water. You may have to do this a few times, but if you don't you may contaminate the next colour you mix. Lavender oil is also an amazing solvent (I bet you didn't know that!). I keep a little bottle in my studio at all times (buy from ebay for about £6-£8). If you have a badly stained brush dry it on a paper towel then shake a few drops of lavender oil onto it. Wipe again on the paper towel and all sorts of old colours will be come out of it. Also good for cleaning oil paint from brushes, leaving them soft and fragrant, and for cleaning up sticky residues from labels etc.
5. Although in theory you should be able to mix any colour from about 6 basic pigments, in practice this is NOT the case. Moreover there are some pigments which have such extraordinary clarity and intensity that they're impossible to recreate from mixtures of other colours. As you progress you will learn what works and what doesn't, but as a rule anything from blue-green to crimson will be easy to work with. Colours on the purple/blue side of the spectrum are sometimes more trouble. Adding titanium white will give any colour extra body and opacity. A very tiny amount may even brighten it. This doesn't always make sense but go with the flow, and keep notes to help you remember what works and what doesn't.
6. The "yellow" of egg yolk has almost zero effect on the colours, and in quite a short time it will bleach out and leave them even brighter. Over time they tend to increase in clarity and translucence.
7. Final amazing and cool thing about egg tempera: under certain conditions, soon after drying, the paint will sparkle as if sprinkled with glitter. I've read that this has something to do with salt crystals in the egg yolk. Sadly it disappears within a day or two, but while it lasts it's rather magical.

Appendix: Making canvas panels for painting

Materials:

High quality waterproof plywood, 18mm thick (*see notes at the end)

Polyurethane varnish - exterior.

Sandpaper - coarse and medium

Waterproof PVA glue (Evostik or similar)

Raw linen (or cotton) canvas

Saw

Decorators 2" paint brush with fairly stiff bristles

Large soft brush

Large, clean, flat surface to work on

1. Linen and cotton must be pre-shrunk. Cotton may be washed in a machine on a hot cycle. Don't wash linen canvas in a machine - you will never iron out the creases! For linen cut a piece no bigger than 1m² and spread on a clean flat surface outside (I use a garden table). Pouring boiling water all over it from a kettle and watch it shrink! Turn it over and do it again. You will need to re-fill and re-boil the kettle if it's a big piece of canvas. Hang up to dry and then iron it.
2. Mark out and cut panels in sizes to suit. Plywood usually comes in 8' x 4' sheets (2440 x 1220 mm) which yield plenty of panels of different sizes, depending on your requirements. Make sure the corners are square.
3. With coarse sandpaper smooth off the edges and corners. With medium sandpaper briefly smooth down the front and back following the grain.
4. Brush off the dust and varnish all over with exterior polyurethane varnish (or shellac). Pay particular attention to the edges.
5. When dry (a few hours is usually enough) choose a side to paint on - usually the most blemished side because that one will get covered in canvas. With coarse sandpaper rough up ONLY the painting surface, across the grain and all around. With a medium paper lightly sand the edges and the back of the panel (in the direction of the grain) to smooth. Brush off again to remove dust.
6. Re-varnish the back and edges of the panel ONLY - not the front side.
7. Now you're ready to glue on the canvas. Make sure it's cut to the size of your panel with an inch or two to spare all round. Tip a quantity of waterproof PVA glue into an open pot or jar which is big enough to fit your paint brush into. You will get a feel for how much you'll need - probably less than you think at first, but it depends on the size and quantity of panels. It's more efficient to do them in batches. Mix a little clean water into the glue (about 10% by volume, 20% if it's very hot) and stir well.
8. Make sure you've got your canvas to hand. Start brushing the glue onto the roughened surface of your panel. You may find it easier to pour some onto the panel first, and spread it around. Work quickly and vigorously with the brush, spreading the glue all over the panel in a thin even layer. If you can see that it's a bit thick in one area, move it around until it's even, uniform and covers the entire panel, right up to the edges. Always run the brush OFF the edges (from the middle of the panel outwards). That way it won't drip down the sides and make a mess. Finally run the brush along the whole length of the panel in gentle, even strokes working your way across.

If your layer of glue is too thick it will soak into the canvas and rob it of absorbency. Worse still, it will do this only in patches, so your washes of paint will be uneven. The glue layer should be very thin - enough to grab the canvas and hold it down, but not to soak through.

9. Drape your canvas over the panel, laying it down gently so it overlaps the edges all round. Smooth it down VERY gently, pressing it into the glue. Work from the middle out towards the edges, without stretching the canvas - just press down gently. As the glue soaks in it may wrinkle slightly. Keep smoothing and pressing it down as the glue dries and it will gradually flatten and stay put. If you've got a clean flat surface put it face down on there for a while, or put another panel on top of it to keep the canvas flat.
10. When the glue is dry and your canvas is flat you can trim the edges with a pair of sharp scissors (put it face down on a clean surface with the edge overhanging and cut right up to the edge of the panel). You're now ready to paint!
11. It's possible to paint straight onto the unprimed linen without any further preparation, however it is very absorbent at this stage. Paint will soak into it and spread annoyingly to where you don't want it. To prevent this I always prime the panel first with egg medium. Make up a quantity with a bit more water than usual and brush it onto the panel, making it evenly wet all over. You'll need at least 1 egg yolk per square foot, more for coarse canvas. If you want a white ground mix white pigment into the medium, but not too much at first. You'll need to give it 3 or 4 coats to make it really white, allowing it to dry (or hair-drying it) in between. However, by the time you've done that be aware that the linen won't be so absorbent any more and wet washes will be trickier to control.

Re-using panels

Once you've done all the hard work of cutting a preparing panels to paint on, it's nice to know that you can re-use them when things go wrong. Easily half of everything I paint ends up in the bin. When it really can't be saved get your fingernails under the edge of the canvas and start to pull it off the board. Once you've got a corner up, grab hold of it and rip. It takes a bit of force, but the canvas will usually come off in one piece. [If you have used cheap Chinese plywood there's a good chance you'll rip a layer of that off as well - another reason to avoid it]. You then have an interesting texture left on your panel, made by the glue and fabric. This is actually an excellent surface to paint on if you like the texture. I've used it quite a few times. If not, get your coarse sandpaper out again and give it a good going over, but only on the canvas side. Brush off the dust and glue on a new piece of canvas exactly as before. You can do this again and again until the board starts falling apart. With oak panels that never happens, so you can re-use them indefinitely!

* Notes on plywood

Plywood comes in many different qualities, grades and thicknesses. The cheapest "waterproof" ply (sometimes called WBP for Waterproof Birch Ply) is made in China. This usually has a reddish outer layer which is paper thin. At the timber yard stacks of ply sheets will be marked R.O.C. (Republic of China) on the side. I have used this but it is of poor quality. When cut you will find it is full of voids, the layers often overlap and it de-laminates easily. Avoid this if possible. If you ask for a better quality you will usually be offered "marine" grade. This is much better, usually of Scandinavian origin and what I now use exclusively. The only drawbacks are cost and weight. It is denser and twice as expensive, but worth it, especially if your paintings are fetching good prices. I have also tried using thinner ply - 6, 9 and

12mm are also available. However even the good stuff in these thicknesses won't stay flat. You will end up with warped panels that are near impossible to frame. Don't waste your time with it.