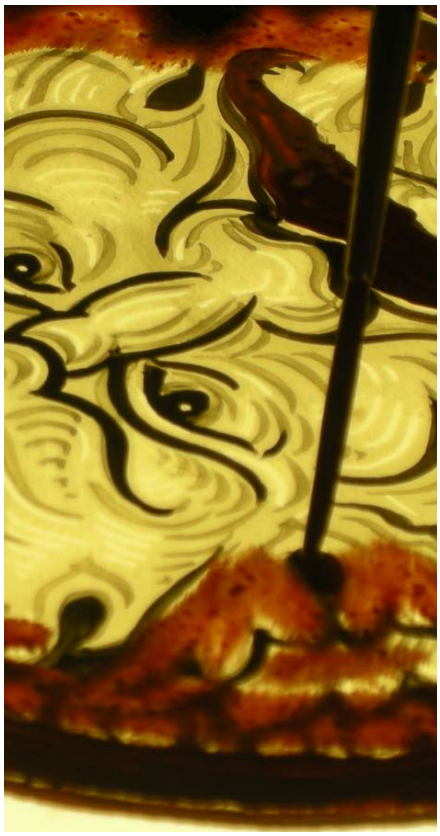
WILLIAMS & BYRNE

Designers Painters & Restorers of Glass

Glass Painting Techniques & Secrets from an English Stained Glass Studio

Part 3 – Silver Stain and Oil

"How You Can Trace, Blend, Shade & Flood from a *Reliable* Batch that Keeps for Months (and Why Water or Vinegar are No Good for This)"



Introduction

Welcome to the joy and beauty of silver stain.

If you're new to silver stain, you can be thankful you don't have all the worries that "old hands" (those used to using water or vinegar, for example) will have. And when you meet a difficulty or complication, just bear in mind that people have been silver staining beautifully for 800 years or so. It can't be all that difficult, can it? — Provided you are *methodical* and *use some other medium* than water or vinegar ...

If you've used silver stain before but always done it with water or vinegar, *this* approach will come as a relief. All the same, it can't entirely remove your "battle scars" — *you* will just have to get over them and *move on*.

So, newcomers *and* old hands: read through this guide and absorb as much detail as you need to right now. You can always re-read things later, or ask us questions.

If you're already competent with tracing and shading, try the step-by-step project of the Green Man. If you're not yet competent like that, pick a simpler project. And for a lot more information about tracing and shading and mixing suitable paint, get the earlier two parts in this series — see page 20 for details.

It's time to make a start. Here are various quick points and quick tips so that everyone — newcomers *and* old hands — can get their bearings.

Quick points and quick tips

These quick points and quick tips are aimed at newcomers and old hands alike. We need to establish a shared frame of reference here.

1. Silver stain comes in powdered form. You mix and grind it with a medium. (There's plenty of information about media in the *next* two sections.)
2. Silver stain already contains a binder so you do *not* need to add gum Arabic.
3. It is corrosive to your palette and tools, so clean them thoroughly after use.
4. Keep a separate palette and tools for silver stain.
5. Keep a separate palette and tools for each of the different media you use with silver stain.
6. Silver stain requires a lower temperature than tracing paint and most enamels. Therefore it is usually fired *separately*. But with some media – e.g. water or vinegar – it is possible to fire stain face-down with tracing paint fire-side up. (*If* you do this, you may consider lowering the top temperature, decreasing any soak time there, and, after firing, removing *all* traces of stain from the kiln bed on which the stain was fired.)
7. *Always* make one or more test pieces. No one avoids this. Ever. No matter their experience. No matter the media they use. Always test. End of story.
8. You may even need to make a test piece which is the same size and shape as the piece you want to do "for real". This is because *surface area* (as well as the thickness of glass, and also as the constituents *within* the glass) makes a sometimes appreciable difference to the rate at which the glass cools down. You would especially do this for a very labour-intensive piece of painting such as a *face* or *armorial crest*. If the test piece works, you will also want to note its position in the kiln. Maybe re-read this paragraph because it contains a number of essential points.
9. Once fired, and the glass is cold, you must wash off the remnants of the stain on your glass. See page 12, steps 23 and 24.
10. Success is judged by the transparency and pureness of the colour (and in restoration work, *also* by matching the original piece). The commonest kind of *failure* is when the stain has a blotched, opaque mother-of-pearl (but *ugly*) appearance. This is usually called "metalling".
11. Failure in terms of metalling is caused by firing too high and/or staying too hot for too long e.g. because the kiln didn't cool down quick enough. Don't understand "too hot" too simply: it's not all down to your kiln and its controller. It's also down to the hot and cool spots in your kiln, the dimensions of your glass plus its physical constituents.
12. You can remove this metalling only with drastic action like using hydrofluoric acid. Not an easy option; testing, on the other hand, *is*.
13. The other end of the "spectrum of failure" is when the glass appears *not to change at all*. This is caused by firing too low, and/or by not staying hot for long enough, and/or by there being an incorrect proportion of silver stain to medium, and/or by the *glass itself* being resistant to the chemical change that silver stain tries to effect (on which, more in a moment). Yes, there are a lot of and/or's there. In practice, common sense and careful observation will clarify which situation you're in.
14. Silver stain works by changing the structure of the glass so it filtrates yellow light, not white. Thus white glass will appear yellow to our eyes, and blue glass will appear blue *et cetera*.
15. If follows that silver stain needs *bare glass* to work. So it can't be used on top of painted or enamelled glass. With float glass, it's likewise best to use the non-tin side because remnants of tin can interfere with the operation of the silver stain.
16. It also follows that, in architectural glass, it's best to put the silver stained side on the outside where all the weather is, because the rain and wind can't wash it away (unless it's acid rain of course), whereas weather *can* ruin paint and enamel.
17. Silver stain works better on soft glass rather than hard glass. As a rule of thumb, hand-made glass works better than machine-rolled glass. But don't worry if you can't get hand-made glass: a lot of machine-rolled glass is absolutely fine. And once you've found a reliable range, you'll see that machine-rolled glass is usually more predictable than hand-made glass by virtue of its automated production method.
18. Once you've found a range of glass you trust, it's a good idea to stick with it. Thus we ourselves use a lot of Polish mouth blown glass as well as a range of the Cordele restoration tints (both from Tatra). German glass from Lamberts is also excellent (and a joy to cut). For complicated staining we often prefer Tatra or Lamberts to the hand-made English glass which it is our good fortune to

have made just a few miles from us. This is because the English glass is like the rest of our magnificent nation: extremely beautiful but rather unpredictable,

19. Again as a rule of thumb, some colours work better than others. Flash green seems particularly recalcitrant to stain, so you would need to apply stain to the white side *not* the green one.

20. Receptiveness / stubbornness is caused by the ingredients of the glass. Therefore be careful when you undertake restoration. If the glass is no longer made, it is fiendishly difficult to mimic the effect of the stain. Thus you may have seen antique silver stained glass which appears *dark red*. This is because of the kelp in the glass. So to copy *this* effect exactly, you will maybe need to find yourself a source of kelp glass. It's just possible there is no other *legitimate* approach.

Media - water and vinegar

Silver stain is most commonly mixed with water *or* with vinegar.

To repeat, since it already contains a gum, there's no need for gum Arabic. It will stick to the glass it is, and, if you're in a hurry, very confident or happy with taking risks, you can fire it face-down at the same time as doing a paint firing on the upward face (this is a higher temperature than necessary for silver stain). But only with water, vinegar or a medium that dries before you fire it.

There are various problems with using either water or vinegar:

1. Quick evaporation of either medium means it's not possible to make a long-lasting and reliable batch of ready-mixed silver stain. Thus you are obliged to mix it up fresh each time and to run through a new set of tests (which most people won't do for the simple reason that the initial test conditions can never be replicated because the initial mix will have dried out);
2. Quick evaporation also means it's nearly impossible to blend and shade from light to dark because the applied stain dries too quickly on the glass and it is difficult to establish its density at any particular point;
3. Water and vinegar only have the one consistency – thin – which means it's difficult to control the strength of colour;
4. It's difficult to apply smoothly water- and vinegar-based silver stain to *selected* areas, so you end up applying it to a wide area, blending it smooth as best you can, letting it dry, then *picking it off from where it's not wanted*. This is time-consuming, wasteful of silver stain, and potentially hazardous by virtue of the dust;
5. It's highly unpredictable in the kiln.

Given these limitations, it is hard to understand why anyone would continue *only* with water or vinegar. But we are at heart all trusting creatures who like to do as we have been told. And so, if we're reliably informed by an expert that silver stain is always mixed with water or vinegar, that's what we continue to believe, despite the evidence of our own senses. ("For surely after 800 years it must be known for certain what media to use with silver stain!")

We just imagine there's nothing to be done except shrug our shoulders and accept our lot.

And maybe we wouldn't enjoy all the new permutations that would be thrown our way if, *on our own*, it came into our heads to experiment with a *different* medium ...

In this way, the imagined presence of a long tradition stifles our common sense. For surely it's actually common sense to say *it can't always have been done like this*, with water and vinegar, for all those long 800 years; *surely it's the modern expert who is mistaken here* (or so we *ought* to say) — because just look at the delicate beauty of 18th century Flemish silver stain, for example. *And please don't tell us this was done with water*. Or vinegar for that matter. Or even urine. (Don't blush. In the true pursuit of beauty, it's perfectly acceptable to use *any* legal substance, and maybe others as well.)

Other media

There is in fact a wide range of other media you can use with *most* silver stains (but not all, and you can't avoid your own testing here) e.g. propylene glycol, squeegee oil and also oil of Tar to name but three.

At Williams & Byrne, we now mainly use oils like Sandalwood Amyris and Lavender. This is because:

1. They have none of the disadvantages of water and vinegar;
2. They are relatively safe (unlike oil of Tar, for example; although pregnant women must take care when using Lavender);
3. It's potentially less embarrassing than explaining why you want a significant quantity of propylene glycol;
4. They smell nice in the studio - yes, we have sensitive, artistic souls, and we appreciate the finer things in life. So oil of Tar is almost a no-no on aesthetic grounds, it smells so wretched, never mind the fact its touch can give you liver failure or worse. You have been warned.

Our method

Make a thick smooth paste using your chosen silver stain plus oil of Sandalwood Amyris and a small quantity of oil of Lavender.

Transfer this paste to a suitable container and add a few drops of Sandalwood Amyris on top of it to keep it lubricated.

Leave this paste covered at least 24 hours. (Covered, the paste is fine for many months, and who knows maybe also many years.)

When you're ready, use your palette knife to transfer a dollop of paste to the palette.

Add some drops of Lavender oil on one side of this paste.

Then use your palette knife to cut off some paste and mix it with these drops. Add more Lavender to thin the mixture further; or add more paste to thicken it.

Load your chosen brush and observe how it applies to glass. Do not worry too much about streaks because you can use the tips of a round-headed badger blender to smooth these away.

Easy, yes? That's how simple things can get when you think for yourself and don't accept received opinion.

Why use Sandalwood Amyris for the paste?

We use Sandalwood Amyris because it is a thick oil, and because it evaporates only very slowly. (It is also economical to buy.)

It is useful it is *thick*, because it means that, with a suitable thinner, there is a whole range of densities we can make.

It is useful it *evaporates slowly*, because it means we can make and keep a good-sized batch which, once we've tested it, we know to be reliable. (So if something goes wrong, we can deduce it isn't the stain itself.)

In our experience, Sandalwood Amyris on its own is just a bit too thick to grind the stain into a smooth paste. That's why we also add some Lavender at this mixing stage.

It is certain there are many other media you can use.

Why use Lavender for the thinner?

We use Lavender oil *because* it is thin and because it mixes well with Sandalwood Amyris.

Again, there are certainly many other combinations of oil that you can discover and use.

Key properties of Sandalwood Amyris and Lavender

Here are some useful things you can do with silver stain when combined with a base paste of Sandalwood Amyris that you then dilute as needed with Lavender:

1. You can keep it ready for months (and maybe longer);
2. You can blend and shade it from light to dark;
3. You can keep good control of its strength;
4. You can apply it to selected areas e.g. by flooding large areas or tracing fine lines within small areas;
5. You can be more confident than you could be with water or vinegar that it will behave as you want it to – but of course *you* **always** *have to do your homework first*. To repeat: there is never any escape from testing, even when you follow our instructions to the letter;
6. You can apply two or more stains to the same piece of glass, and blend them together as needed;
7. If you are careful, you can clean up around passages of stain – just wait until the oil has dried, then use a "cotton bud" (ear cleaner) or a screw of kitchen paper. That said, it's better to apply the stain carefully and accurately in the first place.

2 extremely important points

Read this section carefully, remember the points and always act on them:

1. Once you've applied the silver stain to your glass, you must take whatever steps are needed to prevent particles of dust or dirt from landing on any of the oil;
2. Depending on the thinness of your application and also if you applied an undercoat of neat Lavender to begin with (see point 2 next section), you may need to allow the silver stain to dry out a little – that is, to allow its Lavender-based constituent to start to evaporate. (This takes anything between 15 minutes and three hours in our climate.) And, as it does so, you will need occasionally to take your small round-headed badger and *re-blend your silver stain*. This is because the speed with which Lavender evaporates can sometimes disrupt what was previously your smooth and immaculate blending. Therefore, very lightly, you must restore the former smoothness.

Interesting developments

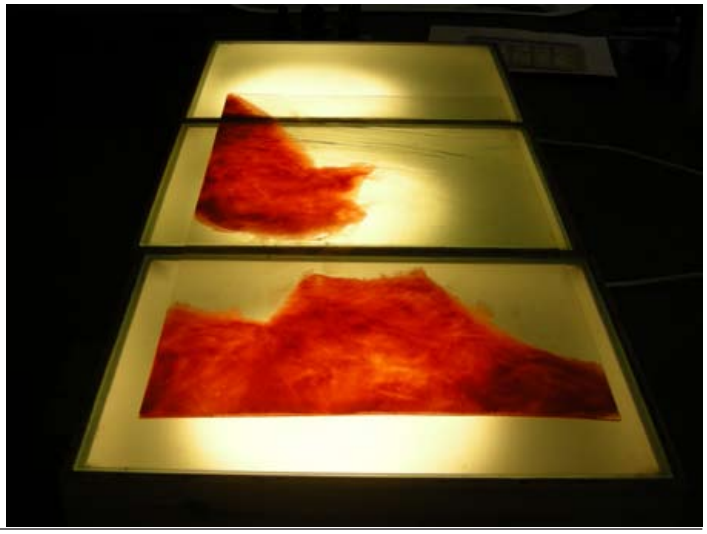
There are many developments you can discover for yourself. Here are four examples for you to consider:

1. You can increase the appearance of "shading" with silver stain by e.g. applying and firing a light wash of water-based paint which you might also stipple or otherwise decorate. This is what we did for the "Fibonacci" window (see picture top-left);
2. You can cover the whole surface of the glass with a layer of neat Lavender oil to lubricate the whole surface. You can then apply thick mid-tones of oil-based silver stain. With a round-headed badger blender, you can then blend and shade these mid-tones and create the most beautiful shading in gold and yellow (see photo of a large piece of unfired glass across 3 light boxes, bottom-right);
3. You can apply the oil-based silver stain then sprinkle e.g. water or turps to create random textures;
4. You can do several stain firings, each time adding more depth to your glass. (In restoration work, this may indeed be the best way to achieve an otherwise impossible result.)

These are just four quick examples for you to see the potential here. It is up to you to develop things in your own way. And *test* them too.

Care of your paste

We store our Sandalwood-based paste in an ordinary kitchen ramekin. We cover the ramekin with a small circle of clear glass



which we mark with important details like the name of the silver stain and the date we made it (see picture on page 3 top-right). When needed, we often use the other side of this glass lid as our palette. After use, we'll often scrape any remainder back into the ramekin and not bother to clean the palette because its natural stickiness will help to seal the palette and ramekin together and thus make it airtight.

Note: projects which are larger than the Green Man e.g. the Fibonacci window (page 4 top-left) need the same large-sized palette that we'd use for other stained glass painting. Such palettes are reserved exclusively for silver stain and oil.

Application

Use any kind of brush you want. It's that simple. Just be sure to keep the brushes for exclusive use with silver stain and Sandalwood/Lavender.

Once applied, use a round-headed badger to blend the stain until it's smooth.

Tracing

Dilute the paste as needed. Load a suitable brush. Trace a line. Optionally, use your blender and carefully smooth the length of the line (or even the width, if you wish).

Blending

Apply the stain. You can apply several layers where you want the stain to be more powerful. Then blend as needed. The nice thing is, you can actually apply the stain quite robustly and roughly, knowing for sure that it's possible to use your badger blender to render everything smooth with a few flicks of your brush.

How to use a round-headed blender

Hold the round-headed blender in such a way that you can control it with your *fingers* — this gives you far more control than if you flick from your wrist.

You see this demonstrated in several of the videos.

If this is new to you, you have just learned a priceless piece of information.

Shading

You'll need two or more consistencies of stain. Start with the thickest consistency – the one with the smallest amount of Lavender. Mix as usual. Load a suitable brush. Apply stain thickly to the darkest area. Add more Lavender to your palette to create a thinner consistency. Mix. Load the brush. Apply the stain. Continue as needed with ever-thinner consistencies. Then use your round-headed badger blender to join the different consistencies together.

If the area is a large one, it is often a good idea to prime the whole area with a thin layer of neat Lavender, blend lightly, and then apply the stain. As noted earlier, you will also need to blend the stain again as the Lavender dries.

Flooding

This requires a diluted paste whose consistency is a bit thicker than the one you're familiar with from flooding ordinary glass paint. Load the brush – and if it is a large area you intend to fill, then you will need a large brush rather than a tracing brush. Paint the stain thickly onto and within the chosen areas. As needed, blend gently.

Note this: it is also possible to flood exactly as you would with glass paint. In this case you'd need a runnier consistency than the one favoured above, plus a tracing brush. If you do choose to use your blender, you will need to take care to avoid splattering stain everywhere.

Care of your brushes

At the start of a staining session, use a few drops of neat Lavender to prime your brushes.

At the end of a staining session, or as needed when your brush gets dirty, use a few drops of neat Lavender to clean your brushes, and, if it's your round-headed blender here, also rub it gently against some kitchen paper.

Firing schedules

Now the fun really starts.

It is important to remember that every kiln is slightly different – even the same model from the same manufacturer.

This rarely matters with glass paint e.g. Reusche tracing black (DE401): even if your kiln and mine actually differ by 10 Celsius / 50 Fahrenheit when both kilns give a reading of 675 Celsius / 1250 Fahrenheit, the tracing black in both kilns will *still* fire glossily and smoothly. This is because glass paint fires successfully by *fusing* to your glass: and there is a wide range of temperatures within which this can happen. So all is nice. And thus it is easy for a glass painter (especially if they are not scientifically or mathematically inclined) to be beguiled into thinking their kiln is *accurate*, whereas in fact (with the help of the "controller") it is only *relatively precise*.

With silver stain, everything is potentially very different.

So *we* can tell you, for example, that *we* typically fire *our* stain at 560 Celsius / 1040 Fahrenheit, and that *we* program *our* kiln to take three hours to get there, after which *our* kiln cools at its own rate to 50 Celsius / 122 Fahrenheit in six hours, when *we* can open the lid and remove our glass, wash off the stain, and behold the beauty of *our* perfect staining.

Yes, we can tell you all these things about what we do, and you can follow them to the letter, and then you will perhaps be sorely disappointed when you open your kiln and inspect your own results ...

Before anyone despairs (which would be a pity, because Sandalwood and Lavender smell so nice *and* work so well with silver stain), let us make two important points.

1. If anyone is tempted to think their life is "Oh, so complicated!", trying to work out the correct schedule for silver stain, please consider the life of a ceramacist, where minute differences regularly make significant differences to the result. So let's keep calm and see things in their proper perspective here. And if someone is constitutionally opposed to testing and methodical practices, then perhaps silver stain is really not their proper "cup of tea" (as we say here). We won't be so damning as to suggest they reserve their talent for a nice range of Pebeo non-firing glass paints, although it's worth remembering they always have that option.
2. Furthermore, in our experience, firing oil-based silver stain is *considerably more predictable* than firing water- or vinegar-based stain. The *caveat* is: "once you've done your tests". That's essential.

You can't avoid them. Not unless you enjoy living dangerously. See how even *we* did a test for our "Green Man"? We took the pains to build up trace lines and shadows (see steps 21 and 22) which we fired *before* using this test piece to practice *exactly* the same sequence of techniques that we proposed to photograph and film for you on the real piece ...

And someone might ask, Was all that effort worthwhile?

To which our answer is, Certainly, because *we wanted to be sure* the project would work, and this was the only way to gain that certainty.

If the test piece had *failed*, we would have removed the unfired stain from the live piece, made a new test piece, traced and shaded it as before, then tried again with stain.

And we would have continued like that until the test piece had worked ...

But actually, with a good measure of method, it *never* comes to that. You too will see, as we said just now, that with oil, everything is altogether more predictable than with water or vinegar.

Our view is that oil-based stain is more predictable because of the way the oil holds the stain. That is, unlike water or vinegar, *oil* allows the granules to plump up and expand and stay nicely suspended in this lovely sticky medium. Also, it does not vary its relative proportion by evaporating as quickly as water or vinegar. So, once you have a batch of oil-based stain that works, then, with a little *care*, and a modest amount of *good fortune*, you have reason to continue to look favourably and thankfully on the batch for the remainder of its earthly existence.

The "care" is required in searching out a range of glass which takes stain well: also in making a good batch of oil-based stain and keeping it away from contamination: also in using clean brushes to apply it: and also in discovering a typical firing schedule that *works in your own kiln*.

"Good fortune" is required because kilns are not scientifically accurate: also because we do not choose to measure exactly the ratio of oil to stain and to maintain this ratio at all times: also because brushes do not apply stain evenly: and also because, even with factory-made glass, chemical constituents can vary from sheet to sheet and indeed within a single sheet.

So take care *and* have good fortune.

Discovering the best schedule for *your* kiln

Your batch of stain is probably the most variable ingredient in the mix. (And it's no use trying to eliminate this variability completely, because the batch is always changing slightly over time, and *you* can't stop that.) Therefore it's best to concentrate your efforts on the firing schedule and the glass you use.

Let's start by seeing if y*our* kiln is similar to *ours*.

When we fire our glass paint at 675 Celsius / 1250 Fahrenheit, the traced lines are *glossy*. They are also nearly entirely *smooth* with the surface — you scarcely feel them when you stroke them with your finger. On the other hand, when we fire our glass paint at 630 Celsius / 1170 Fahrenheit, the traced lines have a *dry biscuit-like* appearance. They are also slightly *rough* to the touch — when you stroke them, you definitely know they are there.

So that's *our* kiln.

If it compares with yours, then *start by using our schedule*.

If our results differ significantly from yours, *make a suitable adjustment to our schedule* and start there.

Let's go:

1. Watch the video and copy how we mix a batch of oil-based silver stain. Using this approach, we've never had a batch that failed. The problem has always occurred in the schedule *or* the glass itself, so let's move on —;
2. Cut a whole lot of different kinds/colours of glass including various makes of float glass – really, as wide a variety as possible – and be sure to note their names/codes. We suggest a wide variety, because this is the best way to start getting information that you can then test and refine;
3. Apply stain to all of them, taking notes and making photos as you wish;
4. Assuming your kiln is similar to ours, program your kiln to reach 560 Celsius / 1040 Fahrenheit in three hours *without* a soak at the top or an annealing cycle on the way down (and if you have a gas kiln, don't worry, you'll just need to figure out a schedule of your own. At Hardman's, where we worked some years ago, we used to fire our stain in just *9 minutes* in the huge gas kiln they had there. Even with our electric kiln, we can, if we wish, reach top temperature in about 50 minutes, then descend, and the stain is fine, if slightly weak);
5. When the kiln has cooled down at its own rate, take the pieces out, clean them, then assess and note down the results ...

What happens next?

Success!

Wonderful. You're away! All the same, make notes and take photos as needed before rushing ahead. In 6 months' time, you'll be glad you did this.

Failure - no yellow at all

This is, if you like, the worst result because it is potentially ambiguous between three causes: the top temperature was too low, or the glass resists stain (and maybe there is nothing you can do about that), or your stain mixture is too thin (and straightaway, therefore, you need to apply it more thickly).

If *none* of the pieces has taken the stain and you started with a reasonable variety of glass and a good thick application of stain, then it is maybe more likely that it is the low temperature which is to blame. So cut more glass and adjust upwards the firing schedule by 10 Celsius / 50 Fahrenheit.

If, once again, none of the pieces has taken the stain, increase the temperature again and repeat.

If this fails a third time, something drastic is going wrong.

It's possible that, coincidentally, none of your chosen glass takes stain. Possible — remotely, because at least some of your float glass should show some reaction.

So at this point, and only at this point, you need to consider the batch and whether you're happy with how it was mixed in the first place.

Failure - ugly metalling

If on the other hand, some/all of the pieces have metalled, don't be disheartened, because at least you got a reaction, so you know the constituents of the glass do not protect it from changing its ionic structure.

Here we ourselves would now work methodically with one type of glass at a time. This is because of hot spots and cool spots (see next section).

So our advice is for you to cut several sample pieces from just *one* kind of glass that metalled, then adjust the firing schedule *downwards* by 10 Celsius / 50 Fahrenheit. (Maybe it's also possible for you to speed up the descent from top temperature e.g. by opening the bungs.)

Continue lowering the top temperature until the glass doesn't

metal.

Be patient. Take notes and photos. You'll get there.

Once you've succeeded with one kind of glass, move onto the next kind. And so forth.

Hot spots

This is another essential variable that you must consider and make allowance for: your kiln may well have some spots which are hotter than others, and spots where the temperature cools down more slowly.

If your kiln has them, it is essential that you know where these hot/cool spots are.

Say you fire 10 small pieces of the same kind of glass with roughly the same application of silver stain on each. Say you fire them to a notional 560 Celsius / 1040 Fahrenheit. Say some of them metal, others fire beautifully, and some of them don't show any reaction at all. Well, it may then be that your best course of action is to forget all about ever filling a whole kiln with bits of glass to stain. You won't succeed in getting the results you want. It's not your fault. It's not the stain's fault. It just comes down to how the heat circulates within your kiln. End of story. Some kilns are notoriously worse/better than others with regard to maintaining an even temperature throughout the kiln. And it's possible for any area that is near a bung hole to suffer. (Check that your bungs fit *tightly*.)

Silver stain — the different brands

There are two main brands, Reusche and Oster.

In the Americas, you can download a Reusche catalogue from www.reuscheco.com and you can either order straight from them (minimum 8 ounces for any order line) or order smaller quantities from any of their US distributors.

Also in the Americas, you can contact Oster on 603 835 6021, or you can e-mail Clifford Oster directly on ceoster@aol.com.

Across Europe, contact PELI Glass products right here: http://www.glasatelier.nl/en_home.php if you are a private individual or http://www.peliglass.eu/index.php if you are a business or a studio.

Note this: we don't get paid for referring you to these suppliers. We only refer you to them on the basis of the quality of the goods they supply and on the basis of our personal experience.

Which are best?

You will probably ask us which stains are best and what each of them looks like.

We ourselves, through ease of access and long-standing familiarity, use mainly Reusche 1383 (Orange #2) and 1384 (Yellow #3) and also Oster's Ancient Walpole. That's for our own work. When it comes to restoration, we use whatever it takes.

And if you're wondering what each of them looks like, then you can see indeed see examples of the *Reusche* paint in the Green Man project on the next few pages.

But you will be familiar with publications which show you how different stains fire ...

And we think this is desperately misleading so it's not something we're prepared to do. The reason we think it's misleading is that so much depends on the kiln, the glass, the firing schedule and the consistency of the paint. It is photographic samples like these which contribute to people's sense of confusion when it comes to working with silver stain. The photographs imply a standard result which is in principle nearly impossible to achieve except by chance; and which in any case is only desirable in practice when doing particularly demanding kinds of restoration work, where your efforts must literally become unnoticeable as such.

Essential oils

You can buy small phials of Sandalwood Amyris and Lavender from many different kinds of shop.

We now buy ours directly from the wholesaler in anything between 100 ml and 500 ml bottles - in particular we get through a lot of Lavender. Our own UK wholesaler is Amphora Aromatics. (There is a surcharge for small orders.) In other countries, check out health stores and chemists', and also businesses which supply materials to aromatherapists. In particular, search the web for a company called Ananda Apothocary. They ship world-wide. Remember you just need Sandalwood Amyris (not the pure and very expensive type).

Conclusion

Key variables:

1. The make of stain itself, its constituents;
2. The media you choose;
3. The consistency of the mix you prepare;
4. The thickness of application to the glass;
5. The glass / its colour / its area and thickness;
6. The firing schedule;
7. The kiln itself - hot spots, cool spots, and rate of cooling.

So there's a lot to think about *if* things go wrong.

The best way to make things go right is to work methodically at all times, and also to take notes so that differences can be observed and explained. Ignore nothing.

Whether you're new to stain or returning to it after a frustrating experience, always consider how you can *keep things as simple as possible*. When you keep things simple, then it is far easier than it otherwise would be to identify which of the variables is giving you problems.

Silver stain repays all the effort you put into it.

But your efforts must be methodical — otherwise your results will at best succeed by chance, and thus be unreliable going forward.

It's your choice. The best long-term option is to work slowly and steadily.

We wish you every success and happiness with your new knowledge.

Step-by-Step Project

1. Bare glass

2. Light undercoat

3. Copy-trace main outline

4. Copy-trace main details of face

5. Copy-trace details on forehead, chin and sides

6. Free-hand (design on one side), add secondary lines

Step-by-Step Project

7. Copy-trace (glass on top of design again) decoration around border

8. Free-hand (design on one side again) strengthen outline of face

9. Free-hand, strengthen main details of face

10. Free-hand, strengthen decoration around border

11. Flood around face and block in within border

12. Pencil your highlights on the design, then use a stick and make these on your glass

Step-by-Step Project

13. Add highlights to border

14. Soften some highlights with dry clean finger - careful!

15. After first firing (1250 Fahrenheit / 675 Celsius)

16. **On the back**, use a stain tracing brush to apply stain #1 within the border (here, Reusche 1384, Yellow #3)

17. Also use the stain tracing brush to apply stain #1 within face

18. Use a stain round-headed badger to blend stain #1 and remove streaks

Step-by-Step Project

19. Prepare and apply stain #2 (here, Reusche 1383, Orange #2)

20. Use the round-headed badger to soften stain #2 and blend it gently into stain #1. Cover your glass safely and run suitable test firing(s)

21. Do steps 16-20 on the back of a pre-fired test piece

22. Fire the test piece in the kiln (our kiln 1040 Fahrenheit / 560 Celsius)

23. The test was successful, so we fired the main piece. See above how, after firing, stain #1 is light pink and stain #2 is dark pink

24. Make sure the glass is cool enough, then use a wet sponge to remove the fired remnants of stain

Step-by-Step Project

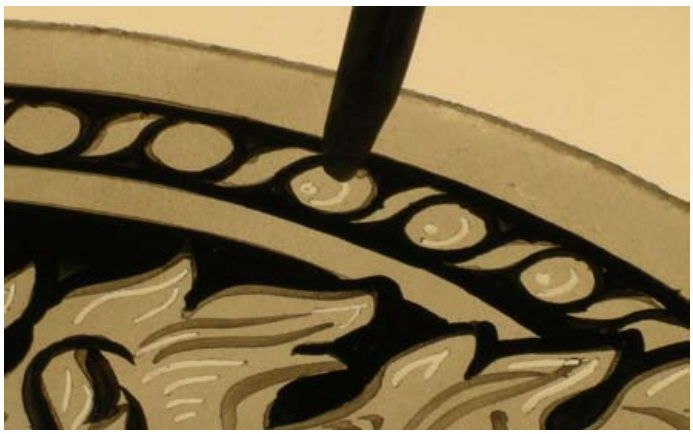
Key Points

Keep the design in your sight at all times

Take care with the curved lines within the border

Keep your palette tidy - even when blocking in and flooding (as here)

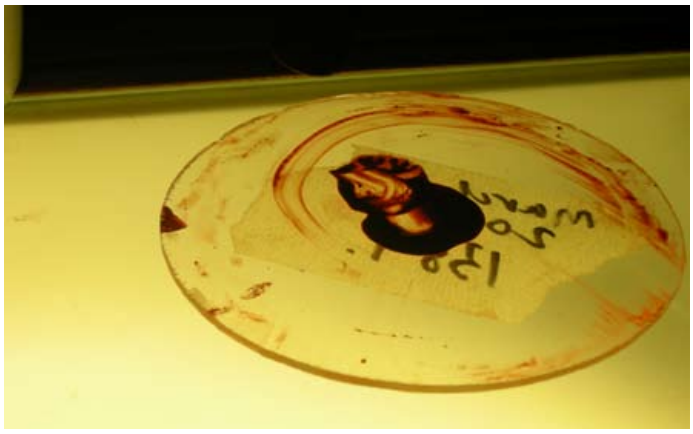
A bridge is useful even / especially when highlighting



Pay close attention to the fine details within the highlights

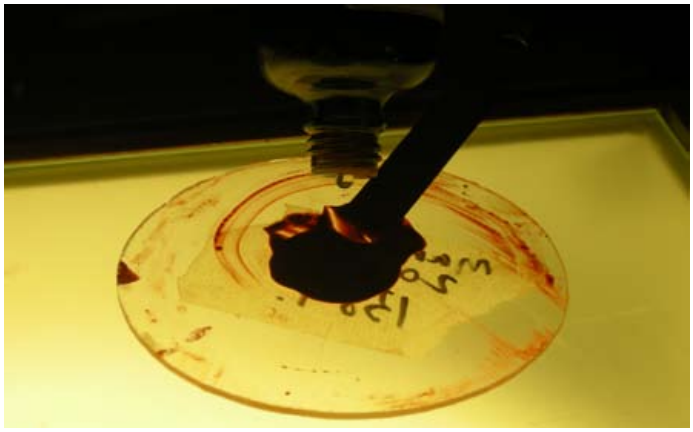
Final highlights and softening are often best done against natural light

Take some thick pre-made Sandalwood stain paste from your reservoir

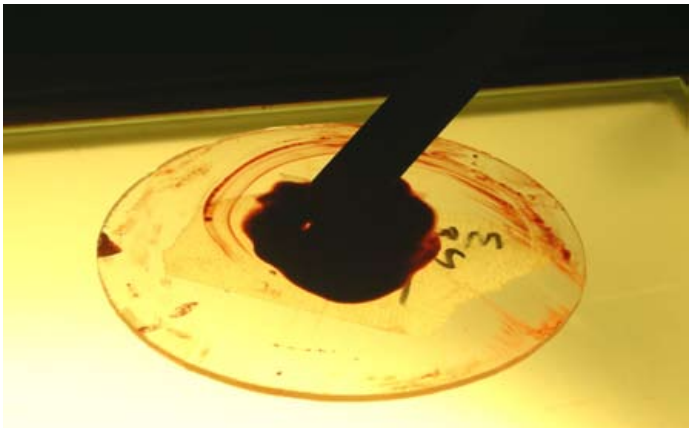


Place it on a suitable palette (for once a small one)

Key Points



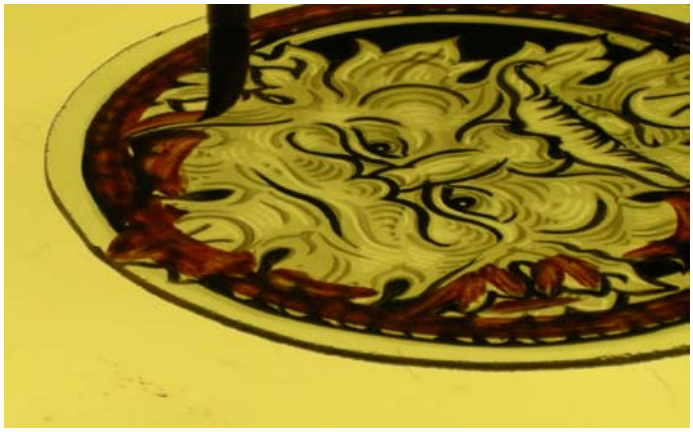
Dilute the Sandalwood-based stain paste as needed with Lavender oil



Use a palette knife to grind and mix as needed

Load the stain brush

Remember to use your bridge



Yes, try to be neat, but do not worry too much about streaks because ...

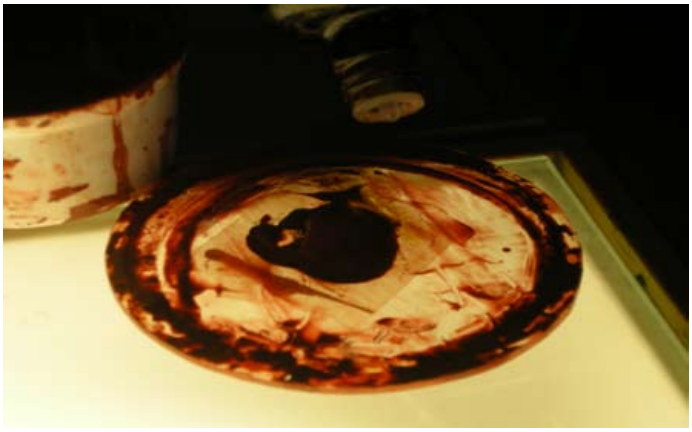
... you can then blend lightly to soften the streaks

When you're finished with stain #1, scrape it back into its container

Then move onto stain #2 (see the date we made up our paste here?)

Key Points

As before, extract some Sandalwood-based stain paste onto a palette



Add Lavender oil as needed to thin the paste

After mixing and grinding, load your brush - here we use a fine one

Drop in bits of stain #2 where needed

With this oil-based method, you can also trace with stain

Blend again as needed, and fire the glass, stain side up of course

Once fired and cool enough, use a damp sponge to remove dried stain

We'd done a test, so we knew it would work

Afterword

And now *I* (Stephen) — not *we* (Stephen and David, who together wrote the other parts of this guide) — am going to write to you *personally* right now. If I could write this individually by hand, in my own expansive and curly script, I would. But I can't. So I will just type and write as I remember things ...

See, 11 years ago, *all* I wanted was to *escape* from the City — which is how we refer to the "square mile" of London, its financial centre — and that was all I cared about. No family then, so I had true freedom of manoeuvre, for which I thank my lucky stars, and on account of which I am today so determined to teach. It's not that I know more than you in any important sense. In fact I know I have everything to learn from you. Yet, being a practical kind of guy, it's just that I like to pass on practical things. Things which work. And also how I discovered them. Because when you see that, you'll also see *how to do this for yourself*.

Here's how it happened eight years back when I was doing my apprenticeship ...

Normally in *this* studio, and perhaps in many others, the "paint shop" doors were shut. Closed. Dark.

Sacred ground.

A phrase I've used before: the holy of holies.

One day, a sun-lit day, for some chance reason these doors were open, and, strange to relate, the master painter was also in expansive mood.

As a mere apprentice, it was incautious of me to venture in, but I reckon an open door that's usually shut always holds a special attraction.

Fumbling over my words, I muttered something about the magnificent shading and matting to be seen in many Victorian windows.

For once not silent, the master painter reminisced about his own apprenticeship, some 35 years earlier. "The whole building was filled with the strangest smell," he mused. "And it all came from *here in this room*. Like road-building it was. Creosote ... Tar, even. It was foul. But the *painting* was magnificent."

You see how, even in his day, *he* wasn't told everything?

And all of us just tend to follow the examples we are set.

But at least he shared the memory now.

Which set me thinking.

And you must remember the internet was new back then.

"'Google'? What's that?" (This is 2002, remember.)

So I rang Reusche - and such was the meanness of the studio, I even paid for the transatlantic call out of my own salary - and asked them about this long-remembered smell.

Immediately they said oil of Tar.

Which I don't recommend for you, because it's carcinogenic.

I got some all the same. (Again from my own salary, and the master painter asked me for some, so I gave him some of mine, by way of saying thank you for his unprecedented openness.)

Yet I was so overworked there at this studio where I did my apprenticeship, often getting in at 8 in the morning and not leaving until 11 in the evening, I never tried it ...

Three years later, I had decided to set up with David in a part of the world we both loved: the magnificent county of Shropshire. And we were working together on a church window, working from the cellar of the 17th century house I was living in back then. (The studio at Stanton Lacy was still being renovated.)

It's easier when you're your own master, so I said, *Come on, David, let's take a break, let's try something different*. (— Because there's no point in always doing what you've always done.) *Let's crack open this flask of Oil of Tar,* I said, *and see what we can do*.

Which we did. And that first piece we still have in the studio, because we couldn't believe our eyes. See, it was so easy to use this oil to shade on top of unfired water-based glass paint, we couldn't believe how simple it was way back in Victorian times ... a "piece of cake" it was to go from light to dark and back again. We felt ourselves alive as never before, for quick-drying water has a deadening effect on every glass painter's sensibility — *and this majestic oil released us*.

Yes, we jumped free "with one bound" as the comic books say.

And it is true.

But the most important part is yet to come.

The very next Christmas, because I am not one to send cards, I was painting mine on glass. And I was minded to stain them also. And I wanted to shade the stain. So I thought, *Surely this magnificent oil of Tar is worth a try? Even though it's foul dark colour is so unprepossessing - what can I lose by a quick experiment? I know everyone says it's only water or vinegar with stain, but ... let's try it all the same*.

So that Saturday morning I did just that.

And the results were — awful.

But David sensed I had a point.

He tried it also.

And the results were — magnificent.

By observation and testing, we soon figured out what I'd done wrong, and, with two bounds, we were away.

Beautifully *stained* stained glass.

And a truly foul-smelling studio.

Not to mention the risk to our health.

The next thing to happen was a summons to the Literary Agent — he who always wished to write like Dostoevsky but chose instead to help other writers to realize their own potential.

He wanted a front door. Not just any front door, mind. It had to have the Wow! factor, he insisted. And he also included that phrase in the contract with us, which must have brought his lawyers to despair.

Thus it was that David and I were challenged by a design brief where it would have been all to easy to carry on as before and use stain and Tar to give the Literary Agent every Wow! he could have ever wished for.

And yet ...

I couldn't face the smell.

I thought, what smell would I enjoy?

Seeing Lavender on a shelf, I sprinkled it across a piece of glass, and badgered it thoroughly, then came down hard with heavy tones of Oil of Tar based silver stain.

And the results were — acceptable but nothing special.

Yet David sensed I had a point.

And he was indeed no happier than I was with the foul smell of Tar throughout the studio.

Not to mention its carcinogenic properties.

(*You* have now been warned off Oil of Tar a second time.)

We tried Patchouli — again this was in the studio, because we had one of those aromatherapy stones which you plug in and heat up and cover with nice oils to cover up foul smells (in our case, *Oil of Tar*).

And we sedulously worked our way through mandarin, bergamot, hyacinth, rose geranium and ylang ylang. All of whose perfumes pleased our senses though they failed to meet the aesthetic and legal demands imposed on us by the Literary Agent ...

Finally we observed what our eyes had been telling us all along,

that a *thicker* starting paste was needed (Lavender evaporates too promptly, and therefore is unsuitable for the heights we sought to reach. A reliable *and* long-lasting batch was what we wanted.)

So it was we fell gratefully upon Sandalwood.

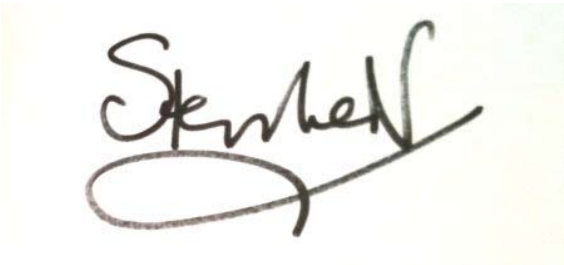
It worked well and smelled delightful.

Nietzsche correctly remarks about "this *nose* of ours, of which no philosopher has yet spoken with proper reverence and gratitude …"

In the 110 years since his death, philosophers have not corrected this omission.

So at least, today, we glass painters can.

Thank you, dear nose, for making us unwilling to continue with the foul-smelling Tar!



Legal notices