WILLIAMS & BYRNE

Glass Painting Techniques & Secrets from an English Stained Glass Studio

by

David Williams & Stephen Byrne

Tracing, shading, back & front, with water & oil, in a single firing!

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Legal notices

Introduction

Our names are David Williams and Stephen Byrne. We're the owner-directors of the Williams & Byrne Stained Glass Studio, in England, UK. Between the two of us, we've 40 years' experience of designing and painting stained glass.

To share information about how to paint on glass, we created www.realglasspainting.com. This is *the* place to go for everything you need to know about stained glass painting. It's a online studio full of exciting resources for stained glass painters of all levels.

At www.realglasspainting.com you can download informative pamphlets on essential glass painting techniques. You can also get lovely stained glass designs, many of them with useful step-by-step photographic over views. There's also a growing resource of online video demonstrations.

Please suggest topics that you'd like us to discuss, and designs you'd like to see. Also ask questions of your own. When you write, we'll reply. Our e-mail address is studio@realglasspainting.com.

Glass Painting Techniques from an English Stained Glass Studio

This download right here tells you all about a wonderful glass painting technique that we use every day when we paint our own stained glass.

The essential point about this technique is that it lets you do most or all painting (except for enamels and silver-stains) in just one firing.

This approach has three advantages:

1. Since the lines and shadows aren't fixed until you fire them, this technique can greatly enhance the subtlety and beauty of your painting;
2. You can greatly improve your overall technique so that other kinds of glass painting become much easier by comparison;
3. You can save on electricity or gas. (It's worth saying.)

The technique is therefore useful to anyone who doesn't already know it, whether you are complete beginner or indeed an experienced glass painter.

Amazing for beginners

If you're a beginner, you'll find a careful sequence of projects that will develop your glass painting skills faster than other methods.

We've tirelessly thought about the essentials. We've thrown away the order in which glass painting skills are usually taught in order to present you with a new approach that really works.

Our unique approach will accelerate your painting skills as quickly as you could wish.

If you want more designs on which to practice, please just write to studio@realglasspainting.com. and tell us what you need, and we will always help you if we can.

Wonderful for experienced painters

If you already paint on glass, we're confident our approach will open your eyes to new horizons.

Maybe there are recurrent difficulties you've been having. Maybe there are boundaries you've come up against. Either way, we can change the way you paint on glass.

And, beginner or improver, we'll always be glad to hear from you. We will reply to any message that we get from you. As they say, this is personal. And, if we know it, we believe in showing you whatever it is that you're interested in learning.

Technique, not self-expression (for now)

Our approach is to show you a technique, and also to explain the components of the technique.

We do this in a practical and down-to-earth way.

We are concerned with giving you a way of expressing yourself. But we are not concerned with what you choose to express: that is for you to decide, and we hope you will tell us about it. We take our

cue from Alexander Pope:

True ease in writing comes from Art, not chance,
As those move easiest who have learn'd to dance.

In other words, we ask you to accept right now that there is a large amount of practice and repetition in learning how to paint glass beautifully.

There is also a large amount of observation and systematic reasoning. A musician plays scales and arpeggios. An actor trains the memory and body. These things take time and effort, but they are hugely rewarding: more rewarding, we believe, than stumbling and fumbling in the dark.

That's why we concentrate on technique (even though we don't believe that technique is everything).

Ultimately, you'll paint better; and we think you'll get more enjoyment from the process.

Design and earning a living

So in this download we explain a particular and fabulous technique.

There are many *other* techniques to learn about (some of which you can invent for yourself): we do not show you everything here.

Also, we do not discuss the process of design, and we do not talk about the business of "creating through painting" in order to earn money and make a living: we will return to these vital subjects in another place.

But, for now, in this download, it's just a particular technique that we describe and show you.

How we're different

Before we begin, it's worth explaining some of the ways in which we're different from other stained glass painters.

The traditional approach is to paint the trace lines, then fire the glass.

Once fired for the first time, you would then shade and highlight, then fire the glass a second time.

Perhaps you would shade, highlight and fire the glass a third time.

The traditional approach to teaching follows the same sequence: learn to trace, and then learn to shade.

We do things differently.

Our first doubts

Now (we thought) it is surely an extraordinary coincidence that the traditional approach to teaching follows the very same sequence as the traditional approach to painting.

You see, even if the traditional approach to painting were the best approach, it wouldn't follow that you would also *teach* things in that order: that made us think that perhaps people would make better progress if they learned things in a different order.

But, if things can indeed be learnt more easily in a different order, then perhaps the traditional approach is not all that it's set up to be.

That's what we wondered, anyway.

Therefore we considered the matter carefully and devised a *different* sequence of teaching you the techniques we know and use each day.

First of all (because we must: everything depends on it) we show you an absolutely marvellous way of mixing glass paint. This already distinguishes us from the crowd: we explain things properly. Normally you're just told to "mix your paint". To be sure, everyone has known a teacher whose "idea of teaching" is to say, "Just do it", but there's more to teaching than that. When you mix and use your glass paint as we show you how, you'll find it easier to paint glass beautifully as only you can.

In the second place, once the glass painting starts, we DON'T begin with tracing as such. We begin by showing you how to paint a silhouette.

We concentrate on painting silhouettes because silhouettes are a fantastic way of teaching you no less than three (3) different ways of using glass paint.

They are also the quickest way we know of developing your hand-eye co-ordination so that, when you (later) want to trace a long, thin, elegant line, you know exactly what to do. You almost know by instinct: by then, it will almost have become part of you.

Contrast this with the traditional approach which *starts* with getting you to paint a long, thin, elegant line ... this is often unsuccessful: how can you possibly do this right at the start? It's ridiculous when you consider it.

(And we did consider it. That's why we don't start with tracing but start with silhouettes instead.)

The third way in which we're different is that we will show you how to paint your shadows *before* you paint your trace lines. This is perfectly wonderful. Of course it's not the *only* way to shade and matt (sometimes indeed you shade and matt on top of trace lines), but it's a great liberation to know that things can be done this way.

Needless to say, you won't need to fire these shadows before you paint your trace lines: that's the fourth big difference. We will show you how to paint lovely trace lines *on top of unfired shadows*.

A fifth difference is we'll show you how to paint on the front *and* the back of the glass: that's easy, but astonishingly effective.

Of course we'll also tell you the important points about making lovely highlights, but the sixth big difference is this: once you've done all this painting with water-based paint, we'll show you how to mix and apply *oil*-based paint on top of *unfired* water-based paint.

And then it will be time to fire your glass.

So, to recap, while the traditional approach would expect you to paint a long, thin elegant line right from the start (and not bother to explain how to mix glass paint like the professionals do), then to fire your glass in between each layer of paint, we (by contrast) will show you how to build up layer upon layer of unfired paint, each layer shimmering with texture and suggestion, and then, after adding highlights and some lovely oil painting, to fire your glass just once.

Just one of these techniques would be worth the "price of admission" so to speak. But we'll show you all six of them.

Is this approach better than others?

We know for sure that the *sequence* in which we teach you things is better than anything we've seen elsewhere. We know the sequence works. We've seen complete beginners (who, in their own estimation, had no artistic capability at all) paint the most gorgeous images by learning the skills in the order that we present them. And they've painted these gorgeous images after

just 2 days with us.

But this does *not* mean we think this particular one-firing glass painting technique is the best one there is.

No, it is one technique amongst many. By the same token, this book is not an encyclopaedia of glass painting.

But, when you know this technique, you can choose when to use it. You can even just use some of it. That, surely, is better than not being able to use any of it.

Here, though, is a simile which suggests why we think this technique is so important: a simile which we take from cooking.

We all know what it's like when a meal has been prepared so that all the flavours can *mingle* with one another: a gorgeous casserole, for example. (Vegetarians: sorry!) The meal would be completely different if all the ingredients had been cooked separately and then put together only at the end.

When you paint many *unfired* layers on top of one another, it's like allowing all the ingredients to blend together. By contrast, when you fire each layer separately (as the traditional approach suggests), it's like cooking each ingredient *on its own* and then adding them together at the end: they're fixed and can't react properly with each other.

Of course this is just a simile. And it's a biased one, to be sure. But it conveys a sense in which, when you know this technique that we will show you, you will learn something that can revolutionize how you paint on glass.

It almost goes without saying that we believe in passing on our knowledge and experience. We'll return to this subject later on. But, for now, we also urge you to *tell the world about your own discoveries* (and we know that you will make them!). This book you're reading now has gone to just about every country in the world, and we ourselves have been enriched by the new friends we've made by passing on the many tips and techniques you'll find in this book.

So we look forward to hearing from you.

We will reply to every e-mail that we receive; if you don't hear back from us, the most likely reason is that we didn't receive your e-mail, so please take the time to send it again. Sometimes of course we are snowed under with work, or simply working away from the studio ... but we *will* reply.

Forum and Online Video

You can also see various online video demonstrations right here:

http://www.realglasspainting.com/stained-glass-painting-videos/techniques/

Password: *badger*

Important

Your card statement will say "CLK*BANK.COM" for this purchase (nothing to do with stained glass painting or Williams & Byrne).

Just "CLK*BANK.COM".

In this section ...

Here are the topics that we going to look at right now:

- Health and safety;
- Light box and painting bridge;
- Glass paint;
- Palettes and palette knives;
- Mixing Bowls;
- Brushes;
- Kilns.

As you'll see, this section tells you about the kinds of tools and equipment that *we* use at Williams & Byrne. But we definitely aren't advising you to be the same as us. In fact, our favourite idea is that you will improve on what we know. And we would love to hear of your improvements: do write and tell us.

Another point to make is that we cannot tell you everything. There are therefore some things we miss out and others that we discuss quickly. This is not though secrecy: as you'll see, we aren't secretive. So, if there are particular topics you want us to explain, just write and let us know, and we'll always do our best to help.

Now let's begin by considering how to look after yourself when you paint on glass.

Health and Safety

We love our work, and we want to stay healthy. We always read the manufacturer's instructions. We follow these in preference to everything else we read in books or hear from others. Please do the same.

But we also think for ourselves. For example, no one can advise us on the consequences of working with a "cocktail" of paints from different manufacturers: perhaps the combined and cumulative effect is especially noxious. We just don't know; therefore it's important to be cautious. There are many things whose risk we just can't assess, so it's better to err on the side of caution.

However, we'll always be glass painters. Nothing will stop us; we won't even retire when we are old. This is why we take all the precautions that we can think of, not just those the manufacturer recommends. For example:

- We change our shoes at work, and our clothes, too;
- We wear aprons and overalls;
- We use masks, for example when we are mixing paint;
- We wear disposable gloves (ours are non-latex);
- We have many other bits of protective gear such as plastic goggles, ear plugs, barrier cream and so on for all the different jobs that we are called upon to do;
- We wash our hands and faces in a basin that is **never** used for preparing food or drink;
- Soap is dispensed from a small free-standing hand-pump (*bars* of soap get dirty);
- We dry our hands on paper towels which are thrown away into a dustbin with a lid. (This is because paint dust on a cotton towel can be hazardous when it dries and can also cause a build-up in a washing-machine.)

There are many things that you must think of for yourself. We advise you always to take every care of yourself, but we also hope that you'll have a great time painting glass.

Kiln-fired glass paint

All paint on glass does just one thing: it changes the light that passes through the glass. What does "change" mean here?

- Sometimes paint stops light passing altogether;
- Sometimes it changes its colour altogether, for example from blue to green;
- Sometimes it preserves the colour but dampens it down a little or a lot: for example, paint can quieten a too-exuberant red or enliven a delicate orange.

So, what is "glass paint"?

For a start, we only use paint that fires in a kiln. (Firing in the kiln is the process that fixes the paint more or less permanently to the glass.) This narrows things down, so that now there are just three broad types of paint to use on glass:

1. Silver-stain;
2. Enamels;
3. And glass paint (as we shall call it to distinguish it from the other kinds of paint).

Each paint fires at a different temperature: that is to say, the top temperature is different in each case.

We'll start with the paint which fires at the lowest temperature (silver-stain) and work upwards to the highest (which is glass paint).

Silver-stain

These are all manner of yellows, ambers, oranges and rusty reds. They are transparent. They usually require the lowest firing temperature of all, typically between 540° and 560° Celsius / 1000° and 1040° Fahrenheit

Silver-stains are usually applied to the outside-facing side of glass. This is because the inside-facing side is where you usually apply all or most of the other two kinds of paint, and silver-stain must be in direct contact with unpainted glass (which it wouldn't be if it was on top of either of the other two kinds of paint).

You might then ask: why in general can't it be on the same side as the other paints but *underneath* them? The reason is that the other paints require a hotter kiln to fire them, and silver-stain usually goes cloudier and murkier (and worse) the higher you fire it.

Enamels

Enamels are just about any colour you can think of. They are either transparent or opaque. They usually fire at hotter temperatures than silver-stain, but, for stained glass painting (as opposed to fusing, for example) usually no hotter than 600°

Celsius / 1110° Fahrenheit. Opaque enamels sometimes fire at a slightly lower temperature than transparent ones: your manufacturer will advise you on this point.

The following points depend on the brand of enamels and the media you use:

- Whether you can mix enamels together, for example, blue and yellow for green;
- Whether you can fire enamels more than once;
- Whether you can fire different enamels on top of one another and make new colours.

You'll need to test the enamels you use, and write down your results.

Unlike silver-stains (see above), enamels do not change the molecular structure of the glass. And, unlike glass paint (see below), enamels do not fire at a temperature that is high enough to fuse them with the glass. Therefore it can be argued that enamels are generally the least permanent of all the three types of glass paints.

Glass paint

Finally, there is what we shall simply call "glass paint" or "paint".

This comes in black, many reds and many browns. It can create everything from impenetrable shadow to subtle tone. It's often mixed with gum Arabic. Glass paint usually needs firing at the hottest temperature, which is anything from 630° to 680° Celsius / 1160° to 1250°. After about 650° Celsius / 1200° Fahrenheit, it is usually the case that paint and glass will fuse together.

At Williams & Byrne, of the three main kinds of kiln-fired paint — silver-stain, enamel, and glass paint — it's glass paint that we use the most of. After that, silver-stain; least of all we use enamels. This is largely down to our own style of design and painting.

Sometimes people make a distinction between glass paint that is used for "tracing" thin lines (such as the outline of a face or hand) and glass paint that is used for "shading" or "matting" larger areas (such as the shadows on a leaf).

At Williams & Byrne, we don't distinguish our various glass paints in this way. For example, we are happy to use good "tracing" glass paint for everything we do. This is because we don't distinguish "lines" from "shading": in our experience, both are different kinds of shadow. Some shadows are pitch-black, others are subtle; some shadows are thin, others are broad. We think that good glass paint — mixed in different densities, mixed with different media, applied in different ways — will allow you to create as wide a range of shadows as you can wish for. So we ourselves have found that a good glass paint – whether described as "tracing black" or "shading red", for example – is good for everything we do with "shadows" thick or thin: it is good for how *we* paint on glass.

Brand / Manufacturer

We get nearly all our glass paints, enamels and silver-stains from Reusche. If you want to use similar techniques as use, we particularly suggest that you get your tracing paint from Reusche. Tracing black (DE401) and Umber Brown (DE402) are excellent. If you use the same paint here as we do, then we are better placed to answer any questions that you have.

Media

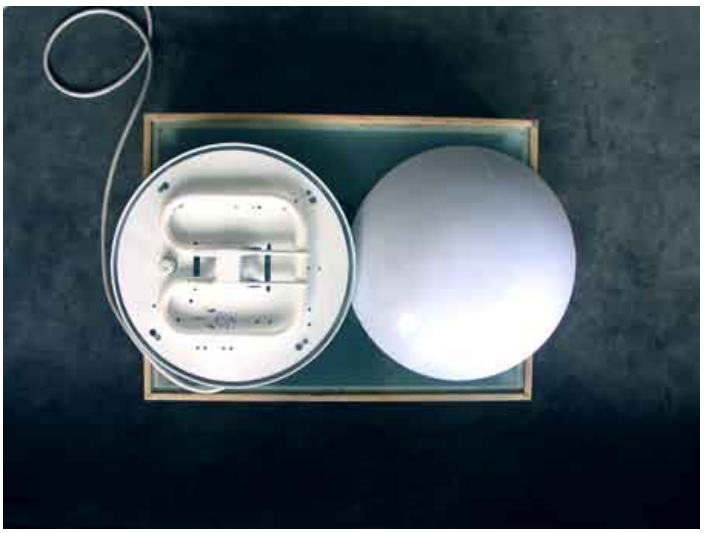
Glass paint, enamels and silver-stain are powder. They must be therefore be mixed and ground with a liquid medium in order for you to be able to paint with them. The medium might be water, white vinegar or various oils, for example, depending on the effect you want to achieve. This subject is too large to explain here, but this point is essential: how well you mix and grind your paint or enamel or silver-stain will have a visible effect on how well you can control the mixture on your brushes. If you don't mix and grind properly, it will be hard to paint glass beautifully. That is why we have prepared a guide which is devoted to this one issue: how to mix glass paint with water. That's how seriously we take the issue.

Light-box

We make our own. Here's our specification:

- At least 22 inches by 16 inches. Can certainly be larger – make sure the glass is strong enough – but not much smaller. (Size is important.) You must allow for the size of your glass (possibly several pieces at one time), plus some/all of your design (which will be as large as it is), plus your palette (because it's sometimes useful to illuminate your glass paint from beneath;
- 3 mm toughened glass on top which is sandblasted on one side to diffuse the light. Our glass rests on a narrow internal ledge. (It's possible to use plastic instead of glass, but the main disadvantage is its flexibility when you lean on it to paint);
- Lit by a low-heat, movable light source, such as a standard bathroom wall-mounted light. Painted white inside to reflect the light;
- Mounted on legs which allow the air to circulate and also permit the electric cable to pass underneath.

Here's a picture from above with the top removed from the light to show the bulb.



Painting bridge

This is called a painting bridge or armrest. We lean on it when we paint: that way it is less likely that our hands will accidentally touch and disturb the unfired paint. Here's a picture of a bridge in use.

Another use is to use it like a ruler to paint straight lines.

The bridge is made from wood. It's strong enough to take the weight that we put on it when we paint.

It's smooth, so we're unlikely to get splinters in our hands.

We make our own bridges using glue to stick together the three bits of wood.

Our bridges come in various lengths. They need to be wide enough to go over the glass that we'll be painting. But they can't be so wide that one or both ends falls off the light box. The wider they are, the stronger they must be.

When you use a bridge for the first time, it'll probably feel awkward. It's important to persevere: you'll soon get used to it. It's nearly impossible to paint on glass without a bridge.

There's more on the painting bridge in a few pages.

Mixing palettes

These are the palettes that we use to mix our paint. We also use them *when* we paint. And we also sometimes use them (partly covered) to store our mixed paint overnight or longer.

There's more on the palette in a few pages.

Palette knives

We use a palette knife to grind and mix our paint, enamels and silver-stains. We have many different palette knives. As with our palettes, we use different knives for different paints and different media. This reduces the risk of cross-contamination.

Palette knives get very sharp at the edges, and so you must be careful when you handle them.

They also wear down, because they're used heavily and often.

This means they can sometimes snap when you don't expect them to.

You'll find that silver-stain in particular is damaging to palette knives: when using silver-stain, clean your knife often.

Ceramic mixing bowls

Ceramic bowls are useful for the early stages of mixing paint. Mixing paint is a big subject. How you mix your paint will make a huge difference to how well you can paint.

Jam jars

Jam jars have all kinds of uses:

1. We use them to hold our painting water for when we rinse our brushes;
2. Or to store paint or silver stain that we've mixed with oil so that it keeps fresh for several months;
3. We store our brushes in a jam-jar while we're painting a particular piece of glass. That way, all the brushes we need are in one place;
4. An empty jam-jar is also a good place to let your brushes dry when you've finished painting.

Paint covers

We use a cover to seal our glass paint mixture overnight.

We also use a lid to cover our glass paint when we are not using it during the day.

The lid does two things. It helps prevent the glass paint from drying out. It also stops dust from landing on it. This is important because dust can contaminate glass paint, enamel and silver-stain.

Our lids are "clay pigeons" that we found on a walk one day. (Someone was a very bad shot.) Use something that is like a bowl. It should be strong. If it is also heavy, so much the better.

To seal the paint beneath the cover, run round the edge of the cover with a moist brush.

Brushes

Our different brushes each do different jobs for us. We use the highest quality brushes as necessary for the job in hand. We look after them. We get to know them. They last for many years.

At Williams & Byrne, we have our own techniques for painting. These techniques suit our own styles, and we know that you will develop your own style. When we teach our students who come from all over the world to paint with us, it's always with that purpose in mind: that they learn how *we* do things and that they then develop ways of *their own*. What this means is that we are very clear about one particular thing: there are *other* ways of doing things!

So long as the finished painting is beautiful, we think that people can use whatever brushes they choose in whatever way they

choose. (Provided the brushes are indeed their own. Of course.) But, however you think about it, brushes are used for **two** main purposes.

1. You can use them to get paint **onto** glass in the first place. (You can of course also use other things than brushes. It's *always* worth experimenting. Carefully.)
2. You can also use them to work with the paint that you've **already** applied to glass. Sometimes you work the paint when it is wet, sometimes when it is dry.

Let's go through each of these in turn.

1. Getting paint onto glass

Flat wide brushes

These are various flat wide brushes that are usually made from hair of squirrel, goat, ox or camel. The softer the hair, the better.

They are flat so that we can use them to apply a "wash" of paint across a piece of glass, either covering the glass completely or partially as required. To this end, we mostly use a $1^{1/2}$ inch wide brush.

Our preferred brush is called a "haik" (or sometimes "hake). In the photograph above, this is the model on the right. They are superb. Get one if you can.

Tracing brushes

We use various tracing brushes. We use these to apply lines of paint or to fill small areas very thickly, for example around a border.

Most of our tracing brushes are made from natural hair such as red sable or ox hair. We sometimes use synthetic hair when we paint with oil; but, for glass paint mixed with water, we prefer natural hair because it expands to hold the glass paint.

The hairs of our painting brushes are typically about an inch long. This is usually long enough, but there is a general myth that one needs a long head of hair. This is not our experience. With 1 inch tips like ours and some clean, cold glass to paint on, then — provided that the paint is well-mixed — we can usually produce lines that are as long and beautiful as needed.

True enough, if we are painting extremely long, straight, thin lines (for example down a 14 inch border), we may indeed use a tracing brush with a $1^{1/2}$ inch tip. But we mostly find that short pointed brushes give us the best results.

Our tracing brushes come in various thicknesses. We use the one that's best suited to the thickness and the darkness of the line we want to apply.

Our tracing brushes are usually pointed at the end, but we also have a few wedge-ended brushes that we sometimes use for the thicker lines.

The tracing brushes can be in quill or ferrule, according to your preference and to what's available near you. Quill brushes are often named after the bird from whom the quill comes: for example, a lark, a crow, a duck, a small goose, a large goose, and so on.

Ferrule brushes are often numbered: for example from 00 or 0 for the smallest to 9 for the largest.

We use both quill and ferrule.

The most important point is that the brush is well made. (It's a craft in itself to make a good brush.)

- A well-made brush, wet or dry, doesn't loose much hair (although some hair loss is inevitable);
- It paints a good even line (but this also depends on one's own skill);
- It comes to an elegant point at the end (provided it isn't wedge-shaped);
- It keeps its shape.

Toothbrushes

We also use soft-haired toothbrushes to get paint onto glass. This is when we "spottle" glass on the back, for example, to make the glass look old.

We've also been known to use an electric toothbrush. If you like textures, it's worth experimenting with different ways of getting paint onto glass.

2. Working paint on glass

Once the paint is on the glass, then we sometimes work it when it is still wet, and we sometimes (also) work it when it is dry. We'll begin with the brushes that we use when the paint is **wet**.

Wide thick blender

This is probably the most expensive kind of brush we use: it is a wide brush made from badger hair. Blenders come in various sizes; ours are 3 inches wide. A good blender is a joy to use and a tool to treasure for many years.

We typically use our blenders just after using a squirrel to paint over a whole piece of glass. We use it to blend the paint *before it dries*. We do this so that the paint has the appearance that we want: this might be smooth, rough, light or dark as the case may be. Thus, the main idea is this: once the wet paint is on the glass, you use a blender to adjust how it looks.

The blender can be thick (top, in the previous picture) or thin (bottom) depending on your preference and budget. Thick ones have their advantages (see below), but we're also very happy with the thinner models.

Most blenders lose hairs from time to time, so be prepared for this to happen: it can be annoying.

This is how we clean our blenders:

1. We place the tips of the hairs underneath a gently running cold tap for 10 or so seconds;
2. We may also lightly stroke the tips as we do this;
3. To dry the hairs, we go outside, hold the handle between the palms of both hands and twirl the brush by rubbing our hands back and forth. (This is one reason why the thicker brushes are good: they usually have round handles, which makes them easier to twirl.) This quickly releases the water from the tips of the hairs. It also ensures that the shape of the brush stays the same.

How often do we do this? A dirty blender doesn't do its job: it streaks the glass paint as you're trying to blend it. That's one sign your brush needs cleaning. Another sign is that the tips are heavy or dirty to touch. In general, the more gum Arabic you paint with, the more often you'll need to clean your blender.

Store your blender carefully: protect it from dust and make sure its hairs keep their shape: inside a purpose-made cardboard frame is good, gently held together by a rubber band.

Thin round blenders

These are long-handled brushes which, again, are made from badger hair.

These brushes have various uses.

We use them as we use a wide blender: that is, to blend wet paint before it dries. In particular, we often use them to blend *small* areas that a wide blender would be too big or clumsy for.

We might also use them to add texture to a band of wet paint that we have just applied. We do this by gently tapping the thin badger up and down over the wet surface. This is called a "wet stipple". The process itself is called "wet stippling".

Stipplers

There is also a technique called a "dry stipple". This is where the surface of dry paint is stippled. These are the kinds of brushes that we use to do a dry stipple: They are necessary, because the glass paint has gum Arabic in it which hardens the paint and makes it difficult to penetrate. Hence these stiffer brushes to stipple **dry** paint, rather than the long thin badgers (which are soft).

Scrubs

We also use many different "scrubs" with good firm bristles such as white hog-bristle. We use scrubs to make marks and scratches in dried paint. We also use them to soften a highlight that we've already made with a stick or a needle. (We also use stipplers in the same way.) We often shape our own scrubs by cutting down hobby brushes. We sometimes also singe them: be careful if you do this.

Sticks and needles

Although they're obviously not brushes, these sticks and needles are as necessary to our painting as our scrubs and stipplers. We use these to make highlights: that is, when we have applied paint, and it is dry, and we have worked it as we want, we use sticks and needles to scratch through to the bare glass beneath.

We make these sticks ourselves by putting needles in the end

of old brushes, or by sharpening the ends of old brushes. We also use long haberdashery needles and knitting needles. You can improvise here, but use these tools carefully.

Softeners

Just as we use a blender to smooth and soften *wet* paint that we have just applied, so there are circumstances when we use a softener such as this one to smooth and soften dry paint, for instance once we've worked it with a scrub or stippler. The kind of softener used for make-up works just fine.

Care of brushes

We colour-code our brushes. This is because we need separate brushes for different media (such as oil or water) and for glass paint, silver stain and enamels. For example, we have separate brushes for:

1. Glass paint and water;
2. Glass paint and oil;
3. Silver-stain and water;
4. Silver-stain and vinegar;
5. Silver-stain and oil;
6. Enamels, likewise mixed with different media.

We've already mentioned the reason why we do this. If something doesn't fire as we expect, we know it isn't because we have contaminated the paint.

We use nail varnish to colour-code our brushes at the end of the handle. So, brushes used for silver-stain and oil are silver at the end of the handle.

Kilns

All the paint we use needs firing in a kiln. The firing makes paint permanent. The firing also causes a reaction in the paint: it is only after firing that you truly see how skilfully you've painted. Thus firing changes silver-stain from an opaque red or orange to a transparent gold or amber.

Kilns are usually electric or gas.

Gas kilns usually contain one "shelf" only; electric kilns sometimes have several shelves. Having many shelves isn't a good thing in itself: the different shelves may each have different temperatures, which can make it difficult to fire evenly throughout the kiln.

Gas kilns usually load from the top; electric kilns can load from side or top.

Gas kilns usually apply heat from the top; electric kilns apply heat from the top, the side, or both.

Gas kilns usually fire more quickly than electric kilns. For example, with a gas kiln, you may be able to reach the top temperature for firing glass paint (e.g. 675° Celsius / 1250° Fahrenheit) in 15 minutes; whilst this can take two hours or longer with an electric kiln. Again, this isn't a good thing in itself: if things can happen quickly, they can sometimes also go wrong quickly.

Be aware that gas kilns have a particular requirement for ventilation, and that you must never use them in a basement. The manufacturer will advise you where to place your gas or electric kiln.

Both types of kiln require the means to let painting fumes escape. These fumes occur as the kiln heats up and the moisture evaporates from whatever media you use. If the fumes can't escape, there is a risk they will build up in the kiln itself with potentially dangerous results; aesthetically, the fumes may contaminate your paint, especially enamels. Gas kilns, by the nature of their design, generally incorporate ventilation. Electric kilns don't necessarily (this is because it isn't essential to how they work): ventilation is essential for firing *glass*. The holes themselves are called "bung holes"; the kiln should come with "stoppers" (plugs) so that you can open or close the bung holes as required.

Both types of kiln require a means of measuring the temperature near the glass.

It is helpful with any kiln to have a programmable device that controls the firing schedule. This is often called a "controller".

It is useful now to be specific and describe the kiln we use at Williams & Byrne where we do **a lot** of firing:

- Our kiln's electric;
- It loads from the top;
- The heat is applied from the top;
- It has just one shelf: this is 18 inches by 18 inches;
- There are two bung holes (one in the side and one in the top) which allow fumes to escape;
- Our kiln sits on legs;
- The legs are on castors (so that we can move the kiln about the studio as needed);
- We have a controller that we can program to store our many firing schedules. This gives us enormous control over the way in which we fire our glass.

Imagine you're with us in our studio

You are standing in front of one of our work-benches, and we are standing on the other side. You are closely watching us. We are working at a light-box, painting glass.

What will you notice about the arrangement of our working environment?

5 quick observations

1. You'll see the palette is on the same side as the hand we paint with. This is so that we don't travel with a loaded brush across the surface of the glass we're painting – a small but important consideration, especially when you may spend hours working on a single piece.
2. You'll see that we often place our palette on the edge of our light-box. It's a balance between, on the one hand, using the light-box to assist our judgement about the consistency and density of the paint that's on the palette; and, on the other hand, not allowing the palette to get over-heated. Sometimes, therefore, especially in full summer, we'll put the palette on the work-bench, beside the light-box. Here, away from the heat, the paint will dry less quickly. And then we might well use an angle-poise to illuminate the palette from above. It's essential you always do whatever's necessary to observe and understand the paint on your palette - and good light, whether from beneath and/or above, is vital here.
3. You'll see that our lump of glass paint is tidily situated towards one corner of the palette, away from us. The rest of the palette (roughly, the bottom two-thirds) is our "working-area" where we prepare and care for the glass paint that our brush is currently using. The working-area is therefore spacious, rather than cramped. And the working-area is tidy, yes, tidy: the whole palette must be kept tidy at all times. There will almost certainly be occasions when you think you must press ahead without sparing the time to tidy up. And things will usually go wrong. A tidy palette saves time and waste.
4. You'll often see us cover our lump of glass paint with a small porcelain bowl or glass jar. This is while we're painting - not just when we take a break. This cover serves two purposes. Firstly, it protects the lump from dust and other contaminants which can damage the paint or clog the brush. Secondly, it slows down the rate at which the lump dries out. This is a good idea, because it will take a lot of your time and energy to reconstitute dried paint.
5. You'll often see us use our palette knife, for example to mix the glass paint or to sprinkle the lump with water. The blade of the palette knife is made of metal. It can therefore endure the kind of vigorous activity that would quickly ruin a brush. That's why the palette knife is in our hands *every few minutes*. If you're new to painting with a palette, it may come as a surprise how often you will use a palette knife. Be prepared to acquire this vital habit. The palette knife is one of your most useful tools for making perfect glass paint.

Abracadabra! Now watch us paint stained glass ...

And now look again and imagine that you are watching us as we paint the a stained glass face. This is a glass painting demonstration just for you – a private lesson, one-to-one. Where will you cast your eyes? What will you watch?

Unfair as it is of us to make assumptions, here's what we *think* you'll do.

You'll start off with fine intentions. So you'll *move* your gaze from face to palette and back again, following our rhythm as we mix some paint, then load our brush, paint another stroke, then do more mixing, then paint again. And so forth, back and forth you'll look between the palette where we mix our paint and the *glass* we're painting.

But, after a few minutes, we think things will change. We think you'll remain fixedly starring at the stained glass, watching the face as it appears, line by line and shadow by shadow. You'll *forget* about the palette. The act of painting will exert a mesmerising effect on you. And this is perfectly understandable. You want to know how to paint stained glass. So of course you think that you must watch the glass we're painting.

It's useful here to imagine we are not teachers but fiendish magicians who want to deceive you. Imagine that we want you to look at the wrong thing (the glass we're painting). Imagine that we want to distract you so that you will remain ignorant of the source of our magic – which is of course the palette.

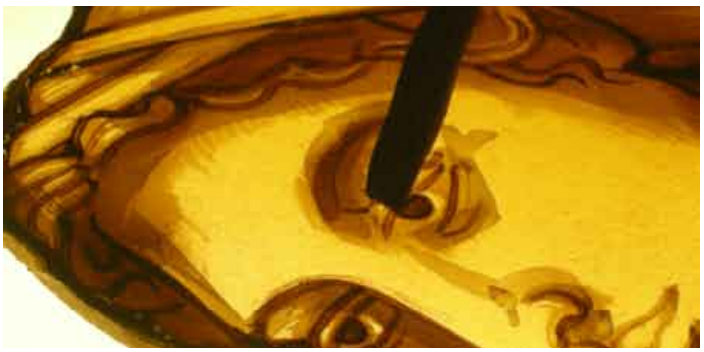
"*So now,*" you hear us say, *"just look at this amazing face as it takes shape. Don't bother looking at our palette – what on earth could possibly interest you there? It's wet and dark, and ugly, too! And our brush (such a fine brush, made exclusively for us in London) and our hands and eyes (we have such exquisite hand-eye co-ordination!) – these things are the real source of all our talent!*"

And so, thinking like this – and falling for our sleight of hand – you might condemn yourself to ignorance.

Thankfully, this is *not* our wish for you.

The palette is where the real work is done

You will only succeed in glass painting when you understand the importance of the palette on which you mix and store your paint. If there are problems on your palette, your brush will just transfer these problems to your painted glass. This is because your brush depends on you to feed it. So, if you feed it dry paint, your



stroke will exhaust itself half-way along a line. If you feed it sloppy paint, your stroke will run all over the place. If you feed it unmixed paint, your stroke will be whatever it will be – sometimes dark, sometimes light, and not at all what you want it to be. The trick is to observe and understand the paint on your palette, and to know how to transform it efficiently from one consistency and density to another. This transformation all happens on your palette, not in your brush. When everything is perfect on your palette, you simply use your brush to move the paint from palette to glass. The brush can't transform paint; it only transfers it.

This is not to say it's easy to use a brush. It's just that you cannot use a brush to paint glass beautifully unless the paint on your palette is as it should be. Clearly you need the correct brush for a particular job. But the brush has no transformational, pseudo-magical powers of its own. None whatsoever: sludge on your palette will simply become sludge on your glass.

Therefore always – always - watch the palette.

The 2 fundamental laws of glass painting espionage

1. Always watch how other glass painters grind and prepare their glass paint;
2. Always observe closely how they use their palette.

Note this: you'll make many more new friends (and also keep them) when you also pass on tips and techniques to other glass painters. For the sake of the craft, don't keep things to yourself.

"What makes an excellent palette?"

Glass painters' palettes are made from glass. Our own palettes are made from either toughened or laminated glass. They are ¼ inch / 5 mm thick. They are the size of this very sheet of paper: that is, a little larger than 8 inches by 11 inches / 210 mm by 290 mm. Our own palettes are sand-blasted on one surface: whilst we always use the smooth side when we're painting, we sometimes use the sand-blasted side when we're grinding and mixing paint. The sand-blasting also serves to diffract the light-box's glare when we're painting. Our palettes have bevelled edges to reduce the risk of accidental cuts.

You'll understand from all this that you must have palettes which are solid, large and safe. You, as a glass painter, should no more accept a weak or small palette than a good cook would accept an ill-equipped kitchen. After all, the palette is where you prepare and look after your paint. Here, as everywhere else in glass painting, you must do things properly: never "make do" with anything less than the right tools and materials. The money you spend on new palettes like ours is money well spent. The return on your investment will last for years.

"How many palettes do I need?"

We ourselves have separate palettes for different media such as water and oil. We also have separate palettes for different kinds of paint such as tracing paint and silver-stain - thus, all in all a dozen palettes. But it's perfectly possible to clean the palette thoroughly before changing medium and/or paint. So there's no need to over-stock on palettes. Get two or three good ones like ours, and you'll be fine. Then you don't have to change palette each and every time you change paint or medium.

1 disaster and 5 mishaps on a palette

Here is a collection of things which can go wrong on your palette:

- The lump collapses wetly and runs all over the palette (this is the *disaster*; sometimes you can recover from it, but it's best never to allow the lump to collapse);
- The lump dries out;
- Too much water in the *working-area* of the palette;
- *Dried* paint all over the working-area of the palette (this will clog your brush);
- Working-area paint is too light/too dark (this is just part of the minute-by-minute rhythm of being a glass painter);
- Working-area paint too thick/too thin (as above).

Are you expecting full solutions to these problems right here and now? All in good time, when other things are clear.

9 ways to use a palette knife

Remember how we said that you'll often need to use your palette knife? Here are some typical uses:

1. Use it to keep your palette organized – this is much better than using and abusing your brushes, which will only shorten their life and make them dirty
2. Use it to chop off small slices from your lump of glass paint
3. Use it to push these slices into your palette's working-area
4. Use it to add drops of water to these slices
5. Use it to grind and squash these slices into whatever consistency of paint that you require
6. When this reservoir of working-area paint begins to dry, use your palette knife to add more water and keep it workable
7. Use it to scrape up dried paint and keep your palette tidy
8. When you require a different consistency of paint, use your palette knife to push aside the remains of previous reservoir
9. And, occasionally, use it to moisten the top of your lump of concentrated glass paint, so preventing it from drying out

Remember this

In real life, when painting glass, you are forever adjusting the consistency and density of glass paint in the working-area of your palette.

The process never stops.

Even when you've prepared a sizeable dilution of *perfect* paint within your working-area, you must forever re-adjust and re-mix it in order to keep it in perfect condition for the work in hand. That's the bitter truth. Remember these wise words and you'll be fine.

We shall finish by repeating this fundamental truth of glass painting:

What you do on your palette is essential to the suucess of your painting on stained glass.

Introduction

Here is where you will learn about one of the most useful glass painting brushes at your disposal — the badger blender. Specifically:

- The different kinds of blender you can find;
- Their most important uses;
- The different paints that you can use with different kinds of blenders;
- How to clean your blender.

You will also discover many important tips on how to blend beautifully.

Note this: read this section right now, then return here and re-read this section later on as needed.

Different kinds of blender

Blenders are made from badger-hair. That's why another name for them is (simply) "badgers". (Glass painting brushes often derive all or part of their name from the animal or bird which contributed to them. For example, a small tracing brush is sometimes called a "lark", whereas a big one is a "goose".)

The main kind of blender is *wide* and can be either thick or narrow. In the picture above, the thick blender is on the left, the narrow one is on the right. The narrow ones are cheaper than the thick ones because they contain fewer hairs. There are many situations where either type is fine. We ourselves use both types (thick and narrow) in our studio.

There are also *thin round* blenders. These come in various size. The thinner the blender is, the more delicate the effect you can achieve with it.

We'll return to this subject when we tell you about the different painting media that the different kinds of blender are often used for. But, before we do that, let's first look at the two main uses that a blender has.

Two main uses for a blender

A blender has two main uses:

1. You can use it to move wet paint around; and
2. You can use it to create texture in wet paint.

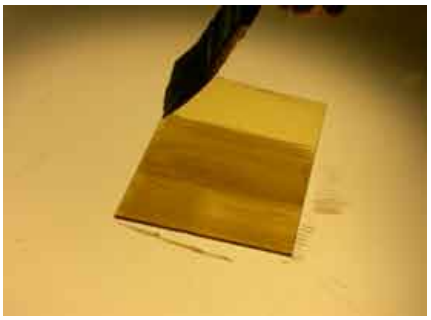
Note that in both cases you use a blender to work with wet paint that has *already* been applied with a different brush.

1. Moving wet paint around

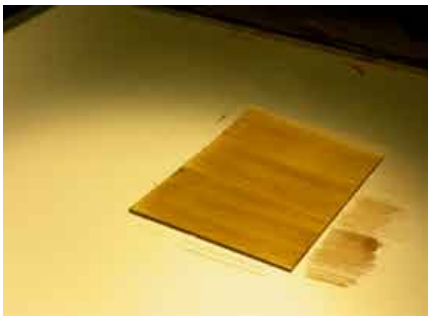
In the simplest case of moving wet paint around, you can use a blender to smooth wet paint *before* it dries on your glass: that is, you use it to *remove unwanted texture*. Here you use a wide brush (like a haik) to apply paint. Then, while the paint is wet, you use your blender to gently blend the stripes together. The end result is a smooth wash of paint over the whole surface of the glass. (You'll learn soon that, if this wash of paint is light and dry enough, it provides a marvellous surface on which to work.) So this is the simplest way of using a blender to move wet paint about on glass: to blend stripes until they are *even*.

But you can of course use a blender to *move paint wherever you want* so long as the paint remains *wet*. For example, having applied the paint with a haik, you can then use your blender to lighten one area and darken another. So you use your blender to *push the wet paint* from one area of the glass to another.

Now turn to the next page to see these different ways of using a blender to move wet paint around the surface of your glass.



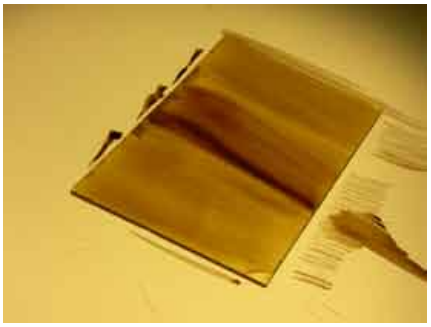
1. Use haik to paint stripes as evenly as possible over the whole surface of the glass.



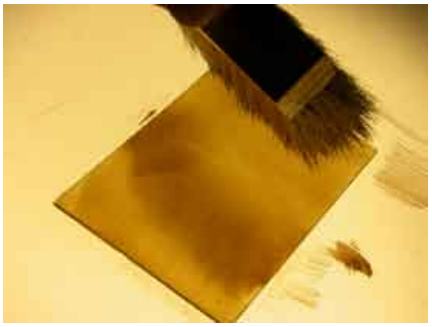
2. Even with the best technique, stripes are usually visible.

3. While the paint is still wet, use your blender to blend the stripes into one another.

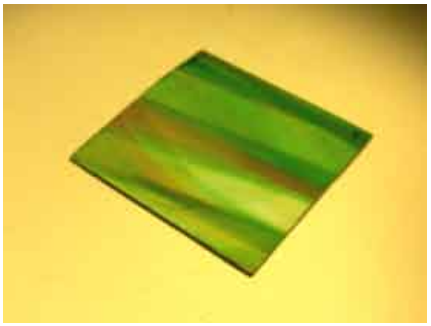
4. Stop when the stripes have disappeared *or* when the paint begins to dry.



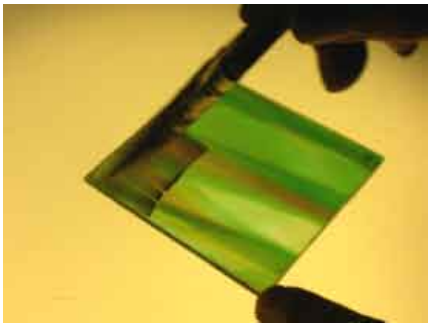
5. Another situation is where you use your haik to apply glass *unevenly*.



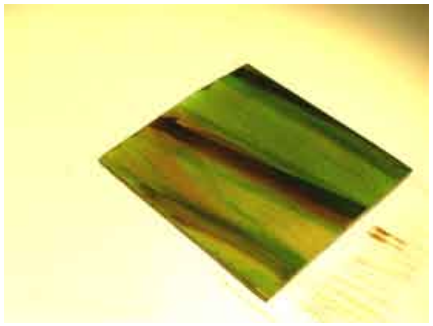
6. While the paint is wet, you use your blender to move the paint and soften the stripes.



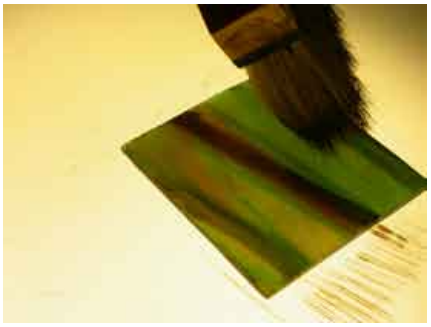
7. Another situation, starting with bare glass.



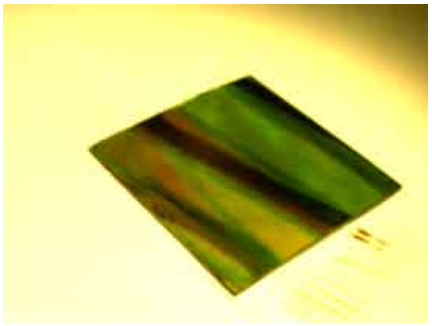
8. Use your haik to apply paint over the whole surface.



9. Use a large tracing brush to paint a stripe.



10. Then use your blender to join the traced line with the undercoat.



11. Much more on this in Part 3.

2. Texture

The second way to use a blender is the opposite of the first: you use it to create texture in wet paint. This is usually called "wet stippling". As before, you use a haik (or similar) to apply paint. Then, having blended it as you wish, and always while the paint is wet, you gently stab it with the tips of your blender. It's well worth experimenting for yourself. And you can of course use a stippled surface like this as the "undercoat" for your subsequent painting.

Note this: when you want to create texture in *dry* paint – "dry stippling" – you'll probably find that a brush made from badger hair is far too soft. You would therefore use a brush with harder hair e.g. hog-hair.

To conclude: blenders are typically used on wet paint either remove texture or create it.

What kinds of paint are blenders used with?

The best thing we can do is tell you about our own experience. We know full well that there are other ways of doing things. So by all means experiment for yourself. That's the real way to make progress. But here's what *we* do at Williams & Byrne.

As a general rule, we only use wide blenders for *water-based* paint, enamel or silver-stain. That is, we don't use our wide blenders for painting with *oil-based* paint (as explained later). But we use our thin blenders for both water-based paint and for oil-based paint.

Note this: all our brushes – our blenders are no exception – are reserved for just one medium (such as water or oil) and just one type of paint (that is, glass paint, enamel or silver-stain). For example, our oil blender is always kept for oil-based paint and is never used with water-based paint. By the same token, we don't use our enamel blender to paint silver-stain. This is so that there is no chance of cross-contamination which might spoil the effect that we want to achieve.

How to use a blender

Let's now state various point that will help you use a blender well. These points are especially important for the technique of "softened lines" which you'll discover in a little while:

☑ Before you start painting, always make sure your blender is in a place where you can get it quickly;

☑ Always have a clear idea of what you want each stroke to achieve;

☑ Be decisive. It is useless being timid: a faint heart never blended beautifully. But note that decisiveness is perfectly compatible with being delicate;

☑ Always examine the paint as you blend. For example, see how quickly or slowly it is drying. Also see where the paint is thickest or lightest;

☑ Always respond to what you see in front of you – easier said than done!

☑ Blend with your whole body, not with your wrist. Blending is not the same as dusting fragile porcelain;

☑ Blend from different angles and in different directions, depending on what effect you want to achieve;

☑ Move the glass around as you blend if this helps you to achieve the effect you want;

☑ It is essential to *begin* vigorously and quickly in order to move around the paint while it is still wet. The paint needs to know that it is you who's in charge;

☑ But, having started vigorously, it is also essential to slow down and to blend more and more gently as the paint dries – otherwise you will leave streaks;

☑ Stop blending before your blender leaves marks.

Let's bring these various points together now.

Given that your blender is ready for you to grab the moment you need it (oh, the tales we could tell you of blenders that weren't where they were meant to be!), the most important thing is always to have a clear idea of what you want to do. So you absolutely have to be decisive. (You can of course be experimental at the same time. But, in this case, you must know in advance that you intend to be experimental.)

The thing is, with water-based paint, the paint itself dries far too quickly for you to have time to think, "Shall I do this? Or shall I do that?" Therefore you must know in advance what effect it is that you want to achieve. You must in fact see the desired end-result clearly in your imagination.

Ideally, the end-result should also be clear from the design in front of you. That is one important reason why, at Williams & Byrne, we place such emphasis on preparing beautiful and informative water-coloured designs. If you clearly imagine the desired result, you are more likely to achieve it. And, all things being equal, you are more likely to imagine the desired result on glass if you have already worked things out on paper. It sounds slick, but it's true: if you know where you're going, you're far more likely to get there.

Then, once you've decided what you want to do, you simply apply some wet paint to the glass in such a way as to realize your intention as closely as possible *without the need for a blender*.

Perhaps the paint goes on exactly as you want it to, so that there's no need to use your blender. If so, well done!

But, if it doesn't, then you'll need to use your blender as quickly and as decisively as possible in order to realize your intention before the paint dries. Therefore, in a perfect world – but one which would perhaps be less interesting – none of us would need a blender.

What an irony! This brush that is so cherished of glass painters is in fact an enduring testament to their lack of skill!

Of course, that's a very controversial way of stating the point: the thing is, everyone (no matter how accomplished) needs a blender. And, given that everyone needs a blender, it's impossible to be on "auto-pilot". You cannot be thinking of other things. You need to focus. With each stroke of your blender, you must always be observing and planning what to do next. It is no good leaving it to chance unless, as noted, that

is your philosophy. All this may sound very analytical and cold and rational. ("Always pay attention!") But it isn't like that at all. Imagine the lovely peace of mind and contentment which mean that you only consider the glass and the paint in front of you. You don't hear noises around you. Nothing distracts you. You forget all those things which might sometimes keep you awake at night. You forget about the jobs that you must do later, about the letters you must write, about the shopping you must get, about how annoying politicians are.

All you do is see what's in front of you and focus on what you want the glass to look like. This is heaven: there's nothing else to think about. That's one important reason why so many people find glass painting so relaxing.

Yes, you are indeed concentrating, but it's such a relief *only to think of one thing*: which is what you must do when you paint on glass.

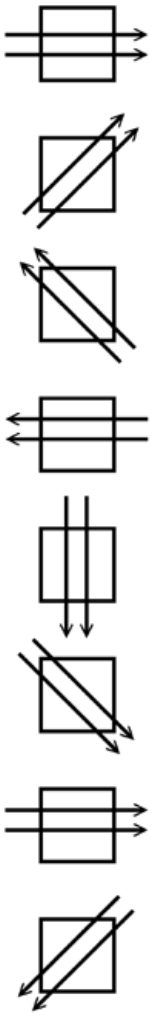
This focus is what enables you to create such beautiful and complicated effects.

For example, suppose that you've applied stripes of paint to cover the whole surface of the glass. By looking closely and by responding to what your eyes tell you, you can use your blender to make the stripes disappear and to cover the glass with a lovely, even tone of paint.

In more complicated cases, you might want to create a textured transition from a dark patch of paint to a light one. To do this, you'd need to blend *and* stipple in response to what your eyes told you as each stroke occurs. You can do this providing that you focus on what you're doing and don't think of other things.

And, to get where you want to get, you must always be examining your glass and the state of the paint, always deciding how heavily or how lightly to use your blender, and always be considering which direction to blend from.

See the diagram in the next column.



The process of blending only lasts a few seconds. But it utterly transforms the glass.

Cleaning

When is it time to clean a blender?

As noted, you generally use a thick blender (wide or narrow) with water-based paint. And water-based paint generally contains gum Arabic: it's the gum Arabic in the paint which can clog your blender. (For oil-based paint, you can also use a narrow thin blender: this is because, being mixed with oil, the paint doesn't dry so quickly, so you don't need such a large brush to blend paint quickly before it dries.)

If you start to find it difficult to blend delicately – if, for example, your blender leaves marks even though you're being as gentle as you can – the likelihood is high that you need to clean it.

Two ways to clean a blender

To clean a blender of water-based paint, there's a dry method and a wet method.

The dry method is gently to beat the tips of the blender against the side of work-bench (for example). The best time to do this is when the blender is dry; that is, at the start of a painting session. Note: the dust can be harmful to lungs. It will also make your work-place messy.

The wet method is to place the tips of the blender underneath slowly flowing cold or warm water (not hot). Brush the tips against the palm of your hand so as to loosen the dried paint and gum Arabic. Go outside and shake of the water until the blender is dry. If the blender has a round handle, you can twirl it between the two palms of your hands.

It's a different process to clean a blender of oil-based paint. It depends largely on the oil we've used. First we remove as much paint as possible by gently tapping the tips against a cloth or piece of absorbent paper. Then we might hold the tips under warm running water, and possibly apply a little gentle soap, then rinsing the tips thoroughly.

The painting bridge

The painting bridge is an indispensable tool. Most people will see immediately the following two important uses of the painting bridge:

- To stop your hand from scraping the unfired painted glass; and
- To keep your hand steady and stop it from wobbling.

But only a few people realize there is a third important use. Once you know this third use, you'll probably hold your bridge in a different way from how you hold it now.

Here it is.

You can **use the bridge to support your brush and painting hand** whilst you are painting.

This is really important. If you can support the bridge like this, then you can *move the bridge while you paint*. You can move it side-to-side and thus help with curves. Or you can move it up-and-down and thus help with the lightness and the thinness of a stroke.

By supporting the bridge like this, the big advantage you obtain is that you can increase your own sense of flexibility. Flexible strokes will usually be more beautiful and expressive than tense strokes.

A final benefit of supporting the bridge is that you also ensure your painting hand doesn't accidentally rock the bridge and turn it over with potentially serious consequences for your painting. But this benefit is less important than the manoeuvrability and flexibility you give to your painting by holding your bridge.

Construction

The typical bridge is a narrow length of wood, each end of which is attached to a small block. The wood must be strong because you don't want it to snap or bend.

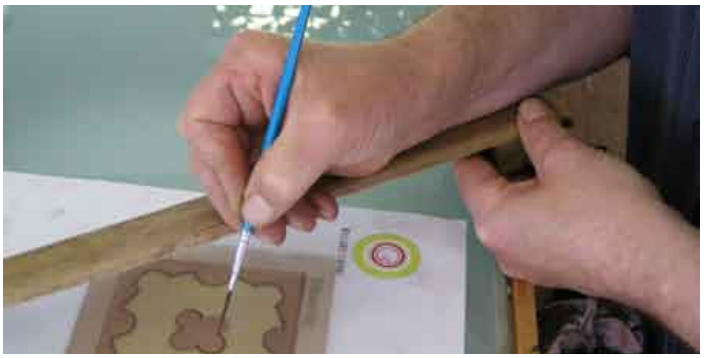
The length of the bridge is determined by the length of your arms and by the size of your light box: 12 to 15 inches long is usual for a bridge, and 1 inch wide. There's no absolutely correct answer here. You will probably have several bridges of different sizes and heights. The bridge goes over or alongside the glass you are painting (which might in fact be several separate pieces of glass) and also rests securely on the light box.

It's easy to make a bridge yourself. You can use strong glue to attach the blocks at both ends.

How to hold a bridge

With your painting hand resting lightly on the bridge, there are two positions you can use to support it:

1. The bridge is resting on your index finger as you see in the next picture:



2. Or you hold the bridge between your fingers like this:

In both positions, the block of the wood at the end is *nestled on top of the other fingers* as you can see here:

In this picture, your knuckles are resting lightly on the glass.

Equally, though, there are times when your hand is holding this end of the bridge in the air – when you are turning it, for example.

How to rest on the bridge

Once again, there are two positions to consider and use, depending on which is best for the stroke you want to paint.

1. Your painting hand is resting *on* the bridge like this:

2. Or your painting hand is resting *against* the side of the bridge like this:

3. Whether resting on or against the bridge, it's also important that your painting hand is resting *lightly*. (If it rested heavily, your painting hand would quickly become tired and strained. It would then be difficult to paint gracefully.)

How many other people use the bridge

You can see from the photos that we mostly use our bridge "side-saddle", so to speak. It's the fleshy pad below the little finger which rests on or against the bridge:

But it's also possible to rest your hand like this:

Yes, we *sometimes* do this. But we find this position puts *a lot of pressure* on the wrist.

The other thing we find is that it's *hard to manoeuvre our hand and brush evenly and accurately*.

So, if this is how you usually hold your bridge, please try the other way and continue until you get used to it.

It won't take long.

You'll soon see the difference when you use one hand to support the bridge like this ...

... while your painting hand rests lightly on or against the bridge like this:

This way, you can also achieve much longer strokes, because you can pull your painting hand and brush along the length of the bridge on which it's resting.

Conclusion

You don't read much in books about how to use and hold the bridge.

Why's that?

After all, it's not as if the revelation of this secret will unleash the forces of Darkness and bring about Disaster.

It's more that, at Williams & Byrne, we regard teaching as an essential part of the designing, painting and restoring that we do. Writing down what we know and talking with you like this actually draws attention to the important things that we might otherwise take for granted.

The "only way"?

As always, all we want to do is show you clearly the things that *we* do. These things work for us. Maybe you know them already, or maybe we can tell you something new.

But there are many *other ways* of doing things. And we know that you too will think of other ways of doing things, which is marvellous.

Please just make use of what we do in whatever way you want, provided that it's safe and legal.

A fantastic recipe for mixing glass paint

We're thrilled you're reading this chapter: it means you're serious about learning how glass painting is really done.

How you mix and manage your paint is crucial to how well you paint on glass.

When you mix your paint properly *and* look after it on your palette, you'll find it so much easier to paint glass beautifully.

That's precisely *why* we want to tell you about the technique that has been of **such great help** to us and our students.

In just two days with us at our studio, we've watched complete beginners learn to paint glass beautifully. And we know that this is mostly due to two things:

1. How they mix their paint
2. How they use their palette

When you get these things right, all the other techniques will be so much easier.

It is interesting to see how little attention is given to this subject in the many "how to" books. Perhaps there's a paragraph or two on mixing paint, but rarely more. There are various factors here:

- "How you mix paint" is a preparatory subject, and everyone is eager to rush ahead and start painting
- With a printed book (as opposed to a downloadable book like this one), the printed space is strictly limited
- It takes considerable determination for someone to express what professional glass painters do largely by instinct

On all three counts, we know this chapter is crucial to you and your glass painting projects.

In our opinion, mixing paint is no more "preparatory" than your **final** brush stroke. You experience the consequences of how you mix your paint throughout **the whole time** that you paint with it. Therefore, we now take every care to explain the best technique we know. We also include many close-up photographs.

Getting used to a new technique can be a strange experience. So it may even be easier to follow our advice if you're about to paint on glass for the very *first time*; by contrast, if you already paint on glass, you will almost certainly need to learn to do things differently, which takes patience. But we are absolutely certain that your patience will bear fruit.

So, beginner or not, try our technique for three months. Adjust it gently to suit your own environment. Make it part of you.

Our confident experience is that this technique will help you in a multitude of ways.

We know this because of the feed-back that we've had from the students who have worked with us at our studio, and also from the many people all over the world who have used this very chapter that you're reading now.

Different kinds of paint

In a moment we're going to show you our fantastic technique for mixing paint and water. So now is a good time to say something about the *different kinds of paints* there are.

All paint on glass does **just one thing**: it changes the quality of the light that passes through the glass.

But what does "change" mean here?

There are three main ways in which different kinds of paints can "change" the light which passes through the glass:

1. Some kinds of paint more or less **stop** light passing altogether;
2. Other kinds of paint change the colour of the glass, for example from blue to green;
3. Other kinds of paint modify the colour: for example, some paint can quieten a too-exuberant red or enliven a delicate orange.

But what is "glass paint"?

For a start, at Williams & Byrne, we only use paint that fires in a kiln. (Firing in the kiln is the process that fixes the paint more or less permanently to the glass.)

This narrows things down. Now there are just three broad types of paint that we use on glass and fire in a kiln:

1. Silver-stain
2. Enamels
3. And "glass paint" (as we shall call it)

Each one of these is fired at a different temperature. They can also be applied with different media: this is the important reason why – although of course they are all paints – it is important to call them by their different names.

We'll start with silver-stain (which fires at the lowest temperature) and work upwards to glass paint (proper) which fires at the highest. – It's this last type of paint that we are going to tell you all about in this chapter.

Silver-stain

These are all kind of yellows, ambers, oranges and rusty reds. They are transparent. They usually require the lowest firing temperature of all, typically between 540° and 560° centigrade / 1000° and 1040° Fahrenheit.

Silver-stains are usually applied to the outside-facing side of glass. This is because the inside-facing side is where you usually apply all or most of the other two kinds of paint, and silver-stain must usually be in direct contact with unpainted glass in order to take effect (which of course it wouldn't be if it were on **top** of either of the other two kinds of paint).

You might then ask: why in general can't it be on the same side as the other paints but *beneath* them? That is, one would apply them first?

The reason is, the other paints (enamels and glass paint proper) require a hotter kiln to fire them, and silver-stain usually goes cloudier the higher you fire it. So, if it were beneath the others, it would need to be fired first at a low temperature, then fired again at a higher temperature when the enamels or glass paint were applied: this would probably make it cloudy. Anyway, if you want to try this for yourself, there's every reason why you should. Please always take things forward in your own way and develop your own techniques.

Enamels

Enamels are just about any colour you can think of. They are either transparent or opaque. They usually fire at hotter temperatures than silver-stain, but usually no hotter than 600° centigrade / 1112° Fahrenheit.

The following points depend on the brand of enamels and the media (e.g. water or various kinds of oil) that you use:

- Sometimes you can mix enamels together, for example, blue and yellow for green;
- Sometimes you can fire enamels more than once;
- Sometimes you can fire different enamels on top of one another and make new colours.

As with everything you do, you need always to test the enamels that you use, and **write down** your results.

Unlike silver-stains, enamels do not change the structure of the glass. Also, enamels do not usually fire at a temperature that is high enough to fuse them with the glass (unlike "glass paints" as we call them: see below). Therefore it can be argued that enamels are generally the *least permanent* of all the three types of glass paints.

Glass paint

Finally, there is what we shall simply call either "glass paint". This comes in black, many reds and many browns. It can create everything from impenetrable shadows to subtle tones. It's often mixed with gum Arabic. Glass paint usually needs firing at the hottest temperature, which is anything from 630° to 680° centigrade / 1166° to 1256° Fahrenheit.

After about 650° centigrade / 1200° Fahrenheit (depending on the hardness of the glass), then the glass paint and glass will usually fuse together.

At Williams & Byrne, of the three kinds of kiln-fired paint – silver-stain, enamel, and glass paint – it's "glass paint" that we mostly use.

After that, silver-stain.

Least of all we use enamels.

This is largely down to our own style of design and painting (and a little down to the impermanence of enamels: we make a lot of architectural stained glass, where permanence is important).

Sometimes people make a distinction between glass paint that is used for "tracing" thin lines (such as the outline of a face or hand) and glass paint that is used for "shading" or "matting" larger areas (such as the shadows on a leaf).

At Williams & Byrne, we don't distinguish our various glass paints in this way.

For example, we are happy to use good "tracing" glass paint for *everything* we do, whether traced lines or blended and stippled shadows.

This is because we don't distinguish "tracing lines" from "shading": both are different kinds of *shadow*.

Some shadows are pitch-black, others are subtle; some shadows are thin, others are broad.

We think that good glass paint – mixed in different densities, mixed with different media, applied in different ways – will allow you to create as wide a range of shadows as you can ever wish for.

So we ourselves have found that a "good" glass paint – whether described as "tracing black" or "shading red", for example – is good for *everything* we do with "shadows" thick or thin: it is good for how *we* paint on glass.

And how we paint on glass is exactly what we're going to show you in this book.

Media

All three types of paint come as powder. Since all three types are usually applied wet, it is necessary to grind and mix the powder with a medium such as water.

There are also other media that we use: for example, white vinegar, ascetic acid and various oils.

We regularly experiment with new media. If you experiment for yourself, research the medium thoroughly before you work with it, remembering that you'll be firing the mixture in a kiln.

Be sure you work safely. For example, some fumes are harmful, some vapours are combustible, some media are flammable, some media are carcinogenic.

In this chapter, we'll explain our excellent technique for mixing **glass paint** with **water**. (We'll tell you about oil in Chapter 6.)

Firing

As we said before, the different paints usually require different firing temperatures, and the usual order is to begin with the paint that requires the hottest temperature (the "glass paint") and fire it, and then work downwards with separate firings each for enamels and for silver-stains.

But it is *sometimes* possible to combine glass paints, enamels and stains in a *single* firing.

There aren't many hard and fast rules; even the firmest rules seem to have their own exceptions. For example, some glass painters happily fire their silver-stain first of all, and, when other paint is applied, simply fire it again, but this time at a higher temperature. It works for them! They can make this work, despite what we said earlier when we discussed the firing range of silver-

stain.

The best course of action is to observe and find out what other people do, and conduct tests for yourself. Then you can **decide for yourself**.

Before we start ...

Now we will begin to explain our technique for mixing glass paint with water.

We'll take things in this order:

- The strategy behind our approach
- The ingredients and equipment
- The technique in detail
- Questions and answers

There is **a lot of information** we want to tell you now, so please remember this: if you mix your paint well and manage it properly on your palette, we are confident you'll find it easier to paint beautifully on glass.

If we didn't tell you what we're going to tell you now, the later chapters would be "showing off": it is unlikely you could copy the techniques for yourself.

That's why we have devoted a whole chapter to the subject of mixing glass paint and water. Others don't, but we do, because we know it makes a huge difference.

When you mix glass paint and use your palette like we do, you can learn to paint like we do.

Strategy

Here is a photograph of our palette with mixed glass paint on it. Three features stand out.

1. The **quantity** of paint — we advise you to paint with a *lump* of paint
2. The **consistency** of the paint — it is solid enough to hold itself in a firm, large mound. It is also wet and glistening
3. The palette is **tidy**

What you are looking at is well-mixed paint that is ready for you to dilute to the consistency you need for the kind of painting / the kind of strokes (light or dark, thick or thin) that you plan to do.

Quantity

Many books tell you to paint with just a teaspoonful of paint. Our approach is different.

When you paint with just a teaspoon of paint, the water will evaporate quickly. This means you'll forever be struggling and re-mixing and grinding.

But when you paint with a **lump of paint** like ours, the water will evaporate more slowly. This means you won't need to be grinding and mixing your paint every few minutes. This in turn means you can spend more time painting. (How often you'll actually need to grind and mix your paint depends on the temperature where you are amongst other things.)

Therefore we suggest to you that it is a **false economy** to paint with a small quantity of paint.

We believe that a small quantity of paint is a **waste of your time**.

We also believe it is a **distraction** which can prevent you from painting as well as you can: you will spend your time mixing and remixing your paint, rather than concentrating on your painting.

This is why we recommend that you paint with a **lump of paint**.

This is just one of many areas where you will find the advice we give you is different from the advice you get elsewhere

It's a complete waste of time and energy to try to paint with a quantity like this:

See for yourself. We make this point because we know it'll

make a huge difference to how you paint on glass.

We know that you'll paint better if you *learn to paint* with a lump like ours.

Consistency

When your lump of paint is firm and moist, you have a mixture that is actually too thick and concentrated to use *as it is*: it would clog your brush.

But this means *you can dilute a little at a time* in order to get the consistency you require for the next few brush strokes.

This has three benefits.

1. By diluting a little at a time, the diluted paint has only a brief opportunity to dry out; this means that you won't waste it, and that it will be a quick job to remix it
2. You can make the paint light or dark, depending on what you need for a particular series of strokes
3. You can make the paint runny or thick depending on your immediate needs

To summarize, if the paint is too runny, it will be uncontrollable on your palette. But, on the other hand, if the paint is too dry, it will be dusty, solid and unusable. A lump like ours gives you an excellent balance between paint that is runny and paint that is dry.

The glass paint is well-mixed and ready for a little of it to be diluted to the consistency that is needed. This means we can control it on our palette: it won't flow all over the place. This is why we recommend that you prepare and maintain a lump of paint that is firm and moist.

Tidy palette

When you keep your palette tidy, you'll be able to paint better than you would with a messy palette. You're reading this chapter because you want to know about glass painting, so do try this out: so, **always** keep your palette tidy. The point always is: **you** need to be in charge of your palette, not at its mercy. The best hand-to-eye coordination in the world, the finest brushes, and the loveliest glass – these things will be of little use if your palette isn't properly organized. Therefore you need **a firm lump of paint on a tidy palette**. Manage your paint and palette well, and you will make it easier for yourself to paint beautifully on glass.

You will need ...

You will need water, glass paint, Gum Arabic, a teaspoon, a small porcelain bowl, a palette knife, a glass palette, a cover for the glass paint, and various brushes.

- **Always** wear protective clothing, protective gloves and a mask as required
- **Always** follow the manufacturer's instructions.

1. Measure 100 grams or 3 1/2 ounces of glass paint into the mixing bowl.

2A. For liquid gum Arabic, make a hole in the centre of the glass paint. Add 1 level teaspoonful of liquid gum Arabic. Now go to step 3.

2B. For powdered gum Arabic, add 2 grams of powdered gum Arabic: this is roughly 0.07 ounces or half a level teaspoonful. Use your palette knife and mix glass paint and gum Arabic together thoroughly. Make a hole in the centre of the mixture.

3. Pour a little water into the well. It is extremely important that you don't add too much. Start mixing the glass paint and water.

4. Round and round you go with the palette knife, each time stirring a little more powder into the water.

4. After a little while, the mixture gathers into a very thick paste. Keep on stirring and mixing.

5. All the powder has been absorbed.

6. Collect the paste on your palette knife.

7. Transfer the thick paste onto your glass palette. Use your palette knife to mix and grind the paint for as long as necessary: this depends on how coarse you glass paint is. At the very least, mix and grind your paste for several minutes.

8. Here's the mixed paint. Notice how the glass palette is tidy. This is possible because the paste is not runny: it doesn't run all over the place. Just so: it is a *lump* of paint. It keeps its shape.



9. Now it's time to test your paint: that is, to test whether there is the right proportion of gum Arabic to water and glass paint. Take a thin, wide brush. Dip it in water. Carefully mix it with a little of the lump. It is extremely important not to flood the palette with water.

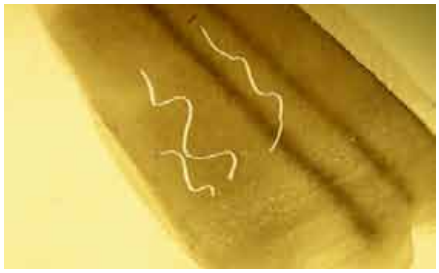


10. To test our paint, we always use the softened lines technique which we explain in Part 3. First, we paint a light, dry undercoat. Second, we trace some light, dry lines. Third, we strengthen the lines by tracing over them a second time.



11. The final stage is to paint a light tone over these layers and to observe how easy / difficult it is to soften the traced lines.

12. We are happy with this effect: it suits our particular style of painting.




13. Another test: scratch some highlights. Observe how you can soften them.

More points on testing

You must test your paint often:

- Each time you mix a new batch of paint
- Each time you substantially change the balance of the paint's ingredients (paint, water and gum Arabic, for example)
- Each time you change the style of painting, for example by using a different brush or by using a different density of paint

In truth you are *always* testing your paint. For instance, before you paint on a piece of glass, you first test the paint by painting a few strokes on the top of your light box.

Of course you want to concentrate on your glass painting, but you always need to pay attention to the paint itself.

Always be asking yourself these questions:

- Is the lump of paint too wet or dry?
- Is the diluted paint too light or dark?
- Is your brush clean?
- Is your palette tidy?

And so forth. One of the most important questions you can ask yourself is this:

- Is there the right amount of gum Arabic in the paint?

What is the "right amount"?

There is no correct answer to this question. The answer depends on the style of painting that you want to do.

For instance, if you're painting silhouettes as we describe in Part 2, you'll want less gum Arabic rather than more, because gum can make paint blister in the kiln.

By contrast, if you're painting several layers of paint on top of one another in a single firing, you'll need more gum Arabic rather than less, because otherwise the layers underneath will wash away.

How to use the lump

You are nearly ready to paint.

But of course you cannot paint with the lump as it is: the paint is too solid and sticky to get it onto your brush.

Therefore, in order to be able to paint with it, you need now to **dilute** it a bit at a time.

This is another wonderful thing about our technique: you dilute the lump a little at a time and make your paint exactly the consistency that you require.

Always remember this: do NOT turn your *lump* into runny and uncontrollable liquid. You absolutely need a **lump** of paint.

If your paint becomes runny, you will need to use a paper towel to remove the excess liquid. You may also need to add more glass paint in order to absorb the excess liquid. And you may also need more gum Arabic ... The whole thing gets more and more complicated

Therefore, **IF** you need it, add just *a little water*: add the water a few drops at a time.

So, as we said, the lump acts as your "reservoir": it's too thick to paint with, so you dilute it as you need to, a little at a time.

To dilute a little of your lump for painting, here's what you do ...

Take a tracing brush, wet it with water and drip some water onto the *top* of the lump.

Do not add much water. You can easily add more water if you need to; by contrast, it is a far more complicated process to add more *glass paint* if the lump becomes too runny. Therefore always add just a few **drops** of water at a time.

When you add these drops of water, let the water *trickle down* one side of the lump.

As the water trickles down, it will carry thick paint with it.

You can assist this process by gently *rubbing your brush* against the *side* of the lump as the water flows down it.

You can also repeat the process by using your brush to lift water that has already trickled down the side of the lump back up to the top; it will trickle down again, each time bringing a bit more paint with it as it goes.

You'll be painting with this small quantity of diluted liquid at the base of the lump.

Since it is such a small quantity, this diluted liquid doesn't take long to make.

However, because it is small, it will dry out quickly. Therefore, it must be briefly remixed perhaps **each and every time** you load your brush with paint.

So always swirl and twirl your brush in the diluted paint until it is thoroughly mixed.

Note: it is usually best to swirl and twirl with the *tip* of your brush. That way, your brush will keep its shape. Also, it won't absorb too much paint itself.

Now rinse your brush in water (this is because you've been using it for mixing, so it's loaded with paint), shake off the excess water, load paint onto your brush by again swirling and twirling its tip in the just-mixed glass paint at the side of the lump, and you're ready start to painting.

There are two points to remember:

1. Only dilute paint **a little at a time** and do NOT dilute the whole lump;
2. Only dilute the paint as much as you have to: darker strokes need less dilution than lighter ones. Always leave the paint as dry as possible.

We must emphasise this point: use as little water as possible. The more water you add, the more likely it is that the paint will pour from your brush in an uncontrollable way and make a mess of the glass that you are painting. Even light strokes need less water than you probably think. Well mixed paint can flow quite easily in a light thin line *or* a heavy thick line with very little difference in the amount of constituent water: it's as much the pressure of your brush-stroke that you must vary when you paint.

Painting

Now you can start to paint. Here are two useful points:

1. Always keep your palette on the edge of your light box: that way, you can see how wet or dry your lump is. You can also judge the consistency of paint that you've just diluted.
2. And, as we said before, when you've loaded your brush with diluted paint, always test it on the light box before you paint it on your chosen piece of glass: that way, you can make sure your brush strokes are the strength you want.

Remix often

Imagine that you have everything you need in front of you. Here's a typical sequence of events:

Dilute a little paint for the next few strokes;
Mix it on your palette;
Rinse and dry your brush;
Remix the paint on your palette by swirling and twirling the tip of your brush;
Load your brush;
Test it on your light-box;
Paint one or more strokes on your glass;
Remix paint on your palette and load your brush again;
Test it on your light-box;
Paint one or more strokes on your glass;
Rinse and dry your brush;
Dilute some paint for the next few strokes;
Remix it on your palette ... and so on.

The idea is you are **always** diluting, mixing, painting, rinsing (and so on) in the sequence that *your* eyes and *your* brain suggest to you.

Here now are some questions that you might want to ask ...

"What glass paint do you use?"

We are not paid to say this but we only use Reusche glass paint to paint lines and shadows as described throughout the rest of this book. (Enamels and silver-stains come from various suppliers.) We mainly use their tracing black (DE401) and bistre brown (DE402). These fire at 1200 - 1250 Fahrenheit (650 - 675 Celsius).

"What does gum Arabic do and how much should I add?"

The main purpose of the gum Arabic is to help the paint to stick to the glass before you fire it. This is not required for all the different glass painting techniques that there are: adhesion is not an absolute good in itself. Therefore, the proportion of gum Arabic to water and glass paint depends on the style of painting that **you** intend to do. You will need to choose a style before you mix your paint.

The amount that we suggest above is usually a good all-purpose quantity for the specified amount of paint and water. However, just as the amount of water will vary depending on the temperature and the brand of the paint itself (for example), so too the amount of gum will vary depending on the style of painting that you intend to do. At Williams & Byrne, we usually paint many layers of paint on top of one another in order to postpone for as long as possible the point at which the paint is permanently fixed by firing. This requires more than the bare minimum amount of gum Arabic. One particular technique we want to show you in other guides is how to master this single-firing technique: to that end, this is a good quantity of gum Arabic to add.

Whilst there is no such thing as the *one and only* absolutely correct proportion of gum Arabic to glass paint, it is certainly possible to add too much gum Arabic.

The more gum Arabic you add, the harder you will find it to create different kinds of highlights. For example, it will be difficult to use a scrub to soften a highlight that you've created with a sharp stick.

Another consequence of too much gum Arabic is that, when you try to create a highlight by using a needle or stick, bits of dried paint will shatter away.

Also, the more gum Arabic you add, the more likely it is that the glass paint will blister when you fire it in the kiln.

It is sometimes said that gum Arabic helps the paint to flow more smoothly from the brush. Indeed, it sometimes seems to us that gum Arabic makes glass paint creamier.

This may be true, but it is difficult to prove it scientifically. But it is certain that, without gum Arabic, unfired glass paint will lift off very easily from your glass. Sometimes, this is exactly what you will want. Other times, you will want to be able to paint several layers on top of one another. Without gum Arabic, this will be difficult or even impossible. The more gum Arabic you add in proportion to glass paint and water, the harder the unfired paint will stick to the glass. Remember that this is not a good thing in it itself: it all depends on what you want to do with it.

There are many wonderful glass painters who use no gum at all.

"Why do you prefer *liquid* gum Arabic?"

Gum Arabic comes as a liquid and a powder. We use it as a liquid. Other glass painters insist on using it as a powder. On the face of it, it seems largely to be a question of what's available or what you're already used to: when you add gum Arabic, adding it as liquid means adding less other liquid (e.g. water) overall, whilst adding it as powder means adding more other liquid overall.

So what's the real difference?

In our experience, liquid gum Arabic is more easily absorbed than powder. Also, it doesn't need grinding.

These qualities are particularly advantageous when you are testing and adjusting a new lump of paint, and also when you are – as you will be – remixing an old lump of paint: we think that liquid gum Arabic is easier for making small and ongoing adjustments to the adhesive / binding property of your paint. You can literally add two drops, mix them in and immediately see the difference.

The situation is different with powdered gum Arabic. You must first grind and dissolve the powder in water on one side of your

palette and then combine it in with the main body of your glass paint. We think this is more complicated than just adding a few more drops of liquid gum Arabic.

"What colour glass paint do you use?"

When we are doing our own painting at Williams & Byrne (as opposed to the restoration and conservation work we do), we use a mixture of tracing black and tracing red from Reusche.

We mix black with red paint roughly in the proportion 4 parts black to 1 part red.

There are two reasons why we prefer this mixture to paint that is pure black:

1. While we are painting, we can see if the red and black are beginning to separate. They can separate either in the lump or in the diluted paint. If the red and black pigment *do* separate, this tells us we need to mix them more. Having a mixture of glass paint thus serves as a useful visual reminder that we must constantly keep an eye on our paint.
2. When the mixture fires, we think the red pigment adds warmth to the darkness of our lines and tones.

If you decide to use a mixture like ours, thoroughly mix the powders together *before* you add any liquid, but be careful not to stir up any dust. A good way to do this is to place all the powder in a sealable container and shake it vigorously with its lid firmly on. Leave time for the dust to settle before you take the lid off.

"How long do I need to grind and mix the paint?"

The time depends on the glass paint that you are using. Some paint is coarse and needs a lot of grinding, for example 15 minutes; other paint needs just a little grinding.

Most of our glass paint just needs to be ground for a few minutes.

You need to grind and mix your glass paint at the start of the day and throughout the day.

"How do I store glass paint overnight?"

To store glass paint overnight, take a natural sponge, wet it in water, squeeze it out, and place it on top of the paint.

Cover the paint with a bowl or jar that is made from glass or porcelain. (Metal is prone to rusting; plastic is too light.)

Take a soft, wide brush, dip it in water, and run it around the edge of the cover as you see below: when the water evaporates, the paint will form a seal.

This will stick the cover to the palette. This means that less air will get to the paint. This will help to keep the paint moist (as will the sponge).

Note: always cover your paint when you aren't using it for more than a few minutes. Uncovered paint will dry out more quickly than covered paint: this means you will need to mix it again and probably add more water or gum Arabic or both. Also, bits of dust or dirt may land in it.

"What other media can I use?"

This chapter describes how to mix glass paint with **water**. There are various reasons.

- Its wide availability;
- The fact that it doesn't create any health and safety issues over and above those which already pertain to using glass paint;
- Painting with water-based glass paint can be considered a foundational technique of glass painting. It's been part of the glass painting repertoire in most parts of the world and at most times.

But you can also use other media than water; other media have different properties; other media are mixed and stored in different ways.

Examples of other media are any of various oils: white vinegar: or turpentine.

Each one of these media gives itself to different glass painting techniques. We ourselves especially use various oils.

But – for the sake of clarity – different media have different health and safety implications. Some are toxic to the touch, some are harmful to breathe in, and some create a fire hazard; and so on!

If you want to experiment, always use different equipment for different media, and always take the greatest possible precaution.

We will show you how to mix oil-based paint in Chapter 6.

"How do I re-mix dried paint?"

If the paint is extremely dry, you may want to use a wide soft-haired brush to moisten the top before you even start: let the water soak in. You will probably hear it "fizz" a little. You may need to add several brush-loads of water in this way.

Then use the flat wide soft-haired brush to put a little water over the whole surface of the palette (to absorb the dust), wet your palette knife with a little water, and then scrape up all the dried paint and mix it thoroughly with the lump.

Add more water as needed, but do not add too much.

Use your palette knife to cut the dried lump and mix the water in.

Keep cutting, mixing and grinding until your lump of paint is as you want it to be.

Full details on the next page.

Even when you cover and seal your glass paint as we describe, you'll sometimes have to deal with a situation like this.

1. Take a wide thin brush and wet it in water.

2. Lightly wet the whole surface of the palette.

3. Don't add too much water. Just add enough water to moisten the whole surface.

4. Take your palette knife and scrape up all the dried paint.

5. Cut into the dried lump of paint.

6. Cut and mix and grind.

7. Keep cutting and grinding. Sometimes you'll find you need to add more water.

8. Once the lump is smooth, then you can remove any excess water.

9. The palette is now tidy and fairly dry. Notice the paint is at one end.

10. Choose your brush.

11. Use the brush to carry water onto the palette.

12. Dilute a little of the lump with the water and make the puddle of paint into the consistency you need for the painting that you're going to do.

13. Load your brush, test and adjust the paint as needed, then start to paint.

Beautiful stained glass silhouettes

We began by showing you how to mix your paint.

We began there because most other books neglect this essential subject. They "explain" it in one or two paragraphs, as if mixing glass paint were self-evident and straight-forward.

But we knew that we owed it to you to explain things properly right from the start.

True, "mixing glass paint" doesn't sound like an exciting subject, but that's not the point.

The point is to preserve the centuries-old tradition of glass painting. The tradition will otherwise become extinct.

We think there's a right way to mix your glass paint.

And we know that well-mixed glass paint is essential to painting well on glass.

That's why we started there. And the general point is that, if you're having problems painting on glass, you must always check your paint.

Now, in this chapter, we're once again going to start in an unexpected place.

We're *not* doing it as the other books do it!

The other books would say: "Take your tracing brush and paint the outline of this shape …"

What use is that? How does it explain what you should do?

What *we* want to do is to show you *how* to use tracing brushes:

We want to communicate the experience that *we* have when using them so that you can use them *like we do*, and with the same control.

So this is what we've done: we've prepared a series of exercises that will develop your skills with a tracing brush.

Silhouettes are the *first* exercise.

You start with silhouettes. Then, in Part 3, we'll show you another exercise which will develop your painting skills by making gorgeous shadows. And by then we know you'll be tracing better than ever you did before. So you'll be more than ready for Chapter 4 which is dedicated to tracing.

Why start with silhouettes?

Silhouettes are a great way to improve your skill in painting with a tracing brush on glass.

This is because, unlike the details of a human face (for example), silhouettes are "forgiving".

That is, you generally don't have to be absolutely exact: towards the end of the project, for example, you can usually correct a line if you dislike it. (This is not always the case with a painted smile, for example, or a painted eye!) And, all the time you practise painting silhouettes, you'll be improving your hand-eye co-ordination, almost without realizing it. This means that the next time you come to use a tracing brush, you'll have grown in confidence. And this confidence will mean better concentration. Better concentration in turn means you have a better chance of tracing more fluently than you did before: you'll have started to remove the anxiety about making the "perfect line" which is the graveyard of beautiful glass painting.

Yes, you indeed *must* paint the perfect line. That's our ambition for you. And we're sure you *will*. But do believe us: you're unlikely to paint the perfect line if you're *anxious*! Silhouettes can help remove anxiety: they can help you to feel absolutely calm about painting a fine and delicate line on glass.

We also start with silhouettes whenever we run glass painting courses at our design and glass painting studio in the lovely county of Shropshire. We ask our students to be patient with us (they often want to start tracing straight away). But, after painting silhouettes for perhaps a day, their painting has improved a huge amount, and they are then ready to start painting shadows as we describe in the next chapter. So for now let's just enjoy the calm experience of painting silhouettes.

It's also important to explain that this chapter isn't purely a means to an end. It is also an end in itself. We designed and painted A stained glass window for the home of Kate Charles, the US crime writer. It depicts an angel in a medieval style, some bars of music with a special significance, the beloved dog *and* a silhouette of Kate herself and her husband.

What you can learn in this chapter

In this chapter, we're going to show you many things:

1. How to use the surface of your light box as a test area for the brush-strokes that you paint on glass: this is such an important thing for you to know, and we're excited to show you how it's done;
2. How to paint a light tone of paint that gives you an excellent surface on which you can accurately trace all kinds of designs (not just silhouettes): again, this is a practical and astonishing technique that can revolutionise how you paint on glass;
3. How to trace a light, dry, thin and graceful line: this takes practise, but we'll help you to develop your skill;
4. How to strengthen this light, thin line to the darkness that you want;
5. How to fill specific areas with a thick layer of paint: we call this "flooding". There's a technique here that we'll explain to you. As we said, once you've mastered it, there are many other times you'll use it when you paint on glass;
6. How to use sticks and needles to sharpen wobbly lines and also to create highlights;

These are the main points we intend to explain. We think you'll learn them more or less effortlessly by the process of painting silhouettes as we suggest.

And now let's start.

Overview

This is the sequence you'll follow to paint a silhouette:
1. Cut your glass to size;
2. Clean it thoroughly;
3. Paint a light undercoat over the whole surface of the glass, then use a blender to smooth the surface of this undercoat before it dries;
4. Copy-trace a light fine outline of the silhouette;
5. Strengthen the outline;
6. Flood the outline;
7. Pick out and sharpen the outline;
8. Fire.

Undercoat

Why paint an undercoat?

The reason is, it primes the surface of the bare glass and makes it easier for you to trace. An undercoat isn't essential; it just gives you more control.

Blend

Here, you want the undercoat to be as smooth as possible. (There may be other occasions where you don't; but *here* yo do.) Even with practice and a good technique, it's nearly impossible to apply the wet paint exactly as you want it to be. That's why you use your blender – gently and quickly to adjust the wet paint into a smooth "canvas" on which to trace.

Copy-trace

Why paint an initial trace and then strengthen it? Why not paint it in one go? The answer is, sometimes you will indeed be called upon to paint a traced line in one go. Most times, however, it's easier to paint light, thin "sketch" lines with the glass on top of the design, and then, with the design on one side, to build up these sketch lines to the required width and density. It's far easier to judge the required width and density without the design beneath the glass.

Strengthen

Here, once the paint is dry, you're simply looking to double up the darkness of the line. Please note: in this instance, make the traced line darker, but do not make it thicker. (This is good training.)

Flood

Flooding is where you use dark, medium-thick paint to block off large areas of glass.

In silhouettes, flooding is used to block in a particular shape. But it's also used on many other occasions when you paint stained glass. Stylistically, you rarely cut a piece of glass to the exact size of the painted object. The reason is, this would make the object appear cramped. Thus there is usually space between the outline of a head, for example, and the lead. Otherwise the head looks like it's wearing a space helmet. So you usually leave a space that you then flood with paint. The next time you look at painted stained glass – in a church or in a book – see how often this is done.

(For teaching purposes, we want you to learn how the same lump of glass paint can be diluted into different consistencies. The paint you make and use for flooding is as thick as it ever gets. So, once you know how to make it, you'll have experienced the whole range from light to dark. And, once you've had that experience, you'll be ready to work on real examples of your own.)

Pick out and sharpen

One of the useful characteristics of painting with glass paint that you fire in the kiln is that, until it's fired, you *often* have the means to adjust the work you've done. You add a little gum Arabic to make sure that the unfired glass paint isn't excessively fragile. Then, at certain points before the glass is fired, you can take a wooden stick or a needle and scrape back unwanted paint.

And then fire your glass.

Conclusion

It's a good idea to do your *first* silhouette carefully but q*uickly*. If you like it, fire it in the kiln; if you don't like it, rub it off and start again.

The point is, everyone paints better when they know where they're going. So, whilst you should always be as careful as possible, don't be obsessive the first time you do this. Your mind will probably be more relaxed the second time, so your second silhouette will almost certainly be better.

Tools & materials that you need

You will need:
- The design – this is at the end of this chapter;
- Glass;
- Glass cutter;
- Glass paint mixed with water and gum Arabic;
- Glass palette;
- Painting bridge/arm rest;
- Light-box;
- Palette knife;
- Jar of water;
- Flat wide for painting an undercoat;
- Wide thick blender;
- Tracing brushes;
- Sharp sticks and scrubs;
- Paper clothes to clean glass;
- Kiln and controller.

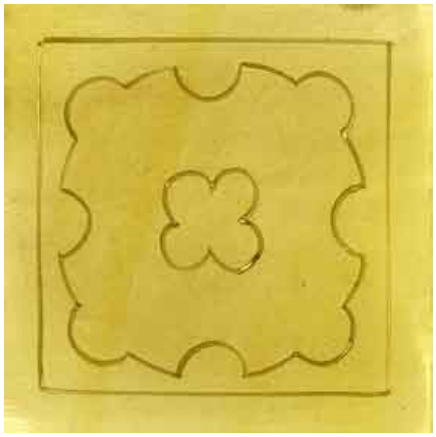
Here's how you paint a light tone.

2 – Silhouettes

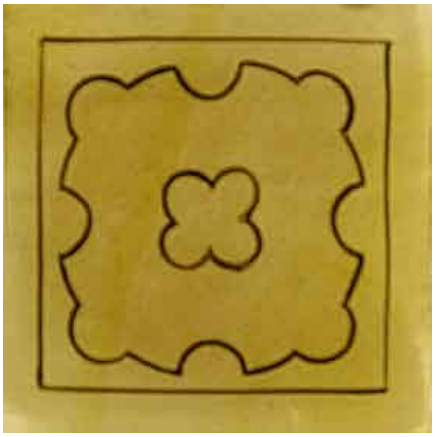
1. Cut glass.

2. Clean glass.

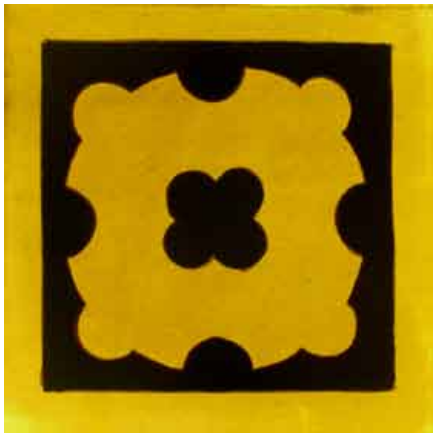
3. Paint an undercoat.



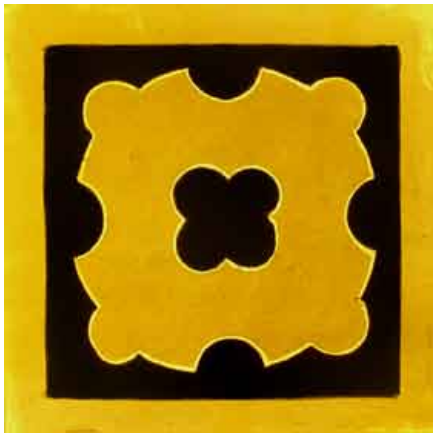
4. Copy-trace the design.



5. Reinforce the copy-traced lines.



6. Flood.



7. Sharpen, pick out centre, remove the undercoat from the border, and fire.

8. Fired glass

1. Use your glass cutter to cut some glass. Choose light glass rather than dark glass, especially the first time: you need to be able to see through the glass to the design underneath.
Once the glass is cut, make sure you roughen the edges of your glass. This lessens the likelihood that you'll cut your fingers when handling it during painting. It can also extend the life of your brushes: sharp edges can remove their hairs!

2. Prepare your glass paint. If you're using old paint, re-grind it thoroughly and re-test it. Remember these points:

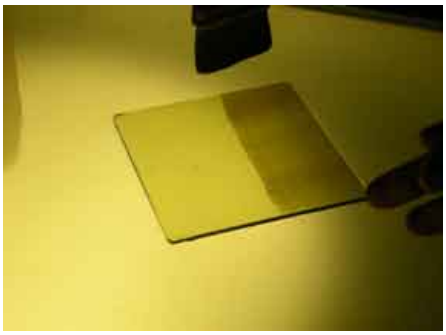
1. If your glass paint is badly mixed, you won't be able to paint as well as you can.
2. By contrast, well-mixed glass paint is a great step towards painting glass beautifully.
3. It's difficult to paint with a **small** quantity of paint and water. That's why we *always* use a "lump" of glass paint.
4. When painting silhouettes, you usually don't need as much gum Arabic as with other types of painting. This is because you'll be "flooding" paint to cover large areas of glass: too much gum is *one* factor that can make the paint blister when you fire it in the kiln. We say more about this at the end of this chapter.

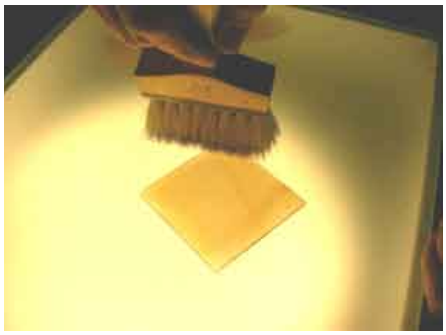
3. Your glass must be absolutely clean. If there is any dirt or grease on it, the paint won't go on smoothly.
☑ The best way to clean glass is to clean it with glass paint: if the paint goes on smoothly, you know the glass is clean. So there's generally no need to use detergent or window cleaner: just use glass paint.

Here's what you do.
1. Take your flat wide brush.
2. Dip it in the jar of water to make it wet.
3. Rub the squirrel around the side of your lump of paint so that some of the lump of paint is diluted into the water.
4. If you need more diluted paint, dip your brush in the water again and repeat the previous step.
5. When you have enough diluted paint at the base of your lump, load your squirrel with paint and rub it *vigorously* over both sides of the glass and also along the sides.
6. Take a paper cloth and rub the wet paint to remove the paint from the glass.

Perhaps your paint goes on smoothly the very first time, suggesting that the glass is already clean: this is possible but unlikely.
☑ Even if the paint goes on smoothly the very first time, it is sensible to repeat the process a **second** time.

Sometimes, if the glass is particularly dirty, you must repeat the process as many as five times or more. That doesn't matter. It's essential your glass is thoroughly clean: otherwise you can't paint on it.
☑ Always take as long as you need to clean your glass thoroughly *all over*.





4. Now apply the undercoat. This step gives you a lovely surface on your glass to paint on with your tracing brush in the next step.

This step resembles what you do when you decorate a room: you first paint an undercoat.

This is just what you're doing here on glass: you're preparing the bare, shiny surface of the glass for all the painting that you'll do afterwards. This light tone of paint will help you paint delicately with your tracing bushes.

☑ The important thing — it is also the difficult thing — is to make this undercoat as light, dry *and* even as you possibly can.

Here's why: when you come to paint the design, you will need to be able to see through the undercoat *and* the glass to the design underneath.

Here's how you paint a light tone.

1. Take your flat wide brush - preferably a "haik". It's already wet from cleaning your glass, so its hairs have already expanded to their full capacity (which is good: a dry brush can be difficult to paint with).
2. If you've already diluted enough paint, you can start painting straight away. If there's no diluted paint left over from the previous step (when you cleaned your glass), dilute some more paint.
3. Load your haik with paint.
4. How do you know the paint is the right lightness and consistency for what you want to do? The answer's simple: test it on your light-box first.

☑ *This* is a general principle of beautiful glass painting: test *everything* on your light-box first. Everything! Here's a picture showing us blending a test undercoat on our light-box:

☑ *Each time* you dilute more paint by adding water to your lump of paint, test the mixture on your light-box *before* you use it on your glass.

☑ *Each time* you load your brush, test it on your light-box *before* you paint on your glass.

This is important. Please do as we suggest. It will soon become "second nature" and instinctive. We'll continue to repeat the point: *always test everything on your light-box first*. It's the best way to prevent yourself from spoiling a piece. So, on your light-box, use your haik to paint two or three light, dry strokes with each stroke as close as possible to its neighbour.

You already understand why the strokes must be *light*: the purpose of this stage is to give you a better surface on which to paint the design which, in the next stage, you'll place *beneath* the glass for copying.

But why must the strokes be as *dry* as possible?

Well, if the strokes are *watery*, the paint won't have enough gum Arabic in it to stick to the glass. Another reason is that watery strokes are difficult to blend and make smooth.

Here are some watery strokes: you can tell they are watery, because of the dark patch on the right-hand side where the strokes finish:

Therefore, keep testing and changing the consistency of your diluted paint until you get two or three light, dry, even strokes on your light-box.

Now take a blender.

On your light-box – in order to rehearse what you will do when you actually come to paint your *glass* – take your blender and blend the strokes until they are smooth.

As you use your blender, observe how quickly the paint dries: this information is useful when you come to paint your glass.

Also observe how the strokes react to your blender: consider whether there is anything about your strokes that you might change the next time. *Now's* your chance to prevent problems from occurring.

☑ If your diluted paint is too dark, take a paper towel and blot some up. Then use your squirrel to mix in a little bit more water, taking care *not* to remove any additional paint from your main lump of paint: the paint is already dark enough.

☑ If your diluted paint is too watery, you've two options. First, you can take a paper towel and remove some paint. Second, you can shake your squirrel to get it dry, then load the *front-half* of it with paint. That is, **don't** load the **whole** brush with paint: if you load the whole brush, the watery paint at the back will exert pressure on the paint at the front and will push it onto your glass in a potentially uncontrollable manner.

☑ If your strokes are too dark (even though the diluted paint is light), wash your brush: it obviously contains a lot of hidden paint.

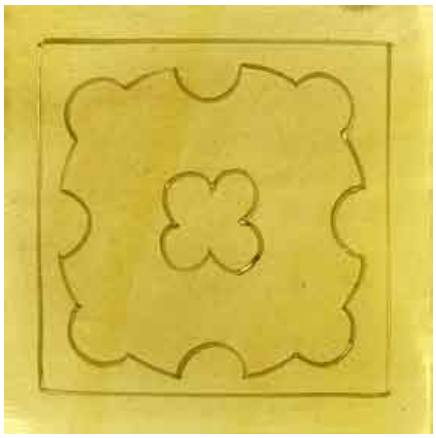
Having practised on the light-box, you've now rehearsed exactly what you're going to do: so now, do it for real:

1. Touch your glass.

Is it cool or warm? Cool glass is often easiest to paint on. If it's warm, remove it from the light-box and wait until it's cool.

2. Paint the two or three neighboring strokes that you've practised on your light-box, making them as light, even and dry as possible.
3. Take your blender (if needed) and blend the strokes so that you can't see where each one joins its neighbor.
4. When you've done this, *don't* touch your glass again until the paint is absolutely dry.

☑ If you touch the glass while the paint is still wet, your fingers may break the delicate surface tension of the drying paint and spoil its finish.



5. Now you place the glass on top of the design and "copy-trace" the outline of the silhouette as lightly and dryly as possible.

Here's the strategy: when painting on glass, it is often best to build up darkness *gradually*. But very few people realize that this is desirable (or possible). Many people think that, if a line is meant to be dark and heavy, they must paint a dark line **in one go**. It is true: sometimes you must. But *usually* it's better not to do this.

☑ Create darkness and depth in stages, not all at once. You have far more control like that. This is something we always do at our studio, *whatever* we are painting.

☑ You should nearly always let paint dry completely *before* you paint over it a second / third / fourth time. If the paint is still drying when you touch it again with your brush, your brush will do several things. First, it will disturb the balance between water and gum Arabic. Second, it will prevent the drying paint from finding its own level. Both of these "interferences" can cause the paint to blister in the kiln. In our view, it is the fact of painting over *wet* paint — not the mere fact of painting over paint (which is what's often claimed) — which is a main cause of blistering.

So use these two tips: try what we say, and decide for yourself.

Here's what you do:

1. Check that the glass you're going to paint is cool. If the glass is warm, remove it from the light-box and wait until it has cooled down.
2. Place the design on the light-box.
3. Place the glass on top of the design, so:
4. You need some light paint to work with: as needed, use your tracing brush to transfer a little water onto your palette and mix into it some paint from your lump.
5. Now clean and dry your tracing brush. It must not be dirty or excessively wet.
6. Swirl its tip around in the paint for several moments:
7. Test this paint on your light-box: here, you should test it on the tests that are left over from the previous stage. If you've cleaned them off, just make some more. What you always want is for your test area on your light-box to resemble the state of your glass as closely as possible. That way, your tests are as accurate as possible.
8. Begin to trace the outline *lightly*.
9. Each time you load your brush, first re-mix the paint, then test it on your light-box *before* you paint on your glass.

☑ Another reason for testing paint on the light-box *before* you use it on your glass is that this helps to get the paint flowing from your brush. Sometimes the paint flows too quickly: in that case, it's just as well you tested it on your light-box rather than rushing ahead and painting on your glass!

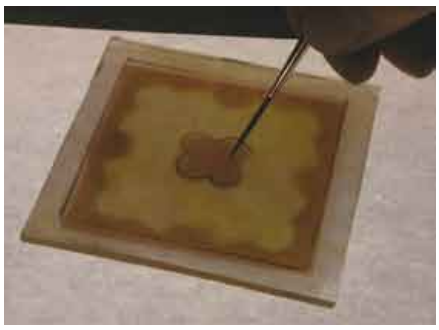
☑ Use the side of your painting bridge to steady and guide your hand when you need to paint straight lines, so:

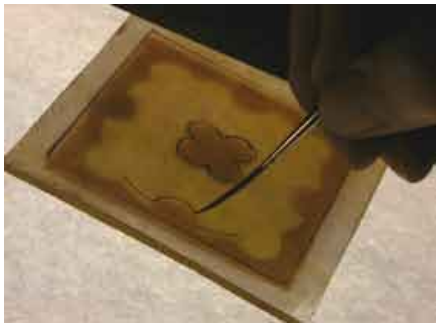
☑ If you want to, it's OK to paint straight lines from one edge of the glass to the other. This is because you can remove the excess later.

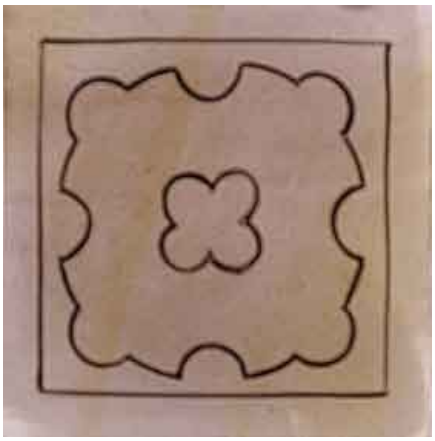
☑ Move the design and glass around to suit you. Never get yourself into a position where you feel cramped. You are in control of things here, so make yourself comfortable.

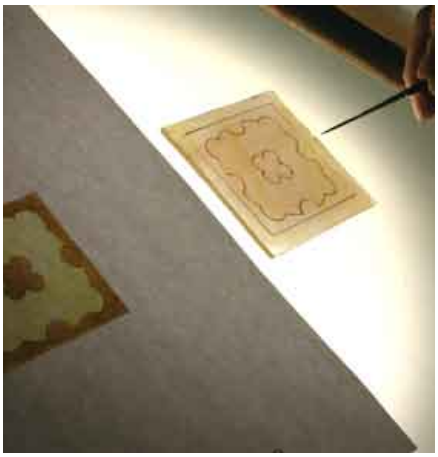
☑ here's no hurry: it's important to enjoy what you're doing.

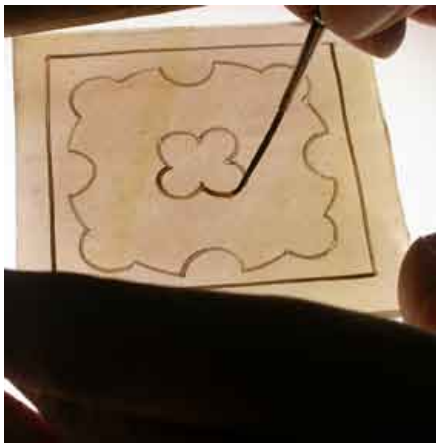
When you've finished, let the paint dry thoroughly and take the design away.











6. Now you paint over your lines again to make them medium-dark. Your painted glass will look like this:

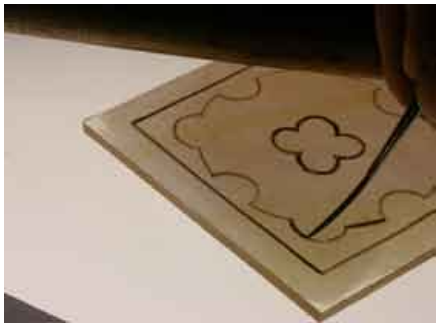
Why do we do this??

What you're doing here is building a "wall" of paint that will provide the boundaries to the flooding that you'll do in the next stage. If your outline is too light, the flood of paint will pour over it. But, if the line is too dark, it'll rise above the flood of paint and look ugly.

A *medium-dark* line will blend perfectly with the flooded paint, and your silhouette will look graceful.

We can't judge for you whether your second outline needs to be stronger or weaker than your first, or even just the same: you must observe things for yourself.

If you first outline was particularly light, you can do a stronger second outline. If your first outline was rather heavy, do a light one now.

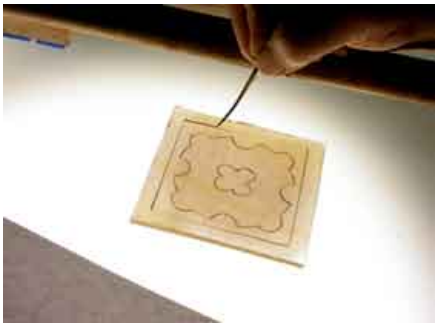


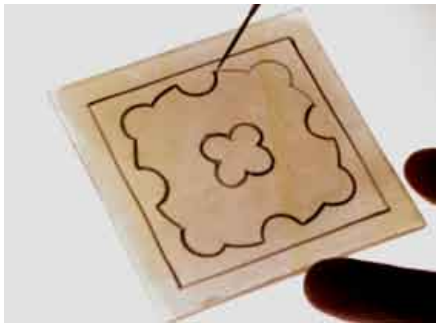
So why not paint the outline in one go?

Well, as we said before, it's difficult and unnecessary to paint it in one go.

☑ It's difficult to control a tracing brush that has a lot of dark paint in it.

Also, the ability to trace lightly and then reinforce a line with different depths of tone is a marvellous skill for you to learn and value in *all* the glass painting that you'll do.



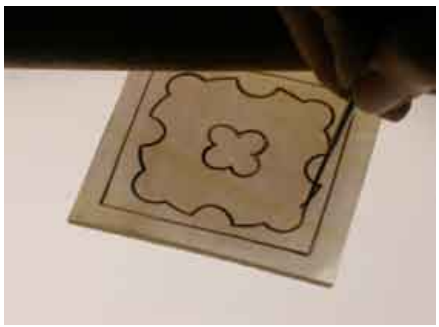


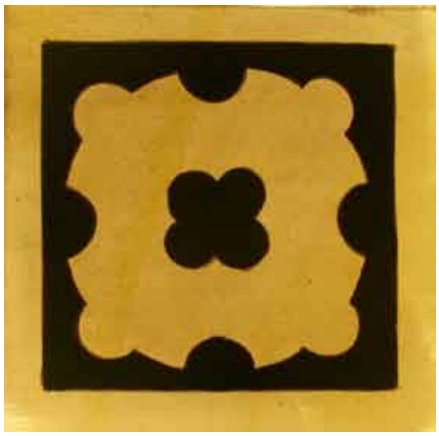
Therefore, although you could build up the wall of paint in just one go, *we don't want you to!* We want you to learn the blessing of how to trace lightly and how to reinforce!

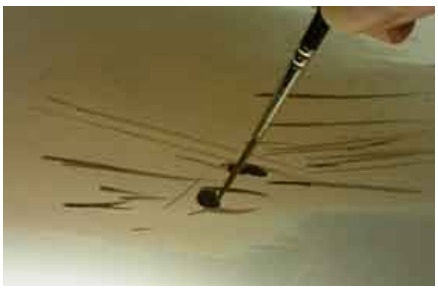
It's important to keep the line as *thin as it was before*: don't thicken it now!

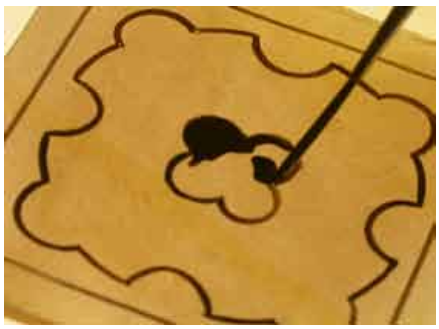
Here's what you do:

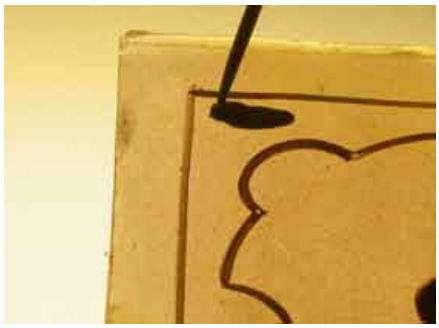
1. Put the design on one side so that you can look at it when you want to.
2. Do what you did before when you lightly traced the outline, but remember that the outcome of this stage is a medium-dark outline. Not a dark one!
3. Remember always to use your light-box as a test area for all the painting that you do: That is, on your light-box you need an area of paint that mimics your glass: a light, dry and even tone of paint with some light, dry and even trace lines on it. If you've no such area, **make one now**. It doesn't matter that this takes time: it's what has to be done!
4. Now reinforce the light outline that you made before, testing each stroke on the light-box before you paint it on your glass:
5. When you've finished reinforcing the light outline, let the paint dry thoroughly.

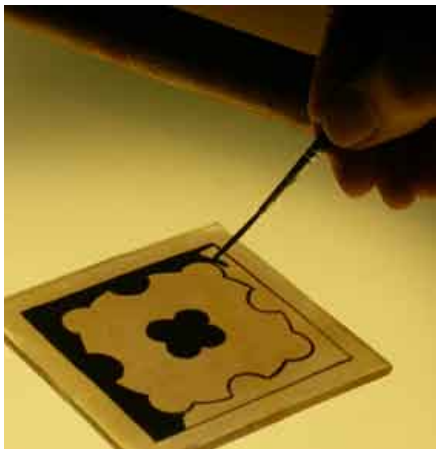












7. Now you'll use a tracing brush to "pour" thick paint within the boundaries of your outline:

This is unlike other uses that you make of your tracing brush: in this stage, your brush is just the means of carrying large quantities of thick dark paint from your palette to your glass.

And you scarcely use your tracing brush to *shape* the paint: the paint should just pour off your brush with minimum intervention from you. Eventually the paint will just stop at the outline you've created in the previous two steps.

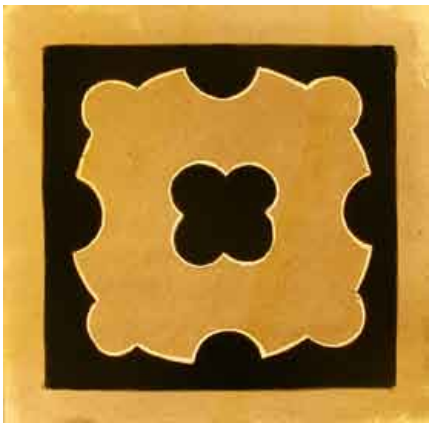
Here's what you do:

1. Load your tracing brush with water.
2. Transfer this water to the top of your lump of paint.
3. Let the water trickle down the sides of your lump, taking thick paint with it as it goes.
4. Once the diluted paint reaches the bottom of your lump, swirl it round and mix it with your brush, so:
5. You need a large quantity of thick paint which has the consistency of melted runny chocolate. This is how you test the paint for thickness. Load your brush. Go to the test area of your light-box. Hold your brush vertically. Bring it down so that the tip of your brush just begins to touch the surface of your light-box. What you want to happen is for the paint to FLOW from your brush: your paint should flow downwards to cover a small circle with NO EFFORT on your part. If your paint flows like this, your paint is good for flooding. But, if the paint gushes down (rather than flows) and begins to separate, it's too thin. If it doesn't flow at all from your brush, it's too thick.
6. Once the initial flow has happened — this flow lasts for perhaps **three seconds** at most — return to the palette, load up with some more paint, and use your tracing brush to transfer it to your glass. You must reload your brush **frequently**. The tip of your brush goes down when you arrive with a fresh lot of paint, then goes up when you leave three seconds later to get more paint: it goes "load with paint-*down*-**1-2-3**-*up*-load with more paint" and so on. This is the secret of smoothly flooded paint. While you brush is flooding paint onto the glass, keep it down: **don't go up and down!** – That will stop the surface of the paint from being smooth.
7. It follows that you'll use a lot of paint! So what you always need to be doing is adding more water to the top of the lump and letting it flow down while you paint. Then, when you come to load your brush again, you must always remix the puddle at the bottom so that the paint which has newly descended is perfectly incorporated with the diluted paint that remained from earlier. Just keep reminding yourself to reload your brush every few seconds, and, every few loads, to replenish the water that flows down the sides of your lump of paint.
8. Since the consistency of the paint is such that it simply falls off your tracing brush, *don't* use a newly loaded tracing brush too close to the outline itself (the paint might otherwise flow over the boundary).
9. When you've flooded the outline, let the paint dry thoroughly. This will take at least 30 minutes under normal conditions.

☑ *Never* touch the paint once it has left your brush. Wait until it is dry.

☑ You absolutely must resist the temptation to shape the paint: just let it stop where it chooses to. *Never* "play" with it or push it around.

☑ Leave the glass lying flat while it is drying! Otherwise the paint will run.



8. Pick out and scrub. Now you're going to clean off some of the undercoat that you applied at the very beginning. The main reason why we're doing this is to increase the contrast between the clarity of the clean and shining glass and the darkness of the silhouette. It's a question of style and choice, not necessity: you don't always have to do this!

When you do another silhouette, you can try something different e.g. rubbing the tone to give it texture. You need sticks, needles and scrubs.

1. Take a sharp stick or needle. Hold it firmly and carefully.
2. With your hand resting comfortably on your painting bridge (this is so that you don't damage the painting that you've already done), use the stick or needle to cut through the light paint which is right at the edge of the area that you've just flooded. At this stage, you can correct a wobbly line: *a little at a time*, use your stick or needle to carve back the dark paint until it has the appearance that you want.
3. Continue until you have picked round your flooding like this:
4. When you've done this, take a small scrub and brush the paint away from the line you've just picked out. Do this carefully so as not to breathe in any of the dust (which can be dangerous).
5. Now take a larger scrub and clean up the rest of the light tone.
6. Hold your silhouette up to the light and have a good look at it.
7. You can use a stick to continue to sharpen any lines you don't like, and you can use your scrub to remove any little bits of the tone of paint that still remain.
8. The last step is to take a scrub and clean the paint away from the edge of the glass.

☑ Be careful not to cut your fingers on the edge of the glass.

Fire your glass

Because paint has been applied thickly, we would use a slower firing schedule which allows the paint to dry thoroughly before moving up to top temperature. Please refer to the suggested firing schedules to see what we do.

Conclusion

Here are the important points to remember:

1. Don't trace on bare glass unless it's absolutely necessary: always paint an undercoat. This will give you a lovely surface on which to use your tracing brushes.
2. Make this undercoat as light, dry and even as possible.
3. Don't touch the undercoat until it is perfectly dry.
4. Test everything on your light-box first. Make sure that what you have on your light-box is the same as what you have on your glass: that way your light-box can provide you with an excellent place to practice calmly.
5. When you trace, it's usually a good idea to build up a medium-dark line in several layers: there's *often* no need to trace a line in just one go. (And remember that the undercoat will contribute to the line's darkness.)
6. Make sure each layer of paint is dry before you paint over it again.
7. When you flood paint over an area of glass, don't "play" with the paint: let it fall from the brush and let it flow where it flows.
8. When you flood paint, load your brush frequently: much better too frequently than too rarely. By doing this, you'll find it easier to let the paint flow by itself.

Silhouettes make lovely decorations

More importantly, the skills you need will always be useful when you paint on glass. So it's a good idea to start each day's painting with a simple and enjoyable silhouette: it's a great warm-up.

Blisters!

The biggest risk when painting silhouettes is blistering: your fired paint looks full of ugly bubbles.

There are three main causes:

1. Too much gum Arabic in the paint.
2. Incorrect flooding.
3. Firing schedule too fast or too hot.

Read on!

Too much gum Arabic

There are some styles of glass painting which almost demand gum Arabic: for example, when you are painting many coats of light paint on top of one another (as we will show you how to do in our other guides). Without the gum Arabic, the layers will blur into one another.

But there are other styles which don't need gum Arabic at all or don't need much.

Silhouettes don't need much gum Arabic.

When painting silhouettes, it is better to use too little gum Arabic than too much. If there is too little, perhaps the worst thing that can happen is that your hand might accidentally rub some paint away.

On the other hand, if there's too much gum Arabic, your paint will probably blister.

If you think your paint has too much gum Arabic, you'll need to add more paint and water in order to change the proportions.

Here are's a test to see if there's "too much" gum Arabic in your paint.

Paint a series of light stripes on your light-box, and use your blender to blend them smooth. When the stripes are dry, rub them with the ball of your thumb or with a fingertip (taking care not to breath in any dust). If it's difficult to remove any paint from your light-box, there's probably too much gum Arabic in your mixture.

☑ You'll find useful tests in our guide to mixing paint and water.

Incorrect flooding

In our experience, this is the main cause of blistering.

To repeat a point we made before: when you flood, you use your tracing brush in a different way than you usually would. In a sense, you're not painting at all. You're using your brush to *move* thick paint between the palette and the glass.

There are three areas in particular where the technique needs special attention.

1. The thick diluted paint on the glass palette must be constantly mixed *every time you load your brush*.
2. The paint must simply *pour* from your brush onto the glass. If it doesn't, it's the wrong consistency.
3. You must *not* push the paint around once it has left your brush: it must find its own balance.

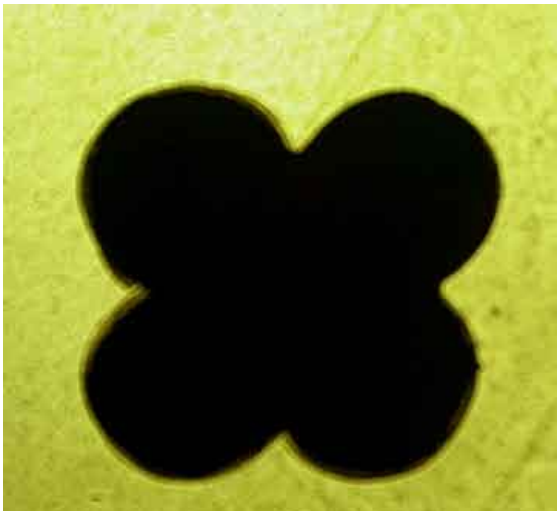
To test these three points, load your brush with paint and flood some paint onto a piece of glass. Then load your brush again and enlarge the flooded area. Now do this a third time. Let the paint dry. Then hold the glass up to the daylight and move it around so that you can inspect the surface of the flooded paint: inspect how smooth or rough is the surface of the dried paint. Some joins are inevitable. But the surface of the paint must not look rough. If it looks rough, it is probable the paint will blister. If it looks rough,

we think that you need to pay attention to one or all of the three points above.

☑ **Mix** the paint each time you load your brush, let the paint **pour** from your brush, and **don't** push it around at all.

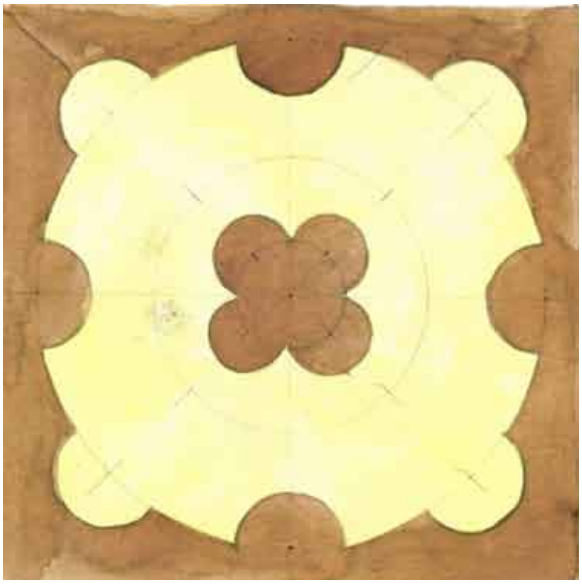
Here is an image of some rough paint: when this is fired, it will blister. This is because the paint has not been allowed to flow by itself; the paint has been pushed:

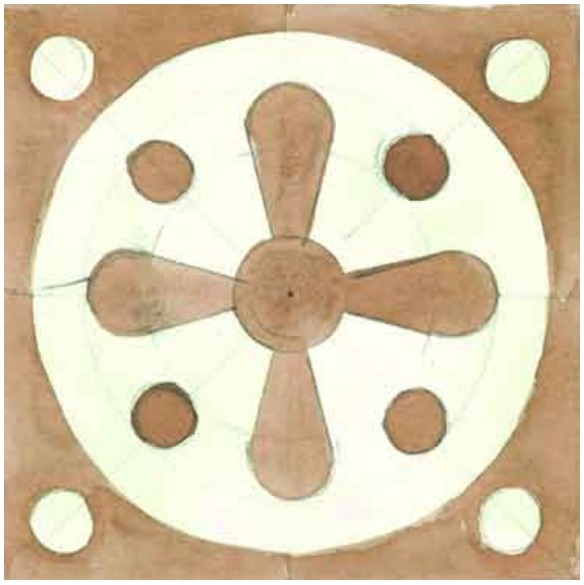
And here is an image of some unfired paint that has been allowed to flow by itself:

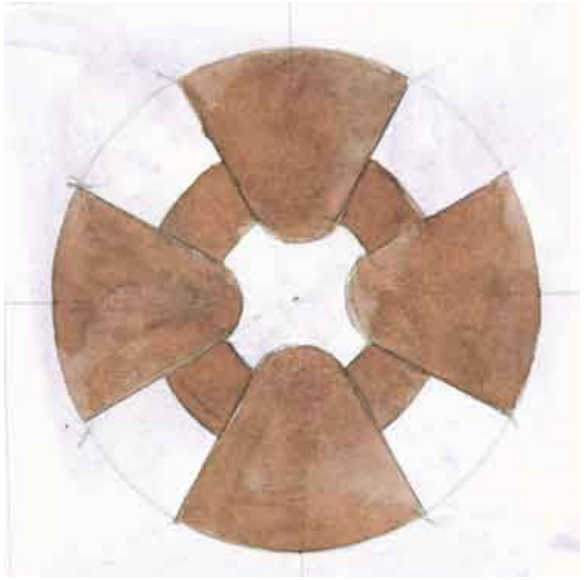


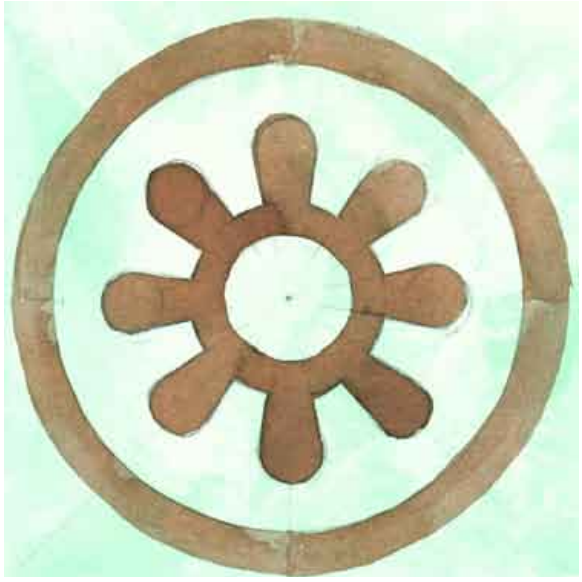
Firing schedule too fast

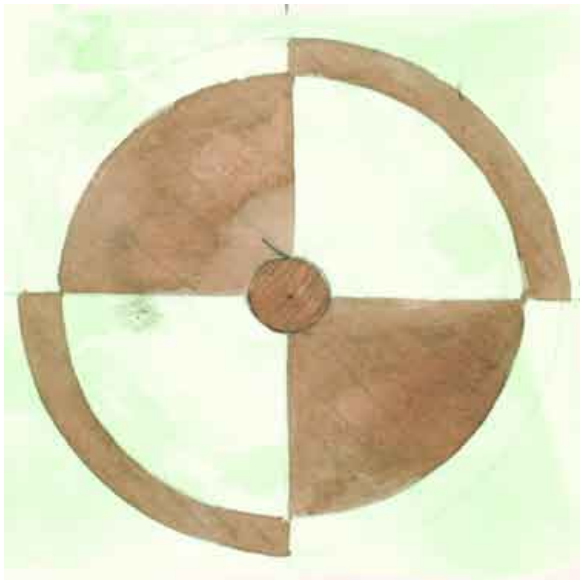
Ensure that the paint is given a good long "soak" to dry it out thoroughly at about 100^{o} centigrade before progressing to the top temperature. Also ensure the kiln does not get hotter than 675^{o} centigrade / 1250^{o} Fahrenheit.

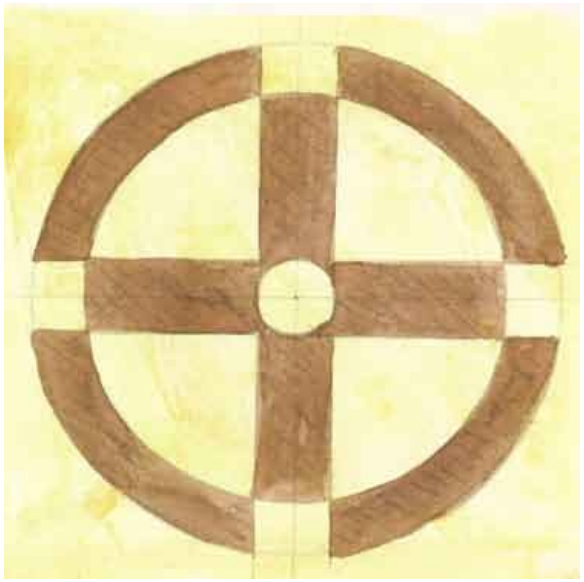


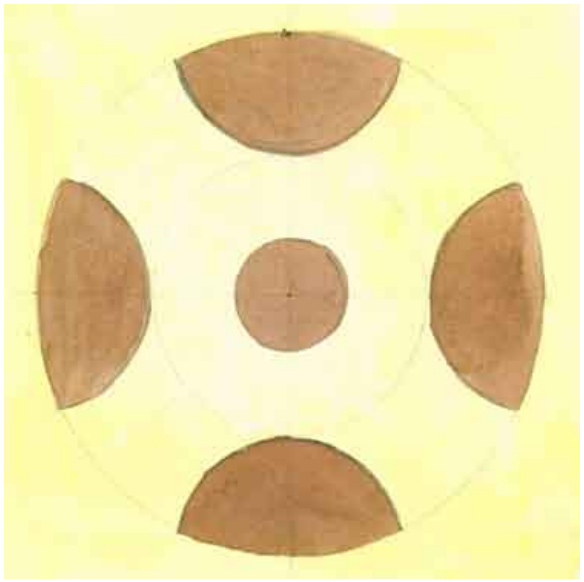


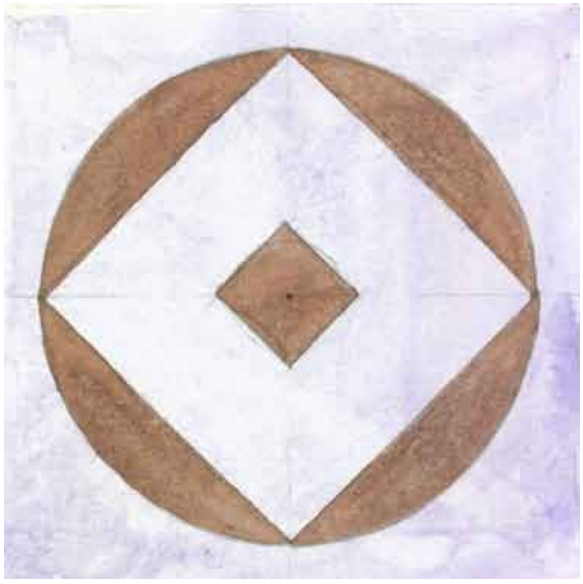












Introduction

In this chapter, you'll discover an extraordinary technique that is worth its weight in gold: you're going to learn all about a marvellous way of creating shadows.

Why is this important?

We all know the expression that nature abhors a vacuum. But in fact there's something that nature abhors more than a vacuum. Namely, an *outline*.

Outlines *don't* exist; shadows *do*.

So we're going to show you how you can change a harsh outline like the one top-left into a soft, gentle, lovely shadow like the one top-right:

When you use this technique, your painting will enter a completely different dimension because you'll develop the skill and confidence to explore new territories. We're excited to be showing you this technique: we haven't seen it illustrated in any of the many books we've read, yet we know that it will make such a huge difference to how you paint on glass.

As with the earlier chapter on silhouettes, this technique is important in itself: you'll suddenly see how to do many new things with shadows and shading. – And many of you, we know (because you've told us), find it hard to shade. Shading *is* difficult. But this technique will help. – But the technique is also important for another reason: namely, you'll find that it will also improve your skill in painting with a tracing brush. Here's why.

When you soften a line as we'll show you how, the line changes. It moves, grows larger, and becomes lighter. The line you first painted becomes something altogether different. Therefore, you can relax a little with the line you paint right at the beginning. *This* initial line isn't going to stay like that: you're going to soften it. So you'll be able to practice a lot with your tracing brush without getting too anxious about whether the line is *exactly* where you want it to be. This in turn will help to give you fluency.

And fluency is as important as accuracy when it comes to painting beautifully on glass.

Accuracy is important but it isn't everything. Lines can be accurate *and* ugly. Fluency makes a lot of difference, because lines which are accurate *and* fluent are also *beautiful*.

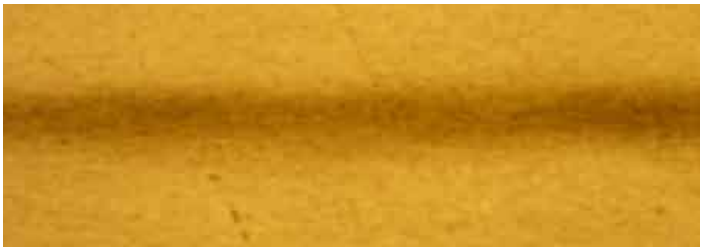
This technique of softened lines will help with fluency; and, by practising it, you'll also begin to acquire the confidence and skill which alone can make you accurate. You're then well on your way to understanding how to paint glass beautifully.

That's why we're excited to show you this technique. Like Chapter 1 on mixing glass paint, it's actually one of those techniques that are generally kept secret. Don't ask us why. Explanations don't matter. What matters is that the techniques continue to get handed down. That's what we're writing down what we know and answering your questions.

What you will learn in this chapter

There are two new points we cover in this Chapter:

1. How to change a thin dark line into a wide, gentle shadow;



2. How to reinforce this shadow selectively so as to create a lovely range of tone from lightest shadow to darkest shadow.

In visual terms, we're going to explain how to create shadows like these which we painted in our stained glass dove (right).

There's also an important piece of theory that we'll introduce you to: the *sequence* in which *you decide* to paint your lines. That is, which lines come first when you are painting a design?

You'll need all the skills we've shown you in the previous chapters. This doesn't mean you need to be an expert in them yet: on the contrary, what you learn in this chapter will improve what you learnt in earlier chapters. But we won't repeat the points that we've explained before.

Tools & materials you need

You will need:

- The design - this is at the end of the chapter
- Glass and glass cutter
- Glass paint mixed with water and gum Arabic
- Glass palette
- Painting bridge/arm rest
- Light-box
- Palette knife
- Jar of water
- A haik or similar
- A badger blender
- Tracing brushes of various sizes
- Sharp pointed sticks and needles
- Scrubs
- Paper towels to clean your glass
- Kiln

Overview

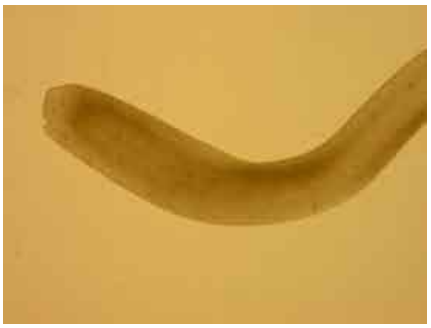
There are two main sections in this chapter: exercises (two of them) and practical designs. The purpose of the *exercises* is to bring you to understand exactly what's involved in painting the design. In the first of the two exercises, you'll use a *large* tracing brush to make *large shadows*. In the second exercise, you'll use a *small* tracing brush to make *delicate shadows*. By then you will understand the techniques you need to paint the practical designs that follow.

1. Prepare your paint. If it doesn't resemble a lump like this, you're just making it hard for yourself to paint glass beautifully. Also clean your light-box thoroughly all over.

2. Assemble your brushes: as well as a blender, a haik and a fine tracing brush, you'll need a large tracing brush like this one on the left which is sometimes called a "goose".

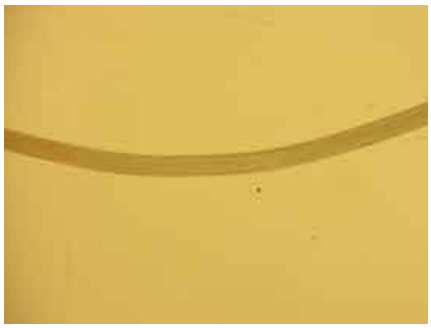
3. Load your goose.

4. On your *light-box*, use your goose to paint a light dry line. You only need to paint a *light* line because, once the paint is dry, you will reinforce it to the required strength. Therefore there is no need for either layer to be particularly dark. You are already familiar with our general principle that it is often better (and indeed easier) to build up strength step-by-step. As for painting a "dry" line, if the line is wet and watery, then the paint won't have enough gum Arabic in it, and it will therefore soften unevenly later on.

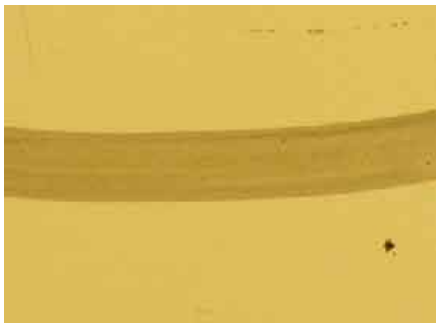


5. You don't want this: here you can see a watery line. You can tell it's watery, because of the dark patch on the right-hand side where the line finishes.

6. You also don't want this. In this picture, you can see a line which is dry on the right-hand side but watery on the left-hand side (as you can see from how the paint has separated and dried unevenly).

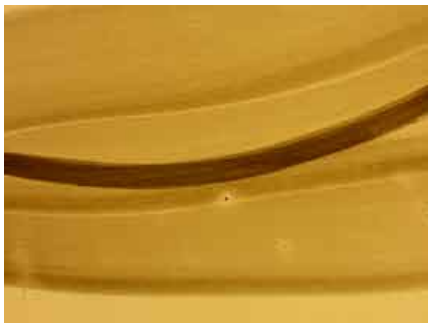


7. Aim for a line like this. It is even across its entire length.



8. Here's a close-up of the kind of line you want. Let the line dry.

9. Load your goose again. Always test it first. Then, when you are happy with the colour and the moisture-content, strengthen your first line by painting over it as you see here. Let the paint dry.

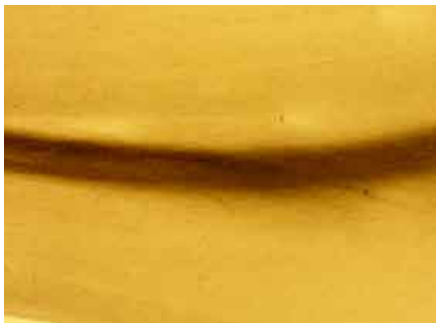


10. Load your haik with light-coloured paint. Test it. Then paint over your goose line. Paint stripes which are next to one another (NOT on top of one another).

11. Now take your blender. While the paint is still wet, blend the stripes so that they are smooth. It will probably help to forget there is a goose line underneath. Just concentrate on blending the stripes on top. Begin by blending *against* the strokes you painted with your squirrel: that is, if your stripes go from side-to-side, begin by blending up-and-down. Then change the angle of blending and push the goose stroke in a different direction.

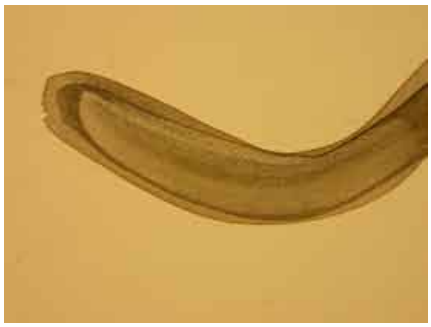
As you blend the wet stripes, you'll find the goose line will move, expand and soften.

So long as the paint remains wet, it's up to you when you stop blending; but don't blend away the goose line, and don't leave marks in your paint.



12. Aim for a softened line like you see here. Now let the paint dry. That's it! This is the basic way in which you can turn a harsh bold tracing line (of different thicknesses) into a gentle shadow. *So what can go wrong here?* Read on.

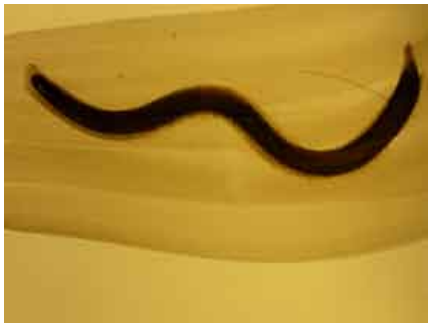
13. You don't want this. Perhaps the line disappears completely. You may need more gum Arabic in your paint. But, before you draw that conclusion, always consider other factors first. In the first place, make sure the reinforced goose line is dark enough. It must on no account be as dark as flooded paint (like the kind you prepare when you paint silhouettes), but, all the same, it needs a definite strength.



14. You also don't want this. Another point to check is that the reinforced goose line has dried thoroughly before you paint over it with your squirrel. This gives the gum Arabic time to harden. If you reinforce too soon (that is, before the earlier layer has dried), *this* is the kind of effect you may see. The second layer has removed some of the first layer.

15. You don't want this: so make sure you don't blend the reinforced goose line into oblivion. Be decisive but do not be destructive. Be vigorous but also sensitive. Here is a case of over-blending. Also, the blending has continued after the overcoat has dried as you can see from the scratches in the paint.

16. You don't want this: here the reinforced goose line is too dark. If the line's too dark, it might contain too much gum Arabic, and no amount of blending with your blender will move or soften it.



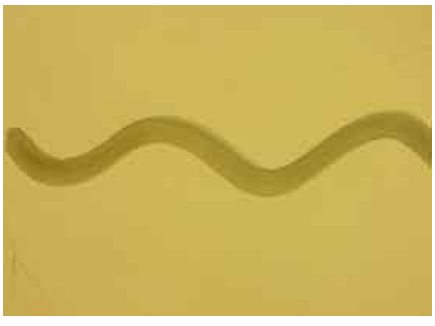
17. You don't want this: the line doesn't soften at all. If so, there may be too much gum Arabic in your paint, but also consider the following points ...

18. Here are other points to consider if the line doesn't soften at all. Make sure the haik strokes contain enough water for their moisture-content to be able to dissolve the gum Arabic a little. Also make sure you are decisive and determined enough in your blending: be bold to begin with, becoming gentler later on as the paint begins to dry. As a *last* resort, add more glass paint and water to your palette in order to reduce the concentration of gum Arabic (see Chapter 1).

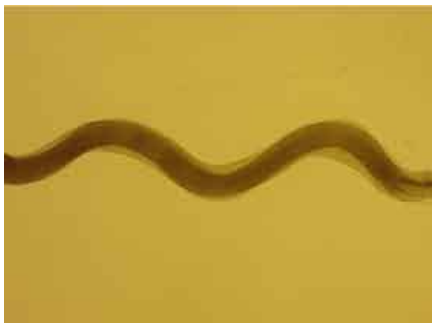
19. Here the line has softened unevenly. This is usually caused by one or both of two factors. First consider the consistency of your strokes of paint: make sure your goose lines are as dry as possible. If they are too watery, then the wetter parts will dissolve more easily than the drier parts. Also consider your blending technique: as you blend, observe where the line is softening and where it isn't, and then blend selectively.

20. That's the basic technique. Now clean your light-box and repeat the exercise several more times. If you like, you can do several experiments at once, each one using a separate corner of your light-box. Here are some variations to try with your goose, haik and blender:

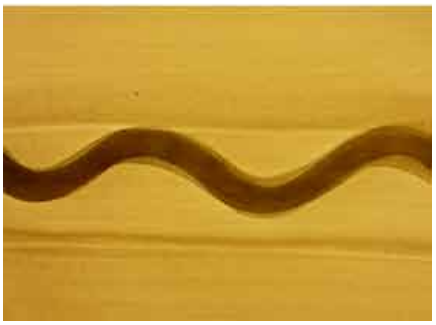
- Paint several straight lines next to one another.
- Paint a curved line.
- Paint several curved lines next to one another.
- Paint shapes such as a circle, a square or a spiral.



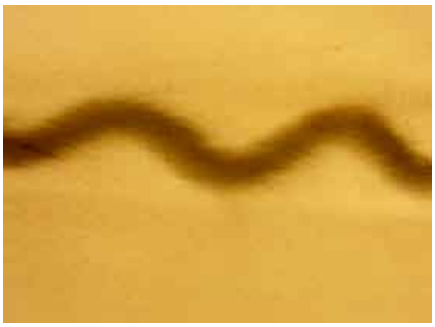
21. Here's a simple squiggle ...



22. Here's the strengthened squiggle.



23. And now the "overcoat".

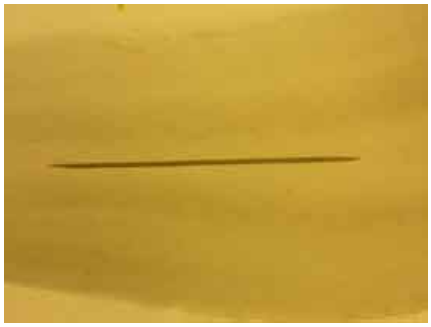


24. The softened, blended squiggle.

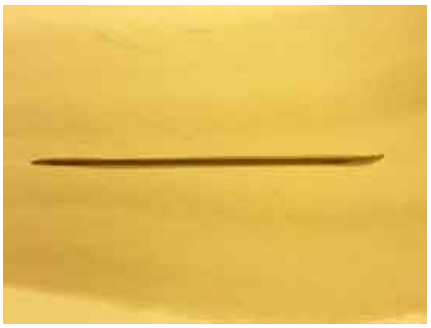
25. When you're happy and confident, it's time to move on to the second exercise. We're going to show you two important developments. Now, instead of painting lines on bare glass, you're going to paint them on top of a light layer of paint like the one you used when painting silhouettes. Also, instead of using a goose, you're going to use a fine tracing brush.

26. Take your haik. Load it with light, dry paint. Paint several light, dry strokes next to one another on your light-box as you see above. While the strokes are wet, take your blender and blend them until the strokes are smooth. Let the paint dry. This gives you your undercoat. This is exactly as you did for the silhouettes.

27. Take a fine tracing brush. Load it with light, dry paint.

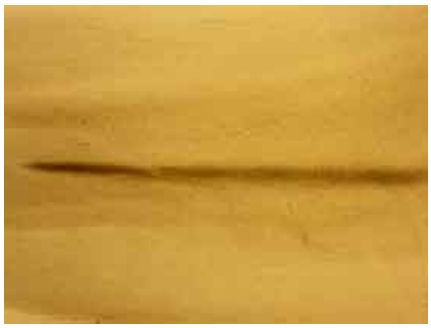


28. Paint a light, dry line. Let it dry. This is the line that you will now soften,

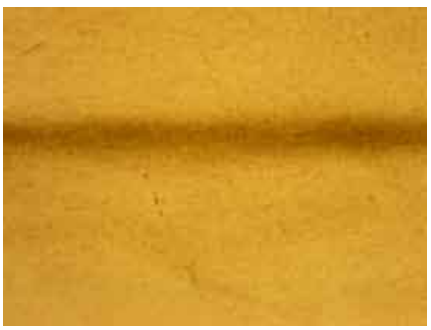


28. Load your tracing brush with more paint and reinforce the original line. Let the paint dry.

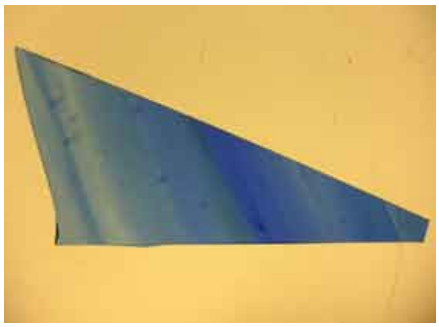
29. Take your haik. Load it with light paint. Paint several light strokes over the tracing line.



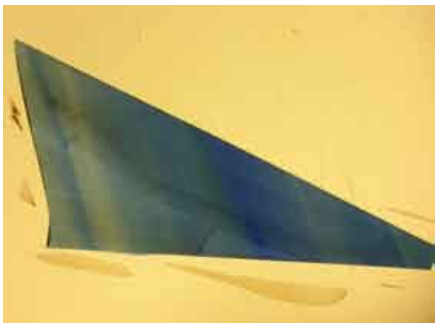
30. While the strokes are still wet, take your blender and blend them until the strokes are smooth. As you do this, you will soften the line that is "sandwiched" in the middle. You need to blend from different directions so that the line is softened evenly. Stop blending before you start to leave brush marks in the paint.



31. That's it! This is lovely. Here's a close-up. Look at the subtlety. There are so many variations you'll devise for this technique. On the next page is a variation we use when the underlying glass isn't quite what we want it to be ...



32. Here we start with a piece of hand-made streaky glass.

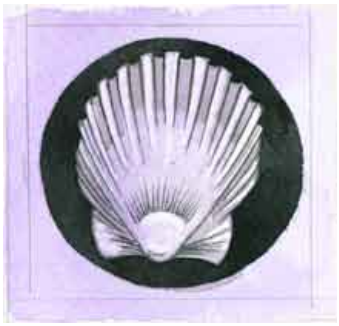


33. Suppose that we want the dark sections to be even darker. Perhaps we need this for a piece of drapery that we want to paint. What do we do? We begin by painting a light wash over the entire surface of the glass.

34. While the wash is still wet, we use a goose to emphasise the sections where we want to increase the shadow

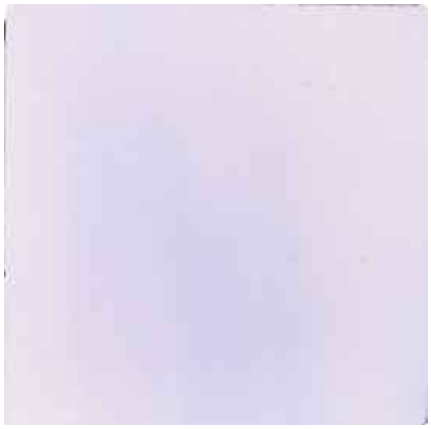
35. And then, again while the wash is still wet, we blend and soften the lines.

36. Here's a close-up of the beautiful effect. This technique is something that you can continue to use for as long as you paint on glass.



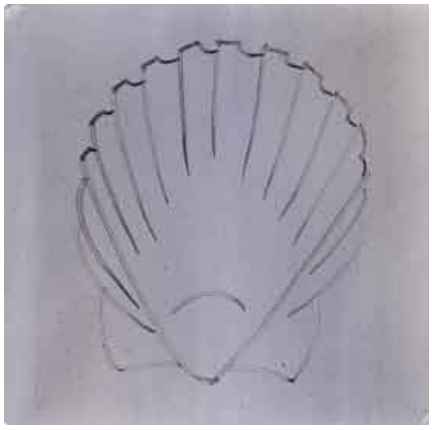
37. And now we'll give you a practical and step-by-step account of how this technique of softened lines can be used to paint this lovely shell. On the next page, you'll see an overview of the main stages; you can keep it by your light box while you paint. A full step-by-step account follows afterwards, along with the designs.

v

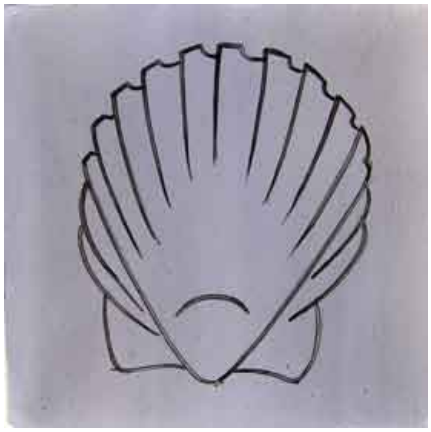


1. Clean glass.

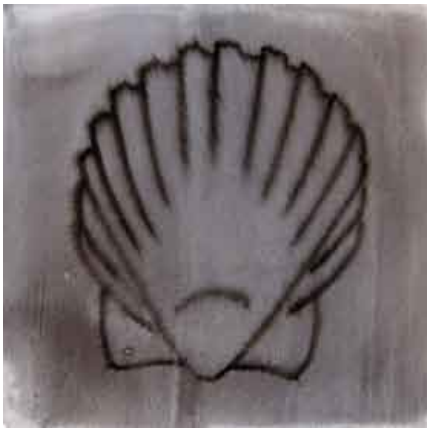
2. Undercoat.



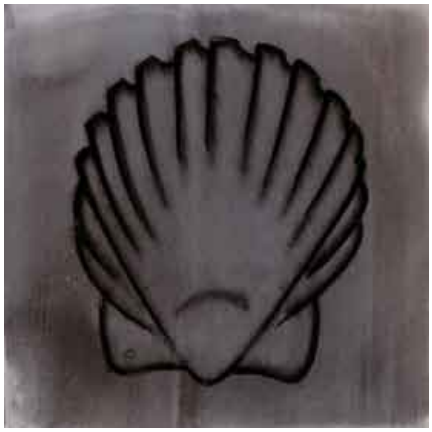
3. Copy-trace.



4. Strengthen.

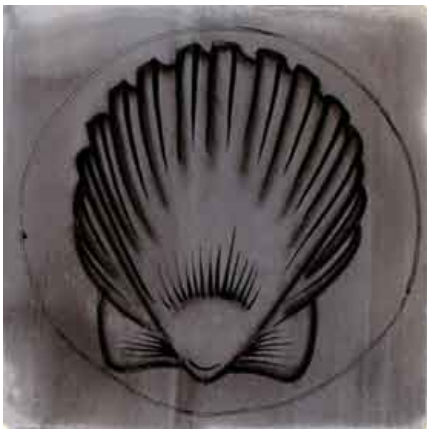


5. Soften.

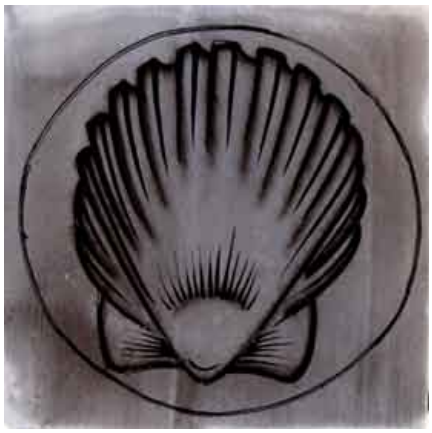


8. Reinforce.

9. Minor details.

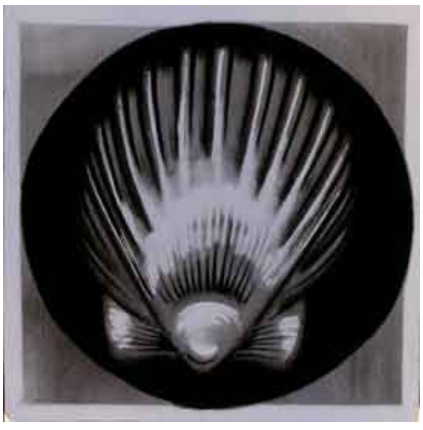


10. Copy-trace.



11. Strengthen.

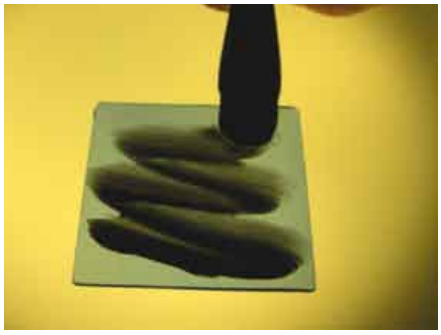
12. Flood.



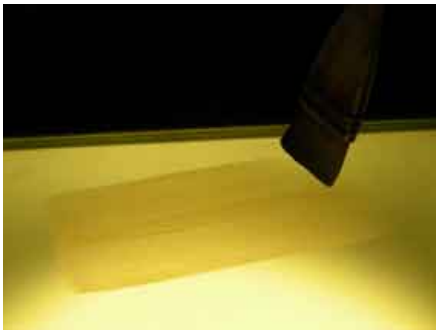
13. Highlight and soften.

14. Fire.

3 – Softened Lines

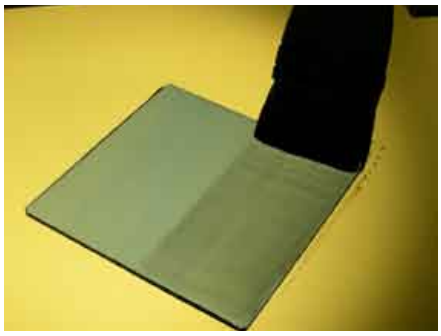


1. Cut and clean the glass. We use glass paint to clean the glass (above).

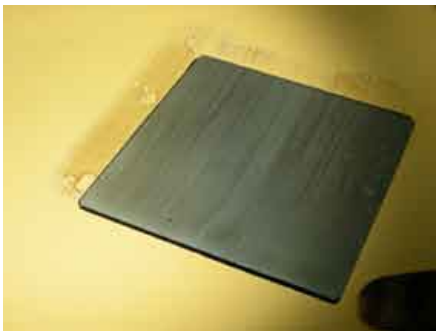


2. Prepare some glass paint that is suitable for an undercoat. (See Chapter 2.) Test it on your light box before you use it on your glass.

3. Also test the paint by blending it: can you make it smooth? Adjust the paint as needed.



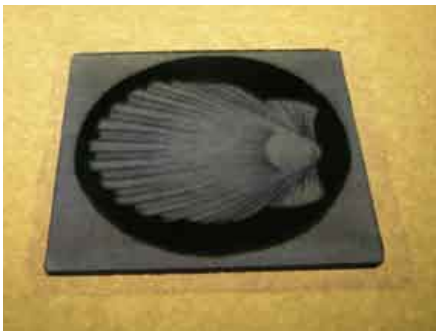
4. Load your haik/wide brush. Paint broad light stripes over the whole surface of the glass.



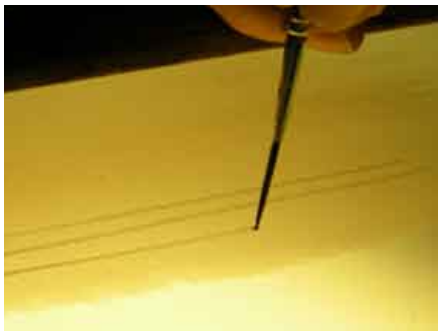
5. The glass looks like this.

6. While the paint is still wet, take your blender and smooth the stripes so that they blend with one another.

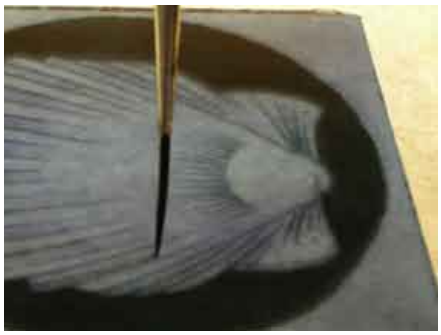
7. Let the undercoat dry.



8. Place the glass on top of the design.



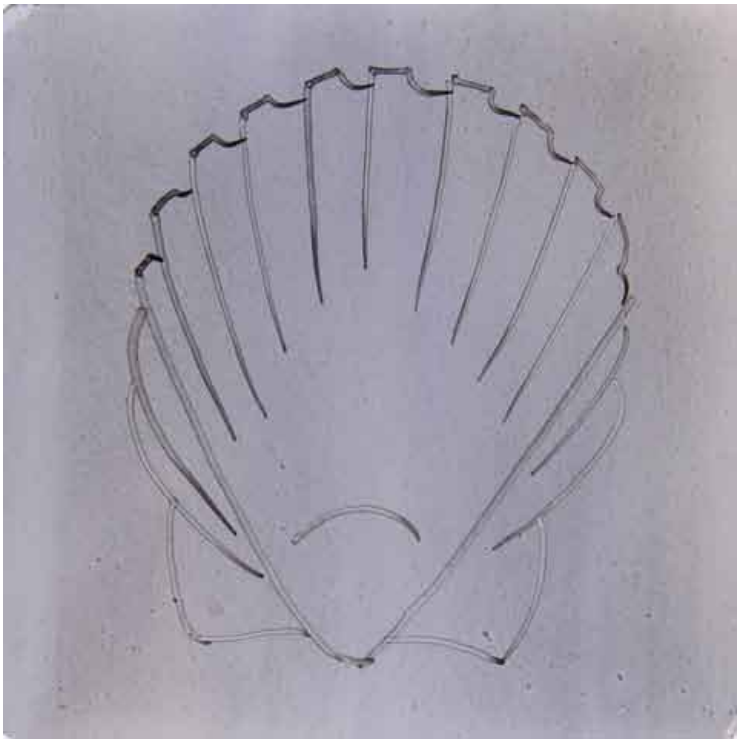
9. Prepare some paint that is suitable for copy-tracing. Test it on your light box first: test it on the undercoat that is there from earlier. Adjust the paint as necessary.



10. Copy-trace the main lines. You omit the minor lines because you do not want to soften them (see photos 21 — 27).

11. Your brush strokes are light and dry.

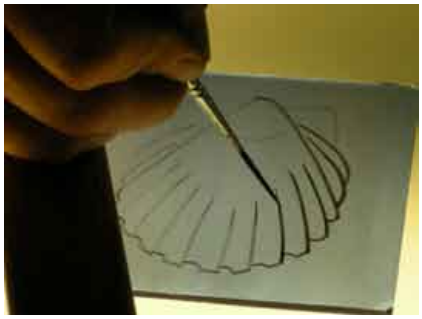
12. Your brush strokes are also thin.



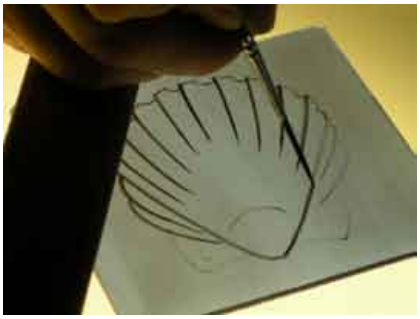
13. Here you see how we have copy-traced the main lines.

14. Mix and test some paint for strengthening the main lines.

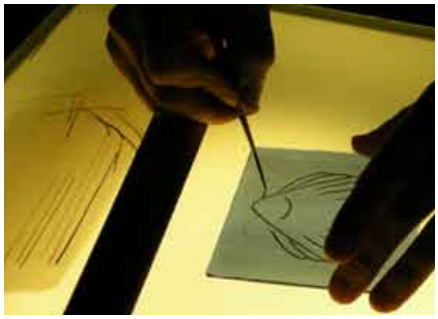
15. Put the design on one side.



16. Strengthen the main lines by painting over them a second time.

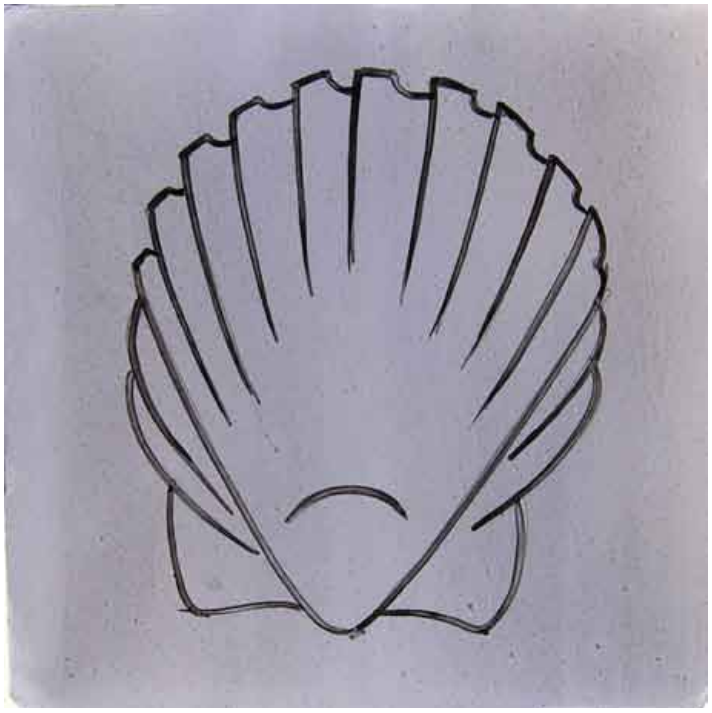


17. Move the glass so that you are always in a comfortable position to paint.



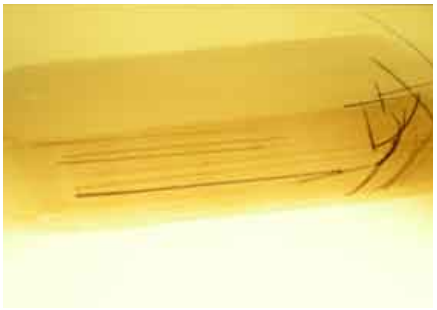
18. Observe the test patch on the light box: use your test patch often.

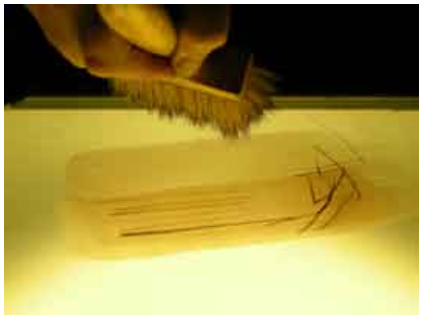
19. Do you see how we're using it?



20. We've now strengthened the main lines by painting over them a second time.

3 – Softened Lines

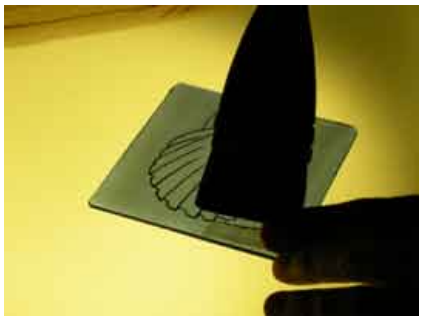




21. Here's where your test patch becomes really useful. Prepare some paint that is like the paint you used for the undercoat. Load your wide narrow brush. Paint a light broad stripe over the test patch. Wait a moment for the water to seep in. Then take your blender and soften the lines. Always observe where the paint is moving and decide where next to make it move. First blend in one direction, then in another, and so on. Stop before the paint begins to dry, otherwise you'll leave scratch marks in the paint.

22. Here you see some softened lines on our test patch of paint on our light box.

23. Put the glass on the light box. Load your brush again.



24. Paint some light broad stripes over the glass.

24. Do this slowly and gently.

25. Take your blender and get ready.

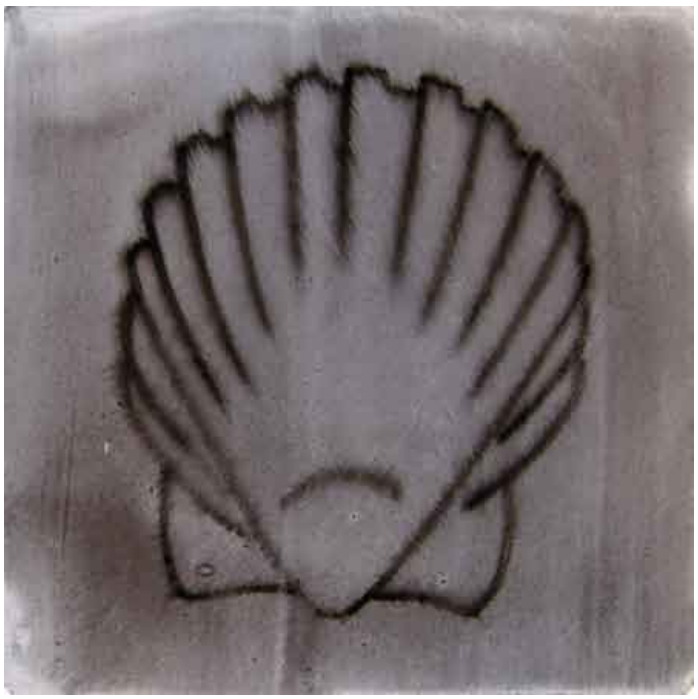
27. Wait a few seconds for the water from the stripes to bite into the paint beneath. (If your working environment is very hot, you have less time here.)

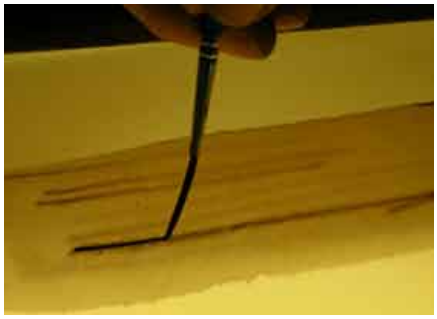
Then start to blend.

As you blend, always observe carefully which way the paint has just moved.

Blend from one direction, then from another, gently one way and then back again, all the time moving the paint lightly and carefully.

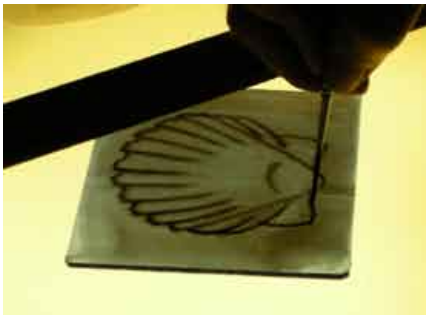
In this way, you soften the main lines and turn them into shadows.





28. Prepare some medium-dark paint and test it on your light box.

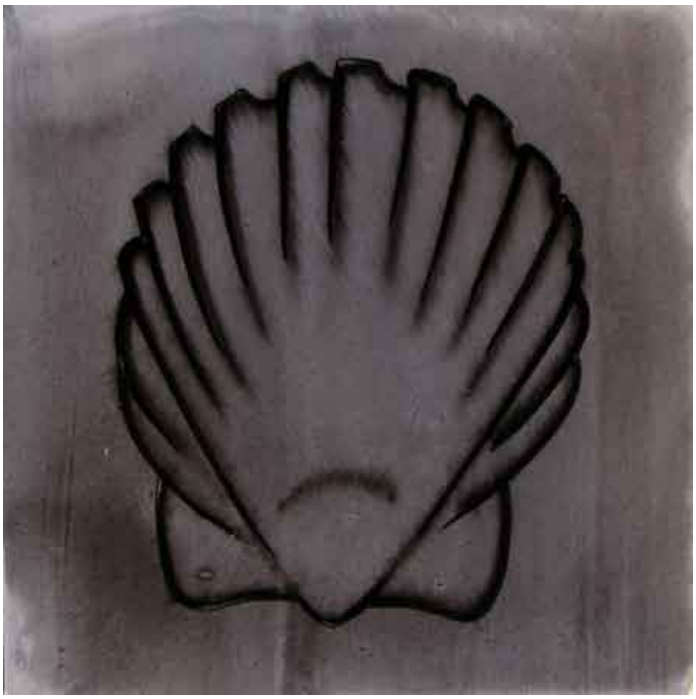
29. Reinstate the main lines.



30. Do not paint exactly on top of the shadows: you do not want to lose them ...

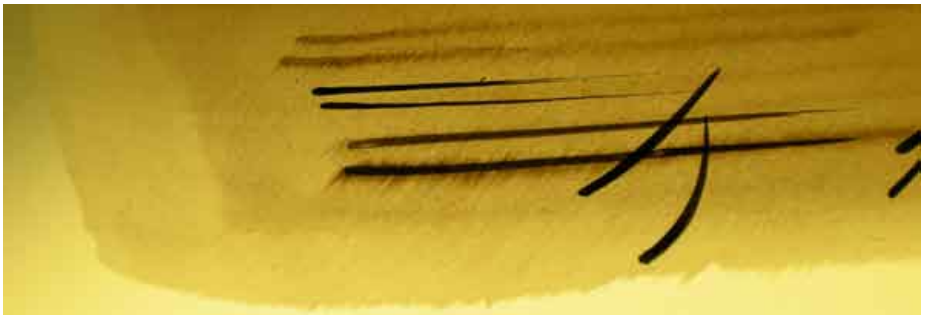
31. Paint just to the outside of the lines.

32. Move the glass so that you are comfortable.

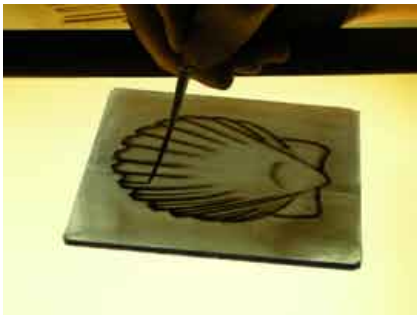


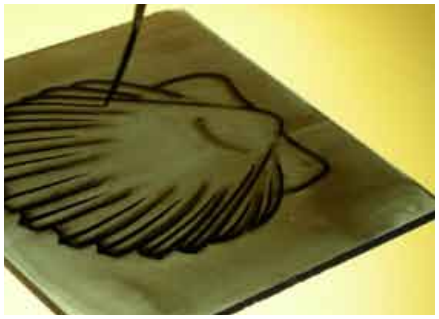
33. You can still see the softened lines: this is because we haven't painted right on top of them.

34. Load your brush and test your paint.

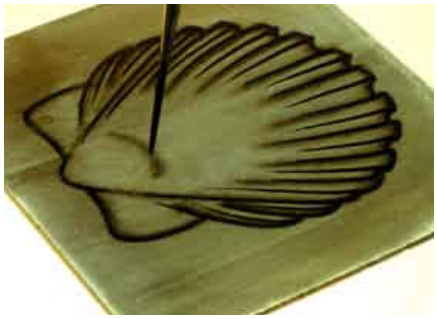


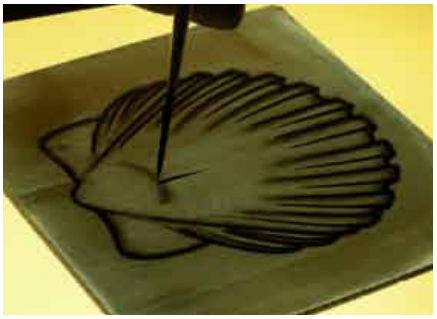
35. You can see how our test patch has evolved with every stage.

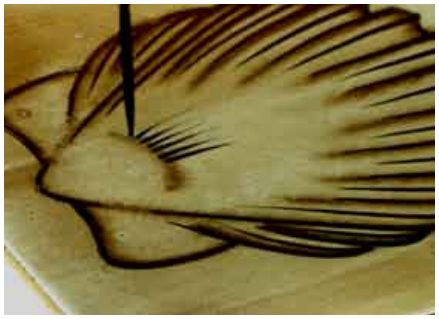




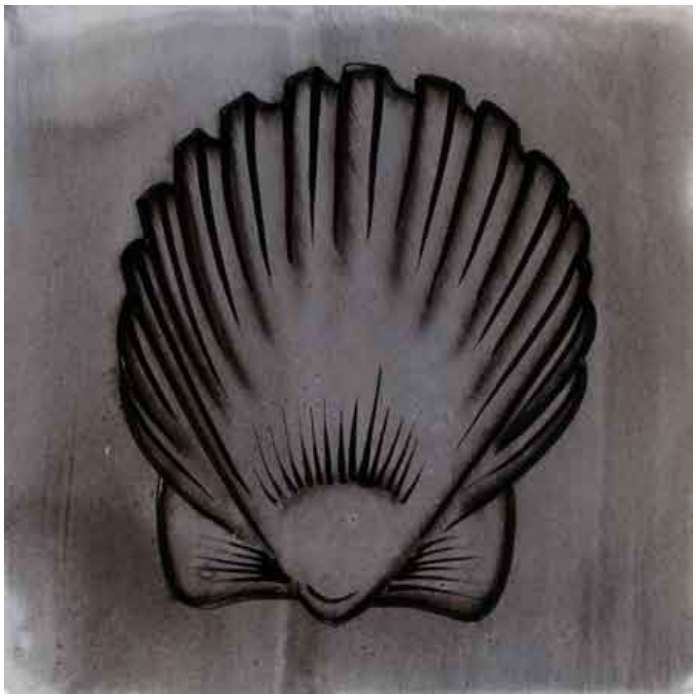
36. Now it's time to add the minor lines. With the design on one side so that you can see it, paint medium-dark thin lines.







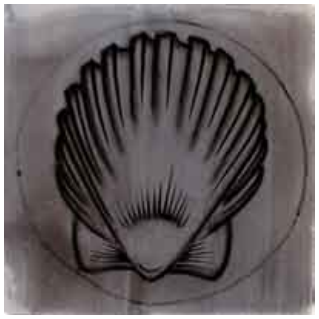
37. Each time you load your brush, first test it on your light box. That way, you can be confident the paint will be as you want it to be.



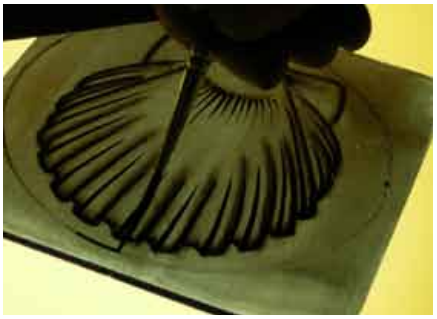
38. Here's the shell with the minor lines now added.

39. Testing on the light box again ...

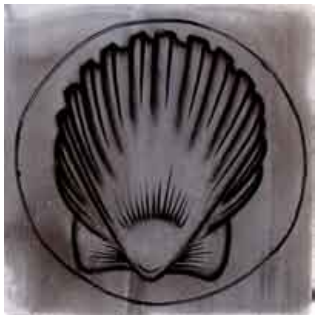
40. Put the glass on top of the design. Copy-trace the outer circle with light paint.



41. Let the paint dry.

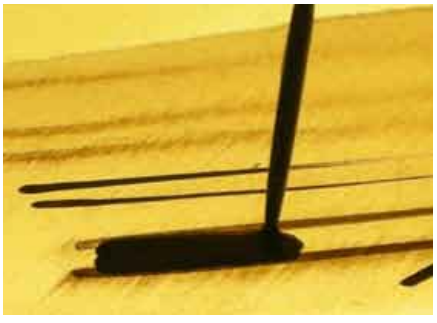


42. Strengthen the outer circle.

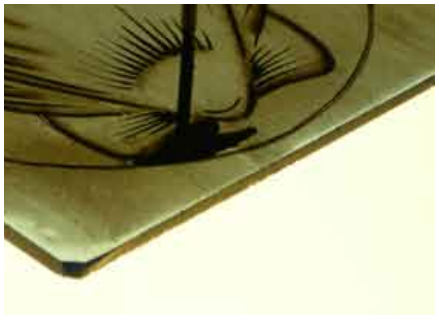


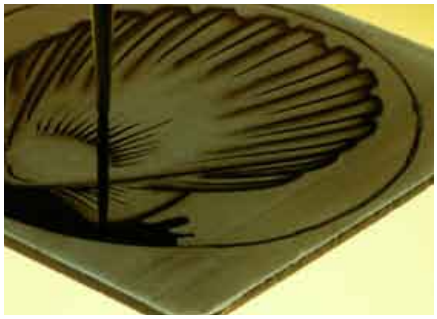
43. You've now built up a wall as you know from Chapter 2.

44. Mix and test some paint for flooding.

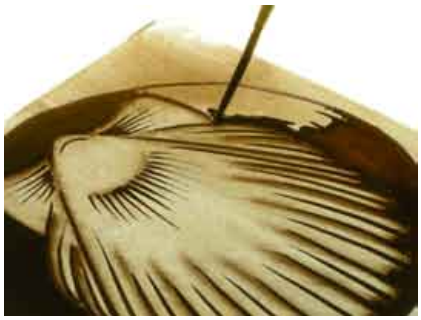


45. It's the same consistency as melted chocolate. Begin to flood.

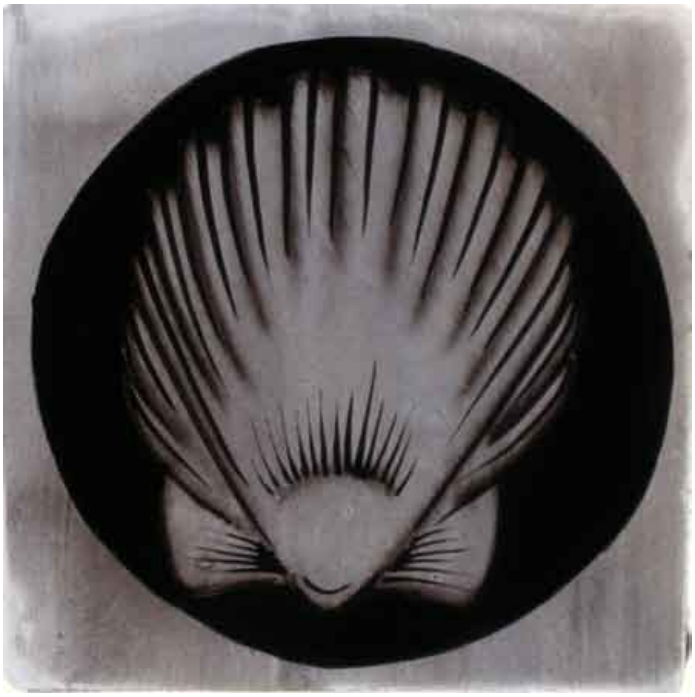




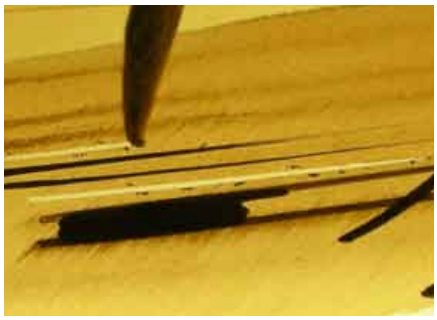
46. Let the paint flow from your brush.



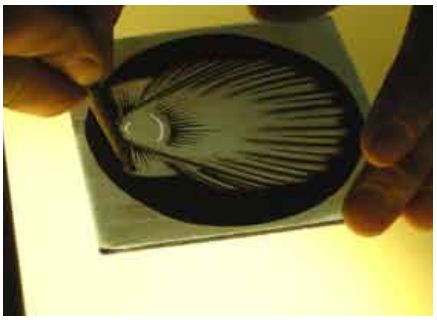
47. Work around the whole shell.



48. Here's our flooded shell. Let the paint dry thoroughly before you pick it up.



49. Test your highlights.

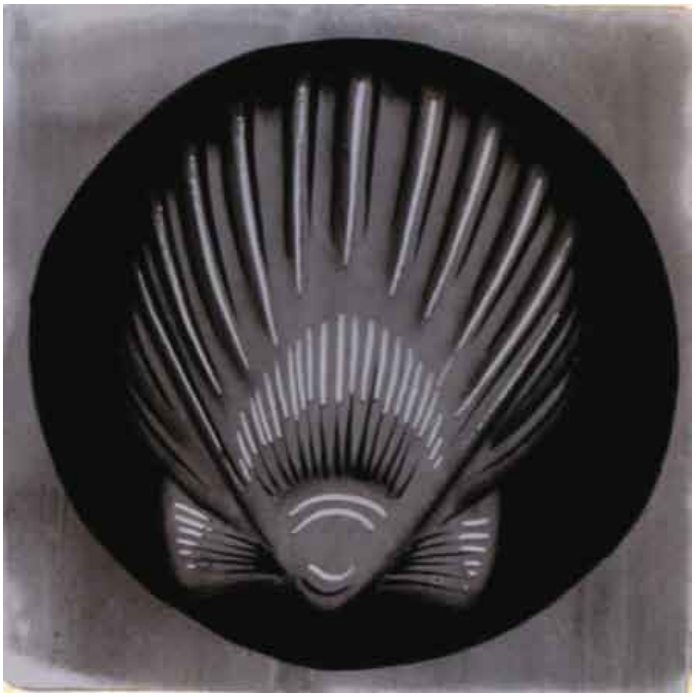


50. Start to scratch lines.

51. Hold the glass firmly.

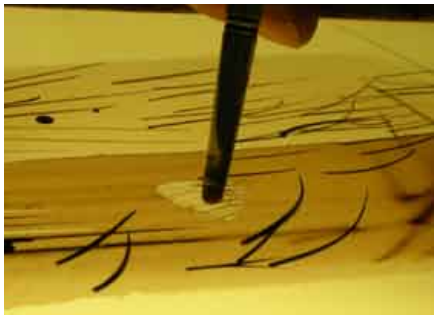
52. Move the glass as needed.

53. Work around the glass.



54. Here's our shell with picked out highlights.

3 – Softened Lines



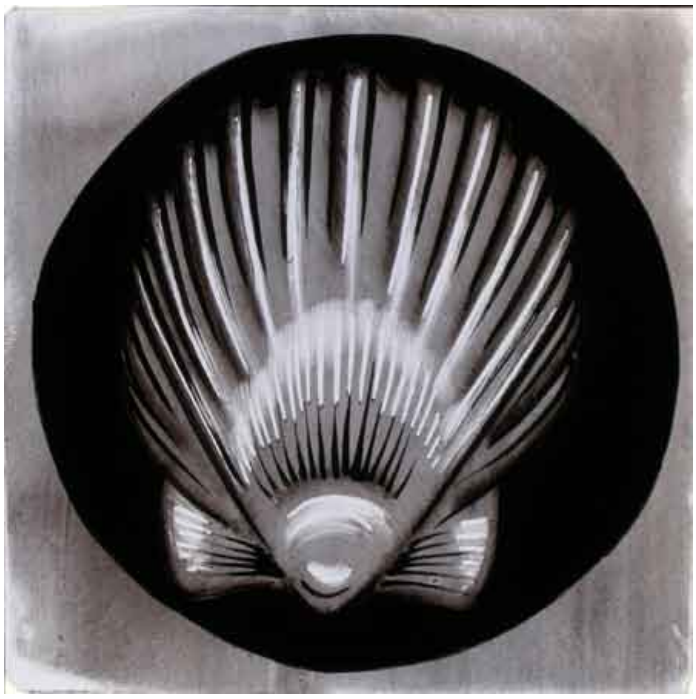
55. Now you can soften some of the highlights. Take a scrub. Test it on your light box. Gently, slowly and lightly soften some of the highlights.



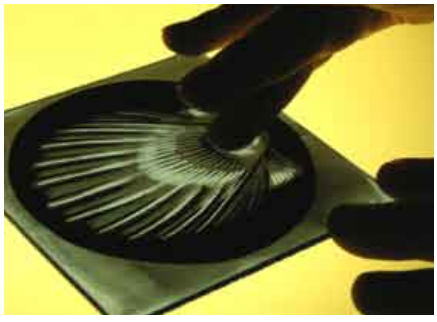
56. When you soften highlights, you still want to be able to see the sharp highlights underneath.

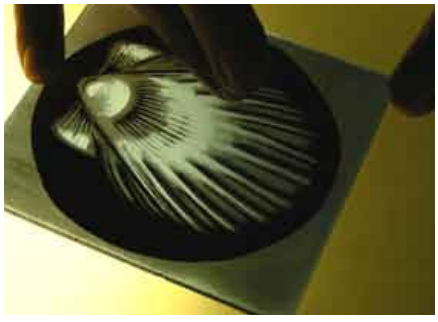
57. Scrub lightly.

58. Don't soften too much.

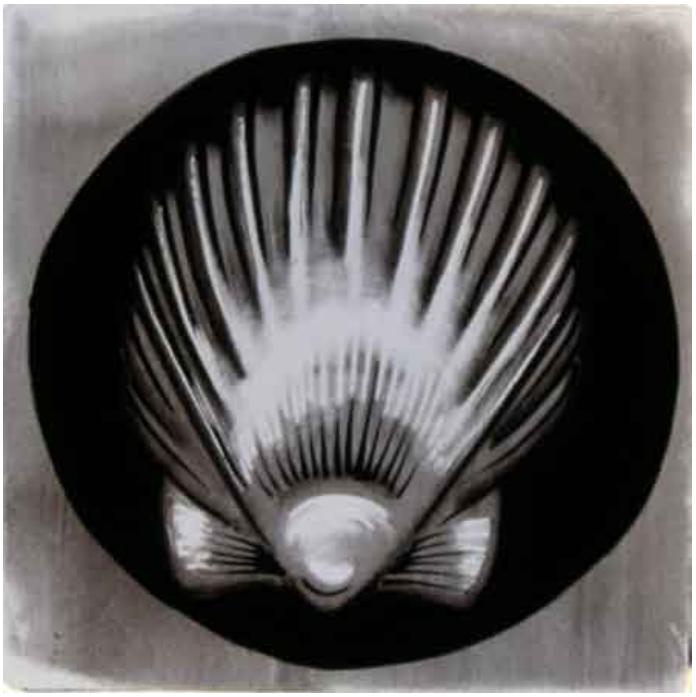


59. Here's our shell.





60. A final piece of softening. We use our bare, dry fingers. If your glass paint contains lead, you must wash your hands carefully.



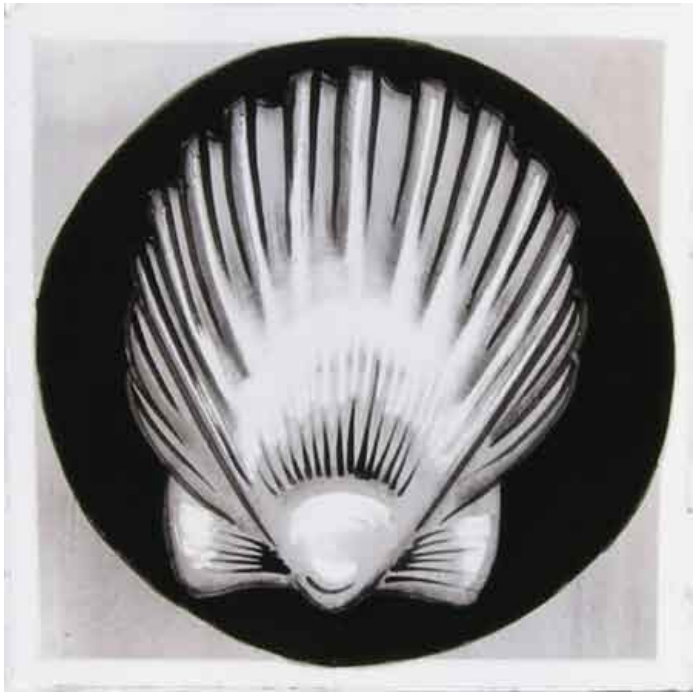
61. Here's the shell now softened by our fingers.

62. Take a scrub and clean the border.

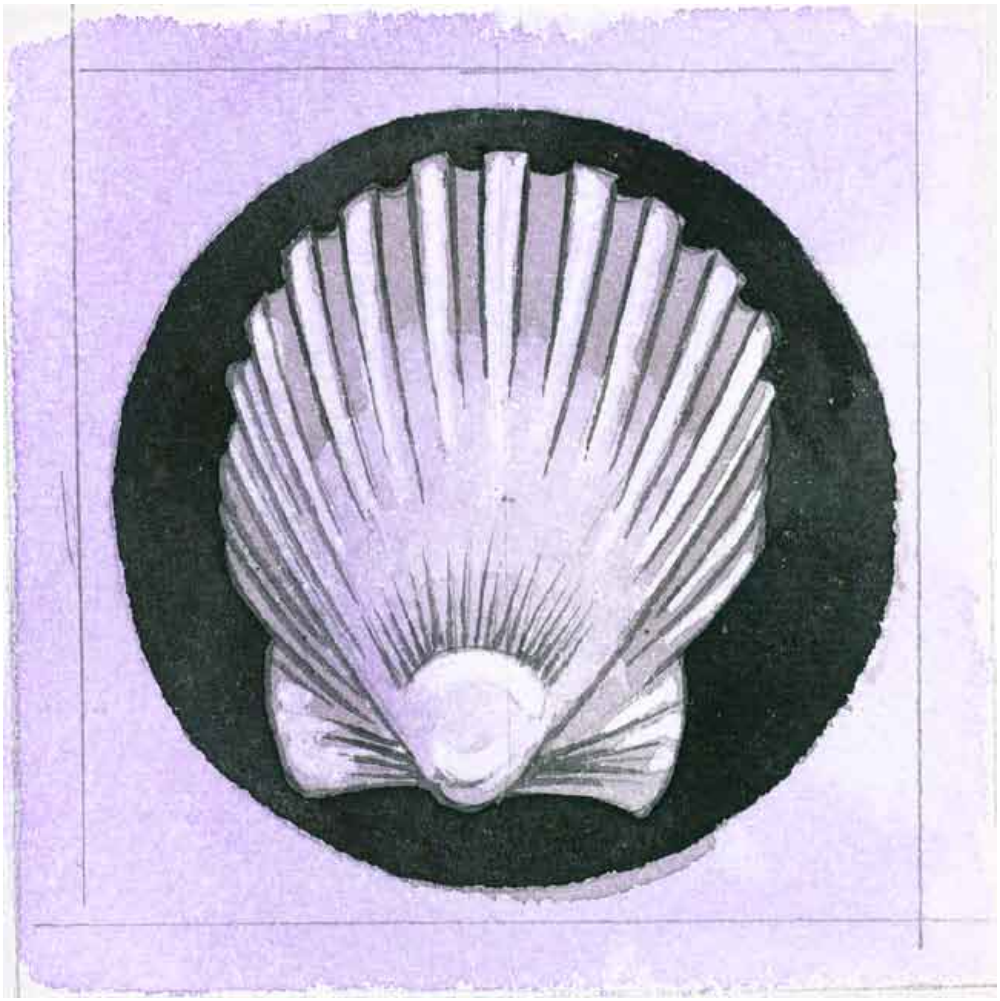
63. Hold the glass firmly.

64. Ready to fire.

This technique of softened lines has endless marvellous uses. Perhaps its greatest significance is this: it begins to free you of the need always to fire our paint in the kiln before you paint over it again. This means that each layer of paint — because none of the paint is fixed in the kiln until the end — remains alive and in some measure adjustable as other layers are added on top. But you've also learned an exciting and straightforward technique for creating shadows (shadows which you can create before you start to trace fine details). This is a natural way of thinking about paint: you want to use glass paint to capture the shapes and depths that shadows have. The shape and depth of shadows is altogether more important than those strange and harshly traced outlines which you often see on painted glass. The technique of softened lines is enormously helpful in showing you how to think this way. Of course, it's perfectly possible to add shadows on top of glass paint that you've already fired. The point is, though, that you don't have to paint this way – you can also add shadows first, as we've shown here.



65. Fired.



Delightful ways of tracing

This chapter is about how to use a "tracing brush" for painting lines on glass.

Of course you've used a tracing brush in earlier chapters. And you've also painted lines in earlier chapters. But one thing that's different in this chapter is that we're going to talk about lines and tracing brushes in a way that we haven't done before. Another difference is that you're going to meet situations where your lines must stand alone and speak for themselves. So, for example, you're *not* going to flood around them with thick, dark paint nor will you soften them.

Now's it's time for a solo!

Imagine that you've learnt to sing a song. Until today, there's always been a piano to accompany you. And today you're going to sing alone. No piano. When you sing alone, there's nowhere for your voice to hide. There's nothing for your voice to depend on apart from all the practising you've done. Similarly, in this chapter, you're going to paint lines where there is nothing to distract the viewer's eye.

Why have we waited until now?

There are two reasons. One is practical, the other is historical.

A better way to learn

The practical reason is this. Everything you've done in earlier chapters has developed your hand-eye co-ordination in such a way that you will now paint lines much better than before. That's absolutely certain. We know this even without knowing you (although we are in touch with many of you each day). Painting silhouettes (Chapter 2) and painting softened lines (Chapter 3) are like singing with a piano accompaniment. But now you've practised a lot. And you've developed a confidence that you didn't have before. You've developed powers of observation that you didn't have before. You've developed concentration and skill that you didn't have before.

So now it's time for your solo.

Whereas other books will say "paint a line", we have given considerable thought to how to teach you how to paint a line. That's why we've given you activities which show you what you need to know.

We've done things in a careful order. And now we're going to be more explicit than we've been until now. The time is right for us to do this.

A misguided tradition

As for the historical reason, we've waited until now because we think that the history of stained glass gives too much prominence to the traced line. What began with medieval iconography now risks developing into a tradition which presents itself as the only correct way to paint on glass: namely, with a harsh, bold outline. The geniuses, of course, always go their own way. But the rest of us can fall easy prey to the illusion that glass painting is only done in one way.

The trouble here is that conformity gets rewarded, mediocrity is tolerated, skills and recipes are forgotten, and innovation is stifled.

At Williams & Byrne, we feel the emphasis on the harsh, bold outline is largely misplaced. After all, what is the difference between line and shadow?

On glass, both line and shadow stop light from passing through: this is what glass paint does. Glass paint blocks light. That's all.

A line is typically thinner and darker than a shadow. But this is just a difference of degree.

It's a shame that lines have somehow managed to grab everyone's attention. So we thought we'd put them in their place and keep them waiting until now.

And now, because we've approached the subject in a specific way, you'll anyway paint them better and more confidently than you would have done before.

We've already shown you *how to paint silhouettes* and *softened lines*: both of these two techniques have quietly improved your skill in painting lines.

The third technique which has also served you well is *the technique of mixing paint*. We explained in Chapter 1 that well mixed paint is essential to beautiful glass painting. But now we need now to talk more about mixing paint. This is one of those times when we are going to be more explicit than we have been in the past: we trust that you've followed our recipe and done it for yourself, so now we can be a little bit more direct.

Mixing paint

The expression, "mixing paint", can mean several different things:

1. One way to "mix paint" is when you make a *completely new batch* of paint as we describe in Chapter 1.
2. Another kind of "mixing paint" is what you do at the *start* of each day's painting. Even if you cover your paint, it will dry out overnight. So you add a little water and use your palette knife to mix away the hard bits. See the free guide to preparing your palette for a step-by-step overview of how to do this.
3. Then, throughout the painting session, you "mix the paint" *from time to time*. This is to stop the concentrated and uncovered

lump from drying out. (How often you do this depends largely on how hot your workspace is.)

4. You also "mix paint" when you *add a little water* to the concentrated lump: you dilute a little of the lump to create a mixture that is the required consistency for the next few brush strokes.

5. And you "mix the paint" again and again each time you load your brush to make sure the diluted paint stays the right consistency. You do this by *twirling and swirling* your brush around and around. This loads the brush and also stops the water from separating.

Each of these different ways is important. Each way depends on the ones before it.

But we want you to be clear about this: whereas points 1 – 3 are preparatory to painting, points 4 and 5 put you in the thick of things. That is, with points 4 and 5, you're actually painting. You do them differently depending on the brush you're using and the kind of stroke you want to make.

This is an important point to state: there are *many* different dilutions that you can make from your concentrated lump of paint.

- These dilutions will be more or less dry / wet.
- They will also be more or less light / dark.
- They will also differ in quantity.

For example, to paint silhouettes, your paint is wet and dark: rather like chocolate that has melted in a bowl. And you need to prepare a lot of paint, because you use it quickly.

By contrast, to paint a tone that is your undercoat, your paint is light and dry.

Your paint is also light and dry when you trace a fine line with the glass on top of the design, but, in this instance, since you're using a tracing brush, you dilute less paint than you do when painting an undercoat (when you use a "squirrel").

The main things to think about are the *consistency* of the paint and *how much* of it you need.

Consistency and quantity

To decide the consistency and quantity, you have to consider three issues:

1. What have you *already* done?
2. What do you want to do *now*?
3. What do you want to do *afterwards*?

"What have you already done?"

Is the glass bare? If it is, you'll need paint that is a little dry (because wet paint will tend to run). If the glass isn't bare, what kind of painting is already there? Perhaps an undercoat, for example, or some softened lines (which mean a tone, a light trace, a reinforced line, then a further tone). If there is a lot of paint there already, you need to be mentally prepared for the fact that the existing paint will tend to suck paint from your brush. The existing paint will also cause your brush to drag a little. All this is just to say that you need to appraise the surface on which you're going to paint.

"What do you want to do now?"

A thin or thin line, or a thick or thin tone? Light or dark? Curved or straight? Long or short? All these things will make a difference to the consistency and quantity.

"What do you want to do afterwards?"

If it's a light thin line that you're painting now, you might be going to reinforce it afterwards, then soften it with a tone.

If it's a thin, dark line you're painting now, perhaps you plan to thicken it afterwards.

The point is, if you know what you plan to do afterwards, it will be easier for you to understand how to do what you want to do now.

Answers to all these 3 questions tell you how to dilute your paint (wet / dry, dark / light), how much paint to dilute, how to load your brush and how to keep the diluted paint well-mixed.

Just observe

All we can say (since we aren't by your side) is, "Observe".

You must also be aware of the weather and the temperature where you are working. They will make a difference to how you prepare your paint.

Now that we have explicitly made these general points, we can start to approach the subject of how to use a tracing brush.

We'll begin by considering the types of brush there are.

Types of tracing brush

Hairs can be natural or artificial. (We ourselves use both.) Natural hairs are often sable. Natural hairs have a "spring" which artificial hairs sometimes lack. Artificial hairs have a constancy and predictability which natural hairs sometimes lack.

The hairs are attached to the shaft in one of two ways: quill or ferrule. Quill is traditional. Here's a quill:

There is nothing special in itself about quill except that glass paint and water won't corrode it. On the other hand, water might dissolve the glue which holds the hairs in place (but you can stick it back on). Glass paint and water can corrode a ferrule. On the other hand, the hairs are generally held in more tightly than within a quill, so ferrules also have their good points. Here's a ferrule:

Tracing brushes come in various thicknesses: thick brushes contain more hairs than thin brushes (but the hairs are the same diameter). Thickness is denoted by a number ("0" is thin, "6" is thick) or a name (a "lark" is thin, a "goose" is thick – imagine what a "condor" looks like ...).

Tracing brushes come in various lengths of hair. Most of our thin tracing brushes are no more than ¾ inches / 2 centimetres long. We have a few thin brushes which are longer: these are useful

for long thin lines. But our thicker tracing brushes can be as long as 2 inches / 5 centimetres. (We often use these to paint large areas of tone that we will soften.)

We do most of our tracing with a "1" and "2" (a "crow" and a "small duck"):

☑ Don't have too many tracing brushes.
☑ It's best to get to know a few tracing brushes.

Tools & materials you need

For this chapter, and aside from various tracing brushes, you will need:

- The design;
- Glass;
- Glass cutter;
- Glass paint mixed with water and Gum Arabic;
- Glass palette;
- Painting bridge/arm rest;
- Light-box;
- Palette knife;
- Jar of water;
- A flat wide brush (as always, a "haik" is best;
- A wide thick badger blender;
- Tracing brushes of various sizes
- Some scrubs;
- Paper towels to clean your glass;
- Kiln.

What you can learn from this chapter

These are the main techniques that we'll demonstrate:

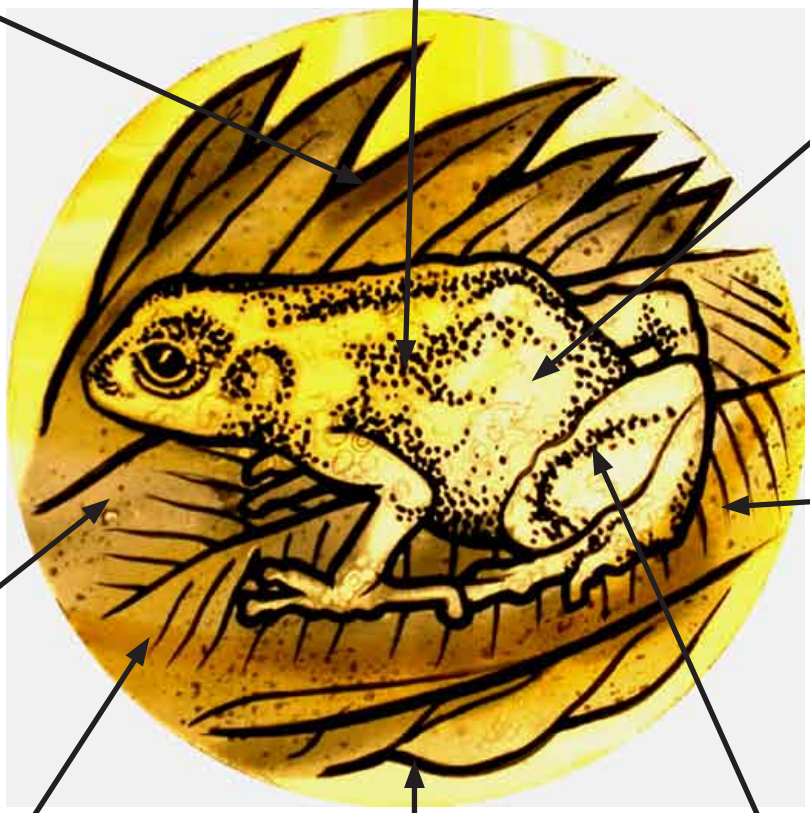
- How to trace lightly and dryly;
- How to reinforce;
- How to thicken;
- How to create shadows from spots;
- How to soften thick lines;
- How to create texture with spots;
- How to create various levels of highlight.

So, all in all, this is a busy and demanding chapter, but great fun. And you have to admit that the design is quite unusual: have you ever done a stained glass *frog* before? Once again, at Williams & Byrne, we do think things through and do them differently.

We've created shadows on the leaves by painting lines on the back of the glass and then softening them.

Inside the frog, we've created shadow and texture by painting spots of various sizes.

We've made the body of the frog stand out from the leaves by rubbing away the underlying paint and allowing this rubbed paint to build up around the spots, thus softening them.



See how there are several thickness of line. The lines around the frog and the leaves, for example, are very thick. The lines inside the leaves are much thinner. This variety of line is much more interesting to the eye than having every line the same.

We've added texture to the leaves by flicking spots of paint onto the *back* of the glass.

We've darkened the leaves by painting on the front *and* back of the glass.

We've created an especially strong highlight around the leaves by removing all the paint from the front and back of the glass, thus leaving bare glass.

Within the frog, we've created a different kind of texture by flicking spots of paint on the back of the glass, then rubbing them away when they are dry.

Overview

1. Cut your glass.

2. Lightly trace the design.

3. Lightly add some spots.

4. Reinforce the lines.

5. Reinforce the spots.

6. Thicken the outlines and spots.

7. Create highlights inside the frog.

8. Paint softened shadows on the back.

9. Flick the back with spots of paint.

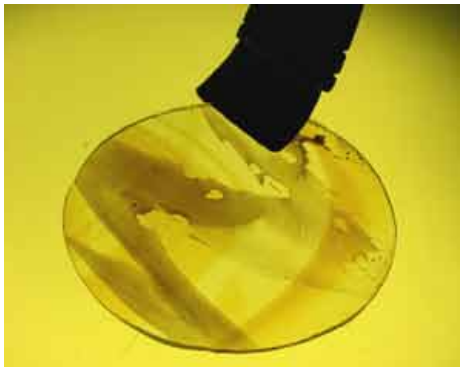
10. Rub the spots.

11. Pick out around the leaves.

12. Fire the glass.

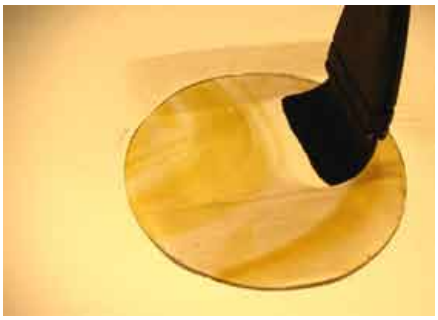
1. This is the design we're going to show you how to paint. There's a copy at the end of this chapter.

2. Choose your glass. It's better to choose light glass rather than dark glass: you're going to paint on it a lot. Cut the glass to size.



3. Clean your glass thoroughly on the front, back and sides.

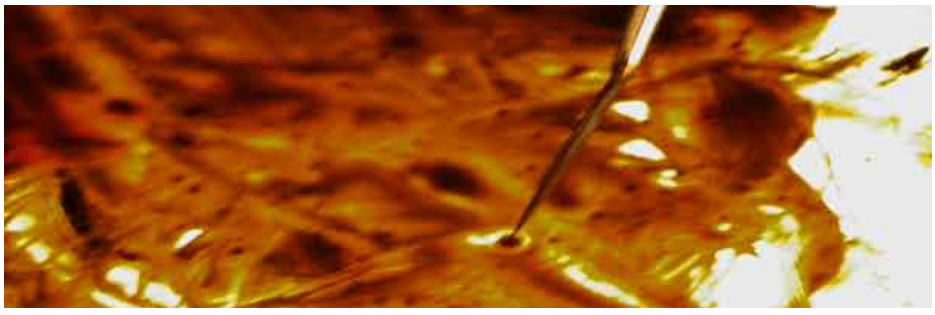
4. Prepare some paint that is suitable for a light tone. See Chapter 1 for how to mix paint.



5. Apply the light tone in stripes. This is your "undercoat" of paint on which you will trace the frog.

6. While the light tone is still wet, use your blender to blend the stripes until they disappear. Let the paint dry.

7. Place the glass on top of the design.



8. Prepare some paint that is suitable for a light initial trace. Use your light-box to test the mixture.

9. Now lightly trace the outline of the frog. Make sure this line is light and thin. (You will reinforce it later, and also thicken it.)

10. This is the lightly, thinly painted outline of the frog.

11. Here is a close-up of the legs. Do not try to paint perfect lines; these lines are simply your first marks.

12. With the same light paint as before, lightly paint the eye.

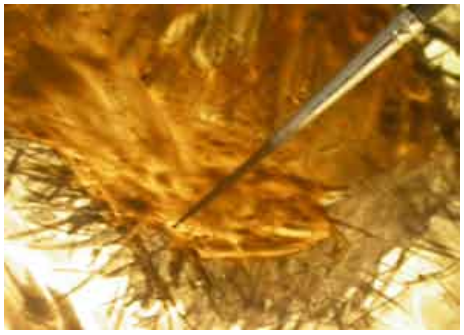
13. The frog now looks like this.

14. Here's a close-up of the eye. It is quite crudely painted. It is important NOT to worry about tiny details when it is the frog as a whole which matters.

15. Use the same light paint as before to lightly and thinly paint the outside of the leaves.

16. This is how the frog now looks. All the lines are light and thin. This is the same technique as we explained in Chapters 2 and 3.

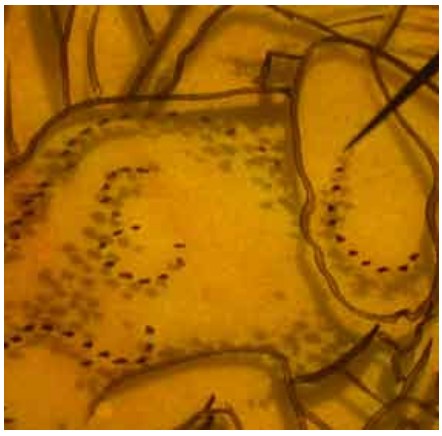
17. The next stage is to paint the lines inside the leaves. Again, you must paint lines that are light and thin.



18. Now prepare some paint that is suitable for making dots.

19. As always (even if we don't mention it), test the paint on your light-box before you use it on your glass.

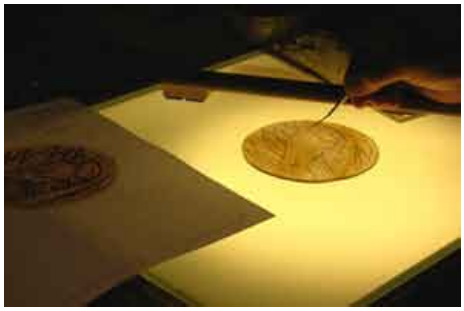
20. Now paint some dots: only the main dots. You'll add more dots later on.



21. Continue to add the main dots. These are simply the dots around which you will add other dots later on.

22. Here you see the main dots which you paint at this point. In the same way that you have lightly trace the *main* lines, so, here and now, you only lightly paint the *main* dots. The light lines and the light dots are like sketch marks – the marks you make while the glass is on top of the design.

23. The next stage is to reinforce the light thin outline that you've just painted. So now prepare some paint that is perhaps a darker than your previous mixture (but this will depend on how lightly and thinly you've painted the outlines). Test the paint on your light-box first.



24. With the design on one side (so that you can refer to it as needed), reinforce the outline of the frog.

25. Make the existing lines a little a little darker. Each time you load your brush with paint, test it on the light-box first.

26. Here's a close-up.

28. Here's the frog with the outline reinforced.

27. Be particularly careful where there isn't much space, such as around the toes. You might paint a little to the outside of the toes.

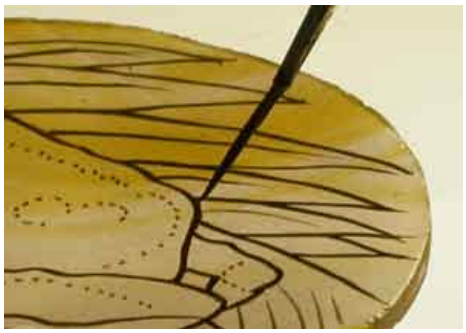
29. Darken the main lines around the eye and also fill in with paint.

30. Here's a close-up of the eye.

31. Reinforce the outline of the leaves.

32. You can see from this photograph and the next that the paint is both dark and dry. How do you know that it is dry? ...

33. Look at how much pressure we exert upon the brush to make the paint leave. This means that *we* control the paint; it doesn't just flow all over the place.



34. Continue to reinforce all the outlines of the leaves.

35. Also reinforce the insides of the leaves. By following the same sequence, you know the earlier paint has dried completely.

36. But, if the earlier paint hasn't dried completely, then, when you paint over it, your brush will tend to lift off the earlier coat. So let the paint dry thoroughly before painting over it.

37. Prepare and test some paint which is suitable for dots.

38. Now you can thicken and darken the existing dots.

39. Also add new dots.

40. You're using dots to indicate texture and shadow.

41. Add a few dots at a time. There's no absolute right or wrong; you must simply consider the frog in front of YOU.

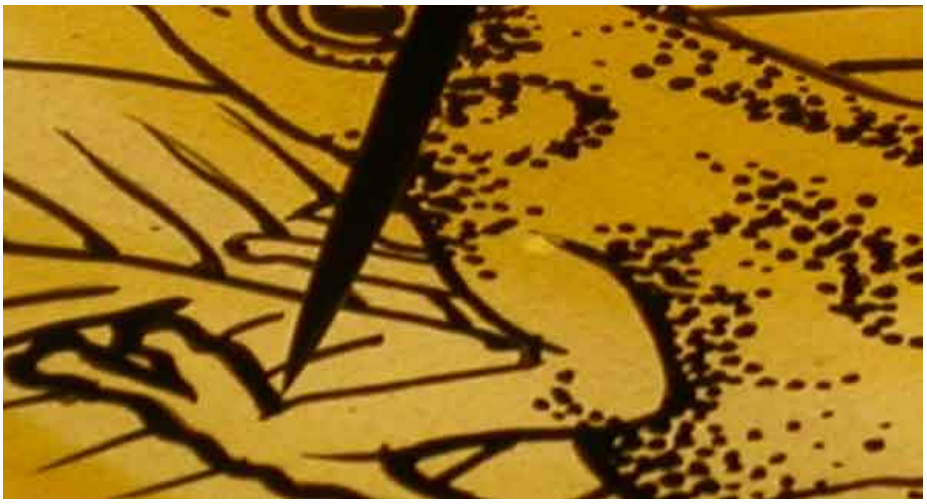
42. Here's a close-up of our frog's eye. Yours won't look exactly the same; it's not meant to.

43. This is quite a long stage, so don't rush it. Always keep looking at your frog: where is a little more weight and shadow wanted?

44. You can see how we build up dots of different sizes and weight.

45. Here's our frog. At this stage, all the lines and dots are roughly the same darkness and the same thickness. So ...

46. ... the next stage is to *thicken* the outline of the frog.



47. This third stage is different from what you've done before. The first stage was to trace the outline *lightly* and *thinly* with the design beneath the glass. The second stage was to *reinforce* the outline with the design on one side. Now, again with the design on one side, you *thicken* the main lines.

48. Here we have thickened the outline of the frog. The effect is dramatic.

49. Now thicken the outline of the leaves.

50. Here's a close-up.

51. Again, the effect is dramatic. As always, test your paint on the light-box before you use it on your glass.

52. Here's another close-up. The consistency of your paint is quite like melted chocolate. But you must always be able to control it.

53. Here's what the frog looks like now. We **don't** thicken the insides of the leaves again. This is because it's good to have contrasting thicknesses and strengths of line. By the same token, it's good to have contrasting strengths of highlights, and now it's the highlights that we're going to demonstrate.

54. First we use our index finger to rub paint away and thus create a highlight. **You** should use **gloves** when you do this.

55. Rub lightly. Stop often to consider the effect. The paint you rub away will in fact build up around the dots, thus softening them gently.

56. We create highlights all around the dots.

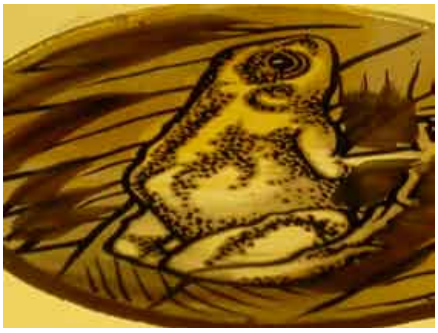
57. This is how our frog now looks.

58. Use a stick to make a highlight in the eye.

59. Now we're going to paint on the **back** of the glass. Then, as in Chapter 3, we're going to soften the lines. So now we take a wider tracing brush (a "6" or a "goose", for example) and mix some paint that is suitable for a light dry tone.

60. As always, we test it on our light-box first.

61. Now turn the glass over. To repeat: this is the **back of the glass**. Paint some simple and thick lines. Make sure no paint goes underneath.

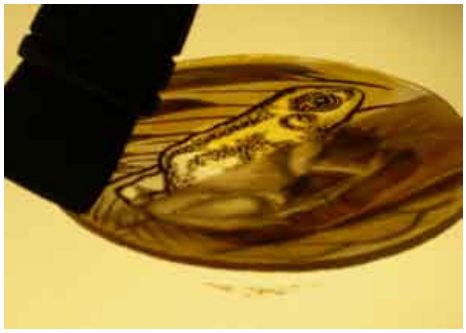


62. Where do you paint them? As with the dots, *your* frog will be different. But the effect is best if you paint these lines around the leaves ...

63. That is, *don't* paint them inside the frog.

64. Here is the back of the glass. Let this paint dry thoroughly.

65. Now we're going to soften these light, thick lines. Take a suitable brush and mix some light paint.



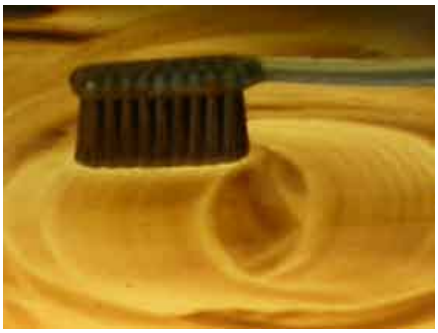
66. Load your brush, and paint stripes all over the back of the glass. Once again, be very careful that no paint goes underneath: this could harm the frog.

67. Our glass now looks like this. But quickly get your blender.

68. Before the paint dries, take your blender and vigorously blend the stripes and the lines beneath them. The purpose is to soften the underlying lines.

69. See how the lines have softened.

70. Here's a close-up.



71. Now we're going to create some texture. Test this technique first on separate glass. Take a soft toothbrush, wet it, and load it with paint.

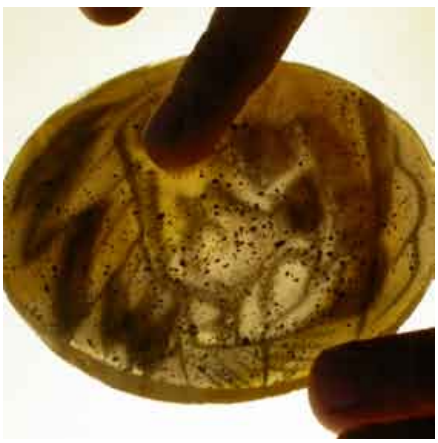
72. This is how we flick the paint onto the **back** of the glass. To repeat: the back of the glass!

73. Flick spots of paint. Don't over spray. You can always test this technique first on a different piece of glass.

74. Here's a close-up.

75. The back of the frog now looks like this. Let this paint dry thoroughly.

76. You want an even distribution of spots over the whole of the glass.



77. Once the paint has dried, rub the spots away. Do this lightly and gently. When you do this, wear gloves.

78. We think it's best only to rub the spots away *inside* the frog. Outside the frog, leave the spots. This creates variety.

79. This is what our frog now looks like. You can see how we have only rubbed the spots inside the frog. Again, this is the frog from the **back** of the glass.

80. Still on the **back** of the glass, take a scrub and rub away the paint outside the leaves.

81. When we turn our glass over, this is what it looks like. If you look inside the frog, you can see where we've rubbed the spots of paint away; if you look closely at the leaves, you can see where we've left the spots. The frog is ready to be fired.

82. We typically fire glass painted in this way to 675^{o} centigrade / 1250^{o} Fahrenheit.

We soak it at this temperature for between 3 and 5 minutes in order to get a smooth and glossy surface.

Then we descend as fast as the kiln permits to 560^{o} c / 1040^{o} F, again soak for a few minutes, then descend to 530^{o} c / 985^{o} F at 10^{o} c / 50^{o} F per hour.

Then we allow the kiln to cool at its own pace.

Exquisite highlights

Here's the question we raised in the previous chapter: what is the difference between line and shadow?

And here now is our personal view.

Surely the difference is only one of degree: on glass, both line and shadow stop light from passing through the glass.

This is one important reason why we have shown you the technique of softened lines: by copying this technique, you'll have had a practical experience of this conviction we have that line and shadow are, essentially, one and the same thing. You'll have seen how to turn a thin dark line into a soft thick shadow.

In this sense, all paint on glass is shadow. If the shadow is thin, we say it's a line, that's all.

So, from the perspective of glass painting, what is *bare unpainted glass*?

We can think of bare glass as pure highlight.

Here are two interesting ways in which shadow and highlight share features in common with one another.

1. Just as you can create shadows with a variety of brushes ranging from nibs to thin / thick tracing brushes and to squirrels and so forth, so you can create highlights with the thinnest of needles through to thick sticks and stiff brushes.
2. Just as you can soften thin lines into larger shadows, so you can break down and soften thin highlights (by rubbing or stroking) so as to blend them with the painted areas around them.

These are things you'll see when you paint the bee as described in this chapter.

As in previous chapters, this chapter builds on the techniques you've learned earlier. But we also talk more explicitly about *highlights*.

There is a lot more to say about highlightsand now we make a *start*.

Ways of highlighting

Purely as a technique, making highlights – scratching through dry paint – is not particularly complicated.

It's not nearly as complicated, for example, as laying down paint in a fine and neat line!

In this sense, some of the things that you learn from this chapter aren't as difficult as some of the things you learned in earlier chapters.

But imagine a juggler who is juggling with 3 balls. It's not that much more complicated for him to add a *4th* ball. And perhaps he can easily juggle with all 4 balls for a few minutes.

Then ask him to continue juggling for an *hour*.

That does become complicated.

Why?

Purely from the viewpoint of stamina and concentration.

So, too, with glass painting: in which regard, this chapter is indeed more complicated than earlier ones.

The bee has a lot more stages than anything you've done with us before.

But *you* have a distinct advantage over the juggler.

Of course you do: you can *take a break* when you need to.

It will be very important to pace yourself and not to hurry.

Say you're painting the light thin trace lines right at the start. If you find yourself losing focus, finish your stroke and stop right there. Take a break. Come back to it later.

With time, everyone finds they can concentrate for longer.

But staring at a light box is tiring. You certainly need a break every now and then. We can't say when. It's up to you to observe your state of mind for yourself. If you're tired and you continue, you'll probably make a mistake. In which case, the bee will take longer to paint than if you took a break.

Got that? – Take a break whenever you need one!

One last introductory point: whilst scratching a fine thin highlight is much easier than painting a fine thin line, *knowing where* to scratch the highlight is just as complicated as painting a line.

Once again, it is important to take a break from time to time.

You can't really remove the highlight once you've made it.

Remember also to hold the glass up to see it in different lights (that is, not just on your light box). In some instances, we also use a *pencil* to mark lines on the design itself in order to do a final bit of preparation for adding highlights.

So, highlighting is technically easy but *aesthetically very challenging*. Be ready for this!

Please remember to read through the chapter *several times* before starting to paint.

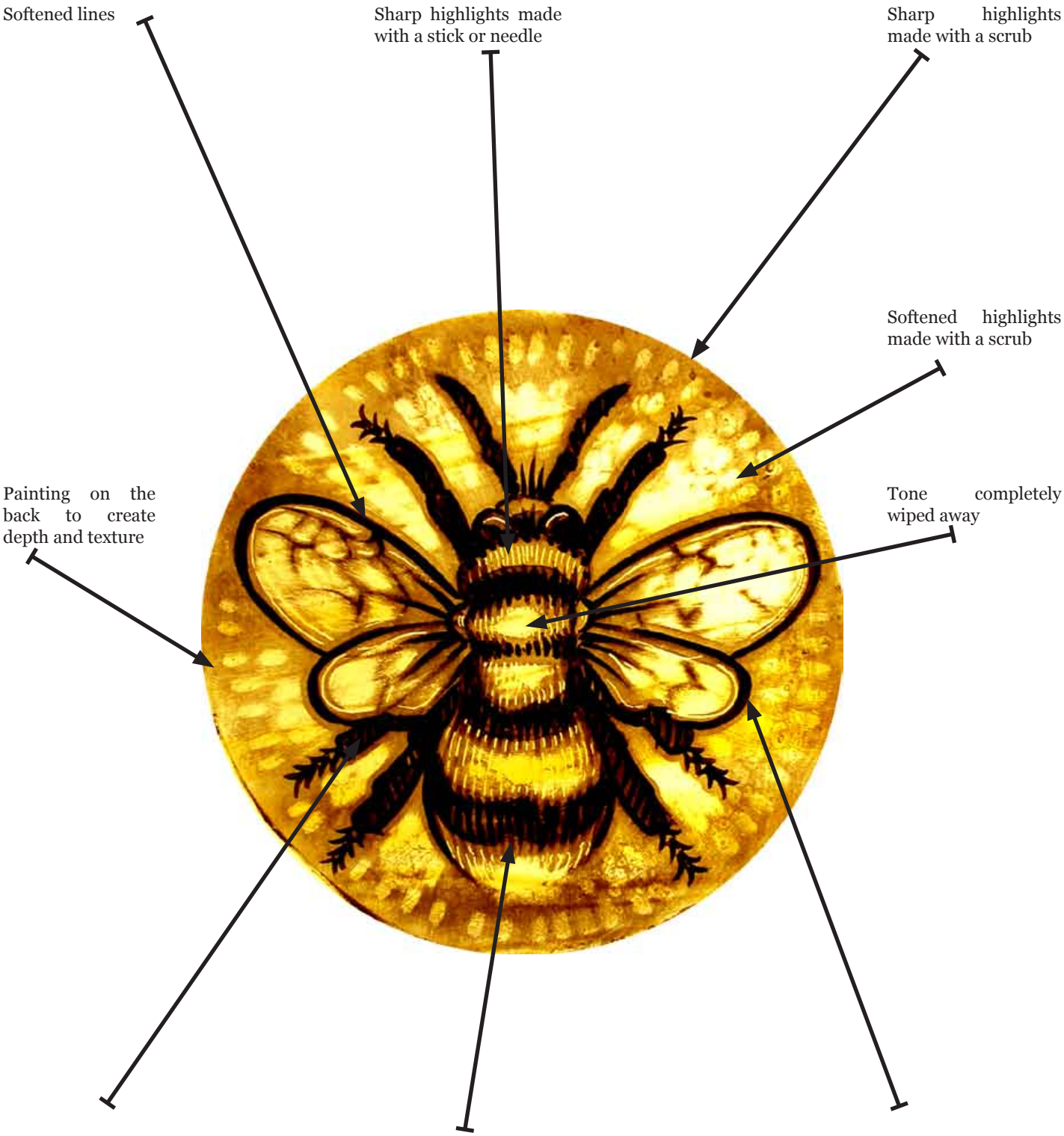
Also remember that your second bee will probably turn out hugely better than your first: this will be because, with the second bee, you will know where you are going.

Have fun!

Tools & materials you need

For this chapter, you will need these items:

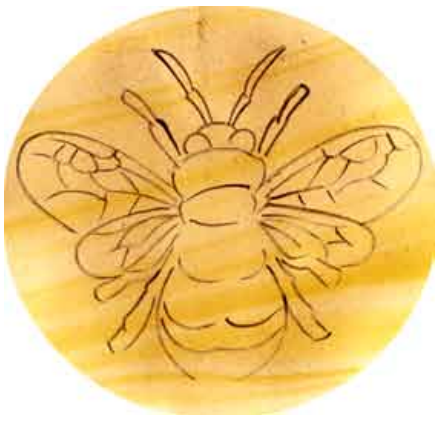
The design, glass, glass cutter, glass paint mixed with water and Gum Arabic, glass palette, painting bridge/arm rest, light-box, palette knife, jar of water, a flat wide brush – preferably a "haik, a wide badger blender, tracing brushes of at least 3 different sizes (0, 2 and 6), various needles, sticks and scrubs, paper towels to clean your glass, kiln and controller.


Softened lines
Sharp highlights made with a stick or needle
Sharp highlights made with a scrub
Softened highlights made with a scrub
Painting on the back to create depth and texture
Tone completely wiped away
Fine lines painted on top of bands of tone to create texture
Bands of tone, decorated with finely traced lines
Built-up lines

Overview

1. Cut and clean your glass.

2. Cover the glass with a a light dry tone.



3. Lightly trace the main lines.

4. Reinforce the main lines.

5. Soften the main lines.

6. Add broad bands of shading.

7. Add details.

8. Reinforce the outline.

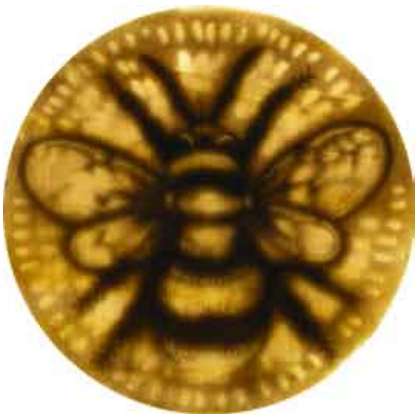
9. Add fine details.

10. Create main highlights.

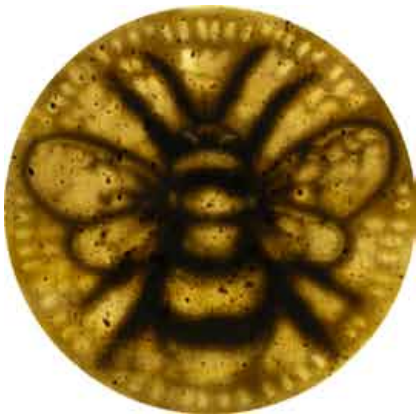
11. Decorate the border.

12. Soften the highlights.

Overview



13. Paint a medium-dark, dry tone on the back.



14. Flick spots of paint on the back.

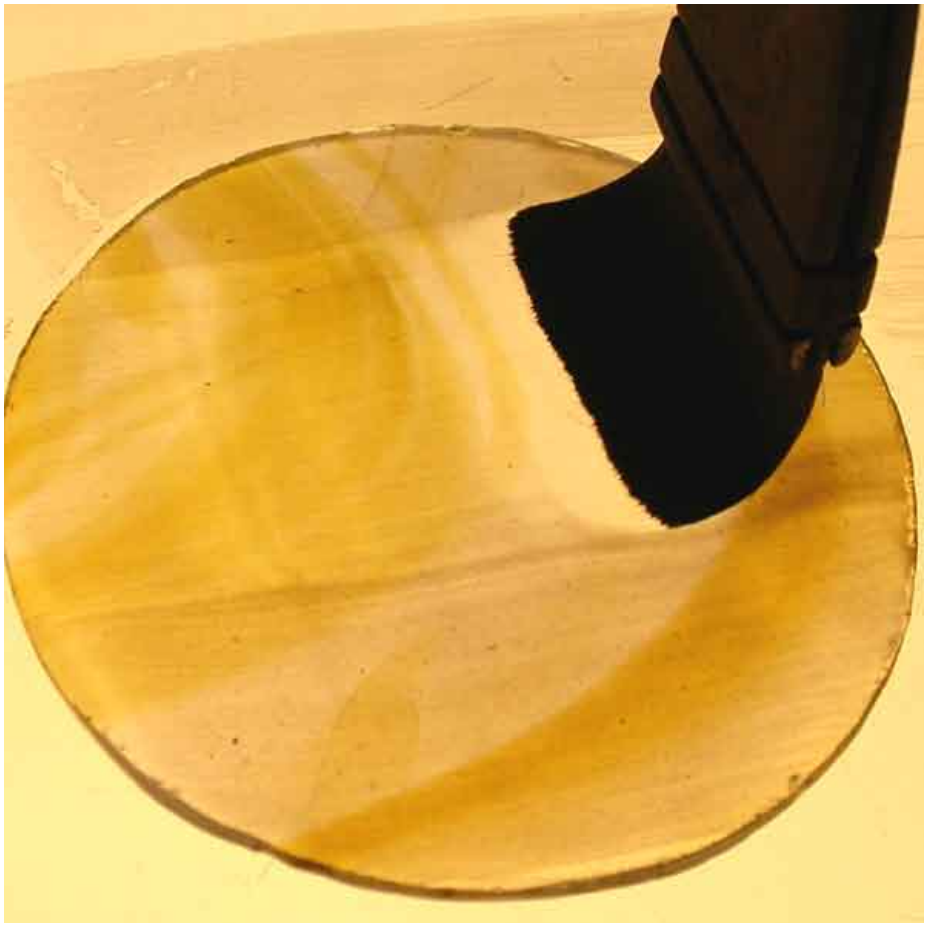
15. Rub away the spots, restore the highlights, and clean up.

16. Fire your bee.

1. Choose and cut a piece of light glass.

2. Clean the glass on **both** sides.

3. On your palette, dilute some paint that is suitable for a light dry tone.

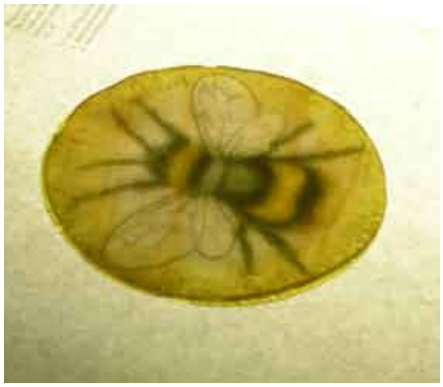


4. Use your squirrel to cover the whole surface of the glass with light, dry, even stripes of paint.

5. As needed, blend the stripes until they are smooth, but stop blending **before** your paint begins to dry.

6. You can of course hold the glass while blending the stripes. The main thing is to work comfortably and quickly.

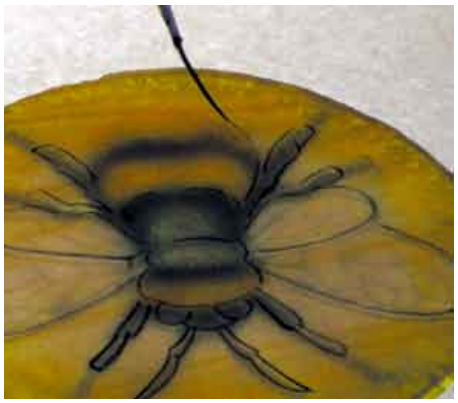
7. Let this paint dry. This is what the glass looks like now.



8. Place the glass on top of the design.

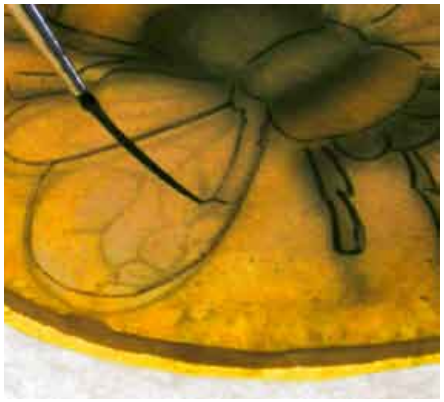
9. Take a fine tracing brush. Prepare some paint that is suitable for a light, dry line. Test this on your light box first.

10. Start to trace the main details.



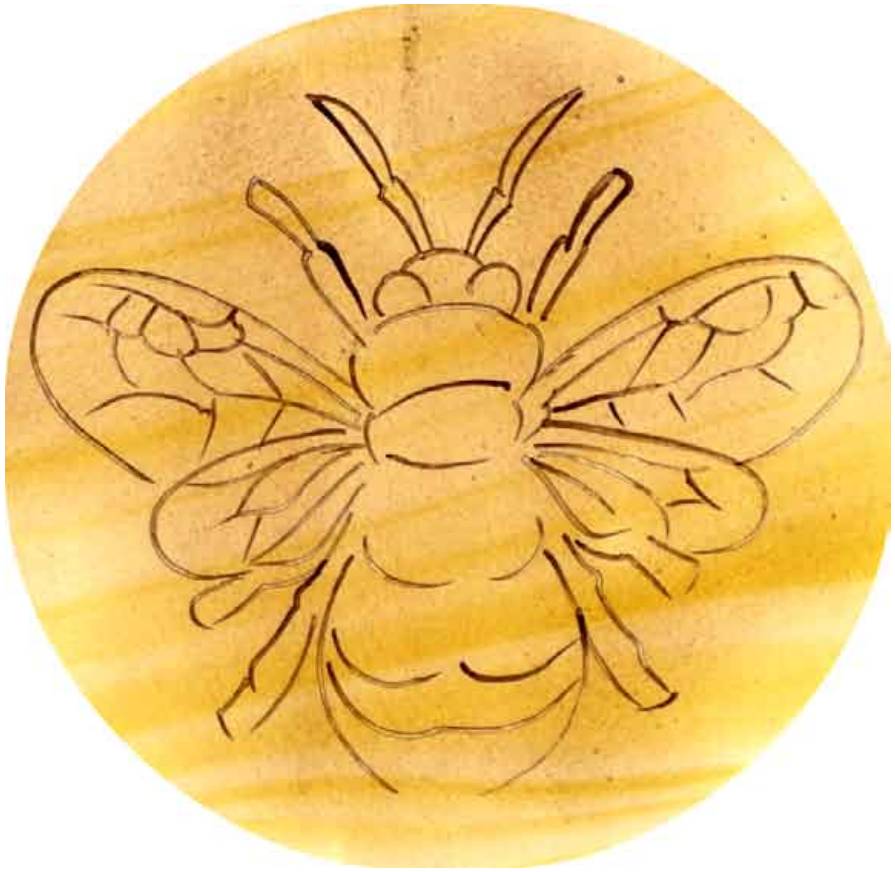
11. Remember that glass painting has its own pace. Do not rush things. You can only paint a line at a time.

12. Every time you load your brush with paint, swirl and twirl the brush to keep the paint well-mixed.



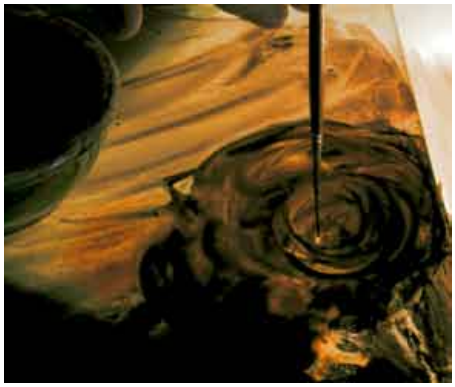
13. The paint is light and dry. It is important that you are in control of it.

14. Keep changing the position of the glass to suit yourself and how you like to paint.



15. This is what the bee now looks like. Here you see the lines you paint first.

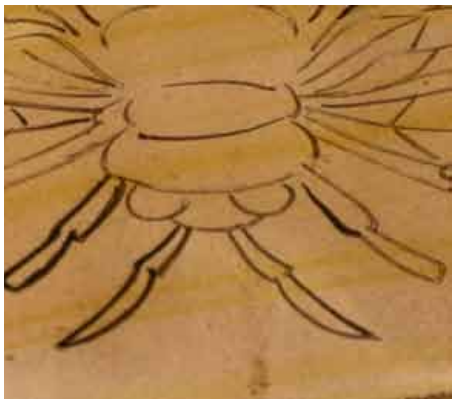
16. See how, even with *our* painting, some lines are darker than others. This doesn't matter too much. – You must be careful, but you must not be fussy.



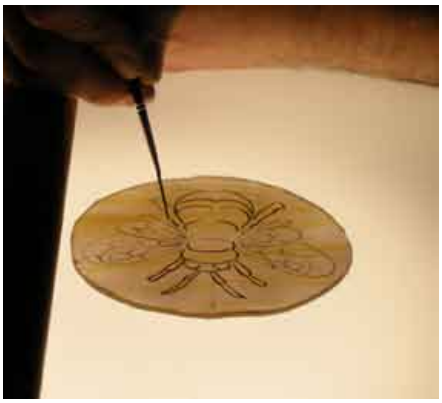
17. Prepare some more paint for the next stage: this is where you reinforce the main lines.

18. Always test your strokes on the light box before you paint on the glass itself. If it looks right on the light box, it'll probably also be good on the glass.

19. Put the design on one side so that you can see it if you need to. Now start to reinforce the lines.



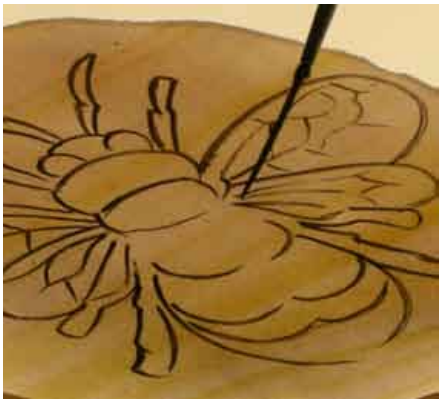
20. In this picture, you can compare reinforced lines with un-reinforced ones. Also see 25 - 27.



21. The reason you're reinforcing them is that, later on, you're going to soften them,

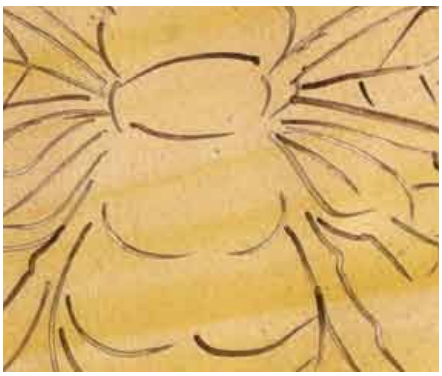
22. Always re-mix your paint each time you load your brush. And always test it on your light box first.

23. Remember to turn the glass so that it is as easy and as natural as possible for you to paint the line you want to paint.

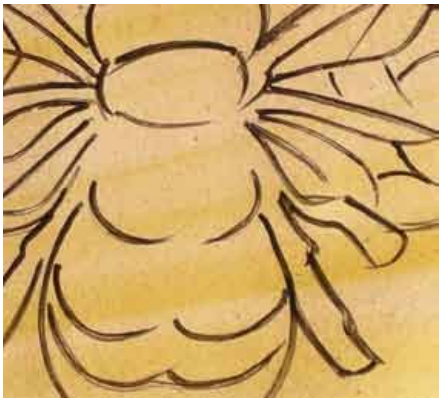


24. The paint is as dry and light as before. Remember: if the paint is watery, it will soften unevenly, and if it is too strong, it will be difficult to soften.

25. Here's the bee with the main lines reinforced.



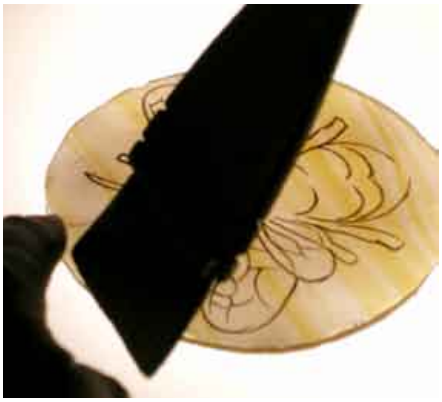
26. So, to compare, this is the bee *before* the reinforcement.



27. And this is the bee *after* you've reinforced the main lines.

28. Now you're going to soften the lines, just as you saw in Parts 3, 4 and 5. Take your squirrel. Dilute enough paint to paint a light, dry tone over the whole of the glass.

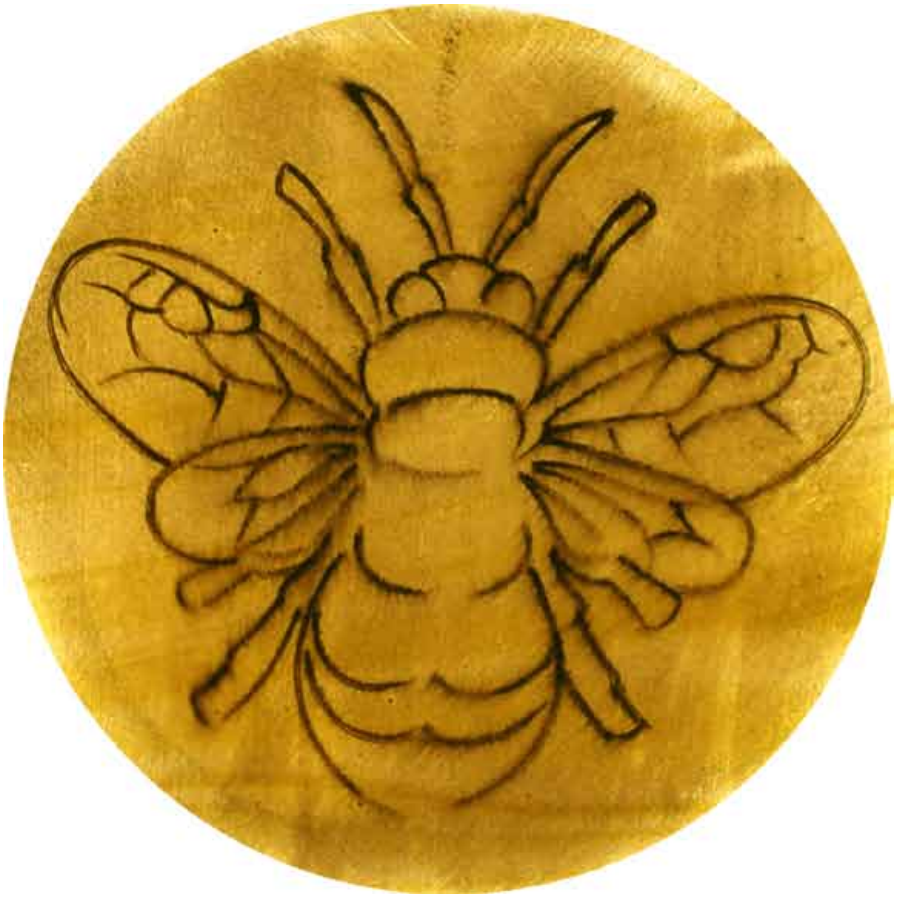
29. Here you see where we've used our light box to test the paint that we've prepared. We've painted over earlier lines, then used our blender to soften them.



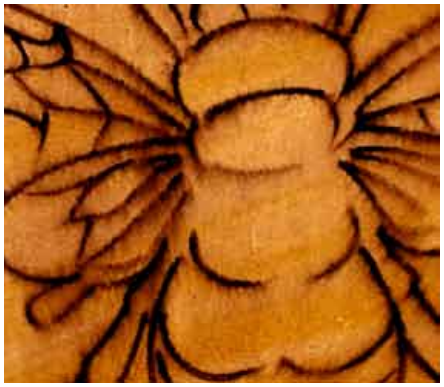
30. Load your brush with light dry paint. Then gently cover the surface of the glass with light dry stripes.

31. Here's the bee now. Don't pause too long here: move onto the next step.

32. While the paint is still wet, take your blender and soften the lines.

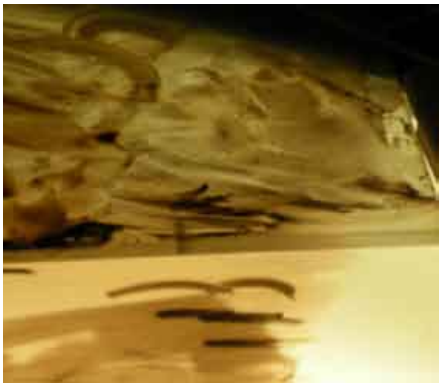


33. Here's the bee now that the main lines have been softened.



34. Here's a close-up. Some lines are more softened than others: that's fine.

35. Now we're going to create some darker tones. Use a larger brush for this.



36. Prepare some medium-dark paint. Test it on your light box.

37. Here you can see the darkness. You can also see the paint is even: there aren't any water-marks. Note: the paint must be fairly dry, but, if it is too dry, it will all be sucked up by the layers of paint beneath.

38. Now you're going to fill in certain areas with bands of tone. Here's a close-up of what you're going to do. See 43 for which areas to fill in.

39. Load your brush. Test your paint on the light box. Then start to fill in the required areas. See image 43 for our suggestion of which areas to fill in like this.

40. Make sure you're always comfortable: move the glass and bridge as needed.

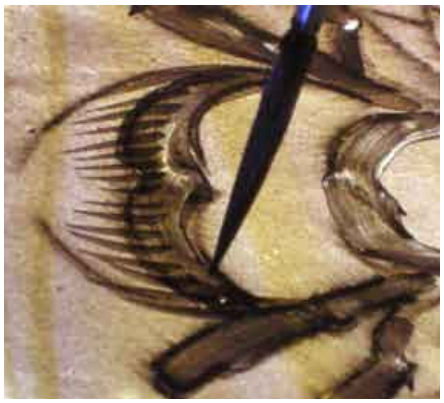
41. Test your paint each time you load your brush: then you can paint with confidence.

42. Here we are applying bands of tone across the body. Note: You'll need to shape the brush to suit the size of the area you want to fill in.

43. We paint the bands of dry tone to four places: the antennae, the legs, the eyes, and also across the body.

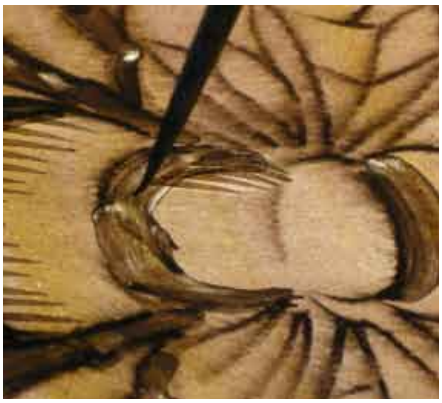
44. Now take a medium-size tracing brush, and prepare some light dry paint.

45. Test the paint on your light box before you use it on your glass.



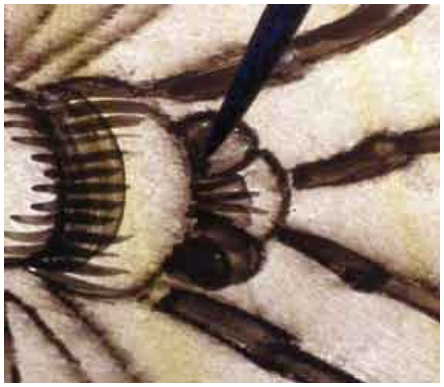
46. Begin to paint light dry thin stripes as shown.

47. Be neat and purposeful, but do not worry about the shape of each individual stripe.



48. This is the sequence: mix your paint, load your brush, test it on your light box, then paint a few strokes, then mix your paint again etc.

49. Also fill in a darker patch within each eye.



50. As before, use a light dry tone to do this.

51. This is how the bee looks now.

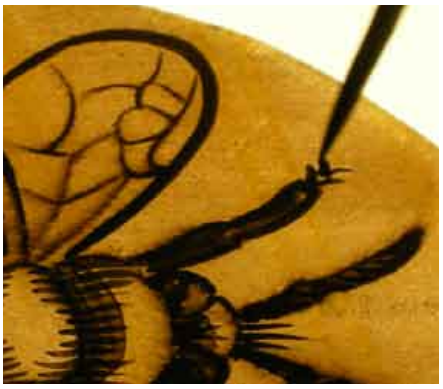
52. Still with the medium-sized tracing brush, mix your paint, load your brush, then test it on your light box.

53. Now reinforce the outline of the bee. Paint a little bit to the *outside* of the softened lines: it is important to keep the gentle shadows that you've made so carefully.

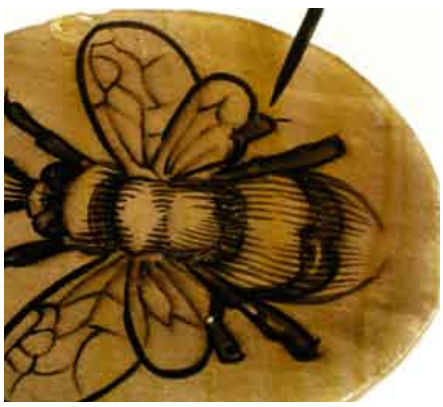
54. Always remember this: *before* you paint a stroke, decide where it *starts* and where it *stops* – it's essential to have a plan. That way, you can decide what kind of paint to dilute (how dark or light, how thick of thin, how wet or dry) and how much paint to load your brush with.

55. You can see that we have decided not to reinforce the tip of the bee's abdomen (where the sting should be). This is because we like variety of line.

56. Now take your smaller tracing brush, and dilute some medium-dark dry paint.



57. Now we paint the ends of the six legs.



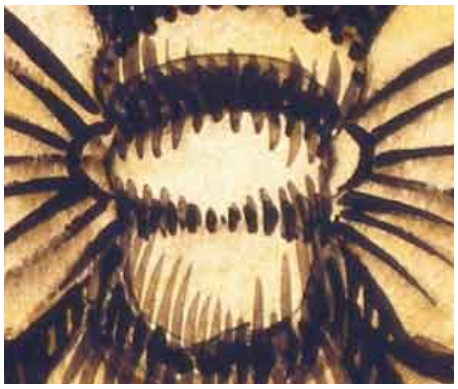
58. These ends are highly stylized: this bee is decorative in spirit, not anatomically exact. For example, we also omit the claws and the sting: we don't want to go frightening people!

59. Here's what your bee now looks like.

60. With the same small tracing brush, add stripes to the legs to create texture.

61. Here's a close-up of the stripes. Paint these stripes on all six legs.

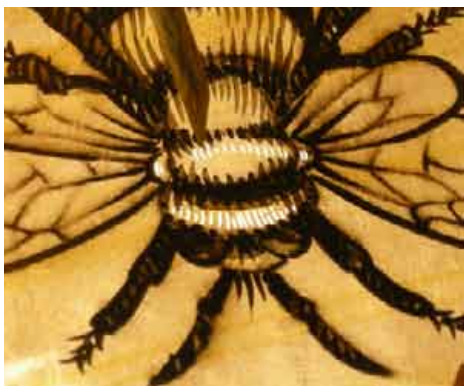
62. Add a small semi-circle to each side of the thorax. Also strengthen a few of the veins which radiate from them across the wings.



63. Here's a close-up.

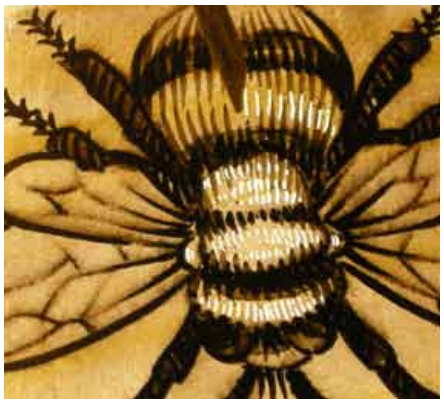
64. This is what your bee now looks like with all the details added.

65. Now it's time to start making highlights. Use a stick to do this. As needed, also use your painting bridge and rest your hand on it.



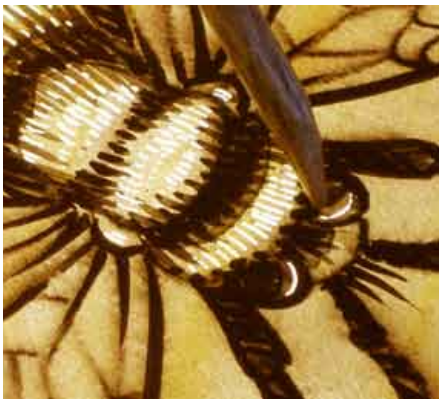
66. Carefully pick out highlights in between the stripes. It is very important NOT to pick into the stripes themselves.

67. Do this carefully, one highlight at a time.



68. Don't rush the job. As with painting, take your time.

69. Remember: you can't remove highlights, so make sure that each one is right.



70. Also with a sharp stick, add highlights around the eyes.

71. Your bee now looks like this. Note how the strokes highlight are different lengths, depending on where they are. This is something you will need to decide for yourself, when looking at *your* bee.

72. The next stage is to add some highlights to the wings.

73. Your highlights will be in different places to ours, because your wings aren't the same as ours.

74. Always judge *your* highlights carefully.

75. Add them carefully and slowly.

76. Here's your bee now.

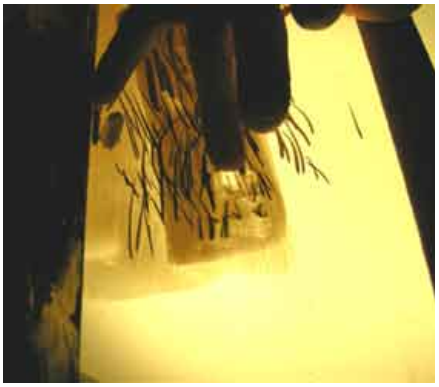
77. Take a small scrub and use it to punch holes in the tone around the bee.

78. Use a bridge if you want to: it is important not to damage the unfired paint by accidentally brushing against it.

79. Work around the bee.

80. Here's your bee now. It's really beginning to shine.

81. Here's a close-up of the kind of marks you want to make with your small scrub.



82. Now you're going to soften some of the highlights.

83. Start with the lighter areas within the main body of the bee.

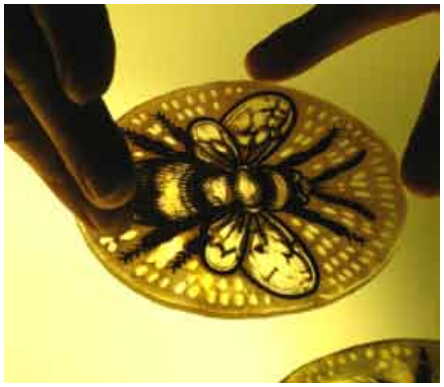
84. We use a bare, dry finger to soften highlights. You must wear gloves.

85. From time to time, you may also need to blow paint-dust away. Do this carefully. Don't breath it in.

86. When you come to do the wings, take particular care: only rub away a little.

87. As with lines: variety is interesting. That's why we only soften *some* of the highlights, not all of them.

88. Here's your bee now.



89. Also soften a few of the highlights that you made just now with your small scrub.

90. You can see from this picture that we are only softening the highlights on the *inside*.

91. The last thing to do is to take your blender and use it gently to stroke the surface of the glass and thus remove any loose paint.

92. Here's your bee now.

Now you're going to paint on the **back** of the glass.

You're going to add texture and also make the glass look old.

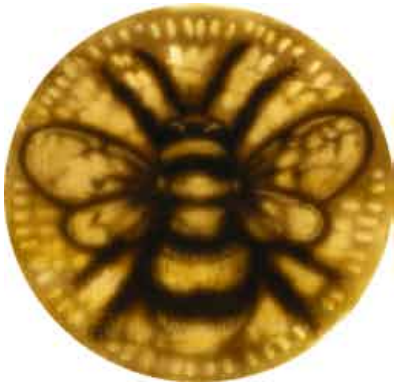
Turn your glass over!

93. Take your squirrel. Mix some paint that is suitable for a medium-dark tone.

94. Use your squirrel to cover the BACK of the glass with medium-dark paint.

95. Take care that paint does not spread underneath the glass: this could damage the painting you've done on the other side.

96. As needed, take your blender and blend the stripes until you're happy with them. Stop blending before the paint dries.

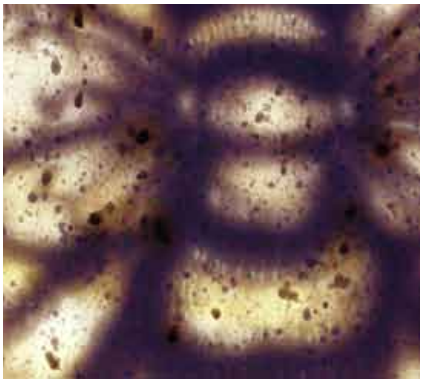


97. Here's the back of your bee now. You're now going to do something else to the back. Note: to the **back**!

98. Take a *soft* toothbrush and load it with paint. (If the bristles are *hard*, it will be difficult to use them to flick paint as you want to.)

99. Now carefully flick paint onto the **back** of the glass. Hold the glass at an angle so that you can see the spots. Don't flick twice in the same area.

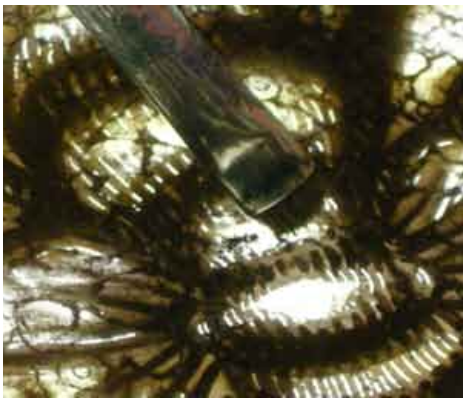
100. Here's your bee now. Let the paint dry thoroughly.



101. Here's a close-up.

102. Use your fingers and gently, very gently, rub the back of the glass. Wear gloves to do this. Or, even better ...

103. Or ... use a blender to gently stroke the spots away. Whichever way you use, be careful not to breath in any dust.



104. Take a scrub. Carefully reveal the main highlights on the body of the bee.

105. Also reveal some main highlights on the wings. Be careful not to damage the spots you've just made.

106. Here's a close-up.

107. And here's what the back of your bee now looks like. All that remains for you to do is to fire your glass. Fire it the other way up i.e. with the painted bee on top. Well done!

We typically fire glass painted in this way to 675^{0} centigrade / 1250^{0} Fahrenheit. We soak the glass at this temperature for between 3 and 5 minutes in order to get a smooth and glossy surface. Then we descend as fast as the kiln permits to 560^{0} c / 1040^{0} f, again soak for a few minutes, then descend to 530^{0} c / 985^{0} f at 10^{0} c / 50^{0} f per hour. Then we allow the kiln to cool at its own pace.

Painting with oil

In this chapter we're going to show you a technique that few other painters understand: how to paint with oil.

This technique is perhaps more astonishing than it sounds.

Oil paint on *bare* glass is one thing: that's easy. Once we've shown you our special method of mixing oil-based paint, you'll quickly see how to do this for yourself. With our recipe, it's also easy to paint with oil on top of *paint you've already fired*.

So, what we're going to show you is how to paint with oil on top of many layers of *unfired water-based* tracing paint. Many people will assume this is impossible to do: they'll think that perhaps the water will repel the oil, or that the oil will disturb the unfired water-based paint. In fact, the truth is different:

- The water-based paint doesn't repel the oil for the simple reason that the water has dried and evaporated;
- The oil-based paint doesn't disturb the unfired water-based paint because the water-paint contains gum Arabic.

But these points aren't obvious until they're pointed out. And this may show us how our general capacity for wonderful invention and discovery can easily be arrested by two main causes:

1. Other people – the consensus, widely held assumptions, common knowledge, people who say that something can't be done, and so forth;
2. Ourselves – taking things for granted, relying on other people's expertise, our lack of confidence, and so forth.

So other people tell us, or we ourselves imagine, that something "can't possibly work", and the opportunity is then missed for a new horizon to emerge. Therefore, don't ever take for granted what other people tell you: try things for yourself. And don't even take for granted what you yourself instinctively believe: experiment for yourself. When you've discovered something new, tell other people about it. We mentioned earlier that a few glass painters DO know about the techniques that we will show you in this Chapter, but another sad fact is that many people keep secrets. Many people who figure out how to do what we do just keep it to themselves.

In business terms, we can sometimes sympathise with this.

Sometimes.

But we see things differently.

At Williams & Byrne, we're designers and painters of glass. (We're restorers, too. This is how we've come to discover so many techniques: when pushed to create a perfect facsimile or forgery, it's amazing how inventive anyone can become.)

We place great emphasis on the fact that we're "designers". As designers, it's our job to come up with the ideas. As painters, we then figure out the techniques which are needed to realize the ideas. The designs and ideas are *ours*. They define our studio. The techniques belong to *everyone*. People can use them or not. It's up to them. People can adapt the techniques as they please, or use them exactly as we do. Again, that's up to them. And we don't see the need – even as a commercially successful studio – to be secretive about the techniques we use.

Our studio is all about the ideas that we invent and the designs that we create.

Consider the example of writing. We all know how to write. But we all go on to write in different ways. It's just the same with these marvellous glass painting techniques that we're going to show you in this Chapter: we're glad to be able to pass them on to you. Perhaps you'll use them, perhaps you won't. If you use them, we know you'll take them forward in your own inimitable way. And, if you don't, perhaps one day you'll make a casual remark to a fellow painter about how such things are possible, and that will set them going.

Overview

Let's run through the steps and give you a sense of where we're going.

As we've said, the fundamental and most amazing point is this: you can paint with oil-based glass paint on top of unfired water-based glass paint. For example, you can use oil to trace the most delicate and beautiful lines. You can also use oil to paint the darkest shadows imaginable. And none of this need disturb the unfired lines and shadows beneath. We'll show you how to do this. It's easy: you just need to believe that it's possible.

But what's even more amazing is that you can soften and blend these oil-based lines and shadows, and still the unfired water-based paint remains the same: the water-based lines and shadows hold their position, while the oil-based lines and shadows move where you want them to.

Why paint with oil?

Here are the main reasons for painting with oil:

- It's an effect that can add richness and depth to your glass painting that cannot be achieved in any other way;
- By virtue of the fact that oil is usually applied over the whole surface of the glass, a lovely unified appearance can be created between bare areas of glass on the one hand and painted areas of the glass on the other;

- It is possible to achieve a fineness and delicacy of line that is all but impossible with water-based paint;
- It is possible to achieve a depth of line that is all but impossible with water-based paint;
- We would also say that, with a little practice, it is comparatively risk-free: this is because, as noted, the oil-based paint does not affect the water-based paint beneath;
- Finally, oil-based painting is more WYSIWYG than water-based paint on its own. Again by virtue of the fact that oil is usually applied over the whole surface of the glass, the water-based paint below doesn't "fire off" to the same extent in the kiln; without the oil-based coating, there is typically a paint loss of about 15% when you fire.

How to mix oil-based paint

Here's a summary to give you the idea of what to do for a really wonderful mixture of oil-based paint.

1. Put some powdered tracing paint onto your palette;
2. Add some oil;
3. Mix paint and oil into a thick paste;
4. If possible, allow the paste to settle and expand overnight;
5. Put (some of) the paste on your palette:
6. Dilute it a little at a time to the consistency you need.

You'll find full details and photos later on.

Our technique is wonderful.

What oils can I use?

Here are three of the oils we often use: Lavender, Sandalwood and Clove. We use essential oils. In this Chapter, we're using Oil of Lavender.

Note that pregnant women must not use Oil of Lavender.

ALWAYS FOLLOW THE HEALTH AND SAFETY INSTRUCTIONS OF WHICHEVER OIL YOU USE

In the simplest case, you can use the same oil both to make the paste and also to dilute the paste.

Sometimes, however, you can use *one oil for the paste and a different oil to dilute it*.

This is a fascinating path for you to explore and develop.

Be aware that each kind of oil has different properties:

- Some oils are carcinogenic when you touch or smell them;
- Some oils might combust in the kiln (this may depend on your firing schedule);
- Some oils smell nice, some oils smell awful.

Always ask the manufacturer or supplier for full details.

To repeat: you must always consider the health and safety issues which apply to the oil you're using.

Here's an important example. *We* often work with oil of Tar, which we get from Reusche in the US. Now oil of Tar is absolutely wonderful to work with. We can use it to paint the finest lines and the darkest shadows. It softens beautifully. But it's carcinogenic. So we have to take a whole raft of precautions. Please always do the same.

What tools and brushes do I need?

You will need the same kinds of tools and brushes for oil-based painting as you need for water-based painting.

For example: palette, palette knife, brushes of different sizes, wide blender and small blender.

It is best to keep one set of tools and brushes for water-based painting and a *separate* set of tools and brushes for oil-based painting.

We distinguish our water brushes from our oil brushes by colouring their ends with a different colour nail varnish.

You can also paint with pen and *nib*, but it is our view that a line created with a brush is more expressive than one created with a nib: the reason we created our particular method of mixing oil-based paint was that we wanted to make it possible to use a brush.

How to paint with oil-based paint

With oil-based paint, you can paint on bare glass OR on previously fired glass OR on unfired water-based glass paint.

In this Chapter, we show you how to paint on *unfired* water-based glass paint.

Here's the method. You'll find full details later on.

Prepare a thick paste of oil-based glass paint as shown.

Use some pure/neat oil to dilute this paste a little bit at a time to suit whatever it is you want to do. This is similar to how you use your lump of water-based paint (see Chapter 1).

As noted earlier, the simplest approach is to use the same oil to make the thick paste as you use to dilute the paste to the consistency you want. This is what we show you in this Chapter. But you can sometimes use quite different oils for the paste on the one hand and the diluting medium on the other: this will work with some oils and not with others. Some oils blend beautifully with one another, other oils won't mix together properly.

When you apply the oil-based paint, your strokes can be dark or light.

Dark strokes have a high proportion of thick paste to pure oil; light strokes have a low proportion of thick paste to pure oil.

Your strokes can be thick or thin. Use a thin tracing brush for thin strokes and a thick brush for thick strokes.

As noted: keep special brushes for oil-based paint – don't use the same brush for water-based paint!

Remember that the oil-based paint is easily removed because it doesn't have gum Arabic in it. Therefore be gentle with it! It is possible to add ingredients to the paste or to the diluting medium which will prevent the oil-based paint from bruising. We ourselves have successfully added different types of varnish. Once again: experiment carefully and imaginatively for yourself.

How do I fire oil-based paint?

This depends on the oil.

This also depends on the kind of painting you have done: you may need to treat heavy / thick painting differently from light / thin painting. As a general principle: it is a good idea to allow the oil to dry naturally in the open air or on top of a radiator. Also, it is a good idea, in your firing schedule, to allow the oil-based paint to soak and dry out as explained below.

Here is a typical schedule for oil-based paint on top of unfired water-based paint:

1. With the bungs out so that the fumes can escape, take 2 hours to go to 100^{0} centigrade / 212^{0} Fahrenheit and soak for 1 hour.
2. Take 2 hours to go to 675^{0} centigrade / 1250^{0} Fahrenheit.
3. Soak the glass at this temperature for between 3 and 5 minutes in order to get a smooth and glossy surface.
4. Descend as fast as the kiln permits to 560^{0} c / 1040^{0} F.
5. Soak for 5 minutes.
6. Descend to 530^{0} c / 985^{0} F at 10^{0} c / 50^{0} F per hour.
7. Allow the kiln to cool at its own pace.

This firing schedule may seem to take a long time. But our approach is to apply many layers of paint and to fire the paint just once.

Note: each oil has different properties when you fire it. For example, some oils are combustible, some oils are noxious. Follow the manufacturer's instructions and fire each oil appropriately. Always with great care. Also consult your kiln manufacturer to be sure that oil-based paint is fine to fire in your kiln.

Example

There are, of course, many ways of painting with oil. Here is one.

Consider this design of a lion's head:

Imagine that we've used water-based tracing paint to bring it to this point:

We could now use sticks and scrubs to create and soften some gorgeous highlights:

Then we could trace some fine details and also reinforce the outline for dramatic effect:

We could stop here, but we won't. So, first of all we can use oil-based paint to add more shadows:

Note: this is unfired water-based paint we're painting on here. So the lion now looks like this:

This is amazing enough, but we can now take a blender and soften these oil-based shadows like this:

And remember: we're just blending the oil-based shadows. None of this blending need have any effect on the unfired water-based paint beneath.

But do note this: depending on the oil you're using, it will dry more or less quickly as you blend. And, once dry, your blender may then begin to leave marks on the unfired water-based paint beneath.

As a last stage we can pick out highlights:

Then we can fire the lion.

Other considerations

Here are some general points to remember:

- There are many different sequences and strategies when you work with oil-based paint. We'll summarise four different sequences below, but please remember there are many other ways of working with oil-based paint.
- When you apply a lot of paint over many layers, you must consider how lightly you should paint. Otherwise your glass might end up darker than you wanted. The great merit of our approach is that you can develop the painted image slowly and responsively over many layers.
- When you use oil-based paint, you must pay special consideration to health and safety. You must wear gloves and masks as required
- Each type of oil has drawbacks: you must research these drawbacks for yourself.
- Oil is slippery and dries more slowly than water. Therefore you need to consider how you handle it and how to deal with spillages.
- Oil is combustible. Therefore you must consider how to change your firing sequence when firing oil-based paint.
- You must consider how you ventilate your kiln and how you ventilate your work-space.

4 core strategies with oil

Here are 4 core strategies for working with oil-based paint on top of unfired water-based paint:

1. Paint the light oil-based lubrication first over the whole surface of the glass, then paint the dark strokes, then blend and soften. Pick out new highlights and soften these. See the butterfly example.
2. Paint the dark oil strokes first, then entirely surround these strokes with a thin oil-based "lubrication", then blend and soften the dark strokes with the thin lubrication. Pick out new highlights and soften these. See the duck example.
3. Only paint the light, oil-based lubrication over the whole surface of the glass. (This can create a lovely feeling of unity across shadows and highlights.)
4. Only paint the dark oil-based strokes.

At the end of each of these sequences, you can let the oil dry, then pick out highlights (again) as needed.

As we said before, there are also many other strategies. This is what's so exciting. You can takes these points and develop them in your own way.

Case study and first project

We include a case study of a duck we painted using oil-based paint. Use this case study to get familiar with the ideas behind the techniques.

We also include a small project for a medieval butterfly: you can consider doing this project first in order to get a feel for the techniques.

Also do experiments of your own on test pieces of glass *before* you attempt either the butterfly or the duck.

Anyway, to begin, we'll show you how to mix and store oil-based paint.

Here's how to mix oil-based paint. We propose you make a thick paste. You can then dilute this paste as you need it to the strength that you require. This makes much better sense than (as some books suggest) making a runny oil-based liquid which can only be used in one way.

1. You'll need a palette, a palette knife, some tracing paint, oil, and a container to store the paint that you will mix. You'll also need the correct health and safety gear as required by the paint you use and also by the type of oil: this is very important. Some oils have poisonous fumes, other oils are carcinogenic, yet others must on no account be used by pregant women.

2. Measure out some tracing paint. Here we used three loads of this small palette knife. You don't need much. A little goes a long way.

3. Make a well in the centre of the tracing paint.

4. Add some drops of oil. Do not add too much oil, because you can always add more.

5. So that you know, this is the kind of mixture you want to make. It's a very thick paste.

6. Returning to where we were, here you see the tracing paint with just a few drops of oil in it.

7. With your palette knife, carefully begin to mix the oil and tracing paint together. Mix carefully and do not stir up any dust.

8. Grind and mix.

9. Mix until you are sure the oil has absorbed as much of the tracing paint as it possibly can.

10. When you're certain that the oil can't absorb any more tracing paint, add a few drops more of oil.

11. Continue to mix and grind.

12. Mix and grind ...

13. Mix and grind ... If you need to add more oil, that's fine: just add a few drops at a time so that the mixture doesn't become runny.

14. This is what you're after.

15. Here you are: a thick paste.

16. Use your palette knife to put the paste in your container.

17. Like this ...

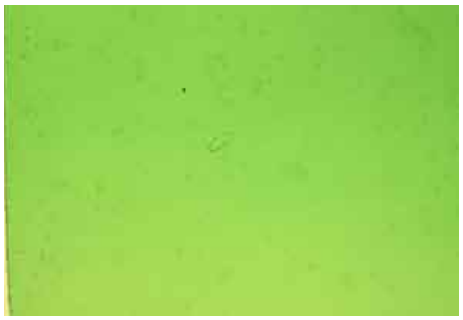
18. Seal the jar.

19. Tidy and clean your palette. Note: you'll need to clean the palette thoroughly before you use water-based paint again.

20. If possible, leave this paste to rest for a day before you use it.

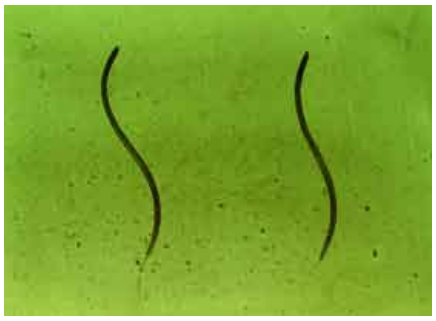
Before you paint a butterfly or a duck as we show you, the best thing is to paint experiments like this. Invent several experiments of your own and get a feel for what can and can't be done.

1. Mix some water-based paint.

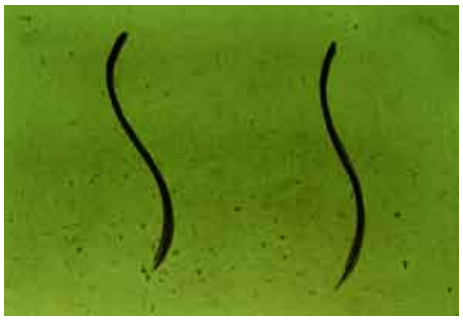


2. Take a small piece of glass and clean it.

3. Paint and blend a light wash.



4. Paint some light, thin lines.



5. Reinforce these lines.

6. Soften these lines as described earlier.

7. Reinforce the softened lines.

8. Add some highlights.

9. Prepare some oil-based paint.

10. Add the diluting oil.

11. Dilute a little of the paste and test it.

12. Trace some dark strokes of oil-based paint.

13. Here's a close-up: some leaching of the oil is natural (although it depends a little on the oil that you are using).

14. Add more diluting oil and prepare a very light oil-based mixture.

15. Start applying the oil over the entire surface of the glass but DO NOT go over the dark oil-based lines again.

16. Here's the glass now completely covered with the light oil wash.

17. Take a blender and gently soften the dark oil-based strokes.

18. Here's a close-up.

19. See what effects you can achieve.

20. Depending on the oil, it will start to dry sooner or later as you blend, and you'll need to stop blending. (You may be able to paint another layer of oil. Experiment for yourself.)

21. Let the oil dry completely, then pick through the highlights again.

22. Here are the highlights restored to what they were.

23. Do several other experiments for yourself before you try the butterfly or the duck.

Observe the different effects you can achieve.

Decide which effects you like and then develop them further.

The point is: you can use this oil-based glass painting technique in *many different ways*.

1. Here's the first step-by-step example. Try this first.

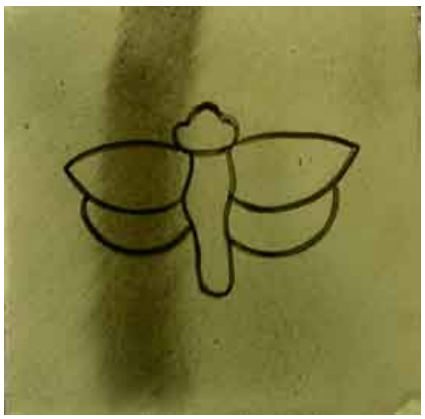
2. Cut some glass.

3. Clean the glass on both sides.

4. Paint a medium-dark line and let it dry

5. Cover the surface of the glass with a light tone of paint. Blend it while it is still wet. Let it dry

6. With the glass on top of the design, lightly trace the main details. Let the paint dry



7. Remove the design from beneath the glass. From now on, keep it on one side. Reinforce the main details and let the paint dry

8. Cover the surface of the glass with a light tone of paint. Blend it while it is still wet. Let it dry

9. Reinforce the main lines a second time. But don't paint directly over the shadow: paint either inside or outside of it

10. Paint the minor details. Let the paint dry

11. Take a sharp stick and scratch out the highlights

12. Take a soft brush and gently soften the wings

13. Take a soft brush and gently soften the background

14. Take a scrub and clean around the edge of the painted glass to make a border

15. Cover the back of the glass with a light tone of paint. Blend it while it is still wet. Let it dry

16. Flick spots of paint across the back of the glass. Let the paint dry

17. Here's a close-up of the spots

18. When the spots are dry, rub them gently

19. Here's a close-up of the effect we get

20. Cover the front of the glass with a light tone of oil-based paint. Blend it.

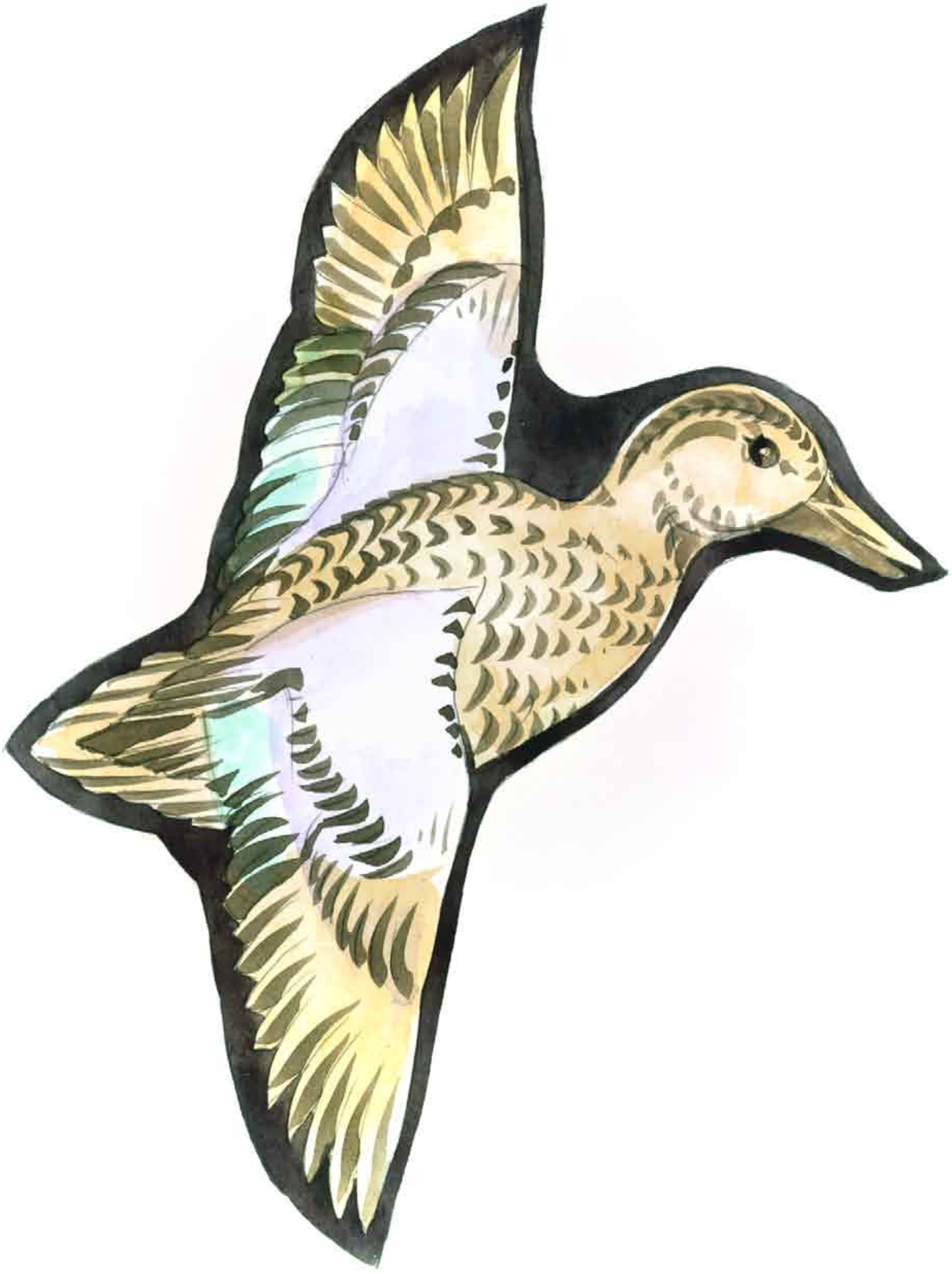
21. Paint a dark line of oil-based paint

22. Begin to blend the oil-based line with the oil-based tone that is underneath

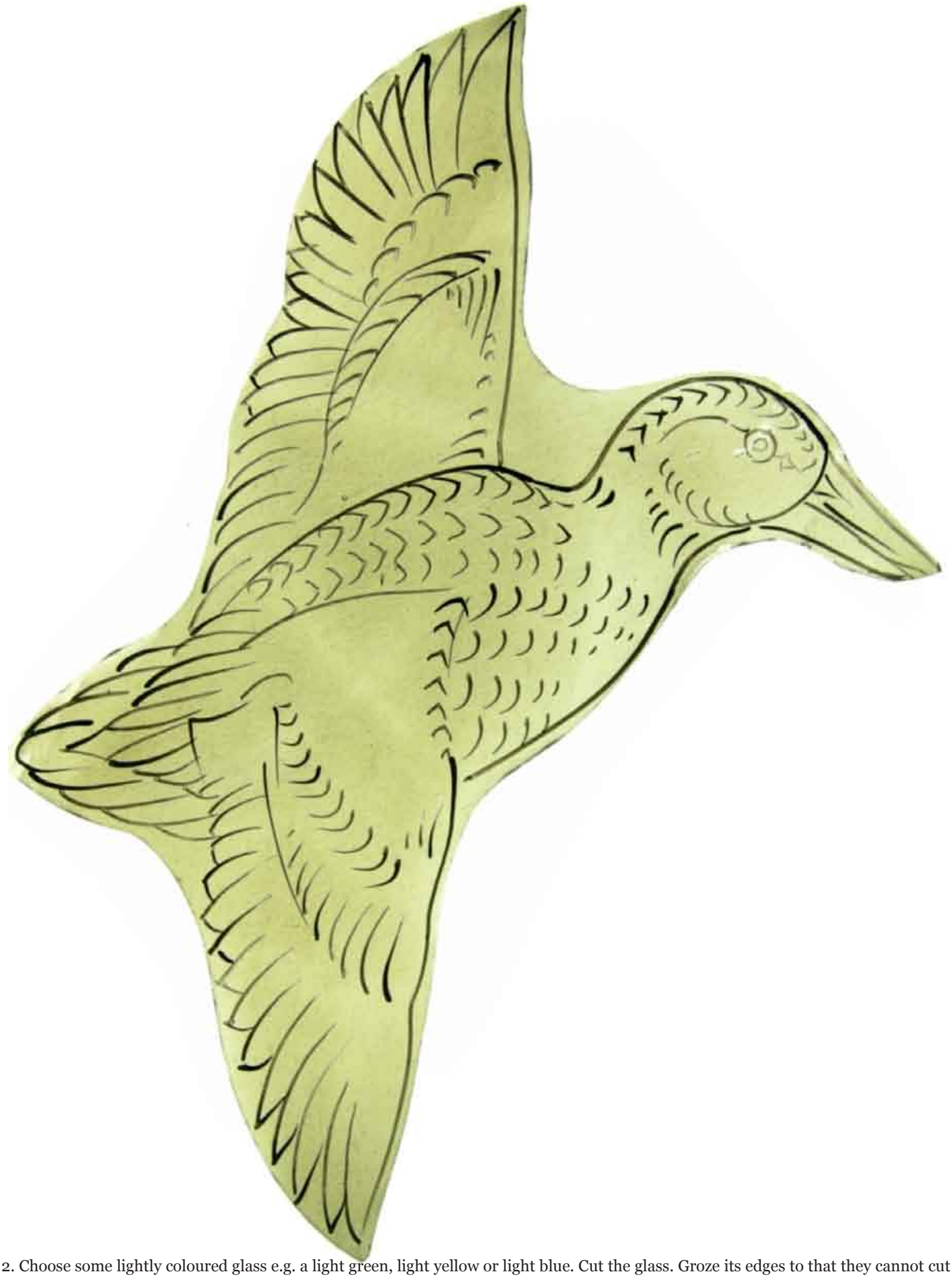
23. This is what our glass looks like when we've finished blending

24. Leave the oil-based paint to dry overnight, then use a stick to pick out the highlights once again

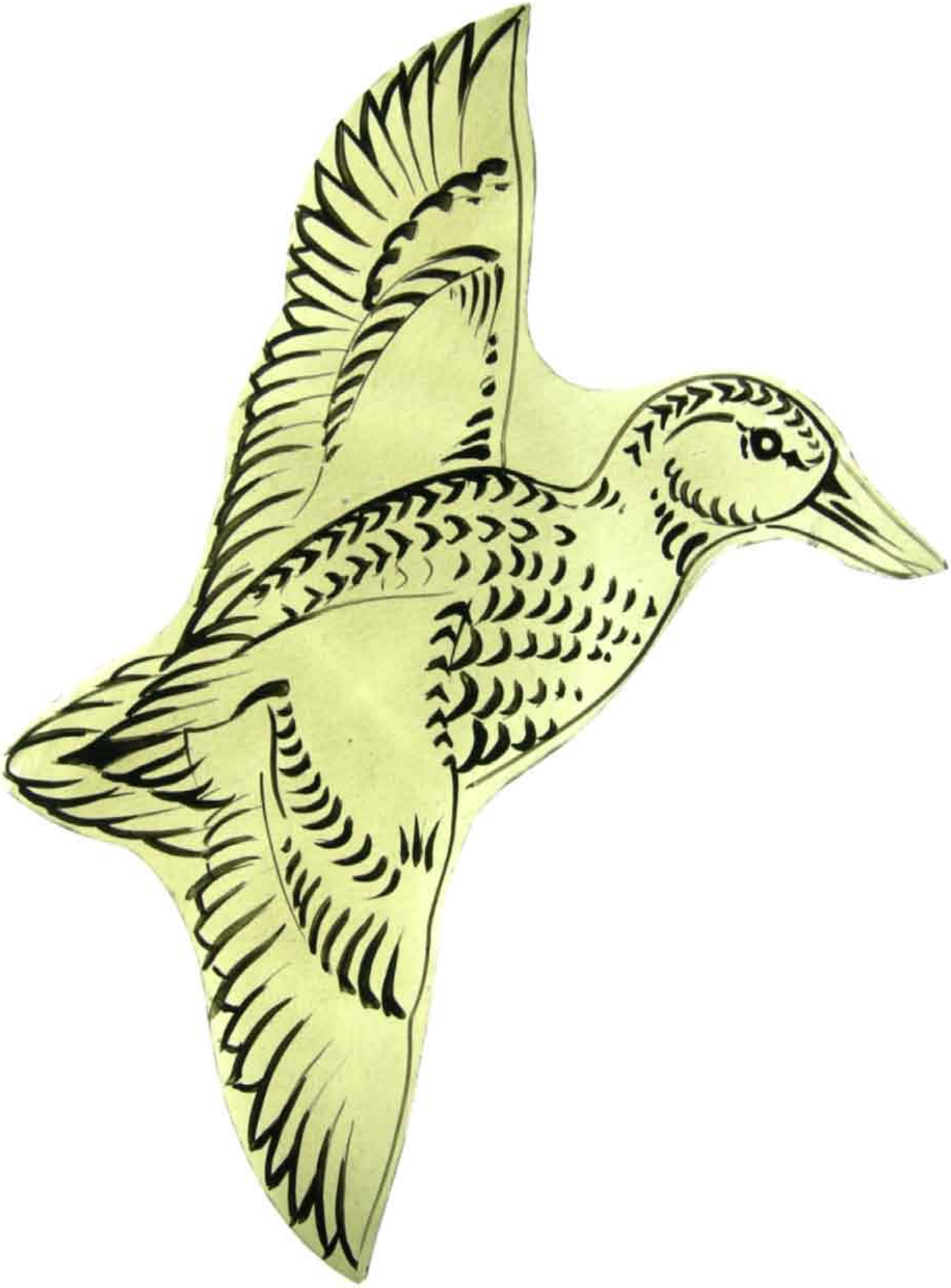
25. Fire the glass. Once fired, our glass looks like this



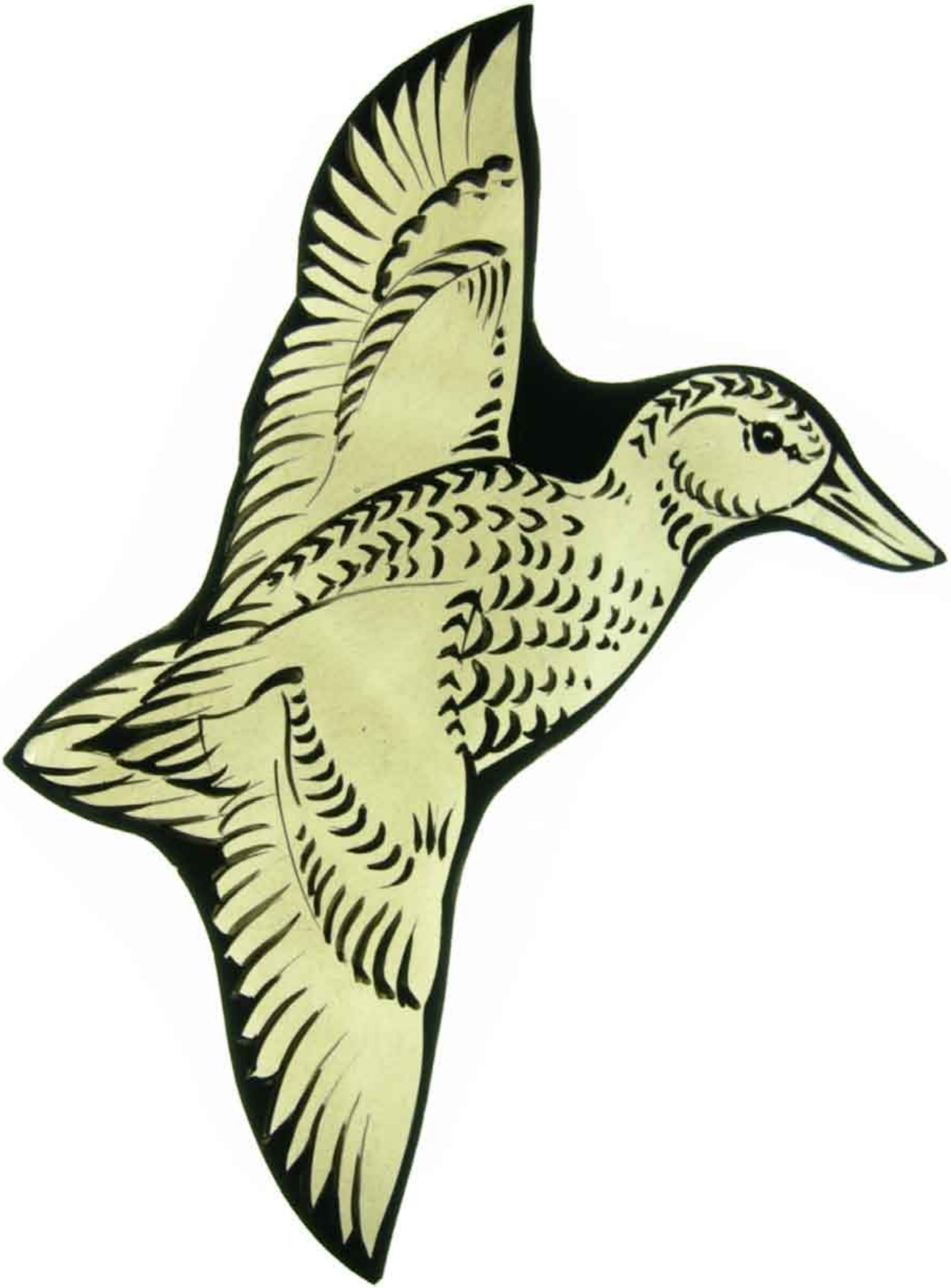
1. Here's the design for the second example. Copy it to a photographic application. Adjust it to the size you want. When you print it, make sure you instruct the printer to print a high-quality document.



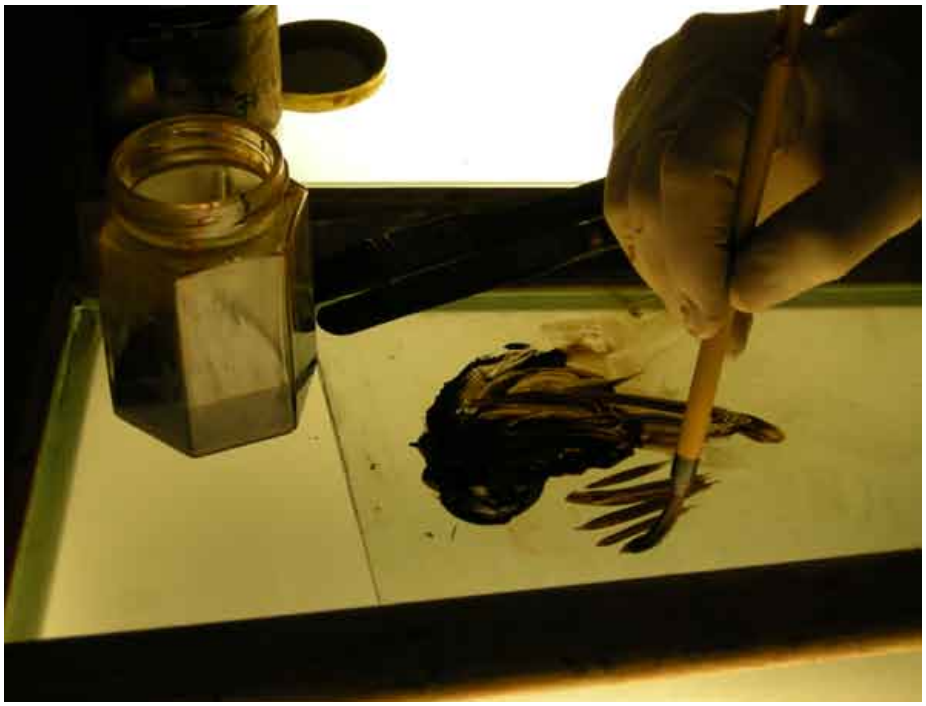
2. Choose some lightly coloured glass e.g. a light green, light yellow or light blue. Cut the glass. Groze its edges to that they cannot cut your fingers or the hairs of your brush. Clean the glass several times. Paint a light wash over the whole surface of the glass, and let the wash dry: see Chapter 2 for details. Lightly trace the lines you see here, and let them dry. As needed, reinforce these lines to make them medium-strength.



3. With a larger tracing brush, build up the lines. This is similar to how you built up the lines around the frog in Chapter 4. Use the medium-strength tracing lines as a wall: you build up paint *against* them.



4. Now it's time to flood. Mix some thick paint as described in Chapter 2: it's rather like runny melted chocolate. Load your brush and flood around the outside of the duck. Re-mix the paint each time you load your brush. Let the paint flow and fall from your brush. Do not interfere with your paint once it has left your brush: let it find its own level.



5. Get the oil-based paste that you prepared earlier and put it on your palette. Add some pure oil around its edges and dilute a little of the concentrated paint. Do NOT dilute all of the paste: just dilute a little of it, a little at a time.

6. Put the design on one side so that you can see it and know where to paint the shadows.

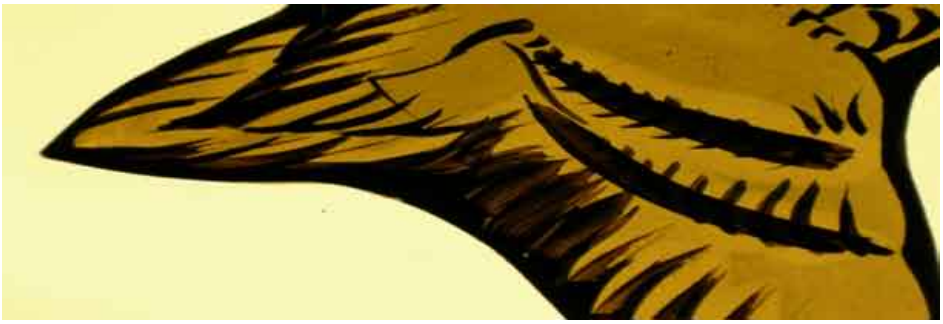
7. Now start to add some dark lines of oil-based paint.

8. Continue adding dark strokes of oil-based paint.

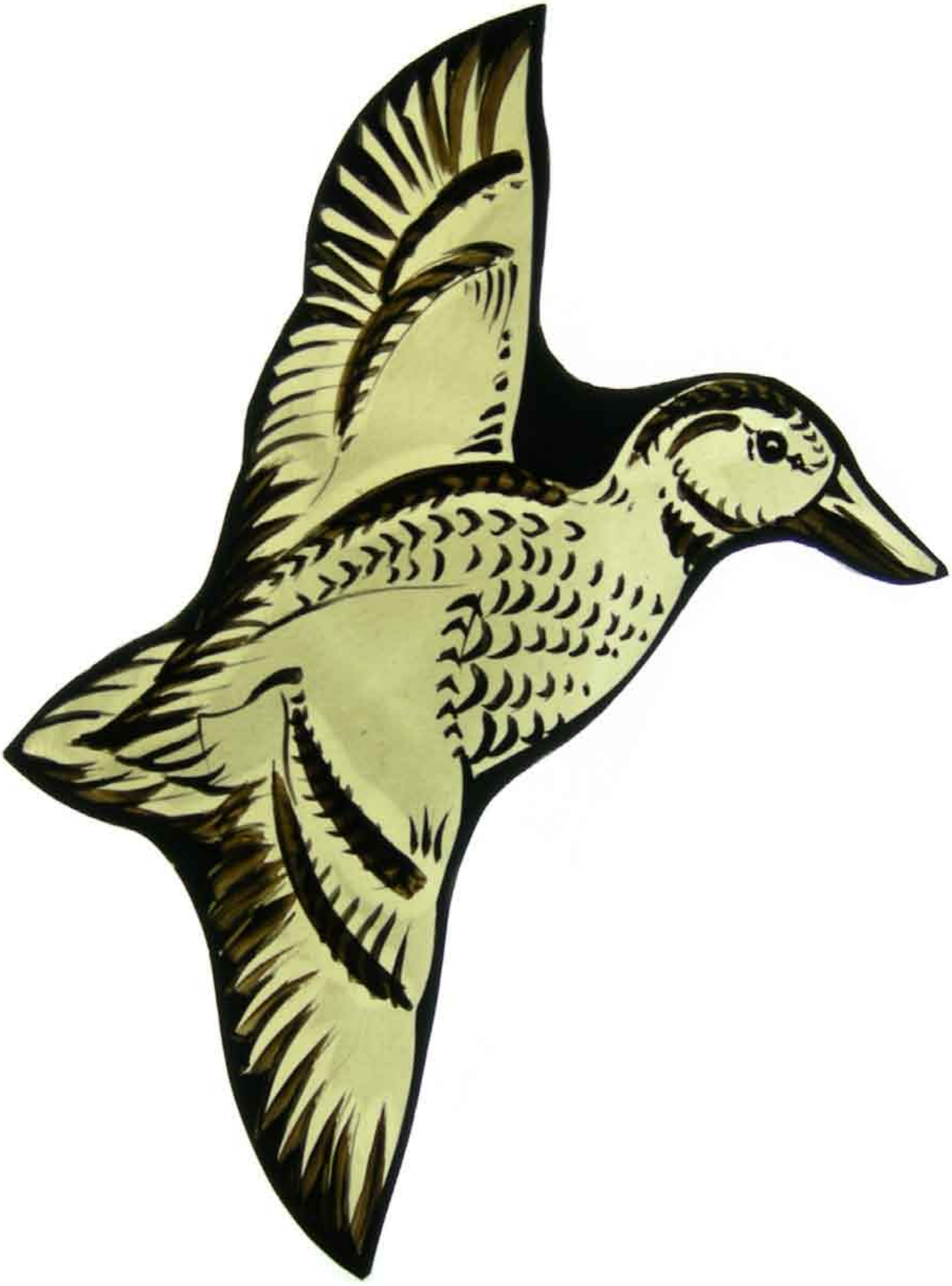
9. Always refer back to the design.

10. Add dark lines where you want to create soft shadows.

11. Be bold rather than timid.



12. You are putting down paint in order to be able to soften it in the next stage.



13. Here's what your duck looks like once you've added dark strokes of oil-based paint.

14. Add some more pure oil and make a light dry mixture. Again, do NOT dilute all of the paste: just dilute a little of it, a little at a time.

15. Mix this paint thoroughly.

16. Use this mixture to paint *all around* the drak oil-based strokes.

17. Here's a close-up: go right up to the edge of the dark strokes but do not go over them.

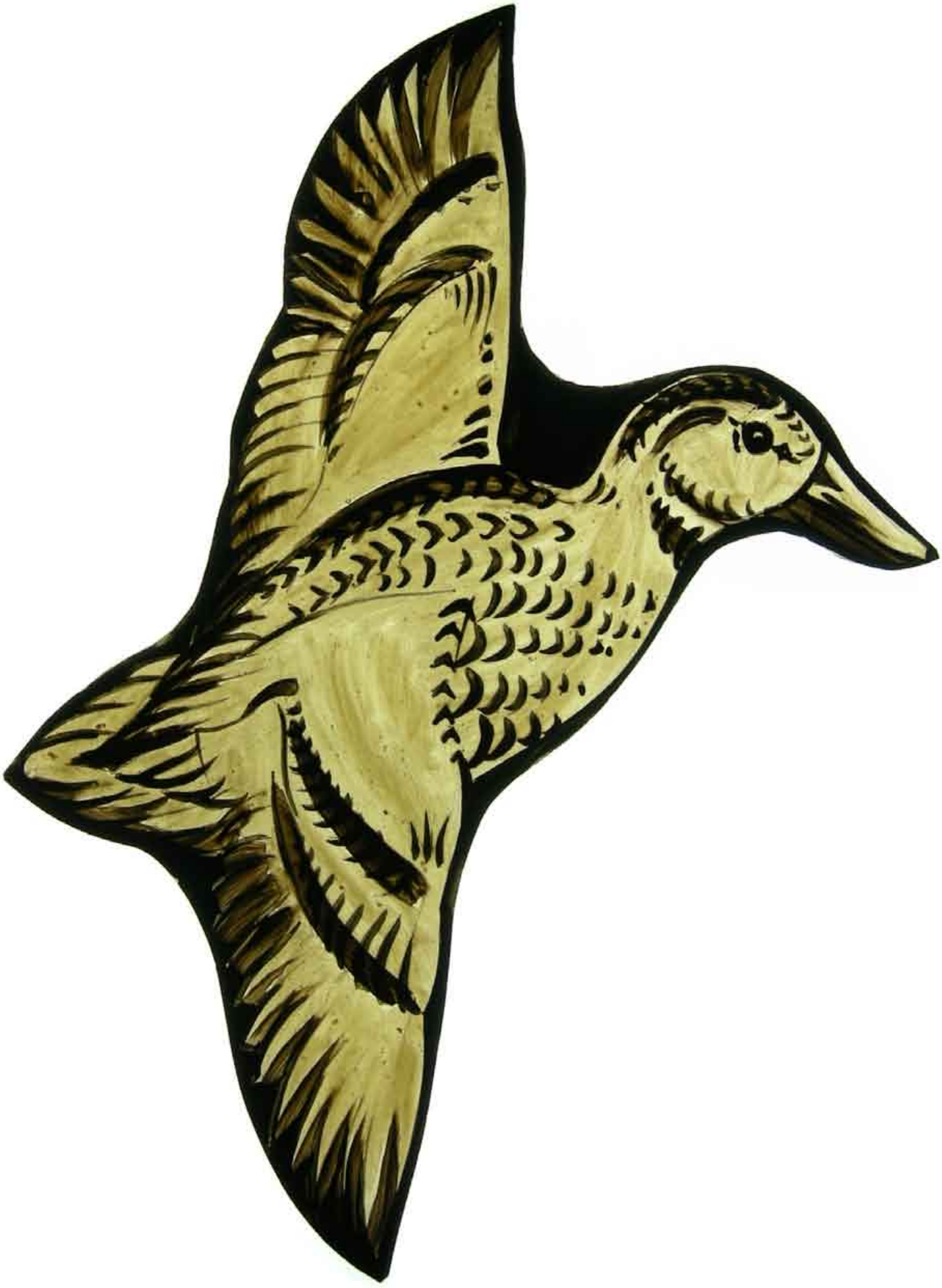
18. Keep mixing your paint and loading your brush.

19. Take care the paint doesn't drip.

20. Paint carefully between the dark strokes.

21. Do not disturb the dark strokes of oil-based paint.

22. When you've finished, adjust the lighting to check that you have carefully covered the *whole* surface of the glass with oil-based paint. Everywhere on the glass there should be either dark oil-based paint or light oil-based paint. Here you can see an area that we missed, so we will have to paint over it.



23. Here's the duck: it's now thoroughly covered with oil-based paint. See how our light oil-based paint hasn't disturbed the dark strokes of oil-based paint: we've only taken the light paint to the *edge* of the dark paint; we have *not* painted over the dark oil-based paint.

24. Take a clean small badger-haired softener like the one you see here.

25. Gently soften the dark oil-based strokes.

26. Blend them with the light oil-based paint.

27. You can push the oil-based paint in many directions. This may surprise you to begin with. Just use your blender lightly. Also note that blending will dry the oil: eventually, your blender will begin to leave marks in the paint, so stop before you reach that point.

28. When you've softened the edges of the dark oil-based strokes, take a clean short-haired stippler.

29. Use the stippler to make some highlights.

30. Use the stippler to cut through both the oil-based paint and also the water-based paint. But only cut through light paint, not the dark strokes or any of the flooding.

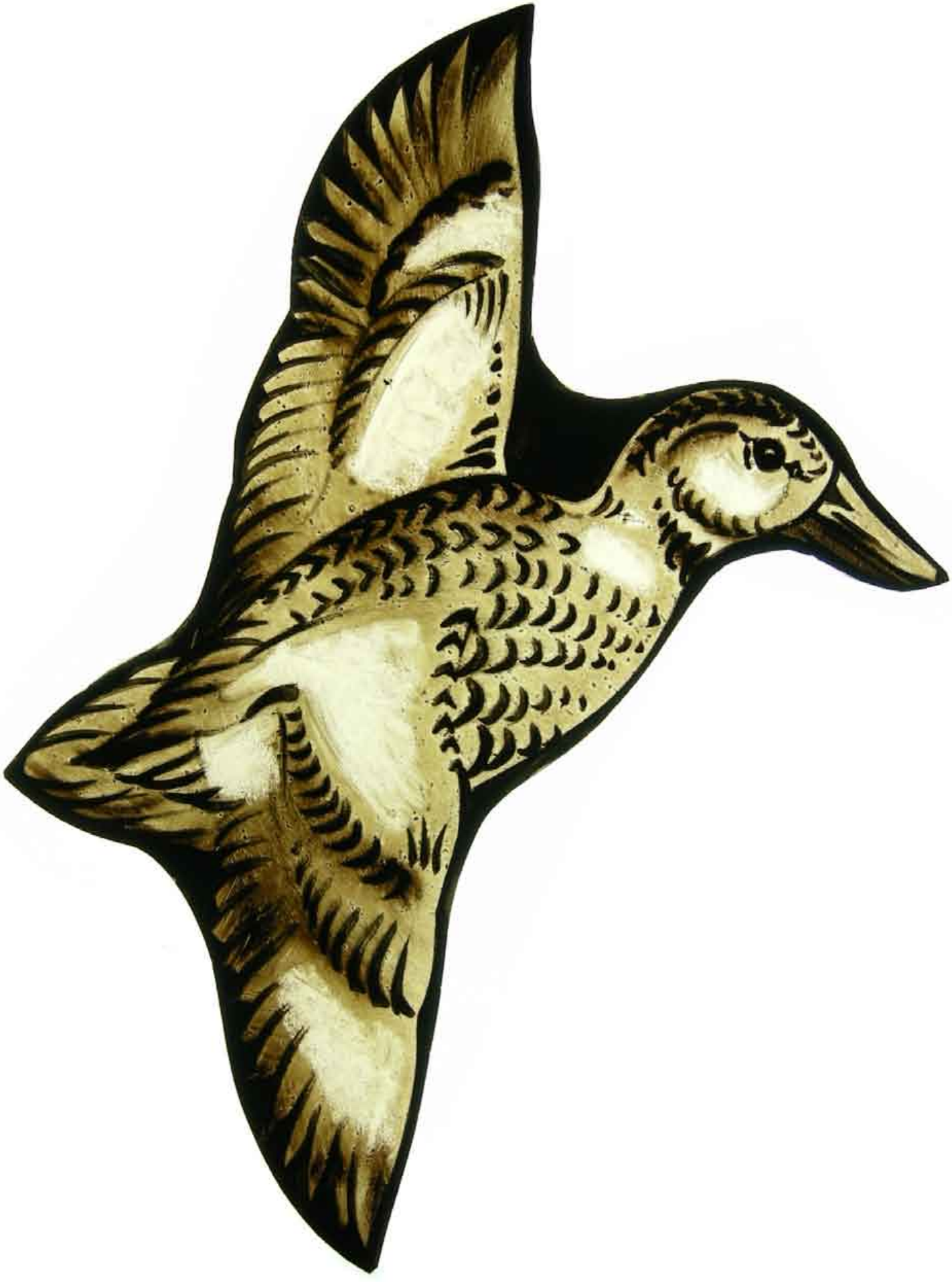
31. Cut through the light oil-based paint and also the light water-based wash that you painted at the start.

Do this on the wings and neck, and also around the face.

32. Take some soft tissue paper or kitchen roll: something absorbent.

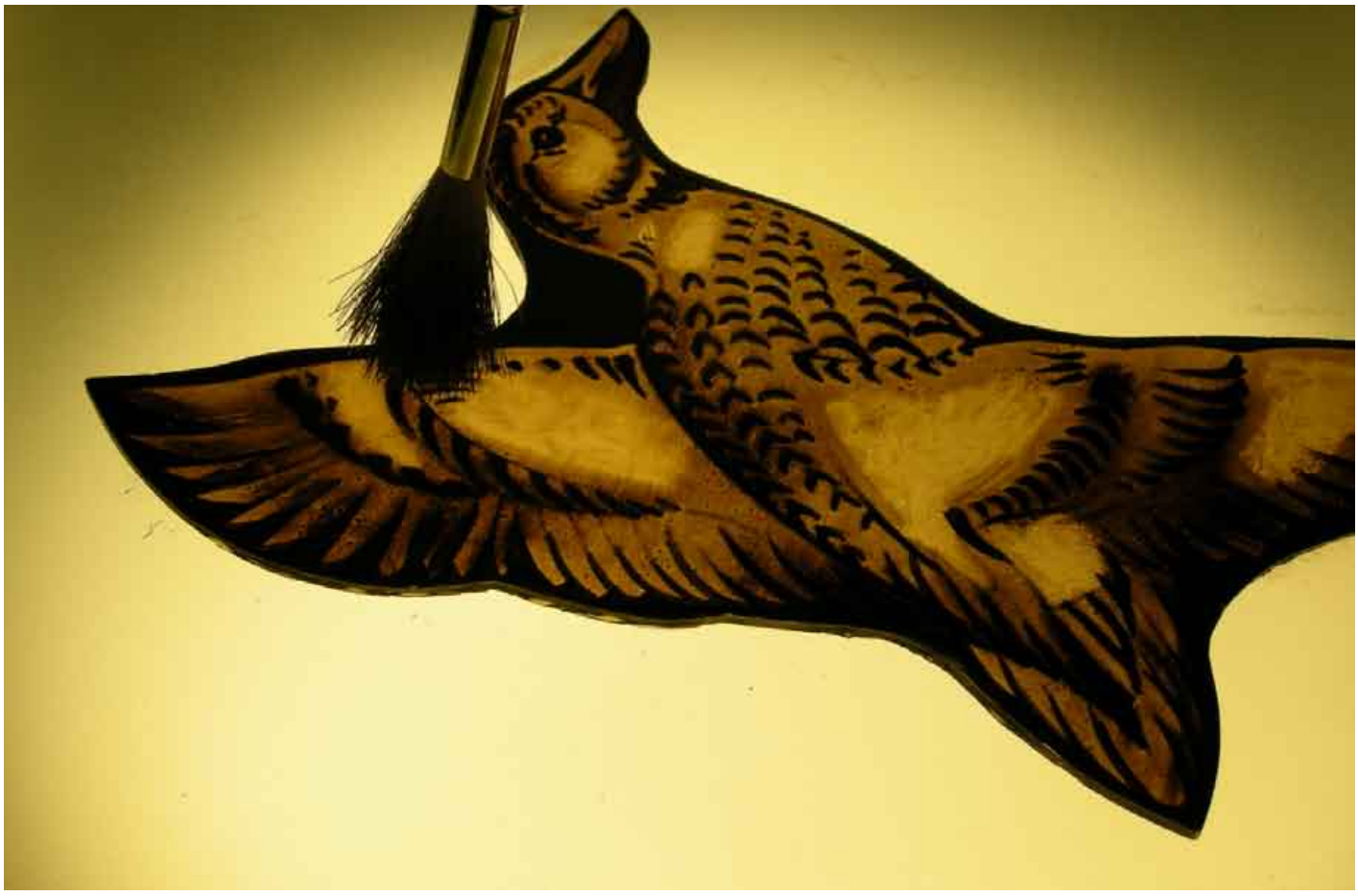
Scrunch the paper up. Use it to lift off oil and paint.

33. Gently and carefully clean the areas that you highlighted with the scrub.

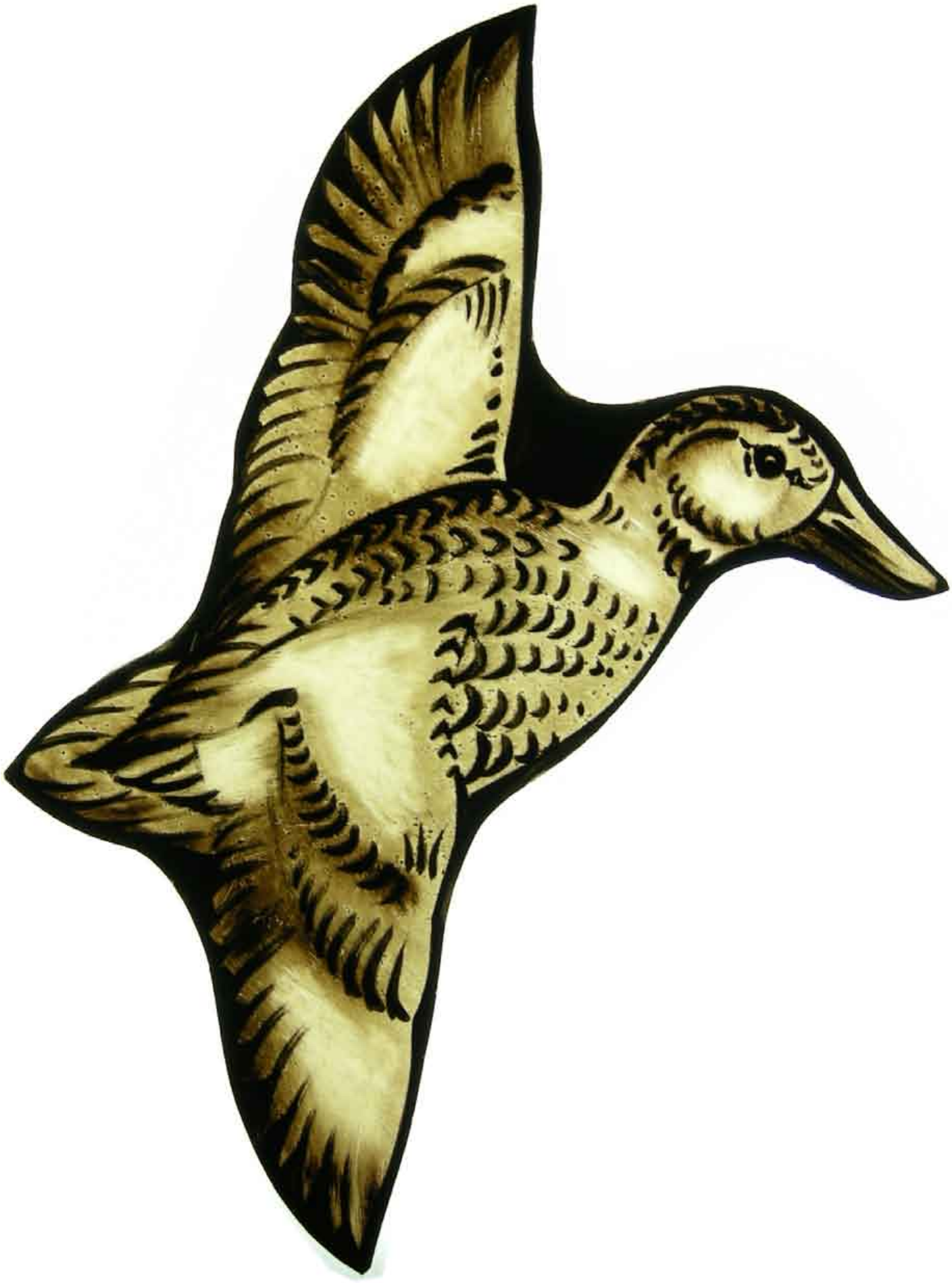


34. Once you've used the absorbent paper to dab away the paint from the lighter areas, this is what your duck looks like.

35. Now take your small round blender once again.

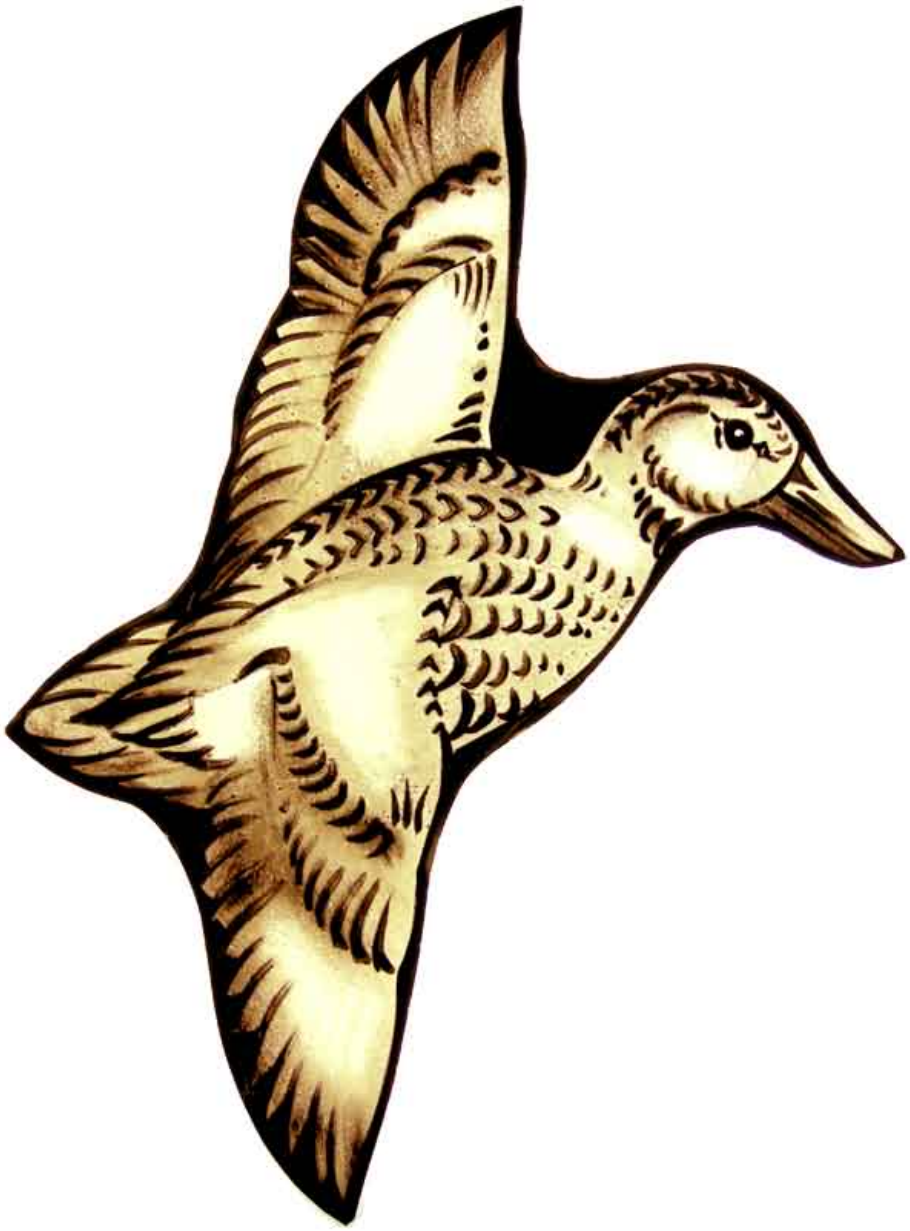


36. Blend and soften the highlighted areas with the darker areas around it. Do this very gently, because the highlighted areas are by now quite dry.



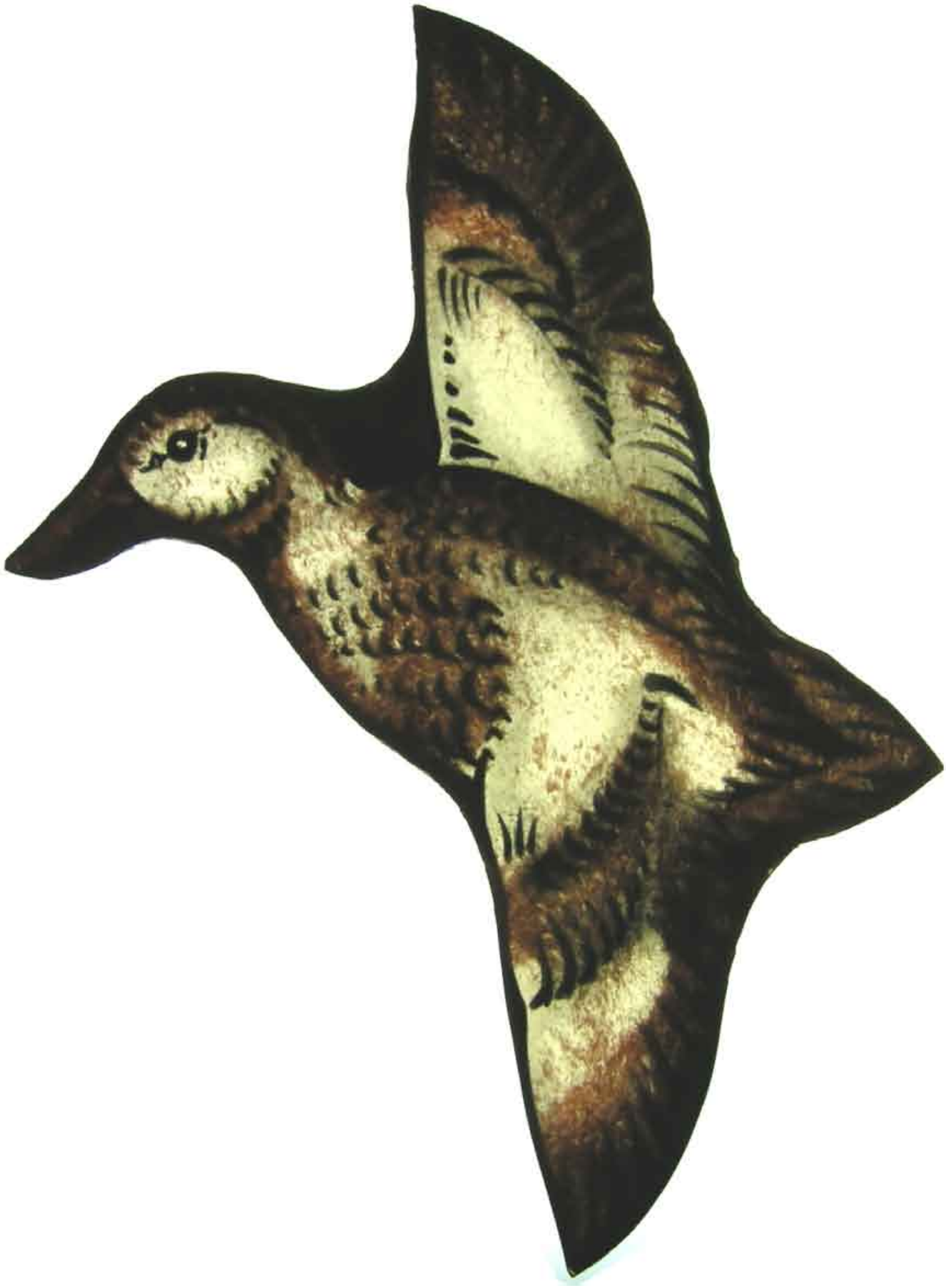
37. Now your duck looks like this.

38. The last thing to do is to make a highlight in the middle of the eye.

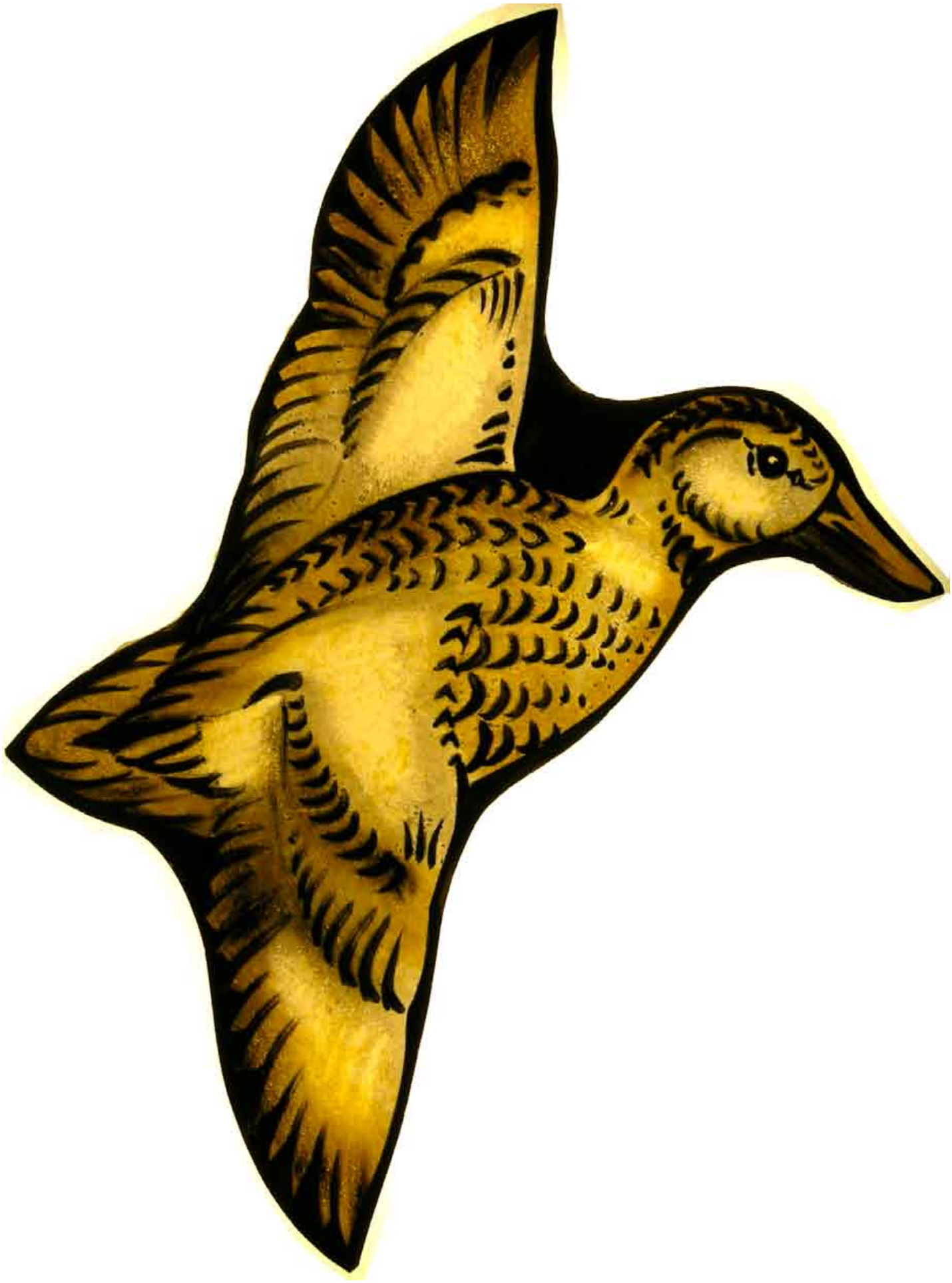


39. Then fire your duck. This is the typical schedule that we use:

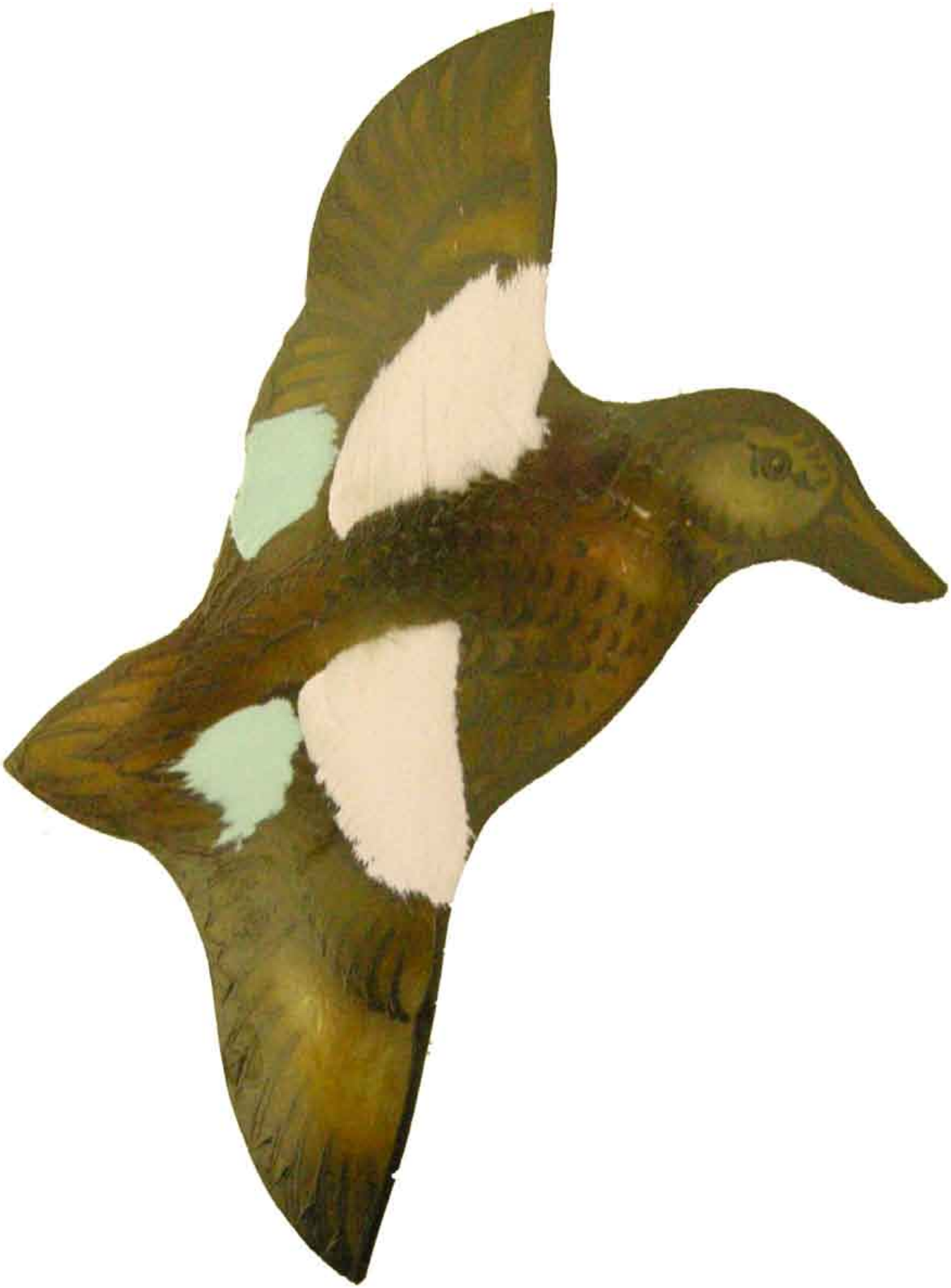
1. Take 2 hours to go to 100^{0} centigrade / 212^{0} Fahrenheit and soak for 1 hour.
2. Take 2 hours to go to 675^{0} centigrade / 1250^{0} Fahrenheit.
3. Soak the glass at this temperature for between 3 and 5 minutes in order to get a smooth and glossy surface.
4. Descend as fast as the kiln permits to 560^{0} c / 1040^{0} F.
5. Soak for 5 minutes.
6. Descend to 530^{0} c / 985^{0} F at 10^{0} c / 50^{0} F per hour.
7. Allow the kiln to cool at its own pace.



40. **Optional**. Once fired for the first time, we also painted some silver-stain on the back and stippled it to give it texture. Then we fired the duck a second time: this time just to 560^0 c / 1040^0 F (no soak) then straight down again. Please note: silver-stain is a "sensitive" paint, and you will need to do your own experiments here.

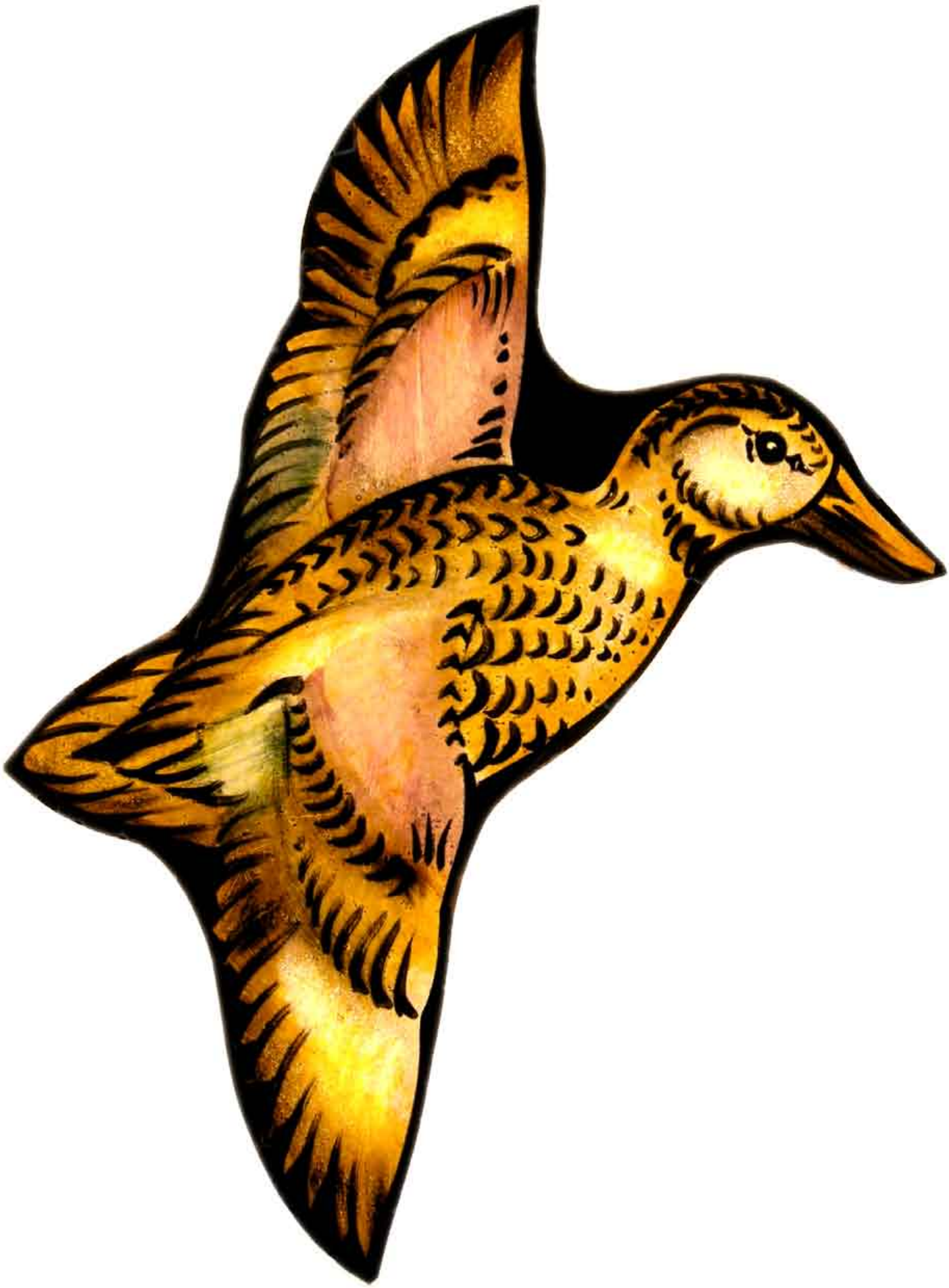


41. Here's the duck with fired silver-stain.



42. **Optional**. We also painted some transparent red enamel and some transparent blue-green enamel on the body of the duck. This photograph was taken with the light-box turned off so that you can see exactly where we painted the unfired enamel. This is on the front of the duck. We then fired the duck again: again to 560^{0} c / 1040^{0} F. This will depend on the kind of enamels that you use.

Please note: it is possible sometimes to fire the silver-stain and the enamel in a single firing.



43. Here's the finished duck.

A wonderful technique

This one-firing method is a wonderful technique: that's what we said at the start, and we're sure of it. And now we hope that you're similarly excited about it.

Beginners

If you've never painted glass before, our approach really gets you going.

First up, you learn to mix glass paint properly.

Then, with painting lots of silhouettes – and it is important to paint a lot of them – you learn how to paint an undercoat, how to copy-trace, how to reinforce and how to flood.

By which point, there's not much to hold you back, so next you learn to shade *before* you trace: wonderful!

Then you trace directly and make different kinds of highlights.

And finally, you discover oil.

So, any beginners who follow this sequence will quickly gain confidence and skill.

Improvers and other glass painters

Many of you will already have painted glass. And we're confident that we'll also have shown *you* many new ideas.

For example, not many people will have appreciated the benefit of painting with a lump of glass paint. Nor will many people have used an undercoat, or shaded before they traced, or painted with oil on top of unfired water-based glass paint, and so on.

Also, we know from our own experience, the two of us (David and Stephen) working together, how useful it is to throw ideas around and talk about them in the open. And we hope that you will feel the benefit of working with us like this: it gets us thinking, and it gets you thinking.

Other techniques

There are so many ways of painting on glass. We ourselves don't always shade before we trace, we don't always paint an undercoat, we don't always paint with oil.

It all depends on what it is that we (and you) want to say.

The one-firing method described in this book is just one technique amongst many.

It's important and useful not to be dogmatic: not to insist that any particular way is the only way.

That's why we've also prepared a series of step-by-step stained glass painting projects which also show you how to do things differently.

You see, techniques make great *walking sticks*; but you don't want to become so dependent on them that they become *crutches*.

So, now that you know this one-firing technique, you're more skilful than you were before. You have a greater choice than you did before, and that is marvellous.

But you need to make the technique your own, to develop it in your own way.

We are always thinking new ideas, and we often pass them onto you as free newsletters (if you've opted in).

And it's exciting for us to know that you too will think new ideas: in so many ways, we could ask for nothing more than that.

P.S. Remember that you can write and ask us questions: we value our conversations with you!