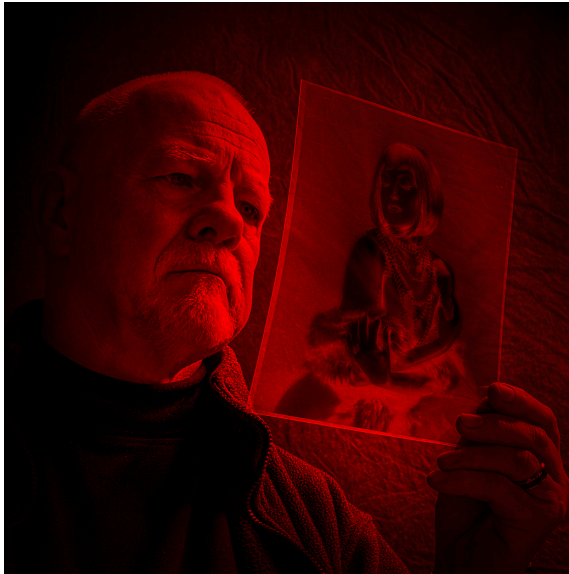


The New Ambrotype Handbook (2026)

(WET PLATE COLLODION PROCESS)



Introduction

My first attempt at writing a manual for this type of historic process was in 2020, - nearly 3 years after I first began my journey into this fascinating (and frustrating) technical and artistic form of photography. Nearly nine years in, I'm still mesmerised by the sheer complexity of the process and utter joy at getting a satisfactory result, which I have been proud to display on my own walls.

The initial aim was to dispel some of the myths and technical 'ramblecrap' produced by the mainly American authors, that either failed to fully educate the reader or just bamboozle the practitioner with terms alien to the English language! Don't get me wrong, I've been immensely grateful for all the guidance I have received along the journey to this point. I feel however, that I am able to add my own spin on the process with my own tweaks to the formula and method. I've come a long way....

Wet plate, is the process of capturing a photographic image onto a solid plate of glass (Ambrotype) or metal (Ferrotypes/Tintypes). The surface of the material needs to be sensitised with chemicals so it can record the image, but the whole process (including development) needs to be completed before the chemicals dry, hence the name 'wet plate'. Early practitioners were often referred to as 'alchemists' due to the fact that they mixed variations of the original formula from raw materials, many of which were highly toxic! Images can be recorded in many cameras adapted for the purpose, however the equipment of choice is a field or large format camera, which behaves like a 'camera obscura'. In other words, images are captured back to front and upside down. Large format cameras allow large images to be captured directly in camera and when

creating Ambrotypes, the image can be corrected by reversing around to view as normal.

Characterised by their artefacts (Arty-facts) at the edges of the plates, the images are not 'perfect' in the modern sense of the term, however it is precisely these imperfections together with the originality of the images (there is only one), that makes them unique. Many of the chemicals and equipment required for the process can be bought from specialist suppliers (I have tried to list as many of them as I can within each section). Chemicals are available in premixed form and are completely safe, so there is little difficulty in making images and no more dangerous than working in a traditional darkroom. That said, there is immense satisfaction with taking control over the entire process from start to finish, mixing chemicals, making plates, taking images and producing unique, 'one of a kind' originals that the majority of today's photographers are unable to create.

I will take you through the process in the order that it happens, describing my personal mix of chemicals and including the equipment you will need to create your own Ambrotypes. Creating tintypes is almost identical without the first step of cleaning the glass.

A Little History

Louis Daguerre developed his Daguerrotype process in 1839, closely followed in 1841 by the Calotype developed by Henry Fox Talbot, but relied on paper negatives and were 'one of a kind' derivatives. This meant that they were expensive, and difficult to make.

The Collodion technique was first theorised in 1850 by Frenchman, Gustave Le Gray, but it is not until a year later that Englishman, Frederick Scott Archer published and introduced the process based on Gray's theories in 1851, and so became the most popular photographic process right up to the 1880's.

The fact that many copies could be made from a single glass plate Ambrotype made it popular with the Victorians. Many of you may well be familiar with the Ferrotype (or Tintype), from which American Civil War images were captured. The Frototypes were very durable and soldiers could carry them in a pocket of their uniform without sustaining significant damage.

With the ability to produce Albumen prints from Ambrotype glass plates, the process developed into Carte de Visite (visiting card or



Frederick Scott Archer (1813-1857)

CDV) which was very popular with Victorians from around 1859. The CDV tag was due to their size which was similar to a business card of the day. The thin paper print was mounted on card, mass produced and collected (just like stamps). Cabinet cards were larger and came in around 1870 and remained popular until the arrival of the Kodak brownie in 1900. Thus, the popularity of dry film emulsion and the explosion of modern-day photography which was accessible to everyone, became the norm.

Ferrotypes were actually made from thin iron sheets but were called Tintypes by the Victorians due the 'cheapness' of how they could be reproduced, and so the name stuck! These tintypes are still collected today, but beware, many CDV's are advertised as tintypes but are actually paper copies from an Ambrotype. A magnet will stick to a tintype, (because it's actually made from iron) but not to a CDV.

Regular tintypes from the Victorian era are quite reasonably priced (£5-15), whereas civil war versions could be £70-250. Ambrotypes, if you can get hold of one, will carry a similarly high price due their fragile nature, even if they have no historical significance or are in poor condition.

Equipment

CAMERAS

It might sound daft, but I know of people who have come unstuck when they get the chemistry sorted and forget about how they will photograph their subjects! We need to use a field or large format camera, you know, the type where the photographer disappears under a black cloth behind a monstrous wooden box with a huge brass lens on the front.

This was true in the past and many photographers choose to continue in this vein, however vintage cameras from the mid 1850's and early 1900's can get quite expensive and have generally seen a lot of use. Beautiful as they are, they may also be quite fragile and you want to use yours, not just look at it!

The camera you buy will be determined by the maximum size of image you want to make. Unlike digital images that can be resized, wet plate images are taken at the size of the film/plate loaded in the back. They can be 'downsized' with what's known as a reducing back, but we will not complicate things here.

I suggest you start small with a 5x4 camera from Intrepid (intrepidcamera.co.uk). These



Intrepid 5x4" Camera

guys make new cameras to order and start from as little as £420 for the base 5x4" model and £620 for the 10x8" model. Lead times can be up to 8 weeks but it's well worth it and they will last you forever....

You can of course go for a fancy Sinar (or equivalent) rail camera costing much more money, but remember you don't know if it's worth the investment yet. You may find some used large format cameras on eBay, but I've yet to come across anything cheaper than a new Intrepid.

LENSES

Don't buy new! Although new lenses are available, they're hellish expensive and come with a UV coating. This process requires a lot of UV light to make images, so anything that blocks UV rays from reaching the sensitised plate is counter-productive. This doesn't mean you have to purchase an expensive vintage brass lens either. You can use coated lenses, it's just that they are not as efficient.

Scour the web (eBay) for second hand uncoated lenses with built-in diaphragms and shutters. These are quite numerous and reasonably priced but may be shipped from Japan, which means you will incur customs and other duties when they arrive in the country. You will need a 150mm lens for a 5x4 camera or a 300mm lens for the 10x8. These equate to an equivalent standard 50mm lenses at 35mm format. These lenses are guaranteed to be in first class condition and can start from as little as £350 including shipping. Be patient and shop around for a good one.

You will also see the lens marked as Copal 0, Copal 1 or Copal 3, (unless you have an antique brass one), this is an indication that the lens has an inbuilt shutter design and also an indication of the aperture size required in the lens board to

mount the lens to your camera. The lens board is then secured to the camera and will vary in size. Just think, interchangeable lenses in the 1850's.



Note the 10x8 lens board and 300mm lens on the left and 5x4 lens board on the right with 150mm lens.

Both lenses are Copal 0

If you buy a camera from Intrepid, you can also buy a lens board mount to fit perfectly with your camera and lens combination. Lens boards come in all sorts of sizes and finding the correct one for your camera could be tricky. Even if your lens comes with a lens board it may not fit your camera. The simplest thing to do if you're unsure is make one from marine plywood with the correct aperture cut in the middle to accept the lens. I bought a Copal 0 board direct from Intrepid when I ordered my 5x4, but made a 3D printed version for my 10x8 camera.

DARK CLOTH

In order to see the image on the ground glass screen at the rear of the camera, you will need to view it in subdued or even dark conditions. This is why you see photographers under a black blanket to focus the image. Contrary to what you may have seen you don't need a specialist piece of kit for this. Manufacturers will offer some pretty luxurious dark cloths for sale which basically cost a fortune for little return. Just buy some blackout curtain, a fancy-dress cloak, or even use your coat! This will be dark enough to see the image and enable focussing. There are however, some guys who want a Rolls Royce to go for the newspaper in the next street!



Under the Dark Cloth

LOUPE



8x Magnifying Loupe

You will need to see clearly when focussing under your dark cloth, and this is done with a magnifying loupe. Sharpness is critical and cannot be done with the naked eye. You may already have one of these in your studio. I have my original Agfa magnifying loupe from when I used to look at slides on my light box. You can get a cheap one from Amazon costing less than £15.

PLATE HOLDER

This is the most difficult piece of kit to give advice on as there is no modern standard. If you intend to use the camera for large format sheet film shooting, there are still quite a few holders available to purchase new and used to fit most cameras, however the wet plate process is over 150 years old, and finding suitable carriers for your plates can be troublesome.

Original plate sizes were generally referred to as follows:

- Sixteenth Plate 1.5 x 1.75"
- Ninth Plate 2 x 2.5"
- Sixth Plate 2.75 x 3.25"
- Quarter Plate 3.25 x 4.25"
- Half Plate 4.25 x 5.5"
- Whole Plate 6.5 x 8.5"
- Imperial/Mammoth Larger than Whole Plate.

When searching through vintage equipment you may well still see these for sale, but they are not cheap and were made of wood which may not be fully functional, warped or light tight. We also use different sizes these days (5x4, 7x5, 10x8 etc) and modern film stock is not exact – it's actually smaller than this!

Fortunately for us 'Ambrotypists', help is at hand....

I made my own plate holders in the beginning from wood, 3D printing or butchered film holders, however there are now several companies manufacturing bespoke wet plate holders and you can buy them off the shelf to fit 90% of all large format cameras. **zebradryplates.com**, make quality holders for many sizes. A 5x4" plate holder will cost about £95 plus tax (and shipping from Slovenia). A 10x8" holder works out about £175 plus tax and shipping. The beauty is that the glass plates can be cut exactly to 5x4 or 10x8 by your local glass merchant.

GLASS PLATES

In order to make a Tintype you need a suitable surface to be sensitised.....in our case we use trophy aluminium or laser engraving plate. However, we are dealing with Ambrotype Glass plates in this manual.

You can use plain 2mm float glass from your local framer. I usually get the framers to cut to the exact size for my holder (5x4", 10x8"). They cannot be sensitised without cleaning which is a very important part of making Ambrotypes as they have grease, fingerprints and other contaminants on the surface.

PLATE RACK

After washing or cleaning you need a method for allowing your glass to dry 'standing up'. This is commonly done in a Plate Rack. You could use a standard dish washer plate rack but commercial ones are available (either timber or 3D printed.) and cost around £40 (**Ebay**)



DARKROOM, DARK TENT OR DARKBOX

Some processing needs to be undertaken in 'safelight' conditions. If you happen to have an existing darkroom, then you're all set up to take images and process plates straight away. However, what if you're starting off or need to take your camera on the road? Plate processing needs to take place wherever your camera is, so making a portable solution that can be used anywhere is the best option.

You don't need to spend big if you don't have a lot of space at home or you want to carry it in your car on location. You can use a hydroponic grow tent (various sizes available at Amazon). I suggest starting with something like a 2m x 1.2m x 1.2m which is collapsible and can be erected in about 20mins. This means it doesn't have to be a permanent fixture and could be transported in the field if required. The only problem is the zips are all on the outside and you will need some dexterity in closing the flaps. A perfect blackout room is not necessary as the sensitivity of plates is very slow, so slight gaps at the zips will not fog your plates.

Amazon has plenty for sale at around £80. The internal faces are reflective mylar and will help 'bounce' the red safelight around to make it easier to work. There is enough space for a small table to work off.



My original darkroom erected in the corner of the garage with a folding camping table.

Bespoke Darkrooms can cost as much as £900 and not as robust.

SAFELIGHT

There are a number of options available, but the two most popular are red strip LED's. These can be bought in 2m or 5m lengths and plug directly into a socket or are available with USB or battery powered options.

You can also cut an opening in the fabric of your tent and secure a ruby red acrylic sheet to form a window. This will allow daylight to be filtered and provide a safe red working environment. (See dark tent on left - ruby window in the rear wall). Both items are available from **Amazon**.



LED Striplights (£10)



3mm (A3) Acrylic Sheet (£16)

SILVER TANK

Apart from the usual developing trays for darkroom processing, you will need a special separate closed tank for sensitising your plates. There are several companies that make them (Lund Photographics, UV Photographic and Etsy), but tend to be a bit expensive. I had mine made by Lerouge, but sadly they no longer make them!

The best alternatives are manufactured by **zebradryplates.com**, and come in many sizes and will even manufacture a bespoke one if needed. Prices at the time of writing are €109 for a 4x5" tank and €179 for a 10x8" tank (plus tax and shipping). Remember that a 10x8" tank will also do a 5x4" plate so unless you know that you're not going to upgrade, go for the larger tank.



Zebra tanks come with a plate support (dipping handle), funnels for filling and are classed as 'travel' tanks as the lid closes to prevent spillages. This means that you can leave the silver in the tanks whilst in transit.

Chemicals

The following chemicals are what I use in my personal process and will suit all positive (Tintype and Ambrotype) images. Although there are variations to the ingredients, they essentially haven't changed from the original formulae published in the 1850's.

1. Salt Bath (**Silver Nitrate**, Distilled Water)
2. Collodion (Plain or non-flexible USP Collodion, Denatured Alcohol, **Ether**, **Cadmium Bromide**, Ammonium Iodide)
3. Developer (Ferrous Sulphate, Glacial Acetic Acid, Denatured Alcohol)
4. Fixer (Sodium Thiosulphate and Water)

Chemicals in **RED** are the most difficult to use and store, so safety precautions must be observed when handling them, for the reasons described below

DISTILLED WATER Always use distilled water (not de-ionised) when mixing primary chemicals. De-ionised and tap water contain contaminants that will affect the 'purity' of the process. The only exception is the final washing of the plate. (**Amazon**)

SILVER NITRATE (AgNO_3) This is one of the most expensive chemicals used in the process and its price can vary due to the precious metals market. If mishandled, this can cause blindness and is corrosive so wear eye protection when handling. It will stain almost anything it comes into contact with. It will eventually wear off skin (2-3 days), but will not come out of clothing! Although the first batch is costly to make to make, once expended it can be revived with little added outlay. It takes a little getting used to, but if you want to keep your costs down I will explain in the mixing chemicals section and is something you need to master. (**sales@rose-chemicals.co.uk**, **johnbrewerphotography.com**, **fishersci.co.uk**)

COLLODION Make sure this is USP or plain collodion, this will also contain some ether, ethanol alcohol and nitrocellulose. This is not able to be used on its own and requires an Iodizer to be added. The Iodizer helps with flowing the solution over the plate, adhesion and keeps the solution from drying out too quickly. The collodion and Iodizer (see mixing collodion section) can be stored separately and have an extended shelf life (1-2 years). Premixed collodions may expire after 1-2 months. (**johnbrewerphotography.com** for premixed, **mamut-photo.com** for USP collodion and premixed)

DENATURED ALCOHOL (Ethanol) This ingredient is common to most of the solutions used and can be substituted with Grain Alcohol (Vodka) or Ethanol (difficult to obtain in most countries). Do not use Isopropyl Alcohol as a substitute. Denatured Alcohol is toxic and you should not drink it. It helps slow down the aging process of collodion. (**Amazon**, **Ebay**)

DIETHYL ETHER Used in collodion to prevent ridges forming during 'flowing the plate' in warm weather. It also helps when pouring collodion onto larger plates. Whilst there are collodions that do not contain ether, these tend to be weaker formulations and may 'lift' or dissolve during fixing or final washing.

Ether is stable when sealed, however, once opened peroxides can form when in contact with oxygen and may even explode when unscrewing the cap or being too close to a heat source (a common problem during the early years, leading to the deaths of many a photographer). I and many others recommend using the ether up completely after opening to avoid the problem altogether. Mixed with alcohol and salts, the problem is neutralised and makes an **Iodizer** to mix with the collodion and also has a long shelf life.

This should be ordered only in the quantities you need and used all at once. This will negate any problems of storage and safety issues. **(Ebay)**

CADMIUM BROMIDE This chemical is a heavy metal and should be handled with extreme care as it is carcinogenic. Always wear your protective gloves, mask and eyewear.

This is the main salt for the collodion and helps with tonal range and shelf life. Collodion has a compressed tonal range when compared with normal black and white photographs and we need all the help we can get. Using CdBr extends the tonal range of the green spectrum. When the Cadmium Bromide interacts with the silver nitrate it forms Silver Bromide (AgBr).

(johnbrewerphotography.com, sales@rose-chemicals.co.uk)

AMMONIUM IODIDE This is another salt used in the collodion and helps with the contrast and speed (if you can call ISO1 speed)! It also has the adverse effect of shortening the shelf life of the working collodion but positive effect of shorter 'ripening time' (the time between making and using). This ripening time can be as little as two hours, whereas other Iodides (potassium iodide) will have longer shelf life and longer ripening times (perhaps 2 months before it can be used)!

(johnbrewerphotography.com, sales@rose-chemicals.co.uk)

FERROUS SULFATE Also known as Iron, it's the main ingredient in the developer. Buy the green crystals as they have the highest purity. This reduces the halides on the plate to pure metallic silver. **(Amazon)**

GLACIAL ACETIC ACID Glacial acetic acid acts as a restrainer in the developer to prevent it from acting too quickly and overdeveloping. Normally an image will appear in about 15 seconds which has to be arrested quickly with water.

(sales@rose-chemicals.co.uk)

SODIUM THIOSULFATE Also known as 'Hypo' it is used to dissolve the unexposed silver from the plate and fix the image. This is less contrasty than fixer made with potassium cyanide leading to duller highlights, however its easier on the mid tones, inexpensive and safe. You should therefore mix a fresh

bath every 10 (5x4) plates or so, to ensure optimum quality. Or after every 5, 10x8 plates. Use fresh Hypo at the start of each session. **(Amazon)**

HEALTH AND SAFETY

All of the above chemicals (particularly the ones in **RED**, have corresponding Safety Data Sheets (SDS). As a responsible photographer I suggest you familiarise yourself with the hazards and safety precautions needed when handling these substances.

I suggest you also obtain some of the following items from Amazon, when making a shopping list!

Safety goggles/glasses

Latex gloves

A half mask respirator, suitable for filtering chemical fumes.

Process and Formulae

GLASS CLEANING

Calcium Carbonate	<i>(Amazon)</i>
Washing up liquid	<i>(Supermarket)</i>
Cotton Wool/Paper Towels	<i>(Supermarket)</i>
Isopropyl Alcohol (Isopropanol)	<i>(Amazon)</i>

Plates need to be squeaky clean before flowing with collodion and this solution will make sure that no detritus affects the film or clarity of the image and also helps the adhesion to the glass.

Place a small amount of Calcium Carbonate (less than 1/4 of a teaspoon) with a few drops of washing up liquid. With a cotton wool pad/ball, thoroughly rub the surface to remove all contaminants (on both sides), then rinse the plate under running water. Finally, stand in your plate rack to dry.

Just before preparing to apply an **Albumen Substrate** (Subbing), use a paper towel and isopropyl alcohol to clean the surface one last time before preparing to pour the substrate.

SUBBING (ALBUMEN SUBSTRATE)

In order to get great adhesion between the Collodion and the glass plate, I recommend 'Subbing' with Albumen. Not needed for Tintypes, but may be necessary to prevent 'lifting' of the collodion during the developing, fixing and washing cycles.

Egg white	1
Distilled Water	500ml
Ammonia	2 - 4 drops

Crack an egg and separate the yolk from the white. Only use the white part and do not allow the yolk to contaminate your mix. Add the distilled water and a few drops of Ammonia. Mix well for approximately 5 mins (use an electric whisk). Allow to settle for about an hour and filter through a cheesecloth into the final container in order to remove froth, bubbles and other detritus from entering the bottle.

Store in a cool place and discard after a couple of months as it will be pretty rancid by then!

MAKING YOUR COLLODION MIX

This is in two parts -

Iodizer first - Remember your aim is to stabilise the Ether and other chemicals so that they don't present a safety or health hazard. Use all of the Ether you bought. Other chemicals can be pro-rata. Use you Mask, goggles and gloves throughout this stage.

	To Make 200ml	500ml
Diethyl Ether	125ml	300ml
Denatured Alcohol	75ml	200ml
Cadmium Bromide	1.9g	4.75g
Ammonium Iodide	2.5g	6.25g

The chemicals can be mixed by hand using a glass rod and glass measuring beaker, however when you get into the process fully, a Magnetic Stirrer comes in very handy (**Amazon**). Store in a cool dry place in glass or plastic bottle.

USP Collodion - is mixed with your **Iodizer** in a ration of 1 : 1 - the fact that the two solutions are mixed together just before use, ensures that they will last longer over a period of time. A stronger collodion mix can be made at 1:1, which will thicken the collodion and allow for a 'harder' set. Some practitioners say that you can use without having to 'sub' your plates with Albumen, but I cannot comment on its effectiveness.

(1 : 1 ratio)	To Make 100ml	150ml	200ml
USP Collodion	50ml	75ml	100ml
Iodizer	50ml	75ml	100ml

Working collodion will go a long way even if making several plates. You will only use 10-15ml of solution for a single 5x4" plate. I tend to mix 100ml at a time and have fresh chemistry for each session, but it will last for about 3 months when unused.

Store in a small glass bottle and let it stand for about 2hrs before use (or better still the night before). Liquid should be a clear light amber colour and can be poured straight from the bottle. The colour will change and darken slightly towards red after prolonged storage and is pretty well done at this stage. Although it can be reconstituted with denatured alcohol, the mix will be pretty weak and the images may be quite fragile on your plates. It's better to store separately and mark 'old red collodion'. This can be used to excite your Silver Bath, instead of wasting fresh chemistry!

SILVER BATH (9% WORKING SOLUTION).

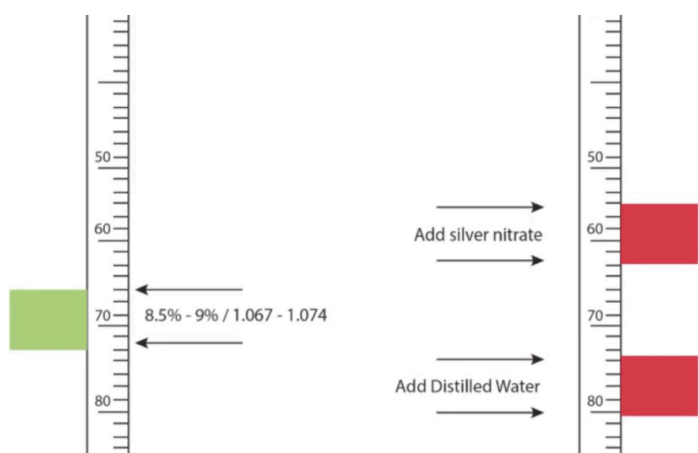
Simple to make but difficult to maintain (for some). Whilst it's a simple cocktail to make, maintaining it over time requires a little care. It's also expensive and you don't want to throw it away! Remember this stuff will stain your hands and clothes, so use precautions. Mask, apron, eyewear, and gloves are required for safety.

Quantities below are for 1000ml of working solution, but you can pro rata the amounts for lesser volumes. You will need approximately 250ml to fill a 5x4" silver bath tank and approximately 800ml for a 10x8" silver bath tank.

To make 1 litre of Silver Nitrate Solution

90g	Silver Nitrate Crystals
1000ml	Distilled Water

Mix half the crystals in 500ml of Distilled Water in a 1000ml glass bottle, measuring beaker or cylinder and mix until all the crystals are dissolved. Pour the solution into a storage jar and repeat for the other half of the crystals. It's easier to dissolve the crystals in part rather than all at once.



Using a hydrometer, float into the stored solution and the Specific Gravity (SG) measurement should be at 70% (or 1.07 on the scale). This is exactly a 9% solution and perfect for sensitising plates.

If the reading is above 70% add distilled water, if the reading is below 70% add a few Silver Nitrate crystals until the reading is exact.

One last thing to check is the acidity level. Using a **PH testing strip**, dip the end into the solution for 1-2 secs and pull out to dry. The strips will have a colour guide on the packaging to measure against and unless you have inferior grade silver nitrate crystals it should be at around 4. However, it may be a little high (>4), if so you can add a few drops of **10% Glacial Acetic Acid** to lower the PH. Don't skimp on the PH strips, you will not get an exact colour match and buying cheap from China is not advisable. They're not expensive (about £7) so buy a good one. Some of them give readings in 0.5 scale which tend to be more accurate. Don't worry too much if your reading is not exactly at **PH4** (this is the ideal), anywhere between 3 and 5 should be OK.

Before using a fresh silver bath (one that's never been used), you need to 'excite' or 'charge' the solution. When the solution is in your tank, take a small glass plate and flow it with collodion (or Red Collodion if you have it), leave it in the tank overnight and it is ready to use. You can re-use the glass plate by cleaning off the old collodion and preparing it again for making an image.

SILVER MAINTENANCE

After a while the silver bath becomes exhausted and will not sensitise the plates properly (you will only learn this by experience). Plates will no longer have the milky smooth appearance of a properly coated surface and images will not stick to the plate. Plates will have low contrast, streaks or spots and will often be the first signs of the silver bath needing maintenance. See also troubleshooting at the end of this guide.

At this point you need to buy some more premixed or maintain what you have. It's expensive to buy new every time and difficult to dispose of correctly so it's worth learning how to do this.

Easy - After prolonged usage, the silver solution becomes contaminated with ether and other particulates from the plates and collodion. Pour the solution from the silver bath into a clear storage bottle that has been thoroughly washed with distilled water. Do not use tap water as this contains chlorine which will contaminate your silver solution even more. Use a funnel to catch any drops (remember this stuff stains) and filter as you pour by placing coffee filters or cotton pads in the base of the funnel. This will catch the initial contaminants from your silver bath. It will take some time as it 'drip feeds' into the bottle.

Remove the filters from the funnel and discard into a waste bin. The filtered silver solution now needs to be 'sunned' to remove any organic material left in the solution. The silver reacts with the UV light, turn black and drops to the bottom of the jar. Sunning is done by leaving the jar outside in the sun for several hours. (More sun = less time - not easy in the English climate). Leave the top off the jar and cover the opening with a breathable material like cotton. As the solution is sunned, any trapped alcohol or ether from the collodion will evaporate away and the cloth cover will stop insects or dust from falling into the

mix. The whole process might take a few days in the summer, but with silver going through the roof price wise these days, its no contest.

Professional - Some experienced practitioners with deeper pockets will 'boil' the solution, but involves buying some more gear and will be complete in about half an hour.

Boiling the solution removes impurities by heat which is then further filtered. You will need a heating mantle and boiling flask (or two). Pour the expended silver nitrate into a flask (don't over fill it) and then boil of about 10 mins and transfer it to another clean storage bottle. After it cools, pour into a vacuum unit and force filter it to remove the impurities which settle in the flask. Pour into a clean storage container.

Final Steps - Once sunning or boiling is complete we need to check the SG and PH as we did when making fresh solution. There is no need to 'charge' the solution before you use the silver bath as we did when making the fresh batch.

DEVELOPER

Developer is another easy mix to make, and as always precautions should be taken with eyewear, gloves and mask. The table below show the quantities for 250ml, 500ml and 1 litre. You only need 10ml for a 5x4" plate and 20ml for a 10x8" plate so don't make large amounts unless you're going to have a good run at it!

	To Make 250ml	500ml	1000ml
Ferrous Sulphate	20g	40g	80g
Denatured Alcohol	5ml	10ml	20ml
Glacial Acetic Acid	7.5ml	15ml	30ml
Distilled Water	222ml	445ml	890ml

Mix the Ferrous Sulphate with 200ml distilled water then add denatured alcohol and acetic acid. Mix well and top off with remaining distilled water. Store in a stock bottle and label it. Although I have given amounts for alcohol, this should be reduced to a low as you can get it (perhaps half), this is only required for flowing smoothly and easily over the plate. A fresh silver bath needs less alcohol in the developer than a used silver bath! Used silver nitrate hinders flow of developer.

Although the developer can be used in a tray as in normal print developing, it is not recommended due to the short developing time required (15 secs). It is also cheap to make and lasts a long time, therefore we only use it in a single shot (less than 10ml per 5x4" plate) and then discard it.

FIXER (HYPO SOLUTION)

Although developing can be done in a dip tank (similar to the salt bath), I prefer to do my development in an open tray as it's easy to see what is going on. Most fixing dip tanks will use less solution and have a clear screen to see the final image forming, however it's easier to keep the agitation of the image going through the process until fully cleared.

	To Make 500ml	1000ml
Sodium Thiosulphate	80g	160g
Distilled Water	500ml	1000ml

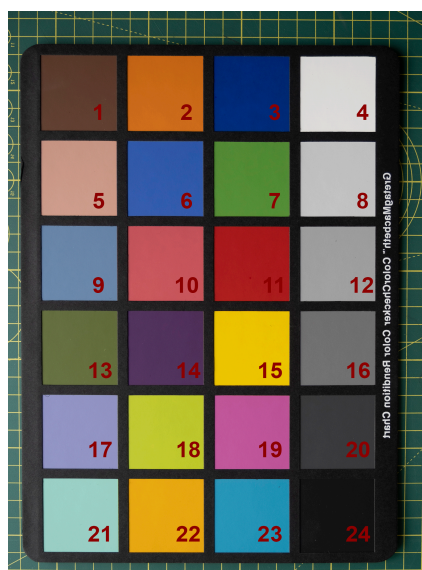
Mix Sodium Thiosulphate with half of the distilled water in a bottle and shake until dissolved. Top up with remaining distilled water and is ready to use.

Making Plates

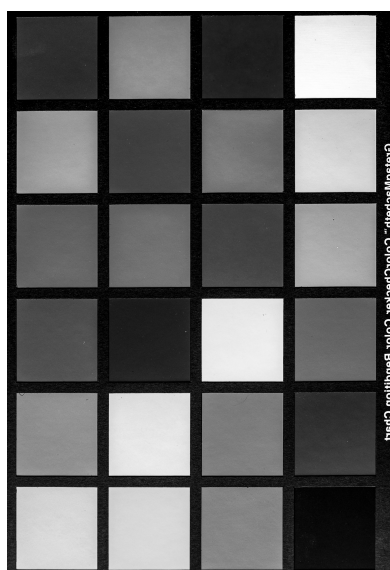
COLOURS AND TONAL RANGE

When making Wet Plate images, it can be confusing as to why some images are better than others. Take a look at the effect of colour and its relationship to collodion.

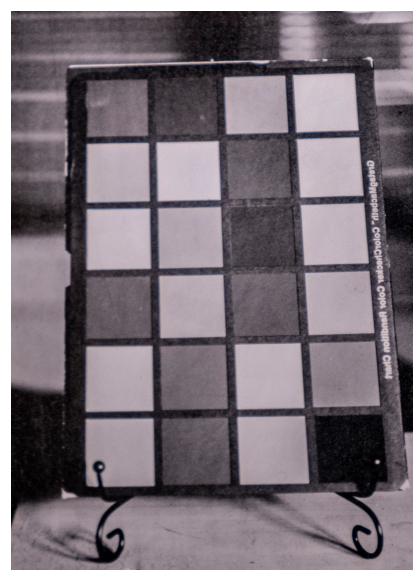
Collodion is a monotonal process which resolves colour images (in reverse) on extremely low sensitivity chemical layers, Using my trusty GetagMacbeth colour checker chart as a comparison. The colour chart is scientifically designed to ensure true to life images under any lighting condition. It gives an accurate representation of colours in nature and is accepted as an industry standard.



Colour



B&W Conversion



Wet Plate Collodion

Suffice is to say that collodion does not behave in a way that most of us would associate with 'normal' black and white imagery, either digital or film processes and has a sensitivity range of about ISO1. Exposure is also dependant on the available UV light, rather than the normal visible light spectrum to resolve the image on the sensitised plate.

The collodion tonal range is somewhat muted and compressed. We can see that comparing the colour patches with the collodion patches that warmer colours render darker from the midtone grey (patch 16), and the cooler tones render lighter from midtone. Greens appear to more representative of mid grey in the sample.

So how does this help us? Let's take a seascape – difficult to do with collodion as everything has to be produced on location....we may have blue sky, white clouds and turquoise waters. (Patches 3, 4, 6, 8, 9, 12, 16, 20, 21 and 23). All the patches are in the Lights range meaning that the tonal differences are minimal, making for an image with restricted tonal range. A digital image converted to black and white would be easy to manipulate the tones to give a pleasant image, however this is not possible in collodion plates. What you see is what you get.

Even in a studio portrait, a person with ruddy complexion and freckles wearing a red t-shirt will all reproduce in darker or midtones, also rendering a muddy or compressed tonal range.

If we look at the greyscale patches (white to black), the difference is extremely nuanced until squares 20 and 24. This means that the image will have to rely on the shadows and contrast contained in the image to provide separation in the tonal ranges. So, when choosing clothing and backgrounds for our portraits, the selection of clothing can play a big part in enhancing the result. Remember also that white is not actually white – it's silver!

The choice of colour within a portrait or scene is equally important as the composition. If the portrait subject has dark or ruddy skin, choose a contrasting clothing colour such a white, blue or green, then use lighting direction to produce sculpted shadows to provide depth. It's not always possible (particularly in a landscape), but if we understand colour relationship it may affect our choice of viewpoint.

EXPOSURE

We have already discussed the low sensitivity of collodion, so using a lightmeter isn't going to be much use, but it can help in getting us into the right ballpark. Most lightmeters will only let you set the lowest ISO to 3 and we will be exposing at about ISO1(ish). Add to that the collodion is most receptive to the UV component of visible light which is only a small part of the exposure value.

After a while, you will have a gut feel for the exposure, but again this is a best guess based on experience and of no help when you're starting off. Apart from the actual amount of EV that visible light has, there are many other variables that will affect your exposure:

- The type of lens you are using and bellows extension.
- The collodion formula, development formula and the age of the chemicals.
- Heat and humidity – summer and winter.
- If the sun is out, cloudy or late in the day, indoors will affect the UV content.
- The size and format of your image (4x5, 10x8 etc).
- Add contrast by under exposing and over developing.
- Reduce contrast by over exposing and under developing.
- Increase highlight detail by over exposing and over developing.

You may think looking at the above that it's really just guesswork, but after a while you will develop your own 'gut feel', and we can get a good starting point by following my good start guide.....

DAYLIGHT EXPOSURES

Set your meter for ISO 3 and choose your aperture as set on the lens in use. Take a 'Reflected' meter reading from the camera towards your subject and note the time indicated. Double the exposure time, then double it again - this will be the equivalent to ISO 1 (ie; ISO3, F5.4, Exp = 0.5secs then your adjusted exposure will be 2 seconds).

This will not be exact (unless you're lucky), and then you can tweak the exposure based on your initial result. Unless you have an over abundance of sunlight, you may well find you are underexposed by about 1/2 to 1 full stop. This is a 'best guess' exposure only and will not be the same for every subject or distance to camera. Inspect your plate and make a half or one stop adjustment either way.....A darker image will be under exposed, a brighter image will be over exposed.

Remember you don't have to be ultra-exact with your timings, particularly with the longer exposures. The difference between 15 and 20 secs may only be 1/2 stop. Under normal circumstances, you should be able to make several plates with the same exposure within an hour, unless you move location or change lighting conditions, and then you will have to start again. Try not to be over ambitious and make too many plates on your first attempts, this is when you rush the technique and mistakes happen. If you make three an hour you are doing well.



1/4 second @ f5.6 - very sunny day

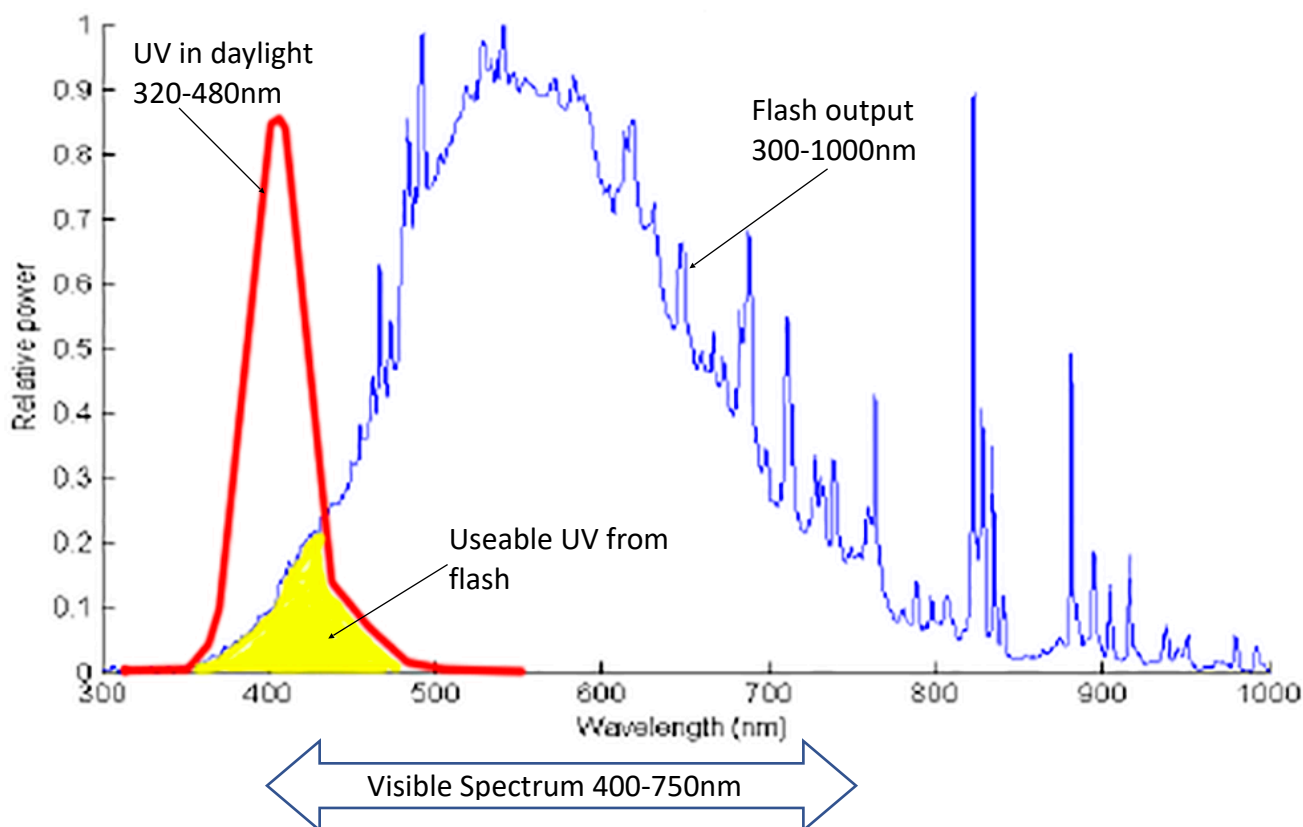


1/8 second @ f5.6 - very sunny day

The images above were taken on a very bright summers day with fresh chemistry. The top image was my first attempt with the bottom image (30 mins later) adjusted by 'gut feel' to ensure more detail was recorded in the highlights. In retrospect, I should have kept the initial exposure and developed for longer, and this would have been perfect. Remember that when your chemistry gets older (i.e.; one or two months), your exposure and developing times will increase.

STUDIO LIGHTING

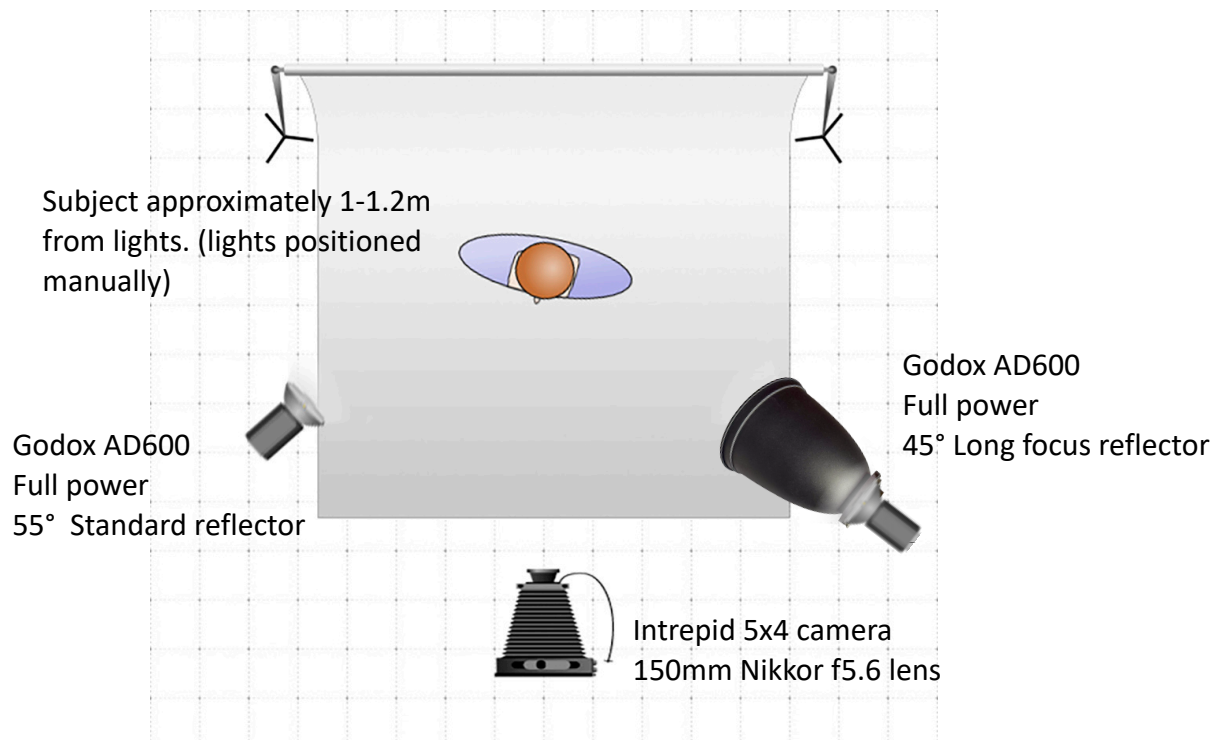
Flash lighting in the Studio is far more predictable than ambient conditions. The only problem is, you need a lot of it! The chart below shows how much light is given off by a typical studio light.



You can see from the chart that the amount of UV produced is quite small, which is why many American publications suggest massive power units up to 2400w/s and several of them!!!! `all I can say is that if you want to nuke your subjects go ahead (blindness is only temporary!) This is not only discomforting for your subjects, it could well be dangerous.

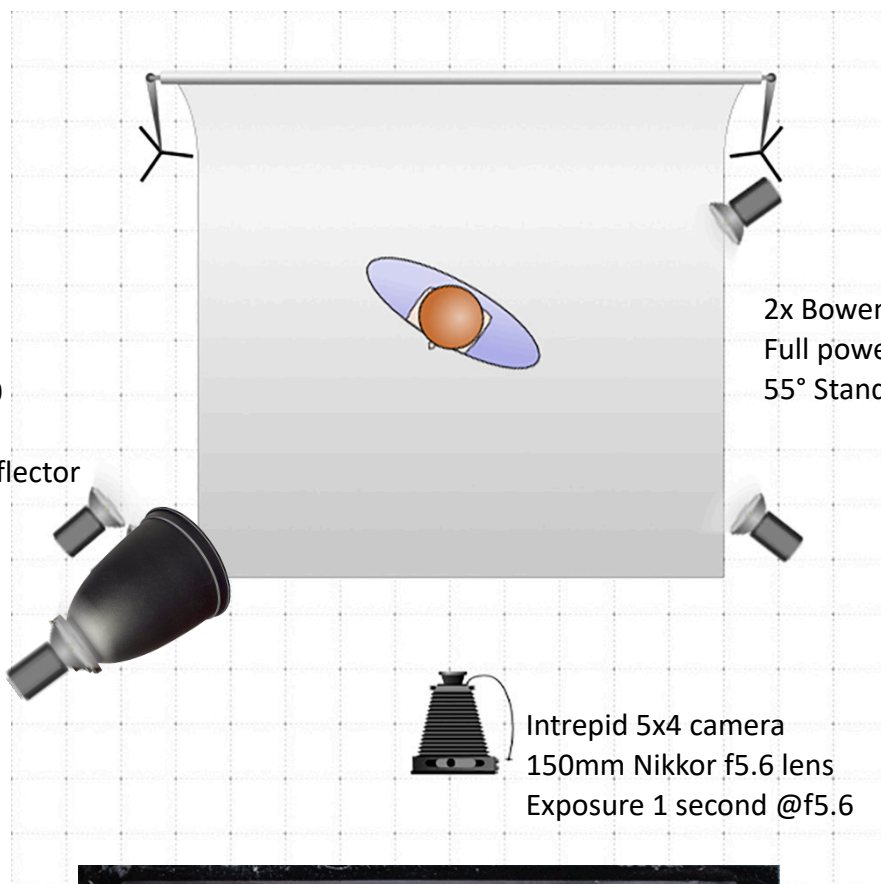
I would suggest smaller powered lights (500w/s) but more of them (say 4). The diagrams below show my original setup with two units and my more advanced setup with 4. The total output was equivalent to 2400w/s but allows for shaping the light around your subjects. Adding modifiers such as softboxes will cut out UV so just use the standard metal reflectors. It may be a harsher light than you're used to but helps with the contrast in your finished plate and the UV output becomes more efficient.

Use the settings shown in the diagrams, but ultimately, it will depend on the power of your flash units and if there is any ambient lighting available. Remember that exposure will lengthen the older your chemistry is!



Basic lighting doesn't inspire great results and tend to be quite stark, however it will allow you to experiment and images are better if the exposure is extended beyond the initial flash by 1 or 2 seconds, allowing any available light to fill in the shadows.

2x Godox AD600
Full power
55° Standard reflector
45° Long focus
reflector



An image captured with four lights. Start with your lights approximately 1m from subject and then adjust the distance based on your initial exposure.

Making Your First Ambrotype

Now we're getting to the exciting part. Those of you who have worked in a darkroom environment before, will have some sense of the anticipation and excitement that photographers feel when the 'magic' happens, and the image you have carefully crafted comes to life and appears before your eyes!

First of all, don't get your hopes up that your first image will be perfect; it won't be - except by sheer fluke. The nature of the process is fickle, so have patience and persevere. That said, this is what wet plate imagery is all about, an authentic reproduction of a historic and unique process, handcrafted by the skills of a talented artist and technician.

From here on in, text in black indicates that work can be done in normal lighting conditions. **Text in RED**, must be done under safe light conditions, i.e.: in the darkroom or dark tent. These sections are in red text just as a reminder!

PREPARE YOUR PLATE

Glass plates need a really good clean to remove grease and other dirt from the surface. Because they don't have a front or back surface, I tend to clean each surface the same. You should firstly de-burr the edges to prevent cuts and it also helps keep the collodion from spilling off the plate. Use some sandpaper or a sharpening stone just to round off the edges.

When finished, use some warm water and mild detergent in the sink to wipe off any grease or other marks and dust with a dish sponge. The type that has a plastic scrubber on one side is perfect. It isn't too harsh and will not mark the surface of the glass.

Now follow the instructions in the Glass Cleaner section, paying close attention to the edges. Your plate will be super sparkly! Collodion on glass plates tend to lift at the edges if the glass is not very clean. This is particularly important in cooler weather (less than 15°C).

To ensure good adhesion of the Collodion to the glass plate, we will 'sub' the plate using an Albumen solution. Pour the Albumen over the entire plate and catch overspill in a drip or catch tray. Tip the plate on its end and wipe the back of the plate of any excess., then place in the drying rack before moving on.

Make sure you know which face has the albumen coating! You can prepare several plates at one time so they are ready for the collodion layer.

FLOWING THE PLATE

It helps before you start each operation to prepare your workspace with the chemicals, trays, gloves etc; that you need so you don't waste time looking for

stuff you should already have, particularly when starting off. You should already have your working collodion to hand (USP collodion + Iodizer) along with your gloves.

- Take your Albumen coated plate from the drying rack.
- Hold your plate flat (like a waiter tray on your fingertips) over a tray to catch any spills.
- Pour a 'puddle' of collodion in the middle of the plate to within $\frac{1}{2}$ " of the edges. Go slowly, you have more time than you think.
- Rock the pool of collodion to each of the four corners in turn.
- When you get to the last corner, pour the excess back into the pour bottle by tipping the plate almost vertically and rock from side to side to prevent ridges in the collodion.
- Use a paper towel to tap the drip corner and mop up any excess collodion. When it stops making a mark on the towel it has set sufficiently to put into the silver bath.
- Holding the plate by the edges and use a second paper towel to clean up the back of the plate.

The collodion will reach an initial 'set' when the plate is tacky. This can be tested by pressing a gloved finger in the corner of the plate. If it feels like a sticky sweet – its ready! If you wait too long it will dry out and the film will not sensitise properly in the silver bath and will happen more quickly in warm weather. I prefer to 'guesstimate' that its ready after around 30 secs, because I don't want to mark the corner of my plate with a big fat finger mark.

Don't forget to replace the cap on your working collodion bottle to prevent evaporation and contaminants entering your solution.

SENSITISE THE PLATE

Only part of this step can be undertaken in daylight! Anything done under a safelight condition (darkroom) is in **red text**. I'm assuming that most people will have bought silver bath dip tanks, which will come with their own 'dipper'. Usually a plastic handle with a ledge for supporting the plate in the silver bath.

- Take your flowed plate (by the edges) and place it in your dipper.
- Slowly lower the plate fully into your salt bath tank, taking care not to splash or jerk it about too much. This would produce a line on the emulsion which will resolve in the final image.
- Close the lid of your salt bath tank.

We now need to wait for the salts in the collodion to turn to silver bromide and silver iodides, therefore making the plate sensitive to light. The process takes about 3 mins, depending on the temperature. (Leave it a bit longer in autumn/winter). Don't fret over the time, but don't pull it too early or leave it longer than 4 mins.

You can actually check by examining the plate under safelight. Lift the lid of your salt bath and slowly pull out the plate. You will notice that the once transparent collodion has turned to a milky opaque colour indicating the reaction is taking place. The sensitising process is complete when the surface is flat and smooth. If you see rivers flowing on the surface (think of water on a freshly waxed car), then it needs to continue soaking. Lower the plate back into the bath and replace the lid.

Whilst the plate is sensitising, you can use this time to prepare your developer in a small shot glass and open your plate holder, perhaps pre-focus the camera to allow plenty of time in your process. Remember, once you have loaded your plate in the holder, the chemicals are already starting to dry out and you're on the clock!

LOAD THE PLATE

Once the plate is ready, remove the lid and slowly take the plate out of the silver bath. It is now sensitive to light. Do not touch the sensitised surface!

- Slowly pull the plate with the dipper out of the silver bath. If you splash Silver Nitrate it will stain anything it touches.
- Carefully prise the plate away from the dipper (it may be stuck due to liquid tension), and drain any excess silver nitrate back into the tank.
- Place the lid back on the tank to prevent spills and contaminants entering the bath.
- Holding the edges of your plate, tap and drain any excess off the plate onto a paper towel. Using a fresh towel, wipe the back of the plate to prevent contamination of your holder and camera.
- Place the plate into your holder (ensuring it's the right way around!) It can be difficult with Ambrotypes under safelight conditions to know which side you have sensitised.
- Close the back of your holder and exit your darkroom.

TAKE THE PHOTO

You will have already pre-focussed and composed your image at this point (but always re-check if shooting portraits), so, with the plate safely in the holder, we're ready to expose the image. Load the holder into the camera and set your exposure and aperture according to your settings.

If everything is ready, remove the dark slide from the holder and expose your image. **Don't forget to replace the dark slide when finished.** I've spoilt several images by fogging! I failed in this regard several times. Everything is so automatic with modern cameras, it's so easy to forget when reverting to traditional cameras.

Remove the holder from the camera and retreat to the darkroom.

DEVELOP THE IMAGE

As we're now safely back in our darkroom (red light conditions) we can unload the plate from the holder. You will have already prepared a 10-20ml solution of developer into a shot glass or beaker whilst waiting for the plate to sensitise. You can do it now, but this only serves to clutter your working space with additional bottles and chemicals. If you're working in a dark tent, this is at a premium.

- Unload the plate from the holder.
- Rest the plate on your fingertips (waiter tray style) as we did when flowing the plate. Do this over a sink or tray to catch the spill.
- In one smooth sweeping motion, flow developer quickly along one edge of the plate and let it drain over the surface. If you splash or 'dump' the developer it will have artefact's, islands or other looks that will not be desirable. (see Troubleshooting).
- Let whatever is on the plate soak into the emulsion – hold the plate relatively flat but rock in a circular motion to keep the developer moving.
- The image should start appearing in around 10-15 seconds in fresh chemicals. If it takes longer than 20 seconds, you may have the exposure wrong or chemicals will be starting to deplete. Keep going – we don't know which it is yet!
- When you think it's about done (just as details are appearing in the highlights).....stop the development immediately with plain tapwater from a jug. You don't need much but if you don't do it quickly the plate will continue to develop and may go too far.

After washing the plate (front and back) over the sink or spill tray, you will be able to turn normal lights on or exit your darkroom to complete the fixing process. It's important to wash the back of your plate also to prevent developer contamination of your fixer.

FIXING

This can be done in a fixing tank or tray in normal light. I prefer the tray because it's easier to use and see the image forming. Fixing the image now removes the silver from the unexposed areas of the plate revealing the positive image.

- Pour some fixer (Hypo) into a tray and tilt to one end.
- Place the plate into the tray and then rock the fixer over the plate in a gentle rhythm until cleared and remove for washing.
- This will take two or three minutes with fresh solution, but up to 10 mins with tired chemicals.
- Don't leave it in the fixer too long or it may swell the emulsion and it will become soft.
- Proceed to **Final Wash**.

Hypo Fixer is quite weak so make fresh for each session. Fixer will contain dissolved silver and affect the look of future plates, making them less bright and

dull. Fixer is cheap to make so don't waste effort making it last longer than necessary.

FINAL WASH

Some photographers wash for a short time and end up having problems later when the plates are dry. You **MUST** wash your plates thoroughly to remove all traces of fixer and anything else which has 'stuck' to your plate. I recommend at least 5 mins under fresh water, or at least 5 changes of water in a tray. If you don't have a sink dedicated to photography (I don't recommend the kitchen!), try my method of using a spare tray....

Most people will have a garden hose and a drain close by. With the tray slightly elevated at one end, let the hose fill the tray at the elevated end and place the plate at the other end. Turn the hose on to a slow (but steady) flow and let it fill up to overflowing. The excess will drain away whilst the hose keeps a constant change of fresh water. You can even leave it unattended whilst you are doing your next plate.

Do not run the water too fast, or dump water straight onto the plate. This may end up stripping the image off the plate. In the field I do a couple of quick tray washes and place them in a storage box ready for a proper wash when I get home.

CLEAN YOUR GEAR!

Remember that chemicals can get everywhere and you don't want it ruining expensive cameras or creating unwanted artefacts from a dirty plate holder. Apart from a general clean-up of your darkroom, trays and other paraphernalia, your plate holder is the biggest source of problems with your images.

Using paper towels, wipe down the holder between each shot, making sure it's completely dry. When a new plate is inserted, the chemicals encourage capillary action of anything already on the holder and it can migrate to both the back and front of your plate. It doesn't have to be squeaky clean, just dry.

A good wash and thorough drying are only required during your main clean-up .

FINISHING

Traditionally, plates were displayed in frames with black velvet showing off the Ambrotype to its best (does not darken the silver layer and looks much brighter when displayed in a frame). If it was intended to make a print from the plate by additional paper or alternative printing then it was just left alone!

A quicker and modern alternative is to coat the emulsion side of the plate with a black coating so the image can be viewed as a positive.. I use a high gloss black acrylic paint (the finishing coat to car bodywork), which doesn't take up much

room and is ready to use. It's also dry in less than an hour and is tough enough to last a lifetime.

- Make a cardboard spray booth, by using any large box from the supermarket.
- Tape up the corners so no paint escapes through the gaps.
- Lay the plate (emulsion side up) and spray an even coat across the image. Do this in a well-ventilated area (aerosols can damage your lungs).
- Turn the box (not the plate) through 90° and repeat.

Wait about an hour before picking up the plate. Everything is now ready for display or archiving. The plate will have a darker appearance than backing with felt or velvet!

Troubleshooting

I can't possibly cover everything you will come across during your journey, however I have included below, some of the more common issues you will encounter. Be aware you will probably try and overuse your chemicals, long after their useful life has expired. Whilst making plates is still possible with tired solutions, your first step should always be – make fresh chemicals!

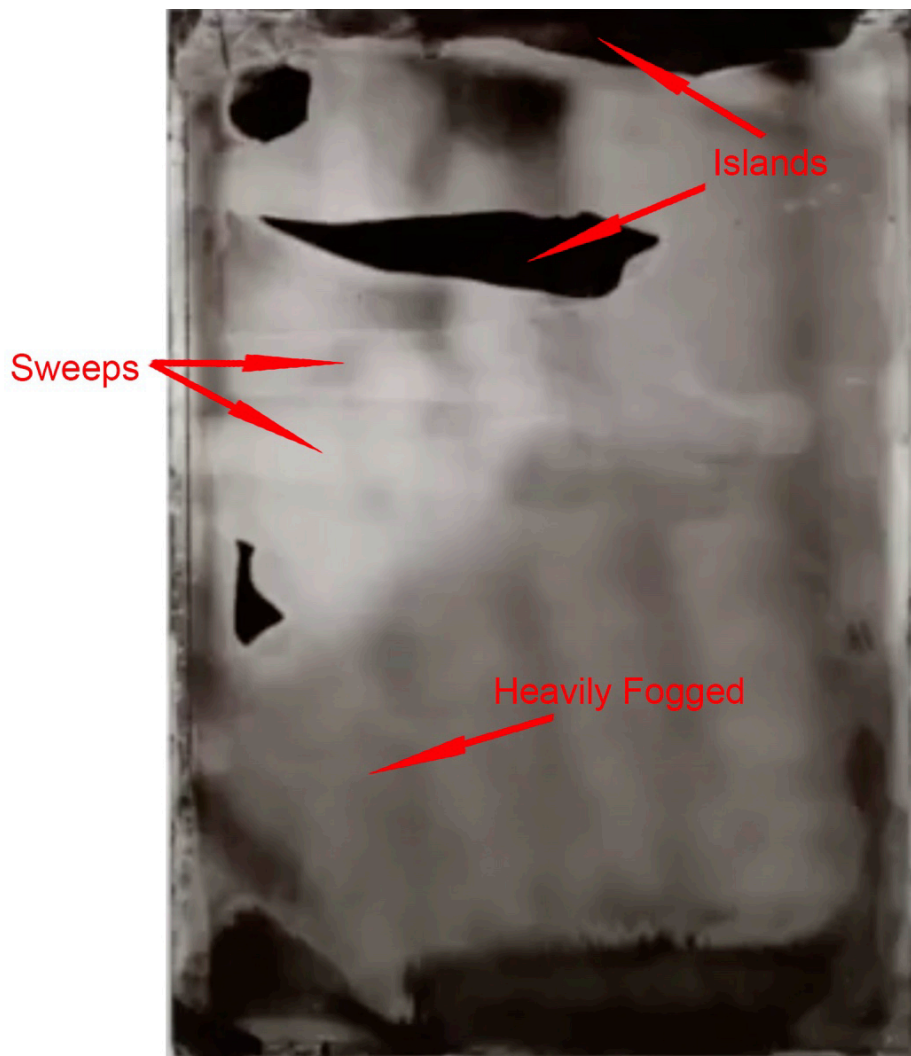
ISLANDS, OYSTERS AND SWEEPS

Islands, are created when the developer stops and starts flowing irregularly over the plate creating 'black holes'. This is usually caused by insufficient alcohol in the developer to allow a good flow over the surface. It can also be caused by contaminants on the surface of the plate forcing the developer to take a 'detour' around its intended direction.



Solution – add (a small amount of) alcohol to your developer, clean your plates better, make fresh developer.

Typical Islands

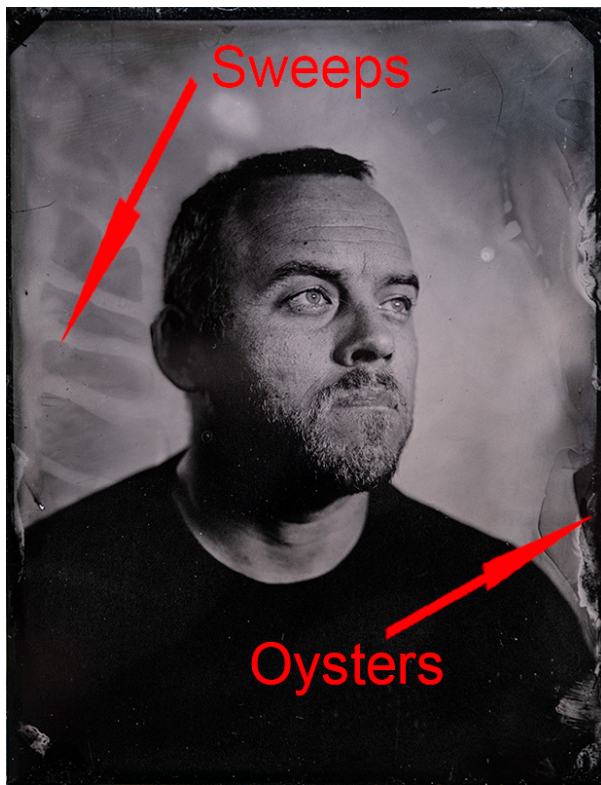


Oysters, usually occur at the edge of the plates and is caused by artefacts or contaminants in your plate holder or dirty plates. Can be worse in wooden plate holders which tend to absorb the chemicals off the wet plates.

Solution – make sure the plates and holders are as clean as they can be. With wooden holders, try varnishing the rebates with polyurethane which makes them easier to clean.

Sweeps, look like tide marks across the plate indicating a poor developer technique. You may be hesitant, too slow or too fast with your developing 'throw'. Caused by the developer staying too long on one area of the plate concentrating the developer on one spot for longer than desired.

Solution – practice your techniques on a blank sheet of glass with tap water. Practice, practice, practice. It will get better with time and experience.



Oysters and Sweeps



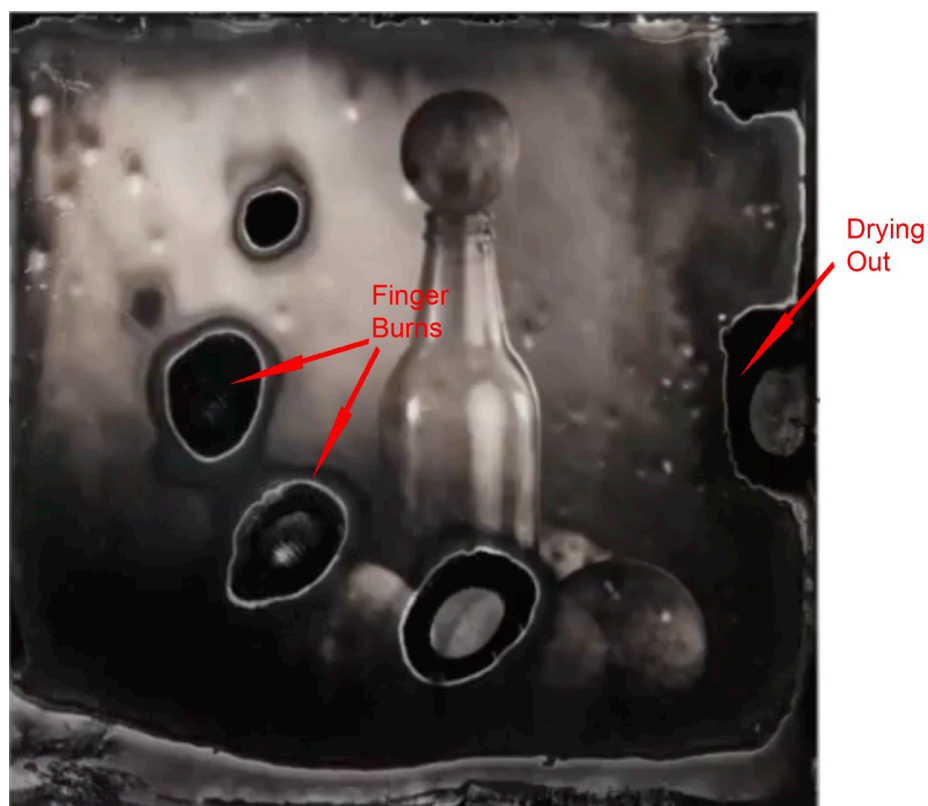
Oysters

FINGER BURNS AND DRYING OUT

Finger Burns, are less common but can occur when a cold plate comes into contact with warm fingers on the underside. Normally we wear nitrile gloves to protect fingers from staining, however some practitioners still insist on doing this process bare handed! In cold weather.

Solution - heat the plate over an alcohol lamp for a few seconds before flowing the plate and wear protective gloves.

Drying Out, is a situation where the flowed collodion has 'set' for too long before immersing into the silver sensitising bath. Mostly happens when humidity is low or in hot weather. You can wait too long before immersion in silver, it goes a bit like the skin on custard when it cools down.



Solution – don't wait too long before immersion into the silver bath and prepare your camera (focus) prior to flowing the plate.

PEELING AND LIFTING

This will only happen with Ambrotypes (glass plates). When the glass is not spotlessly clean (particularly at the edges), the collodion will lift and peel away from the surface of the glass. This usually occurs when the fixing and washing cycles begin. The fluid gets between the emulsion and the glass peeling it back and folding it over from the edges of the plate. The collodion will also shrink slightly when drying, also reducing adhesion.

Solution – take extra care when cleaning the glass and Albumen (egg white and distilled water) to sub the plate before coating with collodion. Use the glass plates as soon as possible after cleaning to prevent dust settling on the surface. Warm up cold plates over an alcohol lamp for a few seconds to remove moisture during cold weather.



Peeling on edges of Ambrotype

STRIATIONS

Striations, are solvent streaks caused by a silver bath that needs maintenance. The effect looks like rain on a window and is caused by the bath being loaded with solvents from numerous plates being immersed without refreshing the chemicals.

Solution – You can rescue the plates in the current session by agitating the plate in the silver bath (under safelight conditions) to 'mix' the solution slightly, but beware the bath will probably be loaded with artefacts and partially developed silver and will damage plates. At the earliest opportunity, the bath should receive maintenance or a fresh solution used.



Typical Striations