The Wet Collodion Plate

16 Steps to making the plates

by Will Dunniway
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Will Dunniway assumes no liability for the risk to, or because of, persons handling any chemicals or equipment listed in this manual.

Readers are warned to use all chemicals and equipment listed in this manual with caution, and use them at their own risk. Misuse of chemicals and/or equipment may be harmful or even fatal. This includes mixing incompatible chemicals. Material Safety Data Sheets (MSDS) sheets are available for each reagent/chemical from chemical supply houses and should be read thoroughly and kept on-hand by all persons using them. All chemicals should be kept out of the reach of children. Flammables (including collodion, ether, alcohol and varnish) should be stored according to local regulations.

Supplemental items purchased outside of chemical supply houses, such as cleaners, alcohol, etc., should be treated with the same care as chemicals (above).

For additional questions on use of chemicals, contact the publishers. For MSDS sheets, contact your chemical supplier.
"...one's skill is never complete; one's knowledge is forever lacking; one's taste is invariably altered; one's opinion ever subject to controversy. There is a complete and constant urge toward improvement..."

Andrew Loomis - 20th century painter

Will Dunniway of Corona, California has been a professional graphic artist and photographer for over 40 years and a student of American history for most of his adult life. Will was born and raised near Los Angeles in the city of Colton. His career eventually took him to the redwood coast of central California. After 30 years away, Will returned to southern California where he currently resides.

Will specializes in the 19th century wet plate collodion process that he first came in contact with at a re-enactment of the Battle of Gettysburg in 1988. By 1990 he learned this unique process through apprenticeships with nationally renowned photographic collodion artists, John Coffer, Claude Levet, and Mark Osterman of the George Eastman House, Rochester, New York. In the decades that have followed, Will has become an expert in this historic photographic process.

The lure of wet plate collodion is its ability to speak of histories long past. Collodion’s rich vocabulary is unique among historical and contemporary photographic voices. This simple hand poured liquid on glass was a quiet visual witness to the Victorian Age, the rise of the Industrial Age, the heroism and carnage of the Civil War, and the taming and vanishing of the American West.

This manual is put together to guide the student though many of the same techniques that Will himself uses.
Welcome to the world of wet plate collodion. With this instruction guide you will begin to take the beginning steps to learn this old and venerable process. As you will soon find out, this wet plate collodion process can be difficult at best to master. But here is where it gets good. Once you begin this journey you will find incredible satisfaction as you see the ‘work of your hand’ come alive right before your eyes as your plate is first developed. Wet plate collodion imagery today remains one of the most beautiful and uniquely appearing images ever made in photography. There is never two plates alike even with the hand of a master. Being of a ‘hand crafted’ nature and of great tonal and grain less detail, these images can be made into dramatically large prints from even the smallest of negatives. Let me encourage you to be patient with the process and your mistakes. The reward will be forthcoming for those that endure the trials and tribulations to be expected as they learn to master this mixture of wet iodides of silver & light.

On a personal note, I would like to acknowledge a few people in bearing with me for more than a decade and a half now in the never ending learning curve that comes with this craft. Forgive me for not mentioning you here if you are one of those wonderful folks.

In the beginning there was John Coffer, my first teacher and now good friend. I owe him greatly for my knowledge. Even today I still learn from him. Some of what you read in this simple beginners manual is in part from his complete manual. (See back ‘recommended’ reading) You must get his manual and available now a DVD set!!!! They don’t come any more talented than John. After John, came my civil war tintypist pard, Claude Levet. Much of what I am today as a tintypist to the civil war reenactment crowd came from him. Claude is one of the ‘greats’ in the collodion arts, I don’t care which century you live in.

For over a decade now there has been Mark & France Osterman. What an incredible couple. The grass got greener on Frederick Scott Archer’s grave the day they started pouring plates. I would like to thank Mark and France for their contributions to this manual especially most of the 19th century line illustrations that were cut and pasted from The Collodion Journal. This incredible journal which is now out of print consisted of 24 issues from 1995-2002. Most importantly, all of their writings were and continue to be based on primary research by reading the vintage books, journals and inspection of the original plates. As teachers, more people have learned the basics or received advanced training on the wet plate collodion process and all of its variants from them than any other source..combined. Mark (and France too) have been my mentors along with many hundreds of others like myself. Much of this manual was made using their ‘How To’ manual as inspiration. Where there was a dot for dot borrowing, I tried to give credit.
My colleagues. Where do I start? Each in their particular way contributing to this manual. Wayne Pierce, my friend and collodion west coast partner. I wish I had his skills. His talents are too many to list here. Bob Szabo, one of the best in the collodion arts today. His historical work shadowing Carelton Watkins in Yosemite is as true as rain. Clovis Davis, another friend and collodion artist from Gods country of Oregon. Clovis is also a master builder of camera boxes. Then there is my good friend and assistant in this craft, Richard Staley. Many of my props and signage comes from him as a painter and calligrapher for twelve years now. He has artistically and masterfully posed my clients while at events in the spirit of the Victorian way. Then there is my ‘Engineer’, Larry Moniot. Larry has engineered most of my camps gear and restored many of my thrashed 19th century cases that I sell. Larry is the proprietor of the ‘Belgium Frog’ Case MFG. Company. Both Richards and Larry’s years of friendship and back braking work have not gone unnoticed. I could not have done it without them. Where does all this talent come from?

Over the years there has been so many others that have in someway contributed to my journey. There was my ex-partner, Crystal, aka ‘Lady Amberbead’. Irreplaceable! We all miss her. Then the one and only and extremely gifted, Floyd Oydegaard, aka Black Bart. Many more friends came to help, such as; Brian Pace, Henry and Katheryn Mace, Neb Frye, Stephan Jacobson, Janice Staley, Dan Dawson, Tony Caltabiano to name a few. Then as always on a moments notice were the legion of helpers from the renowned ‘Guild of Wet plate Photographic Umbrella Holders, Plate Pourers, Image Gilders, Rougers and Roofers.’ (Local Twenty-Seven. Knights of Labor. Temple One) Did I tell you we have fun too!!

Last but not least, there is my lovely wife, Frances. She now stands by my side daily and encourages me in every way to continue my work in this wet plate collodion craft. What a blessed man I am. Saying thank you is just not enough.

So now you the reader can begin your journey, encouraged. Remember you will do best if you find others along the way. There are big footprints to fill. Gods speed and His divine light.

2006 Will Dunniway & Company. From left. Larry Moniot, Richard Staley, Will and Frances Dunniway
Equipment & Chemicals Needed

**Hardware**
- View camera, lens, wet-plate back
- Tripod or camera stand
- Silver bath and cover box with dipper
- Glass or porcelain developing trays
- Fixing bath and cover box with dipper
- Small and large glass beakers with oz. and ml. measurements
- Assorted glass (some amber in color) bottles (3 oz. to 32 oz.)
- Four Funnels for filtering
- Photographic plate rack
- Carbide wheel oil in handle glass cutter
- T-Square
- Ruler (inches)
- Kleenex® Viva Paper towels and cotton rags
- Alcohol lamp
- pH test papers
- Beer or wine hydrometer with tall glass cylinder
- Coleman® Catalytic propane canister heater
- Medium mill file
- Glass plate storage box
- Children’s Steam Vaporizer
- Chemex® square coffee filters

**Materials**
- Silver nitrate
- Plain NF collodion
- Nitric acid
- Whiting compound or Rotten Stone
- Tincture of iodine
- U.S.P. ethel ether (reagent grade)
- 190 proof grain alcohol (available at some liquor stores)
- Potassium iodide
- Cadmium bromide
- Ammonium bromide
- Ferrous sulfate
- Acetic acid 28% (glacial)
- Potassium cyanide or sodium thiosulfate
- Gum sandarac resin
- Oil of lavender
- Potassium bromide
- Copper Sulfate
- Table sugar
With the advance photography in the mid-19th century, Fredrick Scott Archer, an English sculptor and photographer, experimented with collodion in the hope of producing a photographic negative on ordinary glass plates.

Collodion, a thick and syrupy liquid, made by dissolving nitrated cotton in a mixture of alcohol and ether. It was widely used by surgeons as a liquid bandage owing to its strength and adhesiveness.

In 1851, Archer used collodion to hold light-sensitive salts to his glass plates. Once the salts, such as potassium iodide, were in the mixture of collodion, the viscous liquid was poured onto the plate. Allowing the alcohol and ether to evaporate, a thin film containing the necessary iodides and bromides was left on the plate. Ready for sensitizing, the plate was placed in a bath of silver nitrate. This formed a light sensitive compound of silver iodide on the surface of the plate. Once sensitized, the plate was exposed in the camera before the collodion began to set and dry. If the plate dried before development, it would have had practically no sensitivity and would be therefore useless. For this reason alone, the process Archer invented became known as “Wet Plate” collodion process. After exposure in the camera, the plate was quickly returned to the darkroom. Using an acidic solution of iron sulfate, the plate was developed, then rinsed and fixed in a mild solution of potassium cyanide, or hypo. The wet plate photographers could now produce multiple images from a single negative or offer a collodion positive, such as the ambrotype or ferrotype, with speed and consistency. Not until the 1880’s and the introduction of gelatin dry plates did wet plate photography command any less attention from the photographic world!
Photographic work depends upon nicely balanced practices, to which, any slight alteration of the elements, may completely ruin the quality of your work. It is necessary therefore, that you the reader of this guide should not only follow the directions given within this and other instruction manuals, but that you should learn to constantly maintain perfect cleanliness.

All the tools which you the photographer uses must be absolutely clean and, as far as practical, should be restricted to a particular use. This is to prevent slight traces of chemical substances or other potential contamination, which can escape visible detection, and might ultimately effect the quality of the finished plate. The hands especially, must be constantly washed. If washed often and completely, there is less potential that small portions of foreign material be readily transferred. Remember, too much precaution cannot be taken, and many failures to the beginner, may be traced to little neglects like these.
STEP Two
Preparing the glass & ferrotype plate

First, the glass can be acquired in bulk from frame shops, hardware stores, stain glass companies etc. Check your local yellow pages or internet for single strength window glass. Economically, it is wise to buy from a local dealer, as glass gets expensive to ship. Do not use old, previously used window glass or used, old glass negative plates as these do not produce reliable results. Next, it is necessary to cut your glass to the specified image size (if your supplier has not already done this for you). Rainbow Glass, listed in the supplier list, is a good source for oil in-handle carbide wheel glass cutters, or you can buy them locally or through the internet.

To cut the glass, you will need a straight edge ruler and a glass cutter. Place the glass flat on a piece of paper on top a hard surface. Using a ruler, mark your glass size with a fine point permanent marker. Align the edge of these markings with the ruler and your cutter wheel. Starting at the top edge, place the cutter wheel firmly on the mark. Maintaining a constant pressure as you roll the cutter wheel towards yourself, you should hear a cutting noise as the wheel scores the glass. If you do not hear the sound of glass being cut, you need to increase your pressure of the wheel upon the glass. If the glass breaks, your pressure was too great or the surface firmness needs to be increased (such as cutting glass lying upon carpet or cloth). Once the glass has been scored, handle carefully. Using a pair of Fletcher® framing pliers (available at most stained glass stores), place the pliers at the bottom score, matching the white mark on the pliers to your score line. Press the pliers firmly until the glass breaks along your score line, being sure to keep your cutting surface close so the glass does not fall and shatter. You can also decrease risk of wasting glass by holding one edge of your image glass while using the pliers, the glass to be cut off can lay onto your surface.

It is necessary to roughen the edges of the image glass with a medium mill file. This makes the collodion less likely to slip off and the hands are less apt to be cut. In one direction, the medium mill file is to be drawn two or three times away from you along each edge in a 45 degree angle. The roughing should precede the cleaning. Place the now cut and roughened glass into a modern dishwasher, set to a high temperature and wash. Make sure the plates do not touch! After the washer has cycled and cooled, remove the clean glass plate onto a plate holding device as shown on the next page or just laying it on a clean cotton towel, butcher paper, or whatever is handy. It must be free of dirt and grease. Begin to clean using a lent free cotton rag or the Kleenex® Viva brand paper towel brand. Apply to the plate one of the formulas described here.

Using one formula for cleaning, dampen a cloth and clean the underside of the glass once to get a basic clean. Using a same circular motion with a moderate pressure, clean the working side of the plate until you can fog the plate with your breath and have no streaking in this fog. A word of caution here. A clear fog is no guarantee of a
clean plate. You must clean and examine your plate thoroughly for residual greasy finger prints or left
over rotten stone or whiting from cleaning!

After this initial cleaning the glass must be handled as little as possible; its face must never be
touched by a finger, or there could possibly be a finger mark developed on the negative. The clean
glass should be put upon clean paper, and set in a box kept out of the reach of dust and vapors.

**The Rottenstone Glass cleaner.**

*Apply to the glass plate to be cleaned:*
- Rottenstone: ..............1 pinch.
- Grain Alcohol: ..........1 ounce (or enough to make a mud like paste)

**Note: A similar formula of whiting compound will work too:**

**The whiting glass cleaner.**

*Apply to the glass plate to be cleaned:*
- Whiting ..................1 pinch.
- Grain Alcohol ............1 ounce (or enough to make a mud like paste)

If mixing either formula in a jar, use a flexible container and add water to these proportions: (shake well before each use)

**The glass cleaner.**

*Apply to the glass plate to be cleaned from bottle:*
- Rotten stone or whiting: .40 grams.
- Grain Alcohol .............10 ml
- Distilled water .............50 ml

Nitric acid may be used for cleaning too. You MUST wear gloves, eye protection, and full length
clothing to prevent skin contact when using nitric acid.

**The nitric acid glass bath**

- Nitric acid ..................1 part.
- Distilled water .............2 parts

**Caution: Remember to always add the acid to the water, NOT the water to the acid!!!**

If using the above nitric acid mixture, place your image glass into a glass baking dish to soak the
entire surface area of the image glass. This can be done by placing the pieces of image glass in an
oversized glass dish, alternating one from each end, so that their sides shall overlap a little, thus
allowing the free passage of fluid between the pieces of glass. Pour on the above nitric acid mixture.
If using new purchased glass, a full day of soaking will be sufficient to destroy the greasiness. Old
glass that has been used before will require two to three days of soaking. If the glass is needed
sooner, then a mixture containing only half the above proportion of water (1 part nitric acid to 1 part
distilled water) can reduce soaking time with adequate degreasing. After soaking in this bath the
glass will require no washing, but should be placed in a trough or other convenient vessel under a tap
of water for ten or fifteen minutes. Take the glass out one by one and rinse. Rubbing dry with a soft
blotting paper—not with cotton rags, as so universally directed in the old manuals. Cotton cloths can
leave fluff, which has to be carefully brushed away - Kleenex®Viva brand paper towel brand does not.
For making positive ambrotype and ferrotype images: If using a metal ferrotype plate than you can either make japanned plates from tin or soft iron called ‘Black Plate.’ You will need to learn how to japan the metal to get the black coating. Roofing foundation or primer coating can be used. However, no other ingredients such as clays, fibers, or emulsifiers can be added. Read the labels. Lap cement will also work, but needs more thinning with mineral spirits. Without going into a lot of detail, cut your plates to size. Now clean your plates with steel wool if rust or other contaminants are present and wipe clean with Mineral spirits and Kleenex® Viva Brand towels. Prepare the tar (see formula below) into a plastic square tub about a 2 gallon size. It must have a lid. (I use an empty, cleaned Fresh Step® Kitty Litter, 31 lb bucket.) Keep stirring until thoroughly mixed. Let settle for a few hours before using. Either dip, paint, or pour your japanning tar of asphalt and mineral spirits onto the bare metal plates. Let the plates drip/drain for a half hour before putting them into an outside oven like an old Propane ‘has been’ BBQ. Heating of this tar (i.e. baking of plates) SHOULD NOT be done indoors. Stack these still ‘wet’ tarred plates into a rack built of angle iron (threaded bar stock and angle iron) and close the lid. Light the propane burners and cook at high temperature for around 20 minutes. Inspect. The plates should have a satin look to them - not a high gloss! A word of caution here. If you cook the plates too long, you will turn the asphalt to carbon. This is bad as it causes the collodion to enter the carbon cracks on the japanning surface of the plate. When overcooked plates are used, japanning can cause the lifting off of the collodion with your image attached! When plates look ready, open BBQ/oven lid and allow to cool completely.

**The japanning tar mix**

Apply to the bare metal

- Non-fibered 100% asphalt/mineral spirits 1 gallon
- Pure 100% mineral spirits . . . . . . . . 1/2 gallon or more.

Another ferrotype alternative is the new aluminum plates manufactured by trophy supply houses for engraving trophy plaques. They are called peel and pour plates. These plates are great for the non-historical ferrotypist, but they will not be acceptable to the 19th century purist of wet plate collodion ferrotypes. These plates have a plastic peel off sheet that protects the plate until you are ready to pour. See supplier section in back for the addresses of these peel and pour plates.

Last but not least is the colored or clear ambrotype plates. The clear is the same as the negative collodion plates, just under exposed and then backed with a black varnish or black colored paper/cloth backing. Two types of colored plates are available. A dark purple glass we all call the ‘ruby-red’ plate (period to the 19th century) and the modern flashed black glass plate. Suppliers addresses in rear.
Of all that the collodion photographer works with, nothing exceeds in importance as the silver bath. Its preparation is exceedingly easy, and, if a good nitrate of silver is used, it cannot fail to work well, if no mistake or oversight has been made in its preparation. Remember that silver nitrate will stain anything it touches dark or black, and is caustic to the eyes. Be careful when handling.

You will need a vertical glass or plexiglass silver bath with a dipper. A “whole-size” bath, for plates 6” X 8” (I.D of inner tank around 7 x 9 inches) will be found a convenient one for the beginner. Even if smaller plates are used, it is not worth while to use a smaller bath – it holds too little solution and changes too rapidly. The “whole-size” baths require about 900 ml of solution to charge. This solution is to be made as follows:

**Silver Nitrate Solution**

- Silver nitrate . . . . . . . . . . 81 grams
- Distilled water . . . . . . . . 900 ml

Dissolve 81 grams of nitrate of silver in 900 ml of distilled water. This is a 9% solution.

Just figure 9 grams per 100 ml of distilled water. If this is your first silver bath, coat a ‘dummy’ plate with your ‘salted’ collodion and dip it into the bath and leave it there for around 8 hours. Remove the ‘dummy’ plate. Now your silver bath is ‘iodized.’ As you make other solutions of silver nitrate, always use an ounce or two of the used silver bath, adding to the new silver bath. This will iodize each new silver bath solution.

Before using any new silver bath you will need to purchase a hydrometer. (Beer and wine making stores sell them as well as labware supply houses.) This hydrometer will test for the specific levels of gravity in your new solution. In other words, how much silver is in your bath. To start, you will need to add your new silver bath solution to the glass cylinder beaker supplied with the hydrometer. If it is not supplied, you will need to buy a glass beaker deep enough for your hydrometer to float in. Now pour the new bath up to the mark at the top of the glass beaker. Then slowly lower your hydrometer into this measured bath solution. Make a note at what mark the hydrometer levels off at. This mark on your hydrometer will always be your reference point when you need to add new silver solution to any used silver bath. This is in order to bring it back to the 9% silver solution that is desired in the wet plate collodion process.

In my 17 years of pouring plates I have never had to check for the pH of my baths. However, if this is required, use some blue litmus paper to test your silver bath. If your bath is for making positives such as tintypes and ambrotypes it should run a little acidic (pH from around 2.5 to 6). If you are making glass negatives than your bath needs to be on the neutral side (pH 7.2-7.4). Add a drop or two of nitric acid if you need to acidify your silver bath. Test again with the blue litmus paper.

The negative bath should always be kept covered to exclude dust and dirt when not in
use. Constant care must be taken to let no extraneous matter get into it, and to place in it nothing but the plate your wishing to sensitize, which must remain perfectly clean. I do have an exception to this. While I am working and running many plates through the bath, I always leave the lid open to the silver bath tank. I close it only when a plate is dipped into it. I do this because I want the residue alcohol and ether that each plate introduces to evaporate out of my bath as it is being used. I have found this helpful.

As your silver bath is used the silver content is diminished. It also has now acquired alcohol, ether, and free iodides from the plates coated with collodion as mentioned above. To decrease these built up organic materials which can decrease image quality, you must from time to time ‘sun’ your silver bath. Find a glass wide mouthed ‘cookie’ jar (i.e. gallon sized pickle jar). Add your bath solution to this and place in the sun! As the sun strikes this beaker of silver solution it will turn into a murky greyish color. After a few hours in the sun, filter (any shaped coffee filter will do) and check the silver content with the hydrometer as mentioned above. Replenish to the correct 9% level. Let this settle for a few days before using.

If you wish to sun your silver bath until it is dehydrated down to it’s crystal state, then cover your cookie jar with a screened lid. Place this jar securely in a sun exposed window ledge. Leave the jar to sun until all the water has evaporated. This will give you an indefinite shelf life for your silver. Re-hydrate with distilled water, filter several times, and check the silver content with the hydrometer as mentioned above. Replenish to the correct 9% level. You are good to make an exposure now.
The developer. Make the developer as follows:
Iron (Ferrous) sulfate . . . . . . . 16 grams.
Acetic acid, 28% . . . . . . . 16 ml.
Sugar (household) . . . . . . . 15 grams (Warm weather. Cold weather... 5 grams)
Grain Alcohol . . . . . . . . . . 12 ml (Not needed initially if silver bath is new)
Distilled Water . . . . . . . . . . 1000 ml

When these ingredients are mixed and the iron sulfate is dissolved, filter. (Chemex® square coffee filters) Remember to always use a funnel and bottle designated to the developer and only the developer. Of course you will need a clean filter each time. Never re-use these filters. This solution is ready to use. I have found that if you mix your developer a few days to a week before it's use, the action is better. The developer, if kept corked, will keep for a couple of months. It is ready for use as soon as this solution of the iron sulfate is complete and the whole has been filtered. As the developer grows older it becomes reddish. So long as kept clear by filtration, the reddening seems rather beneficial.

The use of this developer will be explained in Step 12

One important note for those doing field wet plate collodion. As mentioned below, water is heavy and hard to transport. If you are in the field doing wet plate collodion here is a tip that might help you eliminate the step of fixing (and the hauling of extra rinse water) until you return to your darkroom at a much later time. Mark and France Osterman showed this to me. It is called Glycerinating the plate.

Glycerine Solution
Glycerine . . . . . . . . . . 2 parts
Distilled water . . . . . . . . 1 part

Mix this glycerine solution and after the plate has been developed, rinse in distilled water in several trays until all the developer is off. Now take the developed, unfixed plate and pour this glycerine mix over it. It is best to store this and other plates flat. (I use Tupperware® shallow tubs.) The kind of Tupperware® that can be stacked with lids. Making sure that nothing can touch your plates image surface, transport these contained plates to your darkroom for a thorough rinsing followed by fixing. Again rinse, dry and varnish. You can delay for days, weeks and even months the fixing of these plates as long as the plate is coated with this glycerine solution.
I will address this step primarily with the Potassium Cyanide fixer that I have used for almost the 17 years that I have been working with this wet plate collodion process. The following will explain why I feel Potassium Cyanide is the best overall fixer.

**Potassium Cyanide Fixer**

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Cyanide</td>
<td>10 grams</td>
</tr>
<tr>
<td>Distilled water</td>
<td>900 ml</td>
</tr>
</tbody>
</table>

Potassium Cyanide has been used for the most part by all the contemporary tintypists for one simple reason. It works better than hypo and sodium thiosulfate. There appears to be little initial difference in appearance (I can tell one from the other) when you fix in the field. However beware. Alternative fixers have their drawbacks. Here are a few.

The color is different. When I first started pouring plates I used sodium thiosulfate and wondered why my images lacked that 'grey/green' color found in all the period tints. I then switched to cyanide and it all came together for me. The cyanide made that difference. If you want to emulate the masters of the past in the hard image production such as tintypes and ambrotypes, then cyanide needs to be used. If you seek to do contemporary 'art collodion' on a black surface of some kind, following the historical process would make little difference.

The second problem with hypo and sodium thiosulfate is the length of fixing time. It has been suggested to some beginners in this craft that the concentrate be increased to ‘speed’ up this action of fixing the plate. Let me tell you, this will only aggravate the issue that is to me the fatal flaw in working with hypo and sodium thiosulfate. This is the need to rinse longer than cyanide. If you listen to some who say that a quick rinse will be satisfying to the buyer of your tins then you are in for some real problems with your customers down the road. They will find your images turning dark (black) with shades of brown and sometimes green to mention a few of the discoloring effects that this unwashed hypo type fixer will do in reaction to the silver in the plate, varnished or not. I know this because most of my early work from 1990-91 has turned to these kind of colors. If you increase the concentrate to speed up the action of hypo and sodium thio-sulfate, then you will need to also increase the time of rinse. If you are in the field, where is all this water going to come from? Water weighs almost eight pounds per gallon. In the field I need to conserve my water. I can rinse a cyanide fixed plate in less than five minutes, with little water. A plate fixed
in hypo and sodium thiosulfate will require at least 30 minutes of constant rinsing if you want the plate to remain archival.

**Note: To delay fixing, see the glycerinizing of the plate in Step 4.**

The other problem with rinsing for long periods of time is having your image float away in the water. If you use the hypo and sodium thiosulfate as a fixer then you need to sub coat (albumen mixture) your glass negatives before pouring the collodion on. Tintypes do not need this as a rule, however I have had tintype emulsions float off if left too long in the water.

Finally, the fixers, hypo and sodium thiosulfate will NOT reduce the silver on the plate if needed. Now this can be good if you are producing glass negatives. You need the density required to print to the ‘print out papers’ (POP) used in the 19th century. However, I still use cyanide fixer for my glass negatives because once again I work in the field doing my landscapes and water is hard to come by.

If you are going to make positives such as tintypes and ambrotypes then you will find that the reducing silver characteristics of cyanide will benefit you greatly as you make images. If the image appears flat then leave it in the cyanide a minute or so longer and watch it. A word of caution as ‘too much’ will cause problems such as uneven reduction of the silver in the image and sometimes blue staining will appear as the cyanide reacts to any latent developer still in the image.

As far as the danger of cyanide is concerned - just use the caution you were instructed with. As a craftsman in any field you will find dangers associated with these crafts.... be it fire, chemicals, or whatever. Your collodion chemistry has 190 proof alcohol and Ethel ether in it, both flammable! Of course there is the explosive/flammable gun cotton in collodion. Life is full of risks. Cyanide is one of them. If you choose to work in the 19th century art of collodion don't do stupid! Keep cyanide away from your mouth, eyes, and any cuts on your skin. Wear gloves for skin protection. I have worked with it for more than a decade now and remain untouched by it's lethal effects. My point is, just treat cyanide with respect as you would do with any poison or flammable solution. Potassium Cyanide's superior fixing properties will reward you in the final results.

If you are going to use these two fixers, sodium thiosulfate and the Kodak® Rapid Fixer (hypo) than I suggest you limit your use of them to fixing collodion glass negatives. Remember to process your plates in a place where you can wash, wash, and wash some more! Best of luck.

**Sodium thiosulfate fixer**

Sodium thiosulfate: . . . . . 140 grams
Distilled water: . . . . . . . . . . 900 ml

**CAUTION: With Potassium Cyanide you can be poisoned in several manners if extreme caution is not exercised. Storage should always be in plastic bottles, well labeled. Keep out of reach of all people especially children and the mentally ill.**

**USE AT YOUR OWN RISK!**
The following instruction in Step Six is a description of the collodion I use for making both, positives and negatives. There are literally hundreds of formulas to be learned and experimented with in the wet plate collodion process. This is not where you will find them. As you begin the following formula will serve you well. NOTE: If you wish to make collodion negatives to print to the ‘print out’ papers (POP) such as albumen and salt, then follow the intensification instructions in Step 14. If you are scanning for digital or silver gelatin printing, than the formula offered here will work fine as a glass negative.

Plain collodion is most often made from 5% cellulose nitrate, 24% grain alcohol and the remainder, ether. When you buy plain or what is called non-flexible (NF) collodion be sure to check the proportion of ether and alcohol before adding additional solvents. The general rule is about a 50/50 ratio of ether and alcohol. I have used a 50/50 formula, but most often benefit from the formula below. Hot weather may necessitate 50 ml of additional alcohol added to the formula below. This will reduce the effects of the collodion peeling off your positive or negative plates caused by the collodion drying too rapidly.

\textbf{‘Old Work Horse’ Collodion formula.}

- Plain NF Collodion \ldots \ldots 120 \text{ ml}
- Ethel Ether \ldots \ldots \ldots \ldots \ldots \ldots \ldots 100 \text{ ml}
- 190 proof Alcohol \ldots \ldots \ldots 50 \text{ ml} \text{ (warm weather add another 50 ml of alcohol.)}
- Potassium Iodide \ldots \ldots \ldots 2 \text{ grams}
- Cadmium Bromide \ldots \ldots \ldots 1 \text{ gram}
- Ammonium Bromide \ldots \ldots \ldots 0.5 \text{ grams}
- Distilled Water \ldots \ldots \ldots 4 \text{ ml}

\textbf{Make the collodion as follows:}

Begin with a 500 ml GLASS beaker. This beaker has to be glass (or Pyrex-) as plastic beakers will be destroyed by the ether in the collodion. Into this CLEAN beaker pour 120 ml of plain NF collodion. Now add 100 ml of ethel ether to this plain NF collodion. You will in some cases see a ‘milky’ cotton like shape form in a reaction within this collodion as the ether is added. Simply stir with a glass or stainless steel rod. It will dissolve in a very short time. Now pour this mixture into your storage bottle. NOTE: Be sure and use an amber colored bottle with a cork or glass stopper or a chemical resistant plastic screw cap. Remember that collodion will destroy most plastics. Set this mixture aside.

Using a gram scale (gun powder grain scales work also. 15.4 grains = 1 gram) measure 1 gram of cadmium bromide. Now add this to a mixing 50 ml glass beaker. Add to this 2 ml of distilled water. Stir with a glass or stainless stirring rod until dissolved. Once this is done, add the other bromide by measuring 0.5 grams of ammonium bromide.
Stir as before until this too is dissolved. Add this hydrated double bromide mixture to the collodion mix you have set aside in your amber storage bottle. Cap (cork) and shake well.

Now using the same 50ml mixing beaker (rinsing between iodides and bromides not necessary) add 2 grams of potassium iodide to another 2 ml of distilled water. Stir with a glass or stainless steel stirring rod until dissolved. Once this is done, add 50 ml of pure grain 95% (190 proof) alcohol stirring until mixed. Now add this ‘iodized alcohol’ mix to your bromided collodion into your amber storage bottle. Cap (cork) and shake well.

Initially, this newly ‘salted’ or ‘iodized’ collodion will be cloudy. Within a few hours (in extreme cases a day or so) it will clear. I have worked collodion in it’s cloudy state and have found it to work just fine. If this is your first batch of collodion, then at this point you will need to add 2 drops of the tincture of iodine. Most drug stores have this for your cuts and scrapes. Buy a very small bottle! Let this iodize your collodion for a few days. You are ready to pour! After the mixing and using of this first batch of ‘Old Work Horse’ collodion, save an ounce or two of this old collodion for adding to your next collodion mix. This will iodize this second batch of collodion. No more tincture of iodine will be needed. Continue to do this from here on out as you mix future collodion batches.

‘Old Work Horse’ collodion if iodized will work almost immediately. It is best to give it a few days to cure. Most collodion formulas with the cadmium bromide require a few days to cure. With ‘Old Work Horse’ collodion I have added ammonium bromide. This particular bromide will add to the brilliancy of your image and increase it’s sensitivity to light. However, in the end this wonderful multi-use collodion will have a shorter life span than if you used only the cadmium bromide. You can lengthen the life time of ‘Old Work Horse’ collodion by storing unused bottles of it in a refrigerator or a very cool place. Seal the collodion bottle in a double zip lock baggy to keep that ‘collodion’ smell out of the refrigerator.

Once cleared and when in use, never shake your collodion. If it falls over or something along this order, give it an hour or so to ‘settle up right’ before resuming use. Collodion is constantly throwing down iodides to the bottom. You will notice as time goes on that your collodion bottle will have a white cake of these chemicals hardened at the bottom. You do not want this bottom crud to end up on your images. It will always cause problems! It is best to use another smaller bottle of collodion to pour from by decanting your collodion from the larger storage bottle to the smaller pouring bottle. After the bottle of collodion is almost empty clean it out by scraping out the hardened (if any) material. To do this pour your left over collodion into a temporary holding bottle. Clean the amber storage bottle by using a bottle brush and a long rod or long shafted, flat head screwdriver. Using grain alcohol as a solvent, scrape to clean out the white crud. Rinse clean with grain alcohol and refill with your collodion solution.

As time goes on, your collodion will begin to age by turning from it’s first mixed color tint of straw to red. This is a indicator of it becoming less sensitive in it’s characteristic’s. You will need to increase your exposure to compensate for this.
STEP Seven

Gum sandarac varnish.

The final step in the process of making the chemistry for creating a wet plate image is the varnishing of the plates, both iron and glass. Using a mayonnaise or like jar add the 220 ml of grain 190 proof alcohol. Set this aside. The next step is to make the sandarac resin into a fine powder. Grind 32 grams of sandarac into a powder. This can be done in several ways. The least expensive is to buy a small mortar and pestle. The other way, one that I discovered recently, is to use a small electric coffee grinder. I use a Black & Decker® (Braun® works too). The 32 grams of sandarac resin fills it nicely and it takes less than 10 seconds to grind this sandarac resin into a fine powder.

Now add this powdered sandarac resin ‘slowly’ to the 220 ml of grain alcohol into the mayonnaise jar constantly stirring as you add. Do not allow it to clump! Close lid and shake vigorously until all the resin is dissolved. Now add the 28 ml of oil of lavender. Shake well and let settle overnight. Filter well into your glass storage bottle using paper coffee filters (Chemex® square coffee filters) or stuff several cotton balls into the funnel neck as you pour back into your storage bottle. Let this settle again. Your varnish is ready for use.

‘Sandarac Photographic Varnish’ Formula

Gum of Sandarac resin . . . . 32 grams
Oil of Lavender . . . . . . . . 28 ml
190 proof Alcohol . . . . . . . . 220 ml

Period field
darkroom
This step is the beginning of the hands on part of the process where you begin to make a plate for the first time. As with the other steps there needs to be some preparation before this pouring is actually done. The first one is to prepare the camera in front of the subject you will endeavor to capture with this wet collodion plate and light. Once you have the camera focused and firmly mounted on a stand or tripod then you can proceed to the plate you wish to expose. If it is a ferrotype, take this plate and with a fine sable brush, brush the surface clean of any dust. Canned air or a by blowing with your breath can work in this way too. Be careful not to spit on your plate.

With glass I find that if you take a damp clean cotton rag or the Kleenex Brand ‘Viva’ towel of distilled water and wipe the plate dry with another Kleenex® Brand ‘Viva’ towel (or any clean cotton towel) then you are ready to pour the collodion on the plate. There is one important step before pouring collodion for those doing collodion glass negatives. This would be the coating of the plate with a substrate of egg whites better known as albumen. This is important for the use of the developer, Pyrogallic acid and even the sodium thiosulfate fixer with it long rinses. I have found it important even when I use the iron sulfate developer as this manual teaches. Why? As hard as it is to judge a plate clean it is to be full proof in keeping glass coated with collodion from peeling. There is nothing so frustrating than to see a nice or even irreplaceable image peel or even blow away as it dries! If you the reader should ever venture into these territories than take note here.

**Albumen substrate**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whites of egg</td>
<td>1 egg</td>
</tr>
<tr>
<td>Tap water</td>
<td>1500 ml</td>
</tr>
<tr>
<td>Non detergent Ammonia</td>
<td>2 drops</td>
</tr>
</tbody>
</table>

Make sure your plates have been recently cleaned as described in Step 2; Take one egg using an egg white separator carefully removing the yoke from the egg. Make sure that none of the yoke gets into the whites. Now feed your dog the yoke, it is good for his coat! Add the albumen (egg white) to the 800 ml of tap water in a glass or stainless steel mixing bowl. Now whip this mixture into a froth with a hand or machine egg beater. Cover this bowl and store in the refrigerator overnight. The next day remove the foamy surface from the albumen mix (and treat your dog again). Filter (Chemex® square coffee filters) the albumen mixture into a sealable storage jar like an old CLEAN wide mouthed dill pickle jar. This albumen mixture is ready to use. Store the extra albumen mix in the fridge for a few weeks until it goes south (rotten egg).

You will need to find an old childrens automatic steam vaporizer. They are really cheap. All drug stores should sell them. Fill this automatic steam vaporizer with
distilled water and wait for the steam to rise off of it. At this point take your glass plate and face the side to be coated to the rising steam and ‘fog’ your plate.

Very quickly flow your albumen mix (like you do when pouring collodion and varnish over your plate) and let the extra liquid pour off into your drain or waste bottle. Don't attempt to save it. If any albumen gets onto the back of the plate while pouring, then wipe this off before it can dry. Put this plate into a plate rack to dry. This plate is ready to use when it is dry. This takes very little time. Be sure and mark the side that has been substrated. It can hardly be detected once dried. Try to use these plates within a few days as the humidity in the air can cause contamination spots within the albumen substrate. It will not peel!

One short cut with this step worth mentioning is to substrate the edges only. Make sure your plates have been recently cleaned as described in Step 2. By using the automatic steam vaporizer expose the surface to be coated with collodion and fog the edges only. Now take a small sable brush dipped into the albumen mix and with your hand as a guide, draw down along the four plate edges, making an bead of substrate about a 1/4” wide. Re-fog it as necessary to make the substrate adhere to the plate edge surfaces. As long as the collodion that is coating the plate is in contact with this edge substrate, edge to edge, it will not peel. However any tear in the collodion within the non substrated area can lead to a peel or lift off of your image. Use caution in this regard.
The first order of business is the precaution needed in flowing the collodion onto your plate. Strong ether fumes will come off this plate as you pour your collodion. These fumes will be rising directly in your face. Make sure that this space you are working in is well ventilated and dust free! You can flow/pour your plates in the open white light. After the plate is flowed you can then take it back into the darkroom. It is very important not to waste time getting this plate you just flowed into your silver bath. If the plate is allowed to dry too much, it will not sensitize evenly in the silver bath. This makes for problems with the final image. The same applies to the opposite. If you immerse the plate too soon into the silver bath, then your plate will again sensitize unevenly. This makes for problems with the final image including collodion still wet lifting off into your silver bath. These collodion chunks can attach to later plates and cause problems. Re-filter the silver bath in this case.

There is some differing opinions on the correct way to hold your clean plate as you are flowing the collodion on. I will tell you about both of them.

Historically, the ‘Cantilever’ hold was used more commonly for those who documented it in the 19th century journals, letters and books. Because it was taught this way, it probably was the most common way of holding the ready to pour plate. It is done something like this:

Taking the prepared plate in hand and your smaller pouring collodion bottle in the other hand you hold the plate at the lower corner with your thumb and forefingers. With the other hand you pour the collodion into the center of the plate in a pool, (about 1/2 the size of the plate in size) pouring enough to cover the plate as you flow the collodion around from one corner to another corner to another corner.
Take care to just tilt the plate ever so slightly. If you tilt the plate at steep angles then the collodion will simply pour off. Take care as the collodion is flowed towards your holding thumb that the collodion does not touch your thumb. Any contamination on your thumb will be wicked off into the plate. This is not good! After the plate has been coated edge to edge, pour off the excess into you main storage bottle slowly keeping the plate at a slight downward angle. Be sure to immediately bring the plate back level and jiggle it up and down to flatten the collodion flow marks, all the while using a cloth or your hand to wipe off the excess collodion on the pour off point. As the plate begins to dry, it will skin over to a slight satin finish. This will only take about 10 to 15 seconds. At this point quickly place the newly flowed plate onto the silver bath dipper and immerse into the bath. See the next step for these instructions.

This style of holding the plate is especially important if you are flowing glass negatives or ambrotypes. I personally have tried the below waiter style while making a glass negative (in cold weather) and have seen my finger tips transmit heat through the glass. This made the iodides in the collodion being flowed at these heated points of finger contact under the glass plate more sensitive when they were immersed in the silver bath. The results of this collodion surface temperature being uneven was white finger tip impressions in the final developed image.

The other manner in taking the prepared plate in hand is called the ‘waiter style.’ This is the primary way that I hold the plate with the exception of flowing glass negatives.

This entails holding the plate in your left hand with your fingers under the plate supporting it as if it was a dish a waiter was bringing to you. With your right hand, take the smaller pouring collodion bottle and as illustrated above pour the collodion into the center of the plate in a pool, (about 1/2 the size of the plate) pouring enough to cover the plate as you flow the collodion around from one corner to another corner to another corner. Take care to just tilt the plate ever so slightly. If you tilt the plate at steep angles then the collodion will simply pour off. After the plate has been coated edge to edge, pour off the excess into you main storage bottle slowly keeping the plate at a slight downward angle. Be sure to immediately bring the plate back level and jiggle it up and down to flatten the collodion flow marks, all the while using a cloth or your hand to wipe off the excess collodion at the pour off point. As the plate begins to dry it will skin over to a slight satin finish. This will take about 10 to 15 seconds. At this point quickly place the newly flowed plate into the silver bath on the dipper, immersing into the bath in a steady motion. See the next step for these instructions.

Remember practice makes perfect. Keep at it and you will improve with time. Don’t worry about the collodion spilling over the edges. It will happen often! There will be excess collodion that flows onto the back of the plate. Ignore this. Focus on your newly flowed surface as you are pouring it. You want an even coverage from edge to edge. This will provide your image with sufficient silver halides to make a wonderful image.
STEP Ten Sensitizing the plate

Now that your plate is coated, place it on your silver nitrate dipper, face up. As mentioned before it is best to use a whole plate (6.5 x 8.5) silver nitrate tank for plates this size and smaller. For plates larger than this (8x10, 11x14, etc.) use only the right size if possible to match your plate size. This is for no other reason than silver nitrate is very expensive.

The silver bath should be upright at an angle of about 15 degrees facing you now with the lid open or off and under a safe light or glass window tinted red or amber, not yellow! Yellow sodium vapor safe lamps are good and will not fog your collodion plates. Absolutely no light leaks!

As you place the coated collodion plate into this silver bath, immerse it evenly and slowly without even so much as a hesitation or jerk. If you pause even in the blink of an eye, this action will cause a line from edge to edge in your final image.

Close the lid and wait for around three to five minutes. Sometimes, I use a simple sand hour glass egg timer. In the darkroom, a timer clock. The time depends on temperature. The temperature of the silver bath is important. The desired working temperature of this silver bath should be between 68 - 78 degrees. If the temperature is below this, leave your plate in the bath longer. If the bath is hotter, than shorter bathing time is required. If you pull a plate too soon (in the same manner as you inserted it, slowly and without pause!) it will show greasy streaks. The plate is NOT ready. Re-insert it into the bath, slowly without pause. Wait another minute or so and examine the plate again. If the silver bath liquid is laying evenly from edge to edge on your plate, then it is ready. With glass negatives, I take a minute or two longer to sensitize. This gives just a little more build up of silver in my final negative image. Caution here. If you forget or delay in removing your plate from the bath in a timely manner, you may find problems appearing in your final image. It can also cause problems in your silver bath. My experience is to keep your plate 10 minutes or less in the bath if possible. The cliche that more is better is not always true with your silver bath and sensitizing of your collodion plate.

Here is a tip. For an even coating of silver on your collodion’s surface, slowly agitate your plate as it sits on the dipper inside your bath and completely submerged - up and down, side to side. This will also speed up the sensitizing process and give you a better plate in the final image.
Once you have pulled the now sensitized plate from the silver bath, place the plate into your awaiting wet plate holder. This is done of course under safe light taking caution to face the plate down with the collodion drip side (pour off side) to the top position in the wet plate holder. This provides more silver to the foreground area of your image. Make sure the plate is firmly in position within the plates corner holders. If the plate is not secure, the film plane will not be aligned, and your plate will be partially out of focus. Once face down in the holder, wipe the back of this plate dry of excess silver nitrate. This keeps the silver nitrate from flowing onto your image side and causing streaks and blotches. Between images and before the plate holder is used for another image, wipe your plate holder dry.

Taking the now loaded plate holder to your camera, place it onto the back of your already focused and ready camera. Remember time is very important here, especially in hot weather. You have maybe 5 to 10 minutes until the plate begins to dry from the edges inward. The exposure is gauged on several factors. The age of the collodion and bromide content within the collodion can be factors in the responsiveness to light. The lens, the color, and strength of the light are additional factors.

The best way to judge the correct exposure time is the make an educated guess with a test plate. After this plate make your adjustments in time or waterhouse (aperture) stops. I have never used a light meter as this test plate is usually faster and more accurate way of gauging the exposure given the variables of the wet plate collodion process. If you want to try and use a light meter you will need a starting point. I am told that fresh collodion is around one [1] asa.

With glass negatives you need to expose the plates two to three times longer than a positive image such as an ambrotype or ferrotype. To develop this glass negative, use a less active iron developer. This produces a good negative density for printing.
There are several ways to develop your exposed plate. I will tell you about two of them: tray developing and in-hand method. I use both from time to time, but prefer the tray developing method.

**Tray developing**
To do this tray development method you take a tray made of any of these materials. Plastic, glass, black rubber or porcelain. Never use any metal or iron trays with the exception of stainless steel. Make sure your tray is just a little larger than your plate. Try and not use an extra large tray in the development of your plate.

Under safe light, remove the exposed plate from the plate holder. Adding just enough developer to cover your plate into the tray, lift your tray at an angle steep enough to pool the developer into one end. Now place your plate (image side facing up) into the tray, lowering the tray back flat onto the table allowing the developer to flow gently over the plate in a smooth, wavelike motion. This will cause the developer to flow across the plate quickly and evenly, without pausing or pooling, which can lead to streaks. It is very important to cover this plate in the blink of an eye. Once this plate is immersed in the developer, lift it from this tray. I use an old pocket knife to get under the plate for lifting. With this plate in hand hold it above the tray. Using a good source of safe light and without any further agitation watch your plate carefully as it develops. This process will only take about 15-30 seconds. What you need to see is detail in the shadow areas of the image within the limited time of the development. If the details in the shadows do not come forward then your image was underexposed. If the shadow details come forward in a rapid manner, say under 10 seconds, then you most likely have over exposed your image.

Never try to push or pull (more or less time) your development times. The development should remain constant within the boundaries stated above. Your image quality will depend on the exposure and development times being correct.

During the developing of glass negatives, you can take the shadow details past the point you would for a ferrotype or ambrotype as mentioned above. Let this negative develop until you can see no more image detail coming forward but before the shadow areas cloud over!

Once the image is developed, to your eye’s liking and without any delay, place the developed plate into a tray of distilled water. You can now turn on the lights.

*Note: The manner in which I use this tray development is very similar to the ‘Helper Tray’ method taught by one of my mentors, John Coffer. I only use this tray for the initial coating of developer onto the plate as John uses his ‘helper trays’ from start to finish of developing. This has to be done with very little developer to be effective. If too much developer is used in my tray method, it can wash away the silver on top the image resulting in a lack luster and dull image.*
In Hand Method

This method is the most common one used by the wet plate photographers of the 19th century. It is universally taught in most of these early manuals. It takes some skill to perfect, so if you decide to do the development this way, you will need to practice using old collodion and old glass. Begin by holding the plate as you were taught using the ‘lobster claw’ method when you poured the collodion onto your plate. Take this exposed plate in hand using your thumb and forefinger at one corner. With a catch tray below this plate you are holding, take a small pouring bottle of your developer in the other hand. Start pouring the developer onto the edge of your plate, flowing the developer across with one wave like motion without pause. This developer should cover the plate in a blink of the eye. In this motion of flowing developer across the plate it is important not to lose too much developer off the edge of the plate. In doing this you will lose some valuable free silver over the edge with your developer that is needed for the plate’s development. DO NOT let this flow of developer pause or pool. It will cause lines in your final image. It is important to note that if you pour your developer in one spot on your plate this will wash away free silver in the collodion and leave this spot black in your finished image.

Follow the above development guidelines as stated in the ‘tray method.’ Once this image is developed to your eye, and without any delay, place the developed plate into a tray of distilled water. You can now turn on the lights.

There is an important thing to learn about your reusing your developer. After each plate, I pour off the used developer into a third bottle for later use. After a dozen or so plates, I take this used developer and add it 50% to 50% new developer into the pouring bottle. I then re-filter the combined old and new developer prior to using, repeating the process as new developer is needed. (The 50/50 solution is made when the pouring bottle of developer has emptied.)

Another way to add silver to a under exposed plate is to take your silver bath dipper out of the silver bath. Remove your plate from the developer and rinse with distilled water. Let a few drops from the silver bath dipper drop into your developer tray. Agitate by tipping the developer tray slightly, causing the silver to mix with the developer. Reapply this new/old developer mix to your plate in the previously described method. This can be repeated a few times until the desired results are achieved.
As explained in Step 5, there are several ways to fix your exposed plate. Without being redundant, I will explain the tank method (using either potassium cyanide and sodium thiosulfate) with a dipper since this is the best and safest method.

After rinsing the developed plate in 2-3 trays of clean distilled water, place the developed plate onto the fixer tank dipper face up, taking care not to scratch the collodion image. Replace this water often. Lower this dipper with image into the fixer. This whole procedure can be done in the white light. With potassium cyanide the image should clear in under a minute. Reverse this procedure by removing the dipper and image from the tank. Examine your image. You might notice from plate to plate that in the thicker poured off places on the image, it will take longer to fix. This is indicated by a blue edge streak. I usually don't let this edge of a blue streak clear if it is too thick. In trying to clear this thick blue streak, the potassium cyanide would reduce the silver in the entire image, threatening the delicate mid-tones of the image. Leave this artifact alone on the edge as just one more artifact of the wet plate collodion process makes it interesting.

Be careful not to leave your image in your potassium cyanide fixer too long. This will result in overall ‘blue staining’ of your image. To long in this cyanide fixer along with this means the reduction of silver leaving an image contrast that can appear garish - sometimes very irregular in mid-tones from edge to edge.

Now rinse in distilled water in several trays. I use this distilled water especially at the end of this process because in drying the plate, it will not spot.

There is not a time limit (be reasonable) or a silver reduction problem in using the sodium thiosulfate fixer. As stated in Chapter 5. You must thoroughly rinse this plate after fixing it in sodium thiosulfate.

From the final rinse trays carefully remove your plate and place in a plate drying rack in a relatively dust free and warm place. After the plate has completely dried, you are ready to varnish your plate.
When making a glass negative for the purpose of making a print for ‘print out paper’ (POP) such as albumen, salt and gold chloride your negative needs to have very good density in your highlights, but your shadows need to be clear without any fogging within them.

I have used this formula and have found it to work well. The ‘Old Workhouse’ collodion formula developed in an iron sulfate solution used in this manual will sometimes need to be mildly intensified for greater density in the highlights. Latex rubber gloves recommended here!

**Important note:** You cannot allow this plate to dry before the intensification is done. If you do, than the intensification cannot be done.

‘Mild’ Intensification Formula.

*Taught to me by John Coffer*

**STOCK SOLUTION A**
- Distilled Water . . . . . 100 ml
- Copper Sulfate . . . . . 18 grams

**STOCK SOLUTION B**
- Distilled Water . . . . 100 ml
- Potassium Bromide . . . 9 gram

Now mix 7 ml for each stock solutions A & B into 300 ml of distilled water. This is your bleach solution. Take the rinsed and fixed glass negative and place it into this newly mad bleach solution. Agitate slightly for around 20 seconds. If the chemical bleach is warm, than less time is required. If the chemical bleach is cold, than more time is required. As you see slight changes in the plate as it bleaches and within these time boundaries, pull the plate and place it into a tray of distilled water. Agitate for about one minute, Dump the water and add fresh distilled water to this same tray. Rinse some more.

Pour this silver solution into a clean tray. Now insert your bleached plate into this tray and with one even wave like motion, in the blink of an eye, flow this silver solution across your image. This intensification will blacken your plate’s images, taking only a few seconds. Quickly rinse. Let dry and varnish. You’re ready to print to POP paper.
The final stage to the making of your wet plate collodion image is the flowing of the varnish over your plate with the fixed, rinsed and dried image upon it.

As with collodion, find a smaller bottle to pour your varnish onto your plates. You can decant from this storage bottle into your pouring bottle, or one final time, re-filter your varnish into the smaller pouring bottle. When you pour this varnish onto and off your plates, make sure you pour back the excess varnish into your storage bottle and NOT your pouring bottle. You don’t want any contamination such as dirt to be poured back into your clean filtered pouring bottle ready for the next plate. Pouring the varnish onto the plate is done in the same way as you would pour collodion onto the plate.

It is important, (but not a must) that you keep your varnish warm as you begin to pour varnish onto your plate. Even more importantly is the heating of your plate. Sunlight is the best. The plate needs to be very warm, but not so hot that you cannot handle it. Kerosene lamps can be used. Other ways to heat a plate is to use an alcohol burner placed inside a metal or glass chimney about 6 inches deep. Dry your plates over the opening of the chimney. I prefer the chimney rigged alcohol burners over kerosene lamps because they are cleaner burning. The very best ‘non-period’ dryer is the Coleman Catalytic® propane canister heaters for keeping the interior of tents warm while camping. Place these burners on a bench in or outdoors. You can heat, pour and dry your plates right over this canister heater. This heater is a good economical decision as it is a dandy ‘flame less’ heater when you are not drying plates also. It is safe to use indoors without emitting toxic fumes. One real advantage to this type of heater is that the flame less heat source will not catch your plates on fire as the other heaters and lamps can do. The Coleman® heater costs about $60 at most sporting goods stores or online with Cabelas.com®

After the varnish has flowed over the entire plate, try and keep the plate vertical over the heat source wiping off the varnish with a clean cotton cloth as it flows off the lower edge of the plate. Once the plate has set up, place it a plate rack and in the sun or some warm place to dry. It takes a few hours to harden. Be careful with this plate for at lest 24 hours before touching the surface.
One of the most essential tools of this wet plate collodion process is the portable darkroom for processing your wet plates on location.

While some collodion artists stay in their studios working in various interior ‘fixed’ darkrooms converted for the wet plate use, still a larger number want to take their newly learned art to the field.

As in the beginning years of this process, collodion practitioners found many ways to work their wet plates in the field. To list all the variations would take a book in and of itself. Below you will find a few examples of what I use. These image illustrations are meant only for your reference. Use these as ideas for your needs. There are a few craftsman that will produce these boxes for you for a fee. See my supplier section at the rear of this manual.

**Tripod mounted ‘suitcase’ dark room box**

This dark room box is patterned after the one John Coffer uses. (See his manual for dimensions, otherwise estimate it yourself.) This is a well designed box. One drawback - it is small. Here are my suggestions for making this box better. I recommend a larger box (for larger plates especially), but not too large that you cannot carry it. Remember this box folds up as a suitcase to carry away! Secondly, make the red/yellow safety windows (glass or acrylic) as large as you can. Finally, line the interior with yellow cotton cloth, always!

*Brian Scadden from New Zealand poses with author Will Dunniway during a 2006 Wyoming shoot. Tripod can be made with detachable legs or as so shown here, a surveyor tripod.*

*Complete field darkroom. Note the lead weight hanging from bottom of darkroom. Winds can blow these darkrooms over if not careful. Both images by Brian Scadden.*
Car darkroom box
If you have no need to interpret the collodion arts historically, than this darkroom will suit you the vagabond traveling artist well. Here are my suggestions for making this box. I recommend as large a box as able, for larger plates especially. Measure it to fit the maximum area in the type of vehicle you are using. Make the red/yellow safety windows (glass or acrylic) as large as you can. Line the interior with yellow cotton cloth (always painting inside hard surfaces yellow!) - whether you use simple cardboard or any doubled light tight material in black cotton or Cordora Nylon®. This Cordora Nylon® was used in the making of my darkroom for my 2002 Dodge Caravan shown below.

You are looking at the interior of my vans darkroom with the van itself inserted at top. Note that the lift back of these caravans becomes a great rain and sun protector - while giving you something to tie off to.
Cardboard box type of portable darkroom by Mark Osterman

While we used that system for several trips, we eventually went to simply using a cardboard box on our international expeditions. We would bring the two layers of cotton cloth (thick black twill and thinner red calico) and the red Plexiglas safe light window. On arrival we buy a mat cutter and a roll of duct tape then find a large appliance box. I can make a darkroom in about 15 minutes. When we’re done we remove the cloth and window and throw away the box.

Authors Note: The drawing below is a good visual on either type of darkroom you might decide to make. I personally prefer the more permanent one as illustrated below.
The Silver Sunbeam - By John Towler in 1864. It was one of the most complete texts on the subjects of photography of the late civil war era and beyond. It can be very difficult to read, but it is a wonderful reference book. A must for the contemporary collodion artist. The last edition of this book, which is now out of print, was printed in 1974 by Morgan & Morgan but is usually available through the internet book finding services. To search for copies: http://www.usedbooksearch.co.uk/

Collector’s Guide to Early Photographs, By Henry Mace - Covering every important element of image collecting, Collector’s Guide to Early Photographs is a one-of-a-kind reference that describes the historical and technical background of all the major early photographic types. Featuring more than 200 black and white photographs and 16 full-color images Collector’s Guide to Early Photographs has been the go-to reference for beginning and mid-range image collectors for more than a decade. Available through Amazon.com or directly from the author through: www.ohenrymace.com

John Coffers “The Doers Guide”, A complete, 165 page, fully illustrated workshop manual covering the entire wet-plate process, including the making of albumen photographs. Manuals can be purchased for $65.00 ppd. USA, this includes 2 DVDs (3 hours total). The DVD set is available separately for $25.00 ppd. Contact John Coffer by regular mail. Or to purchase write:
John A. Coffer - 1236 Dombroski Rd., Dundee, N.Y. 14837-9443

The Ferrotype and How to Make it, by Edward Estabrooke in 1872. This is an important historical overview for those making ferrotypes. I like the chapters dealing with the problems which appear on the ferrotype plates. A must for the contemporary collodion artist. Published between 1872 to 1903 in twelve revised editions. The last edition of this book, which is now out of print, was printed in 1974 by Morgan & Morgan but is usually available through the internet book finding services. To search for copies: http://www.usedbooksearch.co.uk/

Philadelphia Photographer - This was a very popular photography magazine of the wet-plate era. There are hundreds of formulas, designs of equipment, illustrations, and even actual tipped-in albumen prints. Check with your local libraries, swap meets and the internet search for used books and manuscripts; http://www.usedbooksearch.co.uk/
With the introduction of the internet there is now a whole new way of gaining information these days. Below are some sites that will be helpful in your journey to understand and learn the wet plate collodion process from others that are practicing it:

**Will Dunniiway • Collodion Arts**
http://www.dunniway.com Contemporary work
http://www.collodion-artist.com Historical work

**Bob Szabo • Civil War re-enactors site.** Master collodion artist. Site includes a great Wet-Plate Forum!
http://www.cwreenactors.com/collodion

**Wayne Pierce • Company Photographer.** Great illustrations and wet plate equipment builder and repair of old wet plate gear.
http://www.companyphotographer.com

**Clovis Davis • Camera Builder - Collodion Artist.** Nice period work in making 19th century equipment and cameras. Email him at: froglevel@comcast.net

**Mark & France Osterman • Scully & Osterman Studio.** Artists extraordinary. Many great workshops posted hereaalong with tutorials.
http://www.collodion.org

**John Coffer • Camp Tintype web site.** My mentor. Publisher of ‘The most complete wet plate collodion Manual.’ Many varied workshops from case building, japanning, albumen printing to the wet plate process. Incredible artist too!
http://www.johncoffer.com

**George Berkhoffer • Collodion Photographer.** George is probably one of the elders in this process and a very knowledgeable practitioner. His NEW manual ‘Wet Collodion Photopraphy - A Short Manual’ is now available.
http://www.collodionart.com

**Robb Kendrick • Collodion Artist and National Geographic Photographer.** Great contemporary tintype work here by this multi-talented artist
http://www.robbkendrick.com

**Ray Morganweck • STAR Camera Company.** One stop wet plate equipment site. Ray teaches workshops too.
http://www.geocities.com/starcameracompany
**Supplier addresses**

**Artcraft Chemicals**
P.O. Box 583  
Schenectady, NY 12301  
1-800-682-1730 or 1-518-355-8700  
http://www.artcraftchemicals.com  
*One stop supplier of most wet plate Chemistry, including gum sandarac. Best time to call is 6-7:30 pm EST and weekends.*

**Photographers Formulary, Inc.**
Box 950  
Condon MT. 59826  
1-800-922-5255 or 1-406-754-2891  
http://www.photoformulary.com  
*One stop supplier of most wet plate Chemistry, including gum sandarac*

**Country Accents**
P.O. Box 437  
Mountoursville. PA 17754  
1-570-478-4127  
*Sells cut sheets of bright tin for japanning tintypes*

**Main Trophy Supply Inc.**
1691 West Imperial Court  
Mount Prospect, IL 60056  
1-800-323-6054  
http://www.maintrophysupply.com  
*Sells cut sheets of 'Black Bright Aluminum’ .020 Peel & Pour plates for modern tintypes*

**Alpine Stained Glass**
6331 University Avenue  
San Diego, CA 92115  
1-619-563-5026 • 1.888.GLASS.01 (1.888.45277.01)  
http://www.alpineglass.com/shop/product.php/id/S146SF  
*Sells Deep Purple Cathedral Glass, black glass, safe light window glass, front surface mirror, and top quality carbide oil in handle glass cutters.*

**The Company Photographer.**
Wayne Pierce  
1258 Redwood Ave.  
El Cajon, CA 92019  
1-619-227-1734  
http://www.companyphotographer.com  
*Makes wet plate holders, silver bath and fixer tanks, plate holders, portable dark boxes etc. See web site for list. Can build wet plate holders to adapt to wooden dry plate camera’s.*
**LoranOils, Inc.**  
4518 Aurelius Road  
Lansing, MI 22009  
1-800-248-1302  
*Sells pure oil of lavender*

**3L Machine Shop**  
**Larry Linville**  
37635 River Drive  
Lebanon OR 97355-8900  
(541) 258-6602  
Email: 3lmach@comcast.net  
*Machinist for lens boods, flanges, etc.*

**Mountain Home Biological**  
PO Box 277  
White Salmon, WA 98672  
(800) 958-9629 • (509) 493-2128 fax  
http://www.mtnhome@gorge.net  
*Sells a great selection of labware & scales*

**Star Camera Company.**  
Ray Morganweck  
209 First Terrace  
Egg Harbor, NJ 08215  
1-609-965-1283  
http://www.geocities/starcameracompany  
*Makes reproduction wet plate cameras and related equipment*

**Graphic Chemical & Ink Company**  
P.O. Box 7027  
Villa Park, Il 60181  
1-800-465-7382  
http://www.graphicchemical.com  
*Sells powdered asphaltum, whiting and Senefelders liquid asphaltum*

**United States Plastic Corporation**  
1390 Neubrecht Road  
Lima, OH 45801  
1-800-537-9724  
http://www.usplastic.com  
*Sells Plexiglas (acrylic), Plexiglas glue, plastic trays, etc.*

**Clarkson Laboratory & Supply Inc.**  
350 Trousdale Drive  
Chula Vista, California 91910 USA  
(619) 425-1932 Fax (619) 425-7917 E-mail: sales@clarksonlab.com  
http://www.clarksonlab.com/index.html  
*Sells good clean CCI Brand, Ferrous Sulfate along with many wet plate chemicals*

**Mavidon**  
1820 2nd Ave. No.  
Lake Worth, FL 33461  
Toll Free:1-800-654-0385  
*Sells plain collodion USP(NF) by the gallon. $117.*

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