Salted Paper Printing

Salted paper is one of the earliest forms of photographic production to be discovered. Indeed, it is the basis for the negative/positive style of image making we all associate with traditional film based photography. It was simultaneously being researched by William Henry Fox Talbot in England, and Hippolyte Bayard in France. If not for the additional invention of the Daguerreotype in France, Bayard may well have gotten the credit for the discovery of salt processes, but as it stands, Fox Talbot got the credit. Talbot’s book, “The Pencil of Nature” is a collection of some of his early salt works. There are several variations on salted paper processes which include the Calotype (a salted paper negative), the direct positive (an in-camera one of a kind salt print) and the traditional salted paper print - which I am going to show you today! Feel free to explore and research the other processes, as they are each unique and challenging.

In A Nutshell

As the headline suggests, here is the process summed up quickly and easily...

- 1. A piece of paper is prepared by soaking it in a salt solution.
- 2. A coating of silver nitrate is added to the paper, which when combined with the salt creates silver chloride - the light sensitive compound.
- 3. A negative is placed on the paper and both are then placed in a contact printing frame for exposure to UV light, either sunlight or in a UV exposure unit.
- 4. After proper exposure is achieved the print is then processed and fixed through a series of steps.

Not too bad, really. With a little care this is a very beautiful and easy process, though there is plenty of room for error. One of my goals is to drastically reduce your chances of running afoul the many things that can go wrong... which leads me too...

Our Objectives

This is a brief outline of what I want you to get out of this workshop, because quite frankly, my goal is a simple one. First of all, understand that there is more than one way to approach this process. Ask 5 different salt printers (if you can find that many) how they print and you will likely 5 different (though similar) answers. I am showing you how I do things. Where relevant I will point out steps that can be done differently, but I do not want to overwhelm you with information. My main goal is for everyone to make a successful print, something they can be proud of. At the end of this handout there is a
page of web resources and publications, there is plenty of information that can be found from those sources for anyone desiring to find out a lot more about this, or any other salt based processes. Of course, feel free to ask any questions at any time and I will do my best to answer! (Even in the future by e-mail). Finally, along with the print (or prints) you make in this class, I want you to have the confidence and ability to produce salted paper prints in your own home. Chemistry requirements are minimal and negative production is easy, either with a printer of your own, or using the resources here at the center.

**Negatives**

Salt printing is a contact process, which means the negative has to be the same size as the final print. Many people (myself included) attribute the resurgence of these processes to the ease with which digital technology has made negative production - even with digital cameras and files. That being said, there are many ways to make a digital negative, and everyone has a favorite, or a theory, or way it ‘has to be’. If you are interested in researching the other methods, a simple google search will swamp you with information. I am going to show you what I do, which I feel is quite simple, straightforward, and has almost always yielded great results for me.

Different processes have different characteristics in sensitivity, and how they print. In order to accommodate this and achieve a nice continuous tone print, a “curve” is typically added to a negative. This is most easily and most often done in photoshop. I still have CS3, though Adobe is up to CS6, but the steps and commands should still be pretty much the same. The negatives themselves are printed out onto a product called Pictorico OHP. It is a ceramic coated overhead projection film that accepts great amounts of ink, yet is transparent enough to do the trick.

Here is negative production (the way I do it) in a step - by - step:

1. Edit your image until it is the way you like it, and size properly (we are printing around 5x7 at 360 dpi, 16 bit mode).

2. If not already done, discard color information -
   - image > mode > grayscale

3. Disable color settings (for printing dialogue later) -
   - edit > color settings > load > digital neg color settings.csf
4. Apply the salted paper curve to your image -
   image > adjustments > curves
In the curve dialog box you will click on the little square to the right of the ‘load preset’
box, this will open the option to ‘load preset’. Select the SALTED PAPER curve.acv Click
ok. You will see your image change significantly, fear not! It is necessary.

5. You must flip your image so it will print right reading -
   image > rotate canvas > flip canvas horizontal

6. Finally, make the image negative -
   image > adjustments > invert

At this point your negative is ready to print. If it is the only negative you are going to
print simply head to the printer dialogue and print it out.

Print selections and dialogues will probably vary by printer, but here are the selections I
make on my Epson R2400:

Print settings
*color - advanced B&W
*media - enhanced matte
*print quality - best photo
*mode - advanced
*highspeed - off

Color Management
*tone - normal

If you are printing more than one negative, and they will fit on a single piece of Pictorico,
in photoshop, open up the template I have given you and place the multiple images on it,
flatten image (layer > flatten image), and print out as described above.

**Paper Considerations/Preparation**

There are a lot of papers that are suitable for this process. Some are easier to
work with than others, so to start we are using Stonehenge White, 250 gsm (120 lb). It is
a heavier printmaking/general purpose paper that I have found has a good surface and
results in a nice color. The salting preparation I use is quite simple - I soak the paper in a
2% Ammonium Chloride solution. This is the step by step:
1. Mark the paper on the back with paper type (stng 120) and the salting process (2% Am Cl) and then “sltd” to indicate that it is salted. This will help you remember what you have and that it is indeed prepared.

2. Prepare a 2% salting solution by using distilled water, and ammonium chloride. Below are breakdowns of common amounts to make:
   - 100 ml distilled water + 2 g of Am Cl = 100 ml of 2% solution.
   - 500 ml distilled water + 10 g of Am Cl = 500 ml of 2% solution.
   - 1000 ml distilled water + 20 g of Am Cl = 1000 ml of 2% solution.
   and so on...

3. Slowly add a few pieces of paper (up to about 5 at a time) being sure to submerge each completely. Proceed to slowly shuffle through the stack for about 5 minutes, gently pulling the piece at the bottom out of the tray and placing it back in the solution on the top of the stack. After about 5 minutes remove from solution and hang to dry. (A line above the bathtub works well, and wooden clothespins.) Once the paper is dry it is ready for sensitizing, and can be stored indefinitely - and it is NOT light sensitive yet.

Now you have paper prepped and ready for sensitizing...

**Sensitizing the Paper**

**NOTE:** Silver Nitrate can be dangerous! Treat it with respect. Keep away from eyes, nose and mucous membranes. It may irritate your skin. Do not ingest liquid and use caution with crystals. It can cause blindness, in case of eye contact flush with copious amounts of water.** Silver nitrate will bind with your skin and cause brown spots. These are generally harmless (in very small amounts, keeping it to a minimum is best) and in some circles considered a badge of honor. They will eventually fade and vanish. If in doubt, use nitrile gloves. Use care, caution, and be safe.

Sensitizing should be done in subdued incandescent light. Avoid fluorescent light (including CFL’s) and strong window light. Both of these could lead to slight fogging.

Mixing Silver Nitrate from crystals: I use a 15% silver nitrate solution. I typically order 30 g of crystals at a time, and then mix it with 200 ml distilled water to make a 15% solution. I’ve never figured out how many, but this will make a large amount of 5x7 and 8x10 prints. Store in a labeled (silver nitrate, 15%)
brown or blue glass bottle (in a safe place, away from light, kids and pets! RESPECT THE DANGER). I am showing you 2 methods for coating the paper, but there is a third, which I don’t like since it opens up a lot of options for going wrong, but more on that later.

1. Take your salted paper and on the front (remember, you marked the back with the papers information) place your negative and mark off the corners so you know what area to sensitize. Set the negative aside.

2A. When using a glass push rod - use a plastic eye dropper to count out the number of drops of silver nitrate to cover your image area. For a 5x7 I typically use about 12 - 14 drops, 8 x 10 is 20 to 22 - there is no exact number, results will vary based on paper type and personal preference. Place silver nitrate in small glass beaker, or heavy bottom shot glass (not the lighter souvenir type, but the real kind!). Take the beaker (or shot glass) and carefully pour solution along one edge of the image area, dragging from one end to the other as the solution pours out. Carefully but swiftly grab the glass rod and place it in the solution, gently lifting up and down slightly to let the solution spread out (by capillary action). Drag rod across paper, motion should be steady, even and somewhat slow. When you reach the other side, stop, lift up the rod, move it past the solution slightly (onto the dry paper), place back down and go the other direction. I usually do this 4 or 5 times. The solution is colorless so you can’t really see it, but if you tilt your head just right you can see the liquid reflect light on the paper. I use this trick often to make sure the paper is evenly covered. This method maximizes your silver by being quite exact, the next method is a little more loose.

2B. The buckle brush. A buckle brush is basically a cotton ball stuck into a glass test tube, dipped into the silver nitrate solution, then brushed onto the paper surface. The cotton balls can be replaced as needed. I have used this method a couple of times. It adds a bit more solution than the glass rod, and can have an effect on contrast and color tone (though slight). For this method I use 2 bottles - the first with my silver nitrate, and the second with the extra silver I pour back after dipping the cotton ball (to prevent contamination) - it’ll make sense when I explain... First, (carefully) pour some silver nitrate out into a small glass beaker or shot glass. Take your buckle brush and dip into silver until it is fairly saturated. I start by brushing in the middle, then going around the edges, then filling in the blank spaces. Using the reflection of the liquid trick with this method works wonderfully, as even coating can be tricky. Sensitize as many sheets as you will be using, refilling the beaker with fresh silver when necessary. When finished, pour the silver from the beaker into a different bottle (bottle #2) than your fresh silver (bottle #1). This will keep your silver from getting contaminated with any material from
the cotton. In the future you can pour the silver from bottle #2 into your beaker, and top off with fresh from #1 as needed.

2C. This is using a soft bristled brush. I don’t recommend this, but I know a lot of people do it with no issues. Cleanliness is key, as contamination will give you fits. Getting salt from your paper into the silver nitrate will contaminate it, and unlike the buckle brush where you can reload with fresh cotton balls, you are stuck with the same brush over and over. I just avoid the whole thing...

3. Paper can then be hung to dry, set flat to dry, or helped along with a hair dryer on low with a “cool” setting - never warm or hot. I typically use a hair dryer, briefly on the front then mostly on the back. Only sensitize as many sheets as you are going to use in any given printing session, and even then I only do two or three at a time, sensitizing fresh sheets while earlier prints are processing/washing.

**Exposure**

Salted paper is nice because the best exposure is achieved by sunlight! No darkroom with a dim red light here. One thing I have read about, and the way I expose is by using a combination of shade and sun. I am not sure I really see much of a difference, but the logic behind it is sound, so I do it. For sunlight exposure, place your paper with the negative on it into the contact frame, go outside, and then what I do is lean the frame on a ledge or against a wall with the BACK towards the sun. The image will darken quickly, then slow down significantly. *Exposure can vary a lot, but here is what I have found for the midwest, midday, in summer - around 4 minutes of shade and 1 - 2 minutes of direct sun (winter is slightly longer, with less daylight resulting in only a good hour or two for printing).* To check exposure (which I do often, probably more than I need to) simply step inside or somewhere out of direct sunlight and unclip half of the contact frame and pull back the paper to evaluate. Knowing when to stop exposure and begin processing is an acquired skill. Depending on some variables (paper, paper prep, toning, etc...) the print can lighten significantly as it goes through the processing steps. For what we are doing, this is not true. *Using the methods I am showing you I have found that the final print looks virtually the same as it does when you take it out of the sun. If anything, let it go just a little darker than you want it to be.* Some people say that the borders that are not covered by the negative will “bronze” when the print is fully exposed. I think I know what they mean, but different papers and formulas give different looks, so this is not always reliable as a guide. Opening the frame and checking the print is the best. *In the UV box we are using here at the center, exposures*
run around 14 minutes. I usually set the timer for about 10 minutes, and evaluate from there.

### Processing

Once the print is done it goes through a series of wash baths, an optional toning bath, then finally a short fixing bath followed by a final wash. There are a couple different ways to do this - a very thorough method (primarily if you are going to tone), and a more loose, but adequate way. I will present both, though we will only be doing one -

**Thorough method** - Removing the print from the contact frame, having achieved the proper exposure, place it in a bath of 3% salt water with a dash of citric acid added - **10 g citric acid + 30 g kosher salt + 1000ml distilled water**. This will precipitate any unexposed, or “free” silver. It is important to remove this silver if you will be toning your print as it can cause trouble if there is still some there. Gently agitate this salt bath for about 5 minutes, and follow with a 15 minute wash in gently running water. After this wash is when you would proceed with toning. Check out the resources page for links to websites that will have information if you want to look into the wide variety of toners. I have only ever used one toner - gold chloride - which tones the print from its warm tone to a cool one. If not toning, proceed right to **the fixing bath, which is a 10% Sodium Thiosulfate solution with a pinch of baking soda in it - 1000ml distilled water + 100 g sodium thiosulfate + 2 g baking soda.**

The fixing bath is a two tray set up, so separate the 1000ml of fix into 2 different trays, I usually go about 45 seconds in each. Remove from fix and wash for another 30 minutes or more. This is the way I am going to show you, since being thorough is the best for success when it comes to salt printing.

**The not so thorough method** - instead of soaking in a tray of salted water and then washing for 15 minutes, simply wash in a tray of running water for about 10 minutes to rinse away the free silver. It helps if you have a black tray for this since the precipitate is a milky white. If you are not toning I have found that this is an adequate way of doing things, although it can lead to black streaking if not rinsed long enough. Let your heart be your guide. Remember, I do not recommend this way if you are going to tone. After the initial rinse, fix and wash the same way as described previously.

The tone and color of the print will change almost every step of the way, but will dry back down to a warm color that I like to describe as a chocolate tone. Hang to dry!
Wrapping It All Up

Well, I believe that is about all I have for you. There is a lot more information out there, and endless variations on what can be done, but I hope this will get you started down the fun road of alternative photography. I am going to leave the rest of this page blank so you can make any notes about anything I may have forgotten, but was reminded of during the course of the workshop, or for jotting down answers to any questions you may have!
*Chemistry:*
I recommend Bostick and Sullivan in Santa Fe. They are great people and Dick Sullivan is a tireless advocate for alternative processes and continues to experiment and drive these antique methods forward into the future. They also sell glass bottles, measurers, stir sticks, etc... you name it or need it, if it’s for alt pro, they’ll have it.

www.bostick-sullivan.com  (505) 474 0890

*Paper*
There are many good papers for alt pro available locally -
Wet Paint on Grand Avenue in St. Paul (near Macalester) has a good selection.
www.wetpaintart.com  651 698 6431
Blick Art Supplies, several locations around the cities -
www.dickblick.com

*Books -* Don’t waste your money. There are all kinds of resources online if you run into problems, and plenty of people willing to get you unstuck for free. Practice, patience, persistence. You’ll get there.

*Web*
All over the internet there are sites and information, some helpful, but some erroneous and confusing. I am not going to try and give you as many sites as I can find, but rather send you to ones I have found helpful, and these then have links to others.

www.f295.org - Go to the forums, there is a lot of images and information there, though not specifically geared toward alt pro (mostly pinhole photography and homemade cameras and lenses), still, the people are great and there are a lot of great images in a large number of categories to look at, including lots of alternative processes.

www.alternativephotography.com - There is a lot of information here, including links and a forum. It also has featured artists. They also run the alternative photography page on www.facebook.com - there are a lot of great people that post here also, particularly Europeans who have a great, supportive attitude toward alternative process. Just search for ‘alternative photographic processes’.

www.apug.org - The analog photography user’s group, in the forum there is an Alternative Photography section.
Actually, that is all I have for you, but these will lead you to any number of other sites. You can also sift through all the results in a google search... or simply write me.

Here is my info -

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