CHAPTER 5

THE SALTED PAPER PROCESS

Fig 5-27*- Christopher James - Ferris Wheel & Corpse, Delhi, India, 1995 (salt& gold)*

OVERVIEW & EXPECTATIONS

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The salted paper, and the calotype chapter that preceded it, share a homologous history, largely because the inspiration behind both processes was William Henry Fox Talbot (1800-1877). He was also the person who took 200 years of assorted scientific, and observational, clues regarding light, metal, salt, and the camera obscura and solved a significant portion of the photographic puzzle. For that reason, the two chapters share a combined narrative and are written with the intention that will connect them as a single account in the development of salted paper photography.

This chapter will introduce *A Little History* regarding the investigations of chemists and scientists who preceded Talbot, including Schulze, Hellot, Scheele, Wedgwood, and Davy. Talbot, however, plays the leading role in this account of the development of the salted paper process, as he did in devising the *art of fixing shadows* through photogenic drawings and the calotype process … the first chemically developed latent image and the first light sensitive, silver-based, negative to positive paper imaging system. This set the stage for the future of photography in which the negative could be used as a matrix to reproduce an image multiple times. You will also learn how Talbot's discovery, and work, fit into the context of photography's beginning and its future impact upon international culture.

This chapter will reveal the chemistry and formulas for salted paper and will illustrate variations of sizing and salting formulas. Also described are variations of silver nitrate sensitizing formulas, gelatin-salt formulas, pre-sensitizing paper preparation with fumed silica, application techniques, and guidelines for how the prepared paper is exposed and processed. You will also learn a number of toning options along with fixing and final washing considerations. My advice to you, should you want to get a good idea of the path Fox Talbot explored, is to consult the calotype chapter and begin by learning how to make a calotype.

ICON 1 here, (A Little History)

A LITTLE HISTORY

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Being in a State of Salax

In 1912, Ernest Jones, the Welsh psychologist, and disciple of Jung, published an essay about what he perceived to be an irrational, at times lustful, fixation among humans for salt. He could have made his point in a myriad of ways but chose to cite the Abyssinian (Ethiopian) custom of always presenting a piece of salted rock to a guest who would then lick it to show his appreciation of the gift. Did you know that when an ancient Roman man was stricken by love he was described as being in a state of *salax*, or in a salted state? Salax, it turns out, evolved as the origin of the word describing obsessive lust… *salacious*. Did you also know that if you fall below the average level of 7 tablespoons of salt in your body that you will be courting the end of life, but you will never experience a craving for it before you die? Composed of an unstable metal called sodium, it reacts with the poisonous gas chlorine, which becomes table salt, (i.e., sodium chloride), a key ingredient of life. Salt is the reason some wild animals ended up domesticated, the only rock obsessively eaten by everyone, and the primary component in the early discovery of photography. And that should make the salted paper process really personal to you. If you want to know even more about the history of salt I recommend reading Mark Kurlansky's, *History of Salt,* (Penguin Books, 2003)

***Fig 5 – 2 here**, Dan Estabrook, #9.Euphoria, 2004 - (salt and ink)*

Fox Talbot Gets Married

The salted paper process owes its existence to several hundred years of very clever gentlemen and gentlewomen studying the surprising relationships between light and chemistry. The actual concept made its unique debut in the imagination of William Henry Fox Talbot while he was on his honeymoon in 1833. Talbot, his new bride, Constance, and his new toy, a *camera lucida*, traveled to Lake Como, Italy, to celebrate the beginning of their life together.

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While attempting to make a decent drawing of the lake (which is truly beautiful and well worth the effort of attempting a drawing) with his camera lucida, Talbot confronted, head-on, his utter lack of talent for rendering with this new instrument. Faced with this shortcoming, he considered the charming possibility of being able to accurately record images of his life with which he might impress friends and neighbors. When the honeymoon concluded, Talbot, his new bride, and the useless camera lucida returned to England and he set to work on a solution for his inspiration… a burning desire for vacation pics. In 1834, five years before photography was "officially" announced, he came up with the beginnings of a significant discovery.

***Fig 5 - 3 here**, William Henry Fox Talbot, Camera Lucida Drawing, Italy, 1833*

William Hyde Wollaston's Camera Lucida

In 1806, William Hyde Wollaston (1766-1828) invented the *camera lucida*, a drawing and tracing instrument welcomed by many English gentlemen and women who were not only expected to be scholars, poets, adventurers, and interesting at dinner, but also to possess the skill to render an object with a pencil in a lifelike manner… something Talbot did not do very well even with the aid of the camera lucida. As an aside, Sir John Herschel was quite good with Wollaston's device… very good actually.

A camera lucida is composed of a series of interrelated parts including an eye-level glass prism held by a rod and connected to a drawing surface. All the operator had to do was look through the prism, and the image before the "artist" was visible at both eye and drawing board levels simultaneously. The operator's task at that point was to "*trace*" the projected image on the drawing board to achieve a realistic graphic interpretation of the subject. Unfortunately (or perhaps fortunately), the skill required to use the contraption escaped Talbot's control and it was this difficulty that drove him to seek a way to make his holiday images in another manner.

***Fig 5-4 here**, Mark Osterman, Catching Blanks, 2001 –(waxed salted print from 8 x 10 collodion negative)*

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But Wait… There's More: Schulze, Scheele, Wedgwood & Davy

But first … in 1802, 31 years before Constance and William went on their honeymoon, Thomas Wedgwood and his friend, Sir Humphry Davy, made what may have been the first silver sensitized *photogram*. Wedgwood, as mentioned in an earlier chapter, was familiar with the scientific investigations of Johann Heinrich Schulze (1687-1744) who, in 1725, accidentally discovered the darkening effects of light on silver when he mixed silver-contaminated nitric acid with chalk (*calcium carbonate*), creating silver carbonate. He was originally attempting to make a phosphorescent compound, associated with the study of alchemy, called "aluminous stone" or "Baldewein's Phosphor Hermeticus" (first prepared in 1675 and reputed to be an impure calcium nitrate) that was supposedly able to provide a glow even on cloudy days. In any event, curious about why his results turned a deep violet when exposed to sunlight, Schulze eventually figured out that it was caused by contamination of the nitric acid solution by the silver. Additionally, Schulze was aware that the silver nitrate in his lab had turned dark in its glass bottle… except for where the bottle's label on the jar covered the silver nitrate. This prompted him to conduct experiments on the light sensitive properties, and potential, of silver salts.

He performed these experiments by first filling up jars with a mixture of silver nitrate and calcium carbonate (chalk). He then got to work cutting out, and adhering with bees wax, paper alphabet letters to the outside of the silver nitrate jars. Regarding his investigations he wrote, "… *I often wrote names and whole sentences on paper and carefully cut away the inked parts with a sharp knife. Thus I struk (sic) the paper thus perforated on the glass with wax. It was not long before the sun's rays, where they hit the glass through the cut-out parts of the paper, wrote each word or sentence on the chalk precipitate so exactly and distinctly that many who were curious about the experiment but ignorant of its nature took occasion to attribute the thing to some sort of trick."*

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A very interesting side note regarding Schulze's experiments and silver nitrate's sensitivity using letter stencils… in 1737, French chemist, Jean Hellot (1685-1766) recommended the use of a dilute silver nitrate solution as an invisible ink that could be utilized by spies in the course of their espionage. According to Hellot, the message to be delivered by the spy would be written using silver nitrate. Later, having reached the intended eyes, the message could be made legible by exposing it to sunlight whereupon the color of the secret message would turn purple, then brown, and finally black.

A short time later, Swedish chemist / pharmacist Carl Wilhelm Scheele (1742-1786), published a book entitled, *Chemical Observations and Experiments on Air and Fire* (1777). In it, Scheele worked with his newfound knowledge of how the blue - violet end of the spectrum had a noticeable impact on a compound of silver and chlorine (*silver chloride*) through the chemical act of salt to metal reduction. This is clearly illustrated in a spectral analysis of wet plate collodion where the silver sensitized / salted collodion is most sensitive to the blue-violet-ultra violet end of the spectrum. Scheele's findings were later confirmed by Jean Senebier (1742-1809), who re-confirmed the sensitivity of silver chloride to blue-violet rays, noting that darkening took a scant 15 seconds versus the 20 minutes it would take to achieve the same effect if the rays were solely from the red end of the spectrum. This partially explains why safelights are effective in the darkroom.

In case you have an insatiable thirst for obscure knowledge, in a publication titled, *Mémoires physico-chimiques sur l'influence de la lumière solaire*, (Genève 1782, vol. III), Senebier's experiments are described; they reveal muriate of silver's (silver chloride) sensitivity to the various bands of the light spectrum. Times required to darken muriate of silver by the UV rays of the sun:

- Red = 20 minutes
- Orange = 12 minutes
- Yellow = 5 minutes & 30 seconds
- Green = 37 seconds

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- Blue = 29 seconds
- Violet = 15 seconds

This knowledge had a significant impact on Sir Humphry Davy when he and Thomas Wedgwood began experimenting with silver nitrate sensitizer on white leather 20 years later.

Scheele eventually gave up his occupation as a pharmacist for the privileged and rarified life of a university professor in order to dedicate himself to revelation and discovery. Among his observational gems… silver chloride could be dissolved by ammonia but that darkened (exposed) metallic silver was impervious to it. This knowledge allowed him to preserve his experiments with exposed silver chloride, on sheets of paper, by bathing them in an ammonia-rich bath… a method of fixing / clearing the print that was ignored for years! Armed with the knowledge of Senebier's and Scheele's work, (with the unfortunate exception of overlooking Scheele's ammonia fixing bath), Wedgwood and Davy commenced coating paper, glass, and bleached white leather with silver nitrate solutions and laying stencils and other object on these surfaces in sunlight.

You may recall from an earlier segment of *A Little History* how, in 1793, Davy had been told by Joseph Priestly (who incidentally discovered oxygen and soda water) about some experiments being conducted by Elizabeth Fulhame and how those efforts eventually became the foundation of her 1794 self-published book, *An Essay on Combustion, with a View to a new Art of Dying And Painting, wherein the Phlogistic and Antiphlogistic Hypotheses are Proved Erroneous.*

***Fig 5-5 here**, Andréa Brächer, Photogenic Drawing 2011*

In her early research, Fulhame had been seeking a way to impregnate and stain fabrics with precious metals such as gold. She hypothesized that this might be possible with the influence of water and light and her research brought her to the conclusion that

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water played the major role in catalytic reactions as both the *reducing* and *oxidizing* agent. She also noted that following those particular actions the water was always restored to its original state. Fulhame suggested taking advantage of the phenomena of silver and light interaction might be employed by cartographers as a technique to create maps. My assumption is that Davy, being a very intelligent and curious scientist, put all of these influences together as he went into collaboration with Wedgwood.

During the photogram exposures made by Davy and Wedgwood, the silver salt sensitizer turned a gray, purple brown (*the same colors that Talbot achieved in his photogenic drawings preserved with salted water*), and eventually, black in the areas open to exposure. Their "*Sunprints*" required only a simple water wash to remain visible and were successful enough that Wedgwood and Davy formalized their discovery… which of course exposed the paradox that the light required to make an image would also destroy that image if it could not be stabilized. Undeterred, Wedgwood and Davy showed their stenciled photograms by candlelight, thus validating their work and allowing it to be acknowledged. Although there is some written evidence that a few of these prints were still visible into the late 1800s, I am unaware of any still in existence. Wedgwood and Davy published their findings, including documentation of making images on paper and white leather by means of silver nitrate and a camera obscura, in a manuscript delivered to the Journal of the Royal Society in 1802 titled: *An Account of a method of Copying paintings Upon Glass and Making Profiles by the Agency of Light Upon Nitrate of Silver*.

By the early 1840s, amateur artists and chemists were employing photogram techniques with simultaneous creative and practical scientific intentions. Notable projects underway during this period were Sir John Herschel's Anthotypes created with the juices of flowers and sunlight; Anna Atkins' cyanotype studies of algae (a process she presumably learned from its inventor, Sir John Herschel, who lived down the lane)*;* Mongo Ponton's work with potassium dichromate as a light sensitizing solution for his "*shadowgraphs*" (which would eventually lead to the gum bichromate process); and William Henry Fox Talbot's efforts with his photogenic drawings and calotype paper

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negatives. And after that short history excursion we are now back to Talbot's significant discovery, following his honeymoon, in 1834.

In January of that year, Talbot began to experiment with the ideas and inspirations generated on his honeymoon trip to Lake Como. Using his knowledge of past silver salt experiments he proceeded to create precise photogram "tracings" of flowers, leaves, feathers and lace on salted and silver nitrate sensitized stationary. He called his discovery "*the art of photogenic drawing*."

Fig: 5 - 6 here, *William Henry Fox Talbot, Photogenic Drawing of a Leaf, 1839*

In Talbot's earliest photogenic drawing exercises, he coated a fine piece of gelatin-sized stationery in a weak solution of common table salt (sodium chloride). The paper Talbot used was typical of the majority of high quality stationery manufactured in the 1800s and intentionally sized and infused with gelatin, and / or other natural organic binders such as albumen and whey (a high protein by-product of cheese making), in order to enhance the sheet strength of the paper. English made stationary papers for the well-to-do were traditionally sized with gelatin while French papermakers employed starch for the same purpose.

After the salted stationery had dried, Talbot applied a second coating of a 6% - 8% silver nitrate solution… or stronger. This idea wasn't completely serendipitous, as we have seen there is evidence of a fairly well worn path leading to Talbot's moment of inspiration.

When the silver nitrate coating had dried, a light sensitive compound of silver chloride had precipitated within the fibers of the paper. What Talbot was to surmise later was that the silver chloride will provide only a wispy rendition without the organic impurities within the paper to absorb the chlorine formed during the compounding of silver and sodium chloride. This was to be a great and important revelation and it,

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combined with the conclusion that it is the excess of silver nitrate facilitates the light sensitive reaction, that really got things moving at breakneck speed.

Fig: 5 - 7 here, *James Hajicek & Carol Panero Smith, Arc of Departure 2009 –(salt-photogenic drawing)*

These *Sciagraphs*, or *Photogenic Drawings,* that Talbot made during his experiments were semi-preserved with a bath of saturated salted water, although, as Talbot noted, "*we shall find that its* [regarding his exposed paper] *sensibility is greatly diminished, and, in some cases, seems quite extinct*." Talbot went on to write that if that same piece of paper was then to be washed with an additional coating of silver nitrate it would become sensitive once again – indeed, even more sensitive than the first time. Excited by the idea of creating an even faster exposure, Talbot noted that the proportions of salt and silver were critical and that in some cases the silver chloride was "*disposed to darken of itself*" without any exposure to light at all. Eventually, he got to the point that he could alternate between percentages, and numbers, of washes of salt and silver nitrate to the critical point where the paper would be ideal for rapid exposure in the camera obscura.

His method of selecting which piece of sensitized paper to use was an interesting one. He would prepare several large sheets in the manner described, cut off small samples, and number both. He would then lay the test samples out in a line in very diffused light for 15 minutes. The sample paper that showed the greatest tendency to change, under the influence of that low light, was the winner of the test and Talbot would proceed to use its larger companion sheet (the one with the corresponding number) for his camera obscura exposure.

It is interesting to point out several things at this crossroads in the process. First, in Talbot's initial attempts to "fix" his *photogenic drawings* he used Scheele's ammonia fixing bath from 1777 but with, as he wrote, "*imperfect success*." Talbot then recalled a remark by Sir Humphry Davy in which Davy indicated that his experiments with the

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iodide of silver (*actually a sub-iodide*) showed that chemical to be more sensitive than silver chloride in producing a light sensitive reaction.

During a subsequent residence in Geneva, also in 1834, Talbot tried working with Davy's information and discovered in his own experiments that the opposite was true and that Davy's silver iodide formula was not sensitive to light in the least. Talbot immediately began to use this knowledge as a way to *fix,* and stabilize*,* his silver chloride photogenic drawing images by dipping them in a very dilute bath of iodide of potassium. In this way, an iodide of silver was formed making a fixing bath that would render the print, "*absolutely unalterable by sunshine*."

***Fig: 5-8 here**, Malin Sjoberg - photogenic drawing neg & pos - Lacock Abbey - 2012*

During the "*brilliant summer of 1835*" Talbot returned to his original goal of making pictures in camera and created the first camera-made paper negative that could be used to generate multiple positive photographic prints *(See Fig 3-5*). Following his discovery, Talbot wrote a charming description of this experience in his 1839 paper to the Royal Society, *Some Account of the Art of Photogenic Drawing*. He wrote, "*In the summer of 1835 I made in this way a great number of representations of my house in the country… and this building I believe to be the first that was ever yet known to have drawn its own picture."*

The year 1839 was a big one for photography and the first months were really chaotic. On the 7th of January, Daguerre's "invention" of photography was delivered, to the Academie des Sciences in Paris by Daguerre's sponsor, Dominique François Arago. Talbot immediately wrote a letter to Arago, not realizing that the two techniques were quite different, informing him that it was he, and not Daguerre, who had invented this image-making process.

Ironically, a clerk for the French Ministry of Finance, Hippolyte Bayard, had shown his own invention of photographic production, consisting of direct positive salted

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images on sensitized paper, to the same Monsieur Arago just three months earlier. But Arago had already invested too much of his reputation in Daguerre, and Bayard was told to retreat, promised a 600 franc pension for more chemistry and supplies, and subsequently ignored. On the 25th of January, Michael Faraday (1791-1867), the discoverer of *electro-magnetism*, showed a random collection of samples of Talbot's work, including leaves and lace, to the members of the Royal Institution. Interestingly enough, on that same day, Sir John Herschel wrote to Talbot from London informing him that he was preparing to deliver a paper the following week before the Royal Society, respecting the, *"possible fixing upon paper the image formed by a Camera Obscura; or rather, I should say, causing it to fix itself, I should be most happy to show you specimens of this curious process."* Herschel then went on to write, *"If you can not make a convenient call here, Slough has now become so accessible by railway that I would take a drive there any day if you would appoint an hour."* On the 31st, Talbot unveiled his salted paper "photogenic drawings" to the Royal Society in London and read from his paper *Some Account of the Art of Photogenic Drawing or the Process by Which Natural Objects may be Made to Delineate Themselves Without the Aid of an Artist's Pencil*.

Note: Considering the documentation above, it is interesting to me that on the 8th of January, 1819, in the *Edinburgh Philosophical Journal*, Sir John Herschel (1792-1871) wrote, "*Muriate of silver (silver chloride), newly precipitated, dissolves in this salt (referring to hyposulphite of soda - discovered by Chaussier in 1799) almost as readily as sugar in water*."

Fig 5-9 here, *Andréa Brächer, Laycock Abbey, 2011 (photogenic drawing)*

Mr. Talbot's Ferns Are Fixed by Mr. Herschel

Talbot's friend, Sir John Herschel, became very interested in all of this commotion and wrote a letter to Talbot using the word "*photography*" for the very first time. Then, on the 1st of February, Talbot dropped in on Herschel for tea and learned of Herschel's knowledge of the fixing abilities of sodium hyposulphite of soda (*sodium*

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thiosulfate), a factual chemical reaction that Herschel had actually realized some 20 years earlier.

In a letter written by Maggie Herschel to her son, Alexander, in February 1872, she wrote, "*I remember very well the visit… to Slough of Mr. Fox Talbot, who came to shew [sic] to Herschel his beautiful little picture of ferns and Laces taken by his new process – when something was said about the difficulty of fixing the pictures.* Maggie Herschel continued her account by recalling Herschel saying to Mr Talbot*, "let me have this one for a few minutes,"* and after a short time he returned to give the picture to Mr. Talbot saying*, "I think that you will find that fixed."* This was the beginning of hyposulphate of soda fixing.

With Herschel's consent, Talbot described this last piece of the photographic puzzle. When Daguerre heard the news, he immediately adopted the chemical for use in his own work, thus solving one of his biggest problems. On February 8, 1841, Talbot placed a restrictive patent on his calotype discovery almost completely putting the brakes on the new "photographic" medium. As Lady Eastlake put it, "*Mr. F. Talbot's directions, though sufficient for his own pre-instructed hand, were too vague for the tyro; and an enlistment into the ranks of the "Pilgrims of the Sun" seldom led to any result but that of disappointment.*" Because you're probably thinking that the line "Pilgrims of the Sun" is a brilliant bunch of connected words about photographers, you should know that it refers to the title of James Hogg's poem, a an allegorical lament about the heartache of platonic love, written in 1815.

The effects of Talbot's patent were relatively short lived however, due to the enthusiasm of other scientists for making pictures and to the advent of Blanquart-Evrard's albumen technique and its integration with Frederick Scott Archer's wet-collodion glass plate negative process in 1851. It is interesting to note that Talbot eventually realized that he had not perfected an art form but had, instead, certainly commenced one. It is Talbot's salted paper process that led directly to our modern silver halide based photography.

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Up until the mid 1850's almost all salted paper prints were produced by printing-out an image on a sheet of gelatin or starch sized stationary that had been immersed in a simple bath of gelatin, sodium or ammonium chloride, and sodium citrate. After drying the salted paper, it was sensitized with silver nitrate and exposed to sunlight where it would print-out to more or less what it would look like following a rinse in acidic salted water (to precipitate the free excess silver), a simple sodium thiosulfate fix and final wash. There was, however, another salted paper process being practiced at the same time that was developed and practiced by Thomas Sutton, then the editor of the British Photographic journal, *Photographic Notes,* who championed an alternative salt technique of developing-out the image with a weak solution of gallic acid. Although this technique was practiced by many, including such notable gentlemen as Louis Désiré Blanquart-Evrard, whom Sutton had a business relationship with, the colder and more neutral coloration of the developing-out method did not achieve the popularity of the warm reddish browns of the more commonly practiced printing-out method. For more on the developing-out technique, please see the Calotype chapter.

ICON -2 here, (Table Set-Up)

Fig 5 - 10 here, France Scully Osterman, Laszlo and Carole-2002, (waxed salt print from 8 x 10 collodion negative / H. Greenberg Gallery)

TABLE & SINK SET UP FOR GELATIN SALTING PAPER

Gelatin Salting Chemistry & Formulas

In 1835 Fox Talbot had no need to size his papers with gelatin because the fine stationery of that time was manufactured with gelatin and other organic binders in the rag fibers. In my workshops and classes I have found that a simple gelatin sizing is a painless way to enhance detail, contrast, and tonal scale in a salted paper image. This may be less than a pure approach to the process but it beats being frustrated by the inevitable dry-down that occurs in salted paper. Don't size automatically. Try many

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different kinds of papers and do an abundance of comparative testing to find what papers work most successfully for you and your imagery. It is quite likely that you will find that the differences in a gelatin salted paper, versus a simple salted paper, will be so obvious to you that gelatin salted sizing will become a matter of accepted practice in your workflow. If you run into problems, there's more than a good chance it can be fixed with a greater attention to detail. In the salted paper process, the paper is initially immersed in a gelatin, or starch, and multiple-salt solution. This allows the subsequent coating of silver nitrate to react to the salt to create a silver chloride. Here are several formulas and we'll begin with my favorite.

Gelatin Salting #1

(*Yields a reddish - purple salt print without toning*)

- 8 g gelatin

(*Knox gelatin from the grocery store works just fine)*

- 18 g sodium citrate

Note: You may play with the proportion of sodium citrate here. It is primarily in the formula for contrast control. If you remove it entirely you will see an increase in contrast. If you use less than the recommended 18 g in this recipe it will result in a slightly higher contrast image in proportion to the amount not added.

- 20 g ammonium chloride
- 1 liter (1000 ml) of distilled water
- Electric kettle for heating water (*non-metal heating element*)
- Several clean plastic beakers
- Clean trays for salt-soaking the paper:

(*One large tray for hot water and one small tray, that will float in the larger hot water tray, for the gelatin salting formula and the paper that you will immerse in it*.)

- Clothesline for hanging salted paper
- Zip Lock bag for paper storage
- Paper for salt sizing (*Different papers will yield different values*)

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I use this sizing formula almost exclusively and find it especially successful when working with classes, or workshops, with a large number of people. Remember this important rule of gelatin sizing… keep your gelatin warm at all times or it will firm up like a dessert.

Gelatin Salting #2

(*Yields a blue - purple salt print without toning*)

- 8 g gelatin

Note: Knox gelatin from the grocery is perfectly fine and I personally prefer it to Ossein, sometimes referred to as photo grade gelatin, or Maco - LPE410

- 18 g sodium citrate

Note: The same recommendation applies as in Gelatin Salting Formula #1… a slight decrease in the gram weight will yield a slightly higher contrast print.

- 20 g sodium chloride
- 1 liter (1000 ml) of distilled water
- Electric kettle for heating water
- Several clean plastic beakers
- Clean trays for salt soaking the paper

(*One large tray for hot water and one small tray, that will float in the larger hot water tray, for the gelatin salting formula and the paper that you will immerse in it.*)

- Clothesline for hanging salted paper
- Zip Lock bag for storage
- Paper for salt sizing (*Different papers will yield different values*)

***Fig 5 – 11 here**, Bob Kiss – Volterra Etruscan Gate, Tuscany –(salt)*

Contrast Control in Sizing for Gelatin Salting #1 & #2

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Employing a slightly weaker salting solution can increase contrast. Increasing the amount of sodium citrate in your gelatin / starch sizing solution will reduce contrast, whereas decreasing the amount of sodium citrate, or eliminating it altogether, will increase the contrast. Make adjustment in very small increments and begin with slightly reducing the sodium citrate, e.g. 14 grams instead of 18 grams.

A Bit About Gelatin

The role of the gelatin is to provide an emulsion-like surface that will contain the salts so that they can easily be affected by the application of the silver nitrate sensitizer. The thickness of the gelatin is proportional to the amount of silver salts that it can contain, the ease of coating the silver nitrate sensitizer, and the clarity of the final image. As a rule of thumb, a less concentrated gelatin formula will result in an image with greater clarity. As well, a smoother coating, faster drying time (important when dealing with silver nitrate and its relationship with organic matter such as gelatin, salt, and paper fibers), and better rendition of traditional salted paper ambers and reds. The downside of a lighter concentration of gelatin is a slight loss of printing speed.

Gelatin Salting Step Sequence

Step #1 - Begin by soaking the gelatin, in a clean plastic beaker, in half of the water at room temperature for 15 to 20 minutes. This period of time is referred to as the "bloom" time. The bloom number of your gelatin will inform you as to its hardness. Knox gelatin has a low bloom number and is considered "soft." Photo grade gelatin has a higher bloom number and is harder.

After the bloom, add the remaining 500 ml of distilled water and heat the solution to 100° F. I find that the easiest method of doing this is to create a double-boiler like system where you have a very clean plastic beaker to hold your sizing solution and this is set into a larger container holding water warm enough to maintain a 100 degree constant temperature.

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Step #2 - When the gelatin and water mix is at the proper temperature, add the sodium citrate and ammonium chloride by slowly stirring into solution.

Step #3 - Prepare a "double-boiler" tray set up where a smaller tray (large enough for your paper) is filled with the warm gelatin and salts… see each formula for specifics. This smaller tray is set into a larger tray filled with hot water. The smaller tray floats on the hot water in the larger tray, like a boat, keeping the gelatin warm during the sizing. If the gelatin cools, it hardens… just like a gelatin dessert.

The purpose of the gelatin sizing is to prevent the silver nitrate from sinking too deeply into the paper and resulting in a less than vibrant shadow density. As well, it helps eliminate a muddy looking image after dry down. The primary difference between gelatin formulas #1 and #2 is an ammonium chloride / sodium chloride swap. The use of ammonium chloride will result in a little better contrast and a reddish - purple tonality. Contrast can also be increased with a smaller concentration of sodium citrate. If, on the other hand, you wish to lessen the contrast, or want a print that is blue – purple, then you should consider the Gelatin Salting Emulsion #2 with sodium chloride formula.

Step #4 – Gently feed your paper, a sheet at a time, into the tray of warmed gelatin salted solution. I like to put about 10 sheets of paper into the gelatin at a time and slowly sort through the stack being sure to immerse each sheet completely.

Step #5 - After 3 to 5 minutes, remove the paper from the warm gelatin solution and hang each sheet on a line to dry, using clothespins. After the first minute or so, flip the papers upside down on the line to prevent the gelatin from hardening on the lower half of the hanging paper. This will help ensure an even coverage. When the paper is dry, flatten it in a dry mount press at a low temperature, raising and lowering the platen so as not to burn the gelatin. If you don't have a dry mount press, don't worry about it. You can use a clothes iron on a low setting without pressure or simply use a heavier weight

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paper that is less likely to curl. Hanging with pins on the top and bottom corners will also help reduce curling when drying.

Fig: 5 – 12 here, *Allyson Fauver, Salt #10, 2005 (salt)*

Allyson's Gelatin Salting Formula

- 20 g citric acid
- 20 g Kosher salt (*Sodium Chloride - Morton's Kosher*)
- 4 g Knox gelatin (or photo grade gelatin)
- 1000 ml distilled water

This formula is one Allyson Fauver demonstrated for me in a workshop many years ago as she was heading off to law school. Allyson's images were known for their brilliantly deep reds she achieved and by her "old-school" use of salt as a stabilizing bath. Notice that there is no sodium citrate in her formula… indicating that she was seeking a higher contrast image from the start. Begin by making sure everything you will be using … beakers, stirrers, trays, etc. are meticulously clean.

Step #1 - In a 1000 ml beaker, sprinkle the gelatin into 200 ml of cold distilled water and let it stand for 15 minutes.

Step #2 - Dissolve the sodium chloride (Kosher Salt) and citric acid in 700 ml of distilled water that you have heated to a 100˚ F degree constant temperature

Step #3 - Pour the sodium chloride / citric acid solution into the gelatin solution, and add hot (distilled) water to make a total volume of 1000 ml. Place the beaker, double boiler style, in a larger beaker of hot water and stir well until the gelatin is fully dissolved.

Step #4 – Continue the gelatin salting sequence as detailed above.

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Fig: 5 – 13 here, *Allyson Fauver, Experiments, 2005 (salt)*

Allyson's Deep Red: Post Exposure

Allyson's deep red coloration is due to her post exposure work on the print. She washes her images in a 2% - 3% salted bath. This stabilizing bath changes the color of the print to a dark red / brownish orange. Here is the sequence.

Step #1 Stabilizing – After exposure (at which point the print would be a beautiful, deep, rich, eggplant to black color), put it directly into a 3% salt bath (30 g Morton's Kosher salt, and tap water to 1000 ml) for 5-6 minutes, agitating. This alters the color to dark red/brown/orange.

Step #2 Re-Exposure – Next, the wet print is then re-exposed to UV light. As the print is un-stabilized at this point, the new salt bath essentially washes the print in a new and different silver chloride / salt solution. This second exposure brings out lavender in the highlights and results, after drying, in a deep rust red / lavender duo-toned print after the dry down. I'm not sure why this is the case but… old salts are good salts and the older the sodium chloride salt stabilizing bath, the more dramatic the color shift to lavender.

Step #3 Washing – Wash the print in a running tap water bath for 15 to 20 minutes and then hang it up to dry in a very low light place.

Step #4 Heat Press – If you iron or flatten your dried print in a dry mount press, it will result in a deeper and darker coloration.

Allyson doesn't mention these variations to her technique but I'll toss them in here as I think it may help make the print more stable. While you are experimenting, try adding 10 g of citric acid to the sensitizer solution. This will beneficially lower the pH, helping with stability.

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Also, after washing, try toning your print for 30 minutes in a gold / borax toner. Finally, in answer to the obvious question of why she hasn't included a fixing step in her process … it's quite simple. Fox Talbot's earliest salted paper prints were unfixed and the technique Allyson is using is a form of tribute to the mystique and alchemy of a final result that could only be appreciated by candlelight. Her prints, as were Talbot's, are stabilized, but unfixed with sodium thiosulfate. They are, by their nature and intent, changeable and ephemeral, both physically, and emotionally… a reflection of our own beauty, fragility, and mystery.

***Fig 5 – 14 here**, Niles Lund, Portrait of Christopher James, 2004 – (salt print)*

SIZING WITH STARCH OPTION

You may recall the information that fine French stationery paper was sized with starch while English stationery was sized with gelatin. After working with both types of sizing, in my experience gelatin is the superior option. That said, there is a possibility that the look and coloration of a starch sized paper, combined with salt and silver, will suit the intentions and look you are working for better than the gelatin. It is certainly better than no binder at all.

There is a choice of starches for you. Arrowroot is traditional and while tapioca starch (not the pudding beads, but the starch that you will use for thickening in Asian cuisine) is used in the matte albumen formula. Rice starch and wheat starch are also options but my experience with them is limited so I wouldn't be able to give you a thumbs up or down as opposed to the use of arrowroot or tapioca. Here's a pretty standard "old-school" starch sizing formula from the late 1800's for salted paper using any of the starches listed.

Formula for Starch Solution:

- 20 parts starch
- 6 parts Ammonium chloride

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- 3 parts Citric Acid
- 600 parts distilled water

12% Silver Nitrate Sensitizer

- 12 grams of silver nitrate to 100 ml of water

Size and sensitize, as you would using a gelatin-sized paper. You will likely discover that the contrast with starch-sized papers is a bit less pronounced. You can try double coating and that should help. I've read that the exposure times with starch-sized papers are a bit longer than with gelatin-sized papers but I personally have not experienced this difference. My guess is that it has more to do with the negative than it does with the sizing.

ICON -2 here, (Table Set-Up)

TABLE SET UP FOR SENSITIZING SALTED PAPER

- Clean dark brown glass bottle, suitable for chemicals, for the silver nitrate solution.

(*See below for several sensitizer formulas that will be suitable for your printing needs.)*

- Plastic dropper for silver nitrate drop count
- Heavy duty shot glass
- Clean paper or clean piece of Lucite for a coating area on the table surface
- Salted & labeled paper for coating (*see instructions in text for salting*)
- New or silver nitrate only hake brush or Richeson synthetic fiber brush
- Clean distilled water in a beaker for brush rinsing
- Pencil for writing data on paper
- Hair dryer
- Contact printing frame

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- Negative for contact printing
- Tape
- Fumed silica if you are pre-coating before silver nitrate
- 2" foam brush for coating silica

***Fig 5 -15 here**, Fumed Silica and Albumen Test #2*

Fumed Silica Paper Preparation Option

If you are open to an extra step in this process, and are hoping for a way to intensify the full tonal range of salted paper with a greatly enhanced tonal range, you might wish to consider applying a micro application of fumed silica to the paper prior to sensitizing it with silver nitrate. The technique is relatively simple and when done well, the results are quite satisfying. I'll go into more detail, for both wet and dry fumed silica application in Chapter 11 but for now, here is the quick overview.

You'll need a 5" paint roller with high-density foam replacement rollers and a small quantity of fumed silica. The silica is almost lighter than air and since you'll only be using it sparingly, ordering a modest container of it will be inexpensive and will have very reasonable shipping charges.

For an 8 x 10 print, take about an 8th of a teaspoon (just a pinch) and place it on the gelatin sized paper in the middle of the area that you will be sensitizing with silver nitrate after this step. You can also place the fumed silica in a paint roller tray the size of your 5" rollers and simply charge the roller by running it back and forth in the tray… and then moving to the paper to apply the silica.

With firm pressure, begin to rapidly roll out the silica in all directions and continue this, covering your entire surface area, for several minutes. When you touch the paper's surface, you will find it doesn't feel like paper any longer. Actually, it may feel more like the soft nap on sand-washed silk. Now you may go on to sensitize the paper with your silver nitrate solution.

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SILVER NITRATE SENSITIZING SALTED PAPER

When your salted paper has dried sufficiently it is time to sensitize it with a solution of silver nitrate. Up to this point, getting to the completion of the salting stage, your paper has not been light sensitive. The coating of silver nitrate will change this situation and it is necessary to conduct the sensitizing stage of your salted paper preparation under a very low light level. This does not mean under safelight conditions. You simply don't want overhead neon or direct sunlight flooding the room while you are coating the silver on the salted paper.

Begin by preparing the preferred percentage of the silver nitrate solution and be very careful while doing so. Please put on a pair of examination gloves and wear eye protection simply for the safety factor (see below). I'm going to give you three different silver nitrate formulas. The first is a simple and basic one that you use directly. The other uses citric acid as a preservative and extends the time that you can use the paper should you decide to print later. In any case, both standard formulas will do the job. The third formula is one that I use at high altitude. *Before you begin, be sure to note the following:*

***Fig 5-16 here**, Alicia With Silver Nitrate Hand, New Mexico, 2012*

Silver Nitrate: Read This Please

In the 13th century, Albertus Magnus, a Catholic Bishop remembered for his still contentious advocacy of the peaceful coexistence of theology and science, documented the ability of nitric acid to separate the metals of gold and silver by dissolving the silver. As part of this experimentation, Magnus noted that the resulting solution of silver nitrate would blacken skin. Silver nitrate will indeed discolor your skin as it binds with the proteins in the epidermal skin layer and will resemble a temporary henna tattoo. The stain will go away in about a week but if you're impatient you can gently rub away your silver nitrate stain with a pumice stone, similar to the tool some use on one's feet to smooth out rough areas of skin.

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Silver nitrate appears as a colorless and odorless crystal and darkens on exposure to light. Silver nitrate is also highly corrosive and can cause severe skin and eye problems. Silver nitrate is particularly destructive to mucous membranes and the upper respiratory tract. It is the primary silver salt found in photographic emulsions, alternative processes (e.g., kallitype, wet plate collodion, van dyke, albumen, salted paper, etc.), and some intensifiers.

If silver nitrate splashes into your eyes it may cause blindness. It is caustic and if it gets into your eyes you will be in a bit of trouble so do not touch your face when working with it. If you get silver nitrate on your skin you may experience redness, pain, and burning.

Upon exposure to silver nitrate, rinse the area repeatedly and thoroughly with water. Rubbing the area of exposure with sodium chloride (common table salt or Kosher salt) will help to a degree and will also help with skin stain removal. If you get silver nitrate in your eyes immediately flush with copious amounts of water and continue flushing while medical attention is summoned. Do not panic…

Silver salts have antiseptic properties and until the development and adoption of antibiotics, very dilute solutions of silver nitrate were commonly dropped into newborn infant's eyes to prevent contraction of sexually transmitted disease (STD) that the mother may have been afflicted with. First utilized in 1881, this treatment resulted in a significant reduction in eye infections and blindness in newborns. However, an incorrect dosage could result in blindness.

Black silver nitrate stains on counters can be eliminated by washing the stained area with a solution of 2 teaspoons of sodium bisulfite in a quart of water. Be cautious of the sulfur dioxide gas that will be created by this act of cleaning.

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Silver nitrate is additionally a very strong oxidizer. It will combust and forms an explosive precipitate if allowed to come into contact with any ammonia compounds, i.e., ammonium hydroxide (the strong concentration of ammonia used in mordançage).

Never mix silver nitrate with metals such as aluminum or zinc. Again, use all safety precautions especially by wearing gloves and goggles or safety glasses when working with this chemical.

All things considered, I have been discoloring my skin for a several decades now without pain, burning, or any other negative effects. No matter how careful, or how often they decide to wear nitrile gloves, students inevitably get a brown spot or two from silver nitrate solution on their fingers during coating. To date I've not seen any short-term damage. Long-term exposure is unknown so please be aware that silver nitrate can be dangerous if you don't respect it.

Here's another bit of silver nitrate information you might want to keep in mind… silver nitrate isn't very light sensitive all by itself but as soon as it gets together with an organic binder such as dust, gelatin, starch and the like it will become quite sensitive to light.

ICON – 3 here (Measuring Chemistry)

Standard 10% Silver Nitrate & Citric Acid Sensitizer Formula:

I prefer this 10% silver nitrate solution, with citric acid added, to the traditional standard formula below, especially if I am experiencing highlight problems or do not intend to print immediately. The citric acid lowers the pH of the silver nitrate sensitizer, and acts as a preservative. To make it, mix 10 g of silver nitrate into 50 ml of warm distilled water and carefully pour the solution into a clean dark glass container with a plastic cap. Then mix 5 g of citric acid into the remaining 50 ml of warm distilled water and add it to the silver nitrate solution. Store this solution in a dark glass bottle and label it with the date, its contents, and a warning.

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For me, this is a double coating formula meaning I will coat a perfectly dry piece of salted paper, dry it completely, and then re-coat and dry again before exposure.

- 100 ml of distilled water
- 10 g of silver nitrate
- 5 g citric acid (*this lowers the pH and makes it more acidic*)

***Fig 5-17 here**, Christopher James, Whispering-Prague 1983 (salt)*

Standard 10% Silver Nitrate Sensitizer Formula:

This traditional formula makes a 10 % sensitizer solution. Add the 10 g of silver nitrate to the 100 ml of warmed distilled water and stir gently with a non-metallic stirrer until it is dissolved into solution. You can make any concentration that you like and many salted paper printers prefer a less aggressive concentration of 6% with which they double coat their paper. Silver nitrate has a very long shelf life and if you happen to have a kallitype kit in the lab, it is a pre-mixed 10% solution that can be used straight from the bottle.

- 10 g silver nitrate
- 100 ml of distilled water

High Altitude / No Humidity 20% Salted Paper Sensitizer Formula:

This formula is an option if you happen to be working in Aspen, Santa Fe, or Kathmandu. Interestingly enough, I've started to use this mix as a single coating application at all altitudes and it works well, as long as your sensitizer coating to exposure time is very short. Notice that the citric acid is also in this sensitizer mix, lowering the pH and extending the time I can have before exposure.

- 100 ml of distilled water
- 20 g of silver nitrate

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- 5 g citric acid
- Mix the 20 g of silver nitrate into the 50 ml of warm distilled water and carefully pour the solution into a clean dark glass container.
- Finally mix 5 g of citric acid into the remaining 50 ml of warm distilled water and add it to the silver nitrate solution in the dark glass container.

15% Silver Sensitizing On Delicate Paper

Often, when making a salted paper print on a delicate paper, or complicated surface such as Clearprint Chateau Vellum, Bienfang 360 or Rives Lightweight, you will want to coat once rather than subjecting the coating to a second sensitizing step. In situation like this I recommend a mounting the sized paper on a thin and rigid surface that can be put into your contact frame without a conflict of thickness. One of the best methods for this is to use a thin brown packing tape that has glue on one side that is activated by moisture. In art school, you are taught to prepare watercolor paper by soaking the paper in warm water and then putting it on a backing board and double taping the edges to the board. As the paper dries, it shrinks and becomes taut with the resistance of the tape. If you gelatin-salt size your delicate paper, and apply it to a rigid and thin surface, you will be able to easily give it a fumed silica top preparation followed by a single 15% silver nitrate coating. You can cut the tape away for the contact frame exposure or simply put the backing board and prepared salted and sensitized paper in the frame for the exposure… providing it won't break the glass in the frame.

Nikki Seggara's salted paper print was prepared in this manner using 8 grams of gelatin, 12 grams sodium citrate and 20 grams ammonium chloride. She then mounted the paper on Lucite until dry. Nikki then applied a fumed silica top dressing with the dry coating method and then coated the paper with a 15% silver nitrate sensitizer. Following exposure, the print was immersed in a liter of water with 30 grams of Kosher salt and 10 grams of citric acid for 2 minutes. This was followed with a 1-minute sodium thiosulfate fixer bath and a 30-minute wash followed by a several minute soak in distilled water.

Fig: 5 - 18 here, *Nikki Segarra, Between L and Sea_2012 (salt)*

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Sensitizing Considerations

As a rule, try to use the freshly sensitized paper as soon as you can. Salted paper dislikes humidity and in humid conditions the paper will begin to discolor in a few hours. Think of table salt in a salt-shaker on a hot and humid summer day to reinforce this recommendation. If this is the environment you are printing in, try using the silver nitrate formula with the addition of citric acid. In dry, dark, and cool conditions the addition of the citric acid will help extend the life of sensitized paper for a day or two.

Be careful not to apply too much heat (when blow-drying) to the newly sensitized damp paper because that temperature change will cause a loss of sensitivity. If you do use a hairdryer be sure that it is set on a cool setting and blow on the backside of the coated paper for the majority of the drying time making sure that your paper is totally dry before exposing. Blow-drying on the backside of the coated paper also helps draw the sensitizer into the paper's fibers. Moisture in the paper will cause staining and the conditions for generally poor results, so you might want to consider having a dry mount press, set at a low temperature, nearby for removing any residual moisture immediately prior to printing. Often, you won't see the staining until after the dry-down. If using a press, make sure that the time the hot press platen and the paper are together is very brief. Open and close the press rapidly and you'll see the moisture escape out of the back of the press. Do this rapidly until you don't see the steam any more.

If you see a speckled print, with black or brown freckled spots, reminding you of an ancient albumen print found in an antique store, you could be experiencing a variety of maladies. The most common of these are: paper contamination of some type; the paper is ill suited for the process; the silver nitrate application brush has been compromised and not thoroughly washed between coatings; the silver nitrate (if you are dipping the brush) has gone bad due to this contamination; or the paper was moist when you exposed it; you are not using distilled water; kosher salt hasn't been added to the first wash bath, and so forth… this list can get quite lengthy and the best remedy is to do everything perfectly from the start.

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Very often the problem is simply related to the brush not being cleaned well. What has happened is that the brush has picked up salts, gelatin, paper fibers, and dust from repeated applications of silver nitrate sensitizer when brushing across the paper's surface. Then, when a second coating is performed, and the brush is dipped again into the silver nitrate, the solution becomes contaminated. My advice, especially to those in workshops, is to use a shot glass with a drop count (approximately 22 drops for a 4 x 5 inch negative) of fresh silver nitrate for each individual print. You could also use a glass-coating rod (refer to the platinum / palladium chapter for the technique) or new foam brush for each application; however, the latter wastes sensitizer.

If you are having problems, only change one thing at a time. My first move would be to re-mix the silver nitrate solution, adding the citric acid, and try again. My second change would be to go to the drop count in the shot glass versus the dipping of the brush into a beaker of silver nitrate. Third, change papers. Fourth, make absolutely sure that your paper was bone dry before exposing. If you're in a hot and humid climate, perform the entire exposure in open shade to cut down on building up heat (resulting in moisture) in the contact frame.

***Fig 5 -19 here**, Margaret Adams, Dress, 2000 – (salt print and salt print w/ potassium dichromate added)*

Contrast Enhancements: Potassium Dichromate

One of the easiest methods of affecting the contrast of your salted paper print is to alter the initial wash-development bath. In order to increase the contrast, as well as changing the color of the image to a reddish brown, simply add 3 – 5 drops of a 10% potassium dichromate solution (100 g potassium dichromate to a liter of distilled water). This is almost a saturated solution of potassium dichromate, which saturates at 13%, so if you are lacking a scale or are short on time, just make a saturated solution and add a little extra water to it. To use it, heat this solution in a microwave oven in a plastic

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beaker or use a double boiler like tray set-up. The warmer the solution, the stronger the change to contrast and color and the less likely you will experience paper speckling.

Fig: 5 – 20 here, *Rebecca Welsh, Sunrise, Grand Canyon #2, 1995 – (salt)*

Contrast Enhancement with Color Change

You can also increase the contrast of your print by adding a drop or two of a 1% to 5% solution of potassium dichromate to every 28 ml of the sensitizer. (*A 5% solution is made by dissolving 5 g of potassium dichromate in 100 ml of distilled water.*) This will also result in a color change to reddish brown that is similar to the gold / borax toner described later. If you elect to add some potassium dichromate to the solution, warm it up first so that it will dissolve within the silver nitrate more efficiently. This will also help reduce the "speckling" that occasionally shows up on the print when a dichromate is added.

Contrast Enhancement Using Shade and Sun Exposure

This contrast technique is more aggressive than adding potassium dichromate to your wash-development and I would recommend other approaches to contrast adjustments before this one. Simply perform your entire exposure in the shade, then have your first wash be 5-minutes in distilled water with no salt added. Lastly, I would consider making a new digital negative with adequate contrast for the process.

ICON – 4 here (Coating Paper)

Coating Salted Paper with a Synthetic Richeson Brush

I used to teach this process using a common beaker of silver nitrate and having the students lightly dip a clean brush into it and proceed to coat their paper. Most of the time this method worked perfectly fine with minimal contamination issues. As mentioned earlier, the easiest fix for this situation is to make an individual drop count in a shot glass for each print that you do. Consult the Platinum / Palladium and Ziatype chapters for drop count charts and technique. Keep in mind that if you are working in a

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very arid environment, say the high desert in the Southwest, you will want to give yourself more drops to work with because the sensitizer will be drying quite rapidly… and over brushing silver nitrate often results in fogged images.

I am going to recommend that you put aside your traditional hake brush for this process and move to a Richeson, #9010 Series, Synthetic Flat Wash Brush. I have used this brush in all of my workshops and classes for several years now and it's unfailingly perfect. I use less sensitizer, the coating is consistent and doesn't rough up the wet paper fibers, and I am able to move between processes with it easily without contamination… as long as the brushes are meticulously clean and rinsed thoroughly with distilled water between every coating application.

I understand that it's alt pro heresy to use a brush with a metal ferrule but if you employ the shot glass when creating your sensitizer drop count, you will not be dipping your brush into a container of sensitizer and will be avoiding the metal. If I anticipate dipping, say for a large piece where I need a lot of sensitizer, I simply run a bead of super glue along the edge where the brush hairs meet the metal and then, after it's dry, seal the metal with a clear nail polish or varnish.

Fig: 5 - 21 here, *Alan Vlach, Break Time - 2007 – (salt)*

Coating with the Traditional Floating Method

Another method of coating is the traditional "floating" of the salted paper on a volume of silver nitrate in a shallow glass dish. If you opt for this technique, I recommend using a Pyrex lasagna-baking dish, as it's easy to clean, contains a lot of fluid and has high sides. The traditional method is to float the paper on the silver nitrate solution for 15 to 30 seconds, being sure not to get any emulsion on the "back" of the paper. The easiest way to *float* successfully is to bend up the 4 side edges on your paper (*just like in albumen coating*) so that you create a little origami-like "serving tray". The folded edges of the "serving tray" can be trimmed off after the process is complete and this almost eliminates the problem of getting silver nitrate on the back of the paper.

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Coating is performed in subdued light, i.e., no direct sunlight and / or bright artificial CFL or neon. Sensitize the sized paper using any of the coating methods, applying 1 to 2 coats of your silver nitrate solution. If you are double coating, dry thoroughly between coats. The more silver nitrate in the formula, as Talbot discovered, the more sensitive the solution. This means that you can increase the silver nitrate amount in the previous silver nitrate formulas to make a more light-sensitive solution. However, this doesn't mean loading up on a big concentration in one coating. Multiple low concentration coatings work better.

If floating is too difficult for you I suggest using a Richeson Synthetic Wash Brush or the glass rod method. Always mark the front of your coated paper with an "S" (*for silver or sensitized*) because the formula tends to be impossible to see in low light conditions. In both brush and rod coating, allow your newly sensitized paper to sit still in the dark for a few minutes before drying or hanging it up. For extra karma, talk nicely to your paper.

Be sure to use distilled water because normal tap water will almost always cause one problem or another due to the mineral concentration, chlorine, or the pipes that the water flows through. I'll repeat this later, but always do a final wash with distilled water after the last tap water wash with this particular process. This will rid the paper of these various contaminates and chemicals. Also, always clean your brush after every coating application.

***(Fig: 5 -22 here** (Dan Estabrook, #1. Shortness of Breath (Nine Symptoms) - 2004)*

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PRINTING SALTED PAPER

For the salted paper process, I recommend using a quality 100% rag paper with a smooth surface such as Bergger's Cot 320, Stonehenge, Crane's Platinotype, Arches'

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Platine, Crane's Kid Finish, Arches Aquarelle, Arches Grain Satine, or Bienfang 360. Another paper that has been used by a number of alt pro folk lately is the Weston *Diploma Parchment* and it is available through the Butler & Dearden Paper Service in Boylston, Massachusetts. You will, of course, determine which is best for you according to the intentions of your image.

Legion Revere Platinum is a paper that I've had uneven results with and it will occasionally exhibit a splotchy / mottled appearance after sizing and sensitizer application. My best guess is that when this paper, at 90 lb, is immersed in a salted gelatin sizing solution, the paper becomes over-saturated, removing the original sizing. If it's humid, the paper will be so loaded with salt that it will continue to absorb moisture… think salt-shaker on a picnic table in the summer. When the silver nitrate sensitizer is applied to this surface, it displays an uneven texture that doesn't dry down evenly. Consider brushing on the gelatin salt sizing in the first stage of the process rather than immersing the paper in the gelatin sizing as a solution to the problem.

When using a lighter weight paper, the resulting image often will exhibit a greater degree of clarity and tonal resonance. Since the process is going to be taking place on a gelatin sized paper, the best results come from a delicate technique and application with restrained printing. Laying down a fumed silica application on a lighter weight paper will also enhance the quality of your images.

As a place to start, your negative should be relatively high in contrast with a D-max in the 1.5 to 2.0 neighborhood. This is a moderately dense and contrasty negative that would generally be suitable for a conventional silver paper of grade 0. When making negatives for the salted paper process, try to make the best negative possible and then overdevelop it by 50%. If you are going to be making a digital negative then seek a curve profile that increases the contrast and density. You will want to refer to your tonal scale, as being "bulletproof" and then it's important to keep in mind that the sun is many times more intense than your wet lab enlarger. See more on this in the Digital chapter.

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***Fig 5 -23 here**, Salted Paper Curve Profile Example before Invert*

***ICON – 5 here** (Contact Frame)*

Exposure Times

Once you are ready to expose your sensitized paper, place your negative, and bone-dry sensitized paper in a hinged, contact-printing frame so that the light will penetrate the glass, right-reading negative, and sensitized paper in that order. Go outside and place your printing frame in light, preferably open shade, so that it's not directly facing the sunlight. You will notice that the paper begins to darken immediately and subsequently eases off. In my experience, sunlight will expose an average negative well in 6 – 12 minutes but will likely block shadow details in the darkest values. A UV exposure unit will provide a good exposure in 7 – 12 minutes. Again, the darkest shadows will tend to block up and deny detail unless you filter the exposure with a translucent sheet such as Pictorico Ultra Premium OHP.

My recommendation for the best exposure strategy is to use a combination of sun and shade for 6 – 12 minutes. Do the majority of your exposure in the open shade and then hit it with some direct sunlight, or place it in a UV exposure unit, at the end of the open shade exposure to intensify the darks in the image. This technique will yield the best contrast potential with the best density and detail in the shadows.

As mentioned, it is generally best to face your contact printing frame away from the direct sun, or keep it in the open shade, so that you can better control your exposure and contrast. Negatives low in density or contrast should be printed in this manner for greater contrast. Contrast can also be slightly increased by placing a sheet of tissue or vellum over the glass during exposure to slow the pace of the exposure.

ICON – 6 here, (Checking the Exposure)

Examine the progress of the exposure at different, but regulated, times during the printing in the same manner you would with other printing-out processes when using a

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contact-printing frame. Look at your paper in a very low light area so as not to fog the image. The printed-out image should be allowed to go quite deep: highlights should appear much denser than you will often want in the final image and shadows will become almost a metallic bronze color. You may lose a minimum of 2 to 4 steps on a calibrated gray scale step tablet after all of the processing has been completed but there are some things that you can do at this stage to reduce that depreciation.

ICON – 7 here, (Sink Set-Up)

***(Fig: 5 - 24 here**, Tom Persinger, I Cried in My Dream_17_2011 - salt)*

SINK SET UP FOR SALTED PAPER

Tray #1: 3% salting bath Mix: 30 g of kosher salt to 1 liter of distilled water. Add 1% citric acid (10 g) to the salted bath per liter. Agitate for 4 - 5 minutes.

Tray #1 Higher Contrast Option: Mix: 30 g of Kosher salt to 1 liter of distilled water. Add 1% citric acid (10 g) to the salted bath per liter. Then, add 3-4 drops of a 10% potassium dichromate and warm the entire solution. Immerse the exposed print and agitate for about 5 minutes.

Tray #2: <u>Optional</u> Toning Baths: Toning must be done BEFORE fixing the print. Toning baths will alter the image color and often aid in the archival properties of the print. Please refer to the text for specific salted paper toner formulas and times.

Tray #3: 10% Sodium Thiosulfate fixing bath

Mix: 100 g sodium thiosulfate to 1 liter distilled water and 2 ml household strength ammonia. You may try adding 2 g of sodium carbonate to the fix to enhance the cooler values of the print. Fixing time in fresh sodium thiosulfate will be about 1 minute.

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Tray #3 - Optional: Sel d'or Toner / Fixer Monobath Formula:
Mix: 500 ml water to 75 g sodium thiosulfate, 1-teaspoon bicarbonate of soda and 3 grains of gold chloride. Fixing time will be 6-8 minutes.

Use a 30 ml Stock Solution Stock Gold Solution for Sel d'or Toner / Fixer Mix: 154 ml distilled water to 1 g gold chloride (1 gram = 15.43 grains)

Tray #4: Sodium Sulfite Hypo Clearing Bath:
Mix: 1% solution of sodium sulfite (10 g to 1000 ml water)

Tray #5: Final wash for 20-30 minutes

PROCESSING SALTED PAPER

***Fig: 5 - 25 here**, Jesseca Ferguson, Finis 2003 – (salt)*

Kosher Salt Wash Bath

This first bath in the processing sequence consists of a slightly acidic salt bath whose purpose is to precipitate (in chemistry this term means to separate in solid form from a solution) the free, or excess, silver by producing silver chloride. If you have no salt in this bath you will not be removing the free silver and this will create problems with toning, as the gold will not adhere to the silver unless the free silver nitrate has been eliminated. Following your exposure, immerse your print for 5 minutes in this bath of salted water that has been made slightly acidic, lowering its pH, with the addition of citric acid.

- 10 g citric acid
- 30 g kosher salt
- 1000 ml distilled water

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Immerse your print under moderate light and agitate slowly for the entire 5-minute recommendation.

Following this step, move your print to a tray filled with fresh water and gently agitate. Repeat the fresh water exchange with a separate tray of fresh water 2 to 3 times and then move on to the normal washing stage that follows. As a side note, if you forget to remove your print from the salted bath you will notice that it will begin to fade a bit. The stronger the salt solution the more fade you'll see. This could be a way to clear your highlights in a desperate situation.

If you wish to increase the brightness in the highlights that are slightly blocked and less brilliant than you had anticipated, try the first bath option noted above. Then, add 3-4 drops of a 10% potassium dichromate and warm the entire solution. Immerse the exposed print and agitate for about 5 minutes.

(Fig 5-26 here**, Carol Golemboski, Planisphere Celeste_2004 – salt**)

Washing the Print

After the pre-wash salt bath, immerse your print for 15 – 20 minutes in clean running water, making exchanges on a regular basis. This bath clears out the remaining free, unexposed, silver. If you do not wash the print adequately, subsequent toning and fixing will not work well and your final image will likely be flat and muddy in appearance. You will also notice a host of salted paper irritations, the most common being little dark spots.

Continue to rinse the print until all of the silver chloride milkiness that you saw after the first immersion in the water has disappeared. If you have a black plastic tray this will help. The paper is still slightly sensitive to UV light so be careful. Also, do not be shocked by the color of the image when it is placed in the water wash. It will shift toward red and the print will lighten considerably. Hot water will also accelerate the highlight clearing and may result in a more reddish brown shift if your water is alkaline.

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***Fig 5-27 here**, Christopher James - Ferris Wheel & Corpse, Delhi, India, 1995 (salt)*

SALTED PAPER TONING FORMULAS: PRIOR TO FIX

If you go directly to the fixer after the wash stage your print will be reddish brown… or a variation on that palette depending upon your paper and salted gelatin choices. A toning step is not necessary if this is a color decision you've made for your image.

Toning the print following the wash cycles, and prior to the fixing bath, allows you to select from a palette of colors that range from red to purple to blue-brown and smoky-black. Toning will also increase the longevity of your image. The following toning formulas are for you to experiment with and will provide an assortment of tonalities, hues, and contrasts.

The first toner example is made with gold chloride and borax, and it yields a warm reddish color. The ammonium thiocyanate toner will yield a more blue shift in the highlights and mid-tones but depending upon time, will often leave your reds alone. The Gold 231 will often result in a smoky black with highlight shifts to cool rather than the original warmth. Each toner will react differently depending upon freshness and intensity of the toner, paper you are toning, temperature of the toner, success of your washing cycles, and a host of other alt pro gremlins that may decide to visit your print. Experiment and do not invest even a portion of your self worth in the success of the toner. Have fun with it and see what happens.

***Fig 5-28 here**, Christopher James, Sarah, Maine, 2000 (gold borax toned salt)*

Gold-Borax Toner (*warm / reddish color*)

- 800 ml distilled water at 100°
- 6 g borax
- 12 ml 1% gold chloride solution

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Dissolve the borax in the distilled water and add the prepared 1% gold chloride to the solution. Gold chloride in a pre-mixed state can be purchased from most chemical suppliers. Toning will take 15 – 30 minutes of gentle agitation depending on the tone you are seeking. Generally, the color of the image becomes cooler the longer you have the print immersed in the solution. Keep in mind that a dry print looks cooler than a wet print. Prepare this toning solution at least an hour before use and work with it at room temperature. If you find the toning less than active, add or replenish the toner with additional gold chloride solution. One way to be economical about gold chloride is to trim off any parts of your paper that you will eventually over-mat. This will cause less of the gold to be absorbed by the paper. For a black tonality, check out the gold-borax combination with platinum toner in this section. Note that this formula is very similar to the gold-borax albumen toner except that it is half as concentrated.

If you are seeking a deep burgundy color then try the gold borax toner for 30 minutes followed, after a rinse, by the 30 minute gold ammonium thiocyanate toner.

Fig: 5 -29 here, *Carol Panaro-Smith & James Hajicek, Earth Veg 2, 2005 (photogenic drawing)*

Gold-Ammonium Thiocyanate Toner: Standard Salt

(*Blue / gray tonality*)

- 800 ml distilled water
- 25 g ammonium thiocyanate
- 2 g tartaric acid
- 5 g sodium chloride
- 20 ml 1 % gold chloride
- Distilled water to make 1 liter (1000 ml)

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Tone in the same manner as you do with the gold-borax formula. This toner will give you much colder values and an immersion of 6 - 15 minutes in a fresh ammonium thiocyanate toning bath will yield blue-gray tonalities. This toner does not keep well so only mix the amount that you intend to use during a single working session… about 8 prints. If you use a thiocyanate toner be aware that the sodium thiosulfate fixing bath may precipitate sulfur. If this is a problem, and you will know it by the aroma, you can easily fix the problem by adding 5 g of sodium sulfite to the sodium thiosulfate fixer formula and replace the fixer every 4 to 5 prints.

Gold-thiocyanate toner is particularly compatible with platinum toner and a range of colors, from warm red to slate gray to sepia, and can be achieved by adjusting the times of the salt print in each toner and in the sequence they are used.

Gold-Ammonium Thiocyanate Toner II: **POP Formula**
(Bostick & Sullivan Pre-Mixed Solution A & B)
(*Blue / gray tonality*)

- **Stock Solution A**

  10 g ammonium thiocyanate
  500 ml distilled water at 120 ˚ F

Combine the ingredients into a uniform solution, store in a clean plastic or glass bottle and allow the solution to sit for 8-12 hours before use.

- **Stock Solution B**

  1 g gold chloride
  500 ml of distilled water at 70 ˚ F

To use: Mix 50 ml of Stock A with 50 ml of Stock B and 900 ml of distilled water. The toner is good for about 6 to 8 prints before it begins to wear out. When you need to replenish the solution simply keep what is in your toning tray and add 50 ml Stock A and 50 ml Stock B to it. The toning time is subjective and usually between 10 and 30 minutes. The longer you tone the cooler the mid tones and highlights.

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Gold - Sodium Acetate Toner

(*sepia to deep burgundy*)

- 800 ml distilled water at 95˚F to 100˚F
- 20 g sodium acetate
- 20 ml 1% gold chloride solution (*order it prepared; see resources*)
- Distilled water to make 1 liter (1000 ml)

This toner, like the others, is used prior to the fixing bath. Begin by immersing the print in the distilled water pre-wash and salt pre-wash baths. Prepare your toner and see that its temperature is in the 65˚F to 75˚F range. Place your print in the toner and inspect it closely for the changes. Do not over-tone the print with the gold-acetate toner or you will get an overall yellow cast. It is a decent idea to do a test print for a few minutes and see if you like it. Gold acetate toning can be employed in a double toning sequence with the gold borax toner to get a black tonality. Be sure to wash the print well between the two toners if you are performing the split. After toning, rinse and continue the process with the fixer and final wash.

Palladium Toner

(*Reddish brown to slate gray*)

- 450 ml distilled water
- 2.5 ml sodium chloropalladite (15% solution)
- 2.5 g sodium chloride (sea salt)
- 2.5 g citric acid
- Distilled water to make a solution of 500 ml

This palladium toner will alter a salted silver nitrate sensitizer (*with a little potassium dichromate for a contrast boost*) from a traditional reddish brown salt print to a slate gray. It's quite nice but different from its companion toner (platinum). The

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sodium chloropalladite can be ordered in a prepared state and can also be used for your palladium printing.

Begin your toning process by pre-washing your print in the recommended salt pre-washes and then rinse the print in running water for 15 minutes. After the wash, immerse the print in the palladium toner until you are pleased with the results. After toning, continue the process with the fixer and final wash stages.

Platinum Toners
(*Warm sepia / reddish brown / yellow / gray*)

I'll give you two options for salted paper platinum toning. The first is a traditional salted paper platinum formula. The second is a similarly constructed formula but one that is designed to work with printing-out process papers; you'll find it repeated in the POP Chapter. Platinum toner is a little more expensive due to the cost of the potassium chloroplatinite (20% solution) but like the palladium, it can also be used for platinum printing or as an additive for palladium printing. Some very nice tonalities can be realized by two-stage toning combinations such as platinum toner and gold-thiocyanate toner. I'll provide you with the POP platinum-gold-thiocyanate formula as well. Gold-thiocyanate toner is particularly compatible with platinum toner and a range of colors, from warm red to slate gray to sepia, can be achieved by adjusting the times of the print in each toner and in the sequence that they are used. As with all toning, in every process, experimentation will often yield some lovely results… and then drive you crazy when you try to repeat the color on a different day.

Platinum Toner #1

- 450 ml distilled water
- 1.5 ml potassium chloroplatinite (*20% solution pre-mix*)
- 2.5 g citric acid
- 2.5 g sodium chloride (sea salt)
- Distilled water to make 500 ml

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Begin your toning process by pre-washing your print in the distilled water and salt pre-wash baths and then rinse the print for 15 minutes in fresh running water. After the wash, immerse the print in the platinum toner until you are pleased with the results. After toning continue with the fixer and final wash stages.

POP Platinum Toner #2
(*Neutral black-sepia*)

Bostick & Sullivan makes a prepared POP platinum toner using potassium chloroplatinite #3. The kit includes:

- 10 g citric acid
- 10 ml potassium chloroplatinite #3 (20%)
- 1 empty 1000 ml plastic container for storage of the solution

You can make this toner up in a second if you have some Pt/Pd chemistry lying around the house. If not, follow this recipe. To make the platinum toning solution, measure out 10 g of the citric acid on a gram scale and dissolve it in 1000 ml of room temperature distilled water. This will result in a 1% solution of citric acid.

For the citric acid solution, add 7 to 15 drops of the potassium chloroplatinite #3. This is the Part C metal from your platinum chemistry. The more drops added to the citric acid solution the faster the toning and the faster you will run out of this very precious mix. You may wish to add fewer drops to allow time to subjectively inspect your toning progress. *Platinum toner does not have to be discarded after use it simply wears out*. If you feel that its effectiveness and speed are not what they used to be, then simply add 5-10 more drops of the potassium chloroplatinite #3.

It's best to over-expose your salt print by 15%. Go through the pre-wash and salted pre-wash bath sequence and rinse your print in fresh water for 15 minutes. Next, place the print in a clean tray and immediately pour the platinum toner over its entire

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surface. Agitate the tray continuously during the toning process. The toner will make itself evident first in the deeper shadow areas of the print and then work its way through the sequential tonal stages from dark to light.

A short toning time will result in a warmer print and a longer toning period will yield blacks with a cooler image. When you are content with the coloration, rinse the print for 5 minutes and proceed to the fixing stage.

POP Platinum-Gold-Thiocyanate Split Toner

After your pre-wash sequence you can achieve a wonderful gold-platinum split toned POP print by partially gold toning the print (*a short toning time in the POP gold-thiocyanate toner*), rinsing the print for 5 minutes, and then immersing the print in the platinum toner until you like what you see. The darker values will become purple-sepia in the shadows following the gold toner, while the highlights and lighter mid-tones will tone a cool-blue-black in the platinum. Always be sure to first tone with the gold because the citric acid in the platinum toner will be unkind to the gold toner.

Black-Gray Toning

Add 3 drops of a warm 5% potassium dichromate solution to every 28 ml of the silver nitrate sensitizer; coat and expose the print in a normal manner. Following exposure, proceed through the distilled and salted water pre-wash sequence. This salted pre-wash is quite necessary here so don't overlook it. Then, tone the print in the gold-borax toner for 5 minutes and wash it in clear running water for 15 minutes. Following the wash, tone the print in the platinum toner for 5 to 15 minutes followed by a wash of 30 minutes. Rinse the print in fresh water for 10 minutes and then move on to the fix and final wash.

Fig: 5 - 30 here, *Danielle Ezzo - Two Women_1000 - 2011 (Kindred Spirits - salt*

FIXING THE SALTED PAPER PRINT

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Standard 10 % Sodium Thiosulfate Fixing Bath for Salted Paper

Prepare 2 separate fixing trays and into each one add a liter of 10% sodium thiosulfate fix solution detailed below. Fix prints, un-toned or toned for 30 to 60 seconds in each bath. Do not over-fix.

- 1 liter distilled water (1000 ml) *
- 100 g sodium thiosulfate
- 2 g sodium bicarbonate OR 2 ml of ammonia *

* Be sure to use only distilled water for your fixing bath to avoid bleaching down the road.

* The addition of either the sodium bicarbonate or ammonia makes the solution slightly alkaline. This will reduce the *bleaching* effect of the fixer but will not affect the color or contrast of the image.

You may go directly to the fixer after the toning and your image will become lighter the longer it stays in the solution. *Do not over-fix the print and certainly for no longer than a minute in each bath*.

SEL d'OR TONER / FIXER MONOBATH FOR SALT

Sel d'or Toner / Fixer Monobath

Several years after the Daguerreotype process was announced, a French physicist, by the name of Hippolyte Fizeau, introduced an important process change, called *sel d'or* (salt of gold), that gave Daguerreotypists a way to intensify and gild their work. Sometime between 1847 and 1855 the technique was applied to paper prints, e.g., calotype, salted paper, albumen, etc.

In the mid-19th century, sel d'or gold toning was commonly incorporated into the albumen and salted paper processes. Although it was quite difficult to predict whether the technique would ultimately improve, or fade, the print, the single bath

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toner / fixer was widely practiced. When an albumen or salted paper print was immersed in the sel d'or toner / fixer monobath the image color would lighten (orange-brown) and then reconstitute itself to either a cool sienna, purple, or blue-black as gold replaces the silver. The final image color is based upon the depth of the printing, the toning formula, and the length of time the print is in the toning solution. I recommended that you print deeply if you intend to use this technique.

The sel d'or toner is a toning-fixing monobath and is constituted by mixing a solution of gold chloride into a solution of sodium thiosulfate and a little bicarbonate of soda, to make the solution a bit too alkaline. Using it allows the photographer to tone and fix their print in a single bath. Again, it is often unpredictable and the following formula is more "kitchen-sink" than serious-lab. Toning / fixing time is approximately 6 to 8 minutes following the wash stage.

Sel d'or Toner / Fixer Formula

500 ml water
75 g sodium thiosulfate
1-teaspoon bicarbonate of soda
3 grains of gold chloride (use a 30 ml stock solution*)

*** Stock Gold Solution for Sel d'or toner / fixer**

154 ml distilled water
1 g gold chloride (1 gram of gold chloride = 15.43 grains. Therefore, every 10 ml of this stock solution will equal 1 grain of gold.)

A Brief Word About Ampoules

Some chemicals, such as the gold chloride in this formula, are shipped in sealed glass ampoules. When received, they need to be tended to carefully and opened to release the chemical within. Be sure to unpack the gold chloride ampoules in a safe location away from the edge of a table where it might roll off and break on the floor. I

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recommend a rubberized shelf liner, similar to the material that you would use to cut glass on.

There are a couple of ways to open the ampule. First put on a pair of exam gloves. A simple way to handle the task, if you have the option, is to freeze the liquid inside, which will not harm the chemical or cause other problems. Another technique is to make a small scratch with a glass-cutter on the neck of the ampule, then to touch the scratch with a hot wire or rod where the heat caused expansion of the glass will cause the neck to separate from the ampoule's body. One other way to do the job is to immerse the ampule in the water you will be adding it to and then to break the glass ampule with a glass rod while it is submerged. You may then filter the solution if necessary or simply leave the ampoule's shards at the bottom of the solution.

Fisher Scientific has a "Safe-snap Ampoule Collar" made from non-breakable polyethylene that allows the fracture of glass ampoules with complete safety. The collars are disposable and are meant to be used once only so that cross contamination does not occur.

In the last technique, take your 1-gram ampule of gold chloride and drop it into a bottle containing 154 ml distilled water. (*Leave the glass ampule there and break it open it with a glass rod releasing the gold chloride*) Since 1 gram equals 15.4 grains, and you mixed this amount with 154 ml distilled water, every time you need 1 grain of gold chloride for a formula all you need do is add 10 ml of the gold stock solution.

1% SODIUM SULFITE CLEARING BATH OPTION

Use a 1% solution of sodium sulfite following the fixer to shorten your final washing time. To make it, add 10 g of sodium sulfite to each 1000 ml of distilled water.

Fig: 5 -31 here, *Christopher James, Bayside, Maine, 2006 – (gold borax toned salt)*

FINAL WASH & COMMENT

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If you can, it is a good idea to do your final wash, or at least the final minutes of your final wash, with distilled water. Wash your images for 20 to 30 minutes after the fixing stage. You can reduce this time if you elect to use the sodium sulfite mix above. Be very, very careful not to rub the print surface during the wash because the delicacy of the process depends on the surface of the print as well as the rendering of the negative. Following the "dry-down" you will notice that your image has darkened and that some of your contrast has been lost. I often force dry a print to see an approximation of what I will have at the end of the process.

Salted paper, like Van Dyke, has always been labeled as an unreliable process that will eventually fade and break your heart. This is true if you have casual lab skills or if you've been subjected to misinformation when learning the techniques. Most of the time, however, it's simply a matter of working clean and paying attention to the process. Salt prints will fade if there is residual thiosulfate left in the paper. Another reason that early salt prints faded was that they were rinsed and fixed in non-distilled water. As far back as the beginning of this process it was known that even small amounts of muriatic acid (hydrochloric acid) in well water reacts with simple nitrates and will cause your print to bleach out.

In some locations, where there's a good deal of chlorine in the water supply, the print will look totally fantastic until it dries. Then, your heart breaks because the highlights have turned grey. As a solution, use the sodium sulfite wash and soak the washed print in distilled water for about 10 minutes before hanging it up to dry.

One other element to help insure the longevity of your salted paper print is to tone it with one of the gold toners. This works well as long as you have maintained decent work habits during the process. Salted paper printing is a lot of fun to do, but it's loaded with little traps that will drive you nuts if you're not paying attention. Whatever you do, please approach this process, and all of the others that are in the book, with a sense of adventure. Don't take the success of your work too seriously while you're

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learning. Remember, every living creature learns through the process of play… so please have fun with the process.

***Fig 5-32 here**, William Henry Fox Talbot, Five Leaves, (photogenic drawing) (SSPL_10459446)*

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