APPENDIX G

ELEMENTS OF PLATINUM PRINTING

Stan Klimek

Scylla from series Milites Mori 8 X 10 Pt/Pd.

Having spent a couple of decades in commercial photography in Los Angeles, I started to become bored and decided to re-examine what photography meant to me. In 1991, I came across platinum printers John Richardson and Norma Smith, who were giving workshops on platinum printmaking. Platinum printing reaffirmed my love for photography by combining it with printmaking, also a fascination during my art school days. Once again I had the energy to create new work, but this time it would be all mine, with its own signature. One of the rewards of a lifelong pursuit of the arts is the accumulation of the artist's life experiences in his work, creating a fingerprint as unique as the artist him or herself.

Platinum printing has been in existence for over 100 years, but it fell out of favor in the second decade of the twentieth century. Over the past 15 years, however, it has experienced a revival through a small and dedicated coterie of artists from around the world, Dick Arentz chief among them. Having studied the original literature on platinum printing technique, these contemporary printers have engaged in extensive testing of new techniques
and modern materials, sharing discoveries and building on each other's findings. As a result, the platinum/palladium process we know today is safer, more reliable, and more successful than the early process on which it is based.

Like most people, I was sold on printing in modern platinum when I made my first print in 1991. In my case, I used a 665 negative from an old Polaroid 180 camera, slopped the solution with my foam brush onto Crane's Ecru and slapped on a negative—wow, I was hooked! It was a delicate, warm-toned image that gracefully melded with the paper. Years later, I reprinted that image and compared it to the first. I realized how my printing skills had improved; still, I love that first print.

There are many factors that must be controlled to make a good platinum print. They must be tested and refined for each image printed. It is a time-consuming, laborious, and expensive process, made worthwhile by the result. To minimize effort, keep detailed notes of the variables tested. Also, by standardizing procedures, many of the problems that can waste a day of printing can be eliminated.

THE NEGATIVE

The negative used for printing in platinum/palladium must be more contrasty than that used for silver printing. As a general rule, a negative that is optimized for a grade 0 or 1 on silver-based paper is suitable. For my purposes, I use HP5, which is rated ASA 400, at a working speed of 160. After unloading my exposed film into a JOBO_ drum, I presoak for 5 minutes in water at 70_ F. To develop, I use the two-bath compensating method (Table G.1). Solution A is Kodak D-23, which is similar to Kodak D-76 without the hydroquinone, an accelerator for the highlights. Solution A develops the values. Solution B is an alkali bath that works further into the shadows without disrupting the highlights. The film is developed for 7 to 10 minutes in solution A and 3 minutes in solution B.

TABLE G.1 D-23 Two-Bath Compensating Developer

Solution A	Elon (Metol)	30 g
	Sodium sulfite, desiccated	400 g
	Water	4 liters
Solution B	Kodalk (balanced alkali)	40 g
	Water	4 liters

DUPLICATING

In order to contact print a negative at other than its original size, the negative must be duplicated to the size at which the image is to be printed. In the past I have duped traditionally by making a pyro positive on Bergger BPF 200 film, and from that, a negative on APHS litho film. The method I use was developed by Stuart Melvin.

More recently I have had success with the digital duping process with a stochastic negative output on the Agfa Imagesetter, with the help of Peter Ellzey of Copygraphics in Santa Fe (Source: CG). After adjusting the RGB scan file in Photoshop_ and converting to grayscale, I interpolate the file to the desired resolution with Genuine Fractals_ (Source: AG). I have used Telegraphics Software's Rastus plug-in for Photoshop to create the stochastic screen for the imagesetter as a workaround for Photoshop's 30,000 pixel limit. With the release of Photoshop CS in October 2003, Photoshop's_ pixel limit was increased to 300,000 X 300,000. As of this writing, however, I am unaware of any raster image processor (RIP) that is yet able to take advantage of that change.
Because a stochastic negative is printed using random dots instead of the gridded dots of the more common halftone negative, it is more like film. As an example of the capabilities of this technology, recently

I digitally created a 20-inch negative from a 35mm Tri-X film original for a client. The imagesetter output retained the look of a similarly enlarged film negative and grain structure, with no discernable digital dot and no moire´ in multiple registrations. Additionally, digital duping has an important advantage over film dupes: One negative can be taken in-camera and used for any printing process, silver or alternative, by modifying it in Photoshop_ and applying the appropriate characteristic curve.

Materials

Paper

Paper is one of the most problematic elements of the platinum printing process. Papers used for printing in platinum are not made for this process, with few exceptions (Platine being one). (See Chapter 5: Paper.) They can contain sizing and additives that interfere with the platinum printing process. Also, it can be difficult to get in the size or weight required, when needed. Papers vary in how they print; the same paper can even vary among batches or weights. They are discontinued by the mills without notice, or their formulations are changed without announcement. They often harbor unknown paper gremlins that ruin prints for reasons that can never be ascertained.

Printing in platinum is most often done on watercolor or printmaking paper. Each paper has a distinct signature. Exploring the various papers can take a lot of time and be a source of frustration, but is critical in honing printing skills. Experiment, find one or two suitable papers, and come to know them well.

The following outlines my own experience with papers commonly used for platinum printing:

Fabriano Artistico Extra White (aka Fabriano Uno): It produces medium blacks, sharp detail, and coats and clears easily. It is readily available and has a tight weave, good for large prints and multiple coatings.

Rives BFK: It is noted for a beautiful texture and is challenging to work with, but worth the effort. This paper is readily available.

Stonehenge Rising: It coats well, clears well, has a reddish brown warm tone and has a low cost.
Platinotype: It coats well, has good detail and good blacks, and is lightweight.
Somerset: It has a heavy texture, good blacks, and coats well.

Clearprint vellum: It demonstrates sharp detail and has great blacks, but it must be handled delicately. It is translucent and economical.

Arches Platine: It has good blacks, coats well, is very white, has tight weave, and is good for large prints and multiple coats. It has been very inconsistent.

Additionally, most modern papers have buffering agents added to them that can interfere with the platinum printing process. One paper in particular, Rives BFK, has so much buffering agent added that it feels chalky when handled. To remove them, soak the paper in a 1% solution of oxalic acid for 3 minutes and dry naturally. This presoak also adds a slight acidity to the paper, which will improve the blacks.

Platinum/Palladium Solution

The basic solution used to coat paper for a platinum/ palladium print consists of metal salts in solution with ferric oxalate. Other substances can be added to the solution to accomplish various objectives (e.g., ethylene diamine tetraacetic acid [EDTA] to aid dissolving), but I use only a contrast agent. Experimenting with the chemicals and ratios is crucial in improving platinum printing skills.

In comparing the metals, palladium produces a warmer tone, lower contrast, and a wider range of values. It does best in the mid-tones and the shadows of the print. Platinum has a cooler tone and more contrast. It excels at bringing out delicate highlights but has a tendency to grain up when platinum is used in a greater than 1:1 ratio in the solution. I almost always use a 5:1 ratio of palladium to platinum; I find this formula gives a warm tone with the range of values I seek. I use Na2 to increase contrast and choose papers or developers to change tone. (See Chapter 8: Calibration, and Chapter 9: The Platinum and Palladium Print.)

I use a 1:1 ratio of ferric oxalate to metal. I always mix the ferric oxalate from powder the night before the next day's printing. Caution must be observed with the powder as it can become airborne; use a respirator. Mix in a low light environment, preferably with a low watt tungsten bulb. I use a formula of 26 grams ferric oxalate to 100 ml of distilled water with no other additive. Shake it for 5 seconds in an amber bottle and allow it to set up (become clear) overnight at room temperature or with a microwave oven dedicated to chemicals only. After shaking, loosen the cap of the bottle and microwave at medium power for 45 seconds. Tighten the cap and shake for 5 seconds, then loosen the

cap and put it back in the microwave for 45 seconds. Monitor to prevent boiling. By this method it will clear in about an hour, but it will still be hot. Cool it to room temperature before use.

Contrast Control

For contrast control, I use Na2 (sodium chloroplatinate). Na2 works to increase contrast without the graining found with other agents. (See Chapter 4: Chemicals.) I keep on hand dilutions of 2.5, 5, 10, and 20%. To determine the amount of Na2 to add to the metal solution for a specific print, run a test strip without Na2 in the ferric/metal solution to estimate exposure time (many platinum printers use a densitometer for this task; I prefer to use my eye). Using the time determined from that test, expose a part of the print with a full range of values with a solution that contains no Na2. Allow that test to completely dry down, either naturally or with blotting and a dryer; a dry print appears cooler and about 15% darker when it is fully dried down.

When the print is dry, judge how much is needed to increase the contrast. Knowing the amount of Na2 that is needed to add a specific degree of contrast is the product of experience. As a rough guide, if the contrast of an 8_10 print is close, add one drop of 20% Na2 solution; if the contrast is far off, add two drops of 20%, expose, and evaluate. It is helpful to write on the back of the print the variables being tested. Repeat the testing process until the contrast is correct. The bad news about this testing process: It will only provide a starting point, as the full sized print often requires further contrast adjustment. The good news: A negative perfectly crafted for platinum printing may not need any Na2 at all.

Besides adding a contrast controller to the platinum solution, I also extend it with distilled water. This wetter solution makes for a smoother coat. Some guidelines for amounts to add to the ferric oxalate/metal solution are listed in Table G.2.

TABLE G.2 Guidelines for extending the coating solution by the Addition of Water. Too much water results in a mottled or soft print. With too little water streaking may occur.

Extending Solution for Coating

In milliliters		In drops	
Solution	Water to add	Solution	Water to add
2 ml	0	40 drops	0
3 ml	1.5 ml	60 drops	30 drops
8 ml	3.5 ml	160 drops	70 drops
12 ml	7.5 ml	240 drops	150 drops

Technique

Sizing

Most advanced platinum printers don't size unless using a specific paper that requires it. When sizing is done, 250-bloom gelatin in a 2, 3, or 4% solution is used. Each paper must be tested for the correct solution. For example, I found that on Fabriano Artistico EW sized with a 4% solution, the platinum print started to take on a reflective quality. A 2% solution showed no benefit to the print, but a 3% solution was just right. However, 2% seemed to work well for Stonehenge, while 3% was too much.

1. Preshrink paper at 120_ F for 30 minutes with a 1% solution of oxalic acid added to the water.
2. Lay down the warm paper on a sheet of glass and blot the excess water. The paper should still be warm and wet.
3. Warm gelatin solution to 125_ F. Add formalin to the gelatin solution at a 1:50 ratio. This works out to roughly six drops of formalin to 10 ml of gelatin solution; for an 11_14, add 9 drops of formalin to 15 ml of gelatin. Use caution when handling formalin; it is a formaldehyde solution and therefore flammable and toxic with a strong pungent odor that will irritate eyes and throat. It is nasty stuff, but the most effective alternative for hardening the gelatin.
4. Brush the solution onto the paper with a good quality, flat, 4-inch watercolor wash brush that has been warmed in water and shaken of excess water before use. A smooth even coat is critical; anything short of that can ruin a print. Technique is all-important.
    a. Dip the brush in the solution. The brush will soak up about 7 ml of solution on the first dip.
    b. Starting at the top, brush across the entire sheet horizontally; the coat will be thick. Re-dip the brush if the coating becomes noticeably thinner.
    c. Next, without recharging the brush, smooth the horizontal coat with vertical strokes.
    d. Lastly, lightly feather the coating with horizontal strokes across the entire sheet.
5. Allow to dry down naturally. Use the sheet within a few days.

Humidifying

Introducing moisture into the paper before coating improves blacks and makes the coat more consistent and easier to lay down. I introduce 75% humidity from an ultrasonic humidifier for 10 minutes prior to coating. Instead of humidifying the entire studio, I built a box that measures 40 X 28 X 16 inches; this large box humidifies more quickly and permits more control of the moisture content of the paper. It also accommodates paper for large prints and prevents the studio from becoming a sauna. Introducing humidity will increase the contrast and narrow the value scale for some papers; testing is recommended. Humidity gauges are readily available at general merchandise stores at low cost.

Coating

A good coat of platinum/palladium solution is even more critical than a good coat of sizing. I still hear in my mind every time I coat: ''Brush slowly, brush lightly, brush wet, and take your time brushing,'' Stuart Melvin's coating mantra. There are many mistakes to be made with laying a coat. It may be laid down too quickly or too slowly, too softly or too hard, and with too much or too little solution. Another problem may be the paper. The paper may not have enough internal sizing or may not be properly humidified. Most coating problems, I believe, are either from the paper or the coating technique, not the chemistry.

I coat on a light table lit from below with low wattage tungsten bulbs. This allows evaluation of the coating while it is still wet. It shows coating oversaturation, undersaturation, brushing problems, and flaws in internal paper sizing. These problems cannot be fixed at this point, but the lighting will reveal errors in the coat that can be corrected on the next go. Also, occasionally these errors will not be visible on the final print and the paper can be salvaged in time to produce a fine print.

To show a clean print edge instead of brush strokes, use Rubylith_ D3R. Rubylith_ is a mylar with a lacquered red orthochromatic mask that is easily separated after cutting. The Rubylith_ is clear, tough, and stable, and the coating is translucent, enabling precise stripping in of the negative on a light table. My procedure for registration of the negative to Rubylith_ is as follows:

1. Cut a piece of Rubylith_ larger on all four sides than the paper being used. The extension will help with quick registration in the exposure unit and for covering any fugitive solution spots that might have found their way to the print border during coating.

2. On a glass light table, place the Rubylith_ glossy side up. Place the negative emulsion side up on the Rubylith_ and center it with a ruler on all four sides. Tape all four sides down with either lithographer's tape or black photographer's tape.
3. Turn the taped sheets over so that the red mask is facing up. The negative should be centered on the Rubylith_ and oriented as the print will be.
4. With the light table on, place a cork-backed metal ruler on an edge. Take an X-ACTO knife with a new #11 blade and lightly cut through the red mask without cutting the mylar, scoring down the ruler. This will take a bit of practice to master. Overcut the corners by 1/4 inch; it is difficult to get a perfect corner without overcutting.
5. Cut the remaining three sides and gently lift up the red mask at a corner with the tip of the knife. Once the corner is up, grab the red mask and strip away the cut area.
6. Cover the overcuts on each corner with a 1-inch strip of Rubylith_ tape at a 45-degree angle to each corner. This Rubylith_/negative sandwich will hold together well and can be stored as is for future printings. If brush marks are desired at a later date, simply strip off the red mask.

Now that the negative is ready, it is time to coat.

1. Dip a 4-inch Richeson brush in distilled water and remove the excess by dragging it across the lip of the bowl. After two easy shakes, the brush is ready for coating.
2. Pour a bead of the ferric/metal solution at the top of the area to be coated. Brush it quickly in a rough rectangle 10 to 15% larger than the print area.
3. After the rough in, slowly move in horizontal and vertical patterns until the coat appears smooth, using only the weight of the brush.
4. Blow dry on a medium-warm setting or with fans. Different papers have different drying requirements. Stonehenge should set-up for a few minutes before drying. Rives BFK should be brushed and dried quickly. Fabriano Artistico has a better black if dried immediately. If masking for a clean edge, blot the edges of the coat with tissue. This will make clearing easier and erases the small faint gray line that appears on the more absorbent papers.
5. Humidify again at 75% for 8 to 10 minutes.

After these steps, the paper should have a translucent and smooth orange coat that appears flawless on the light table. It is now ready for exposure.

Exposing

Exposure equipment for platinum printing is usually adapted from equipment designed for a wide range of other uses. I use a 36_45-inch vacuum frame from a frame maker and a 1 k metal halide Olite from a commercial printer. I find the metal halide produces better blacks and sharper detail than the fluorescents I have used.

The print should be exposed immediately after the post-coating humidification. I believe maintaining humidity in the paper during exposure deepens the blacks and increases contrast. In order to preserve the moisture in the paper during the exposure process, I sandwich the coated paper and the negative between a piece of mylar the size of the exposure unit's surface and the glass. Caution must be used that the paper not be humidified to greater than 85% when using this technique, because the excess moisture can irreparably scorch the emulsion of the negative. To guard against this, 1 mil mylar can be placed between the paper and the negative without interfering with the quality of the print being exposed.

After laying the coated paper in the frame on the mylar, register the negative on the paper. Secure the glass and start the exposure. Platinum/palladium prints can be burned and dodged to a maximum 10 to 20%. When the exposure is complete, remove the print immediately to the developer; it is especially delicate and light sensitive at this point.

Developing and Clearing

I use either potassium oxalate or ammonium citrate to develop prints. Potassium oxalate produces redder, warmer brown tones. Ammonium citrate yields a yellow-brown hue that is cooler than the potassium oxalate's, but it still has a warm hue. When heated, the tone becomes warmer and deepens. Do not heat the developer to more than 120_ F. This higher temperature will cause varying results, as each paper responds differently to the developer. For example, Stonehenge developed in potassium oxalate heated to 120_ F has a very warm reddish-brown tone, whereas Fabriano Artistico EW developed the same way will have a cooler tone than the Stonehenge.

1. Mix the developer. It is preferable to overestimate the amount needed to develop a print than to underestimate. If part of the print is not covered in the first pour it could leave a mark on the print that cannot be worked around, especially on a highlight. A quart for an 8_10 and 1.5 gallons for a 20_24 should suffice.
2. Pour the developer over the print in a tray quickly. Though the latent image is immediately apparent, develop for at least 3 but no more than 4 minutes to allow complete conversion of the ferric oxalate and to facilitate clearing.
3. After complete development, wash for 10 seconds in 70_ F water. Repeat.
4. Follow with 4 minutes in Kodak Hypo Clear in a 1:1 ratio from stock solution.
5. Wash for 10 seconds in 70_ F water. Repeat.
6. Agitate for 3 minutes in a 3% solution of muriatic acid[1]—3 minutes exactly.
7. Wash for 10 seconds in 70_ F water. Repeat.
8. Soak for 5 minutes in Kodak Hypo Clear in a 1:1 ratio from stock solution, agitating intermittently.
9. Wash for 15 minutes.
10. Dry naturally.

Inadequate clearing is a common problem. Besides making for muddy highlights, failure to completely clear a print will cause it to stain over time. It is difficult to judge when a platinum print is cleared; the color of undissolved ferric oxalate is easily mistaken for print tone. In this case, trust the formula instead of the eye. However, a print that has been masked in Rubylith_ as described previously will readily reveal to the eye a poorly cleared print, as it will have a slight discoloration or yellow tint in the border area where the Rubylith_ was.

1. Muriatic acid is an older term for hydrochloric acid. Hydrochloric acid, MSDS 4, is extremely caustic. See the precautions for handling and mixing acids in Chapter 4: Chemicals. I have tried different clearing methods and, in some cases, the muriatic acid step can be dispensed with if the paper is a tight weave like Fabriano Artistico and Platine. However, with Rives and Stonehenge, due to their soft weave and minimal internal sizing, the acid is needed. I have seen no delicate highlight etching occurring from the use of muriatic acid, and it guarantees complete clearing. The clearing agents like Hypo clear, EDTA, and sulfites do a great job in dissolving unexposed ferric, but when combined with an acidic etch from an acidlike muriatic, it removes most of the remaining vestibules of rust.

Finishing

Spotting Out

Though Spotone_ is the traditional medium for spotting, I prefer watercolors. The dyes in Spotone are less stable than the pigments in watercolors. I have found that lamp black with a bit of burnt umber works well for 90% of spots on the platinum print. To prepare, squeeze out a small dab of lamp black, mix in the burnt umber with a mixing knife, and let it dry. After it is mixed, it can be stored for future use. If dried out, rewet with a spotting brush that is charged with water. Additionally, Chinese white works on some small dark spots in white areas. A high quality sable brush, size 3 to 5 aught, works well for spotting out. After careful practice, even delicate highlights can be blended seamlessly.

Filling In

Sometimes values can be drawn in using high quality artist's charcoal and a smoothing stump. This can be useful in saving a difficult-to-print image by adding a bit of value to a small flawed area. The materials necessary for this technique can be found at the art store: sticks of charcoal in black, burnt umber, and burnt sienna; fine grit sandpaper; a kneadable eraser; and paper stumps for blending.

1. Determine what combination of the three hues of charcoal sticks will match the tone of the print. Grind up a small amount of charcoal dust with sand paper from the chosen sticks.
2. Pick up this blended dust with the tip of a stump and remove most of it. Only a slight amount of charcoal dust needs to be on the tip.
3. Lightly test on a scrap of the same kind of paper the image is printed on to get a feel of how much to lie down. In this case, less is more.
4. Draw in the flawed area of the print, then gently smooth it with a stump. Continue to draw and smooth until the area blends into the print. Small mistakes can be corrected with a piece of the kneadable eraser. Warm it in the hand until it is pliable enough to roll out a fine point. Take the mistake out with this point and redraw. No need to protect or fix this charcoal dust; it is bonded to the paper fibers.

   It takes practice to become proficient in this technique, but the reward for persistence is an invaluable tool for finishing that could save a print.

Etching

In some cases, imperfections that lay below the surface of the paper can be repaired. The smallest can be spotted with Chinese white watercolor. On a heavier weight paper with a tight weave, such as Fabriano Artistico, flaws in the border area can be lightly sanded out with a small piece of fine grit sandpaper. Irregular particles imbedded in the paper can carefully be picked out with the tip of a sharp #11 X-ACTO blade and lightly mended with a bone burnisher.

Occasionally a print will be affected by the notorious Black Dot Plague. This is characterized by several or many black dots occurring at random in the coated area of the print. The prints of every experienced platinum printer have been infected by this scourge at some point, and the cause is unknown. In mild cases, etching the dots out with the tip of a #11 X-ACTO and spotting with Chinese white helps. If they persist in subsequent prints, a change of paper can help.

Flattening

I flatten prints in a dry mount press between two sheets of rag board on moderate heat for 3 minutes. Then I place them under a heavy sheet of plate glass until the heat dissipates.

Waxing

Waxing a platinum print can deepen the blacks, give a pleasing tone to the highlights, and can impart a pleasing sheen to the print if done correctly. Waxing is not without its detractors, however. Some do not like the look. Others worry that it may not be archival. Still others fret about gilding the lily. Ultimately, the decision to wax or not lies with the judgment of the printer. Materials needed for waxing are Gamblin cold wax medium, a 2-inch stencil brush, a stiff shoe polish brush, and a soft shoe brush. To wax:

1. Tape the print to a sheet of glass with drafting tape. Mask off the edges of the print. (3M Low-Tack Painter's Tape works well.)
2. Place a light next to the print and position it so the light falls across the print. This will aid in laying down an even application by allowing the monitoring of the coat as it goes down.
3. Take a quarter-size dab of wax with the stencil brush. Using short strokes, cover a 3-inch by 3-inch area. Smooth that area with the stencil brush twice. Take another dab of wax and repeat on an adjacent area. Slowly work up the print. Platinum/palladium prints are tough and can withstand this. When

finished, examine the evenness of the entire coat of wax in the oblique light. Make any necessary adjustments.

4. With the stiff shoe brush, brush out to smooth and pick up the excess wax, using horizontal semicircular movements. Keep the brush clean while working the coat.
5. Examine the wax coat in oblique light again. If it is not smooth enough at this point, use the soft shoe brush to smooth it out. If it is already smooth enough, do not brush further. Overbrushing creates a gloss. Remove the tape mask from the print and blend the edge of the wax with your thumb. Let the wax set up for 2 days.

A good way to see the effects of waxing is to lay down a strip of low-tack painters tape down the middle of a rejected print and wax one side. This allows direct comparison of the wax's effect.

The quest for the perfect platinum print is similar to aiming at a moving target. After all these years, I still learn something new every time I print. Techniques I've been using become ineffective. Materials change or another printer comes up with an improved procedure. But after I chase it down, work it through, and come through with an image with which I am satisfied, I am allowed to relive the moment that I made my first platinum print.

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I have made my contribution to *Platinum and Palladium Printing, Second Edition* by Dick Arentz available with Dick's permission.

The complete second edition of this book is available in the PDF format which can be purchased from Dick Arentz's web site.

I hope the information I have contributed for this book can be useful for anyone exploring and refining platinum printmaking. Keep in mind that the contemporary platinum print is a process of evolution as new techniques, materials and ideas are shared and explored.

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