Integrating Hand Skills with New Media for Intaglio Printmaking
Practical uses of Polymer Plates and Digital Printers for the Traditional Print Geek.

As Printmaking Artists, many of us are drawn to each of the various print media for their specific textural and visual characteristics, as well as our own personal, physical connection to printmaking materials. Many etchers, for example, work in the media partly because the task of working the metal surface inspires and challenges them. Whether or not the image is planned before the etching process begins, the various metalworking techniques for intaglio offer their own, sometimes surprising, routes to discovery. While contemporary processes, like photopolymer intaglio, can accelerate the plate making process considerably, by offering much less labor intensive techniques that can achieve qualities similar to traditional copper plate photogravure, there’s still nothing quite like a real rosin aquatint printed from an etched copper plate.

This lecture/demonstration will illustrate techniques for successfully integrating hand drawn, traditionally etched imagery on copper with photo-based/digital imagery exposed onto photopolymer in a multiple plate intaglio print, with particular concern for the seamless integration of contrasting source imagery and plate making techniques with controlled registration and specific spatial relationships. The following is a list of tips to guide you through such a challenge. The relevance and particular order of this information will depend on your own vision and the specific needs of your project.

Test your Printer.
You’ll want to be certain that the inkjet printer you are using (if you’re making digital positives) can consistently print your image at the correct size. Some printers and scanners can distort images slightly so that your film positive will not match in registration with your hand made plate. If you are composing digital before analog, this won’t matter quite as much. However, if you’re composing a digital image to register with an existing copper plate, you must be able to rely on your scanner and/ or your printer to be faithful to what you ask of them. Some prior experience with polymer plate making will be necessary so that you have some idea of what you’re looking for and are familiar with what your equipment requires to give you the best results in a film positive.

Test example: If you’ve begun to develop your image with a preliminary drawing to scale, scan the drawing and print it out on the same transparent material and using the exact same printer settings you’ll be using to expose the final plate(s). Place that film positive over the original drawing to make sure both dimensions are unchanged and free of distortion. If this step is successful, you know that you can trust your scanner and are free to move on with the project. If not, you’ll have to tweak the equipment a bit. Consult your printer software/user guide. Some printers/rip drivers include printer dimension accuracy test files and other helpful features with instructions for adjusting feed, suction and platen gap which can help you to get more accurate results from your printer.

Analog to Digital: Composing a digital image to fit an existing hand made plate/ Digital to Analog: Etching a copper plate to fit a digital image plate.
Once you’re satisfied with the dimensional accuracy of your scanner and printer, you can scan in any existing plates that you’ll be working with. Remember to use the settings that gave you the best results during your preparatory tests. The plate scan can now function as a key for digitally composing additional layers for hand printing. While you’re composing digital imagery, keep the plate on its own layer, which you can hide or reveal as needed, for reference only. Unless the plate itself becomes a source for successive layers in the final print, the scanned plate layer will not be included in the final output of your digital image (your film positive).

When registration matters, you should never use prints on paper for registration set up. Paper is always prone to expansion, contraction and stretching, which can cause all sorts of registration mistakes. Always use the plate itself, or impressions/tracings on a dimensionally stable Mylar. This way, you can be more confident that none of your materials will change physical size at any time during your work.
Use a copper plate that closely matches the thickness of the steel backed polymer plate you'll be using. This will help with registration and you will have consistent pressure from one plate to the next when you're at the press. 20-gauge copper is the same thickness as KM73 photopolymer plates. I've actually used a machine polished 18-gauge copper, which measures 0.039 inches thick, with a KM73 plate, which measures 0.027 inches, with good results. You can slip a sheet of paper (such as a mid-weight card stock) underneath you're template when running the thinner plate to equalize printing pressure, but I found it to be unnecessary for such a slight difference. In either case, I recommend running a blank stretch plate through the press with your paper before each impression when you get to the press.

Plate Scanning
If your copper plate is already in progress, scan it in so it can function as a registration key while you're preparing imagery to be printed from a photopolymer plate. If you are developing your digital image before working into the copper, plate scanning can wait. In either case, the same principles apply when you want to preview the registration of imagery from the two types of plates. The copper plate should be as flat and free of warp as possible to ensure accuracy in your digital composition. You'll want be careful not to scratch or shatter your scanners glass, but a few heavy art history books on top of the scanner door can help the plate lay flat during scanning. Scan the full plate at 100% using the same resolution your image is to be in the end. I recommend 300 or above. Once it's in Photoshop, square off the canvas to the plate in the window using the crop tool. Then, zoom in tight and crop again, right up against the outermost edges of the plate, including the bevel. Keep the corners of your crop rectangle at 90 degrees. Make sure the crop tool is not set to perspective. This option will distort the image and cause you to misregister your imagery. Because the plate you're scanning is to be your key for setting up imagery in accurate registration, be careful not to perform any modifications to the file that might distort the image or alter it's size at any time during the process.

Now you're almost ready to begin constructing the digital image. It's important to first establish the bevels of the copper plate as a white/empty border around the picture plane of the digital image. This will ensure that the edges of the plates, as well as the image rectangles/picture planes will also line up. The polymer plates will not be beveled in exactly the same way as the copper, but this border will occupy the same space as the copper bevel. One way to establish the border/bevel, in Photoshop, is to carefully select the image area of the plate (not including the bevel) so that the inner edge of the marquee falls exactly on the outer edge of the picture plane on the plate. Select inverse so that the border is now selected and use the bucket/fill tool to whiten the area. Keep the white border isolated in its own layer at the top in your layer arrangement. Being set above all other layers of your image, it will automatically crop out any information that falls outside of the picture plane (like stopping out a bevel on a copper plate before etching). The placement of the scan of the copper plate, in terms of layer arrangement will probably vary depending on what you're doing with your image. It's most important that you can easily reference the plate image in relation to other layers in the digital image by sliding the transparency level down to reveal how the plates will overlap when printed together. Whenever you're not directly referring to the copper plate image for registration, hide the layer to avoid distraction.

For visual/aesthetic reference, you may also want to scan in a proof of the plate, printed in the color you intend to use. Remember that the purpose of this is only so you can see on screen, a more clear approximation of how the images will overlap when printed. Again, you should never trust an impression on paper when you are setting up registration. When you scan the proof, it is not likely to fit exactly over the plate it came from because, having been printed on damp paper and dried, it will have contracted to a final size, most likely smaller than it is on the plate. Place this layer at the top of the composition in your layer menu and set the layer style to multiply. The multiply setting gives the positive areas of the layer a degree of transparency and drops out the negative/white space which gives a good approximation of how the plates will actually print together. To get this layer to fit properly, use the various options of the transform/free transform function under the Edit menu until the proof fits in registration to the plate it was made from. Hide and reveal the layer as needed. Remember to hide both the plate layer and the proof layer before printing the final output for your film positive.
**Bevels and Plate Edges**

Registration systems for multiple-plate intaglio printing are often based on the edges of the plates. Alignment of imagery from one plate to the next is dependent on the relationships between the image placement and, at least 2 of the 4 edges of each plate. Plates should be measured and cut carefully. Also, any beveling or polishing work done to the 4 sides of the plate should be done consistently from one plate to the next. *Keep the relationship of the edges to the image as identical as you can.* The degree to which the edges of the plate are prepared is, in part, a matter of preference, particularly when the plates are 18 gauge or thinner. When printing thin copper plates, a slight, rounded edge is usually sufficient. However, my experience with polymer plates for intaglio printing has been that the edges tend to deteriorate and hold annoying pockets of ink in between the polymer coating and the steal backing. Even when the plates have been cut carefully and the edges polished, it takes some extra cleaning up around the edges of the plate to get that ink out. To avoid over wiping the perimeter of the image during the edge clean up, *cut the plate slightly larger than the image* - usually between 1/32” and 1/16”. The printed image will have a narrow white border surrounding it, which resembles a more extreme beveled edge plate mark on the print. To preserve the adhesion of the polymer to the steal backing, do not bevel the edges of polymer plates. After cutting the plate down, I give it an additional post exposure to harden the polymer. Then, round the edges slightly with 1000 - 2000 grit sand paper wrapped around small plate scrap and give them a final polish with a burnisher. This will help give your print a good, clean plate mark.

*When you prepare a copper plate to work by hand, treat the edges similarly to those of the polymer plate to make accurate registration at the press easy and consistent.* If you leave 1/16” around the image on the polymer plate, do the same on the copper by measuring 1/16” from the outermost edge of the plate and lightly score a dry-point line around all 4 sides of the plate. File from the edge, right up to the measured dry-point line to give the plate a very slight, round angled bevel that mimics the edges of the polymer plate.

**The Drawing Board for transferring**

A drawing board fitted with a registration pin system is a valuable tool when transferring information from one plate to the next. Referring to the drawing board to confirm registration can illuminate mistakes that you might correct before getting to the press. You also might notice slight adjustments for placing the plates on your press template. Having a carefully designed drawing/registration board also allows you to work freely, back and forth between digital and analog means, letting the elements of each plate evolve simultaneously. It’s especially useful when you want to etch a copper plate to print in registration with a digitally composed polymer plate.

Any flat, rigid board should work well. Attach a sheet of Mylar to the face of the drawing board and draw a rectangle, measured to the plate size, just below the registration pins. This rectangle will match the rectangle on the press template you make for printing. Next, you’ll need an extra copy of the digital film positive, which includes corner crop marks, 1/16” outside the image. (These crop marks will be referenced when cutting the polymer plate after exposure, development and post exposure.) The digital image need not be finished at this point, however, because this film will function as your master registration guide for the time, the placement of each element of the image within the composition should be locked down by now. Align the corner crop marks on the film positive with the drawn rectangle on the board. Make sure that you are seeing the image in the plate orientation = backwards. This means that you are placing the film face down on the template. Once the film is lined up to the crop marks, keep it in place for the moment with either tape or enough weight to keep it from moving until you attach the punched registration pinholes. To make these, cut strips of Mylar or other transparency to the length of the film by a width equal to the distance between the top of the pin system on your drawing board to the top of your film. Punch them in line with a center mark. Attach the strip to the pins on the board face down. Then tape the film to the punched strip without moving either one from its proper placement on the drawing board. Now you have a registration guide that will lay down exactly where it’s supposed to, provided that you place the plates exactly within the drawn plate rectangle when transferring information and checking registration. When placing plates, I usually only refer to 2 of the 4 sides - the top and right side. Use any 2 sides you prefer. It will work as long as you keep it consistent. Draw additional notes, arrows etc. on the board to indicate any slight adjustments you might need to make for plate placement. Now you’re set up to do any tracings/transferring imagery from the positive film to another plate for hand working.
Printing
When you finally do get to the press, if accurate registration is critical, cut a stretch plate. This an extra blank plate cut to the same width and thickness of the printing plates. The length of the plate should be slightly shorter than the printing plates to compensate for the lengthening of the plate mark as the paper stretches. This plate should not have imagery etched into it and will not be inked. The sole purpose of this plate is to pre-stretch your paper within the plate mark. As paper is run through the press at printing pressure, it will stretch. If it stretches as the image is transferring, you’ll have no hope of accurate registration. Running a stretch plate just before your inked image plates should stretch the paper to its maximum length under the given pressure. Having done this, as long as you are cautious about plate placement on the template, your imagery will line up exactly as you planned. The number of times you run the paper through on the stretch plate will depend on how many plates you’re printing. When printing a 2-plate print, I’ve had the best results running the stretch plate twice, once in each direction. When it came to a 4-plate print, I found that my registration was best when I actually ran the paper through 4 times before printing the image plates. This all depends on how exacting you want to be. You do, however, have to be careful not to drain all of the moisture out of the paper in the process. Remember, in order to get a good impression, your paper must remain properly damp throughout printing. There are a few ways to ensure this. One is to have a water mist sprayer at the press with you to replenish the moisture as needed from the backside of the paper. This can be problematic because it’s difficult to control. Another method is to lay a sheet of thin plastic wrap between the press and the blankets, preventing the blankets from sucking too much water out of the paper during stretching. I would then remove the plastic wrap before printing the image plates. I found that the best method for keeping the paper at the proper dampness was to keep it simple by only blotting the paper lightly before running the stretch plate and moving quickly from one plate to the next and no extra tricks were necessary.

Before printing, draw a registration template on Mylar with a magnetic underlay. Use Mylar for its dimensional stability and its tolerance to cleaning. Draw all of your lines with a fine pointed sharpie on the back side of the film so you can see them easily without any risk of them transferring onto your printing paper. Draw a rectangle to the size of your paper and a smaller rectangle to the size of your plates. Keep the top and bottom margins of your paper long enough to keep them pinned underneath the press while you switch plates from one to the next. Tape the Mylar template onto a thin magnetic sheet to hold the polymer plate in place as it goes through the press. The magnet also makes it much easier to get the plate in the right place because the attraction flattens out the warping. The magnet will not hold the copper but it is less necessary because the coppers weight should keep it in place as long as you’re careful. After inking the image plates, place the clean stretch plate in place on the template. Lightly blot your paper and remove any lint, or remove it from the damp pack and brush it off with a paper towel. Lay it in place on the template over the stretch plate and run through the press in both directions (more if necessary). Stop the press while the top roller is still on the very end of the paper. This keeps the paper from moving so that all you have to worry about at this point is placing the plates accurately. Pull the blankets and the paper off of the plate and lay them over the surface of the top roller while you remove the stretch plate from the template and replace it with the first printing plate. Run the press through to the other side. Stop before you roll off the end of the paper so you can switch to the next plate again without the paper changing position. Repeat these steps until all of your plates have been printed on the sheet. Be decisive about the printing order of the plates depending on which plates lose the least impact from stripping off the paper onto successive plates, and depending on the direction of the press movement for each plate. If the paper is going to continue to stretch, it will tend to fall off registration toward the bottom of the image (that is, if the plate goes through top first, the opposite occurs if it goes through bottom first). It may take a few proofs to determine the best printing order and direction through the press for each plate. Once you’ve decided what works best, take notes and keep it consistent.